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Biocultural Heritage: Quinoa as an important resource to be maintained through tourism experiences for food security in the face of climate change

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Abstract:
The regions in Chile where quinoa is grown share certain features, namely the marginality of farmers, cultural and geographic isolation, and long distances to markets. Yet there is an increasing global awareness of quinoa's high nutritional value and the heritage value of its biodiversity. This research aimed to develop a sustainable alternative to traditional agriculture through rural tourism that highlights the value of local landrace diversity and associated farming practices. The FAO recognizes the important contribution of generations of farmers in shaping agricultural landscapes whose cultural and agricultural components jointly reflect the evolution of local farming systems. The world heritage value of this agricultural diversity renders agrotourism a relevant approach to its conservation. We studied three regions in Chile where attempts to associate tourism and quinoa are underway: *Aymaras* communities on the northern Highlands, farming communities of Spanish descent in the centre, and *Mapuche* farmers in the south. The agrotourism form mobilized in each region is analyzed strategically by combining the study of tourism supply and demand. The three approaches to preserving the heritage of the quinoa crop in Chile are adapted to specific local contexts and territories. Whether it is to define a hiking trail in the North, entice tourists off established tourist circuits in the centre, or to develop a new endogenous tourism economy among the *Mapuche*, agrotourism takes different forms where the maintenance of quinoa's agricultural heritage allows relations between farming and tourism activities, market and non-market goods, and cultural and natural goods to be explored.

Keywords: Biodiversity, Community-based tourism, Quinoa, Chile, Agrotourism

Introduction

Quinoa has been recognized by the United Nations Food and Agricultural Organization (FAO) as one of the world's most outstanding crops due to its high nutritional quality (Vega-Galvez *et al*., 2010). The FAO recently declared 2013 as the International Year of Quinoa (www.fao.org). The FAO also has invited the world community to sign and

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ratify an international treaty to protect genetic resources which are essential due to their use in basic food chains. In the Andean region, quinoa has been cultivated as a staple food for the past seven thousand years (Mujica *et al*., 2004). Quinoa began to be cultivate in Chile three thousand years ago (Tagle & Planella 2002), well before the Incas extended their influence over the indigenous ethnic groups inhabiting the lands of what is the country today (the better known groups in the country, listed from north to south, are: Aymaras, Quechuas, Licanantay, Collas, Diaguitas, Picunches, Pehuenches, Mapuche, Huilliches).

Over time, small scale farmers throughout the country adopted the crop, only to gradually abandon it later. In Chile today, quinoa continues to be cultivated in only three main areas: the northern highlands region known as the *Altiplano* in Aymaras Indian communities; the center of the country in isolated coastal and marginal farmers' communities; and the south of the country, mainly in small home horticultural gardens, usually maintained by women in Mapuche Indian communities (Bazile & Negrete 2009). The main reason that quinoa has not disappeared entirely is that in these isolated localities beyond the reach of global markets, ancient traditions were conserved and staple-foods continue to be consumed.

Plant genetic resources for food and agriculture (PGRFA) are the biological basis of world food security and, directly or indirectly, support the livelihoods of every person on earth. PGRFA consist of diverse genetic material contained in traditional varieties and modern cultivars grown by farmers, as well as wild crop relatives and other wild plant species that can be used as food for humans and as feed for domestic animals, fibre, clothing, shelter, wood, timber, energy, etc. Whether used directly by farmers as a raw material or by plant breeders, PGRFA are a reservoir of genetic adaptability which acts as a buffer against potentially harmful environmental and economic global changes (Chevassus-au-Louis and Bazile**,** 2008). The erosion of these resources poses a severe threat to the world's food security in the long term. Although often undervalued, the need to conserve and utilize PGRFA as a safeguard against an unpredictable future is clearly critical. The conservation and sustainable use of plant genetic resources are keys for improving agricultural productivity and sustainability, thereby contributing to national development, food security and the alleviation of poverty (FAO, 2011).

Farmers who can afford to invest in appropriate improved crop varieties and external inputs usually are rewarded with increased yields and higher incomes. However, many farmers in developing countries cannot afford expensive external inputs such as fertilizers, pesticides or seeds that are adapted and improved for particular ecological and economic situations (Bazile et al, 2008; Sissoko et al, 2008; Soumaré et al, 2008). Plant genetic diversity, both at intra and inter-specific levels, therefore is a critically important part of their farming systems, which are maintained to cope with risks. Resource-poor farmers constitute over half of the world's farmers and produce 15-20% of the world's food. These farmers generally do use modern, high-yielding varieties because such varieties often are not appropriate to their traditional cropping systems. It is estimated that some 1,400 million people, approximately 100 million in Latin America, 300 million in Africa and 1,000 million in Southern and Eastern Asia, are now dependent on resource-poor farming systems in marginal environments.

The intensification of agricultural systems often results in habitat destruction. Changes in agricultural systems are reported to be the causes of genetic erosion by many countries. Genetic erosion also is the result of economic pressures. Despite the value and importance of maintaining genetic resources, including a large number of traditional crops, individual farmers rarely realize this value in the form of direct financial benefits. In economic terms, this is called, "a failure of appropriation". Such

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failures of appropriation are frequent in the case of public and/or commons goods. Farmers have little financial incentive to continue growing these crops. There is, in fact, a disincentive when higher income can be obtained by converting from traditional varieties to modern varieties which contribute to habitat destruction. If steps are not taken to make it worthwhile for an adequate number of farmers to continue to grow and develop such crops, economic forces will lead to continued genetic erosion. In this context, the following have been identified as being needed to promote food security and biodiversity conservation:

- Genetic erosion in the fields must be reduced and *in situ* conservation must be promoted in such a way that farming systems and practices are taken into consideration;
- This genetic diversity must be used effectively through improvement or promotion programs.

To safeguard and support the world's agri-cultural heritage systems, FAO launched an initiative in 2002 for the conservation and adaptive management of ten GIAHS pilot sites. Agri-cultural shows the both importance of agriculture and culture. The *Globally Important Ingenious Agricultural Heritage Systems* (GIAHS) programme tries to maintain not only genetic diversity *in situ* with financial incentives, but also the entire farming systems, including the farmers' traditional practices, which are the source of this diversity. This important example of protection demonstrates that to preserve potential genetic resources, the cultural elements of local communities contributing to the creation of this diversity need to be maintained. Worldwide, specific agricultural systems and landscapes have been created, shaped and maintained by generations of farmers and pastoralists using diverse natural resources and locally adapted management practices. Building on local knowledge and experience, these agricultural systems reflect the evolution of humankind, the diversity of people's knowledge, and our profound relationship with nature. These systems have resulted not only in outstanding landscapes, the maintenance and adaptation of globally significant agricultural biodiversity, indigenous knowledge systems, and resilient ecosystems, but above all, in the sustained provision of multiple goods and services, food and livelihood security, and quality of life.

In the isolated areas of Chile where quinoa continues to be cultivated, it is done so because the plant can grow in diverse and demanding environments that often are inhospitable for other crops. Over the centuries, quinoa has become deeply integrated into farming practices and social traditions. The crop mainly is destined for home consumption because, although cultivated following traditional practices that use few inputs, producers do not have the resources to meet the organic certification requirements currently demanded by export markets. The crop largely has been neglected by the Chilean government (Bazile *et al*., 2011), which has shown little interest in promoting organic farming. Instead, it has pursued neo-liberal policies over the past 40 years which have promoted modern agricultural practices focused on production (seeds, wine, fruit, etc.) for export markets (Valdes & Foster 2005). This economic model has led to high inequality in Chile and the near complete monopolization of land by export crops, particularly in the Araucania Region of Chile (Garin and Ortega 2009) where quinoa has been cultivated since ancient times.

People and plants have interacted with each other for a very long time. In our research, we study agricultural biodiversity not only to remember this shared past but also to understand the resilience and adaptation capacity of agricultural systems. Our work focuses on the centres of origin of plants such as quinoa, which are the base of our alimentation and represent dynamic systems which interact with related wild plant species and with human practices and societies. Without these interactions, such plants could not be maintained.

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While conducting our research, we met with a range of stakeholders (researchers, agricultural extension officers, farmers and farmer organizations, municipalities, tourism operators) with an interest in quinoa. We discussed the impact of their activity on agricultural biodiversity conservation (Chia *et al*, 2009) in Chile, and developed with them different scenarios of quinoa's future in the country. One of the scenarios, named Territory Promotion through Tourism (referred to in the remainder of the paper by the Spanish acronym, VTT for "*Valorización del Territorio por el Turismo*"), explored the potential role of tourism in contributing the conservation of a plant such as quinoa in Chile. In our view, if the tourism sector gave recognition to all aspects of agricultural practices affecting biodiversity dynamics, there would be greater appreciation, on both national and international levels, of the contribution of generations of farmers' practices to tangible (PGRFA) and intangible (knowledge) assets.

The goal of this research is to develop a basis for a sustainable alternative to traditional agriculture, with consideration of the promotion of landraces diversity and associated cultivation practices. As a first step, we demonstrate that a strategic analysis of agrotourism is necessary, studying both supply and demand. Second, we demonstrate the need to improve the competitiveness of small-scale farms to achieve the sustainability of these farming systems.

In the results section, the contrasting experiences of three different regions where tourism and quinoa have been associated in Chile are examined.

Context and Material: Quinoa in Chile, a 5000-year old crop

Due to the existence of particular adaptations of this species (*Chenopodium quinoa* Willd.) in certain geographic zones throughout the Andes, there are five main quinoa ecotypes associated with sub-centers of diversity (quinoas from Inter Andean valleys, the highlands of Peru and Bolivia, the Yungas in Bolivian subtropical forest, the "Salares" or Salt flats of Bolivia, Chile and Argentina, and coast types at sea level in Chile and Argentina). Of these groups, only two can be found in Chile: one are cultivated quinoas with large pale seeds found in the High Andean Salares of the Chilean Altiplano; the second, with darker and smaller seeds, are the coastal types found in central-southern Chile and Argentina. The ancestral classification made by Andean cultures also includes a wild quinoa type called "*ajara*" or "*asha quinoa"*, which is morphologically similar to traditional quinoa.

The three ancestral zones of quinoa cultivation in Chile were visited and characterized.

Quinoa of the north, the crop most adapted to highlands

The "*Salar*" ecotype can be found distributed in the regions of Tarapacá and Antofagasta; the landraces are traditionally cultivated by highland indigenous communities in Chile (*Ayamaras*) in saline soil. Rainfall falls mostly in the summer (between December and February), fluctuating between 100 and 200 mm per year. These plants are closely related to the varieties of the "*Salar*" ecotype of Bolivia. Nevertheless, there is evidence that some plant materials were introduced from the Andean zone of Peru and the region of Antofagasta. In spite of this, the morphology dominating most of the landraces studied corresponds to the "*Salar*" quinoa.

The distinguishing features of the northern zones (around 19°S) are an altitude of between 3500 and 4000 meters, an important drought season (less than 150 mm per year), and many frosts (more than 200 days/year). This crop is part of the ancestral cropping system based only on quinoa and camel livestock implemented by Aymaras

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communities, who maintain a diversity of landraces associated with specific culinary dishes. Their agri-cultural calendar is linked to traditional events (Bazile *et al*., 2011).

Quinoa of the central zone

Compared to the extremely dry conditions of northern Chile, the distinguishing feature of both the center and the south is the concentration of rainfall during winter rather than summer. Between 700 and 1,900 mm fall per year depending on the geographic zone, comprising, from center to south, the regions of Libertator Bernardo O`Higgins (VI), Los Lagos, and Los Ríos (XIV). Regions in Chile are numbered from I to XV working from north to south, with 2 exceptions for the most recently created regions: region XIV los Lagos in the South (between IX and X) and region XV (the most northern in the country).

In the central zone of Chile (between the regions VI to VIII), quinoa is cultivated at altitudes ranging between 0 and 800 m above sea level, with a medium level of rainfall (400-500 mm/year).

The quinoa found in the central zone (at about 34°S) is the coastal ecotype cultivated by isolated, older farmers with the highest poverty index in the country. The preservation of quinoa in this region is threatened by the increasing introduction of conifer plantations for cellulose exports.

Quinoa of the south, a Mapuche tradition upheld by women

In the southern region (around 39°S), quinoa traditionally is grown with vegetables by women in small “home gardens” next to their houses. The surface area devoted to quinoa is very small, ranging from 100-200m2 to just a few rows of plants to allow the preservation of a landrace and its uses. These surfaces never appear in the Chilean National Agricultural Census, what may explain why its cultivation in the south has not yet been officially recognized.

In this region, quinoa always is grown with abundant manure. This practice is not common in other regions, where quinoa is considered to be a crop that needs neither fertilizer, agrochemicals nor pesticides to grow. In these home gardens, quinoa is grown alongside corn, beans and potatoes, which protect them from the strong summer sun. The most relevant difference between highland quinoa and *kinwua* or *dawe* (the names of quinoa in the *Mapuche* language) is that the latter is produced in zones with more rainfall (1000-2000 mm/year) and at lower altitudes.
Many, diverse types of quinoa are cultivated; all the work of many generations of family farmers who remained untouched by the influence of diverse agricultural modernization programs. This diversity has produced a high number of crop species and subspecies (as landraces) with different uses at the family and community level. For example, quinoa may be used as a staple food, condiment, to cure poultry diseases, and for the preparation of *mudaï* (drink prepared by the Machi for *Mapuche's* celebrations). It also is recommended for pregnant women (to induce milk production) and as medicine (leaf infusion to fight intestinal parasites), and seed coat saponins are sold on local markets as insect deterrents.

Some reintroduction programs are managed by NGOs such as CET Sur, and focus on the survival of endemic landraces. These reintroduction programs are only in the south. In 1996, this local NGO began to develop projects involving quinoa, first acquiring a landraces collection, followed by attempts to revive this crop through the distribution of seeds and workshops about agricultural practices and uses.

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However, it is clear that the farmers themselves are the main actors of biodiversity conservation. Two types of seed exchanges take place in communities and represent farmers' main access to seeds. The first is an "individual" exchange between people or families within a community, with the exchange made either openly or privately (and at times even in secret). The second is a kind of traditional market known as *Trafkintüs,* which is a large, organized event with an opening ceremony and the presentation of each participant. A special group of farmers known as "Curadoras", meaning Curators of Biodiversity, are the most active participants in both types of exchanges. They possess considerable knowledge of crop adaptation and seed management, and may be identified as nodal farmers due to their important role in seed exchanges and the confidence they inspire in the farmers supplied by them. CET Sur provides support to "Curadoras" by promoting regional level *trafkintu*, thereby upscaling the events. The "Curadoras" are in turn expected to train a new generation of farmers to conserve quinoa varieties (Thomet, 2010).

The three quinoa agricultural regions of Chile share certain common characteristics such as the marginality of its farmers, isolated locations, and long distances to urban areas and markets. Nowadays, there is increasing awareness of the importance of the genetic resource potential that these regions represent for global biodiversity heritage. The question that interests us is whether tourism can contribute to the conservation of this agrobiodiversity heritage, and if so, what form of tourism should be developed. As generations of farmers have contributed to shaping the natural landscapes where quinoa is cultivated, agricultural practices are an important component that must be considered when the geography of tourism addresses the issue of heritage.

Conceptual background:
Linking Agrobiodiversity to Tourism

Through visits to farmers and their agro-ecosystems, we were able to discuss with farmers their cultivation practices and uses of quinoa. Their vision of the plant, and of the ways their values and knowledge could be maintained, also was part of the conversation. Discussions were held about how farmers could establish an exchange system of goods and culture with people visiting their region as tourists.

Concern for "heritage", either in the French version, "*patrimoine*", or the Anglo-Saxon one of "heritage", often is associated with the Western world's vision of its own culture as one with a unique value. However, objects (artifacts, monuments, sites, animals, plant species and social practices) and the uses (memory and identity processes, transmission dynamics, links with the past and with history) included today within the sphere of Western "cultural heritage" sometimes already are part of cultural practices and collective representations of non-western societies (Chen Ching-Fu & Chen Pei-Chun, 2010). This plurality of "heritage" conceptions makes it possible to move beyond a rhetorical division and better define what makes world cultures different and what connects them. Moreover, although all societies do not attribute the same meaning or the same values to their heritage terminology, they are nonetheless part of a recent semantic and conceptual translation process of the international norms propagated by "heritage" institutions.

The difficulty in analyzing the layers and the differentiations of "heritage" vocabularies stems from the fact that international bodies have gradually included in the "heritage" field very different objects (architecture, town planning, art, landscape, environment, languages or practices and social representations). In so doing, they have encouraged actors to interpret certain local terminologies in terms of "heritage", even though "tradition", "culture", "custom", "memory" or "transmission" could have been considered independently. Moreover, the division of the "heritage" field into "cultural heritage",

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“natural heritage” and “intangible heritage” contains in itself a classification of the real which is not directly transferred to social situations and which also obliges local actors to redefine their own categories of thought (Dutfield, 2011).

Furthermore, western “heritage” terminology is perhaps only pertinent to the extent that the actors themselves assert their right to this vocabulary and use it: “heritage”, “safeguarding”, “preservation”, “restoration”, “valorization” etc.

Links between tourism and agriculture

The concept of rural tourism is linked not only to the concept of landscape but also includes social aspects (Lew, 2011). Initially, rural tourism considered leisure activities separately from the rural activities, including agriculture, of local populations. However, there is a growing realization that the concept of rural tourism needs to be expanded beyond an interest in the landscape to include interacting with the people living in and working on the land (Buckley, 2011). Studies linking tourism and rural populations were initiated by researchers specialized in fields other than tourism, such as geographers, economists, sociologists (McAreavey R. and McDonagh J., 2011).

For rural tourism to contribute to more integrated and sustainable development, it must first be debated and developed by taking into account the distinguishing features of farms in a more integrated landscape (Bazile *et al.,* 2009). Keane (2005) provides a helpful definition of the many faces of rural tourism, which includes agrotourism, farm tourism, soft tourism or ecotourism, and alternative tourism. The European Union's definition also considers “all tourism activities in rural areas”.

The specific tourism demand associated with “rural life” goes beyond a recreational dimension to include a sense of place: the tourist is not simply looking to buy a product, but to “feel”, “experience”, or “discover”. Regional products such as quinoa respond to this demand by offering an opportunity to interact with local producers and acquire knowledge about an area.

Tourism and agricultural biodiversity recognition

Farmers’ varieties, otherwise known as landraces or traditional varieties are the product of breeding and selection carried out continuously by farmers, deliberately or not, over many generations (Coomes, 2010). Farmers’ varieties generally are not genetically uniform and contain high levels of genetic diversity. These varieties consequently can be difficult to define or distinguish unequivocally as a particular variety. Landraces, however, may be recognized morphologically. Farmers have names for them and different landraces are understood to differ in their adaptation to soil type, time of seeding, date of maturity, height, nutritive value, uses and other properties. Due to their genetic diversity, landraces need to be the focus of most conservation efforts.

The three functions of genetic variability are associated with three values. Genetic diversity helps to provide stability (portfolio value) for farming systems at the local, national and global levels by smoothing yield variability through the maintenance of a wide range, or portfolio, of crops and intra crop diversity. Losses due to the failure of a particular crop or variety are compensated for by the yields of other crops or varieties.
Genetic diversity also provides insurance (option value) against future adverse conditions as needs are constantly changing and because genetic resources may later prove to provide useful characteristics, such as resistance to new diseases or adaptability to changed climatic conditions. Finally, genetic diversity represents a “treasure chest” of potentially valuable but as yet unknown resources (exploration

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value). This is the reason both wild ecosystems and traditional farming systems need to be maintained because plants in these habitats are likely to contain and develop new and valuable genetic characteristics.

By using locally adapted varieties, or mixtures of varieties, farmers are able to spread the risk of crop failure resulting from pest and disease epidemics or adverse environmental effects such as drought. Farmers' varieties often are well adapted to poor conditions. In southern countries, local varieties can grow in the low-fertility soils of arid zones. Similarly, in the difficult and unpredictable growing conditions that characterize much of the southern countries (poor or erratic rainfall, very long or short growing seasons, no external inputs); landraces provide smallholder farmers with a more reliable crop yield. In Chile, local quinoa varieties are valued, especially in remote mountain areas where they are adapted to diverse ecosystems, including cold climates, dry and flooded areas, and saline, alkaline and acid soils.

To conclude this section, our consideration of the concept of "agrobiodiversity" includes specific geographic circumstances that explain the development and specialisation of agricultural practices and systems; and the concept of "agrotourism" could play an increasingly important role in maintaining the diversity of local practices which contributes to the very particular biodiversity of Chilean quinoa.

Lane (2005) considers that we can speak about integrated agrotourism when the local population is involved in a social construction process with various steps: "co-building, negotiation, experimentation". This concept may be used to distinguish ethno tourism from indigenous tourism. While the former involves tourists coming to learn how Indian communities live and maintain their customs and traditions, indigenous tourism is promoted by the Indian communities themselves to assert their identity through their traditions and agricultural practices (Amsden *et al*., 2011; Coria J. and Calfucura E., 2012; Cullen-Unsworth *et al*, 2011). We believe that all stakeholders in a territory need to work together through a co-learning process to develop sustainable tourism alternatives (Butler, 1999). For this reason, our research approach relies greatly on the participation of Indian communities in the definition of their development paths.

Results and discussion

In this section, we present three different approaches to tourism as a means to maintain the Chilean quinoa's culture; each adapted to a specific context.

Farmers' life experiences along the long distance "Camino del Inca" hiking trail

The main objective of this tourism construct is to interest hikers, who initially come to the Altiplano to discover the natural beauty of the National Parks, in the life of the rural communities along the way. The variety of quinoa specific to Tarapacá (the first region of Chile) is a mirror of the natural and cultural history of the area, reflecting aspects of the region, culture, modes of productions, and cuisine. There are two possible ways of developing tourism in this context.

The first involves local communities trying to make the most of existing tourist attractions. For example, the Cariquima community is located along the "*Camino del Inca*" (the most frequented hiking trail of North Chile) and near the Isluga's Vulcan National Park (Figure 1). This offers opportunities to develop tourism infrastructure that could induce tourists to spend a few days on the site discovering others facets of agro-Chilean culture.

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However, in terms of sustainable development, it is not enough to develop “Quinoa tours” as a new tourism attraction; these efforts must be connected to production areas and their farmers. Another approach in northern Chile is being undertaken by the Cancosa community. In this approach, three components of a sustainable development are being considered in an integrated fashion:

- Livestock: llamas have been part of local farming systems since ancient times, and the animals play an important role in numerous folklore festivals. Each family has access to collective grazing areas and manage individual corrals on various parts of community territory.
- Quinoa: today, the crop is managed collectively on community land as part of the tourism development project with the aim of highlighting its diversity and presenting the plants as a kind of living museum.
- Tourism: this is a new component of the territorial development of the community, with the establishment of first class infrastructure allowing stays in the local hostel and the preparation of specific dishes with local products.

Today, the experiment has reached the stage of defining tourism circuits, developing products for distribution and marketing, and integrating with other existing tourism circuits. However, the work began in 2004 when the Aymara Indian community of Cancosa, together with the community of Bellavista de Bolivia, began to develop a tourism project named the "International Circuit Pica - Cancosa - Bellavista - Llica and Uyuni". To implement their project, the Aymara Indian community of Cancosa received the support from regional authorities and the public and private sector in Chile and neighboring Bolivia. To consolidate this initiative, an original Framework Agreement on Cooperation was signed by the Universidad del Mar (Chile) and the Cancosa Aymara Indian Community. The accord was signed with the University and its School of Architecture to construct lodging facilities for tourists that are integrated into local habitats (using local materials, solar panels, etc).

In the second half of 2006, the project "*Strengthening of the tourist routes of the municipality of Pica*", was launched. It was funded by the Origins Program at the CONADI Institution, a support service of the Government of Chile for indigenous communities. The project focused on developing themed tours and the generation of products. This was achieved by providing training to micro companies linked to tourism and designing brochures to promote tourism.

This initiative was followed with the on-going project, "*Technical Assistance for tourism projects Mamiña Communities, Cancosa with the incorporation of towns and Collacagua Lirima*" funded by the Origins Program (under CONADI, a support service of the Government of Chile for indigenous communities). This project is based on providing tools to better cope with the development of tourism in the area. This is achieved by focusing training on the real needs present in different localities, encouraging work between communities, developing models of sustainable tourism and designing products aiming to enhance natural resources and strengthen cultural identity.

The Aymara Indian Community of Cancosa invites all forms of public and private institutions to participate in tourism, but the key feature of their development is that they are managing their own future by carefully integrating their three components of sustainable development: livestock-agriculture-tourism.

Quinoa tours in the Secano costero

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Rural tourism is seen as a potential means to promote development in the sixth region of Chile, where quinoa still is found. Although this dry coastal area historically was geographically isolated, new roads and communications are bringing in new visitors. The potential for economic development in this area nevertheless is shaped by its relative isolation and environmental conditions. The main appeal of the area for visitors is the agrarian society and its population. This is why our research focused on local stakeholders' perception of tourism to assess the level of acceptance of such an innovation in their systems.

Quinoa tours in the *Secano costero*, could exploit many isolated places where farmers are living to share their culture and their gastronomy. A quinoa tourism route also could integrate other existing and successful tourism sites (Figure 2). It thus could be associated with surfing areas or traditional salt production on the coast. Another possibility would be to develop a quinoa tour associated with the "Colchagua" wine tours in this region.

Based on the results of interviews in the study area, tourism has economic potential due to the beauty of the landscape and the relative geographic isolation of the area. All of the respondents recognized that quinoa, which is part of this landscape, could be something that attracts tourists.

Increasing interest on the part of both foreign consumers and Chileans in healthy lifestyles and concern for the environment suggests that there is potential for special interest tourism revolving around quinoa. A structured, sustainable project involving all of the stakeholders of the territory could respond to this potential.

However, there is an absence both of strategic management able to articulate private interests and public services and of funds that could be devoted to the promotion of tourism. This means that everything which has been achieved thus far has been done so through isolated projects that follows no strategic plan, and which are neither participatory nor sustainable. While there is a clear need to improve access roads and public transport, because supply is scarce and of poor quality, little action has been taken. There are many pending tasks, the coordination of actors, locally and globally, is one of them, as well as the projection of scenarios with the participation of the local community.

The results indicate that there indeed has been an increase in tourism and quinoa can be part of the attractions for tourists with special interests. However, although the attitude and perception of the local community is positive with regard to tourism, it is not yet adequately organized to respond to such a tourism demand.

Mapuche communities and economic relations in territories with tourist potential

The quinoa crops cultivated by the Mapuche communities in the territory that includes the municipalities of Villarrica, Pucón and Curarrehue, appears to be a new opportunity to rethink the territorial dynamics, where quinoa not only plays an economic role but also a cultural one. This territory presents a high tourist potential, differing from the rest of the region that presents high levels of poverty.

The Mapuche communities of these territories are developing a productive alliance between producers and chefs of restaurants and hotels to incorporate quinoa and other indigenous products in gastronomic meals. The promotion of cultural and gastronomic tourism appears to hold potential to improve the Mapuche economy.

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At present, 70% of the demand for quinoa from restaurants is satisfied by agriculture enterprises from Temuco or Bolivia, local production thus is not fully exploited. Yet restaurants recognize that tourists are willing to pay relatively high prices for local products, which enables the restaurants to offer farmers higher prices when buying their products. The important thing for the restaurants is to offer products that they can showcase as coming from the Mapuche people, and the diversity of varieties can be used for visual effect to present attractive plates.

Initial research findings indicate that restaurants will increase their demand for local products if they can rely on suppliers providing consistent quality and regular production. These requirements call for the development of not only technical competence but also management capacity. A second finding indicates that increased production could create imbalances at the family level. At present, quinoa crops in the area generally are cultivated by women in their home gardens. If market demand for quinoa becomes economically interesting, the entry of men into relatively large-scale, market oriented quinoa production may upset the quinoa production carried out by women, which is oriented around home consumption and the preservation of local varieties. This may in turn have an impact on the genetic diversity of quinoa in the territory.

Conclusions

In the context of quinoa production in Chile (Aymaras communities in the north, small farmers in the centre, and Mapuche communities in the south), we have studied how the development of tourism in rural areas could contribute to the reappraisal of agriculture when the tourism activities are genuinely connected with local actors.

The paper demonstrates that a strategic analysis of agrotourism is necessary, studying both supply and demand, to develop a sustainable alternative to traditional agriculture, with consideration of the promotion of the landraces diversity and could improve the competitiveness of farms. It will not be easy to implement an alternative to traditional agriculture to maintain quinoa landraces. The task is complex because we need to consider the duality between:
- food and non-food goods;
- private goods (products) and public goods (landscapes, etc.);
- monetary and heritage value;
- natural and cultural heritage and agribusiness

... and not only aspects related to supply and demand for tourism.

Finally, we show a duality between tourism and non-tourism activities, and ask the question: does integration really exist?

The main question now is the following: how may tourism change and at the same time preserve the future of quinoa's heritage? One interesting suggestion that emerges from this research is to develop a new framework to examine the steps of the process through which the link between tourism and agricultural activities is elaborated rather than developing tourism products as a final package.

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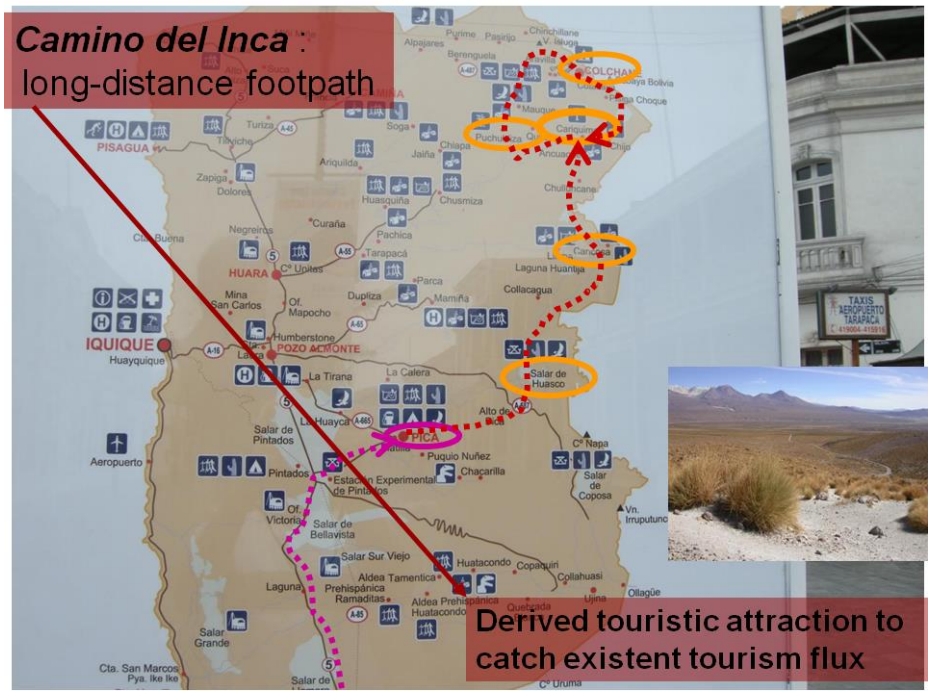

Figure 1: Tourism's experience in the chilean highlands

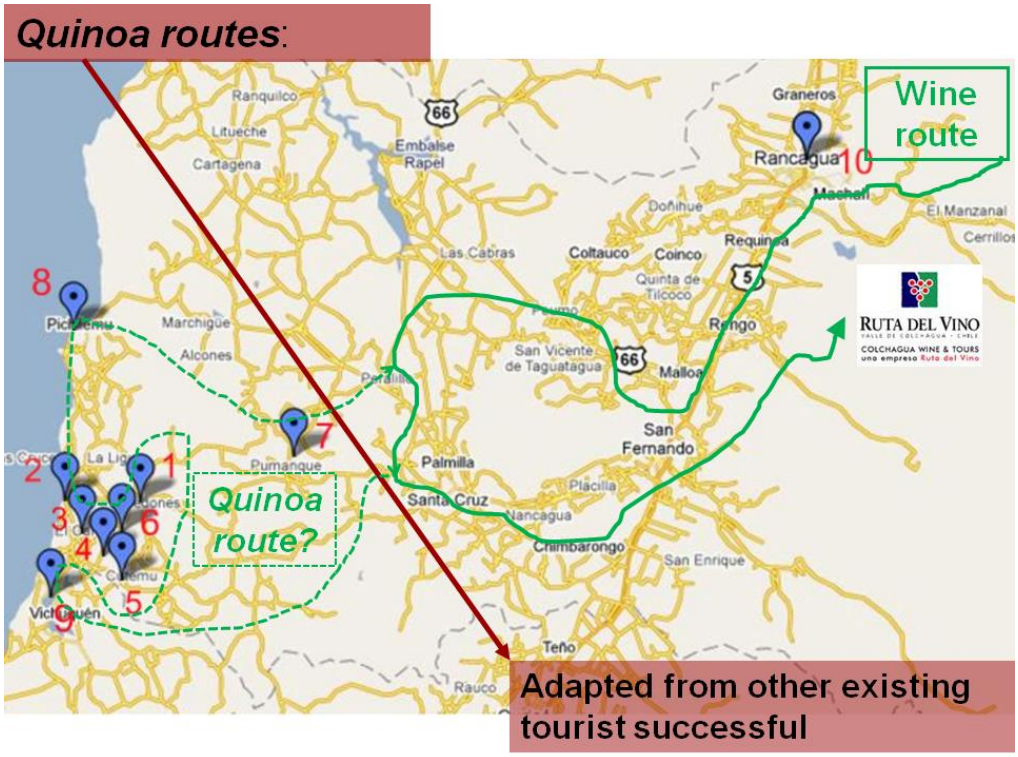

Figure 2: Tourism's experience in the *Secano costero* from Chile central

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