

How new healthy food habits, like eating more quinoa, can increase social-economic and nature-care responsibility in new agro-biodiversity scenarios.
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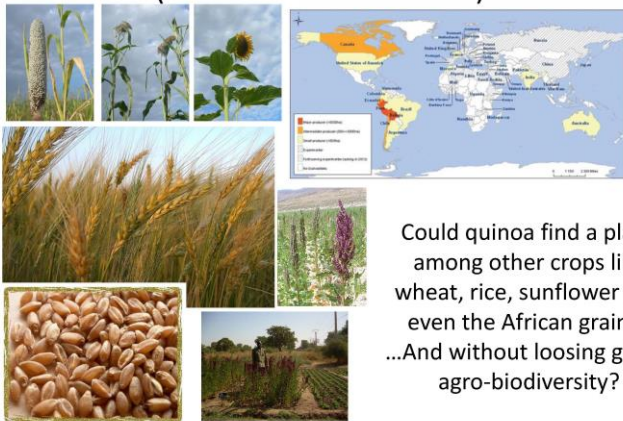
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Eating quinoa is becoming an important diet change for humans of developed countries that do care about nature and about food quality. This opens the question on where this resource will come from in the future and what it could mean for biodiversity conservation issues. This change will surely imply social-ecological consequences and opportunities for changing farming systems towards ecological agricultural intensification. I analyze sustainable use of quinoa for not disturbing agro-biodiversity, ensuring food security and economical equilibrium from producers to consumers. I suggest governance issues that could ensure these goals. This would require top-down decisions in developed countries in agreement with similar decisions to be taken in underdeveloped countries, from where quinoa is a major source. Behavioral changes in humans are needed to consolidate sustainability and sense of responsibility for nature. For this we need technical understanding of risks under no-change (business as usual) scenarios. Increasing the knowledge of functional foods like quinoa might be of great help but also increasing the knowledge of risks in ecosystems under scenarios like high-inputs agriculture or at high CO₂-emissions. Strong science-policy interfaces are suggested, including all major stakeholders from farmers (quinoa producers) to consumers of all social-economic levels.

Organic Agriculture (arid zones + organic manure + biodiversity)
 vs.
Industrial agriculture (temperate zones + chemical fertilizers/monoculture)



Quinoa: countries that have tried it until 2013
 (Bazile & Baudron 2014)



Could quinoa find a place among other crops like wheat, rice, sunflower and even the African grains?
 ...And without losing global agro-biodiversity?

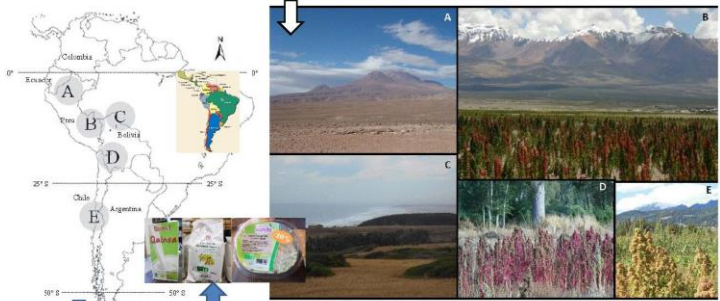
Scientifically based food choices
 (functional foods like quinoa as prevention medicine):



Quinoa origins in arid landscapes of South America

Quinoa diversity is high at agronomic, edafo-climatic and at cultural levels. There are five main ecotypes with hundreds of not-yet improved farmer's-varieties. But the higher diversity of consumption has increased in developed countries (importers).

Chilean landscapes with quinoa from North (A) to South (E)



Diversity of quinoa food presentations (rich in proteins and vitamins) in Europe (France).

1 2 Distribution of five main quinoa ecotypes: A: Inter-Andean Valleys, B: Altiplano, C: Yunga, D: Salares, E: Costa

4 **International quinoa markets:**
 What benefit for countries of origin?
 fair trade: yes, but in the future
 What contribution from such markets to Green House Gases?

CO₂ Foot print



Local markets:

Can quinoa be cultivated in countries out of its zone of origin?

Governance proposal:
 More connections between consumers-farmers-politicians-teaching and research



5 6 Particularly for incentivize healthy food habits

7 8 **Conclusions:**
 Agro-biodiversity should be better conserved if:

- Consumers are better informed.
- Organic managements predominate in farms.
- Farmers are supported by local consumers.
- Governance in poor or rich countries help to incentivize local food chains, as opposed to disconnected and high-carbon food chains typical from today's dominating exportation markets.
- New foods like quinoa are introduced as a new alternative to farmers into their crop rotations rather than as a replacement of their crops. Past introduction of with potatoes, tomatoes, corn, that came from America did not decreased European crops diversity.
- Science helps to show the functional benefits of consuming a **diversity** of food choices (as a form of preventive medicine).