Scientists sequenced the quinoa genome in February this year, with their leader expressing hopes the advance could help change the world. "Quinoa has great potential to enhance global food security," said Mark Tester, a professor at Saudi Arabia's King Abdullah University of Science and Technology.

Tester's optimism is born of the crop's resilience and nutritional heft. It is a good source of fibre, minerals, vitamins, and antioxidants, and contains all the amino acids humans need, making it a complete protein. Many of its benefits are substantially reduced by cooking but sprouted quinoa can be eaten raw. Significantly, it is gluten-free, while its low glycaemic index makes it well suited to diabetics. It's also beneficial to migraine sufferers and those at risk of obesity or cardiac disease.

Quinoa can already be grown just about anywhere. It tolerates poor and salty soils and a wide soil pH range. Traditionally an Andean crop, it thrives at any altitude from sea level up to 4000m (13,000 feet). It is suited to any climate, from warm or cold arid conditions to tropical, and withstands a temperature range of -8 to 38C.

Tester's team have already pinpointed various genes which should allow farmers or scientists to selectively breed or edit out the plant's less desirable traits. Chief among them are saponins, chemical compounds that produce bitter-tasting seeds as a natural defence. To eliminate this, quinoa is heated to crack the seed coating, and washed repeatedly. The process is costly, demanding much energy, water and labour. It possibly also removes some nutrients.

Quinoa plants are also tall and willowy, meaning they produce only small seed heads and are susceptible to wind damage. Genetic information could help produce stockier plants with larger seed heads which can be grown closer together.

Quinoa's drought resistance could be ideal in a warming world, while its tolerance of harsh conditions promises to open up unusable land to agriculture.

"In Australia in 2001, over 5.7 million hectares of mostly agricultural land was affected by salinity," says Professor Ute Roessner of the University of Melbourne, who was a member of the international sequencing team.

"Predictions indicate that if effective solutions are not implemented, the area affected could increase to 17 million hectares by 2050."

Quinoa could also be grown in arid areas in India and sub-Saharan Africa where farmers are reliant on seasonal rains. It has been the focus of food security initiatives in the Mediterranean, Middle East, North Africa and North Indian plains, while the UN declared 2013 the International Year of Quinoa in an effort to raise awareness of the crop's potential.

Tester believes quinoa can become as common and cheap as rice, although Douglas Cook, director of a resilient chickpea program at the University of California is more cautious: "I think [quinoa] could mean an important part of the solution, but it's not going to be a game changer.

"The places where bigger changes are going to occur are in crops that have already had significant investments and that are already mainstay in the human diet."

Global quinoa imports grew 13% to 75,208 tons in 2016, continuing a slowing trend, down from 37% growth in 2013. By contrast, the major grains and cereals are consumed in their hundreds of millions of tons. However, last September Technavio forecast a CAGR of 26% in the global quinoa seed market for 2016 to 2020.

Almost all quinoa is grown (and consumed) in Peru and Bolivia, though these countries' share has reduced from 100% to 85% of the global harvest, with the grain now grown in at least 90 countries. Seventy per cent of exports are destined for the US and Canada, followed by France, the Netherlands and Germany.

The Washington State University is testing quinoa varieties with a view to boosting US production, but quinoa is still barely domesticated, despite being grown since Inca times. There are relatively few active breeding programs, but Tester says breeders will be able to "use that knowledge of the genome to make much faster and greater improvements in the crop, improvements that really haven't been so easy to do over the past couple of decades."

The rice genome was unveiled in 2006, and has informed insect and disease-resistant varieties, announced early this year by Chinese scientists.

Endorsed by Oprah Winfrey, quinoa is already served by McDonalds, and has the potential to be used to produce milk, beer, cereals, hair products, and snacks.

"[The aim is to] move this crop from its current status as a crop of importance in South America, and a crop of novelty in the west, to become a true commodity in the world," says Tester. "I want the price to come down by a factor of five... I want it out of the health food section."