

Keen on Quinoa: An Assessment of the Viability for Growing Quinoa in the United States

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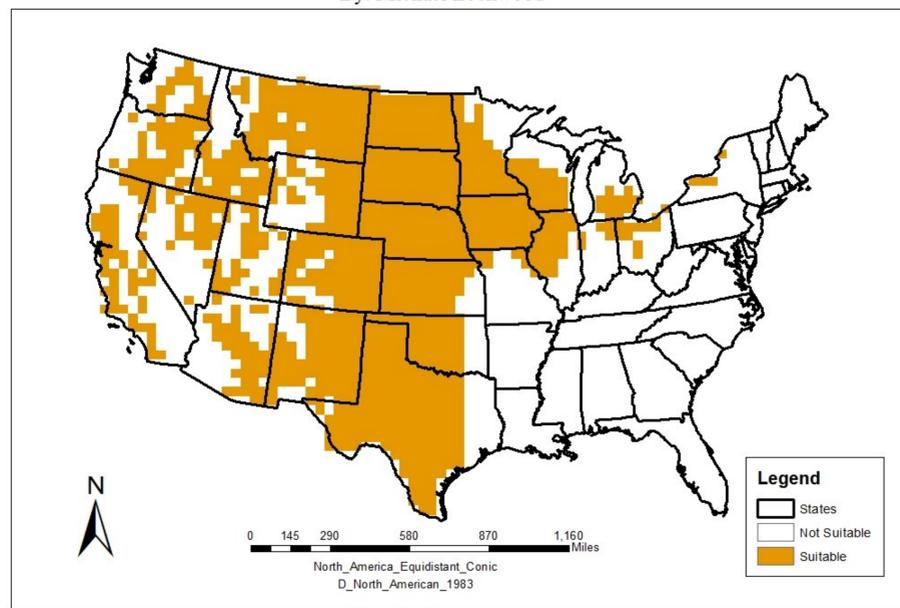
Dedicated to the loving memory of my grandmother, Irene "Renee" Gryns (May 2, 1919-March 2, 2013)

Abstract: Quinoa is a pseudo-grain that is mainly produced in the Andean region of South America. The countries of Peru, Bolivia, and Chile produce the largest quantities for export and a downside has been that they are unable to produce enough quinoa to meet global demand. While quinoa has grown in popularity, the market price has grown because South American is the only major producer and exporter of quinoa. However, it can be grown in other countries, including the United States. The question remains, how viable is it to produce quinoa in the United States? The purpose of this thesis is to determine where in the United States quinoa can be grown and whether it is economically viable to grow it. The results show that quinoa production is a viable option for specific parts of the country like the Pacific Northwest because it can meet the crops growing requirements. In addition, agricultural practices such as crop rotation and crop integration or mechanical uses for cultivation and harvesting are viable options. The United States can viably produce quinoa, but is limited to certain parts of the country.

Map 1 Description: Boolean Overlay based on quinoa cultivation requirements: Soil pH of 6-8.5; Annual Precipitation of 11-40 inches (300-1000 mm); Annual Temperature of -1-32 degrees Celsius; not included: Elevation

Suitability of growing Quinoa in the United States based on Soil pH, Average Annual Precipitation, and Average Annual Temperature.

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Source: Created by Michael Lockwood using ArcMap GIS Software

Figure 1. Map of South American Quinoa areas



Figure 2. Maturing quinoa plant



Methods: The methods to this project are diverse. First, I conducted a literature review of quinoa, including its biological properties, its uses, its geographic location where it can be grown, and the benefits and problems with growing it. In addition, I conducted interviews with some of the top quinoa researchers and producers in the United States, which include Kevin Murphy of Washington State University, Frank Morton of Wild Garden Seed in Oregon, and Ernest New of White Mountain Farm in Colorado. Furthermore, to illustrate the viability of producing quinoa, I used a cost/benefit analysis to compare the economic viability of growing quinoa versus growing other crops such as wheat. Plus, I used GIS maps to illustrate areas in the United States based on the requirements quinoa needs in order to effectively thrive.

Table 1. Nutritional comparison between quinoa, rice, and

Nutrient	Quinoa	Rice (unprepared)	Wheat Durum
protein	14.12 g	10.42 g	13.68 g
fiber	7 g	1.2 g	n/a
iron	4.57 g	2.44 mg	3.52 g
calcium	47 mg	83 mg	34 mg
potassium	563 mg	188 mg	431 mg
magnesium	197 mg	32 mg	144 mg
phosphorus	457 mg	154 mg	508 mg
zinc	3.10 mg	1.01 mg	4.16 mg
manganese	2.033 mg	n/a	n/a

Table 2. Cost/Benefit Analysis of producing quinoa (seed and food) vs. Wheat

Stats/Product	Quinoa Seed	Quinoa Food	All Wheat
	900-1500	900-1500	2,778
lbs/acre			
	\$70	\$7	\$7.95
\$/lbs			
	\$63,000-105,000	\$63,000-10,500	\$22,085.10
Total Revenue			

Conclusion: Quinoa can be grown in the United States but its scope of production and growth is limited to certain areas of the United States. This includes places like the Western half of the United States, where it has ideal conditions for growing quinoa. For example, the Pacific Northwest has a high elevation, the correct range of temperature, the right amount of precipitation during cultivation, and the proper soil. In addition, based on the cost/benefit analysis, quinoa production is more likely to fill niche markets than national markets. In order to expand quinoa production, there needs to be more promotion and support by the government to make quinoa a viable cash crop. For now, cultivation techniques such as a rotational crop or intercropping with other crops. Further information is needed on the amount of quinoa produced and whether it can replace other established crops such as wheat.

References:

- Figure 1: http://books.nap.edu/openbook.php?record_id=1398&page=152
- Figure 2: Image by the author of this presentation
- Background Image: <http://ayurvedawellness.org/recipes/quinoa-recipes>