"El chuño" as a Possible Geotourism Strategy at a Geopark from Peru

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Abstract. This article has the intention of discuss possibilities for geoheritage protection and sustainable development as one of the goals of UNESCO Global Geoparks program. The UGG is an innovation in terms of management and governance on fighting for mitigating climate changes, environmental protection, and local development, through a transdisciplinary approach on geotourism, by stimulating a network of local and global actors to cooperate. As part of it, social responsibility and collective action are essential. Thereby, a study case of a traditional food system in a Geopark in Peru is proposed here, the goal of this article is to discuss how the chuño can sum on touristic circuits and if it makes sense. The project was discussed with local actor who initially proposed the chuño for it and it is demonstrated that many benefits can be taken from this innovation in the local geotourism.

Keywords. Local knowledge, geoheritage, Sustainable Development Goals

1. Introduction

The urgency for mitigating climate changes and protect natural resources has led international and local communities to focus its efforts on innovative and multidisciplinary strategies of facing the challenges (1,2). This multidisciplinary environment demands new forms of governance and responsibility, holding local actors on accountable, with global support and the encouragement of their associations transdisciplinary. Said that, some global initiatives have worked with the framework of networks, such as the Global Geoparks Networks (GGN) in the geotourism context(2).

By supporting the creation of UNESCO Global Geopark (UGG) around the world in the last nine years, GGN has fomented opportunities for education, sustainable development, tourism and environmental and geoheritage protection(1,2). As a value of the network, a geopark needs to commit and demonstrate actions to fullfil the Sustainable Development Goals (SDG) from the United Nations, such as zero hunger, decent work and economic growth, climate action and life on earth(3).

Said that, this work aims to discuss how a traditional food production system can contribute with the geotourism on a UNESCO Global Geopark in Peru, called Colca y Volcanes de Andagua and analyse its importance for the development of the local community. The traditional food system in caso is called "chuño", an ancient technology of dehydrating potato that guarantees food security for the entire year in the Andes Mountain Range.

2. Theoretical Background

2.1 UNESCO Global Geoparks

UNESCO Global Geoparks is part of the UNESCO International Geoscience Programme (IGCP) which exists since 1972, and supports research and capacities on geology and geophysics. One of its umbrella projects is UGG, is a initiative that brings together geoheritage sites of international importance protection, through collective action, by promoting sustainable tourism, geoeducation and conecting local actors on a network of cooperation.

Through geotourism, UGG is shown that it is possible to benefit society in aspects, such as mitigating climate changes, hungry and awarness on earths natural resources importance.

Nowadays, there are 213 geoparks in 48 countries of the world. By the year of 2015, the brand of UGG was created, but the first moments of the project were at year 2000. After that, by the establishment of the International Geoscience and Geoparks Programme (IGGP), the project of UNESCO Global Geoparks was officially raised and has grown all over the world(1).

2.2 Geoheritage and collective action

The importance of protecting the geoheritage gets clearer as we think that this is planet earths history and its many and distinct periods of life. The IGGP innovates in therms of environmental protection by not establishing areas with no human presence allowed on it. Unlike, the purpose of the project is stimulate protection raising awarness with sustainable use of natural recourses, providing human interaction with it from touristic activitis and descentralizing decision making. In the scope of geotourism in Geoparks, it is interesting to combine as many territorial attributes as possible, such as agriculture, geoheritage sites, ancient knowledge and others (1).

The network around the Geopark begins by putting together local actors from distinct areas, from researchers to local guides, with the mission of coordinating benefitial activities for tourism. The counterpart of local actors for receiving a Certification of UNESCO Global Geoparks is the responsability for coordinating and manage good practices of geotourism in collective and colaborative way, which means, indigenous and local comunities, touristic agencies, local farmers, cookers, and so on working together. According to UGG web site:

> "UNESCO *Global Geoparks are single, unified areas where sites and landscapes of international geological significance are managed with a holistic concept of protection, education and sustainable development"*(4)

By that, UGG is concerned about collective action and bottom up work, which is perfectly understandable as a network, where decision making, working groups and strategies of education, such as touristic routes, can be taken independently, but in concord with principles. The governance and management of all this distinct groups that act on a Geopark should is essential for the project, eventhough this central council stimulates descentralized decisions of activities. That is the importance of social responsability on being part of a collective action (2).

The idea of a network may confuse autonomy with independence, reason why a central governance exists. Globally the UGG project is oriented by the Global Geoparks Network (GGN), where other parks actors and local ones can interact. The network is a sensitive way of people working together for geoheritage and environmental protection(1).

2.3 El chuño and Geopark Colca y Volcanes de Andagua

The Geoparque Mundial de la UNESCO Colca and Volcanes de Andagua (GMUCVA) is located in Castilla and Caylloma provinces of Peru, with 6,582.42 km^2 of area surrounded by the Andes Mountain Range, where volcanoes can achieve from 3,600m to 6,715m of elevation in its summits(5). This region is occupied by Andean traditional communities, which conserves a culture that lasts more than seven hundred years, and hundreds of years before Spanish arrival.

"El chuño" is an ancient freeze-drying potato technique developed by the Inca's, Aymara's and other independent civilizations from Peru and Bolivia hundreds of years ago(6,7). It is part of traditional local knowledge in Andagua and guarantees the communities food sovereignty and security, resulting in many dishes consumed at many meals. As GMUCVA is surrounded by Andes Mountain Range food is sometimes scarce and the potatoes dehydration provides food supply throughout the year, due to a process that takes almost 20 days of sun drying and night freezing at the high mountains(6,7).

3. Methodological approach

This work aims to discuss the benefits of the traditional food system, chuño, as touristic route for sustainable development, geoheritage protection and education. The work is the study case of a traditional food called chuño and its potential benefits for the tourism in Colca y Volcanes de Andagua Geopark from Peru.

Therefore, the work was based on literature review and the informal dialogue with local actors from GMUCVA to understand their perceptions, contributions and discuss possibilities of considering the sum of chuño's process of preparation, tasting experiences and storytelling as an option in the Geopark touristic activities. The results are based on local actor's thoughts about a touristic route with the chuño and literature review.

4. Results

One important strategy of Global Geoparks Network (GGN) to promote sustainable development was the creation of the concept of geofood and then geogastronomy (8), which became a key attribute of the geoparks around the world. Besides of providing income, the food is important to valorize the local identity, sovereignty, and maintenance of cultural habits, which can be very important to face climate change and industrial food production. In terms of sustainable tourism, food systems can also expand the number and quality of memories in the

touristic experience(8). So, by including local dishes, its preparation and presence in touristic circuits, it provides more ways of education and tourism (8).

According to local actors, chuño is processed in the high mountains where the cold during the night freezes the potatoes, that are cropped in low areas of the territory. This crop areas have a big chance of having the presence of volcanic ashes, what indicates a major predominance of andosols, a typical soil originated from geological events in volcanic areas. The processing of obtaining the chuño is passed from their ancestors and the work is done collectively.

Thus, after harvest the potatoes are taken to the high lands, where they will spend from 5 to 7 days exposed to the sunlight and the freezing at night. Once in the high lands, the first step, the potatoes need to be crushed, what is done by women and man together, then it will be more likely to lose water and dehydrate. Every day, it is necessary to turn the potatoes, increasing the physical exposure to the weather. After this long work, when they identify that the potatoes are finally dried and with less than 80% of its initial weight, that also means it can last for years(9). That is the moment where chuño raises and can be washed and eaten or stored for the dry season.

The **Fig. 1** shows an important local leadership, a woman that holds a part of the Andagua's community knowledge. The traditional knowledge is usually capable to keep stories, memories, technologies (as chuño preparation), genetical resources such as varieties of potatoes and more. According to her, nowadays the usual varieties of potato destinated for chuño preparation are called papá canchán, ojo azul, tomasa and huaña was the best one for white chuño preparation, but their genetic seems to be lost.

In the other image (**Figure 2**), it is possible to see two different types of chuño, separated by size, what indicates distinct destinations of meals. The chuño can be cooked with water, meet and other vegetables, but it can also be processed into flour, that besides of being part of local meals can be found in distant urban markets. As many research indicates, strategies of relocation of traditional foods can be very important for local communities recognizing its identity and costumes, who are at risk of being lost, especially because young people are exposed to industrial food, have no incentive to stay in their homeland (10).

Therefore, as one of Geoparks goals, rural development is also about cultural protection, what means that there is no model for it, but the expression of territorial motivations, values, and habits (11). Globalization has threatened developing countries offering material goods and services, employment at the same time it takes people from their homeland to live in cities and have contact with mass culture, as their home is turned into productive land of capitalism (12). One of the main threats for Andagua is gold mining (5).

Fig. 1 – A local leadership with chuños in his hands

Fig. 2 – Different sizes of chuño.

The proposal of a touristic attraction including chuño preparation, tasting and tales could be very connected in the context of geoeducation. But it also could be an opportunity for the new generation to be part of the protection and star the defense of their territory, taking responsibility for itself, organizing community and sustainable tourism attractions.

Thereby, a touristic circuit could be a walk through their land, where they visit potato growing areas, or chuño processing sites. As discussed with local actors, these areas are very close to volcanoes such as Volcanoes Melizos (as **Figure3** shows), one of the most visited locations of the park. The Peruvian guides could organize walks through this growing and volcanic areas accompanied with tales about local food and farms, such as chuño. These guides will be able to learn with their elder about volcanic soils and their connection with growing plants, the trajectory of this tradition and memories of their people.

Complementary, the history of how this technology emerged, how to process potato into chuño, its importance for the community food supply, what dishes can be prepared were other ideas discussed along the study. As well as include visitors in the preparation of chuño, along some days, could be an immersive experience and a distinct proposal of visiting. The role circuit would finish with a tasting moment of local dishes cooked with chuño, meet and other traditional meals, in local people houses and kitchens, with more and more tales from there.

Fig. 3 – Volcanoes Melizos, close to potatoes growing areas.

5. Conclusions

The discussion in the body of this text is part of a brainstorm about how to and reasons to include a local food system on the touristic portfolio of Colca y Volcanes de Andagua Geopark. The traditional food system, chuño, has shown plenty of reasons to contribute to a better and conscious use of the natural resources from the park landscapes, at the same time it promotes community tourism and helps to keep the ancient technology of food processing and sovereignty in this site of Peruvian Andes Mountain Range.

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