

## **Nepalese Quinoa**

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## **Introduction**

Quinoa is a species of goosefoot, a grain crop which is normally consumed for its seeds. (Secretariat, 2013) Quinoa is high in protein and lacks glucose. The United Nations called 2013 the Year of Quinoa and thus quinoa has begun to emerge in other countries including Nepal. (Secretariat, 2013) It is a hardy crop that can grow in many different climatic settings and has a resilient capacity to adapt. Moreover, traditional cultivation has allowed this crop to have many different unique varieties. (Bojanic, 2011) There are three main reasons why quinoa can work in Nepal; its nutritional value, adaptability and most recently its economic gains. In addition, in places like Ecuador, quinoa has led to women empowerment focused organizations. (SumaLife, 2014) Ultimately, Nepalese farmers can greatly benefit from growing quinoa not only as subsistence farming but also as an export product.

## **Taxonomic Classification**

The taxonomic classification is:

Kingdom:	Plantae
Order:	Caryophyllales
Family:	Amaranthaceae
Subfamily:	Chenopodioideae
Genus:	Chenopodium
Species:	<i>Chenopodium quinoa Willd.</i>

(E.A. Oelke, 1992)

## **Important Facts**

There are five main groups of quinoa that are divided according to their agro-ecological conditions: subtropical zones, salt flats, highlands, valleys and sea level. (León, 1994) This diversity in climatic zones and altitudes is what gives quinoa a great potential to improve food security. Moreover, this ability to adapt has also led to experimental trials in Africa, Asia, Europe and North America. (Institute, 2002)

Ninety-two percent of all production is undertaken by two countries - Peru and Bolivia. In Bolivia and Peru, most of the quinoa is produced by smallholder farmers for subsistence use which will also be of great importance to Nepalese farmers. (Bojanic, 2011)

Quinoa can be used anywhere from human consumption, to animal feed, to medicine and even industrial use. (Secretariat, 2013)

### **Nutritional Value**

It is not only the quantity of protein in quinoa but the quality that sets it apart. Quinoa grain contains all nine essential amino acids as shown in Table 1. (E.A. Oelke, 1992) Moreover, of these nine amino acids, quinoa exceeds the recommendations of eight of them. In particular, quinoa grain has significant quantities of lysine which most grains are deficient in. Quinoa also exceeds most grains in terms of overall mineral content as shown in Table 2. (E.A. Oelke, 1992)

Amino Acid	Amino Acid Content (g/100g protein)				
	Quinoa	Wheat	Soy	Skim Milk	FAO
	%				
Isoleucine	4.0	3.8	4.7	5.6	4.0
Leucine	6.8	6.6	7.0	9.8	7.0
Lysine	5.1	2.5	6.3	8.2	5.5
Phenylalanine	4.6	4.5	4.6	4.8	-
Tyrosine	3.8	3.0	3.6	5.0	-
Cystine	2.4	2.2	1.4	0.9	-
Methionine	2.2	1.7	1.4	2.6	-
Threonine	3.7	2.9	3.9	4.6	4.0
Tryptophan	1.2	1.3	1.2	1.3	1.0
Valine	4.8	4.7	4.9	6.9	5.0

Table 1 (E.A. Oelke, 1992)

Crop	Ca	P	Mg	K	Na	Fe	Cu	Mn	Zn
	%				PPM				
Quinoa	0.19	0.47	0.26	0.87	115	205	67	128	50
Barley	0.08	0.42	0.12	0.56	200	50	8	16	15
Corn	0.07	0.36	0.14	0.39	900	21	-	-	-
Wheat	0.05	0.36	0.16	0.52	900	50	7		14

Table 2 (E.A. Oelke, 1992)

The overall nutritional value makes it a very good food for sustainable farmers to grow all around the world.

### **Adaptability**

As stated earlier quinoa is able to grow in five different climatic zones which make this plant very versatile. Moreover, this versatility allows quinoa to withstand temperatures from 38°C to -8°C and heights from sea level all the way to 4000 meters. (Committee, 2010) It is also important to note that quinoa uses water efficiently as it has physiological mechanisms in place that enable it to tolerate lack of soil moisture. Quinoa is typically grown in loamy soil with moderate slopes and average nutrient content. It grows best on neutral soils but can grow on alkaline soils with up to a pH of 9 and acid soils with up to a pH of 4.5. (Secretariat, 2013)

Nepal is divided into three main agro-ecological zones: Mountains, Hills and Terai. The versatility of quinoa will allow it to thrive in both the hillside and the terai in Nepal, given the right soil. (Koos Dijkshoorn, 2009)

### **Environmental Sustainability and Pests**

#### **Soil Degradation**

Degradation of soil normally happens right before planting and during harvesting. This is because the practices that are normally used can lead to erosion which will damage the soil. As

stated in class when preparing the soil one has to be very careful because a farmer can remove their top soil. Moreover, during harvest some methods, specifically traditional uprooting can result in soil erosion and loss of organic matter. (Bojanic, 2011)

### Pests

The biggest problem with quinoa is the wide range of insects that affect it during the vegetative period. There are two pests that affect quinoa the most: quinoa moths and ticona complex (nocturnal butterfly). Losses to these pests range from five to sixty-seven percent. (Bojanic, 2011) There are projects right now being tested to prevent mass yield loss, but continuous efforts are always welcomed.

### Economic Factors

Consumers in North America and Europe are the driving force and the main reason that quinoa prices have increased dramatically. The increases in these continents are due to the demand for more organic and fair trade products that are also very healthy. (LIGHT, 2012) Moreover, due to the price increase of quinoa, production has also increased but still cannot meet with the high demand. It is because of this demand that quinoa grain prices in 2010 were five times that of wheat. (Bojanic, 2011) Furthermore, as stated earlier the production of quinoa is undertaken by two main countries: Peru and Bolivia. Both the need for more supply and the fact that two countries govern quinoa production leaves space for new players on a global scale.

### Costs of Production

Quinoa requires very little investment since it is a very rustic crop. To put it into perspective for one hectare, overall costs are less than one thousand dollars as of 2011; this is because quinoa does not require major investments. (Bojanic, 2011)

### Impact on Women and Children

It is also important to note the impact that quinoa has had on empowering women in the recent years. Since quinoa consumption has greatly increased it has given ways for organizations to team up with women farmers to produce organic quinoa. An organization like SumakLife is giving women economic fortitude by helping them produce and export quinoa in the hope that it will help to give these women a stronger voice in their communities. (SumaLife, 2014)

### **Market Opportunity to Canada**

As stated in the economic section of this paper there is a large demand for quinoa and a poor supply. Canada does not escape the health fad that has overtaken the United States and most of Europe. Currently Canada has a free trade agreement with Peru since 2009 for their quinoa. The free trade agreement stipulates that the food from Peru is duty free. (LIGHT, 2012) If the demand for quinoa continues to increase and Peru can't handle the supply Canada will start to look for more suppliers.

### Documentation

In order to import quinoa into Canada, only one item is required, namely nutritional labeling. (LIGHT, 2012) Moreover, if the country in question has a free trade agreement for that product then one would need to obtain a certificate of origin from the supplier for proof.

### Buyers

There are five main buyers that make 78% of all imports of quinoa. Two are from Quebec, one from California, one from British Columbia and the last one is from Ontario. Costco Wholesale is the largest importer of quinoa in Ontario, and hence the best choice for for Nepalese exports. (Canada, 2014)

### Buyer Information

Costco Canada Corporate Office:  
**415 West Hunt Club Road**  
Ottawa, ON K2E 1C5 (Canada, 2014)

### Concluding Remarks and Practical information for Improvements

Quinoa has proven to be a very healthy and versatile crop. Not only does it have a huge demand in North America and Europe but the suppliers consist of only two countries. Moreover, the demand in recent years has consistently been higher than the supply thus there is a necessity for a new player globally.

## **Bibliography**

Bojanic, A. (2011). *Quinoa: An ancient crop to contribute to world food security*. Santiago: FAO.

Canada, I. (26 de September de 2014). *Canadian Importers Database*. Recuperado el 17 de November de 2014, de Quinoa:  
<https://www.ic.gc.ca/app/scr/ic/sbms/cid/productReport.html?hsCode=100850>

Committee, J. N. (2010). The return of the ancient food of the gods: Quinoa. *JNCC*. E.A. Oelke, D. P. (1992). *Alternative Field Crop Manuals*. Minnesota: University of Minnesota.

Institute, I. P. (2002). *Neglected no more*. IFAD.

Koos Dijkshoorn, J. H. (2009). *Soil and Terrain database for Nepal*. AJ Wageningen : ISRIC - World Soil Information.

León, J. H. (1994). *Neglected crops: 1492 from a different perspective*. Rome: FAO Plant Production and Protection.

LIGHT, S. (18 de March de 2012). IMPORTING TRENDS: QUINOA AND COCONUT. *Small Business BC*, pág. 1.

Pariyar, D. (2008). *Country Pasture/Forage Resource Profiles Nepal*. Rome: FAO.

Secretariat, 2. I. (2013). *2013 International Year of Quinoa*. Santiago: FAO.

SumaLife. (12 de October de 2014). *Productos Organicos Chimborazo Cia LTD*. Recuperado el 18 de November de 2014, de Productos Organicos Chimborazo: <http://www.sumaklife.com.ec/>

Wholesale, C. (2014). *Costco Wholesale*. Recuperado el 18 de November de 2014, de Costco Wholesale: <http://www.costco.ca/contact-us.html>