

The potential of small holder technology in quinoa producing communities of the Southern Bolivian Altiplano

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At 4,000 meters above sea level, the Uyuni Salt Flat region in the Southern Bolivian Altiplano is truly one of the most amazing landscapes on earth. The native flora and fauna includes tall-2,000 year old cacti with colorful flowers and fruits, llamas, vicuñas, a 12,500 square kilometers salt flat and the deepest and bluest skies make the setting worthy of a



national geographic front page report. Intrinsic to this landscape is the harsh environment that surrounds it. The salt flat region area experiences extreme temperatures that range from -18C° to 27C°. In this arid landscape, the soils are made mostly of sand with as little as 1%



of organic matter in them. Precipitation in the area on average reaches only 250mm per year and overnight frost is present about 225 days of the year. Reaching and mobilizing in the area is a challenge to say the least as infrequent 50 year old buses have to fight their way through dirt roads and paths.

It is within this context that hundreds of communities surrounding the salt flat live. These are communities of Aymara and Quechua origin who have adapted to these hard conditions for thousands of years. For women in these communities, manually getting a couple of buckets of water from underground wells and walking long distances to obtain dry bushes for fuel—is part of their daily existence. The basis of the livelihood of these families is a limited agricultural production that includes quinoa, bitter potatoes, fava beans and llama



livestock raising. Market development of quinoa in the last 20 years and in particular the opening of international markets has allowed families to generate incomes that on average are higher than incomes of other rural populations in Bolivia. Yet this income in a context of extreme marginalization and structural poverty means very little to these farmers. A trip to the market to obtain provisions including fruits and vegetables is a rather costly 3-day affair. The limited agricultural production and the difficult access to markets contribute to malnutrition in the area.



Quinoa, a highly nutritious grain with a good content of quality protein (12% to 18%), complete on essential amino acids, vitamins and minerals, is a resource that if maximized--could contribute to a better nutrition of the families. Unfortunately quinoa, which used to be a staple food present in all meals of this population, is no longer consumed as it was before. Families in the area in response to an increased demand have significantly increased the production of quinoa. This involves a lot more work

hours for all family members— leaving women less time to prepare the meals. Moreover, the linkages to markets and additional income has made possible for families to access “modern” easy to prepare yet less nutritional foods such as pasta, rice and processed foods.

Although families have in general an awareness of the nutritional contents of quinoa and the grain has been part of their traditional dietary culture, it is consumed progressively less as families adapt to this transition. While the decreased consumption is due to several factors, one of the main obstacles is the considerable time and work required to process the grains. Quinoa grains from the salt



flat region are covered with a layer of saponin that needs to be removed prior to consumption. The job of removing the saponin is traditionally done by women and it requires as much as 6 hours to process 12 kg of grain. The process involves the roasting or toasting of the grains, the stepping on the hot grains in a stone bowl with bare feet (which creates friction and loosens the saponin), the cleaning of the saponin dust by the wind (which is achieved by pouring the grains from above), the rinsing of the grains in a couple of waters and the drying



of the grains in the sun. This process is done outdoors and normally after harvest season--this translates on women enduring extremely cold winter winds for the 6 hours that the processing of the grains takes. In addition, the process causes women other health problems such as blisters on their feet, low back pain and pain on their joints.



In collaboration with a local mechanic and with the generous funds of the Congressional Hunger Center, a small machine that replicates this process was built and tested it in several communities. The machine is capable of processing the same amount of grains that takes a woman 6 hours in about 7 minutes. Furthermore, the machine is able to maintain the ring of the grain where the protein and the amino acids are concentrated to a greater extend than the manual process. Participatory evaluation of the machine was done in several communities of the area. The evaluation involved a blind testing of the grains processed manually and in the machine as well as contingency evaluations. Acceptance of the small processing machine was broad; women that brought the quinoa to be processed were extremely excited at the prospect of having a machine for their use in their communities. The machine however is expensive for any one family to buy (\$800 US) but people in the community are willing to pay a user fee according to the amount of quinoa they process in the machine. While the needs of the communities are great and will require large investments to truly lift them from poverty, this small machine has great potential to actually have an impact on the livelihoods of this population. The machine will reduce the burden of women's' work, have a positive impact on their health and potentially improve the nutrition by facilitating the consumption of a nutritious grain. This is a low input high impact opportunity for any organization committed to practical rural development and the improvement of livelihoods of marginalized populations.



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and here a couple of links about her work

- http://www.biodiversityinternational.org/About_Us/Fellowships/Fellows_Gallery/index.asp#Mickey_Leland_International_Hunger_Fellowship
- <http://www.hungercenter.org/international/currentfellows.htm>