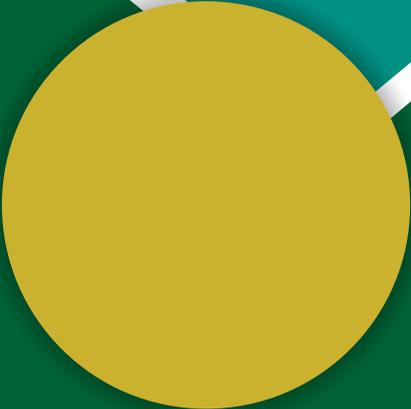


Quinoa - a Super food and Cash Crop



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There are at least 50,000 species those can be used as food however, less than 300 species make their way into the market. Global food availability and consumption patterns are main reasons of malnutrition and global food insecurity. This implies that people should eat more of the world's underutilized crops, also known as 'orphan' or 'minor' crops. Most of these underutilized crops have very high nutritional profile and resilience traits, with the ability to withstand biotic and abiotic stresses better than most of the current major staples. Some of the underutilized crops have become popular

in the developed countries due to their nutritional properties. One of these is quinoa, a pseudo-cereal native to the harsh climate of Andean mountains, so naturally has tolerance to adverse conditions and wide adaptability.

The crop is grown for its grains. Its grains are considered as functional food, a food which lowers the risk of many diseases or exerts positive effects on health other than its nutritional value. Quinoa grains contain all essential amino acids including lysine, threonine, tryptophan which are deficient in most cereals. The grain protein content ranges from 13% to 19%. Its mineral contents (Ca, Mg, Fe, Cu and Zn) are higher than those of wheat, rice maize and barley. Quinoa grains are also rich in main vitamins especially α -carotene, niacin, thiamine, riboflavin and α -tocopherol (vitamin E). Quinoa grain also contains health beneficial fatty acids like linoleic and oleic acids. The whole plant is also used as green fodder. Crop residues are also ideal to feed cattle, sheep, horses and poultry. There are a range of quinoa products from food, cosmetic, pharmaceutical and many others uses.

Quinoa plant can grow up to a height of 1- 3 m depending upon sowing density. The roots penetrate almost 30 cm deep in rhizosphere. Stem is cylindrical, 2- 3.5 cm in diameter. Seeds are round to flattened, 1.5- 4 mm in diameter and in 1 g there are 300-350 seeds. Seeds also vary in color and size. The color may vary from black to white and grey. It can be grown on variety of soils ranging from clayey to sandy soils having pH 4.5 to 9 and is also well adaptive to frost, salinity and can tolerate water deficit conditions.

Quinoa was introduced in Pakistan during 2009 by Alternate Crops Lab, University of Agriculture, Faisalabad. Basic production technology has been developed. Local yield and nutrition profile are comparable with the grain produced in the native lands. Its local consumption is increasing as well as exporters have been attracted to increase its production to make it exportable commodity. Quinoa was cultivated on about 800 acres during 2015-2016 with average yield of 22 mounds per acre. Its local consumption is increasing however most of the produce was exported. Farmers earned 3-4 times more than from wheat. So, Quinoa has already been recognized as a cash crop and exportable commodity.

The world trade of quinoa has grown significantly in recent years. Since 2006, there has been a sharp increase in exports from Latin America, the region of the three Andean countries that account for over 80% of global exports. Due to this phenomenon, the World Customs Organization has introduced a tariff opening for quinoa, subheading 10.08.50. Quinoa exports amounted to approximately USD131 million in 2012, with high concentrations in both origin and destination. For example, 84.2% of global exports originate from Bolivia, Ecuador and Peru, 10% from the United States of America, and 6% from the European Union.

International price (FOB) of quinoa remained relatively low during 1992 and 2007, at USD 1-2/kg. In the subsequent 2 years, the price rose sharply to around USD 2.9/kg in 2009, to then settle at around USD 3/kg. This rapid increase in price reflects the high demand in the international market.



A complete meal used as alternate of rice

Quinoa

A super food, very high in protein, cholesterol lowering fat, gluten free, rich in minerals, vitamins and antioxidants

1kg

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Comparison of the nutritional values of grains and quinoa (edible 100 g)							
Composition (g)	Quinoa	Rice	Barley	Wheat	Corn	Rye	Sorghum
Lipid	6.00	0.50	1.3	2.50	4.75	1.63	3.50
Proteins	16.00	6.50	10.0	13.00	9.00	10.00	10.50
Ash	2.5	0.20	0.65	1.10	0.65	1.00	0.80
Fiber	7.0	2.8	15.50	10.75	7.00	15.00	6.50
Carbohydrates	64.00	81.50	77.75	71.00	74.25	75.85	72.0