Fairtrade Labelling Organizations International - FLO

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FEASIBILITY STUDY FOR FAIR-TRADE LABELING OF QUINOA IN ECUADOR, PERU AND BOLIVIA

(Study of the insertion of Andean quinoa growers' organizations in the global quinoa food chain, and of the possibility to contribute to improve the living conditions of Andean peasants)

Confidential report

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Content

Introduction

Quinoa (*Chenopodium quinua* Willd.) is an Andean pseudo-cereal whose grain contains 12 to 18% of protein (in the fresh wet grain) with an exceptional high quality, particularly rich in essential amino acids such as histidine and lysine, respectively 3.25 and 6.1% of protein composition. This protein has high assimilation rates, higher than casein, when the grain is cooked (Koziol, 1992). The quinoa grain has very low gluten concentrations and an important level of essential fatty acids (linoleic and alfa-linolenic acids) in an average of 5.6% (in the fresh wet grain), a value that can go up to 9.5% (Koziol, 1992). The quinoa grain has remarkable vitamins content and level, and more vitamin A, vitamin E (alfa-tocopherol, an anti-oxidant), and vitamin B2 than barley, rice or wheat. Compared with other cereals, the quinoa grain has much more calcium, iron, potassium, magnesium, manganese, copper and chlorine (Koziol, 1992). These nutritional qualities are the foundation of the argumentation that has allowed an important growth of quinoa demand in organic markets of North America and Western Europe.

The growing demand in these countries has stimulated the Bolivian government' leaders to consider this grain as a way to alleviate poverty in the Andean region. Also, it has facilitated the reevaluation of its nutritional qualities by white people. Andean public policies promoting it are rising. In Peru these are focused on promoting quinoa production and consumption through public health and food security programmes. In Ecuador a quinoa promotion committee has just been created. The Bolivian government, funded with 3,500,000.00 US$ by the Dutch Government (DGIS) and supported by the World Bank and the Corporación Andina de Fomento (CAF) has launched policies aiming to promote and increase the productivity of Bolivian quinoa food chain for an initial 2003-2006 period. The final aim of this proposal is to increase quinoa exports to expand the national and, supposedly, the peasant's income. For this attempt, a Quinoa Competitiveness Committee and a technical governmental agency in charge of planning the quinoa food chain reinforcement, mediate funds and a performance-monitoring plan have been set up. The small farmers and their organizations are considered to receive technology transference programmes and an exports promotion project, for all Bolivian traders are on the agenda. However, small farmers' organizations will be marginalized from the main activity of this programme, based on credit programmes with 2,500,000.00 U$S essentially accessible through associations with private stakeholders that will receive this support to capitalize Bolivian quinoa exporters. These farmers' organizations as well as the Bolivian subsidiaries companies of the main quinoa private importers based in France do not accepted to be associated in this proposed financial relationship with newcomers, who they perceive as potential profiteers, because they consider they already have the knowledge to carry quinoa trade. Moreover, subsidiaries of French companies yearly receive money transfer from their main office obtained with lower interests.

If small farmers still remain marginal in Andean public export promotion policies, they are important for many European quinoa market actors. Indeed, the expansion of quinoa market in Europe is also the result of the work of fair trade importers and retailers, in particular GEPA, Claro (Ex-OS3), CTM, Solidar'Monde and Oxfam, all working with

small farmers. The European quinoa fair trade market is still expanding. However, it has no regulations necessary to attribute and monitor the fair trade labelling, guarantying an income answering to the basic needs and livelihoods' improvement of quinoa growers and quinoa food chain workers, as well as the sustainability of quinoa production.

The present study attempts to provide the knowledge necessary to set up fair trade labelling standards and procedures for the international trade of quinoa from the Andean region (Ecuador, Peru and Bolivia). To this end we first provide a background report on Andean quinoa production, processing, industrialization and trade. In this first step, we present the quinoa growers' organizations from these countries and their performance in production, processing, food industrializing and trading activities. Secondly, we present the livelihoods of quinoa growers affiliated to these organizations and we estimate the revenues necessary to provide them with minimal life quality and allow sustainable quinoa production. In a third step, we propose specific standards for quinoa trade, including reference price, economic, environmental and social standards.

To bring about this study, we have made field work in Ecuador, Peru and Bolivia interviewing actors involved in the quinoa production, processing, industrialization and trade, to gather information about these activities, the performance of growers' organizations in these activities and the livelihoods and living conditions of quinoa growers. We also used data collection of official production and export statistics from Bolivian, Ecuadorian and Peruvian state institutions, such as agricultural ministries, export promotion agencies and customs. We completed the information collection using scientific publications on the quinoa grain characteristics (structure and nutritional value) and processing.

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Part 1: Andean quinoa growers' organizations in the global quinoa food chain

The Andean quinoa growers' organizations

Since the end of the 80's, Andean quinoa growers' organizations have started to play an important role in quinoa commoditization with different levels of autonomy and weight over the market from one country to another one. In Bolivia two organizations have an important control of organic quinoa offer and exports, and are not any more receiving important financial support and gifts. One of them (CECAOT) has reached some financial autonomy and trade independency, while the other (ANAPQUI) has lost since 2000 the leadership of Bolivian organic quinoa exports and has recently increased its trade dependency, having suffered significant losses and having important loans to pay in order to reach financial profitability. The other organizations (PPQS, APAAL, APROAL and the Chimborazo Producers Corporation) are playing an active role on quinoa export since 2000, but are financially and commercially weak, having to be supported by local NGOs. To compete, some of them are creating common companies with NGOs or private companies.

Likewise, as a consequence of the quinoa demand' expansion, several growers' organizations (APROA and APROQUILL) have recently appeared in the Southern Altiplano region without any support or any significant market importance. However, no organization has been set up in the Huancayo region belonging to the Junin department, which is the second production area in Peru. This multiplication of quinoa growers' organizations, as a consequence of the quinoa market expansion, has been simultaneous to the proliferation of private companies exporting quinoa, particularly in the Bolivian Southern Altiplano. This phenomenon has increased trade relations heterogeneity in rural communities, because in any of them peasants sell to different companies, organizations and even intermediaries, following their monetary necessities according to the immediate presence of buyers. Let us now present these organizations.

The Central de Cooperativas Agropecuarias Operación Tierra (CECAOT)

Created in 1975, CECAOT is the oldest Andean organization of quinoa growers. This organization located in the Nor Lípez province, southern shore of the Uyuni salt flats, Bolivia, was created at the end of a 6 years rural development project carried on by Terre, a Belgium NGO. Initially, CECAOT focused its activities on providing machinery services and technical assistance for agriculture (plough and pests control), leaving the trade control to rural intermediaries from this region. In 1982, CECAOT split in two entities, one of them preserving the original organization while the second, the Sociedad Provincial de Productores de Quinua (SOPPROQUI), became the motor for the creation of ANAPQUI (see ahead). The marginal commercialization activities of CECAOT, unable to avoid and break the power of intermediaries, pushed some farmers to demand a more active trade role and intermediaries control. Dissidents also claimed for a different political orientation for this organization, considering necessary to organize the majority

of national quinoa growers to control middlemen activities, represent peasant's interest and generate collective benefits from trade. The opposition of leaders and advisors led to a division that diminished the regional leadership of CECAOT. Even if this organization exported in 1983 few quantities to Quinoa Corporation, a pioneer company that developed the United States quinoa market since the mid 80's, the external trade was rapidly stopped by the bad quality of the grain (impurities and irregular grain) traditionally washed in rivers and dried in the open.

CECAOT took almost one decade to recover its export activities, selling reduced quantities in the national market during this desert crossing. Part of its recovery laid on the mediation of the external adviser for this organization that allowed the obtaining of funds. After almost one decade searching for support, CECAOT got NGO's funding (CARITAS and Catholic Relief Services-CRS) to build up a factory for basic quinoa processing (manual washing in rivers and grain selection machines) and with reduced capacity. In spite of this aid, CECAOT had not enough quality of grain to be able to export and had to improve the quinoa processing. Since 1990, CECAOT obtained a loan of 450,000 US$[1] from the Inter-American Development Bank (IDB), allocated to develop exports and improve processing quality, and also a donation of 150,000 US$ for technical assistance on trade, management and quinoa production. The organization also got a credit of 110,000 US$ for plough machinery, and a donation of 70,000 US$ from the Inter-American Foundation to set up credit programmes allocated to quinoa growers in each one of its cooperatives. In 1994, CECAOT obtained a second support from the IDB (donation and loan) with the same characteristics as the first, to build up a new processing factory with quality standards and low water use. This support also allowed CECAOT and its members to implement biological production, being certified by IMO-Control who is approved by the International Federation of Organic Agricultural Movements (IFOAM). With this support, this organization started to export conventional quinoa in 1991 and established a regular business relationship with a broker in 1995, which allowed the export of biological quinoa since 1996. At present, this organization has around 250 members[2] belonging to 14 communal cooperatives from Nor Lípez, three of them from regions having recently started to cultivate quinoa.

The Asociación Nacional de Productores de Quinua (ANAPQUI)

ANAPQUI was created in 1983 through the initiative of Belgium cooperation officers associated with some quinoa producers that founded SOPPROQUI, and with the support of the Confederación Sindical Unica de Trabajadores Campesinos de Bolivia, the national farmers' union. Promoting the collective peasant quinoa trade and control over intermediaries, ANAPQUI founders afterwards enrolled regional leaders as mediators for peasant mobilization and for the creation of three more regional organizations spread around the Uyuni salt flats (Laguna, 2003).

[1] : Loan with 5 years of amnesty, 50 years of term and a yearly rate of 2%.

[2] : In the growers' organizations considered in this study, the membership of one individual corresponds to its family membership.

The institutional and economic development of ANAPQUI has been depending on cooperation officers, technical staff and institutional support, and - sometimes - initiatives. With the initiative and support of Belgium cooperation officers and Bolivian technical staff, ANAPQUI progressively increased its markets, selling initially to a Bolivian state owned mining company and to food security programmes (Caritas and the World Food Program). The cooperation officers also established a relationship between ANAPQUI and SOS-faim, a Belgium NGO that became its main sponsor. Initially, SOS-faim funded the set up of a basic quinoa processing factory and a programme for the diversification of production that included breeding and horticulture (PIAT). In 1987 ANAPQUI had terrible trade problems. ANAPQUI's technical staff found a small market in the United States, and the intermediation of SOS-faim allowed to establish in 1988 trade relations with a fair trade retailer association (OS-3, called at present Claro). Three years later, through an agreement, OS-3 left to GEPA the management of the import of ANAPQUI's quinoa for all the main European fair trade importers currently affiliated into the European Fair Trade Association (EFTA)[3]. The choice of these importers for a unique import management that allows joining their needs in a small amount of yearly planned orders wanted to reduce and simplify export/import procedures and to save money and resources for both sides: EFTA members and ANAPQUI. Fearing conventional fair trade market growth, GEPA convinced ANAPQUI to swift to organic production. The implementation of an internal program (PROQUINAT) supporting this production change and assuming the internal control was funded by Swiss Help to the Workers, a Swiss NGO, and SOS-faim. ANAPQUI's production is verified by Bolicert, a Bolivian organic certification company certified by IFOAM, which was created in the first half of the 90's in response to the development of Bolivian small organic peasant organizations. At the same time, this NGO funded a leadership training programme, involving higher degree education for some people. This same year, with the mediation of Bolinvest, a Bolivian export promotion agency, ANAPQUI started to sell to Quinoa Corporation, a company that bought most of ANAPQUI's sales between 1993 and 1999, reaching in some years more than 50% of Bolivian sales. Simultaneously, through an exclusive trade relationship, ANAPQUI sold quinoa to Priméal-Euronat and Markal between 1994 and 1999. Both companies are French and, specially the first one, contributed significantly to the expansion of the European quinoa market. Besides, ANAPQUI's leadership was productive in negotiations with the United Nations Development Program and SOS-faim to respectively obtain processing and food-products factories. These two institutions also provided operation capital and means of transport for the organization. The total amount of support received by ANAPQUI is higher than 3,000,000 US$.

ANAPQUI's staff and SOS-faim stimulated the quinoa growers' involvement in the organization. In 1990, four-monthly decision councils involving representatives and leaders of regional organizations were created. Further, in 1994 a personal affiliation process was launched intending to increase the peasant's quinoa sales to the organization

[3] EFTA was created around 1984, its current members are: GEPA (Germany), Solidar'Monde (France), Fair Trade Organisatie (Netherlands), C.T.M. (Italy), Oxfam Wereldwinkels Verdeelcentrum (Belgium) and Magasins du Monde – OXFAM (Belgium), Claro fair trade (Switzerland), Traidcraft (U.K.), Oxfam Market Access Team (U.K.), EZA Dritte Welt (Austria), Intermon Oxfam (Spain) and IDEAS (Spain).

as well as identification and participation with it. In exchange, the members obtained part of ANAPQUI's profit proportionally to the quantity of quinoa they sold. With this advantage, the regional organizations and membership grew up rapidly, reaching a number of 1200 families associated in 2000, belonging to seven regional organizations. However, organic certification regulations pushed ANAPQUI towards accepting only organic producers as associates, therefore leading to a decrease of members to a present number of about 800 families.

Quinoa growers organizations depending on external support

This kind of quinoa growers' organization is present in the three Andean countries.

The Planta Procesadora de Quinua de Salinas (PPQS)

Located in the Salinas de Garci Mendoza region, in the northern shore of the Uyuni salt flats, this organization was created in 1990 with the name Consejo de Desarrollo de los Ayllus de Salinas (CODAAS) by the Programa de Autodesarrollo Campesino (PAC), a programme funded by the European Commission and the Bolivian Government. CODAAS received financial donations from this programme, as well as a quinoa-processing factory, the first built in Bolivia following an industrial perspective. Initially, CODAAS was supposed to belong *de facto* to all the settlers of the Salinas region and to be managed by the traditional authorities of each one of the ayllus (traditional territories) composing the region of Salinas. In reality, it was clear that the traditional authorities play other roles in the socio-political dimension, laying more on ritual and moral faculties than on skills for management or trade activities, and therefore could not have the knowledge required for these activities. Moreover it was impossible for any organization to maintain trade activities while located in a village without electricity and communications system such as Salinas. If PAC understood the leadership problems, management and trade opportunities were not.

In 1994, CODAAS was reformatted and took the name of PPQS, becoming independent from the traditional authorities, which were replaced by elected members. Voluntary membership was also established, technical staff was engaged to support organization leaders, and important funds from PAC were injected. This change initially produced expecting hopeful outcomes. CODAAS exported in 1995 and 1996 10 and 18 tons, respectively, to Ecuador and Peru. However, CODAAS never had management and trade conditions because of its location, neither competent management staff, and could not find other external markets, been obliged to sell small amounts of pearled quinoa[4] in the national market and to some middlemen selling in a non registered way to the Peruvian market. Notwithstanding, owever, PPQS has maintained its number of associates whom are close to 120 members.

The Corporación de Productores Comercializadores Orgánicos Bio Taita Chimborazo

Meanwhile in Riobamba, Ecuador, the NGO ERPE started in the beginning of the 90's, a project supporting small peasants to improve organic agriculture production and trade.

[4] : Pearled quinoa is raw quinoa having lost, by industrial or manual washing processing, its external layer and an important part of its immediate layer, were a bitter substance called saponine is found.

Simultaneously, ERPE encouraged quinoa growers to organize themselves, an initiative that was reinforced by the NGO's technical support and intervention in the growth of quinoa trade, leading to the creation of the Corporación de Productores Comercializadores Orgánicos Bio Taita Chimborazo. The support on organic production became specialized on quinoa organic production and trade in 1997, as a consequence of the demand of Inca Organics, a company that started the trade of Ecuadorian quinoa ecotypes in the United States. Having guaranteed a market, ERPE decided to invest in quinoa trade and to set up a quinoa-processing factory. In an amateur way, the NGO bought a grain washing machine that they adapted for quinoa washing. In 2000, ERPE obtained a loan of 450,000 US$ from the Canadian Cooperation Fund to get the factory set up (valued in 130,000 US$). The same year, ERPE got a donation of 200,000 US$ for quinoa marketing and trade from the Corporación de Promoción de Exportaciones e Inversiones (CORPEI), an Ecuadorian state institution promoting Ecuadorian exports and investment in Ecuador. At present, ERPE mainly exports quinoa grain to Inca Organics and sells very little quinoa to the national market.

Simultaneously, ERPE started to provide technical assistance, threshing services[5], and an internal organic certification programme for quinoa growers, and it also paid for their external organic certification, done by BCS, a German company certified by IFOAM. This new dynamic increased the acceptance of ERPE by quinoa growers from Riobamba. At present, the Chimborazo Producers Corporation has 3.580 families (from 144 communities) associated.

<u>The Asociación de Productores del Altiplano (APROAL)</u>

A similar dynamic has occurred in the Peruvian Altiplano region where the Centro de Promoción Urbano Rural de Juliaca (CEPURJ), an NGO based in the town of Juliaca, has launched a programme of agricultural production and trade development. CEPURJ has promoted the constitution of the Asociación de Productores del Altiplano (APROAL) an organization composed by two hundred small peasants that mediate the support of CEPURJ. This NGO wants ambitiously to augment land productivity as close as possible to 2 tons/ha, as one means to increase peasant's income. To that end, CEPURJ provides the APROAL associates with free technical assistance on quinoa cropping, bovine herding and costs monitoring, and technical assistance for the monitoring of collective organic quinoa certification done by Biolatina. Organic labelling is funded by CEPURJ and the Proyecto Corredor Puno-Cuzco, a project by the International Fund for Agricultural Development (IFAD), supporting farmers and artisans trade initiatives. Also, CEPURJ sells the associated mechanical services for plowing, seeding and threshing to the peasants.

CEPURJ also wants to increase the peasant's income mediating and multiplying their quinoa sales. This NGO has created a company named Industrias El Altiplano, which processes quinoa, manufactures food products and commercializes them, with a factory located in Juliaca. The manager of El Altiplano underlines that the APROAL members did not accept to buy stocks from this company, which belongs in 99.5% to CEPURJ. We

[5] : ERPE proposes threshing services with machines made for barley and wheat that have an important impurity level when used for quinoa.

did not have the possibility to verify or appraise the reasons that led to this attitude. One of the proposals of El Altiplano is to use part of its overhead to fund - through credit- quinoa production improvement, especially for manure deal. At present, El Altiplano buys between 140 and 200 tons of quinoa per year, which come from 2,000 families, with 100 to 120 tons produced by APROAL's associates. Most quinoa is mainly transformed into food (pops, flakes, extruded products, fortified mix) sold in the national market. El Altiplano exports around 50 tons of quinoa grain per year. However, APROAL is still very dependent because it earns few money selling quinoa to El Altiplano at low prices (16 US$/qq[6]), does not sell this grain to others, and does not have the knowledge in management and trade to assume this task.

The Asociación de Productores Agropecuarios del Altiplano (APAAL)

Simultaneously, the NGO CARE has started a programme for the rehabilitation of ancient agricultural raised fields surrounded by channels of water called waru warus, which were used by pre-Hispanic inhabitants. To stimulate the reconstruction of waru warus this NGO has started a programme supporting the increase of land productivity through the extension of yields, and the increase of peasant's income through organic production and collective commercialization. CARE has supported the organic certification by Biolatina for many of the peasants for whom it works, and offered technical support to promote the growth of the quinoa area yearly seeded in current cropping rotations. The NGO has also promoted the revalorization of quinoa biodiversity through its production and trade. To achieve this project CARE has promoted the creation of the Asociación de Productores Agropecuarios del Altiplano (APAAL) as a mediator for collective trade. This peasant organization is composed by 8 local organizations grouping around 1,000 associates from one hundred communities where waru warus were reconstructed. To allow the commercialization of quinoa produced by APAAL, CARE convinced El Altiplano and Quinoa Corporation to buy and sell biodiversity, particularly pisank'alla[7] ecotypes. However, APAAL is weaker than APROAL. Its market is very limited, and with around 50 tons sold to El Altiplano, it is completely dependent financially from CARE and there are no management and trade capacities.

New organizations without external support and high vulnerability

The growth of the global quinoa market has stimulated the constitution of several organizations of quinoa growers. In the Anta Valley, Cuzco, The Office of Agricultural Promotion from the Peruvian Ministry of Agriculture and the National Programme of Food Assistance (PRONAA) have promoted and obtained the intensification and extension of conventional quinoa cropping to 3,000 ha. The Ministry has also promoted the constitution of the "Asociación de Productores de Quinua y Cebada Anta". However, this organization has obtained reduced financial or technical support. It received only a rotating fund loan for quinoa production in 2001 that was not renewed. Besides, as an association, the organization is asking for a non-profit legal entity, request that PRONAA

[6] : One quintal (qq) is equivalent to 100 British pounds or 46.8 Kg.

[7] : Pisank'alla ecotypes have red colors that do not disappear after quinoa processing and cooking. The grain has high response to insufflation.

uses to avoid buying in the future and paying 60 tons already bought to the organization. Several interviewed people all along Peru underlined that PRONAA seems to be largely corrupted and that the organization has seldom managed to sell its quinoa grain, which is generally bought to intermediaries. Having no legal entity, this association has also problems to accede to credit. Internal conflicts have also appeared as a consequence of the weakness of the market. Some peasants demand that all members should seed and sell the same quantities to the organization.

In the Bolivian Southern Altiplano region, two new organizations have appeared. The first one, the association Productores de Quinua de Llica[8] (PROQUILL) has initially been constituted in 1999 by growers working with Jatary-Thunupa, the affiliated company of the French firm Euronat-Priméal. The organization has neither legal entity, nor owns infrastructure, capital or financial support. The 120 associates of PROQUILL are normally certified organic by Ecocert, which is paid by Jatary-Thunupa, but are not satisfied because of the mostly low rate of grain bought by this company. According to the growers, this company uses their certified organic quantity to buy conventional quinoa in regions closer than Llica to Oruro, where the Jatary's factory is located. This tactic allows to decrease costs of quinoa transportation and to improve Jatary's benefit. Several quinoa growers interviewed in Challapata and all around the Southern Altiplano quinoa production region confirmed this argument. Wanting to go around this problem, PROQUILL wants to pay its own certification with Bolicert in order to be independent from having to sell exclusively to Jatary, being therefore able to sell to any other company or private individual. Finally, in the southeast shore of the Uyuni salt flats, the south of the Antonio Quijarro province, a small group of conventional quinoa growers has created the Asociación de Productores del Altiplano (APROA). This organization has no sponsors and it is buying services from SOPPROQUI, the regional organization of ANAPQUI that has a quinoa processing and food factory, producing pearled quinoa and quinoa bars.

Comparing Andean quinoa production

Quinoa: a crop with genetic diversity across regions

Quinoa is a plant with high genetic diversity whose varieties show specificity to particular regions, to optimally express its productive potential. These varieties are denominated ecotypes, and the regions they come from and where they are better adapted are called eco-regions. In other words, each eco-region has a particular group of ecotypes. The eco-regions have been defined according to the morphology of the plant's stem, leaves and grain, and the conditions in the ecosystems where they grow, in absence of any consideration to their genetic, nutritional and bio-chemical characteristics or to their aptness for different processes of food preparation. According to Tapia, 1979, there are four cultivated eco-regions of natural origin. Besides, another one of human origin must be added. The first group of ecotypes is denominated Valle ("valley") and grows in the

[8] : Llica is a very isolated region, kept away from quinoa processing centers.

valleys of Ecuador, Peru (Huaraz, Huancayo, Cuzco, etc.), Bolivia (Muñecas, Camacho, Bolivar, Tapacarí, San Lucas, etc.) and Northern Argentina. This kind of plant has a small, brown grain, in general with little to moderated amounts of saponine[9]. The next group of ecotypes is called "Altiplano" (Highland), has high diversity, is found in the Titicaca Lake basin, Northern Altiplano, and is characterized by a grain of larger size and greater whiteness. In the southern Bolivian highlands, around the Uyuni salt flats and south from Coipasa, the "Salar" eco-region is found, with the bigger[10] and whiter grains. This grain, also known as "quinoa real", is the one preferred by the global market, representing more than 90% of the quinoa exports, as we will see when studying the quinoa trade. Further south, in the Concepción region, Chile, there is the "costeña" ("coastal") region, with grains similar in size to those from the "Altiplano" group, but with a high level of saponine and a color darker than the one of the "valle" eco-type. And last, in the central Altiplano of Bolivia, the so called "dulce" (sweet) region is found, constituted by hybrid ecotypes resulting from the human action of crossbreeding the "Altiplano" and "Real" ecotypes. The grain of this ecotype is larger, though smaller than the one from the "quinoa real", but superior to the rest of ecotypes from other regions, as it is almost white and has little saponine.

The presentation of the different groups of quinoa ecotypes shows clearly that Bolivia has greater advantages in what concerns the grain, as it possesses four eco-regions, while Ecuador and Argentina only have the "valle" group of ecotypes, of lesser commercial quality. Chile is even in a more difficult situation as many of its ecotypes have already been introduced to the United States, Canada, Holland and Denmark, and some among these have been used to obtain new local varieties of brown color and with a lot of saponine, which makes little interesting to import coastal ecotypes. Considering the number of ecotypes[11], Bolivia preserves its advantage being the country with greater genetic diversity: it possesses more than 1880 accessions (PROIMPA, 2001), followed by Peru with 1029 accessions (Ortiz et al., 1998) and next by Ecuador, with 283 accessions (Nieto, 2001).

Differences in quinoa production

Quinoa production dominates mainly in Peru and Bolivia (Graphic 1). In the first of these countries, the yearly quinoa production has fluctuated between five thousand and fifteen thousand tons, between 1977 and 1993, increasing afterwards due to state policies for supporting the production since 1990, through the Ministry of Agriculture (credit and artificial fertilizers donation policy) in response to Japanese companies demand and at a lesser extent due to the demand from social programmes on food security and health care started in 1992, and currently grouped in PRONAA. As a result of these policies and of

[9] : Saponine is a chemical substance that gives a bitter taste to quinoa, and is placed in the perianth and pericarp (external layers) of the grain.

[10] : 2.4 to 2.8 mm of diameter.

[11] : To date, the ecotypes have essentially been classified from the morphologic point of view and not from the genetic one. This form has limits, as a genotype is often expressed according to several phenotypes or visible characteristics, being one of them morphology, but not the only one. Because of this, only the genetic study of the different ecotypes allows us to see if they really correspond to different varieties.

their indirect effect on the stimulation of internal consumption, Peru is the first quinoa producer in the world since 1998, with a production that varies around the 28,000 tons, 50 per cent of which comes from the Lake Titicaca shore (the Azángaro, Juliaca and Puno regions). This policy also has impacts in other regions such as the Anta Valley. In 1996, new varieties were introduced and the area under quinoa production in this region increased to 1,000 ha. With the growth of the quinoa price paid to the grower, from 0.2 to 0.34 US$ per Kg, peasants have extended their quinoa fields, reaching 3,000 ha in 2003 and replacing partly the potato cultivation. This production has important mechanization, mainly for the preparation of soils, sowing, harvesting, and threshing. Besides, it has an essentially conventional nature, because of the predominance of the commercialization for the national market. Organic production is close to 100 tons, being produced by APAAL and APROAL and certified by Biolatina with the technical and financial support of CARE and the Centro de Promoción Urbano Rural de Juliaca (CEPURJ)[12]. Organic production is located in the basin of the Titicaca Lake and reaches the lakeshore, where it is cultivated in raised fields surrounded by water called waru warus. Production in this region combines motorized plowing and harrowing with animal traction and manual harvest, except in waru warus, where tractors cannot access. For this production, fertilizing is being done with animal manure and plagues are controlled with rotations that have more than three crops, and with the application of local vegetable extracts and liquid manure, without being necessary to use integral control methods or insecticides based upon permitted vegetable extracts like neem[13] and pyrethrum[14], whose use will be allowed by the International Federation of Organic Agricultural Movement (IFOAM) until 2005.

In the case of Bolivia, between 1977 and 1980 the production has fluctuated between five thousand and ten thousand tons yearly, increasing then, in spite of the impact of “El Niño” phenomenon in 1983, as an answer to the growing demand for “quinoa real” in Peru, The United States and Western Europe (Laguna, 2002). In this manner, the importance of “quinoa real” in relation to the total production of Bolivian quinoa has increased, currently representing 60% of the national production, which reaches the 23,000 tons. The production of quinoa in Bolivia is less intensive than in Peru, using less insecticides, and agricultural machinery only for harrowing and at a lesser extent during the sowing in the Lake Titicaca shore, the Southern Altiplano and less in the Central Altiplano. The rest of the interventions in the productive cycle are manual.

Due to the climate difficulties, the Southern Altiplano doesn’t favor any other crop, and rotations are short with one year of quinoa cultivation alternating with another year of fallow. This kind of monoculture rotation and mechanized farming creates ideal conditions for the development of larvae and pupas, favoring the proliferation of plagues. Due to this, the plague control in organic production is increasingly more and more intensive due to the resistance created in the plagues populations, being carried on

[12] : The Proyecto Corredor Puno-Cuzco funded by the Corporación Andina de Fomento (CAF) has partly financed organic certification of APROAL for the agricultural cycle 2002-2003.
[13] : *Azadirachta índica*.
[14] *: Chrysanthenum cinerariafolium*

through the use of allowed products, local vegetable extracts (muña[15], ñaka t'ola[16], etc.), at a lesser extent light traps and in certain cases – when the plagues are massive – with banned insecticides. Until 2001, the conventional production of Bolivian "quinoa real" had profits of 29.5 US$/qq and was slightly less profitable for farmers than for those having organic production who used to get profits around 30 US$/qq. This situation, combined with the reduced availability of pesticides made from plants (pyrethrum and neem), whose use is allowed by Bolivian organic regulations only under necessity and with previous permission given by the organic certifier, discouraged until 2001 the organic production (Laguna, 2003). Nevertheless, since 2001 the important difference between the organic and conventional quinoa price paid to farmers, and the growth of actors supporting organic certification that has increased the provision of pyrethrum to growers (CECAOT, Quinuabol, Jatary-Thunupa and Irupana) have allowed the extension of organic production. Furthermore, ANAPQUI has diffused and promoted lights traps use as a way to control pests and avoid the growth of their resistance. This alternative, which requires important labor, social organization and collective action, has been adopted only in communities with important rates of families associated to ANAPQUI. Moreover, the intensification of the peasant's link with the market leads to the specialization in the use of 6 to 8 varieties, resulting in the marginalizing and genetic erosion of several ecotypes in certain areas of this region. Also, the cultivated lands in the Southern Altiplano, of sandy texture and with little clay and organic matter, are in a process of wind power erosion as a consequence of their mechanized plowing in conditions of organic fertilization, still insufficient due to their high cost (Laguna, 2000a and b).

In the Southern Altiplano, biological production tends to expand because of its market-oriented nature, reaching actually 3,200 tons[17], while there is no certified organic production in the other regions of production. Organic certification in the Southern Altiplano is essentially paid by growers' organizations and secondary by private companies exporting quinoa and some big growers from the Salinas region who pay their own certificate. **The organic certifications conditions imposed by Bolivian regulations and Bolicert, the main certification company in Bolivia, oblige ANAPQUI to certify the hole of the production of its associated peasant families to have its internal organic certification recognized**. Let us point out that these regulations are not mandated in IFOAM, European Union and United States organic regulations, but are part of Bolivian organic regulations agreed between Bolivian Government and the Association of Organic Producers of Bolivia (AOPEB).

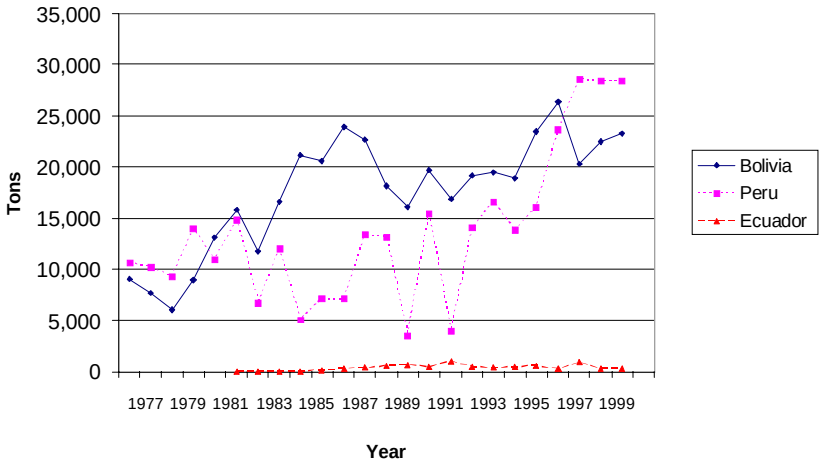
Ecuador has maintained a reduced production, in spite of the initial impulse of Latinreco, a firm that made possible to achieve a total production of more than 1,000 tons in 1992. That year, the company stopped promoting the production, industrialization and commercialization of this crop. Since then, the Ecuadorian production fell until the year 2000, remaining mostly in the northern mountains, under an intensive and conventional

[15] : *Satureja perviflora*
[16] : *Baccharis incarum*
[17] : ANAPQUI and CECAOT respectively certified 2000 and 400 tons of organic quinoa, whereas Bolivian private companies certified 800 tons.

form, due to the existence of contracts between the producers and the industrial company INAGROFA. Ecuadorian quinoa production is essentially located in the Chimborazo province, Riobamba region. In 2000, the production of this province represented 80% of national production, which reached 226 tons (Junovich, 2003). In Ecuador, organic production is very important. Indeed, in 1997 ERPE launched in Riobamba the programme of "Producción y Comercialización de Productos Orgánicos" (Production and trade of organic products) with the intention of preserving and revaluing in an organic way the quinoa diversity of this region. ERPE's project had an important impact and it is the main organic quinoa provider from Ecuador. Between 1998 and 2002, the organic production in this region has constantly grown from 49.5 to 826 tons, having reached 189 tons in 2000 (equivalent to 75% of national production). The productive system in this region uses animal fertilizing and traction, privileges long rotations that include up to five years of different crops and, consequently, reduces the necessity of insecticides and light traps. Likewise, INAGROFA has recently followed this initiative and has already certified less than 10 ha of big individual quinoa growers located in the north of Ecuador in the Carchi and Imbabura provinces. These new impulses have not yet achieved an increase on Ecuadorian quinoa production, which is placed below 1,000 tons, because of the trade difficulties.

Finally, Canada and the United States produce 80 and 120 tons respectively, of small varieties of quinoa of the "costeña" ecotype. Their production tends to decrease due to the difficulties and the high work and costs of quinoa post harvest (threshing, airing out and selection) resulting from the lack of adequate machinery in these countries (McCord, 1995). Besides, the high incidence of plagues, the warm summers that provoke the pollen abortion, the delay of the vegetative cycle due to the arrival of autumn (Olke et al., 1992) and the appearance of the grain being produced, halt the production of quinoa (Laguna, 2002).

Graphic 1: Comparative evolution of Andean quinoa

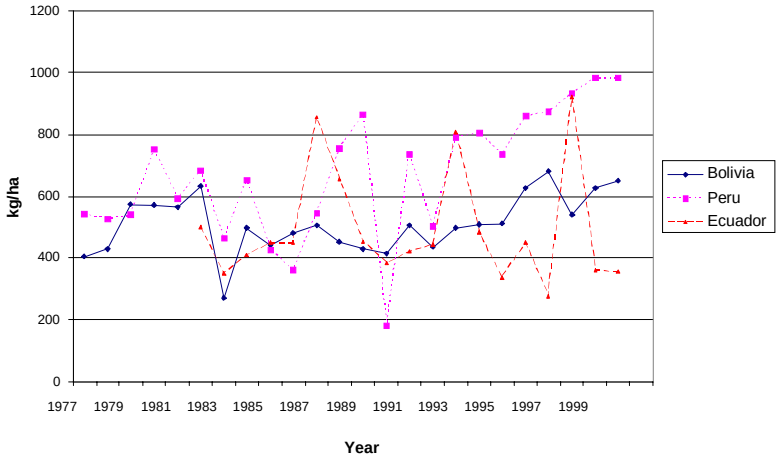


Source Ecuador: Proyecto SICA, Ministerio de Agricultura y Ganadería
Source Peru: Oficina de Información Agraria, Ministerio de Agricultura
Source Bolivia 1977-1982: Oficina de Estadísticas Agropecuarias, Ministerio de Asuntos Campesinos y Agricultura
Source Bolivia 1983-2000: Instituto Nacional de Estadísticas

A closer analysis of quinoa production in the Andean countries shows different outcomes in the soil productivity (Graphic 2). Since 1999, yields in Peru tend to become stable after having grown since 1995, due to the commercial importance that has induced the use of chemical fertilizers (mainly in the Mantaro valley, Cuzco and part of the Lake Titicaca shore) and at a lesser extent of organic ones (Lake Titicaca), without existing important processes of soil degradation in the quinoa producing regions. Besides, the chemical plague control has been increased, leading in some cases, such as the one in the Mantaro Valley, to an increasing application per hectare. Yields are high in intensive production areas such as the Mantaro Valley, with 1.5 tons/ha, while they are lower in less intensive areas of the Titicaca shore, with 0.8 tons/ha.

In Bolivia the yields grew slightly since 1992 and are around 650 tons/ha. The lower and relatively stable level could be explained by the existence of soils with less organic matter than in Ecuador and Peru, especially in the Southern Altiplano, also by the climatic resistance of the Central and Southern Altiplano quinoa ecotypes, which contribute in more than 80% to the national production, and by the absence of very adverse conditions, except for the droughts in 1983 and 1997-98, caused by the "el Niño" phenomenon. Without being able to state it yet, we think that the growing trend in the yields could be explained by the mercantile importance of this production. This leads to the constant habilitation of virgin land to replace land with decreasing fertility, and by the greater increase of organic fertilization practices in the Southern Altiplano.

Graphic 2: Comparative evolution of Andean quinoa yields



Source Ecuador: Proyecto SICA, Ministerio de Agricultura y Ganadería
Source Peru: Oficina de Información Agraria, Ministerio de Agricultura
Source Bolivia 1977-1982: Oficina de Estadísticas Agropecuarias, Ministerio de Asuntos Campesinos y Agricultura
Source Bolivia 1983-2000: Instituto Nacional de Estadísticas

Ecuador has excellent agro-climatic conditions to obtain high yields. There are good soils of volcanic origin with a lot of organic matter and water retention, and higher rainfall

than in Peru and especially in Bolivia[18], particularly in the Carchi region where yields can reach 2.5 tons/ha. Nevertheless, Ecuadorian yields are very low and variable because the preponderance of its production comes from the Chimborazo region, which has a reduced average, estimated in 0.5 T/ha by official statistics (Junovich, 2003), but important internal and yearly variability differences. Indeed, in our fieldwork and looking at ERPE's data we found high variability in yields: 1.85 T/ha in some communities of the Colta and Columbe, cantons with good quality soils, and up to 0.29 T/ha in some communities of the Guamote canton, with sandy and low organic matter soils. Also, the quality of the soils changes inside this region and even within communities, few of them show erosion. Moreover, there is a strong intra-regional variability of agro-climatic factors presented in Pusimacho and Sherwood (2002), such as frost and rainfall, and of plant diseases, particularly of mildew (Jacobsen and Sherwood, 2002).

The quinoa harvest and post harvest are also different from one country to the other, having an incidence over the quality. In Peru, the harvest and threshing are made generally with machinery, whether through cereal harvesters (in the Mantaro valley) or, as in the Lake Titicaca basin and the Anta region in Cuzco, where the quinoa plants are reaped, threshed afterwards through stationary threshing machines; or, if lacking such machines, manually, using sticks and pieces of fabric, necessary to prevent the stones and dirt from mixing up with the grain, without totally achieving this purpose because besides dirt and pebbles, there are small pieces of quinoa stems. Besides, the reaped plants are stacked on the plots' ground favoring the presence of rodents that infect the grain with faeces and excrement. This last threshing option is not completely immune to the presence of impurities. The following stages also present problems for the quality. When choosing the manual threshing, the grain is afterwards aired out manually, without totally eliminating the impurities because of the optical tiredness during this operation. Also, the producers do not have silos to store quinoa, carrying on this process in sacks kept in the producers' houses, also prey to rodents.

As in the Peruvian shore of Lake Titicaca, the threshing in Bolivia is more of a long and costly work process that makes more expensive the selection of the grain. This is carried on through reaping, in the "Altiplano" and "Dulce" eco-regions, and only in part of the organic production from the Southern Altiplano, being the rest of the organic production pulled manually, same as the totality of the production of conventional origin. This last type of intervention allows pebbles and dirt to mix in the quinoa cobs when they are stacked. As in the case of the Peruvian Altiplano, these harvest methods favor the contamination of the reaped quinoa stacked in the plots. In the Northern and Central Altiplano, the threshing is similar to the one carried on in the Peruvian Lake Titicaca basin, while in the Southern Altiplano it is essentially carried on with the help of transportation means and tractors, risking to contaminate the grain with more stones and grease / oil stains from the vehicles. Only a small part of the threshing in this region is

[18] : In Ecuador the regions of quinoa production receive between 300 and 2,000 mm of rainfall, with stable rainfall (900 a 950mm) in the Carchi region, which has the best soils (Pusimacho and Sherwood, 2002). In Peru rainfall varies from 850 to 550mm. In Bolivia, the Altiplano and Central Altiplano eco-regions receive from 850 to 550mm and 400 to 300mm respectively, while the Uyuni salt flats receive from 250 to 100mm of annual rainfall.

carried on with stationary threshing machines. Finally, let's say that there are very few Bolivian producers with silos to store their grain. Nevertheless, with the support of the post harvest project funded by FAO and DGIS-the Dutch Cooperation, many producers have equipped themselves with manual airing out appliances and sickles, and two regional organizations belonging to the National Association of Quinoa Producers buy the classified grain to the producer.

Ecuador also has harvest and post-harvest problems that increase the work and costs to obtain a clean grain. In the Riobamba region the problems are the same as in the Bolivian Southern Altiplano and worse than in the Peruvian Altiplano and the Central and Northern Bolivian Altiplano. The harvest is made pulling out the plants and stacking them in the plot; the threshing is made with animals or manually, through rubbing the cobs with the hands, to sift it afterwards, which makes this operation very slow. Even if ERPE sells threshing services to some Riobamba farmers, the totality of them have to air out their grain manually and do not have silos to store it. Only the harvest in the Carchi region is mechanized by the use of cereals harvesting / threshing machines or of stationary threshing machines, previously cutting the top part of the stem. We were not able to verify if producers in this region store quinoa in silos.

In organic production, farmers from Juliaca and Juli have the lowest production costs in the Andean region, with an average cost of 2.5 US$/qq (1 to 2.5 US$/qq), while farmers from Riobamba have the highest costs, ranging from 8.5 to 21 US$/qq, with an estimated mean of 13 US$/qq (Table 1 and Appendix 1). Let's point out that in the Ecuadorian case, the dollarization was translated into inflation, which had repercussions in the increase of costs for services, inputs and equipment. In the Bolivian Southern Altiplano, the production of organic quinoa costs range from 5 to 8 US$/qq, with an approximate mean of 7 US$/qq (Table 1 and Appendix 1). In the second part of this report we will analyze more intensively costs and profitability per product and work invested among organic and conventional Andean farmers. Concerning conventional quinoa, we must mention that Ecuadorian big farmers from Carchi, with highly capital-intensive cropping systems have the lowest production cost (around 1 US$/qq). However, in Peru conventional quinoa costs are lower for small and capital extensive peasants from Juli (2 US$/qq) than small and medium farmers with medium capital intensification from Anta-Cuzco and the Mantaro Valley (8 US$/qq) (Table 5 and Appendix 1). This situation is explained by the high yields obtained by the first group of farmers with low capital investments. We consider an average for Peruvian conventional quinoa production of 6 US$/qq. With costs close to 4.5 US$/qq, Southern Altiplano conventional quinoa farmers have lower production costs than the former but higher than those from Juli (Table 5 and Appendix 1).

Table 1: Comparative costs and profits of Andean organic quinoa chain in the 2002/2003 campaign (in US$/qq, reference prices for August 2003)

Eco-region	Real-Bolivia			Valle-Ecuador		Altiplano-Peru
Location	Southern Altiplano			Riobamba		Juliaca and Juli
Kind of Trade	Link with fairtrade importers despite the existence of official quinoa FT standards		Willing to be Fair Trade	Willing to be Fair Trade		Non Fair Trade
Chain partners	ANAPQUI/GEPA/ Solidar'Monde/ Altereco/CORA	ANAPQUI/GEPA/ World's Stores	Quinuabol/Biogrow[19] Markal/Monoprix	ERPE/Inca Organics/ Infinity Foods/Retailer.		APROAL/El Altiplano/Quinoa Corporation
Process along the chain	Bulk import Package by the Intermediary	Import in boxes packed by ANAPQUI	Bulk import. Package by the importer	Bulk import. Package by the importer	Bulk import, no package and detail retail	
Production costs	7.0	7.0	7.0	13.0		2.5
Price paid to peasants	17.0	17.0	19.0	30.0		24.5
Profit for farmers	(6%) 10.0	(4.6%) 10.0	(7.7%) 12.0	(15% and 11.1%) 17.0		22.0
Profit for ANAPQUI's regional organizations	1.3	1.3	/	/		/
Processing and export cost	15.0	37.0	10.0	27.0		13.5
Export Price FOB	59.0	86.5	56.0	66.0		57.0
Profit for exporters	(15%) 25.7	(11.8%) 38.2	(18.1%) 27.0	(8% and 5.9%) 9.0		19.0
Import Country and sale	France	Germany	France	United Kingdom		United States
Cost of shipping	3.0	3.0	3.0	2.4	2.4	
Import tax	0.0	0.0	0.0	0.0	0.0	0.0
Commission for import planning mediator	4.2[20]	/	/	10.0[21]	10.0	/
Logistic costs	2.0	3.0[22]	1.0	3.8	3.8	
Transportation	0.6	0.3	3.4	1.4	1.4	
Palletization/Storage	1.3	1.3	5.6	3.0	3.0	
Analysis	0.0	1.2	0.0	0.0	0.0	0.0
Cost of selection and box packing	/	/	/	40.0	0.0	
Price of sell to intermediaries	107.8	205.5		165.7	122.0	
Added value taxes	5.9	14.0		0.0	0.0	
Profit for importer	(18.6%) 31.8	(45.7%) 96.3		(34.8%) 39.1	(38.9%) 35.4	
Cost of selection and box packing	27.2		35.0			
Transportation	5.4		2.2			
Logistic costs	10.1		7.4			
Price of sell to dealer	229.0		168.5			
Added value taxes	12.6		9.3			
Profit for intermediary	(38.7%) 65.9		(29.5%) 45.6			
Logistic transportation costs	9.4	10.0	8.5	8.2	8.2	
Price of sell to consumer	289.8	313.4	260.0	221.0	221.0	372.7
Added value taxes	15.9	21.9	14.3	0.0	0.0	
Profit for retailer	(20.8%) 35.5	(36.1%) 76.0	(44.5%) 68.7	(42.0%) 47.1	(59.6%) 90.8	
Total added value	170.2	210.5	153.3	112.2	152.2	

Important notes: for northern countries actors we do not consider their fixed costs linked with the development of the product such as personnel, package design, company's office renting and manufacture when boxes are not made in producer country. **For this reason, we consider that final added value of the chain is much lower and that its distribution is much more profitable for farmers**. For this reason, we underline in yellow added value distribution average that needs to be précised in the future.

Generally, bulk quinoa is imported in bags of 25 kg each one. Imported quinoa's boxes and those packed in Europe have both a content of 500g of grain. The change rate was: 1 Euro = 1.2 US Dollars. 1 qq = 46.8 Kg, 21,36 qq = 1 Ton

Source: Quinoa growers from above mentioned regions, ALTERECO, SolidarMonde and Markal for the French market, Infinity Foods and Inca Organics for the UK market, ERPE, El Altiplano, ANAPQUI, Quinoabol.

[19] : Biogrown is a company owned in 50% by Markal (France) and in 50% by Dutch Organic (Do-it).

[20] : Paid to GEPA

[21] : Paid to Inca Organics

[22] : Concerns the application for European Union to obtain the permit to import ANAPQUI's products in Europe. It is paid once in lifetime by GEPA for all EFTA importers. Its cost is 250 Euros.

Quinoa processing and industrialization in the Andes

Processing

Even though the field work did not allow us to visit all the quinoa processing plants, nor all the companies carrying on this process, interviews with key informants, secondary information and observation of products in retail centers allow us to provide some elements about the competitiveness of quinoa processing in the different Andean countries.

In Peru there are two industrial processes of quinoa that use machinery produced in the country itself. The first kind of process is generally spread in the Puno-Juliaca-Sicuani region with more than 60 micro-enterprises processing quinoa, mainly established in Juliaca. Most of them use the humid process, which consists on washing the quinoa in receptacles, drying it outdoors on canvases, classifying it through sieving and airing it to remove more impurities. Although it requires less equipment (only the classifier is bought), this humid method is more costly due to the high amount of water and work it requires, reaching a cost of 2.5 US$/qq. Many of these small industries process more than 10 tons of quinoa monthly, obtaining a product of medium quality, because of the impurities still present in the final product.

The process of de-saponification using the humid via, practiced in the Andean countries, has important effects on the nutritional properties of the quinoa grain. On one hand, it seriously reduces the minerals content. A study by INIAP (1986) showed that washing reduces in the grain the initial calcium content in 29%, the magnesium content in 20%, 49% of the potassium, 52% of iron, 27% of manganese, 38% of copper and 49% of sodium. On the other hand, washing eliminates Vitamin B3 (niacin) in 45% (Koziol, 1992).

The second kind of process, the dry method, is used by the large agro-industries (El Altiplano S.R.L., Industrias Alimenticias Cuzco S.A., Clements Peruana S.A.) and some small micro-entrepreneurs of the Puno-Juliaca region[23]. This consists in initially classifying the grain, discarding straw, pebbles and broken grain using vibrating sieves, and then polishing the grain, which eliminates the saponine found in the external grain layers (the perianth, the most external, followed by the pericarp), and then a new classifying process following the same method. The polishing of quinoa grains from the Valle and Altiplano eco-regions removes the perianth, almost totally the pericarp and some parts of the embryo located under the pericarp. The quinoa processing capacities of the industries vary from 4 to 6 tons daily, 1,000 to 1,500 tons a year, for a daily eight hours turn. This dry processing method is the most advantageous because of its low costs and the lack of use of water for washing, of energy for drying the grain, and the lesser use of work forces to manipulate the grain. Peruvian exporters have the lower export prices in the Andes because the processing costs[24] are low, in average around 13.5 US$/qq[25], and

[23] : The Altiplano is also installing a humid complementary way of processing.

[24] : To simplify our work, we include in the processing cost the administrative, commercial and export costs.

quinoa producers are low paid by the processing industries and micro-enterprises, between 13.5 and 15 US$/qq for conventional quinoa, and 24.5 US$/qq for the biological grain (Table 1). We must also point out that, several firms exporting organic quinoa only select the grain (classification and sieve) because they sell "quinoa real" imported from Bolivia in a non-registered way.

The polishing process also reduces the nutritional quality of quinoa, though differently compared with humid method. Besides eliminating saponine, the abrasion of external tissue eliminates minerals (potassium, magnesium, phosphor, iron, chlorine, sulfur, aluminum and silicon)[26] and vitamin B3[27] present in it. While the vitamins loses with this process are similar to the ones through washing, polishing generates lesser lack of minerals than the humid process. Koziol (1992) points out that with the polishing the concentrations of calcium, phosphor, iron, potassium, sodium and zinc diminish between 12 and 15%, the concentration of magnesium diminishes in 3% and the concentration of copper in 27%. Nevertheless, the polishing wears out a part of the embryo placed underneath the grain's external tissue, reducing the protein content in 6%, a situation that does not occur with the quinoa washing (Koziol, 1992), and it is likely that it also reduces the content of essential oils (linoleic acid and alfa-linolenic acid), essential for the cellular synthesis of the human organism[28].

The grain obtained at the end of the dry processing looses some nutritional quality but the good classification process provides size regularity and cleanliness. In spite of the good harvest and post harvest conditions that reduce impurity of the grain, the large agro-industries, particularly "El Altiplano", buy quinoa grain applying quality prices. The machinery used by these companies and a small part of micro-enterprises observes food quality norms because the pieces in contact with the food are rustproof or inox steel, liberating grain from metallic particles. Let's point out that "El Altiplano" has established its own food quality standards and innovations that are the highest norms in Andean region. It is the only processor of quinoa having equipped its factory food machines with inox pieces and having hygiene rules (isolation of processing areas and staff hygiene). It is also implementing a quality control process based on the furnishing of a physics-chemical, microbiological and quality laboratory and on the training of staff to fulfill the company's own hygiene standards. However, the company still needs a continuous processing chain that avoids manipulation and contact of the product with humans. None of Peruvian processing companies has established quality control processes such as ISO 9000 standards.

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[25] : This low price is explained by the fact that these factories also process conventional quinoa, choice that allows scale savings.

[26] : The perianth possesses important concentrations of potassium and chlorine and lesser quantities of magnesium, aluminum, silicon, phosphor and calcium, while the pericarp also possesses important proportions of potassium and lower concentrations of calcium and sulfur (Varriano-Marston and DeFrancisco, 1984). Loses of iron, sodium, copper and zinc, revealed by Koziol (1992) suggest that this minerals are also found in the grain's external tissues.

[27] : Vitamin B3 is mainly found in the quinoa grain's surface while the other vitamins (A, E, B1, B2 and B6) seem to have a uniform distribution in the grain (Koziol, 1992).

[28] : Varriano-Marston and DeFrancisco (1984) point out that the essential oils are mostly concentrated in the embryo.

In Ecuador quinoa is industrially processed according to the dry and wet methods. INAGROFA carries on a simple and little costly process: selects, polishes and packs mostly conventional quinoa. We don't know if this company owns steel machinery and has quality food standards or if it fulfills the ISO 9000 requirements. What we can point out is the lack of impurities in the grain obtained at the end of this process, because INAGROFA works with producers harvesting with a combined cereals harvesting machine and with stationary threshing machines fed by cobs cut at the moment of this operation, without being put down on the ground. The average cost of this process is of 17 US$/ton with a price paid to the producer of 24 US$/qq for conventional quinoa and 35 US$ for organic quinoa[29]. Besides, the polishing machine bought by this company from Latinreco (a Nestlé branch) has a high processing capacity of 500 kg/hour (4 tons/day or 1800 tons/year with 8 hours turn) that could allow it to lower the fixed costs, in case of working at an elevated regime. Nevertheless, its processing is still reduced because it reaches 25 tons monthly (300 tons/year).

In the case of ERPE, which exclusively processes organic quinoa, the wet method is used to keep the grain's dark color because of commercial reasons we will explain ahead. This process starts with selecting through sieves, then machine washing with several rinses (up to four), then drying with air warmed by combustion, followed by airing out to break the quinoa grain lumps, then an additional selecting with sieve and finally a strip for final control with antibacterial ultraviolet light, and a electromagnet for heavy metals. ERPE's collecting policy establishes a maximum grain impurity level and prices for the producers according to the quality, obliging farmers to remove impurities. This choice considerably reduces impurities but imposes them important labor to farmers who have to manually harvest, thresh and air out. ERPE has not yet defined quality standards for levels of saponine, impurities and grain's size regularity. This has led some ERPE's customers in England to stop their purchases because quinoa still had saponine. The processing capacity of the ERPE's plant is of 290 kg/hour (2.2 tons/day or 580 tons/year with an 8 hours turn). This process is demanding in terms of water and energy, having forced ERPE to dig its own well to reduce the costs, which reach the 27 US$/ton (Table 1). Also costs are important because of the high price paid to the producers, in average 30 US$/qq of quinoa (Table 1). Without leaving aside this alternative aimed to a niche market in North America and England, ERPE wants to change to the dry method, to reduce its costs to an expected amount of 18 US$/ ton.

In Bolivia the quinoa industrial processing is homogeneous and is applied only to organic "quinoa real", essentially for export. The quinoa processing uses a combined method with machineries almost completely built in the country itself. This process consists on an initial classifying, similar to the first classifying carried on in Peru, followed by the polishing, a second classifying, a washing with reduced water volume applied in only one rinse to eliminate the remaining saponine[30], drying with gas or through an influx of sun

[29] : Currently, only one organic producer works with this company providing a production lower than 15 tons.

[30] : In quinoa "real" some parts of the percicarp remain after the polishing of the grain, obliging to make an additional washing to remove the residues of saponine.

heated air, a third classifying, an elimination of volcanic pebbles through densimetric machines[31], a manual selection and, in some processing plants, at the last stage of the process, quinoa is selected with an optical sensor. The other processing plants are interested on providing themselves with this equipment due to the problems for the final grain quality, resulting from the lack of good post harvest methods massively adopted. Indeed, some exporters still have some impurities, particularly pebbles, broken or color grains and even mice faeces. Even if we do not have scientific data concerning quinoa nutritional losses through this process, we consider that protein losses are at the maximum similar to those of Valle and Altiplano quinoas (comparing grains with similar protein content) because of the presence of parts of pericarp and the reduced abrasion of the embryo after the polishing. We also estimate that this process, compared with humid process, has lower mineral losses because it requires only one rinse and less water. Not all the enterprises processing "quinoa real" own machineries with inox pieces, neither have important hygiene and quality standards, nor have implemented quality control processes. Only one of them (Jatary-Thunupa) has established HCCP safety quality norms in conformity with those of CARREFOUR, its main customer, and it seems to have a quality control process according to ISO 9000 norms.

The processing capacity of this method varies from 4 to 8 tons/day (1,050 to 2,100 tons/year with 8 hours/day turn). CECAOT has the highest processing performance, while ANAPQUI is second, with around 5 tons/day, and other producers are close to 4 tons per day. This type of processing implies an important equipment and infrastructure cost, which could *a priori* lead us to think that it will be very high because of the maintenance of these machines, the quantity of water and energy used for washing and drying the grain, and the work needed for quinoa manipulation during the drying stage.

Nevertheless, because of the greater processing capacity installed and the lower general costs of goods, services and work force in Bolivia, the processing costs of quinoa are highly variable been relatively low for Bolivian private companies around 10 US$/qq (Table 1). **However, organic quinoa exported by these companies, particularly Andean Valley, SAITE and Quinuabol, is essentially subsided by ANAPQUI, who pays its certification. This process implies a cost of 2.60 US$/qq that competitors are marginally paying only for certifying their factories while ANAPQUI has additionally to pay the certification of its internal certification system, the salaries of its technicians in charge of organic register and monitoring and for the working costs. Moreover, ANAPQUI, CECAOT and PPQS lack of policies of quality pricing, situation that increases their processing costs. Processing costs of ANAPQUI and CECAOT are between 15 and 15.5 US$/qq and those of PPQS are still much high, around 20 US$/qq, as a consequence of the location of their factories in areas without electricity obliging them to use fuel generators.** Bolivian exporters bought also organic quinoa at lower prices than those from Ecuador and Peru. To compete with private enterprises, associations of producers (ANAPQUI, CECAOT and PPQS) must pay less to the producer. In August 2003, ANAPQUI use to pay 18 US$/qq and CECAOT and PPQS bought their quinoa in 15 US$/qq while the private enterprises pay

[31] : Densimetric machines separate grain from volcanic pebbles through their density.

19.5 to 22.7 US$/qq (150 to 175 Bolivianos/qq)[32]. **Since the recent quinoa price growth (see part 2) since the end of 2003, in April 2004 ANAPQUI pays 27.5 US$/qq (220 B$ Bolivianos/qq), a bit lower than private exporters 28.0 US$/qq, while CECAOT pays 23.4 US$/qq.**

Finally, in the three countries conventional quinoa sold inside national markets is processed manually. This process consists in washing and rubbing quinoa inside bags that are soaked in river's running water, and drying it in the open over sacks. Because of this, this processing method is the cheapest, with a cost varying according to the country, of around 0.40 to 0.80 US$/qq. Nevertheless, the grain produced has very bad quality due to the high presence of impurities and broken grain and because of the variable quality of the water used, often contaminated by nearby populations. While this processing method doesn't represent the majority of the Peruvian and Ecuadorian quinoa production, it does in the case of the Bolivian production in the Altiplano, Dulce and Valle eco-regions. This processing method, as well as the wet and combined industrial methods existing in the Andean countries, has consequences on the environment because the saponine extracted from the grain is released without previous treatment to the watercourses. Saponine affects the blood system of superior animals living in the water. Contamination can also result of the dry method. In Bolivia the saponine dust resulting from polishing has no chances of any use because of the lack of industries that could require it. When the saponine deposits fill their capacity, the stored dust is burnt.

Industrialized Products

As numerous food products are produced with quinoa, mainly in Bolivia, and the companies producing them hardly know the production costs by product, it was not possible to carry on comparisons of costs and profit between the different food products produced in the Andean countries. In spite of this limitation, we have arguments to state that Ecuador currently possesses a little competitive agro-industry of quinoa in relation to the Peruvian one, and especially in relation to the Bolivian one. In fact, the Ecuadorian range of products elaborated with quinoa is very narrow and limited to pearled quinoa and intermediate food products (flakes, pops and quinoa flour), except for the baby food, as shown in the Appendix 2. This is similar to the Peruvian range of quinoa-based products, except for the mix of extruded flours for social programs of food security produced in the latter. In any case, the production of quinoa food products from both countries is very small compared to the Bolivian production that has a wide array of finished products (muesli, granola, bars, cookies, pops, dehydrated soups and pastas[33]), besides the intermediate products and the pearled quinoa. This simple observation shows us that Bolivia is the Andean country with quinoa food products of greater added value,

[32] : To say it exactly, nevertheless, the company pays 22.7 $ US/qq (Jatary, filial of Euronat-Priméal pays to the producers, at the best situations, 3 and 9 months after taking the product, with no interest). Several producers whom have sold to this company more than 2 years ago complain of not having been paid yet.

[33] : The flakes are mainly used to prepare muesli and at a lesser extent for granola, while the pops are used more for the latter product and less for muesli. The pops are also used for the bars. Finally, the flour is used to prepare fortified mixes, cookies, pastas, snacks and baby food.

probably without being able to generate the greatest added value because the production of food products is much lower than the Peruvian one. The lack of finished products in Ecuador is explained by the limited demand, in one hand, and in the other, taking an argumentation already presented (GTZ-PAC, INIAP, CORPEI, CRS, 2003) by the ignorance of the local and external demand for quinoa food products and of the necessary inputs to this.

Considering the high quality and presentation of its quinoa products, Ecuador also has to progress. There are no relevant differences of quality among industrial food machines available in Andean countries, because the majority of their food industries have inoxidable steel machines. Differences lie more on the range of intermediary and final food produced in each country (see appendix 2). Its pearled quinoa, sold in supermarkets, has good quality and very diverse presentation (from bad to good), while in Peru the quinoa quality is good and in some cases medium but the packaging is of very good quality (Appendix 2). In turn, at the supermarket level, Bolivia produces the pearled quinoa of better grain quality because of its better classifying and lack of impurities. Nevertheless, the plastic packaging used is less resistant than the one used in Peru. Although we cannot compare the intermediate Ecuadorian products with those of its Andean equals[34] we can do it among the latter two. Compared to Bolivia, Peru has better quality and packaging of pops and flakes, being some of the latter prepared with "quinoa real" imported from Bolivia. This does not imply that Bolivia has bad quality and presentation of these products. We also have to stress that the majority in the Bolivian array of finished products, has good to very good quality and packaging, particularly in what concerns exported products. Besides, Bolivia is the only Andean transporter of finished quinoa products, some of which have the organic certification.

The participation of the actors in the elaboration of quinoa products is very variable. In Ecuador, after having failed to process quinoa pasta by the lack of hard wheat, ERPE only elaborates pearled quinoa with little added value, while the private companies prepare intermediate quinoa products. In Bolivia the associations of producers have a marginal importance in the elaboration of quinoa products. ANAPQUI produces pearled quinoa and intermediate products, which are exported in small amounts, while CECAOT produces pearled quinoa, intermediate products and cookies for the national market. In Peru, El Altiplano has a very wide range of intermediate products. Nevertheless, the greater part of the transformation is carried on by private companies that sell in the local market (Irupana, Kris-Industrias Venado, Logal, SIMSA, El Ceibo, Agroindustrias Nativas and La Estrella) and that export (La Coronilla). Finally, considering the difficulty to sell Ecuadorian and Peruvian quinoa ecotypes (see the next section for trade problems in these countries) small peasants' organizations from these countries should try to develop finished quinoa food products, where grain aspect is not relevant. Moreover, if these products were developed and quinoa was fair trade labelled, finished quinoa food products could incorporate fair trade products coming from other organizations. Currently, this alternative is poorly followed in the Andean region where only one producers' organization offers organic quinoa food products ready to be fair trade labelled. Even if its products have moderate to good quality and moderate packaging, El

[34] : The comparative study of food products was requested moments before leaving Ecuador.

Ceibo, a Bolivian cacao planters' organization, is the only worldwide provider offering two products responding to these criteria (see Appendix 2).

Commercialization

The market outside Andean countries

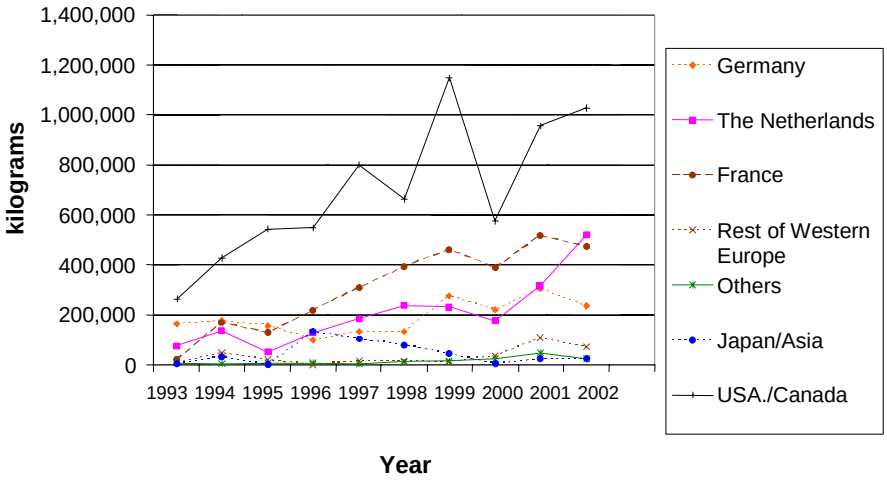
The global quinoa market involves essentially pearled quinoa. Due to the distrust of the majority of the importers concerning the quality of Andean food products, very few transformed products are exported. Only primary Bolivian products are exported (flour, pops and flakes) in small quantities, generating little added value for this country. The registered market for pearled quinoa from the Andean countries has become almost exclusively organic, except for the reduced exports between Andean countries, Venezuela and Argentina. The quality requirements lie basically on local organic standards fulfillment and labelling, except for CARREFOUR who has set up its own additional quality standards regarding bacteriological, granulometric and maximum allowed impurities levels. However, some supermarket chains interested in selling quinoa could require more quality.

The quinoa market in the Northern hemisphere has had an almost constant growth since 1983, having moved from an annual value of about 31,000 US$ in that year, for 47 tons, to almost 2,790,000 US$ for 2,800 tons[35]. Besides, the number of quinoa food products has been multiplied in the Andean countries themselves, as in the importing countries. In the former, several kinds of products are elaborated (see previous section) while in the northern countries quinoa is mainly used to make pastas. If we count such products, the value of quinoa will be much larger. Besides, we must count the quinoa produced in North America, with an approximated value of 840.000 US$ corresponding to a 200 tons production.

North America has been the main market for organic quinoa between 1995 and 1999, with yearly acquisitions between 550 and 1150 tons. To these must be added the USA and Canadian production of quinoa with costeño ecotypes corresponding to 300 tons for the first years, and 200 tons for the last years. The United States are the main North American market, importing since 1998 an average of 900-950 tons yearly. The quinoa market in this country has been promoted and developed by Quinoa Corporation, an enterprise that buys more than 50% of the United States imports. Nevertheless, the demand from this country grows, though in an irregular manner, meaning with this that it is lower than the projections made by the quinoa importers, producing year after year over-storage of quinoa (Graphic 3).

[35] : My own elaboration based on exports data from Ecuador, Peru and Bolivia, provided by the Central Bank of Ecuador, Customs from Peru, and the Bolivian Institute of Exports and the Exports Window System from Bolivia respectively.

Graphic 3: Evolution of quinoa imports in non Andean countries, by weight



My own elaboration adding up the non-Andean exports from Ecuador, Peru and Bolivia.
Sources: Central Bank from Ecuador, Customs from Peru, INPEX-Bolivia and SIVEX-Bolivia.

Since 2000, Western Europe has become the main market for organic quinoa, buying 850 tons in that year of low global demand, to import afterwards 1200 and 1300 tons in 2001 and 2002 respectively. In 1996, France became the main European market for quinoa. Since 2001 this country imported directly 500 tons a year, besides some 140 and 160 tons being imported through the Netherlands in 2001 and 2002 respectively (Graphic 3). The rapid growth of the French and European demand is explained by the specialization of two French companies (Euronat-Priméal and Markal) in the industrialization and trade of organic quinoa, which were the ones to assume the promotion of quinoa in the French market and part of the European market. These firms have managed to contact supermarket franchises, making of France the only non-Andean country where quinoa and its byproducts are commercialized in supermarkets, besides the traditional retail centers such as organic and health products shops. The German demand, where quinoa has not yet reached the massive retail centers such as supermarkets, has not grown since 1999, oscillating around the 270 tons, among which 40 tons pass through the Netherlands. Also, Holland is the entry port for some 70 tons aimed to GEPA, an association that promotes, retails and redistributes products in the market willing to be fair trade in Germany. This fact shows us that the German market yet evolves, having grown from some 250 tons in 1999 and 2000 to 310 tons between 2001 and 2002. Subtracting the Netherlands imports that go afterwards to France and Germany, we can say that the quinoa demand in this country is stagnated around the 100 tons in 2001 and 2002. Also, the consumption in the other countries of Western Europe is even more marginal although it has increased since 2001 and is restricted to the market willing to be fair trade[36] and the health products market. Most quinoa bought by these countries is re-

[36] : We understand by market "willing to be fair trade", the actors (quinoa processors, importers, distribution intermediaries and retailers) that have promoted the principle of solidarity with small farmers, and have tried and been ready to pay more and contribute to strengthening the livelihoods of small quinoa growers.

exported again from Holland and Germany. England buys quinoa re-exported from Holland and the United States. The other European countries buy some quinoa re-exported from Holland, if it is for the organic health market, and from Germany if it concerns market willing to be fair trade.

Let's point out that there is not an official fair trade market with labelled actors, since there are no regulations for it. However, the current growth of European fair trade market asks for enlarging the pallet of fair trade certified products, one of which is quinoa. That is why importers and traders currently performing and willing to be certified as fair trade, once the official standards are implemented, have already stimulated the interest of European consumers on it. Even French supermarket groups (CARREFOUR, Monoprix, Cora, Leclerc, Super U) have chosen this marketing strategy in which quinoa has also been promoted.

Currently, yearly quinoa fair trade represents about 600 tons of quinoa (400 for France, 80 for Germany, 80 for the Netherlands and 30 for the rest of Europe). Most of the import for potential fair trade is coordinated by GEPA, which re-distributes imported quinoa and coordinates the direct exports from Bolivia to the European importers, mainly French, Italian and Dutch. The promotion of quinoa in the European market willing to be fair trade is coordinated by a series of local associations linked to a fair trade global network (Fair Trade Labelling Organizations - FLO) to which GEPA is associated. Also, around 80 tons of Valle quinoa coming from the Chimborazo Corporation, with the mediation of the United States based Inca Organics, are sold by Infinity Foods in the United Kingdom. This company, not involved in GEPA's network, is interested in selling and being fair trade labelled. In the USA, fair trade has recently been launched on the basis of two keys product whose prices are affected by speculating markets (coffee and cacao). That is why there is still no interest on selling products with less demand, such as quinoa, for this kind of recent markets.

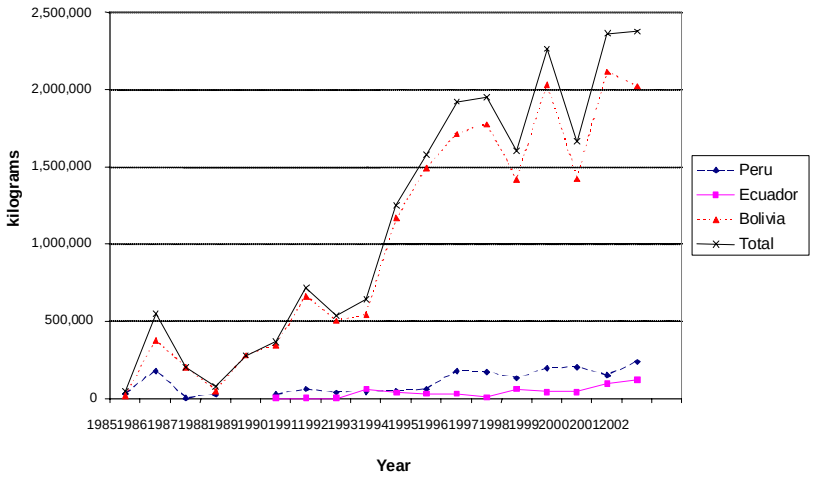
Finally, let's underline that in absence of fair trade regulations, some actors of the European market commit some irregularities. Some 200 tons sold in this country by the CARREFOUR group do not really correspond to the fair trade, as the producer in the Southern Altiplano from whom the quinoa is being bought is paid between 3 months to 2 years after having delivered its quinoa to the Jatary enterprise[37], a subsidiary of Euronat-Priméal, the supplier for CARREFOUR. The lack of a global regulation for quinoa fair trade allows this kind of extortion. Also, it allows the constant re-negotiation of the willing-to-be fair trade quinoa price, a situation that could be translated into prices lower than the ones paid by some private companies.

Considering the exports performance of Andean countries, important differences need to be underlined. From 1990 to 2000, Bolivia controlled 88 to 95% of the global quinoa exports, exporting only varieties from the Real eco-region (Laguna, 2003; graphic 4), and having exported to 22 countries since 1991. Besides, Bolivia was the first country producing organic quinoa (since 1991), having carried on its first exports in 1993. The

[37] : While this company offers the higher price for the producer (175 Bolivianos the quintal against 120 to 160 Bolivianos the quintal), it only pays 5% at the moment of buying, paying the balance afterwards.

access of the Bolivian quinoa to important markets is the result of long term commercial relations established many years ago. Also, because of the "quinoa real" morphology, its white color, big and swollen, this type is quite fancied by almost all importers and intermediaries of the quinoa chain in France, Germany and Holland, and in many of the new markets (Colombia, United Kingdom, Belgium and Canada) and the United States. The main importers in Europe, principally Priméal-Euronat and Markal, have invested in subsidiary companies in Bolivia, Jatary-Tunupa and Quinuabol respectively, and they intend to protect their investments trying to convince their customers and consumers that "quinoa real" is the best quinoa, based on its morphological characteristics. However, several customers buying quinoa, principally those already involved in fair trade are not worried by this argumentation.

Graphic 4: Evolution of Andean quinoa exports in weight



Sources Central Bank of Ecuador, Peru Customs, INPEX-Bolivia and SIVEX-Bolivia

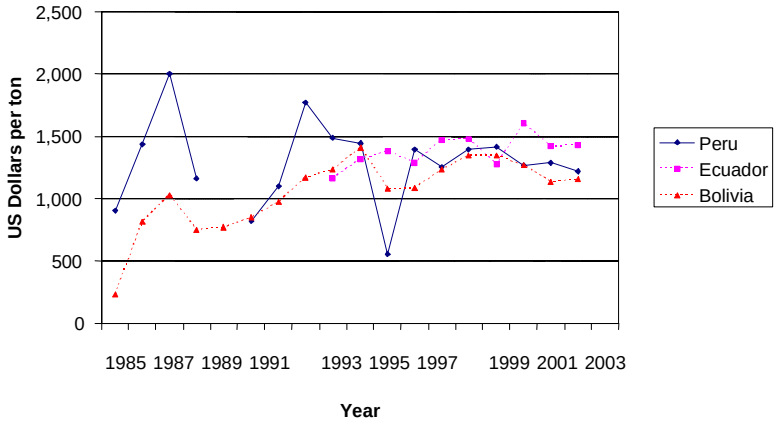
The sales in France take place mostly because of the relation existing between Euronat-Priméal and Markal, in one hand, and their subsidiaries in Bolivia in the other hand. The access to Germany is made through the close relationship existing between GEPA and ANAPQUI, a relation that also makes possible for the latter to have access, directly or through the former, to European markets, including France and the Netherlands. Besides, the exports towards the latter country, Germany, Belgium, Canada and the United States are made through "brokers" with whom certain exporters, particularly the Central de Cooperativas Agropecuarias Operación Tierra (CECAOT), have long term trustworthy commercial links. Finally, the access of Bolivian quinoa to the United States tends to diminish the importance of long term relations based on fair trade criteria and commercial trustworthiness. Most exports are based instead in low-cost relationships, a criterion with which the Bolivian quinoa is more competitive than the one from Ecuador and Peru, except for the relation between ANAPQUI and Quinoa Corporation. Although this company demands from the organization of producers a somewhat similar price to the other Bolivian exporters, it needs to buy from it an important quantity of quinoa to justify its marketing strategy in the United States, based on the promotion of the

indigenous knowledge and the support to the improvement of the living conditions of small producers.

To compete, Ecuador and Peru sell in new markets (New Zealand, Mexico, Belgium and Spain), mostly in the United States and some in Canada, where the consumer is used to buying brown colored costeño quinoa. Both countries have adopted somewhat common strategies to access this market having increased their participation in quinoa global market and reduced Bolivian exports that represented 83% of worldwide registered exports in 2002 (graphic 4). In Ecuador ERPE has an alliance with Inca Organics, based on fair trade criteria. This allows it to develop its commerce towards the United States with a marketing strategy based upon the promotion of consumption and preservation of heirloom biodiversity of local Valle-type quinoa, and upon characteristics of non polished (washed) grains of dark color, arguing its higher content of fiber and proteins. In turn, INAGROFA sells to Eden Foods, also from the United States, less than 20 tons of conventional quinoa Valle type. This is mostly transformed into flour, to be partially commercialized while the rest becomes ingredient for pasta. Peru partially chose the biodiversity strategy selling colored quinoa (pisankalla) to Quinoa Corporation. Nevertheless, these sales are very limited (less than 25 tons) and marginal in relation to the other Peruvian exports that at a great extent concern Bolivian quinoa "real" (more than 100 tons). Besides, Peruvian exports tend to stagnate due to the bad quality of the quinoa "real" sold with a classification and selection that does not remove all impurities (Graphic 4).

The low Peruvian and Ecuadorian exports are not only explained by their lack of quinoa "real" production, but also because of the average export prices. From this point of view, Ecuador is the less competitive among the three Andean countries (Graphic 5) exporting the ton in more than 1,400 US$, while Peru does it in 1,200 US$ and Bolivia in 1,150 US$. The average Ecuadorian export price only reflects the over expenses in processing and mainly in production (Table 1).

Graphic 5: Comparison of the quinoa export prices in the Andean Countries



Sources: Central Bank of Ecuador, Peru Customs, INPEX-Bolivia and SIVEX-Bolivia

Let's point out that the commercialization strategies developed to date by Ecuador, Peru and Bolivia have some different risks. On the one hand, Bolivia must improve the methods of plague control to avoid the use of chemical insecticides by some producers with organic certification. Also, Peru and Ecuador have problems in relation to the organic origin of some of their quinoa. The quinoa "real" re-exported by Peru is not organic, and is processed before their import in Peru, using the wet via in Bolivian rivers contaminated with human waste. Also, Ecuadorian quinoa sold to Eden Foods is essentially conventional but is sold as organic to the final consumer. This situation is risky for the Ecuadorian quinoa image. Finally, the commercial strategy adopted by Inca Organics, partner of ERPE, is somewhat risky. In fact, the humid method eliminates almost half of the vitamins found in the grain. Besides, the protein gains in comparison with the dry method are not very important (6%) and can be compensated in function to the protein content of the varieties processed. The same can be said of fiber. In fact, polishing can only destroy part of the embryo, where the fiber present in the grain before polishing concentrates, producing, as in the case of protein, small fiber loses. Finally, fiber is not the most important nutritional argument of quinoa. Evaluating his own research and those of several actors, Koziol (1992) estimates the quinoa fiber content in 3.8%, bigger than the one found in wheat and maize, but smaller than the one found in barley (4.4%), rice (6.4%) and mostly in legumes such as beans (5%), soy beans (5,6%) and tarwi or chocho (14.6%).

It is also important to underline that since the mid 1990's organic quinoa is being overproduced. Its demand in northern countries has a low growth, actually being around 2,500 tons/year, whereas Andean organic quinoa offer is over 3,750 tons/year. **This situation has lead the northern importers to take advantage and decrease the FOB prices paid for quinoa to Bolivian exporters, from 1,340 US$/ton in 1998 to 1,100 US$/ton in 2003**, with more emphasis in United States market that used to pay 1,400 US$/ton (FOB prices) in 1999 and pays between 950 and 1,100 US$/ton in 2003. **Even fair trade importers such as GEPA have reduced the price paid to small peasants' organizations. From 1993 to 2000, GEPA paid ANAPQUI a between 1,400 and 1,500 US$/ton of organic quinoa and while in 2003 it pays 1,250 US$/ton of organic quinoa.** This situation has also affected Peruvian exporters who have decreased their export FOB price from 1,450 US$/ton in 1999 to 1200 US$/ton in 2002 (graphic 5), to be able to compete. Meanwhile, Ecuadorian quinoa is still not affected by this situation because of the predominance of the trade relationship between ERPE and Inca Organics, who wants to provide high price to small farmers paying a FOB price of a little bit more than 1,400 US$/ton. However, this situation will necessarily affect the price of Ecuadorian exports to news markets.

The internal market in Andean countries

The markets in the Andean countries are more involved with conventional quinoa and at a lesser extent with the organic quinoa retailed by the producer when he cannot do it in the export market. The quinoa sold mostly in popular markets has no real quality

standards, while the packaged quinoa sold in the supermarkets has to abide to the national sanitary regulations. The Bolivian market has currently a volume slightly higher than 15,000 tons, from which half is self-consumed by the producer itself. This market tends to grow due to the recent implementation of a lactation benefit policy which should buy 2,000 tons yearly, and due to the promotion by the State, Dutch Government Cooperation and the international organizations, to the development of a quinoa "real" chain. Most quinoa "real" produced in Bolivia is conventional, being mostly consumed in Bolivia and secondarily traded in a non-registered manner[38] to Peru, at the yearly rate of 4,000 to 6,000 tons, and in the third place is exported in a registered manner (Laguna, 2002). Since the end of the 60's this country is the main external market for Bolivian quinoa, which is being sold mostly in retail, in Lima's popular neighborhoods, and in a more reduced scale packaged in supermarkets of that city, where only one brand sells Peruvian quinoa. Before being distributed through these centers, quinoa "real" is selected and packaged in several small companies of this city. In general, Bolivian and Peruvian quinoa has no problems sharing the Peruvian market, which has a yearly consumption close to the 34,000 tons (Table 2). Except for the reduced exports, almost all the Peruvian production is used to satisfy the national market that is also enlarged by the state policies on food security and the promotion being currently made for this grain by research and cooperation programmes and by private companies.

Table 2: Evolution of the Peruvian consumption of quinoa in tons

Year	Peruvian Production	Official Imports	Non registered Imports	Registered Exports	Total Consumption in Peru
1990	10,679	20	1,700	22	12,377
1994	16,629	197	4,000	49	20,777
1998	28,614	21	4,200	137	32,698
1999	28,439	80	4,500	199	32,820
2000	28,382	40	6,500	263	34,659

Source: Laguna (2002)

The Ecuadorian market is much smaller than the former two, but it is growing, having reached the 850 tons in 2001 (Baquero et al., 2002). From these, 400 tons are of quinoa "real" and the other 200 tons of quinoa Altiplano entering the country in a non-registered manner. This quinoa is sold in supermarkets, retail markets and neighborhood shops. According to the companies selecting and packaging grains (La Pradera and Más Corona) the offer of imported quinoa contributed significantly to the increase in the Ecuadorian demand of quinoa. According to them, the consumers show also preference for big, white and swollen grains. These companies and partly the supermarkets chain Supermaxi use Ecuadorian quinoa to make flours and only pack Peruvian and Bolivian pearled quinoa, which they cannot import in a registered manner because of the opposition by the Ecuadorian Ministry of Agriculture, while some companies still maintain their preference for Ecuadorian quinoa (INAGROFA, partially Supermaxi, and El Sabor, see Appendix 2). Because the existence of the Andean community of nations allows the importing of

[38] : Many authors consider this kind of trade as smuggling, committing an appreciation mistake as Ecuador, Peru and Bolivia belong to the Andean Nations Community where quinoa has no import customs duty. Instead, this kind of trade constitutes an evasion of the Added Value Tax, as the transactions are not registered escaping in this manner the internal taxation.

quinoa without customs duty one cannot talk of disloyal competition when referring to the importers of Peruvian or Bolivian quinoa. On the contrary, it is a loyal competition based upon quality, as the consumers prefer the imported grain which has a price (in the processing plant) of 25 US$/qq, slightly higher than the price of Ecuadorian quinoa (24 US$/qq).

The performance of quinoa growers' organizations in global trade

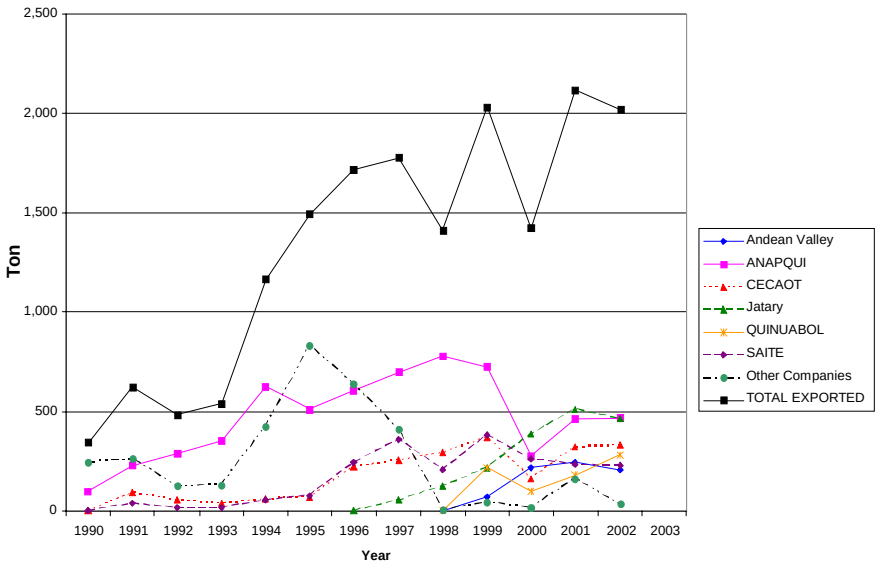
The Asociación de Productores de Quinua y Cebada Anta, APAAL, APROAL, APROA and PROQUILL do not have processing factories, have a reduced market and exclusively depend on private companies or NGOs to sell their quinoa production. Only two of them (APAAL and APROAL) are organic certified with funds coming from NGOs sponsoring them. In this section, I will evaluate the performance of the quinoa grower's organizations (CECAOT and ANAPQUI) that have an important role in global organic quinoa chain, and of the organizations (PPQS and ERPE) that could have this importance in a very close future in association with private companies.

CECAOT: small increase with no fair trade link

Despite the aid received, CECAOT had important management and corruption problems in 1994. In one hand there were no clear management rules and processes and no leadership trained in management and trade activities. In the other hand, CECAOT's adviser, manager and some leaders robbed important amounts of money. These problems pushed the organization's members to look for alternatives aimed to solving management processes. A 50,000 US$ programme was launched in 1998 funded by the Canadian State Cooperation and carried on by Socodevi, a Canadian NGO of the cooperatives board of this country, in charge to support cooperatives development all around the world. This programme implemented management and trade training for leaders and organization affiliates and allowed to establish management rules and processes. Currently, CECAOT seems to have an improved financial and management situation and has not anymore external support. CECAOT has specialized on the export of organic quinoa and, mediated by its European broker, has increased its sales that surround 300 tons per year. Even though CECAOT does not sell to the fair trade market and although it has been ignored by actors involved in this kind of market, it has become the third Bolivian quinoa exporter (Graphic 6). Moreover, having no more external funding, CECAOT is also looking at the national market since 2002. Recently, with the application of decentralization measures and of policies for food security in Bolivia, this organization won the supply bid for the children breakfast programmes funded by the Potosi Municipality, and is daily providing 33,000 cookies' rations, representing a yearly amount of 83,000 tons of biscuits. Even if we could not obtain CECAOT's balances, we know that profits actually achieved are close to 150 US$ per ton sold in 1,000 US$. These are much lower than those earned by ANAPQUI, because CECAOT does not sell to importers working on fairtrade. However, this relatively good trade situation should not hide CECAOT's highly indebted (more than 700,000 US$) financial situation. To pay the loans, CECAOT has chosen to give the lowest price in the organic market to its

associates, around 120 Bolivianos/qq, 15 US$/qq. Despite this decision, the sales expansion and management stability of CECAOT and the lack of known corruption, have stimulated quinoa growers of Nor Lípez to join it.

Graphic 6: Performance of Bolivian quinoa exporters by weight exported



Source: INPEX Bolivia for 1990-1994 and SIVEX-Bolivia for 1995-2002

ANAPQUI: the growth of vulnerability and fair trade dependency[39]

Initially, because of the lack of competition, ANAPQUI has largely dominated Bolivian quinoa exports from 1993 to 1999, and as a result it was the worldwide main trader, increasing its sales from 220 tons in 1992 to 780 tons in 1998 (Graphic 6). However, in a more and more competitive context ANAPQUI has lost markets. This attitude had serious consequences on ANAPQUI's trade activities. Euronat-Priméal and Markal never where committed with ANAPQUI, nor with other small quinoa growers' organization, and stopped to import quinoa from this organization, revealing hidden strategies based on vertical integration through the creation of their Bolivian subsidiary companies[40]. These are in charge of buying quinoa directly from independent growers and of processing it afterwards and exporting it. Simultaneously, problems of quality, packaging and schedule fulfillment, led Quinoa Corporation to reduce considerably its deals with ANAPQUI. Like the rest of the importers from the United States, where fair trade is still not

[39] : For more details see Laguna (2003).

[40] : Priméal-Euronat started to sell and process quinoa in 1989, in association with CAM, a Bolivian private company, who was its provider. In 1994, Priméal-Euronat ended its partnership with CAM after a struggle and, obliged to look for a provider able to supply important quantities, established trade relations with ANAPQUI.

promoted, this company wanted to reduce its costs and shifted to another cheaper Bolivian provider.

Like the majority of Andean quinoa exporters, except for the French subsidiary companies, ANAPQUI never had a good knowledge of the quinoa market complexity and dynamic, and it did not develop a market strategy, even during the presence of non-peasant technical staff in the organization. It did not try to increase its knowledge of quinoa market, neither to develop a trade strategy, waiting to be contacted by foreign buyers. However, in 2001 the growing fair trade demand of European importers (GEPA, AlterEco, Solidar'Monde, and others in Germany and the Netherlands) allowed ANAPQUI to partly recover its sales, reaching 450 tons per year (Graphic 6). Moreover, 2002 was an exceptionally good year for ANAPQUI because it sold, through an invitation, 450 tons which provided an overhead of 95,000 US$, thanks to the Italian Cooperation Agency support to food security programs in Bolivia. Beyond this exceptional sale that will not happen frequently, ANAPQUI remains economically vulnerable. Its dependency on the fair trade market has seriously increased. Sales to fair trade market represented 15% of ANAPQUI total sales in 1997 while they represent more than 60% at present. No signs of any marketing strategy to break this dependency are currently evident in foreign and local markets, such as municipalities' food security programmes. Financially, this means that ANAPQUI's profits could remain reduced because its profit point implies the sale of 400 tons.

ANAPQUI's outcomes were lower than those expected not only in a trade level, but also in an organizational dimension. Few leaders were prepared through the leaders training programme and very few of them were integrated into the organization's management and leadership. Simultaneously, with the retreat of cooperation and technical staff from organization's decision-making process and with the increase of funding, the leaders developed authoritarianism, some were involved in corruption too, and nepotism and reduced information flow to ANAPQUI's associates are current practices in a context of increasing regionalism and factionalism (Laguna, 2003). Nepotism is currently impeaching the application of internal quality pricing. Some regional organizations of ANAPQUI, particularly CEDEINKU, consider that the first should recognize the effort of the growers in providing grain of quality, free of chemicals and impurities. Facing the opposition of ANAPQUI, CEDEINKU has decided to trade quinoa by is own and through ANAPQUI.

These problems were early detected by SOS-faim, whom induced analysis processes in the organization that several times recommended changes for the creation of a control structure and management independency, which were not applied until 2000. These behaviors can not only be explained by the lack of information, transparency and members' control but also by the absence of identification with the economical and political project initially proposed for ANAPQUI (Laguna, 2003). In fact, for several growers the added value is the essential structuring factor in ANAPQUI, an organization that has become for them only a way to trade and that now could be avoided by selling to one of the private companies and organizations exporting quinoa that have proliferated since 1995.

For several years, the aforementioned problems have produced staff and activities instability that affected ANAPQUI's trade and management efficiency. Since 2000, ANAPQUI does not have managers and it is managed by its board, composed by peasants with no specific knowledge in this domain, and in quinoa international markets, having therefore made several mistakes that affected ANAPQUI's performance. This choice follows pro-indigenous ideologies of current leaders that refuse to depend on external technical staff' advising and cooperation, which is discursively perceived as a loss of power and independency. This attitude reflects on the public vindication, some times arrogant, of ANAPQUI's self-finance capacities and a discursive refusal of financial aid, that is constantly looked for in private, and which more and more institutionally isolates the organization.

The absence of good management in ANAPQUI can be observed in several dimensions. **The organization has certified much more quinoa than it really sells. Despite sales growth, its collecting was very low** (around 35% of certified quinoa), and in several years its sales of organic quinoa were larger than the quantity of organic quinoa collected (Table 3). Therefore, there is a possibility that should be confirmed that conventional quinoa could have been sold has organic quinoa during some years. **Been obligated to certify the whole of the production of its associates, ANAPQUI gets in average a harvest of 1,200 tons per year while its current sales are around 450 tons per year**. **Lets point out that according to international organic regulations such as IFOAM, EU and USA-NOP standards, CECAOT and PPQS, respectively certified by IMO Control and Biolatina, are not obliged to organic certify the whole production of its members to set an internal certification system.** ANAPQUI's lower capacity of sale creates an arena for pressure of its associates over national leaders. **Wanting to increase their income selling their organic quinoa, they push national leaders to allow them to sale their surplus to private companies.** Concerned by their image and status the last always accept.

These ANAPQUI's policy favors private companies, particularly Andean Valley, Quinuabol and Saite, with whom it competes, providing them a subsidy because they do not have to pay the certification of the majority of organic quinoa they bought to peasants, which is paid by the first. Moreover, allowing its private competition to have lower export prices, ANAPQUI support the growth of their leadership in quinoa collecting in Bolivia and their sales and market parts and the distribution in Europe. These changes put the organization in a dangerous situation, passing from an overhead of 36,000 US$ in 1998 and of 13,000 US$ in 1999 to a deficit of 80,000 US$ in 2000, explained by the reduction of exports from 760 tons in 1999 to 250 tons in 2000 (Laguna, 2003). **The excessive overhead of certified organic quinoa paid by ANAPQUI compared with the real sales has contributed all along several years to increase ANAPQUI's deficit (Table 3). Since 2000, the reduction of the value of exported quinoa, included of the one sold to GEPA, has deteriorated this situation.**

Table 3: Efficiency of ANAPQUI to use its organic certified quinoa

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	TOTAL
Production (T)	198.99	215.59	178.92	535.02	784.44	1,024.47	1,267.28	826			4,312.75
Collected Production (T)	86.7	162.72	201.82	309.76	556.86	458.16	374.34	143			1,521.50
Exports (T)	80.50	186.20	146.84	271.00	369.00	438.50	745.84	236.01			1,626.35
Sales in national market (T)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00
Equivalence of sales in gross quinoa (T)	87.50	202.39	159.61	294.57	401.09	476.63	810.70	256.53			1,767.77
Balance producer	112.29	52.87	-22.90	225.26	227.58	566.31	892.94	683.00			2,791.25
Balance producer %	56%	25%	-13%	42%	29%	55%	70%	83%			65%
Balance ANAPQUI stock (T)	-0.80	-39.67	42.21	15.19	155.77	-18.47	-436.36	-113.53			-246.27
Balance ANAPQUI stock %	-1%	-24%	21%	5%	28%	-4%	-117%	-79%			-16%

Source: ANAPQUI

Management problems are also evident in other forms. Money and resources are still managed in an informal manner, with people carrying important amounts of cash money and without clear registers of this, leading to important money losses. For example 25,000.00 US$ have been lost in 2002 when an accountant carried this amount with him instead of transferring it through bank. Management problems are also evident on the organization's monitoring of financial execution and situation, unknown by leaders and incredibly by accountants who do not seem concerned by this. Another example: ANAPQUI has a loan of 150,000 US$ with 8% of interest rate to refund and its food factory is still not completely installed, having bought equipment that is not always adapted. Nevertheless, grassroots members and some leaders want to invest the 2002's exceptional overhead of 95.000 US$ in public telephone cabins, petrol stations, social insurance for associates, etc. A balance needs to be found between financial necessities and investment intentions following a management analysis.

PPQS: The need of fusion to survive

PPQS has not only been affected by the difficulty to find markets but also by its leaders' corruption, concerning tens of thousands of U.S. Dollars. After a long desert crossing, PPQS decided to invest in organic production and started a certification programme, being certified by "Biolatina", a Latin American organic certification company supported by the GTZ (the Official German Cooperation Agency). In 2002, PPQS sold quinoa to Jatary-Thunupa and since 2003 it is associated with Irupana Andean Organic Food, a Bolivian company producing several food products with quinoa (pops, granola, cereal bars, flakes and flour) with regular quality (Appendix 2). PPQS buys quinoa to its associates, makes the selection and afterwards sells it to Irupana, who continues the rest of the process and eventually industrializes part of this grain to sell it afterwards. Irupana and PPQS have agreed to set up a common company in which individual members of PPQS would have 33% of stocks, while the private firm will have the remaining capital. Irupana has no economic funding and has submitted a proposal to the Inter-American Foundation in the hope to be funded. Nevertheless, the constitution of this company will make PPQS not anymore important for its current associates who will also be members of

the new company. This means, that this option will affect the existence of economical activities of PPQS because it will not anymore imply the use of its factory. It might also affect the compromise of some of its members who will not anymore need to be affiliated to PPQS to sell their quinoa and will be able to leave the organisation.

The Chimborazo Producers Corporation and its shoot out grain

Until now, the outcomes of the Chimborazo Corporation have depended on ERPE's performance that has become the dominant Ecuadorian quinoa exporter. The good export prices paid by Inca Organics allowed ERPE to transfer the majority of the received value to the quinoa producers, initially paying 55 US$/qq in 1998 and 40-35 US$/qq in 1999. This price's policy stimulated peasants of the Riobamba region to increase their areas under quinoa production and to multiply quinoa production. In this way, the production of peasants working with ERPE passed from 50 tons in 1998 to 826 tons in 2002 (Table 4). However, ERPE's collected production was much lower, being around 43% of the certified quinoa, despite having grown from 38 tons in 1998 to 403 tons in 2001, to decrease again to 143 tons (Table 4). Moreover, ERPE's did not the plan quinoa production according to the demand. That is why its sales were much lower than the quantity of collected quinoa,[41] exporting 25 tons in 2000, around 100 tons in 2001 and 2002, and having subscribed agreements for 168 tons in 2003. This situation created an initial huge overstocking of 400 tons to which part of 2003 harvest must be added (Table 4), and also the immobilization of the working capital equivalent to 299.000 US$[42] representing 46% of the funds received by ERPE for this project. In this context, ERPE lost 180.000 US$ until the end of 2002. This loss is also explained by the high price paid to quinoa growers, the higher price in Andean region, based on a false evaluation of farmers' production costs[43].

Being aware of these problems, ERPE has considerably reduced the price paid to quinoa growers to 30 US$/qq, and also has decreased the quantity of certified production, which passed from 826 tons in 2002 to 400 tons in 2003. Simultaneously, ERPE has cut down the quantity of organic quinoa collected, buying only 17% of the 2002 production, and allowing a stock overhead of only 25% of bought grain (Table 4). This practice shows the

[41] : Like Baquero and al. (2002), we must underline that quinoa exports of ERPE are much higher than official statistics given by the Central Bank of Ecuador.

[42] : We consider an average value of 35 $ US$/qq.

[43] : ERPE and Chimborazo Corporation's evaluations of costs do not exclusively consider the real monetary farmers' costs. Their calculation considers as costs the domestic non-monetary inputs and services coming from breeding activities such as manure or animal traction force. If these costs were calculated they should at least be considered as income generated by breeding activities, immediately consumed in cropping activities. Indeed, their availability allows to avoid obtaining them outside the domestic farm. Moreover, these calculations consider domestic labor as a predefined value cost, forgetting that farmers are independent workers perceiving their income, and rewarding their work, once the agricultural cycle is over, therefore with no insured income until the harvest and sale have passed. Indeed, their income depends on the quantity harvested and on its market price. In a general perspective, false evaluation of cropping profitability and costs currently happens in several NGOs and technical institutions from the Andean region that, only when they do this evaluation, used to assimilate peasants to private companies having only engaged working force.

will to try to plan organic production or offer in relation to the demand, and to avoid the collapse of this Project.

Table 4: Relation between ERPE's quinoa organic production and trade until the end of July 2003

	1998	1999	2000	2001	2002	2003	TOTAL
Production (T)	50.00	80.00	189.00	369.00	826.00	400.00	**1,914.00**
Collected Production (T)	38.00	72.00	161.00	403.00	143.00	0.00	**817.00**
Exports (T)			25.00	104.00	102.00	168.00	**399.00**
Sales in national market (T)				0.96	1.38	2.07	**4.41**
Equivalence of sales in gross quinoa (T)	0.00	0.00	26.04	109.33	107.69	177.16	**420.22**
Overhead producer	12.00	8.00	28.00	-34.00	683.00	400.00	**1,097.00**
Overhead producer %	24%	10%	15%	-9%	83%	100%	**57%**
Overhead ERPE's stock (T)	38.00	72.00	134.96	293.67	35.31	177.16	**396.78**
Overhead ERPE's stock %	100%	100%	84%	73%	25%	/	**49%**

Source: ERPE

ERPE needs urgently to increase its sales to consolidate its financial situation. However, in one hand it did not find new markets. In the other hand, Ecuadorian quinoa is only sold in niche markets dominated by the Bolivian quinoa "real" (United States, Great Britain, Spain and Canada). The argument used by ERPE and Inca Organics to sell pearled washed Ecuadorian quinoa, stressing its higher protein and fiber concentration, is very vulnerable. The washing produces huge losses of grain vitamins, while abrasion used in Bolivia and Peru reduces in very low quantities the concentration of protein and fiber, which could be easily compensated using varieties with high levels of fiber and protein. ERPE is also limited because it has not developed quinoa food products and its attempt to produce pasta failed due to the lack of hard wheat production in Ecuador.

ERPE and the Chimborazo Producers Corporation are also planning to create a common company. This intention responds to the ERPE's will of sharing the benefits of quinoa processing and trade with the growers, further from the profit they obtain producing this grain, and of guaranteeing and providing better management and trade skills. This ERPE's attitude could be perceived as paternalistic, but with the previous management problems having affected many quinoa growers' organizations and with the context of increasing competition that requires good knowledge, this solution could in a short and medium term be the best way to consolidate, in a management and trade perspective, the Chimborazo corporation.

Finally, the fusion between ERPE and the Chimborazo Corporation in a common company could help to improve planning between organic production and demand, and to decrease the pressure from farmers that would demand more quinoa organic certification and trade. However, this option needs the implementation of alternative organic and fair trade crops and breeding, to compensate the reduction of organic quinoa production that could be used as ingredients on organic and fair trade food.

Key points of small farmers' organizations performance regarding fair trade standards

Andean quinoa growers' organizations have developed capacities to sell and fulfill organic quality requirements and have contributed, particularly in Bolivia and Ecuador, to increase the income of their associates. Their links with NGOs and private companies

from northern countries, many of which are involved in fair trade, have strengthened and contributed to this achievement. However, their sales have become essentially dependent on fair-trade market and the volume sold seems to have a low growth, particularly for Bolivian and Peruvian organizations, while private exporters, less and less committed and dependent on them, are still increasing their sales.

In a market context more and more competitive context, Andean quinoa growers' organisations have high processing and exports costs. In one hand, these higher costs lie on wrong choice regarding certification companies or on the absence of cheap energy supply in their processing factories locations. ANAPQUI is obliged by local organic regulations to certify the whole of its associates' quinoa production despite considering its required trade volumes. This pushes ANAPQUI to allow its associates to sell of surplus organic quinoa to Bolivian private companies to which it might compete, practice that is equivalent to subsidy the lasts. On the other hand high costs lie on the location and techniques to process quinoa. CECAOT and PPQS have processing plants located in regions without connection to the national electric energy supply network having to use diesel generators. Certainly, PPQS has inherited this condition from its former sponsor, a European Union cooperation program, but given more importance to identity than profitability CECAOT members have chosen this option to settle this factory in the production region. In Ecuador, ERPE has taken the humid processing way to comply immediate market requirements. This organizations are aware of the costs of this choices and look for solve them. CECAOT plans to move its factory to Challapata a city with electric power supply, PPQS is confident in its association with Irupana that will allow them to process quinoa in the factory of this company based in La Paz. ERPE wants to implement a parallel dry processing by grain polishing. Finally, let us underline that Southern Altiplano quinoa growers' organizations have partly seen their costs increased by some corruption, factionalist and nepotist practices.

Finally, the quality of quinoa proposed by Andean small growers' organizations, excepted the one coming from El Altiplano, might have impurities and metal particles because of the lack of stainless steel processing machines and of continuous processing line. The majority of Andean private exporters are also concerned by this limit.

In this context, the subsidy of private exporters by quinoa growers' organisations should be avoided through clear standards forbidding individual quinoa producers to sell organic quinoa whose certification has been paid by growers' organizations to private exporters.

The premium of fair-trade labelling might also be useful supporting these organizations in facing these problems. It could be invested in improving the quality of the grain desaponification and classification buying stainless steel parts of machines. This premium could also be used developing marketing capacities, in order to avoid an exclusive dependency on fair trade. This support should also concern management enforcement and stability and market knowledge, independently of who will assume these tasks inside the organization. However, in the case of organization with rooted tendencies to instability and self sufficient leaders deprived of particular knowledge on this issues this changes might be suggested, accompanied, rather than imposed.

We have also seen that the majority of small farmers' organizations have week financial situations. Certainly financial support could help them not only for buying grain to their associates but also for improve weakness before mentioned. Organisations such as ANAPQUI, CECAOT, PPQS have already received important amounts of donations and could be financially strengthened only depending on them selves, dispute some ambiguous claims for having additional donations particularly in the case of ANAPQUI, which alternate with self financing vindications. Considering the expensive credit in the Andean region, where interest rates are high (16 to 23% per year), it is likely that small farmers' organizations, and especially those with low levels of sales like APAAL and APROAL, might not be able to obtain it. For this reason we consider that pre-financing support will be welcome on quinoa fair trade relationships and standards.

Having shown the usefulness of quinoa fair-trade premium and pre-financing for quinoa growers' organizations, we suggest FLO to encourage debates among their associates to consider investing part or the totality of it in solving these organization limits but also in increasing internal democracy and the participation and identification of its associates.

Certainly, a long-term relationship is needed to allow organizations to resist competition and to preserve their part of market, and if possible increase it. However, we should not believe that providing long term trade relationship will be enough to set up sustainable quinoa growers' organisations. This effort will be close to ploughing in the desert if there not was any parallel support in the achievement of organizational strengthening based on democracy and transparency and in increasing their associates identification and participation. Certainly, this weakness is more visible in old organizations having no longer important support of external organizations such as ANAPQUI, CECAOT and PPQS, but should not be unconsidered in recent organizations still dependent on management carried by external support. As a first step facing this challenge, the network of actors directly or indirectly involved in fair-trade willing to support quinoa growers' organizations in a long term process should think in extend their relationship to grassroots members avoiding traditional contacts merely centered with leaders of organizations. This choice could help to consolidate an information flow inside these organizations, but also in providing space for wider participation and for identifying and strengthening elements of internal cohesion. This process hat might be transcripted in additional aims and activities that could be so important and even more relevant than trade issues.

Part 2: Livelihoods of small peasants working with quinoa growers' organizations

Brief presentation of farming systems

In Ecuador and Peru the farming systems have an important integration between cropping and herding. Comparing Andean quinoa growers, those from Riobamba, an ex-hacienda region, have the lowest land tenure which they essentially use for cultivation. Human density is high and land is scarce. That is why in last decade the indigenous communities

have divided the majority of the collective humid rangeland located at high altitudes (3400-3500 m), called páramo. This land has been given to young families to allow them to cultivate. Currently, in Colta and Coloumbe households have less than 0.8 ha, and up to 1.5 ha in Guamote. These families cultivate several imported crops (wheat, barley, rye and oat) and native crops (quinoa, lupine mutabilis[44], corn, broad bean and Andean roots-oca, mashua, melloco and potatoes) mainly for self-consumption and secondary for monetary needs. Barley is the main crop produced because of its importance for feeding bovines. Quinoa cultivated areas have grown since the ERPE's project started, and now quinoa areas represent in general the second cropping area of Colta and Columbe households. There is no important area difference among these crops. Barley, oat and rye are mainly cultivated to feed one or two bovines in Columbe and Guamote, or none to one in Colta, which provide manure and traction force for cropping activities (plowing, harrowing, seeding and hilling). In some communities, very small plots of carrots, onions and cabbage are also cultivated for self-consumption. Alfalfa and ray grass are also cultivated in some communities to allow bovine milk and cheese production. However, in the majority of communities where the cropping area has grown to the detriment of páramo, bovines have considerably decreased in number. Despite the consecutive reduction of manure and animal traction force, households have low inputs dependency. Having low incomes, they buy small amounts of external inputs, mainly manure. To control pests they implement long multi crop rotation cycles that reduce the presence of pest and the necessity of pesticides. However, reduction of soil fertilization produces yields fall. Besides the agricultural activities, Riobamba farmers mainly get money through breeding activities. Besides herding bovines, they herd little animals such as 2 to 7 sheep, 1 or 2 pigs, 20-30 guinea pigs, and several chickens. Finally, the expansion of cropping areas has favored soil erosion in plots with important slope and low vegetation cover. Soils degradation is quite limited but tends to increase, and manure use alone does not help to preserve them. That is why infrastructures are also needed in plots with high slopes.

In Anta-Cuzco and in the Peruvian Altiplano surrounding the Titicaca Lake, small farmers have more land and more crop production than in Riobamba. In general, they cultivate 3 to 6 ha, with several crops (potatoes, barley, quinoa and broad bean). In the Anta region they also produce corn, alfalfa, wheat and oat, while in the Peruvian Titicaca Lake shore they grow Andean roots, cañihua[45] and lupine mutabilis. Potato and corn are cultivated in important areas, mainly as cash crops, whereas others crops are sold only when household self-consumption is satisfied. Farmers have moderate inputs consumption for cropping activities. Generally, they buy chemical fertilizers and tractor services for plowing and harrowing, with the exception of the very poor farmers. Long crop rotation cycles with 3 or more crops and 4 to 7 years fallow reduce pest attacks, with the exception of the Cuzco region where there is high potato production and pest presence, so chemical pesticides are used for potato and quinoa production.

[44] : Called in Ecuador by the name of Chocho and in Peru and Bolivia by the name of Tarwi.
[45] : Cañihua, *Chenopodium pedicaullae,* is a plant from the same family and gender as quinoa, but slightly lower in protein level.

Nevertheless, they utilize manure and traction force from bovines. Indeed, like in Riobamba, these peasants herd animals too; but having more fodder resources, they do it in greater quantities, especially for sheep and bovines. In Anta, grassland with alfalfa allows each family to herd 8-10 milk cows and some bulls. Many of such families have also private rangeland that they use for herding around 15 sheep. In the Titicaca shore where alfalfa cropping is harder by the absence of important irrigation, families exploit semi-arid private rangeland (in general 5 to 10 ha per family) and sometimes communal land, herding in average more than 30 sheep, 5 to 10 alpacas and 4 to 5 bovines. No evident important signs of environment degradation are evident in the Anta region and in the Titicaca Lake shore.

In the Uyuni salt flats bank from the Bolivian Southern Altiplano we find a different situation. Even if human density is low, hard climatic conditions limit the available cropping land. Potatoes and quinoa, and very small plots of irrigated fabea-bean and barley were cultivated in volcano slopes, with low frost risk. In the mid 80's, important demand for quinoa "real" and the availability of tractors and plough stimulated the quinoa production transfer from volcano slopes to pampas, and the increase of its area of production. Because only quinoa can tolerate the frost and low rainfall of the pampas, farmers have increased its areas of cultivation, especially in the second half of the 90's when - encouraged by the growth of the price paid to farmer (Table 6) – quinoa almost reached the whole area where frost is tolerable. Even in low prices periods since 2000, farmers have expanded the quinoa-cultivated area, trying to compensate their income reduction with an increase in the production area. In average, families from the Uyuni salt flats' shore have 8 to 10 ha of land, seeding half with quinoa every year and leaving the rest in fallow. However, land access can be heterogeneous in the communities where migration was important at the moment of the quinoa cropping expansion, where some families can concentrate more than 50 ha and even reach to 150 ha in some cases. The shift of the main agricultural area from the slopes to the pampas has turned the agricultural system in an almost mono cropping system. In volcano slopes, potatoes cultivation has decreased considerably and quinoa cultivation has almost been abandoned, whereas quinoa has been cultivated in pampas alternating one year of cropping with one year of fallow. Its expansion in the pampas has reduced the available rangeland for llama and sheep herding that provided a complementary income (Laguna, 2000a and b). That is why many farmers from north, west and southern Uyuni salt flats pampas (eg. Puqui and Mañica) have dropped this activity, which has remained only in regions located at the south of the salt flats southern shore, such as San Agustin, where quinoa production is more recent and has not reached the pampas until now [46].

However, the constant use of motorized plowing has induced soil erosion and largely increased pest presence. To preserve soils, organic producers, and some conventional too, have started to add dry manure to the soil when plowing is being done but in variable amounts, sometimes lower than those recommended for organic farmers, and many times much lower for conventional producers. Despite this initiative, soil degradation continues in the majority of the region because more manure is needed per hectare and manure reserves are not at all sufficient for the cropping area in production. Also, no scientific

l[46] : In general, herds are not bigger than 10 to 25 llamas and 6 to 25 sheep.

knowledge is available concerning the understanding of soil erosion processes neither alternatives for erosion processes and for manure application in more efficient ways.

Quinoa cropping

Comparing Andean quinoa cropping, important differences appear from one country to another. First, big inequalities exist concerning land tenure and quinoa cropping areas in the Andean region. Some extensive quinoa fields exist only in the Carchi and Imbabura region where there are a few big farmers and rare haciendas with important land tenure, of 30 ha for the former and more than 1000 ha for the latter. All of them are highly market-connected and cultivate several crops (potatoes, corn and wheat) in a conventional manner. Usually each big farmer cultivates an average of 6 ha of conventional quinoa, and few of them are organic; meanwhile, the few "hacendados"[47] can seed up to 50 ha of conventional quinoa. All of them do it under contract with INAGROFA. Quinoa fields also exist in few communities of the Mantaro Valley with big farmers. Compared with their peers from Carchi, these farmers have similar land tenure and cultivate in a conventional way similar crops, with 4 to 8 ha of quinoa, all with commoditization purposes. All these big farmers have capital intensive cropping systems, using motorized traction for soil work (plowing, harrowing, seeding and hilling), mechanical harvesting and threshing and high levels of chemical pesticides[48] and fertilizers (Appendix 1). Let's point out that in Mantaro Valley, many medium farmers are also present cultivating 6 to 12 ha, with 1 to 2 ha of conventional quinoa. They have somewhat capital intense systems, which is expressed in the bargain of motorized services (plowing, harrowing, harvesting and threshing machines) and the use of important chemical pesticides and fertilizers (Appendix 1).

Quinoa is mainly produced by small farmers cultivating less than 6 hectares. These are the almost exclusive providers of organic quinoa. However, big differences also persist among small farmers in natural and cropping resources tenure. Compared with other small farmers from the Andean region, those from the Riobamba province (Columbe, Colta and Guamote) have the smallest quinoa area with 0.15 to 0.25 ha seeded with quinoa (Appendix 1). Before ERPE's project, quinoa was scarcely seeded in association with other crops. Since the high prices generated for this project, quinoa, mostly organic, is seeded alone and has increased to the aforementioned areas. In Peru small farmers sow generally 1 to 2 ha of quinoa. However, the demand for quinoa coming from both countries is low and do not pull up its production. On the contrary, in the Uyuni salt flats' shore, quinoa "real" demand has stimulated the expansion of its production. In average, peasant families sow 4 to 5 ha of quinoa "real" (Appendix 1).

The majority of cropping systems and quinoa cultivation is done by small Andean farmers. Their quinoa production, like the hole cropping systems, is labor intensive and some of even highly intensive, and has capital intensity varying from none to medium.

[47] : In Spanish the "hacendado" means the Hacienda owner.

[48] : In this region, pests' presence is important due to the resistance developed to chronic intensive use of pesticides.

We can distinguish four types of cropping systems among small farmers. The first type is labor intensive and capital extensive and is represented by small farmers from Riobamba and those from Juli, Peru, who cultivate around 0.22 ha of raised fields in the Titicaca Lake shore. The majority of them produce organic quinoa. All of them are labor intensive having the highest labor uses which ranges from 180 to 230 working days per hectare (Appendix 1). Two reasons explain these high levels. The first one is the time needed to reach the plots or several plots cultivated from the house, that is not proportional to plot size and consequently increases labor for small plots. The second concerns the error created by the conversion of resources used in small areas to the equivalence of one hectare. However, this cropping system has high labor levels because they concern several cropping interventions without using any motorized traction force. It has the same interventions to prepare soil as the cropping system of intensive big farmers presented above, but instead it uses bovine traction force (Appendix 1). Among these interventions, harrowing is very important because it allows to maximize seed germination and plant density in cropping systems like this, which use manual seeding in continuous movements after a previous animal traction passing. The absence of tractor use in this system is explained by the high slopes' gradient, higher than 6%, in which the majority of Riobamba farmers cultivate, and by the narrow size of raised fields in Juli, which are surrounded by water channels that make the tractors' access very difficult. Similarly, harvest is manual (by cutting stems), and so is threshing (done by friction of cobs), being both stages highly labor intensive; in Juli this is done by the manual beat of cobs using sticks (Appendix 1). The long rotation cycles and the recent expansion of quinoa cropping allow small farmers to do not use organic or natural pesticides. The fertilization of quinoa crops lies on domestic animals manure. In Guamote and Columbe, they mainly use manure produced by their domestic animals, while those from Colta, with less bovines, have to buy part of the manure and also the bovine traction force services. In Juli, farmers do not have to buy manure for cultivating their land raised fields, which have been recently built on fallow lands, where pests' presence is low too. Only some conventional farmers from Juli use chemical fertilizers in very low quantities (55 kg of Amonia Nitrate/ha).

A second group of cropping systems can be distinguished, represented by the Peruvian households from Anta-Cuzco, Cabanas-Juliaca and those from Juli growing quinoa on rainy plots simultaneously to their aforementioned cultivation in raised fields. These farmers have low capital-intensive cropping systems, which are less labor intensive than in Riobamba. Usually, they cultivate 1 to 2 hectares of quinoa with less labor intensity ranging from 45 to 70 working days/ha (Appendix 1). Motorized machines use is limited. Generally, tractor plowing is used for soil preparation (plowing and harrowing) by many farmers from Cabanas and Juli and by some farmers from Anta. Farmers that cannot use tractors adopt bovine traction force. Seeding is always done with bovine traction force. Hilling by animal traction is mainly done in Anta and marginally in Juliaca where manual weeding is instead preferred as in Juli. Harvest is similar to the previous system and threshing is done by manual stick beat and in some occasions with stationary threshing machines. In Anta, some farmers do the threshing through renting tractor services to shatter quinoa cobs. In this region, with important pest presence, farmers do intensive chemical pesticides applications, while in Juliaca and Juli the use of those is not frequent

(Appendix 1). However, organic farmers from these last regions control pests applying intensive quantities of local vegetables, liquid manure and biol. In all these regions, manure is not currently used on conventional quinoa production because it is seeded after potato, which receives important levels of manure; however some farmers can apply small quantities of chemical fertilizers like in Anta. Meanwhile, important quantities are applied by organic farmers, such as those from Cabanas-Juliaca that use more than 3 tons/ha (Appendix 1).

In the Bolivian Southern Altiplano, the cropping system has two types of quinoa production. The first one, located in the pampas surrounding the Uyuni salt flats (for example Puqui, Appendix 1), is a quinoa mono-cropping system with one year of fallow. It has medium capital intensity and the lowest labor intensity among small farmers, even if it is still important, ranging from 39 working days/ha, for conventional quinoa, to 50 working days/ha for organic quinoa (Appendix 1). This system uses motorized plowing which is a crucial operation in this arid region. Eliminating weeds, plowing preserves minimal soil humidity for quinoa seeding and germination. In general, soil humidity is scarce, remaining in depths[49] that seeding machines cannot reach. That is why farmers seed manually with low density digging pits[50] until they reach humidity, a choice that makes unnecessary to harrow previously. However, the main labor contribution comes for harvesting and threshing. This is higher for organic production (20 working days/ha) with more harvesting labor than for conventional production (15 working days/ha). The use of tractor services for cobs crashing reduces the labor needed for this operation. Labor is also important for pest control, induced by mono-cropping and plough use, applying chemical pesticides and natural piretroids (pyrethrum), respectively in conventional and organic production (Appendix 1). Both kinds of production have important differences in inputs use. Compared with conventional production, organic production is much more capital intensive because it requires important quantities of manure (from 5.6 to 6.5 tons/ha), partly coming from long distances, for soil erosion control induced by plowing. Few conventional farmers use important amounts of manure and many of them do not use it at all. Also, organic production uses pyrethrum and neem, despite having a restricted use by organic standards, and in some cases light traps for butterflies' control.

The second type of quinoa cultivation is located in the slopes of the volcanoes surrounding the Uyuni salt flats and those from San Agustin (Appendix 1). Many farmers from this region often combine this system with the pampas cultivation system. This one needs important labor contribution (around 52 working days/ha) because it is located in steep slopes that do not allow tractor use. Labor is essentially invested in manual plowing (made with tractors in the pampas), manual harvesting and threshing (generally done with sticks), and even as transportation means. The lack of tractor's use reduces considerably pest presence. That is why manure represents the main inputs expense. Farmers buy around 2.8 tons/ha.

[49] : In average more than 10 cm.
[50] : In general, distance between pits ranges from 0.8 to 1 meter.

Quinoa added value and costs

Growers' costs and profitability

Comparing the profitability of the different quinoa cropping systems it is clear that the big farmers from Carchi producing conventional quinoa make 23 US$/qq and have the highest profitability in the Andean region, whatever their production is (Table 5 and Appendix 1). This profit is explained by the high yields (2,000 kg/ha), the price they receive for their quinoa, which is the highest price for conventional quinoa in the Andean region (512 US$/ton), and the low production costs (0.31 US$/qq) allowed by mechanized production (Appendix 1). Even if we have some doubts concerning the production costs of these farmers, we do not believe that they are considerably lower to make these farmers lose their high profitability. Contrasting them with the medium farmers from the Mantaro Valley, the latter earn 7 US$/qq (Table 5 and Appendix 1). This lower profitability is explained by high production costs (8 US$/qq), using important quantities of chemical pesticides and fertilizers and tractor services for soil preparation, combined with lower prices for conventional quinoa (320 US$/qq) and lower yields (1,600 kg/ha) than in Carchi (Appendix 1). Despite this lower profitability per quintal, these farmers have the highest profitability per working day (17 US$/working day) between medium and small Andean farmers, because the mechanized cropping interventions allow them to invest less work (18 working days/ha) (Appendix 1).

Table 5: Comparative costs of Andean conventional quinoa chain in each national market (US$/qq)

Eco-region	Real-Bolivia	Valle-Peru	Valle-Peru	Altiplano-Peru	Valle-Ecuador	Valle-Ecuador
Location	Southern Altiplano	Mantaro Valley	Anta-Cuzco	Juli	Riobamba[51]	Carchi
Type of Farmer	Small, semi capital intensive use	Medium: capital intensive	Small, semi capital intensive	Small, semi capital intensive	Small, capital extensive	Big: highly capital intensive
Production costs	4.5	8	7.5	2	10.7[52]	1
Profit for farmers	9.5	7	7.5	11.5	5.3	23
Price paid to farmers	14	15	15	13.5	16	24
Cost of factory Processing	10	12.5	13	13.5	1	17
Total processing and purchase cost	24.0	27.5	28	27	17	41
Sell Price	36[53]	34[54]	37[55]	35[56]	21[57]	58.5[58]
Profit for processors	12.0	6.5	9	8	4	17.5

Source: quinoa growers, middlemen and small crafters from above mentioned regions and INAGROFA

[51] : Riobamba peasants sell their quinoa to middlemen processing the quinoa by manual washing and sun drying.
[52] : Farmers and technicians interviewed told us that in Riobamba there is no significant production mode and cost differences between organic and conventional production except for the quantities of manure added that might be 0.5 t/ha lower for conventional production than for the organic.
[53] : Price at the Bolivian-Peruvian border for registered (official) export.
[54] : Sold in Lima.
[55] : Idem
[56] : Idem
[57] : Sold in Quito
[58] : Sold in Quito

Important differences concerning added value and production costs appear from one Andean country to another, for biological and conventional production. On the contrary of big and medium capital intensive farmers from Carchi and Mantaro Valley growing conventional quinoa, small producers from Juliaca, Juli and Anta have less profitability. Despite having apparently similar yields, the profit of the first ranges from 7.5 to 12.5 US$/qq because they are largely less paid than in Carchi, receiving between 290 and 320 US$/ton (13.6 to 15 US$/qq) (table 5 and appendix 1). Peasants underline that since 1998 their conventional quinoa value of sell price has lost 15 to 20%. We explain this trend by the saturation of local market after an important growth of domestic production of quinoa started in mid 90's (graphic 1). Juliaca, Juli and Anta conventional quinoa growers can obtain a correct profit because they have lower production costs in comparison with Carchi and Riobamba producers affected by inflation after the dollarisation of Ecuador's economy (appendix 1, table 5). Particularly, those from Juli and Juliaca are very low (1 to 2 US$/qq) despite consisting in motorized plowing and harrowing services purchased for rainy quinoa cropping, and in engaged labor force for manual plowing in rainfeld raised fields[59]. Meanwhile, Anta production costs are high (7.5 US$/qq) and essentially concern labor hiring for harvesting and threshing[60], and cost of tractor services for threshing (appendix 1). We must also underline that all these have income per household's labor day invested in quinoa cropping ranging from 3 to 8 US$/working day. This is higher than current wages obtained through migration.

Conventional quinoa production has different importance in small peasant households' reproduction and income. In Peru quinoa harvest coming from the ½ to 2 hectares in average seeded is mainly oriented for self consumption with rates varying between 50 to 60% of their production (personal communication of Mario Tapia). For this reason quinoa price fall of conventional quinoa has lower effects on peasant monetary income which is mainly based on migration for temporally sell labor for low wage, small commerce, herding activities and cropping of potatoes, wheat and barley. In Ecuador conventional quinoa is essentially sold (78% of local production) to middlemen for domestic market at very low prices that have not considerably changed in the last years (16 US$/qq, table 5), but small peasant families with similar pluriactivity, including migrating, herding and cropping activities, seed small plots of quinoa in general ranging from 1/8 to ¼ ha. That is why we estimate that conventional quinoa trade represents less than 5% of monetary income of Peruvian and Ecuadorian peasant households.

It also appears that organic small farmers earn more than those with conventional production. The first have profits ranging from 10 to 23 US$/qq, while the second get from 7 to 11.5 US$/qq (Tables 1 and 2, Appendix 1).

Quinoa organic small producers from Riobamba are well paid but are those with lower profits among Andean peasants. Those from Colta and Columbe, who have quite high yields (1,150 kg/ha) earn around 22.5 US$/qq, while those from Guamote - with less land productivity (380 kg/ha) - make 8 US$/qq (appendix 1), with **an average profit for the region of 17 US$/qq** (table 1). However, **they earn less than in 1999 when they use**

[59] : Engaged labor force represents 6% of the total work force used, close to 217 working days/ha.
[60] : That represents 16% of total labor force invested in production (43 labor days/ha).

to be paid 40 US$/qq allowing them a profit of 30 US$/qq in Colta and Columbe and 20 US$/qq in Guamote. Their price for selling organic quinoa has reduced because export prices have fallen since 2000, as before mentioned in part one. Despite this price drop Riobamba's organic quinoa producers, particularly those from Colta and Columbe, have the highest revenue per quintal among Andean small farmers been mainly explained by the price they receive which is the highest in the Andean region.

Knowing that organic quinoa sales had a very moderate contribution on Riobamba's household monetary income (estimated between 5 and 10%), the price fall of organic quinoa have marginally affected peasant families' economy. These households have important migration and have to hire significant labor force for agricultural practices, especially for seeding, harvesting and threshing. This choice explains their important organic quinoa costs representing 10 US$/qq for farmers from Colta and Columbe and 21 US$/qq for those from Guamote, with less yields. Having their organic certification paid by ERPE, their high cost lies on the quantity of hired labor force and not on the daily cost of hired work, which does not have significant difference among Andean countries[61]. Indeed, hired labor represents around 20% of the total labor invested in quinoa cropping (Appendix 1). Considering the important household labor invested in production (140 to 170 working days/ha), Guamote farmers poorly reward their work (0.5 US$/day) at lower levels than an engaged worker who earns 3 US$/working day. However, Colta and Columbe farmers earn a little bit more (3.8 to 4 US$/working day) than working outside their community.

The reduced group of Peruvian small organic farmers from Juliaca-Juli, is the one with the highest profits among Andean small quinoa growers, earning 22 to 23 US$/qq (Table 1 and Appendix 1). Selling their grain at lower prices than in Riobamba (520 US$/ton or 24/qq), their profitability is explained by their higher yield (1,600 to 2,200 kg/ha[62]) that contributes to have lower production costs and that has contained negative effects of organic quinoa price small since export price have decreased in 2000. Concerning organic production in rainfeld raised fields, its costs are also very low because only small amounts of labor are engaged for plowing. Also, organic producers from Juliaca and Juli do not have to pay for organic certification, which is assumed by NGOs and development projects sponsoring their organizations. However, knowing that Peruvian organic quinoa is recently produced and has a small demand its production has still not become very important in the income of peasant families. We can estimate this importance in 15-20% of peasants' income. However, important differences exist concerning retribution of domestic labor invested in organic quinoa production. Farmers cultivating raised fields in Juli and involving high household labor investments (216 working days/ha) earn 5 US$/day, while those from Juliaca with lower domestic work invested (57 working days/ha) reward it at 13 US$/qq (Appendix 1).

[61] : Wages per daily hired working day are 3.5 US$ in Ecuador, 3 US$ in Peru and 3.2 to 3.8 US$ in Bolivia.

[62] : In rainy cropping systems (without irrigation) with important use of manure, yields are close to 1,600 kg/ha, while in small raised fields (720m^2) of the Titicaca Lake shore yields are equivalent to 2,200 ka/ha. Considering that the conversion from small-scale plots to one-hectare measures always has errors we think that their yields are probably lower. The absence of manure fertilization constitutes one more element leading to be doubtful about this yield.

Concerning production in the Southern Altiplano, conventional quinoa growers currently earned 9.5 US$/qq in August 2003, which is a bit lower than the earnings for conventional farmers from Juli but higher than those perceived in Anta-Cuzco and the Mantaro Valley (Table 2 and Appendix 1). Despite being less paid than organic growers with important conventional quinoa price drop since 2000 (Table 6) having reached 14 US$/qq in August 2003 (300 US$/ton) and 25 US$/qq in March 2004, their lower costs close to 4.5 US$/qq (Table 5) have allowed them to content their income erosion which was of 30 US$/qq in 1999. These costs particularly lie on the purchase of tractor plowing services and labor force hiring for threshing. Domestic labor force is still important and close to 35 working days/ha, which represent more than 80% of total labor invested in production (Appendix 1). That is why, in a context of low prices paid to growers for conventional quinoa in August 2003, their domestic labor was poorly rewarded, close to 3 US$/day and similar to wages obtained selling labor through migration. However, since the end of 2003 this last has increased following quinoa price recovery reaching 6.4 US$/labor day in March 2004. During this period, their profitability has also grown to 20.5 US$/qq. Despite, this lower profitability quinoa remains an important component of household's income whose contribution we estimate between 60 to 70% of total households' income.

The price decrease observed for conventional quinoa (Table 6) could be understood as a consequence of the increase of production of Southern Altiplano in 1999[63] **and by the saturation of the Peruvian market since the end of 90's, as a consequence of the Peruvian quinoa production growth (Graphic 1). Despite recent sales of quinoa real to Ecuadorian market, Peruvian quinoa market has remained overcrowded until the end of 2003**. **Moreover, regardless that Bolivian market remains the main consumer of quinoa real it has not been stimulated in order to better reward quinoa growers. Between 2000 and the end of 2003, this situation has led to a fall of the price paid to the Southern Altiplano peasant for the conventional quinoa chain. Nevertheless, the price seems to be recovering since 2003 (Table 6) because of Peruvian quinoa production stagnation** (Graphic 1) **and an important production drop in Southern Altiplano since 2003's harvest.** Between the end of our fieldwork period (August 2003) and December 2003 the price has increased from 14 US $/qq to 25 US $/qq, with an average price of 20 US$/qq for 2003.

Table 6: Nominal prices paid to Southern Altiplano's producers per quintal of quinoa in US$

Year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Conventional quinoa	16.2	18.5	19.1	13.4	14.8	25.1	25.6	26.9	28.8	30.2	33.5	37.1	37.2	34.4	19.4	16.7	8. 6	20	25
Organic quinoa	0	0	0	0	0	0	29.5	30.4	31.4	30.6	35.4	39.1	38.1	37.8	25.8	23.5	21.4	23.5	28.0
Difference (%)	/	/	/	/	/	/	15.2	13.0	9.0	1.3	5.7	5.4	2.4	9.9	33.0	40.7	149	30.1	37.5

Source for 1986-1998: IICA/PNUD (1991), Pinget and van der Heyden (1994), intermediaries from Challapata market, ANAPQUI.
Source for 1999-2004: quinoa growers, intermediaries from Challapata market, ANAPQUI, CECAOT, Irupana, Quinuabol.

[63] : Strangely, official Bolivian statistics provided by the Instituto Nacional de Estadísticas (INE) have not registered this important growth of area of cropping and production of quinoa, as they failed to do for 1994 harvest. We are doubtful about the reliability of these official stats.

Conventional quinoa price's fall between 2000 and 2003 also affects the price paid to Bolivian organic quinoa growers, who where less paid than in Peru and Ecuador during these period. In average, the first sold a quintal of organic quinoa in around 23 US$ (table 6), with dramatic situations in the first half of 2003 in which ANAPQUI and CECAOT respectively paid their associates 365 and 320 US$/ton (17 and 15.5 US$/qq) and others explained private companies bought at 405 US$/ton (19 US$/qq). The difference is partly explained by lower costs of the lasts. **Until the saturation of the northern countries' demand for organic quinoa market, in the beginning of 2000's, the Uyuni salt flats' growers were better paid than in Peru (Table 6) but lower than Ecuadorian** where prices initially where high around 40 US$/qq in 1999. The drop of price can be explained by the conjunction of several elements. **First, since 1999 the growth of organic quinoa demand in northern countries has been lower than Southern Altiplano's organic production. Second, in order to reduce losses of profitability after having lost Quinoa Corporation contract in 2000 and because of organic certification subsidization of Bolivian private exporters, ANAPQUI - who was the main quinoa buyer and the main Bolivian exporter until 1999** (Graphic 6) - **had to decrease the price it paid to farmers** (from 220 B$ to 160 B$) in 2000. **Third, this decision of price reduction to peasants coincided with the fall of conventional quinoa price under the saturation of the Peruvian quinoa market, situation that gave "room for manoeuvre" to Bolivian exporting companies to follow this tendency reducing price for organic quinoa to a level slightly higher than conventional production (table 6).** That is why organic quinoa price to the farmer has considerably decreased from 39 (1997) and 38 US$/qq (1998 and 1999), to 23.5 US$/qq in 2003 (Table 6) with a bottom price of 18.5 US$/qq in July 2003. The growth of conventional quinoa price to peasant observed since September 2003 has obliged organic buyers to follow this trend increasing the price **reaching 28 US$/qq in December 2003**. Since that the **level of price remained unchanged until March 2004, but was still the lowest ever given to peasant since organic quinoa started to be exported (table 6).**

Until 1999, Southern Altiplano's quinoa growers use to have a high profitability despite obtaining the lowest yields of Andean region, ranging from 1000 kg/ha in Puqui, a less arid area, to 560 kg/ha in the arid districts of Mañica and San Agustin[64]. In 1999, they used to earn 29 to 30 US$/qq for quinoa produced in the pampas and 31 US$/qq for quinoa grown in volcano slopes. As a consequence of quinoa prices drop, the income of organic quinoa growers from Southern Altiplano has also considerably decreased because organic quinoa use to represent 60 to 70% of small peasant households income in 1999 (Laguna, 2000b). For the harvest of the 2002/2003 cycle they got 7.5 to 11 US$/qq producing on pampas and 13 US$/qq manually cultivating on volcano slopes (Appendix 1), with an estimated average profit of 10 US$/qq for the organic production (Table 1) which is slightly higher than the conventional quinoa profit, surrounding 9.5 US$/qq (Table 2). This means that the profit for these peasants coming from organic quinoa production has decreased in 66% in four years. However, with the recover of quinoa price since September 2003 average profit for organic production has increase to 20.5-21.5

[64] : Rainfall in Salinas is close to 230 mm/year whereas in Mañica is close to 150 mm/year and in San Agustin is near to 130 mm/year.

US$/qq (table 7) an amount slightly lower than the one earned by organic growers from Peru and barely more profitable than conventional quinoa production in this region (20 US$/qq).

Production costs seem to have a secondary role on the lower income of Southern Altiplano peasants. Indeed, ranging from 5 to 7 US$/qq, production costs are much lower than those from Riobamba, but are higher than those from the Anta-Juliaca-Juli regions (Appendix 1). For both kinds of production, these costs mainly consist on the purchase of manure, tractor services for threshing and labor hiring for harvesting and threshing. In the region surrounding Mañica, engaged labor force represents around 6% of the total labor force used on organic production, but in most of the Uyuni salt flats shore it represents around 18%. During the quinoa price crisis organic quinoa growers get a lower reward for their work invested in this production (3 to 6 US$/day) than selling it to other families cropping quinoa (3.2 to 3.8 US$/day), investing it in conventional quinoa production (3 US$/day) (Appendix 1) or working outside the region (3.5 US$/day). In this situations, farmers produce quinoa because work outside the farm is not always available, and they want to ensure their food security and also to stay part of their time in their community, for social and cultural reasons. Meanwhile, since prices have recently recovered labor retribution in organic quinoa cropping as got levels of 7.5 US$/ day.

Added value distribution in the organic quinoa chain for export

In August 2003 in most of the Andean conventional quinoa trade circuits, peasants earn more than processors and sellers for weight unit of this grain. In Ecuador, big farmers earn by far more than private companies, getting 23 US$/qq instead of 11.5 US$/qq. In the conventional quinoa chain, the Uyuni salt flats peasants earn 9.5 US$/qq getting close to the profit obtained by those having organic production (10 US$/qq) in this region, and higher profit than the companies processing and exporting quinoa, which make 7.5 US$/qq (Tables 1 and 5). In Peru, conventional quinoa processors and sellers in Lima, or exporting from Lima, have higher profits (9 US$/qq) than small farmers from Anta-Cuzco (7.5 US$/qq). However, they earn less (8 US$/qq) than the producers from Juli (9 US$/qq), and from the Mantaro Valley (6.5 US$/qq against 7 US$/qq) (Table 5). This leads us to state that inequality of income between small farmers and processors and sellers lays essentially on the differences between the quinoa volumes traded by each of these actors.

Meanwhile, the situation is different when we consider the added value created by the **organic quinoa chain, which ranges from 113 to 210 US$/qq and whose distribution all along is quite unequal, particularly for farmers and exporters**. Considering the quinoa chain added value distribution among farmers in one hand, and among processors/exporters in the other hand in August 2003, it clearly appears that **in Peru and Ecuador organic growers get more added value than exporters, with more emphasis in Ecuador.** Peruvian peasants from Juliaca and Juli obtain 22 US$/qq whereas Industrias El Altiplano gets 19 US$/qq (Table 1). In Riobamba, organic peasants receive 17 US$/qq while ERPE earns 9 US$/qq. **In Bolivia, exporters got more profit than**

small farmers between 2000 and 2003. Farmers get 10 to 12 US$/qq albeit exporters make 19 to 20 US$/qq or 60 to 100% more (Table 1). **However, the growth of prices paid to peasants for organic quinoa registered since to the end of 2003 has inverted this situation allowing peasants to earn more than exporters** (table 7). Currently, Southern Altiplano organic quinoa growers get 20.5 to 21.5 US$/qq. **Bolivian exporters are not exporting at higher prices despite paying more organic quinoa growers**. In fact, the comparison of tables 1 and 7 shows that **since September 2003 Bolivian exporters have transferred part of their added value to farmers who now have similar or higher added value than exporters. However, the rest of the actors of the chain in Europe have maintained the same import cost, preserved the level of their profits and still concentrate the majority of added value**. **However, we must underline that estimated added value for European actors is lower than it appears in table 1 and 7 because we did not include the fixed costs of personnel, development and manufacture of packages and other fixed costs necessary to ensure the functioning of quinoa chain importers, intermediaries and retailers. This inequality of distribution has certainly been increased with the recent US Dollar devaluation in relation to the Euro and the British pound.**

Table 7: Comparative costs and profits for Bolivian organic quinoa real chain in March 2003 (in US$/qq)

Kind of Trade	Link with fair-trade importers despite the existence of official quinoa FT standards		Willing to be Fair Trade
Chain partners	ANAPQUI/GEPA/Solidar'Monde/ Altereco/CORA	ANAPQUI/GEPA/ World's Stores	Quinuabol/Biogrow/Markal/Monoprix
Production costs	7.0	7.0	7.0
Price paid to peasants	27.5	27.5	28.5
Profit for farmers	(12%) 20.5	(9.7%) 20.5	(13.9%) 21.5
Profit for ANAPQUI's regional organizations	(1%) 1.3	(0.5%) 1.3	/
Processing and export cost	15.0	37.0	10.0
Export Price FOB	59.0	86.5	56.0
Profit for exporters	(9%) 15.2	(9.8%) 20.7	(11.3%) 17.5
Country of import and sale	France	Germany	France
Interventions in quinoa chain northern countries	Bulk import Package by the Intermediary	Import in boxes packed by ANAPQUI	Bulk import. Package by the importer
Commission for GEPA mediation in import planning	4.2	/	/
Price of sell to intermediaries	107.8	205.5	
Added value taxes	5.9	14.0	
Profit for importer	(18.6%) 31.8	(45.7%) 96.3	
Price of sell to dealer	229.0		168.5
Added value taxes	12.6		9.3
Profit for intermediary	(38.7%) 65.9		(29.5%) 45.6
Price of sell to consumer	289.8	313.4	260.0
Added value taxes	15.9	21.9	14.3
Profit for retailer	(20,8%) 35.5	(36.1%) 76.0	(44.5%) 68.7
Total added value	170.2	210.5	154.3

Important notes: for northern countries actors we do not consider their fixed costs linked with the development of the product such as personnel, package design, company's office renting and manufacture when boxes are not made in producer country. For this reason, **we consider that final added value of the chain is much lower and that its distribution is much more profitable for farmers**. For this reason, we underline in yellow added value distribution average that needs to be précised in the future.

Generally, bulk quinoa is imported in bags of 25 kg each one. Imported quinoa boxes and boxes of quinoa packed in Europe have both a content of 500g of grain. The change rate was: 1 Euro = 1.2 US Dollars. 1 qq = 46.8 Kg, 21,36 qq = 1 Ton

Source: Quinoa growers from above mentioned regions, ALTERECO, SolidarMonde and Markal for the French market, Infinity Foods and Inca Organics for the UK market, ERPE, El Altiplano, ANAPQUI, Quinoabol.

Two ways of added value concentration could be distinguished in northern countries. The first way of added value distribution concerns the Bolivian-European

chains linking ANAPQUI with fair-trade importers belonging to EFTA represented by GEPA[65] and private companies and associations interested in fair-trade in a context of absence of specific quinoa fair trade standards. **The first way shows an important added value capture by the intermediary actors in France and Germany** (tables 1 and 7) **following two variations**. **The first variation** one concerns the export of 48 tons of organic quinoa in boxes of 500g of grain each involving a reduced number of actors. **Boxes are packed by ANAPQUI, imported by GEPA and retailed to consumers by World's Shops**. Within the limits of our added value calculation for European actors, as before mentioned, it appears that **this chain has the highest added value** (210 US$/qq) **which is mainly retained by GEPA** (96 US$/qq) and secondly (76 US$/qq) by world shops, while ANAPQUI and farmers get around 20.5 US$/qq each, 9% of total added value (table 7). However, **compared with other chain, this one provides to Andean peasants and exporting organisations the higher profit.** The second variation concerns a chain with more volume (around 220 tons) involving six actors: the peasant, ANAPQUI, GEPA, Solidar'Monde, Altereco and CORA, the retailer. Its total added value of this is 170 US$/qq but only 35 US$/qq stay in Bolivia (Table 1). From this quantity the producer got 10 US$ in August 2003 (table 1) and currently gets 20 US$/qq (11% of total added value) (March 2004) (table 7), while ANAPQUI who use to earn 25 US$/qq in August 2003 obtains 15US$/qq in March 2004 (8% of chain's total profit). The remaining 135 US$/qq are divided as follows: 4 US$/qq for GEPA to cover its import mediation, 31 US$/qq for SolidarMonde, the fair trade NGO directly importing quinoa in France, 65.8 US$/qq for Altereco, the intermediary company who sales to Cora, the supermarket that takes 35.5 US$/qq (table 1 and 7). We can observe a possible important difference of profit between the farmer and Altereco, the intermediary company. The second might earn six times more than the first. Altereco also makes twice as much as the importer NGO and the supermarket.

The first kind of quinoa chain show us that GEPA also assumes marginal tasks in time and monetary costs regarding quinoa import. It organises the flow control of the yearly imported organic quinoa. This activity takes two days and simultaneously concerns the whole of organic fair trade products (coffee, cacao, honey, rice, etc.) imported during the yearly. This operation takes two days been done by IMO control for a total cost of 2000 Euros, whose pondered distribution following the imported value essentially corresponds to coffee and cacao. Once in a life, GEPA also has to ask the certificate of European Union allowing it to import from ANAPQUI procedure that takes 3-4 days costing the small amount of 250 Euros.

The second way of added value retention is the classical model where the retailer gets the highest part of the total added value while peasants and first intermediaries get the lowest part. We can see it in the quinoa chain going from Ecuador to Great Britain (table 1) **and in most of the important quinoa chains coming from Bolivia to the French market willing to be fair trade** that have high vertical integration, such as

[65] : According with a mandate of EFTA members, the link between these actors and ANAPQUI and the yearly import planning and procedures are managed by GEPA in order to make economy scales for EFTA members, their respective buyers and ANAPQUI as well as simplify procedures.

the chain Quinuabol/Biogrown/Monoprix which concerns 30 tons[66]. Compared with sales to ANAPQUI, Sourthern Altiplano farmers earn a bit more doing it to Quinuabol (12 $US/qq in August 2003 and 21.5 US$/qq in March 2004), and retain a bigger proportion of the total added value (14% instead off 10-12%, see table 7). Despite getting a higher part of chains' total added values (12-15%) farmers from Ecuador gain less (17 US$/qq) than those from Southern Altiplano and Peru (22 US$/qq) in March 2004. Similarly, higher costs in Ecuador explain ERPE's lower profit than those from Quinuabol and ANAPQUI (9 US$/qq against 19-20US$/qq). ERPE gets only 8% of total added value while Infinity Food its quinoa importer in United kingdom gets 35 to 39 US$/qq (representing 35 and 39% of total added value) (table 1). However, final retailers get 47 and 90 US$/qq (42 to 60%). Considering the chain going from Southern Altiplano to Biogrown[67] and Monoprix we have similar tendency en added value distribution than in the previous chain (table 1). However, compared with al chains going from the Andes to northern countries the chain Southern Altiplano/Quinuabol/Biogrow/Monoprix has the less inequal added value distribution. Farmers and Quinuabol get 14% and 17.5% of it while Biogrow and Monoprix respectively obtain 29% and 44% of total added value.

Household strategies for generating income and satisfying basic needs

In Riobamba, agriculture mainly has food security purposes. Andean roots, including potatoes, lupine, corn and wheat are produced exclusively for household consumption, albeit barley is in part domestically consumed and the surplus is sold to local markets. However, an important part of barley, and the totality of rye and oat are used for animal feeding, particularly for bovines. Selling their food surplus, these farmers can obtain the money necessary for buying domestic assets (food, domestic and productive goods, school material, housing building material, etc.). Before ERPE's project, scarce quantities of the produced quinoa were infrequently self-consumed in soups or sold to local markets. Since quinoa has good prices and its external consumption has increased, its cash crop tendency has been reinforced among these families with low quinoa consumption habit. Indeed, they sell most of their production; some studies underline that the importance of quinoa sales can reach 90% of the production in some cases (Junovich, 2003), which means that some families self consume 20 kg of quinoa per year. However, quinoa expansion is limited by the household multi-cropping strategy and by the difficulties to sell Ecuadorian quinoa abroad and in national market, as previously presented.

Riobamba's household income lays on two main activities. Animals' commoditization is the first of these and the main purpose of breeding activities. Families feed young animals, principally bovines, pigs, sheep, guinea pigs and chickens and sell them once they are mature. Secondarily, they sell eggs and cow milk in low quantities[68], as these products are mainly self-consumed. Meanwhile, their main income generating activity is related to migration (Table 8). In general, the family head and one or two teenager

[66] : However, Quinuabol export to Biogrow around 320 tons per year.
[67] : Biogrown is a company owned in 50% by Markal (France) and in 50% by Dutch Organic (Do-it).
[68] : An average of 3 eggs/day and one milk liter/day per family.

children from each family[69] of the region move temporarily to Quito and Cuenca, in the highlands, and Guayaquil, in the coast, where they develop different activities. Some of them do activities with very low income, ranging from 12 to 24 US$/week, such as domestic servant for women, and lugging, shoe polishing and retailing of domestic goods for men. Others work as masons, or sell clothes and groceries, earning between 40 and 60 US$/week, and few sell legumes, earning 100 US$/week. Considering that one migrating member in each family develops these activities around 4 months a year, this means that with migration he/she generates a yearly income between 192 and 960 US$, which is higher than the revenues they get with quinoa which are around 80 US$ (Appendix 1). With this we clearly see that organic quinoa growers from Riobamba earn from less to similar amounts (0.50 to 3.90 US$/day) to what they pay to engage other peasant for working in their own agricultural production (3.50 US$/day). It is also clear that they earn less than working outside during their emigration period, which provides in most situations higher than 4 US$/day.

With low incomes, families have reduced food purchase. Every three weeks, they buy basic food products for an average cost of 65 US$ (1,040 US$/year) and including carbon hydrates (rice, potatoes, pasta, manioc and sugar), bacon fat, and small quantities of fruits and vegetables[70]. Less poor households, mainly located in the Columbe canton, can sometimes buy meat (1 US$) and cheese (1 US$) weekly. Income is also invested in children education that is perceived to provide basic skills to children and allow them to move up. In general, all of them go to primary school, located in the majority of each one of these communities. The cost of this choice ranges from 174 US$ to 262 US$ per child per year[71] (10 to 15 US$ per three weeks) because children from poor families bring their own lunch to school. However, secondary school is not always close to all the communities, and - mainly in Colta - this forces the families wanting their children to study to pay transportation, which has an average cost of 90 US$ per year per child. This increases transportation costs and even forces families to rent rooms nearby the schools for their children to attend secondary school. That is why almost the totality of families from communities without close secondary schools are not financially able to provide their children with secondary education.

Once education and food needs are satisfied, income can be invested in clothing and housing. In general they need 200 US$ per family per year to buy clothes and additional 200 US$ to obtain better quality clothes (Table 8). Their houses generally have 2 to 3 small rooms with a kitchen located outside. In poor communities such as several from Colta and Guamote, they have clay soil and are built with home made clay bricks and bought material (windows, one door, wood and zinc sheets for the roof) for a cost of 220 to 330 US$. In communities with more income like many from Columbe, houses have

[69] : In average families have 4-5 children.

[70] : In average they buy 35 Kg of rice (14 US$), 90 kg of potatoes (23 US$), 3 kg of pasta (3 US$), 5 kg of sugar (3 US$), manioc (1 US$), bacon fat or 4 liters of oil (2 US$), 150 g of salt (1 US$), several fruits (apples, bananas and citrus) in 3 US$. They also buy small quantities of legumes (tomatoes, onions, carrots, lettuce and cabbage) costing around 15 US$.

[71] : Fixed costs are composed by utensils (25 US$), sport, ordinary and jubilee uniforms (55 US$), books and others materials (50 US$) while variable costs lay on lunch break collation (44 US$) and lunch (88 US$).

cement soil and are in general built throughout several many years (4 to 5) with bought material[72] with a total cost of 800 to 1,200 US$ (160 US$ to 300US$/year) (Table 8). Concerning health, the majority of peasant communities have drinking water. Normally, farmers have the right to subscribe for 5 US$ a year to a peasant's health insurance programme that does not cover medicines. However, few of them are informed about this system, which also seems to be corrupted, reasons why many farmers do not want to subscribe to it. Other healthcare expenses for household members are not frequent and are only made at health centers and hospitals, when they have some gravity. Families use first local herbs, and go to the healthcare services only once the first have proven to be ineffective.

In Cuzco and the Peruvian Altiplano, small farmers have similar family size but have more land and crop production than in Riobamba. That is why they can sell more products (mainly potatoes) to the market once their self-consumption needs are satisfied. They would like to reduce the potato areas and replace them with quinoa once it has good price. In general, farmers sow 1 to 2 ha of quinoa. Due to the low price of quinoa (0.28 $ US/kg), conventional quinoa growers do not seed with trade purposes and only sell their surplus. Quinoa is sold only by farmers seeding more than 1 ha of quinoa such as those from Anta and Juliaca. Many of them would like to seed more quinoa, substituting part of the potatoes, once the quinoa prices grow. Meanwhile, quinoa self consumption is very important for the farmers and represents more than 35% of their production (6 qq/family), a degree that can reach almost 100% in households with small areas of quinoa (lower than 0.75 ha, producing 12 qq/per family). Only some farmers involved with the programmes of the Peruvian Agricultural Ministry and organic growers supported by CEPURJ cultivate quinoa mainly as cash crop, with the hoping to find profitable markets with the help of their sponsors. Moreover, processes of rangeland individualization have appeared since the CEPURJ quinoa project has started. Collective rangeland has been fragmented and individually appropriated by farmers, having been later used for quinoa cropping. However, only a part of those working with CEPURJ have sold their organic quinoa mainly to "Industrias el Altiplano". Moreover, farmers want a minimal production of corn and barley for their self-consumption and autonomy and barley for feeding their bovines. That is why, in current market conditions, farmers do not want to increase their quinoa production area, not even those who are organic certified.

Household income is based on animal herding and migration activities and for some of them in handcraft and agricultural products trade. In Anta, several people produces milk and is associated to small farmers' organizations to which they sale their milk for yogurt and cheese production and trade. In the Juliaca-Puno region they mainly sell feeden bovines and sheep. In this last region, with the second bigger agricultural market from Peru, several farmers have also invested in rural commerce, working as intermediaries. The important tourism in this region has also stimulated some families to invest in wool handicrafts. However, like in Riobamba, migration remains the main source of income for these families, and many of them work in towns such as Cuzco, Juliaca and Puno, in the mines in the Andean highlands and Amazonian versant of the Andes, and in the coffee and coca plantations of this region. Migration is essentially seasonal, especially

[72] : Cement, building steel, cement bricks, windows, one door, wood and zinc sheets for the roof.

when it concerns the Amazonian versant of the Andes, and with double residence implying predominant life in towns and return to the communities just for cropping activities. In general, we can consider a 4 to 5 months migration period to the Amazonian versant with incomes ranging from 45 to 90 US$ per month, which could represent slightly higher yearly incomes (130 to 450 US$) than those obtained with quinoa (120 to 250 US$). Migrants with double residence and life mainly concentrated in town have multiple activities such as masons, groceries trade, small commerce, public transportation, etc. That is why their income (more than 600 US$ per year) is higher than the one coming from quinoa production (Appendix 1). However, living in town they have more expenses than in their communities. We also see that conventional quinoa growers from Cuzco, Juliaca and Puno earn the same or a bit less per working day (2.9-3.1 US$/day) than what they pay to hired peasants that help them in agricultural production (3.0 US$/day), and the same as those working in plantations and mines of the eastern versant of the Andes (2 to 4 US$/day).

Families growing quinoa in the region going from Anta to Juliaca and the Titicaca Lake shore (Puno and Juli) have less domestic expenses than those from Riobamba. They have high self-consumption and low food purchases. Those from Anta who have corn production spend 9 US$ per week (432 US$ per year) for oil, sugar, salt, legumes, fruits and little rice, pasta and bread. However, those from the Juliaca-Juli region, with no corn production and less potato harvest, weekly spend the same to twice as much as those with higher incomes, such as those from Cabana, with organic quinoa. In general, they buy similar products with a bit more rice and sheep meat. Considering food purchase and crop production among these farmers, mainly composed by potatoes, barley, corn and quinoa, it is clear that their nutrition does not seem to be completely well balanced, despite quinoa consumption, and essentially lays on carbon hydrates, like in Riobamba. However, Peruvian families have lower food costs (430 to 860 US$/year) than Riobamba families (1,040 US$/year) (Table 8). Concerning education access, these families have the possibility to send their children to primary and secondary school at lower costs than those from Riobamba. Each child studying in primary school implies a yearly cost of 123 US$ whereas one child in secondary school implies an investment of 135 US$[73], whereas in Riobamba they have to pay at least 264 to 352 US$ per child.

Besides education and food needs, domestic expenses concern clothing needs (11.5 to 23 US$ per family member per year or 72 to 144 US$ per family, see Table 8), which are again lower than in Riobamba (200 US$ per family per year). Their houses generally have 3 to 4 small rooms with a kitchen located outside. Houses are gradually built with clay bricks and bought external material (doors, windows, roof sheets and wood) and have clay or cement floors. Taking similar sizes than those from Riobamba, their costs are around 570 US$ (145 US$/year) for houses with clay floor and 650 US$ (165 US$/year) for those having cement floor (Table 8). All the peasant communities have drinking water. However, free public healthcare insurance only exists for children enrolled in primary school. This is one of the reasons explaining why, like in Riobamba,

[73] : Transportation and collation break seems to be constant costs requiring 50 US$ each independently from the level of school study, while school uniform costs 14 US$ in primary school and 21 US$ in secondary school and utensils need 9 US$ in primary school and 14 US$ in secondary school.

healthcare expenses are not frequent and are only made in situations of gravity when local treatments are not effective.

Table 8: Current basic subsistence expenses of quinoa growers families from the Andean region in US$

Region	Southern Altiplano	Juliaca-Juli	Riobamba
Average composition	6	6	6-7
Main income	Migration: labor sale Sale of services (transportation, tractor, etc.) Commerce	Migration: labor sale and small commerce	Migration: labor sale and small commerce
Main agricultural income	Quinoa production	Potatoes, animal herding and eventually corn production	Animals feeding
Food costs (US$/year)	360-840	430-860	1,040
Base of domestic nutrition	Carbon hydrates and vegetal oil. Scarce vegetables, fruits and meet.	Carbon hydrates and vegetal oil. Scarce vegetables, fruits and meet.	Carbon hydrates and animal fat. Scarce vegetables, fruits and meet.
Primary education costs per child (US$/year)	85	123	174-262
Total primary education costs per family (US$ for 2 sons)	190	246	348-524
Secondary education costs for one child (US$/year)	190	135	174-352
Total secondary education costs per family (US$ for 2 sons/year)	190	270	348-704
Higher degree education for one child (US$/year)	550	/	/
Housing costs	900-1200	580-660	640-1,200
Housing costs per year[74]	225-300 100 150	145-165	160-300
Basic clothing costs (US$/family)	250	72-144	200-400
Basic healthcare costs (US$/year)	40	40	60
Other basic costs[75] (US$/year)	300	300	400
Total basic subsistence expenses without university (US$/year)	1,975-2,530	1,503-2,025	2,556-3,428
Total current subsistence expenses including university studies (US$/year)	2,335-2,890	1,503-2,025	2,556-3,428

Source: quinoa growers of above mentioned regions

In the Bolivian Southern Altiplano, quinoa production and sale expansion have increased farmers' income, with quinoa as its main contributor. In 1999, when quinoa prices where high, quinoa average income for organic growers was around 1,500 US$/year and represented 65% of the households income (Laguna 2000b). This clearly shows us that earnings coming from quinoa are higher in the Southern Altiplano than in Riobamba, Cuzco and Juli. However, organic growers from the Uyuni salt flats shore get less money than those from Cabana-Juliaca, who use to seed only 2 ha (Appendix 1). Higher incomes have allowed the farmers, specially those from northern Uyuni salt flats shore with higher yields, to invest in other economic activities such as trade (animals, groceries, clothes,

[74] : Housing costs do not concern depreciations of infrastructure but just the yearly expense for built the house during building period.
[75] : Transportation, domestic goods and services requirements, etc.

etc.), services provision (plowing and seeding with tractors, transportation, mechanics, weld, etc.), and to become teachers or nurses. Currently, with the quinoa price fall, quinoa profit ranges between 560 US$ and 1,100 US$/year, and around 560 US$ for conventional producers, implying a reduction of around 600 US$ for organic farmers (Appendix 1). This situation has pushed them to increase their migration, particularly in the southern and western shores of the Uyuni salt flats, where quinoa soil productivity and income are lower. In many communities of these regions one to two family members migrate for a 4-5 months period, mainly to Chile, where they work as miners, masons and horticulture workers, earning 250 to 400 US$/month or 1,250-2,000 US$/year. The data presented on Appendix 1 shows that conventional quinoa growers from the Southern Altiplano earn less per working day invested in quinoa cropping (3.0 US$/day) than what they pay to hired peasants in agricultural production (3.2 US$/day).

In this region, quinoa expansion has also increased quinoa consumption in peasant households, which are in general composed by 6 members[76]. Before quinoa expansion in the mid 80's, families used to seed ¼ to ½ ha for harvesting 6 to 12 qq that they mainly consumed. Families with organic production get 60 to 105 qq of organic quinoa with a 20% rate of self-consumption (12 to 21 qq), and those with conventional quinoa obtain between 35 and 55qq with a 25% rate of self-consumption (8 to 14 qq). Families have also preserved, in the volcano slopes, small plots of potatoes (from 0.2 to 0.4 ha) where they harvest 5 to 13 qq for their self-consumption (Laguna 2000b). Families that have kept their llama and sheep herding have also the possibility to consume meat (in average one to two sheep per month and 6 llamas per year). However, they cannot cover their needs and have to buy every month 1 qq of potatoes and 4 to 16 kg of meat (with bones). Moreover, with a narrow spectrum of crop production, the Southern Altiplano farmers have to buy considerable quantities of food. They spend 30 to 70 US$/month (360 to 840 US$ per year), amount that implies slightly lower food costs than in Cuzco and the Peruvian Altiplano, and particularly lower than in Riobamba (Table 8). In general, the Southern Altiplano families buy ½ qq of pasta, ½ qq of wheat flour, ½ qq of rice and small amounts of legumes (3 to 7 US$/month) and fruits (1.5 to 6 US$/month). This also, shows us that like in Riobamba and the Southern Peruvian highlands, the families growing quinoa have a badly balanced nutrition based on too much carbon hydrates (Table 8).

High income initially obtained with quinoa sells has allowed peasants to give their children the possibility to attend primary and secondary studies and, for many of them, higher studies as schoolteachers and BAs. Primary studies cost 85 US$[77] per child per year, while secondary studies, which cost 190 US$[78] per child per year (Table 8), require from most families to gradually build another house in intermediaries cities, using self-made clay bricks and external materials costing 900 to 1200 US$[79] which are also used

[76] : 2 parents and 4 children.
[77] : 39 US$ for uniform, 34 US$ for utensils and materials, 12 US$ for collation breaks.
[78] : 100 US$ for uniform, 40 for utensils and materials, 30 US$ for collation breaks and 20 US$ for transportation.
[79] : Generally these houses are built with roof sheet in zinc, windows, doors, cement, wood, chalk, electric installations, water pipes, etc.

by the parents to develop the economic aforementioned activities. Reflecting their double residence migrant strategy, their houses in the communities are smaller than those built in cities and are composed by two or three rooms and one outside kitchen. In some cases, when the families have significant income, they buy a solar panel system in 400 US$ to have light. These houses are also built throughout several years with clay brick, with a cost of 600 US$, or 150 US$ during 4 years (Table 8). These last houses have similar costs to those from Peruvian quinoa growers and to those low-income quinoa growers from Riobamba. Meanwhile, city houses for these peasants have similar costs to those built in cement bricks by farmers mainly located in Columbe, Riobamba, but are much more expensive than those of Peruvian quinoa growers and other Riobamba quinoa producers. However, Southern Altiplano's young people can also move farther cities if they to have a relative living there, who would accept to house them, in which case the investment would be of at least 50 US$ per month or 550 US$ per year (Table 8). Compared with other Andean quinoa regions, the families from the Southern Altiplano have the lowest cost on primary education per child and per year, while their costs for secondary education are lower than those from Riobamba (264 to 352 US$ per child per year) but higher than in Peru (135 US$/child/year).

Key points of small quinoa growers' livelihoods regarding fair-trade standards

We have seen that alike the production costs, those for basic living are different from one country to the other, been higher in Ecuador and then Peru than in Bolivia. It is also evident that **land tenure is very different from one country to the other and that farmers from Ecuador with higher costs of living have the lower land tenure, while Bolivian farmers with lower costs of life have the higher land tenure.** In Riobamba, each family has less than 1 hectare, with possibilities to expand quinoa production to less than 0.4 ha without affecting the agricultural system based on animal feeding and a minimal food security. In Peru, quinoa cropping could be expanded in average up to less than 2.5 ha per family, without seriously affecting the agricultural systems and livelihood strategies. In Bolivia quinoa cropping can be expanded until the limit of available plowing land located in pampas, respecting at least a rotation leaving half of land in fallow, which means in average 5 ha of quinoa per year per family.

It also appears that the majority of farmers from Ecuador and Peru poorly pay the labor they invest in quinoa production, perceiving lower or similar salaries to those they get working away during migration or even selling their labor in quinoa production of other families. Moreover, the labor invested by organic quinoa growers from Riobamba and by those who produce conventional quinoa in Peru and the Bolivian Southern Altiplano is similarly paid to the external labor hired for their own agricultural production. **For this reason it is pertinent to provide them a fair trade price that creates a profitable difference between the labor they invest in quinoa production and this they provide outside the household and that improve their living conditions compensating their lost of purchase power created by Ecuadorian dollarisation and permanent local moneys devaluation regarding US dollar.**

In Southern Altiplano quinoa production organic is barely more profitable than conventional production since the end of 2003. The first kind of production has been more profitable only between 2000 until mid-2003 as a deepest drop on conventional quinoa price. It is true that fair trade do not have attributions to regulate the relationship of profitability between organic and conventional trade. However, knowing that strong relationships exist between important organic and fair trade importers, intermediaries and retailers, and between those and farmers organizations and some private exporters, it would be recommendable to raise this point with them in order to stimulate price practices that could create a positive income differential for organic growers.

We have also seen that Andean growers earn a small amount (in general between 10 and 14%) of the total added value created along quinoa the chain which essentially remains in northern countries. Paradoxically intermediaries associations and companies involved in fair trade (GEPA and Altereco) have the highest added value retention levels, which are higher than those of private companies willing to invest in fair trade such as Markal/Biogrow. Added value distribution inequalities is going worst with permanent Peruvian and particularly Bolivian moneys devaluation regarding US dollar, and with the devaluation of this last currency compared with Euro. Moreover, conventional quinoa prices have decreased in all Andean countries because of Bolivian quinoa real overproduction, Peruvian quinoa production growth and Peruvian and Ecuadorian quinoa market saturation. But this fall have been dramatic for organic quinoa prices paid to Ecuadorian, Peruvian and Bolivian peasants have decreased because the growth of the demand of northern countries is smaller than Andean production. Particularly, price paid to Southern Altiplano quinoa growers have dramatically decreased. Despite a small recovery of the price level between August 2003 and March 2004, organic quinoa growers from Southern Altiplano sell their grain at much lower prices (27.5 US$/qq) than they use to do it between 1996 and 1999 (35-39 US$/qq). This reveals that Bolivian organic quinoa market and price is not independent from inferences of Peruvian conventional quinoa market and pushes us to take account of this expectable influence when we attempt to fix prices for organic quinoa fair trade. Q**uinoa price drop has differently reduced Andean peasant's income.** The affect as been lower in the income of Ecuadorian growers with very small quinoa plots (less than 0.25 ha) followed by those from Peru seeding 1 to 2 ha in average than for Bolivian farmers whose income is composed between 60 and 80% by quinoa production. Between 1999 and August 2003, the quinoa profit of the lasts has lost 66% of the value they used to be. Despite the recovery of organic quinoa price for Bolivian peasants since the end of 2003 their income is still 33% lower than it was in 1999. **Price fall has considerably affected Andean farmers' livelihoods, particularly their economic diversification and the schooling of their sons. For that reason a factor of price correction is required in Fairtrade farm gate price definition. Finally, the partial recovery of price paid to Andean farmers and their profit recovery has undermined quinoa growers' organizations because their price of export has not increased. To allow their financial viability fair-trade farm gate price setting must preserve their profit and for that reason must be matched with a organic quinoa FOB price.**

Considering these elements, we propose to give different quinoa fair trade prices for each Andean country, trying to compensate these inequalities. The explanation of the fixation of proposed prices is given in Appendix 3 and the price in the following part of the report.

Part 3: Proposing standards for quinoa fair trade

Part B: Specific Standards for Quinoa and Quinoa growers organizations

1. Social Development

Some quinoa growers' organizations have problems regarding democracy, participation and transparency. It seems to be necessary to establish some standards that could help to evaluate the existence of these required social processes but also as a means to stimulate internal processes that could go strength them.

To be a fair trade labelled organization (FLO), quinoa growers' organizations will have to:

- accept the following standards,
- be legally constituted having status and juridical existence,
- set up yearly plans for global activities, business and investment, with the participation of its associates or their respective delegates,
- have in its structure an instance that will permanently, at least twice a year, allow to inform the delegates of members, and make strategic decisions with them, the manager of the organization and if necessary the technical staff,
- have a general manager,
- have at least one post for monitoring organization performance and informing associates, collectively designed by associates,
- have a yearly budget and a financial balance sheet, financial indicators, and half year reports on budget advancement execution,
- disseminate periodically, at least twice a year, written information concerning the aforementioned items to its associates,
- disseminate periodically the written records of intermediary decision instances, yearly congresses and monitoring to its associates,
- buy quinoa in equal quantities to its associates,
- inform every associate about these standards
- fulfill these social development standards within a maximal period of one year

2. Economic Development

2.1 Fair trade Premium

A 4.00 US$/qq fair trade premium will be paid to quinoa growers' organisations. The allocation of this amount will be collectively decided by the members of the organization.

FLO recommends to invest use this premium for organization's strengthening, business support and for the adaptation of processing factories according to safe food process regulations. However, this recommendation is not compulsory.

Organisational strengthening includes internal information dissemination, progress on meeting the requirements of the criteria, training to increase awareness on fair trade and to improve the participation of members in the organisation's decision making and representation of organisations' members.

Business support includes customers' satisfaction survey, investment in quinoa market analysis, customers search and quinoa promotion (participation in meetings, advertisements), leaders and staff training in business and management, maintenance for compliance with the minimum criteria and cross-subsidizing of non fair trade sales.

Considering the increasing sanitary requirements of the quinoa market in Northern countries, the conversion of processing factories of quinoa growers' organisations with low food processing standards implies the implementation of machines with inox steel pieces, the continuous quinoa processing without manual operations, cleaning systems for factories, clothing for the workers (gloves, bonnet and mouthpiece), and sanitary services and hand washers.

2.1.1. Minimum Requirements

An initial list of priorities for the use of the premium, regarding the aforementioned elements shall be presented to FLO before certification.

3. Environmental Development

These standards are applicable to small farmers' organizations.
Time limits set in this section are measured from the week the producer organisation starts fair trade exports.

Definition: agrochemicals as used in this text, include all synthetic inputs directly used in the production of agricultural products or for the maintenance of processing equipment involved, including pesticides, fertilizers and coadjutants like cleansing substances, detergents and mineral oil products.

3.1. Organic production

Organic certified quinoa production will have to fulfill national organic standards and the standards at the importing countries and from the International Federation of Organic Agriculture Movement (IFOAM). Bolivia has already implemented national organic regulations and the Peruvian organic actors have already proposed an organic regulation that should be adopted soon. However, these regulations do not discuss the amount of manure to apply to preserve soil fertility and its physical properties. That is why, for

organic quinoa production, a minimal amount of manure must be established in each region. In Riobamba 2 tons per hectare must be applied. In Puno and Cuzco, in Peru, 5 tons of manure per hectare must be used. In the Bolivian Southern Altiplano, 7 tons of manure per hectare must be incorporated to soil. The price paid for fair trade quinoa will allow fulfilling these requirements (see further and Appendix 3)

3.2 Integrated crop management ICM

Certified Non organic quinoa fair trade will have to follow the Integrated Crop Management (ICM) which aims to establish a balance between business and high level environment protection, through the permanent monitoring of economic and environmental parameters, upon the basis of which an integrated cultivation and conservation plan is devised and permanently adapted, taking into account the conditions set by local soil and climate. ICM minimizes the use of pesticides, and supports the use of manure and particular cropping practices to preserve soils.

Progress requirements

The same as FLO standards for banana (3.1.1 in banana standards)

3.2.1. Soil erosion control

Agricultural practices must conserve and improve the soil structure, life and fertility, in order to sustain long term productivity and to reduce the negative environmental impact by silting of rivers and other water sources.

Minimum requirements

- In the next agricultural cycle after a quinoa growers' organization becomes fair trade certified, all its members will have to apply manure. Considering differences in soil quality, farmers from Ecuador will have to apply at least 1.5 tons per hectare of manure, those from Peru will have to apply a minimum of 4 tons per hectare of manure and those from the Southern Altiplano, where soils are the most degraded, at least 5 tons per hectare in pampas and 4 tons per hectare in volcano slopes. Other organic fertilizers can be used in equivalent fertilization levels (chemical composition) than manure.
- In the Southern Altiplano, motorized soil labor will be allowed only for plowing and seeding.
- The use of motorized tractor plow will be allowed only if manure applications according to previous requirements are being done.
- Agriculture in slopes will not be allowed to use plowing in level lines or, if doing manual plow with chaqitaclla (also called uysu or wiri) with a progression following the gravity, only if soil is alternatively returned in both sides.
- Quinoa growers from Ecuador and Peru will have to seed quinoa in a cropping cycle rotation including at least three different crops with a minimum 2 years fallow. If the rotation cycle involves more than three years cultivation with different crops, every

additional year with crops will be compensated by the reduction for the same period of the minimum fallow period. In the Bolivian Southern Altiplano, quinoa produced in pampas will follow a rotation cycle with one year of quinoa cropping and one year of fallow. The year of fallow must be respected. Also, quinoa cultivated in volcano slopes will have to alternate the cropping cycle with potatoes and other possible crops, if plots have irrigation (barley, fabea bean, onions, etc.). In slopes, if manure is added following specified conditions, traditional rotation cycles will be allowed, consisting in one year of potato followed by one year of quinoa during three cycles and at least six years of fallow, or consisting in one year of potato followed by two years of quinoa during two rotations and at least six years fallow.

Means of verification: field visit and interviews.

3.2.2. Water resources protection

Water resources should be adequately protected from pollution by chemicals and saponine. Special attention should be given to the conservation of drinking water.

Minimum requirements

- After a year, it is forbidden for quinoa growers and organizations to throw pesticides, synthetic fertilizers and un-composted manure to rivers and lakes.
- Quinoa processing factories are not allowed to throw water with saponine or to throw saponine powder to the water. Water with saponine will have to be filtered to remove and recycle the saponine. Saponine powder will not be allowed to be burnt.
- The sale of quinoa saponine powder or water with saponine to cosmetic or detergent industries is recommended, like the recycling of saponine powder in compost in ditches covered by cement to avoid soil infiltration.

Means of verification: field visits, water analysis and interviews.

3.2.3. Agrochemicals

The use of agrochemicals that constitutes a risk for humans and for the environment should be minimized and replaced by organic and/or biological methods.

Minimum requirements

- The use of herbicides is not allowed.
- The use of organo-chlorides pesticides is not allowed.
- The use of pesticides must vary in doses and chemical composition to avoid resistances. Pesticides might change every year if more than two similar products are available on market.
- For cleaning quinoa-processing factories, the least aggressive available cleansing chemicals will be used.

- After one year, pesticides kept by farmers will be stored in separated places and under rain protection.

Means of verification: field visits, organization's accounting book and interviews.

3.2.4. Waste

Waste and environmental impact of waste must be minimized. Cutting back the use of resources and external inputs used, reusing and recycling of materials should be enhanced. The disposing of waste should not damage natural ecosystems, in particular water resources.

Minimum requirements

- Within three months the fields, processing factories and riverbanks are free of waste. The disposal of non re-usable and non-recyclable waste is done by burying or other adequate means.
- Unused chemicals shall be returned to the supplier if possible. Otherwise agrochemicals and filtering material for the purification of water with saponine, non-reusable pesticides, containers and plastics shall be disposed of in a way to minimize the environmental impact. If burying is the best alternative, depots are to be located at least 200 meters from open water bodies, drinking water sources and protected areas.

Means of verification: field visits, organization's accounting book and interviews.

Part C: Trade Standards for Quinoa

1. Product description

1.1 Fair trade Quinoa concerns processed (desaponified) quinoa grain and products derived from it which have been produced, traded, processed and marketed according to the standards and contracts established by FLO, Fair trade Labelling Organizations International e.V.

2. Long term trade relationship

2.1 All quinoa to be sold with fair trade label must be purchased to quinoa growers' organizations legally constituted. The purchase could be directly exported or sold to a local private company that will export it later.

2.2 Importers, producers' organizations and exporters, if necessary, seek to establish a long term and stable trade relationship.

2.3 Local private exporters will be fair trade agreed for organic quinoa export if they totally buy it from producer's organisations carrying an internal collective organic certification program.

2.4 Importers, exporters and producers' organizations sign a contract with FLO International, which defines the rights and obligations of each respective party vis à vis FLO international. In addition, importers sign a contract of purchase for fair trade quinoa with every grower's organization/exporter.

2.5 Purchase contracts should comply with at least the following requirements:

- Contain this document as an integral part. If no reference is made in the final producer-importer/exporter contract to one or more of the areas covered by the trade standards, FLO will assume that the specifications of the trade standards apply and will use them as terms of reference to solve outstanding disputes.

- Contain a confirmation by the importer that targeted volumes of FT quinoa to be yearly purchased will be specified précising monthly shipping with their respective quantities and destinations. At least one month before the start of every yearly plan each growers' organization/exporter will be informed about the targeted volume of fair trade quinoa to be bought for the year.

- State the maximum volume per month the producers' organization/exporter is committed to sell to the importer. Possible variations during the contract period must be specified with monthly orders at least 3 weeks before shipment.

- Specify the quality requirements and tolerances of the quinoa and packing method and material (or refer explicitly to Appendix 4 of this document).

    -Indicate the price of fair trade quinoa
    -Delivery conditions
    -Payment conditions for fair trade quinoa
    -Indemnity and liability of each party
    -Give the law and jurisdiction applying
    -Define "force majeure"

2.6 Purchase contracts may not contain clauses that contradict these standards. Terms related to fair trade price, premium, payment and contractual obligations are not negotiable, as they refer to principles or rules laid down by FLO. Quality tolerances, shipment conditions and procedures to adopt for quality claims and inspections may diverge from the trade standards, provided that:

- The final producer's organization-buyer (importer or Bolivian exporter) contract states explicitly the differences with trade standards where necessary.

- A detailed account of the procedures the buyer (importer or Bolivian exporter) and the producer's organization will follow instead is given.

- Producers are made fully aware of the implications of the clauses contained in the fair trade contracts signed by their organizations.

- These clauses are not detrimental to producers.

FLO reserves the right to check whether they are compatible with FLO's principles as laid down in the trade standards. In case of doubt or dispute the clauses in this document prevail.

2.7 In each yearly purchase plan, importers will specify the total and monthly-expected shipping of fair trade quinoa, with quantities per destination, weekly periods of sending each ship's cargo and the sources (producers' organizations) they intend to obtain them from.

Yearly purchase plans will be sent to FLO and to the producer's organization at least two weeks before the beginning of each year and to the producers a maximum of one week after they have been received by their organization. FLO will treat this information as confidential.

The yearly purchase plan implies a legal obligation to buy at least 50% of the projected fair trade quantities during the quarter. This obligation is cancelled if during each quarter, more than 10% of the grain is not within quality standards.

2.8 Unless either one of the contract parties, at least two weeks before the expiring date, gives notice that it wishes to end or modify the contract, the contract is automatically renewed for a new contract period of the same duration.

3. Pre-financing

3.1 The buyer (that means the importer purchasing from the producers' organization or the local private exporter buying from the producer's organization) shall pre-finance 40% of the contract value until 15 days after having passed the command.

3.2 Pre-finance must allow access to cash for producer organizations in order to buy from their members. The payment instruments (cash, L/C Red clause, etc.) will be arranged in the contract.

3.3 The pre-finance is meant for the quinoa producers' organization. If the exporter is not this kind of organization he will receive the pre-finance to transfer it to the organization but beforehand both have to legally agree upon the handling of the pre-financing money and the fulfillment of the contract.

3.4 In case of at least one shipment per month it would not always be necessary to pre-finance the whole amount before the first shipment. Pre-finance would be to be adapted to organizations' financial needs.

4. Pricing and premium

4.1 From the 1st of May 2004 quinoa growers will receive a country-specific fair trade farm gate minimum price for organic and conventional quinoa. These will be defined on their current costs of production, the current reward of their labor, cost to comply environmental requirements (ICM) and a compensation quinoa price drop and income fall registered since 2000. This compensation attempts to create a positive differential for the wage of daily labor invested in quinoa production in order to support farmers in continuing seeding quinoa and allow them the possibility to preserve and improve their living standards, particularly education, food composition and nutrition, housing, clothing, health and their investments for develop household pluriactivity. Criteria for setting bellow referred prices are explained in Appendix 3. In each mentioned country, quinoa growers will receive the same minimum fair trade price independently from the kind of ecotype of quinoa grain produced.

Minimum fair trade farm gate price for raw quinoa to be paid to the growers in United States Dollars (US$)

Kind of production	Organic			Conventional		
Country	Bolivia	Peru	Ecuador	Bolivia	Peru	Ecuador
Per ton	854.4	747.6	918.5	704.9	598.1	704.9
Per qq (46.8 kg)	40.0	35.0	43.0	33.0	28.0	33.0

4.2 In each country, quinoa growers' organizations will receive the same minimum premium independently from the kind of ecotype of quinoa grain produced.

Premium for quinoa growers' organizations in United States Dollars (US$)

Kind of production	Organic			Conventional		
Country	Bolivia	Peru	Ecuador	Bolivia	Peru	Ecuador
Per ton	85.4	85.4	85.4	85.4	85.4	85.4
Per qq (46.8 kg)	4.0	4.0	4.0	4.0	4.0	4.0

Growers' organizations receiving fair trade price will have to pay their associates according to fair trade prices fixed in these standards, before one week after having received the pre-financing credit from the buyer.

4.3 The fair trade premium is paid to farmers' organizations on top of the fair trade minimum price for farmers. This premium is 4 US$/qq for all origins. Its use must be collectively decided by the members of the organizations. We recommend using it for organization strengthening, quinoa processing improvement regarding food safety and quality control processes and for market development.

At the end of every business year, during their yearly assembly quinoa growers' organizations having received fair trade premium will have publicly inform all their associates of the total amount of premium perceived. During this meeting, associates of these organisations will have to decide the use of this premium.

4.4 From 1st May 2004 current external buyers of quinoa growers' organisations been to be certified will have to agree the fair trade farm gate price and the premium for farmers without penalizing the current profit of quinoa growers organisations. In other words, they will have to buy their quinoa with a new FOB quinoa price. This will be at minimum defined as follow: the current quinoa FOB purchase price to which will be added the premium price and the difference between proposed fair-trade farm gate price for quinoa and the price the currently perceive for quinoa. A current FOB price is given further in the applicability of fair trade price and premium section. Of course private exporters buying to quinoa growers' organisations or importers directly purchasing from the last will be free to define the profit they want to obtain.

4.5 FLO will review the country-specific minimum fair trade prices at least every two years. Price changes will be announced no later than 1st October and come into effect on 1st January. Importers and local private exporters have to accept and facilitate external control of compliance with these conditions.

4.6 If, during a quarter period, the market price or export price fixed by the authorities is higher than the fair trade minimum price, the higher price shall apply until two weeks after it becomes lower than fair trade minimum price.

4.7 If the organization is not the local exporter, the credit of the premium and the quinoa growers' fair trade price after the pre-financing will be paid on the account of the producer' organization no later than 2 weeks after collecting the quinoa.

4.8 The value of a quinoa order, including fair trade quinoa price and premium, will be paid to the exporter (local private company or the quinoa growers' organization) no later than 3 weeks after collecting the quinoa order from the ship.

4.9 If the weight of bags or boxes is other than the agreed weight, the total price is adjusted pro-rata in line with the weight.

4.10 If after having signed the monthly order, the buyer (that means the importer purchasing from the growers' organization or the local private exporter buying from the grower's organization) requires the extension of the shipment or transportation schedule beyond the limits of sound commercial practice of the exporter (three months after the buying order), the real costs of storage, interest and insurance must be covered by the buyer in the terms of contract. This rule is not applicable for those organizations in whose respective countries exist specific export and sale regulations which make the above unworkable.

5. Quality requirements

5.1 Quality requirements and tolerances for fair trade quinoa must be specified in a written purchase contract, together with packing and labelling requirements.

5.2 In order to solve problems of diverging quality standards applied by clients, the importer should agree to suitable quality standards with growers' organizations and if it is not the exporter, with the export company too, or refer in the purchase contract to FLO's standard quality requirements for non-organic fair trade quinoa, as described in Appendix 4

5.3 If growers' organizations, in one hand, and importers or export companies, in the other hand, do not agree to different tolerances, those specified in Appendix 3 apply.

6. Non fair trade sales

6.1 the same clause as (5.1) for banana with the word "grain" instead of "fruit".

6.2 the same clause as (5.2) for banana with the word "grain" instead of "fruit".

6.3 the same clause as (5.3) for banana with the word "grain" instead of "fruit".

6.4 the same clause as (5.4) for banana with the word "grain" instead of "fruit".

7. Shipment conditions

7.1 Within the framework of the contract, orders for each shipment are mentioned in sourcing plans for quarters.

7.2 Shipments not complying with quality standards and with shipment orders should not be shipped. If, nevertheless abnormalities occur, the exporting organization of producers or the exporter having previously bought to the growers' organizations shall give notice in writing to the importer as soon as the abnormalities are discovered, especially with regard to: quantities diverging from the order, non homogenous grain, with more impurities than those mentioned in this standards (Appendix 4), exceptional packing material used, faulty labelling of carton boxes and bags and abnormal processing, storage and transport conditions.

7.3 the same clause as (6.3) for banana.

8. Short falling systems

8.1 the same clause as (7.1) for banana with the word "grain" instead of "fruit".

9. Indemnities liabilities and procedures to follow in case of quality claims and inspections

9.1 Quality checks and inspections in the port of origin and in the port of destination, as well as liabilities and indemnities determined accordingly for the parties will follow the procedures laid down in Appendix 5 of this document.

9.1.1 the same clause as (8.1.1) for banana.

9.1.2 the same clause as (8.1.2) for banana.

9.1.3 the same clause as (8.1.3) for banana.

9.2 the same clause as (8.2) for banana.

9.2.1 the same clause as (8.2.1) for banana.

9.2.2 the same clause as (8.2.2) for banana.

10. Payment

10.1 If the grain is accepted by the importer after inspection in the country of destination, payment shall be made at the least within 48 hours after acceptation.

10.2 The same clause as (9.2) for banana.

10.3 If the producers' organization exports or its exporter buyer send documents through banks to be delivered against payment of the grain, they are liable for losses caused by late arrival of the documents.

11. Information rights and obligations

11.1 FLO has been a system to audit the flow of fair trade goods, so as to guarantee that fair trade products bought by consumers are actually produced by fair trade producers' organizations and traded under fair trade conditions. All producers and traders will supply FLO with quarterly information about volumes bought and sold. All trading actors allow FLO to inspect their documents. These documents for organizations are: balance sheet; financial indicators; financial audits; written records of monitoring, yearly congress and intermediary decision instances; status and juridical documents; yearly plans for global activities, business and investment; written information disseminated to its associates, fair trade contract with private companies. For private exporters and

importing companies these documents concern balance sheet, importing documents, fair trade contract with producers' organizations. An external audit may be required annually.

12. Arbitration and suitable law

12.1 The same clause as (11.1) for banana.

12.2 The same clause as (11.2) for banana.

Key points of quinoa fair trade standards

All quinoa to be sold with fair trade label must be purchased to quinoa growers' organizations legally constituted. The purchase could be directly exported or sold to a local private company that will export it later. Local private exporters will be fair trade agreed for organic quinoa export if they totally buy it from producer's organisations carrying an internal collective organic certification program. This regulation will avoid the subsidy of local private companies exporting organic quinoa by peasant organizations.

A differential fair trade farm gate price is allowed per Andean country and kind of production (organic/conventional). This supports costs of environmental requirements for soil preservation, through the application of regionally differentiated amounts of manure, and the setting of a positive differential to increase the productivity of labor invested in quinoa cropping. Wanting to contribute in growers household life standards it also provides compensation to dramatic drop of quinoa prices registered since 2000 that has affected their life standards particularly those regarding food, housing, education and investments for economic diversification. Farm gate fair-trade prices are presented in the next section and in detail in (Appendix3).

A premium of 4 US$/qq is allowed to legally organized growers who have to collectively decide its allowance. Knowing that important production costs differences exist among quinoa growers (appendix 1) and that I do not attempt to enhance differences among Andean quinoa growers we propose a unique premium. Moreover, I do not consider fair to create discriminations among these organizations, that fair–trade also attempts to make stronger, because part or even the totality of the premium might be invested in strengthening growers' organizations such as quality and costs of processing, associates information and participation in the decision making of the organisation (internal information dissemination, training to increase awareness on fair trade, trade and management aspects), and marketing and management practices. Knowing that current volumes of quinoa sold on European fair trade market turns around 600 tons per year, the application of the proposed price in conditions covering all this demand could represent 51,264 US$. This means that if associates from quinoa growers' organisations decided to use premium to strengthen their organizations they will have this additional amount to invest in this choice.

Applicability of fair trade price and premium

Referential current FOB price of growers' organizations for export of bulk quinoa

To compare the impact on FOB price, we consider current costs and margins of quinoa growers' organizations. We also consider their current projects on news ways of processing quinoa, particularly for ERPE who wants to export polished quinoa. Knowing that ERPE has not started yet to process quinoa by polishing we propose to give them the same profit obtained by private companies.

Kind of production	Organic				Conventional				
	Bolivia	Peru	Ecuador		Bolivia	Bolivia	Peru	Ecuador	
Exporting Organisation	ANAPQUI	El Altiplano/ APAAL	ERPE/ Corporation Chimborazo		ANAPQUI	CECAOT	El Altiplano/ APAAL	ERPE/ Corporation Chimborazo	
Kind of quinoa desaponification process	Mixed	Dry	Humid	Dry	Mixed	Mixed	Dry	Humid	Dry
Fair trade farm gate price for grower (US$/ton)	854.4	747.6	918.5	918.5	704.9	704.9	598.1	704.9	704.9
Premium for collective allowance (US$/ton)	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4	85.4
Profit for ANAPQUI's regional organizations (US$/qq)	1.3	/	/	/	1.3	/	/	/	/
Profit for ANAPQUI's regional organizations (US$/ton)	27.8	/	/	/	27.8	/	/	/	/
Processing and export cost (US$/qq)[80]	15.0	13.5	27.0	18.0	14.0	15.5	12.0	25.0	18.0
Processing and export cost (US$/ton)	320.4	288.4	576.7	384.5	294.0	330.3	256.3	491.3	384.5
Direct Fair Trade certification costs (US$/ton)	4.7	8.0	6.3	3.9	3.8	5.2	5.7	3.9	3.9
Current profit for processor (US$/qq)	15.2	19.0	9.0	9.0	15.2	7.9	19.0	9.0	9.0
Current profit for processor (US$/ton)	324.7	405.8	192.2	192.2	324.7	168.0	405.8	192.2	192.2
FOB Price for bulk quinoa (US$/ton)	1,617.4	1,556.6	1,779.1	1,584.5	1,440.7	1,293.8	1,345.6	1,473.8	1,367.0
Current FOB price for bulk quinoa /ton)	1,250.0	1,217.5	1,409.8	/	/	/	/	/	/
Difference in average	29.4%	27.8%	26.2%	/	/	/	/	/	/

Prices further down the chain

FLO's standards committee must avoid falling in the current trap evaluating fair trade proposed prices further the chain at FOB levels. Indeed, to evaluate the changes of prices further down the chain it is initially necessary to underline that the majority of added value generated along the different quinoa remains in Europe (see part two). This means that in important price increase to farmer in conditions in which al the actors of the chain decide to preserve their same profit will have a much lower rise at a retailer level. Considering the Bolivia-Europe organic quinoa chain, the application of the proposed prices and premium, in conditions where

[80] : Of course conventional processing costs do not take in account organic certification.

chain's actors will not try to take profit of fair-trade labelling enhancing their own profit, will increase the price for consumer in 0.17 US$ or 0.14 Euro cents per 500g package. For example for the ANAPQUI/GEPA/Solidar'Monde/Altereco/CORA, this means an increase from 2.58 to 2.72 Euros/500g, equal to 5.4%. Regarding Quinuabol-Markal-Monoprix chain this means an increase from 2.32 to 2.46 Euros/500g package equivalent to 6%. Regarding the chain ANAPQUI/GEPA/German World's Stores the above proposal will increase the retailing price from 2.79 to 2.95 Euros/500g package (5.7%).

Fair trade proposed prices do not seem to treat quinoa fair-trade sell involving new importers, intermediaries and retailers. First they remain lower than some prices, for example than those proposed in the Netherlands through the chain Jatary/Primeal/Lima (Belgium)/Organic Retailer in 2.90 Euros/500g. Second, it is true that proposed fair trade prices for organic quinoa will be higher than those currently proposed in France buy non fair-trade retailers such as CARREFOUR (1.66 Euros/500g), Champion Bio (2.00 Euros/500g) and Naturalia (2.20 Euros/500g). However, a recent survey with quinoa consumers buying in CARREFOUR (Laguna, forthcoming) seems to show that their main criteria for purchasing quinoa which lies on diethetic criteria, particularly gluten free (celiac disease) and vegetarian consumption and that they are aware that CARREFOUR is not a fair partner for farmers. These consumers have profiles corresponding to those so far underlined by fair trade surveys in France (IPSOS, 2000, 2001, 2002 and 2004) that means: professional with higher studies and medium high income level (engineers, teachers, etc.) and young people currently involved in higher education studies. The majority of them, excepted one part of young people currently studying, state their willingness to pay more than 2.5 Euros per package if they are insured that the price will go to peasants. Some of them also state that they could buy quinoa in others stores than CARREFOUR supermarkets if they were informed.

In the Ecuador - United Kingdom quinoa chain, in conditions in which chain actors will not look for increase their profit, the proposed price would imply sale price of 5.06 US $/kg instead of 4.70 US$/kg or 2.53 US$/500g instead of 2.35 US$/500g. This means an increase of 7.6% for the consumer.

It is important to inform that among importers actors consulted about this fair-trade farm gate price and premium proposal only GEPA has contested it when initially I proposed an increase of FOB pricing in 40% (in March 2003). This reaction is surprising for a fair trade pioneering association, one of the bases of EFTA. First, as we have shown that despite an growth of 25 to 29% in FOB price, the real increase of price at the end of the chain or the retailer will be equal or lower than 6%. Second, in a capitalist rationality, fairly compatible with fair trade principles, in my opinion, GEPA argues that they must increase their prices of sale following the same rate of quinoa FOB price growth or in other words that they must look for preserving the profitability of capital. They sustain this argument of the fact that an increase of FOB price will automatically imply an increase of their costs. This argument has serious limits. First, GEPA currently pays ANAPQUI 1,250 US$ per ton of bulk organic quinoa while between 1993 and 1999 it use to pay 1,700 US$ per ton of conventional quinoa and between 1750 and 1850 US$

per ton of organic quinoa. Second, an increase of price does not imply more time to invest on ordering to ANAPQUI yearly commands for EFTA members. On the contrary having price references, time used for negotiating price will be saved, that means savings in communication and personnel costs will be able. Also, GEPA will not have to make additional administrative steps with European Union for agreements allowing import of ANAPQUI's products because these have been so far done. Neither, GEPA will have to expend more money on IMO control certification of flow and procedures regarding organic products by GEPA. Indeed, organic certification controls are calculated following the number of days required for this work. Knowing that an increase of price of FOB price does not implies to an increase of purchased quinoa volume, neither of the number of orders, we do not see how this could lead to an increase of GEPA's import cost. In fact, GEPA's argument would only be valid if it had to borrow money but let us remind that current interest rates turn around of 4%. This means that if there was a necessity to borrow money, the additional cost after implementation of new prices should be equivalent to multiplication of this interest rate per 26 or 29% of ancient FOB quinoa price. Moreover, the loan should only be needed for a small amount of money concerning direct purchases of GEPA: the import of 50 tons of quinoa packed in boxes of 500 g by ANAPQUI[81]. Indeed, bulk quinoa import mediated by GEPA is not paid by this but by its EFTA partner to whom is destined the ordered of quinoa. FLO's standard committee must be informed that if the GEPA position of increasing profit proportionally to FOB costs is followed it will automatically lead to a bigger inequality of distribution of added value staying essentially concentrated on European actors, particularly in those who currently make the higher profits (GEPA and Altereco), because initial inequalities of distribution already exist along the chain. Having stated that, we invite GEPA to reconsider its policies regarding fair trade prices and its rationality of profitability.

[81] : The other 200 tons mediated by GEPA are directly paid by its EFTA associates.

Bibliography

Baquero M., Viteri G. and Jacobsen B., 2002. *La quinua y sus mercados: Ecuador y la Unión Europea*. FAO/Centro Internacional de la Papa (CIP)/Catholic Relief Services (CRS), Quito, manuscript.

GTZ-PAC, INIAP, CORPEI and CRS, 2003. *Fortalecimiento de la cadena de la quinua orgánica*. Memoria del Taller, GTZ, Quito, manuscript.

IICA/PNUD, 1991. *Estudio de mercado y comercialización de la quinua real de Bolivia*. Proyecto BOL/C01/Procesamiento de Quinua. manuscript, La Paz, Bolivia.

INIAP, 1986. *Historia de las dos primeras variedades de quinua*. Unidad de recursos filogenéticos, Estación Experimental Santa Catalina, Instituto Nacional de Investigaciones Agropecuarias, Quito.

Jacobsen S. and Sherwood S., 2002. *Cultivos de granos andinos en Ecuador: informe sobre los rubros quinua, chocho y amaranto*. FAO/Centro Internacional de la Papa (CIP)/Catholic Relief Services (CRS) eds., Abya Yala, Quito.

Junovich A., 2003. *La quinua en el Ecuador a través de los datos del III Censo Nacional Agropecuario*. Proyecto SICA, Ministerio de Agricultura y Ganadería/Banco Mundial, Quito, manuscript.

Koziol, M.J. 1992. "Chemical composition and nutritional evaluation of quinoa (*Chenopodium quinoa* Willd.)". In *Journal of Food Composition and Analysis*, Vol. 5, n° 1, pp 36-68.

Laguna P., 2000a. "El impacto del desarrollo del mercado de la quinua en los sistemas productivos y modos de vida del Altiplano Sur boliviano". Paper presented before the *XVI^{to} Simposio de la Asociación Internacional de Sistemas de Producción*, Santiago, Chile, minutes published in CD-Rom and web page at: http://www.rimisp.cl/ifsa/ifsave

Laguna P., 2000b. *El impacto del desarrollo del mercado de la quinua en los sistemas productivos y modos de vida del Altiplano Sur boliviano*. Asociación Nacional de Productores de Quinoa (ANAPQUI), manuscript, La Paz.

Laguna P., 2002. "Competitividad, externalidades e internalidades, un reto para las organizaciones económicas campesinas: La inserción de la Asociación Nacional de Productores de Quinua en el mercado mundial de la quinua". In *Debate Agrario*, Centro Peruano de Estudios Sociales (CEPES), n°34, pp 95-169.

Laguna P., 2003. *¿Capital social o caja de Pandora? Contestación y deformación de la acción colectiva en comunidades y organizaciones económicas campesinas de cara a la mercantilización de la quinua*. Electronic Conference "Collective action and fight against poverty", Grupo Chorlavi, Santiago, http://www.grupochorlavi.org/accioncolectiva/documentos/capitalcicda.pdf

McCord B., 1995. "Quinua could become the breakfast of champions and change the face of agriculture". In *Esso-Farm Trak Advances Magazine*, Spring #, Calgary, Alberta, Canada, pp 13-14.

Nieto C., 2001. "Cultivo, producción y conservación de la quinua en el Ecuador". In Jacobsen S., Mujica A. and Portillo Z. eds. *Memorias del Primer Taller Internacional sobre Quinua: recursos genéticos y sistemas de producción.* Centro Internacional de la Papa, Lima, p 456.

Oelke E.A. et al. (1992). "Quinoa". Presentación del curso *Grain crop production and management*, Departamento de Agronomía, Universidad de Wisconsin, Madison. http://corn.agronomy.wisc.edu/FISC/Alternatives/Quinoa.htm

Ortíz R., Ruiz-Tapia E.N. and Mujica A., 1998. "Sampling strategy for a core collection of Peruvian quinoa Germ-plasm". In *Theoretical and Applied Genetics*, n° 96, pp 475-483.

Pinget K. and Van der Heyden D., 1994. *Estudio de comercialización de la quinua en el mercado nacional: Alternativas para las organizaciones de productores*. Manuscript, Programa Quinua Potosí (PROQUIPO), Potosí.

PROINPA, 2001. *Catálogo de colección de Quinua conservada en el Banco Nacional de Granos Altoandinos*. La Paz.

Pusimacho M. and Sherwood S., 2002. *El cultivo de la papa en el Ecuador*. Abya Yala, Quito.

Varriano-Marston E. and DeFrancisco A., 1984. "Ultra-structure of quinua fruit". In *Food microstructure*, Vol. 3, pp 165-173.

Appendix 1: Costs and net margin comparison of quinoa cropping in Andean region for the harvest 2002-2003

Appendix 1: Costs and net profit comparison of quinoa cropping in Andean region for the harvest 2002-2003 (in US $)

REGION		Ecuador					
		Colta	**Columbe**	**Guamote**	**Carchi**	**Valle del Mantaro**	**Anta-Cuzco**
TYPE OF PRODUCTION		biological-hillside	biological-hillside	biological-hillside	conventional-slight slope	conventional-plain	conventional-plain
INTENSIFICATION in CAPITAL		Small scale extensive producer: animal traction little external inputs	Small scale extensive producer: animal traction without external inputs	Small scale extensive producer: animal traction without external inputs	Large scale intensive producer.Mechanized production high external inputs	Medium scale intensive producer: mechanized farming and harvesting, aporque with animal traction and high external inputs.	Small scale, little intensive producer; animal traction with external inputs.
IRRIGATION		dry farming	dry farming	dry farming	dry farming	dry farming	dry farming
BUYER		ERPE	ERPE	ERPE	INAGROFA	middlemen	middlemen
MERCHANT VALUE OF PRODUCTION							
average sown area per family in local units		3/4 solar	3/4 solar	1.3 solar	0,00	0,00	4 topos
average sown area per family (Ha)		0,15	0,15	0,25	6,00	1,50	1,00
yield (kg/ha.)		1150,00	1150,00	380,00	2000,00	1500,00	800,00
total production harvested (T)		0,17	0,17	0,10	12,00	2,25	0,80
price/T ($ US) in August 2003		640,80	640,80	640,80	512,00	320,00	320,00
Value of the Gross Product $ US		**110,54**	**110,54**	**60,88**	**6144,00**	**720,00**	**256,00**
MONETARY COSTS[1] FOR INPUTS AND SERVICES and LABOUR USE							
Plowing	Type of farming	Animal traction	Animal traction	Animal traction	Mechanised	Mechanised	Animal traction
	Family labour used (day-wages)	0,50	1,00	1,00		0,50	2,00
	Total number of day-wages hired fallow	0,00	0,00	0,00		0,00	0,00
	Fallow Total Cost	**4,00**	**1,20**	**2,00**		**39,00**	**0,00**
First	Type of intervention	Animal traction	Animal traction	Animal traction	harrow	harrow	Animal traction
Leveling	Family labour used (day-wages)	0,50	0,50	0,50	0,00	0,50	2,00
	Total number of day-wages hired for the first leveling	0,00	0,00	0,00	0,00	0,00	0,00
	Total First Leveling	**0,00**	**0,00**	**0,00**	**0,00**	**48,00**	**0,00**
Second	Type of intervention	Animal traction	Animal traction	Animal traction	harrow	0,00	0,00
Leveling	Family labour used (day-wages)	0,50	0,50	0,50	0,00	0,50	0,00
	Total number of day-wages hired for the second leveling	0,00	0,00	0,00	0,00	0,00	0,00
	Total Second Leveling	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
Fertilizing	Type of fertilizing 1 used	Manure (cow/sh.)	Manure (cow/sh.)	Manure (cow/sh.)	Chemical fertilizer	Manure rest of potato	Urea
	Type of fertilizing 2 usec	0,00	0,00	0,00		Leaf fertilizer	Manure rest of potato
	Family labour used (day wages)	2,00	2,00	4,00		1,00	3,00
	Total Number of day-wages to load / spread the fertilizer	0,00	0,00	0,00		0,00	0,00
	Total number of day-wages hired for the fertilizing	0,00	0,00	0,00		0,00	0,00
	Total Cost Fertilizing	**2,99**	**2,04**	**4,76**		**91,00**	**19,36**
Sowing	Type of sowing	Animal traction	Animal traction	Animal traction	Mechanised	Animal traction	Animal traction
	Family labour used (day wages)	3,00	3,00	10,00		8,00	6,00
	Number of day-wages hired for sowing	3,00	3,00	5,00		4,00	2,00
	Total cost Sowing ($ US)	**12,45**	**11,25**	**19,42**		**32,13**	**8,56**
Piznado[2]	Family labour used (day wages)	0,00	0,00	0,00		0,00	0,00
	Number of day-wages hired for piznado	0,00	0,00	0,00		0,00	0,00
	Total Cost Piznado	**0,00**	**0,00**	**0,00**		**0,00**	**0,00**
Weeding	Family labour used (day wages)	0,00	0,00	0,00		0,00	0,00
	Total Number of day-wages hired for weeding	0,00	0,00	0,00		0,00	0,00
	Cost Total Weeding	**0,00**	**0,00**	**0,00**		**0,00**	**0,00**
First Hilling	Type of intervention	Animal traction	Animal traction	Animal traction	Mechanised	Animal traction	Animal traction
	Family labour used (day wages)	1,50	1,50	2,50		6,00	2,00
	Total number of day-wages hired for aporque	0,00	0,00	0,00		4,00	2,00
	Total Cost First Up-rooting	**0,00**	**0,00**	**0,00**		**12,00**	**6,00**
Second Hilling	Type of intervention	Animal traction	Animal traction	0,00	Mechanised	Animal traction	Animal traction
	Family labour used (day wages)	1,50	1,50	0,00	0,00	0,00	3,00
	Total number of day-wages hired for aporque	0,00	0,00	0,00		0,00	1,00
	Total Cost Second Up-rooting	**0,00**	**0,00**	**0,00**		**0,00**	**3,00**
Pest control	Type of control 1 used	not applied	not applied	not applied	chemical	virate	Piretroide: Bulldog
	Type of control 2 used	0,00	0,00	0,00		tamaron: org cloryde	Perfection: org fosfora
	Family labour used (1 day wages)	0,00	0,00	0,00		3,00	8,00
	Total number of day-wages hired for fumigation	0,00	0,00	0,00		0,00	0,00
	Total Number of day-wages hired to control light traps	0,00	0,00	0,00		0,00	0,00
	Total Cost Pest Control ($ US)	**0,00**	**0,00**	**0,00**		**71,00**	**4,20**
Harvest and threshing	Means of harvest	manual reap	manual reap	manual reap	mechanic. harvest	mechanic. harvest	manual reap
	Family labour used for the harvest (day-wages)	3,00	3,00	6,00		0,00	9,00
	Total number of day-wages hired for the harvest	3,00	3,00	5,00		0,00	3,00
	Total Cost Harvest	**10,50**	**10,50**	**17,50**		**0,00**	**9,00**
	Means of threshing	manual friction	manual friction	manual friction	mechanic. harvest	mechanic. harvest	Tractor
	Family labour used for the threshing (day-wages)	8,00	8,00	18,00		0,00	5,00
	Total number of day-wages hired for the threshing	0,00	0,00	0,00		0,00	0,00
	Total Cost Threshing	**0,00**	**0,00**	**0,00**		**90,00**	**80,00**
Transportation of	Means of transportation	0,00	0,00	truck	truck	truck	0,00
the harvest	Family labour used (day wages)	0,00	0,00	0,00		0,00	0,00
to the house	Total number of day-wages hired for loading/unloading	0,00	0,00	0,00		0,00	0,00
	Total Cost Means of Transportation (US$)	**0,00**	**0,00**	**0,00**		**0,00**	**0,00**
Airing out	Means of airing out	Manual airing	Manual airing	Manual airing	mechanic. harvest	mechanic. harvest	Manual airing
	Family labour used (day wages)	0,50	0,50	0,50		0,00	3,00
	Total number of day-wages hired for airing out	0,00	0,00	0,00		0,00	0,00
	Total Cost Airing out ($ US)	**0,00**	**0,00**	**0,00**		**0,00**	**0,00**
Transportation of	Means of transportation	0,00	0,00	0,00		0,00	0,00
the harvest	Family labour used (day wages)	0,00	0,00	0,00		0,00	0,00
to the selling point	Total number of day-wages hired for loading/unloading	0,00	0,00	0,00		0,00	0,00
	Total Cost Transportation ($ US)	**0,00**	**0,00**	**0,00**		**0,00**	**0,00**
Total Monetary Cost for Inputs and Services ($ US)		**29,94**	**24,99**	**43,68**	**0,00**	**383,13**	**130,12**
Total Monetary Cost for Inputs and Services per qq ($ US/qq)		**8,13**	**6,78**	**21,53**	**0,00**	**7,97**	**7,61**

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Appendix 1: Costs and net profit comparison of quinoa cropping in Andean region for the harvest 2002-2003 (in US $)

REGION		Ecuador					
		Colta	Columbe	Guamote	Carchi	Valle del Mantaro	Anta-Cuzco
TYPE OF PRODUCTION		biological-hillside	biological-hillside	biological-hillside	conventional-slight slope	conventional-plain	conventional-plain
COSTO MONETARIO CAPITAL FIJO INCLUYENDO DEPRECIACIONES Y MANTENIMIENTO ($ US)							
Sprinklers	Total of unities per farmer household	0,00	0,00	0,00		1,00	1,00
	Costo total fumigadoras ($ US)	**0,00**	**0,00**	**0,00**		**1,62**	**1,08**
Light traps	Total of unities per farmer household	0,00	0,00	0,00		0,00	0,00
	Costo total Trampas de luz ($ US)	**0,00**	**0,00**	**0,00**		**0,00**	**0,00**
Airing out machine	Total of unities per farmer household	0,00	0,00	0,00		0,00	0,00
	Costo total venteadoras ($ US)	**0,00**	**0,00**	**0,00**		**0,00**	**0,00**
Roman plough	Total of unities per farmer household of plough	1,00	1,00	1,00		2,00	2,00
	Total of unities per farmer household of wooden shaft	1,00	1,00	1,00		2,00	2,00
	Total of unities per farmer household of yoke	1,00	1,00	1,00		2,00	2,00
	Costo Total Arado Romano (Reja) ($ US)	**1,09**	**1,09**	**1,14**		**3,71**	**2,98**
Liuk'ana	Cantidad total poseída	0,00	0,00	0,00		0,00	0,00
	Costo total Liuk'anas ($ US)	**0,00**	**0,00**	**0,00**		**0,00**	**0,00**
Takisa/Chela	Total of unities per farmer household	0,00	0,00	0,00		0,00	0,00
	Costo total Takisa/chelas ($ US)	**0,00**	**0,00**	**0,00**		**0,00**	**0,00**
Sickle	Total of unities per farmer household	3,00	3,00	3,00		4,00	4,00
	Total cost sicles ($ US)	**0,10**	**0,10**	**0,16**		**1,50**	**1,00**
Thresh hood	Total of unities per farmer household	0,00	0,00	0,00		0,00	0,00
	Total cost tresh hoods ($ US)	**0,00**	**0,00**	**0,00**		**0,00**	**0,00**
Tractor	Total of tractors per farmer household	0,00	0,00	0,00		0,00	0,00
	Total cost of tractors	**0,00**	**0,00**	**0,00**		**0,00**	**0,00**
Disc plough	Total of unities per farmer household	0,00	0,00	0,00		0,00	0,00
	Total cost of disc ploughs	**0,00**	**0,00**	**0,00**		**0,00**	**0,00**
Sowing machine	Total of unities per farmer household	0,00	0,00	0,00		0,00	0,00
	Total cost of sowing machines	**0,00**	**0,00**	**0,00**		**0,00**	**0,00**
Total Monetary Cost for Capital ($ US)		**1,19**	**1,19**	**1,31**		**6,83**	**5,05**
Total Monetary Cost for Capital per quintal ($ US/qq)		**0,32**	**0,32**	**0,64**		**0,14**	**0,30**
TOTAL MONETARY COST ($ US)		**31,13**	**26,17**	**44,99**	**80,00**	**389,96**	**135,17**
Average quantity produced by farmer (qq)		**3,68**	**3,68**	**2,03**	**256,32**	**48,06**	**17,09**
Cost per quintal		**8,45**	**7,10**	**22,17**	**0,31**	**8,11**	**7,91**
NET MARGIN FOR PRODUCER ($ US)		**79,41**	**84,36**	**15,89**	**6064,00**	**330,04**	**120,83**
NET MARGIN PER QUINTAL ($ US/qq)		**21,55**	**22,90**	**7,83**	**23,66**	**6,87**	**7,07**
Yield (kg/ha.)		**1150,00**	**1150,00**	**380,00**	**2000,00**	**1500,00**	**800,00**
Yield (qq/ha.)		**24,57**	**24,57**	**8,12**	**42,74**	**32,05**	**17,09**
Met Margin/ha ($ US/ha)		**529,60**	**562,63**	**63,57**	**1011,02**	**220,10**	**120,87**
Total Family labour used (day wages)		**21,00**	**21,50**	**43,00**		**19,50**	**43,00**
Total number of day-wages hired		**6,00**	**6,00**	**10,00**		**8,00**	**8,00**
Total labour required for the crop (day wages)		**27,00**	**27,50**	**53,00**		**27,50**	**51,00**
Percentage of Labour Hired (%)		**22,2%**	**21,8%**	**18,9%**		**29,1%**	**15,7%**
Total Labour required per hectare (day wages/ha)		**180,00**	**183,33**	**212,00**		**18,33**	**51,00**
Net Margin per family day-wage ($/day)		**3,78**	**3,92**	**0,37**		**16,93**	**2,81**

[1]: costs exclude household contribution (labour, manure and animal traction) for cropping

[2]: Piznado is the practice of covering quinoa seedling with stalk to avoid its desiccation for sunstroke.

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Used change rates: 7.83 Bolivianos (B$) = 3.47 Peruvian Soles = 1.00 $ US

1 qq = 46.8 Kg

sh. = sheep

Appendix 1: Costs and net profit comparison of quinoa cropping in Andean region for the harvest 2002-2003 (in US $)

Peru				Bolivia			
Cabanas-Juliaca	**Juli-Puno**	**Juli-Puno**	**Juli-Puno**	**Puqui-Norte Salar**	**Puqui-Norte Salar**	**Mañica-Sur Salar**	**San Agustin-Sur Salar**
biological-plain	conventional-plain	conventional-raised fields (waru waru)	biological- raised fields (waru waru)	biological-plain	conventional-plain	biological-plain	biological- hillside mountain
Small scale, little intensive producer: mechanized farming and leveling, aporque with animal traction lack of external inputs.	Small scale, extensive producer: mechanized farming and leveling, aporque with animal traction lack of external inputs.	Small scale extensive producer: animal traction and very low external inputs	Small scale extensive producer: animal traction and lack of external inputs	Moderately intensive small scale producer: mechanized farming and purchase of external inputs (piretro and guano)	Moderately intensive small scale producer: mechanized farming and purchase of external inputs (tamaron)	Moderately intensive small scale producer: mechanized farming and purchase of external inputs (piretro)	Small scale, extensive producer: manual labour and partly with external inputs (guano).
dry farming	dry farming - aynuqa	surrounded by water	surrounded by water	dry farming	dry farming	dry farming	dry farming
Ind. El Altiplano	middlemen	middlemen	Ind. El Altiplano	ANAPQUI and PPQS	middlemen	CECAOT	ANAPQUI
0,00	0,00	3 waru warus	3 waru warus	7.8 tareas	7.8 tareas	0,00	0,00
2,00	0,75	0,22	0,22	5,00	5,00	6,00	4,00
1600,00	1400,00	2600,00	2200,00	1000,00	515,00	561,60	561,60
3,20	1,05	0,57	0,48	5,00	2,58	3,37	2,25
520,00	290,00	290,00	520,00	390,00	302,00	330,00	390,00
1664,00	**304,50**	**165,88**	**251,68**	**1950,00**	**777,65**	**1111,97**	**876,10**
Mechanised	Mechanised	Manual: Wiri-Uysu	Manual: Wiri-Uysu	Mechanised	Mechanised	Mechanised	Manual: Chela-Takisa
0,50	0,50	9,00	9,00	1,50	1,50	1,50	16,00
0,00	0,00	3,00	3,00	0,00	0,00	0,00	16,00
39,00	**14,63**	**9,00**	**9,00**	**120,00**	**120,00**	**144,00**	**60,80**
harrow	harrow	Manual: Kupaña	Manual: Kupaña	0,00	0,00	0,00	0,00
0,50	0,50	6,00	6,00	0,00	0,00	0,00	0,00
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
47,60	**17,85**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
Manure (cow/sh.)	Manure rest of potato	Nitrato Amonio	Manure rest of potato	Manure (lama/sheep)	Manure (lama/sheep)	Manure (lama/sheep)	Manure (lama/sheep)
Roca fosfórica	0,00	Manure rest of potato	0,00	0,00	0,00	0,00	0,00
6,00	0,00	1,00	0,00	16,00	0,00	28,00	16,00
0,00	0,00	0,00	0,00	10,00	0,00	0,00	8,00
0,00	0,00	0,00	0,00	0,00	0,00	0,00	4,00
14,40	**0,00**	**0,01**	**0,00**	**434,66**	**0,00**	**302,40**	**97,26**
Animal traction	Animal traction	Animal traction	Animal traction	Manual: Chela-Takisa	Manual: Chela-Takisa	Manual: Chela-Takisa	Manual: Chela-Takisa
6,00	3,00	6,00	6,00	35,00	35,00	45,00	32,00
0,00	0,00	0,00	0,00	5,00	5,00	3,00	0,00
9,36	**3,75**	**3,75**	**7,80**	**26,92**	**26,92**	**18,79**	**8,74**
0,00	0,00	0,00	0,00	20,00	20,00	24,00	16,00
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
4,00	6,00	6,00	6,00	5,00	5,00	5,00	0,00
5,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
15,00	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
Animal traction	0,00	0,00	0,00	0,00	0,00	0,00	0,00
8,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
3,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
9,00	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
Purin y Biol	not applied	not applied	not applied	Piretro/trampa de luz	Tamaron	Pyretrum	Light traps
Extractos Vegetal	0,00	0,00	0,00	0,00	0,00	0,00	0,00
38,00	0,00	0,00	0,00	40,00	35,00	40,00	16,00
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	**0,00**	**0,00**	**0,00**	**18,75**	**2,55**	**8,40**	**0,00**
manual reap	manual reap	manual reap	manual reap	manual reap and tear out	manual reap and tear out	manual reap and tear out	manual reap and tear out
24,00	9,00	9,00	9,00	55,00	55,00	66,00	40,00
8,00	0,00	0,00	0,00	5,00	5,00	6,00	8,00
24,00	**0,00**	**0,00**	**0,00**	**16,00**	**16,00**	**22,80**	**30,40**
manual sticking	manual sticking	manual sticking	manual sticking	truck or tractor	truck or tractor	truck or tractor	Manual sticking/truck
16,00	9,00	6,00	6,00	20,00	20,00	26,00	24,00
4,00	3,00	0,00	0,00	20,00	8,00	6,00	4,00
12,00	**9,00**	**0,00**	**0,00**	**142,00**	**56,71**	**46,80**	**50,24**
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**7,20**
Manual airing	Manual airing	Manual airing	Manual airing	mechanic. Airing	mechanic. Airing	Manual airing	Manual airing
12,00	3,50	6,00	6,00	6,00	4,00	12,00	8,00
0,00	0,00	0,00	0,00	2,00	2,00	0,00	0,00
0,00	**0,00**	**0,00**	**0,00**	**6,40**	**6,40**	**0,00**	**0,00**
0,00	0,00	0,00	0,00	truck	truck	truck	0,00
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
170,36	**45,23**	**12,76**	**16,80**	**764,73**	**228,58**	**543,19**	**254,64**
2,49	**2,02**	**1,04**	**1,63**	**7,16**	**4,16**	**7,55**	**5,31**

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Appendix 1: Costs and net profit comparison of quinoa cropping in Andean region for the harvest 2002-2003 (in US $)

Peru				Bolivia			
Cabanas-Juliaca	**Juli-Puno**	**Juli-Puno**	**Juli-Puno**	**Puqui-Norte Salar**	**Puqui-Norte Salar**	**Mañica-Sur Salar**	**San Agustin-Sur Salar**
biological-plain	conventional-plain	conventional-raised fields (waru waru)	biological- raised fields (waru waru)	biological-plain	conventional-plain	biological-plain	biological- hillside mountain
1,00	0,00	0,00	0,00	2,00	2,00	2,00	0,00
2,15	**0,00**	**0,00**	**0,00**	**1,15**	**1,15**	**1,38**	**0,00**
0,00	0,00	0,00	0,00	1,00	0,00	0,00	2,00
0,00	**0,00**	**0,00**	**0,00**	**0,90**	**0,00**	**0,00**	**0,36**
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
1,00	1,00	1,00	1,00	0,00	0,00	0,00	0,00
1,00	1,00	1,00	1,00	0,00	0,00	0,00	0,00
1,00	1,00	1,00	1,00	0,00	0,00	0,00	0,00
2,98	**2,05**	**1,66**	**1,66**	**0,00**	**0,00**	**0,00**	**0,00**
0,00	0,00	0,00	0,00	4,00	4,00	0,00	0,00
0,00	**0,00**	**0,00**	**0,00**	**1,71**	**1,71**	**0,00**	**0,00**
0,00	0,00	0,00	0,00	4,00	4,00	6,00	6,00
0,00	**0,00**	**0,00**	**0,00**	**1,71**	**1,71**	**5,40**	**3,60**
4,00	3,00	3,00	3,00	5,00	0,00	5,00	4,00
2,00	**0,56**	**0,17**	**0,17**	**3,13**	**0,00**	**3,75**	**2,00**
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
0,00	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
7,13	**2,62**	**1,83**	**1,83**	**8,61**	**4,58**	**10,53**	**5,96**
0,10	**0,12**	**0,15**	**0,18**	**0,08**	**0,08**	**0,15**	**0,12**
177,49	**47,84**	**14,58**	**18,63**	**773,33**	**233,16**	**553,73**	**260,60**
68,35	**22,43**	**12,22**	**10,34**	**106,80**	**55,00**	**71,97**	**47,98**
2,60	**2,13**	**1,19**	**1,80**	**7,24**	**4,24**	**7,69**	**5,43**
1486,51	**256,66**	**151,30**	**233,05**	**1176,67**	**544,49**	**558,24**	**615,50**
21,75	**11,44**	**12,38**	**22,54**	**11,02**	**9,90**	**7,76**	**12,83**
1600,00	**1400,00**	**2600,00**	**2200,00**	**1000,00**	**515,00**	**561,60**	**561,60**
34,19	**29,91**	**55,56**	**47,01**	**21,37**	**11,00**	**12,00**	**12,00**
743,52	**342,33**	**687,95**	**1059,70**	**235,42**	**108,94**	**93,07**	**153,93**
115,00	**31,50**	**49,00**	**48,00**	**198,50**	**175,50**	**247,50**	**168,00**
20,00	**3,00**	**3,00**	**3,00**	**42,00**	**20,00**	**15,00**	**40,00**
135,00	**34,50**	**52,00**	**51,00**	**240,50**	**195,50**	**262,50**	**208,00**
14,8%	**8,7%**	**5,8%**	**5,9%**	**17,5%**	**10,2%**	**5,7%**	**19,2%**
67,50	**46,00**	**236,36**	**231,82**	**48,10**	**39,10**	**43,75**	**52,00**
12,93	**8,15**	**3,09**	**4,86**	**5,93**	**3,10**	**2,26**	**3,66**

Source: quinoa growers from above mentioned regions

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Appendix 2: Characteristics of quinoa food products industrialized in the Andean region

PRODUCT	ECUADOR	PERU	BOLIVIA
Pearled Quinoa	Pearled Quinoa of diverse quality: good processing quality and packaging in plastic bag (INAGROFA), a little dirty and bad packaging in thin plastic bag (Supermaxi), small, very dirty and bad packaging ("El Sabor"). "La Pradera" and "Más Corona" sell pearled quinoa Real and Altiplano with impurities, despite the sieving before packaging. In bulk markets one can find pearled quinoa Real and in lesser quantities Altiplano and Ecuadorian Valle quinoa. Both quinoas are of low quality because of the high presence of impurities and the lack of grain selection. Pearled quinoa exported to northern countries is mostly organic.	Pearled quinoa of diverse quality. In supermarkets one finds quinoa from the Altiplano and Valle eco-regions, with good processing and packaging in plastic bags (Incasur-IACSA), dirty "Altiplano" quinoa with rigid plastic bag packaging (La Sazón- Industrias Alimenticias Brazar), Real-Altiplano quinoa mixed (La Siembra-Acroposa), quinoa Real with impurities and broken and black grains, and good packaging in thick plastic bag (La Serranita-AGALPESA), quinoa Real without impurities, with selected grain and rigid plastic packaging (Tesoro del Campo- DISWYL, Sureña, Costeño-Corp Transcontinental). The bulk and retail markets from Lima and Arequipa represent by far the bigger sales form for pearled Valle, Altiplano and Real quinoa. Nevertheless, the quality is very bad because of the high quantity of impurities and non-selected grain. Pearled quinoa exported to northern countries is organic in a minority, because part of it is conventional with organic certificate.	Pearled quinoa Real of good quality and good packaging presentation, in flexible and thick plastic bag. In supermarkets pearled quinoa Real is sold without impurities and excellent selection (Princesa-SIMSA[82]), and regular (S.M.-Distribuidora Chiu, Andean Valley and Irupana). In retailer markets one finds pearled quinoa from the Real and Dulce eco-regions and mixes of both with some impurities and little resistant plastic packaging (El Príncipe). Pearled quinoa exported to the northern countries is mostly organic.

[82] : SIMSA buys quinoa from ANAPQUI

PRODUCT	ECUADOR	PERÚ	BOLIVIA
Flakes	They are produced (Jacobsen and Sherwood, 2002). The product was not obtained to make an exact evaluation.	Quinoa flakes of very good quality are produced, mixed with amaranth, oat and maca flakes, with plastic bag packaging of very good quality and design (Incasur-IACSA) and mixed with oat flakes in plastic bags packaging of moderate resistance (3 Ositos-Clements Peruana).	Quinoa flakes of moderate quality are produced (some black grains) with packaging in plastic bags moderately resistant (La Princesa-SIMSA) and little resistant good quality packaging (ANAPQUI). Nevertheless, the lack of steel machines is a factor that could lead to the contamination of pops with heavy metals. Flakes are exported with organic certification, mostly to Europe.
Pops	They are produced (Jacobsen and Sherwood, 2002). The product was not obtained to make an exact evaluation.	The production process for pops through heating up and decompressing used in the Andean region destroys the protein value of quinoa. Independently of the protein value, quinoa pops of very good quality are produced, either of very good quality mixed with sugar in resistant plastic bag packaging (Incasur-IACSA) or mixed with sugar and chocolate and vanilla chemical essences in cardboard boxes badly designed or resistant plastic bags packaging (El Altiplano).	Quinoa Real pops of good quality produced in a partly craft manner sold in little plastic bags packaging of bad quality and design, in little small cities, regional markets (ANAPQUI, COPROQUIRC). In some small cities' downtowns and in others of bigger dimensions, pops are used as ingredients of elaborated products. Pops with organic certification are exported, mainly to Europe. In the cities, pops of excellent quality covered with honey and in plastic packaging of moderate resistance are sold.
Muesli	Not produced	Not produced	Produced in three brands. Two are conventional, produced by Logal and SIMSA under the corresponding brands Titos and La Princesa. Both products have very good presentation. The first of very good quality and taste (abundant quinoa flakes, quinoa pops, amaranth, nuts, raisins, apple and honey) and presented in a transparent and resistant plastic packaging (Logal). The second is also of good quality but with less interesting taste that the first one, and the flakes are not cooked enough (oat, corn and wheat flakes, quinoa pops, raisins and honey) and presented in cardboard boxes of very good design (La Princesa-SIMSA). The third Muesli is organic, certified by Immo control, and exported to Europe. It is of the extruded kind, starting from a mix of flours (being its main ingredient rice, followed by quinoa, banana, sugar and cacao). It is produced by the company called "La Coronilla". Its presentation is very good and its quality is similar to that of the cereals made by big multinational companies.

PRODUCT	ECUADOR	PERÚ	BOLIVIA
Quinoa bars	Not produced	Not produced [83].	- bars or nougat of quinoa pops mixed with dried fruits, nuts, and honey with good grain selection in resistant plastic packaging (APROA-Uyuni) and little resistant ones (SOPPROQUI) -bars of quinoa pops mixed with honey and chocolate. Some are of moderate quality. Irupana produces humid cereals bars covered with chocolate and excessive sugar. El Ceibo produces similar bars with bad package design that does not allow to see the product. This product has largely more than 50% of ingredients coming from organizations with fair trade label or susceptible to obtain it, having potential to be sold in the fair trade market. Both bars have low resistance packaging. Others are of excellent quality with a very compact pressing, an additional ingredient (peanuts) and a very good aluminum packaging (La Estrella). This product has started to be exported to Brazil. - granola bars (quinoa, cañahua, amaranth, oat, wheat, Brazil nut, raisins and honey bee) with low rigidity and plastic packaging with moderate resistance.
Granola	Not produced	Not produced	Produced in two brands: Titos (Logal) and Irupana. Titos produces a granola with blown grains (oat, wheat, amaranth and quinoa), nuts, raisings and honey with excellent quality concerning the taste and the selection of grains, though with a very low proportion of quinoa and reduced proteins value. Irupana has a granola of good taste and quality but with defective presentation due to the packaging and the lack of information about the product.
Flours	Mixed raw and whole meal flours are produced (Jacobsen and Sherwood, 2002). The products were not obtained to make an exact evaluation.	Good quality raw flours are being produced with quinoa and wheat, in good plastic packaging (Incasur-IACSA) and little resistant plastic packaging (El Altiplano).	Raw quinoa flour without impurities is being produced for export (ANAPQUI) and for the local market (Andean Valley). Besides, cooked quinoa (called pito) flour for immediate consumption is being produced, without impurities in plastic bag packaging of moderate en quality (Irupana).
Fortified mix	Not produced	Mix of quinoa, cañahua, soybeans, rice, extruded flours broad beans, barley and maize, sugar, vegetable oil, powdered milk, vitamins, minerals, flavorings prepared for the National Programme of Food Help (PRONAA in Spanish). This good quality product has no commercial purpose, as it is donated. Therefore the packaging has regular quality (flexible plastic but a bit resistant).	Not produced

[83] : Blown Amaranth bars of two kinds are produced in Cuzco. The first type is very common, with dried fruits, almonds and honey, in resistant plastic packaging (several brands), while the second is a mix with honey, chocolate and chemical flavoring that requires improving and better packaging (Mara).

PRODUCT	ECUADOR	PERÚ	BOLIVIA
Quinoa and chocolate breakfast mix	Not produced	Not produced	El Ceibo produces a very good quality mix of organic cacao with quinoa flour produced by ANAPQUI, and with sugar, vanilla and chemical aromas. The product has solid external paperboard package with bad design. Internal plastic package that cannot be closed after usage. This product has largely more than 50% of ingredients coming from organizations with fair trade label or susceptible to obtain it, having potential to be sold on fair trade market.
Bread	Not produced	Not produced	Irupana produces good quality industrial bread made with a mix of flours of quinoa and wheat with good packaging.
Cookies	Not produced	Not produced	Partly semi-craft cookies are produced with flour mixed with quinoa and wheat, and with defective packaging but of very good quality (Irupana) and good (CECAOT).
Baby food	It is produced (Jacobsen and Sherwood, 2002). The product was not obtained to make an exact evaluation.	Not produced	Not produced
Quinoa pastas	Not produced. ERPE tried to produce noodles without having found yet a good process, for the lack of hard wheat in Ecuador.	Not produced	Biological and conventional pasta produced by “La Coronilla”, excellent presentation and quality due to the use of a mix of rice flour with quinoa. Currently launching a line of organic and conventional pasta with rice, quinoa and cañahua.
Dehydrated quinoa soup	Not produced	Not produced	Dehydrated soups of good quality. One of them produced by Kris-Industrias Venado has chemical inputs (monosodic glutamate, hydrolized protein, hydrogenized vegetal fat, etc.). The other produced by Q’Gusto-Agroindustrias Nativas has dehydrated vegetables and only hydrogenized vegetal fat. Both soups have good aluminum packaging.
Snacks	Not produced	Not produced	- Chips of an extruded and dehydrated flour mix (quinoa, manioc, potato, cañahua) produced by “La Estrella” with high quality and excellent presentation in aluminum bag. “La Coronilla” produces several types of snacks: - Salty and spicy organic and conventional sticks made of a mix of flours (rice, quinoa, cañahua, chili peppers and onions) extruded with high quality and excellent presentation in resistant plastic bag. - Salty organic and conventional fried onion rings made with a mix of extruded flours (rice, quinoa, etc.) of good quality with the same kind of presentation as the previous product. - Sweet organic and conventional chips made of a mix of extruded and dehydrated flours (rice, quinoa, cañahua) of very good quality and the same kind of presentation as the previous products.

Appendix 3: Explaining the construction of proposed fair trade quinoa prices

1. Cost of Production COP

1.1 Current costs of inputs, services and capital for field operation/harvesting and packing

Production costs are different between the three Andean countries as shown before in Tables 1 and 5 and in Appendix 1, and summarized ahead. We exclude from this evaluation the big farmers with high levels of capital use from the Carchi and Imbabura regions in Ecuador, and the medium farmers with capital-intensive use in the Mantaro Valley of Peru. The bags for packing are provided by quinoa growers' organisations.

Kind of production	Organic			Conventional		
Country	Bolivia	Peru	Ecuador	Bolivia	Peru	Ecuador
Size and intensification	Small, semi intensive capital use	Small, semi intensive capital use	Small, capital extensive use	Small, semi intensive capital use	Small, semi intensive capital use	Small, capital extensive use
Inputs/Services	6.9	2.35	12.7	4.4	4.85	10.4
Capital/Invested	0.1	0.15	0.3	0.1	0.15	0.3
Average cost of production (US$/qq)	7.0	2.50	13.0	4.5	5.0[84]	10.7

Source: quinoa growers of above mentioned regions

2. Current small farmers' profit or labor remuneration after packing (updated to March 2004)

Current farmers' profit or labor rewarding refers to profit earned by the farmer family in quinoa production after having discounted their monetary costs for inputs and services (including hired external labor force) and for capital (machines and tools). This profit is divided by the total amount of quintal harvested. Indeed it corresponds more with a cost of Living, but also with amounts that could be saved for investment in production, education, economic diversification, etc.

Kind of production	Organic			Conventional		
Country	Bolivia	Peru	Ecuador	Bolivia	Peru	Ecuador
Size and intensification	Small, semi intensive capital use	Small, semi intensive capital use	Small, capital extensive use	Small, semi intensive capital use	Small, semi intensive capital use	Small, capital extensive use
Labor (US$/qq)	21.0	22.0	17.0	20.5	9.5[85]	5.3

Source: quinoa growers of above mentioned regions

[84] : Considering that farmers from Anta-Cuzco and those from Juliaca-Juli-Puno have important differences between their production costs, 7.5 US$/qq to 2.5 US$/qq, we propose a mean of 5 US$/qq.
[85] : In average conventional quinoa is sold to intermediaries in 14.5 US$/qq.

3. Additional costs of production to reach environmental requirements

Kind of production	Organic			Conventional		
Country	Bolivia	Peru	Ecuador	Bolivia	Peru	Ecuador
Size and intensification	Small, semi intensive capital use	Small, semi intensive capital use	Small, capital extensive use	Small, semi intensive capital use	Small, semi intensive capital use	Small, capital extensive use
Current use of manure (T/ha)	5.0	0.0	1.0	0.0	0.0	0.5
Manure to add to reach environmental requirements (T/ha)	2.0	5.0	1.0	5.0[86]	4.0	1.0
Cost of manure (US$/T)	11.0	10.4	13.6	11.0[87]	10.4	13.6
Additional Cost of manure to comply environmental requirements (US$/ha)	22.0	52.0	13.6	55.0	41.6	13.6
Harvest before environmental requirements compliance (qq/ha)	17.0	36.3	12.8	11.0	21.4	10.5
Cost of manure per current quintal (qq) to comply environmental requirements (US$/qq)	1.5	1.5	1.0	5.0	2.0	1.5

Source: quinoa growers of above mentioned regions

4. Additional Cost of Living COL to compensate quinoa price and income drop

Prices paid to farmers for organic and conventional quinoa have decreased, principally in Bolivia and Ecuador, leading to dramatic drops of income and labor productivity in these two countries with serious consequences on living standards, economic diversification and attempting against sons education. These drops are also responsible for the low reward of labor invested in quinoa production which is similar and in some situations lower than selling it outside the farm through migration or even working for other quinoa growers (see part 2 and appendix 1). For this reason, we consider necessary to provide an allowance to compensate this price and income fall and create a positive differential for the wage of daily labor invested in quinoa production in order to support farmers in continuing seeding quinoa. We underline that within this support we do not attempt to stop peasant pluriactivity but just allow them to continue producing quinoa with more decent rewards as one of their multiples strategies of their livelihoods. Through this choice we want to preserve the basic life standards of peasants, seriously diminished since price fall, particularly education, food composition and nutrition, housing, clothing, health and their investments for develop household pluriactivity.

We think that this support must be allowed differently from one country considering the importance of quinoa price drop since 2000, their costs of production and processing, characteristics of their grain produced and of their respective demand. Four big points have guided our definition of this support. First, we have tried to support farmers whose household income has been seriously affected. This means consider families with incomes highly dependent on quinoa production because they do not have possibilities to

[86] : Climatic conditions allow the use of chemical fertilizers in Ecuador and Peru while in Southern Altiplano arid conditions oblige to only use manure. Climatic conditions of Peruvian Andes allow a better organic matter degradation and incorporation into soil while soils of Southern Altiplano have lost important amounts of organic matter and require more important manuring.

[87] : Average value per ton of manure including its transportation in the Bolivian Southern Altiplano.

diversify their production or current prices for others productions are low (Southern Altiplano), those who have low yields (Southern Altiplano) and high costs (Riobamba) and those who have been the most affected by price fall (Riobamba and Southern Altiplano). We have also considered that providing a good price to Peruvian producers would stimulate them to increase their production if their organizations are able to find importers.

Second, we have set the price considering the expected FOB price in comparison with current FOB price and taking in account current processing cost and processors profit. In this perspective, we have integrated the current project of ERPE to simultenously develop polishing process of quinoa (dry way) to its current washing and drying process (humid way) which is extremely expensive (see the end of the third part of the report).

Third, we have preserved differences among organic and conventional production, looking that FOB prices for the last will remain lower than those for the first and that organic farmers earn more than those producing conventional and then to avoid pushing them to make fraud.

Four, we have considered current demand of grain. Knowing that Bolivian quinoa real is the most purchased quinoa we have tried to give lower prices that allow lower FOB prices to other kind of grains (Altiplano and Valle from Peru and Ecuador) to make them more acceptable by importers. This choice has one exception. For Ecuadorian organic grain processed by washing which already a well advanced marketing that allows its sell in higher prices using the image of tradition and "heirloom" and integral ("whole") grain with "more fibers" developed by Inca Organics. However, this choice can not be preserved with polished organic quinoa (dry processing) because the grain lost its brown color, becoming yellow-white and has a thin powder, situation that destroys marketing arguments of heirloom grain. For this reason we have looked to preserve lower FOB prices for polished grain than those given to quinoa real. Considering that, Peruvian quinoa (Altiplano) has whiter color and greater size but has a current narrow international demand in comparison of Ecuadorian quinoa (valle) we have chosen to give to these two kinds of quinoas similar FOB prices.

Kind of production	Organic			Conventional		
Country	Bolivia	Peru	Ecuador	Bolivia	Peru	Ecuador
Size and intensification	Small, semi intensive capital use	Small, semi intensive capital use	Small, capital extensive use	Small, semi intensive capital use	Small, semi intensive capital use	Small, capital extensive use
Compensation for the drop of quinoa sell price (redistributive social allowance) (US$/qq)	10.5	9.0	11.0	3.0	11.5	15.5

Source: calculated following data provided by quinoa growers and intermediaries of above mentioned regions, private exporters and ANAPQUI.

5. Fair trade farm gate price

Kind of production	Organic			Conventional		
Country	Bolivia	Peru	Ecuador	Bolivia	Peru	Ecuador
Size and intensification	Small, semi intensive capital use	Small, semi intensive capital use	Small, capital extensive use	Small, semi intensive capital use	Small, semi intensive capital use	Small, capital extensive use
Average cost of production (US$/qq)	7.0	2.5	13.0	4.5	5.0	10.7
Labor (US$/qq)	21.0	22.0	17.0	20.5	9.5	5.3
Cost of environmental requirements (US$/qq)	1.5	1.5	1.0	5.0	2.0	1.5
Compensation for the drop of quinoa sell price (redistributive social allowance) (US$/qq)	10.5	9.0	11.0	3.0	11.5	15.5
Total: Fair trade farm gate price to peasant (US$/qq)	40.0	35.0	43.0	33.0	28.0	33.0
Fair trade farm gate price to peasant (US$/Ton)	854.4	747.6	918.5	704.9	598.1	704.9

6. Fair trade investment premium whose allocation must be collectively decided

Following Fair-trade Labeling Organisations (FLO) regulations investment premium must have a maximum monetary value of 15% of production costs. However production costs are different among Andean countries and between organic and conventional production. That is why the application of this regulation could increase differences of peasants' income. To avoid this situation, we propose to consider a reference production cost of 25-26 US$/qq for all Andean quinoa growers that leads to offer a unique premium of 4 US$/qq or 85.4 per ton.

Kind of production	Organic			Conventional		
Country	Bolivia	Peru	Ecuador	Bolivia	Peru	Ecuador
Size and intensification	Small, semi intensive capital use	Small, semi intensive capital use	Small, capital extensive use	Small, semi intensive capital use	Small, semi intensive capital use	Small, capital extensive use
Premium for growers' organizations (US$/qq)	4.0	4.0	4.0	4.0	4.0	4.0
Premium for growers' organizations (US$/Ton)	85.4	85.4	85.4	85.4	85.4	85.4

Knowing that current volumes of quinoa sold on European fair trade market turns around 600 tons per year, the application of the proposed price in conditions covering all this demand could represent 51,264 US$. This means that if associates from quinoa growers' organisations decided to use premium to strengthen their organizations they will have this additional amount to invest in this choice.

Appendix 4: Terms of reference for quality requirements and tolerances applying to fair trade labelled non- organic quinoa.

Minimal Quality requirements after processing and before loading into trucks to the port.

- Size of quinoa grain: the size of the grain must have a diameter higher than 1.5 mm.
- Grain humidity: equal or lower than 10%.
- Selection of quinoa grain: the presence of impurities (black grains, ashes, broken grain, volcanic stones and small stalk) will be lower than 0,1% of the total weight and the presence of rodents faeces will be lower than 0,01% of total weight.
- Homogeneity of classification of quinoa grain (granulometry) according to eco-region:
    - 95 % of grain from the Valle eco-region (Ecuador, valleys from Peru and Bolivia) will have a diameter between 1.5 and 1.8 mm.
    - 95 % of grain from the Altiplano eco-region (Peru and Bolivia, valleys from Peru and Bolivia) will have a diameter between 1.7 and 2 mm.
    - 95 % of grain from the Dulce eco-region (Bolivia, valleys from Peru and Bolivia) will have a diameter between 1.8 and 2.1 mm.
    - 95 % of grain from the Real eco-region (Bolivia, valleys from Peru and Bolivia) will have a diameter between 2 and 2.5 mm.
- Microbiology: following regulations of each importing country. To be specified in the contract.
- Packaging: there must exist uniformity in bags and boxes, tolerance is until 1% of total boxes and bags.
- Pesticides, only in case of conventional ICM criteria: lower than 0.01 mg/kg.

Appendix 5: Indemnities, liabilities and procedures to follow for quality checks and inspections

5.1 **Processing factory acceptance of the grain**. The same as for banana (Appendix 3.1) with the words "processing factory" instead of "FOB" and "grain" instead of "fruit".

5.2 **Authorized surveyors**. The same as for banana (Appendix 3.2) with the word "grain" instead of "fruit".

5.3 **Authorized quality inspection in the processing factory.** The same as for banana (Appendix 3.3) with the words "processing factory" instead of "harbor of loading" and "grain" instead of "fruit".

5.4 **Quality report from the country of destination**. The same as for banana (Appendix 3.3) but with the difference that the importer must report quality problems in writing within 4 days hours after arrival in the country of destination for issues regarding granulometry and impurities (grain selection) and within 3 weeks after arrival in the country of destination for microbiology and residues of pesticides. In this clause the word "grain" must replace the word "fruit" written in banana's standard.

5.5 **Refusal in the country of destination.** In the country of destination the importer can only refuse the grain if it exceeds the quality requirements and tolerances proposed in Appendix 4 excepted for the humidity that could change during the shipping.

5.6 **Authorized quality inspection in the country of destination.** The same as for banana (Appendix 3.3).

5.7 **Permanently contracted surveyor.** On request of the joint producers, FLO will facilitate selecting and bringing under permanent contract an authorized surveyor in countries where quinoa is produced and processed, who will be at the producer's disposal on short notice.

Every inspection is paid by the part that requests it.

For convenience, the importers may agree to pay surveyors who are contracted by producers and deduct these payments from grain payments to the producers.

5.8 The same as for banana (Appendix 3.3).