



CLIMATE CHANGE IN ANDEAN COMMUNITIES



CLIMATE CHANGE IN ANDEAN COMMUNITIES



Swedish Society for Nature Conservation



PRATEC
Andean Project for
Peasant Technologies

CLIMATE CHANGE IN ANDEAN COMMUNITIES.

Facts, perceptions and indigenous adaptations

PRATEC

Proyecto Andino de Tecnologías Campesinas

(Andean Project for Peasant Technologies)

Lima, March 2009

- © **Climate Change in Andean Communities.** Facts, perceptions and indigenous adaptations.
- © PRATEC. Andean Project for Peasant Technologies
Martín Pérez 866, Magdalena del Mar. Lima 17
Telefax: 0051-1- 2612825.
pratec@pratec.org.pe www.pratec.org.pe
English translation: Jorge Ishizawa Oba.

First edition: April 2009, Lima, Perú.

ISBN:

Legal Deposit made at the National Library of Peru No:

Printed in: Bellido Ediciones.

Los Zafiros 244, Balconcillo. La Victoria. Lima, Perú.

Teléfono: 051-1- 4702773.

Cover design: María Gabriela Rengifo Faiffer

Edition: Gladys Faiffer.

This publication was made possible by the Swedish Society for Nature Conservation.



CONTENTS

Introduction	5		
1. CLIMATE CHANGE IN THE ANDES: THE FACTS	10		
2. THE ANDEAN PEASANT PERCEPTION OF CLIMATE CHANGE	11		
2.1. THE PERCEPTION OF CHANGE IN TIME: THE FEELING OF REDUCTION OF TIME DURATION	11		
2.2. THE RISE OF DAILY TEMPERATURE	12		
2.3. THE MELTING OF GLACIERS	14		
3. HOW CLIMATE CHANGE IS AFFECTING THE ANDEAN AMAZONIAN COMMUNITIES	18		
3.1. ASCENT OF CROPS. ALTITUDINAL RELOCATION OF CROPS AND ANIMALS	18		
3.2. CHANGES IN THE PATTERN OF RAINS, FROST AND WIND.	23		
3.3. CHANGES IN THE SITUATION OF WATER.	28		
3.4. CHANGES IN THE BEHAVIOR OF ANIMAL	31		
3.5. CHANGES IN THE AGROFESTIVE CALENDAR	31		
3.6. UNUSUAL PRESENCE OF PLAGUES IN HIGH ALTITUDE CROPS AND DISEASES IN ANIMALS.	32		
3.7. DISAPPEARANCE OF WILD RELATIVES OF CULTIVATED PLANTS.	34		
3.8. FLOW REDUCTION AND DISAPPEARANCE OF WATER COURSES.	34		
3.9. DISAPPEARANCE OF BUSH AND TREE SPECIES	35		
3.10. BREAKDOWN OF THE RELATION OF RESPECT WITH COMMUNITY AUTHORITIES AND AMONG FAMILY MEMBERS	36		
3.11. DISAPPEARANCE OF NATURAL PASTURES IN THE HIGH ZONES.	38		
3.12. THE WEAKENING OF THE CEREMONIES OF RESPECT TO THE ANDEAN DEITIES	40		
3.13. CHANGES OF THE MEANING OF CLIMATIC SIGNS OF INDICATORS.	40		
3.14. LOSS OF HEALING POWER OF PLANTS.	42		
3.15. CHANGES IN THE BEHAVIOR OF ANIMALS.	43		
		3.15.1. THE FISH IN THE LAKE	43
		3.15.2. AMPHIBIANS, REPTILES AND BIRDS	44
		4. THE ORIGIN OF CLIMATE CHANGE ACCORDING TO ANDEAN COSMOVISION: LACK OF RESPECT	46
		4.1. ABUSE OF PACHAMAMA USING CHEMICAL INPUTS	53
		5. WHAT ARE THE ANDEAN AMAZONIAN COMMUNITIES DOING TO ADAPT - CONVERSE WITH CLIMATE CHANGE?	54
		5.1. SOWING LAKES	54
		5.2. TAKING CARE OF SPRINGS	55
		5.3. NURTURING KITCHEN GARDENS	56
		5.5. NURTURING THE WILD	60
		5.6. RECOVERING THE OPERATION OF PREHISPANIC INFRASTRUCTURE.	61
		5.7. RECOVERING KNOWLEDGE ABOUT PLANTS	62
		5.8. RECOVERING ANCESTRAL PATHS	64
		5.9. PROTECTION AND CARE OF FORESTS	66
		6. ACTIVITIES OF INSTITUTIONAL ACCOMPANIMENT OF ADAPTATION TO CLIMATE CHANGE.	66
		6.1. STRENGTHENING THE KITCHEN GARDENS	66
		6.2. RECOVERY OF COLLECTIVE FALLOW LAND: THE LAYMES	66
		6.3. PLANTING SPECIES THAT NURTURE WATER	67
		6.4. PROTECTION OF SPRINGS	67
		6.5. REVITALIZING CEREMONIAL CENTERS TO CONVERSE WITH CLIMATE AND GLOBAL WARMING	67
		6.6. RECOVERING THE ROLE OF THE TRADITIONAL AUTHORITIES IN THE CARE OF THE ENVIRONMENT.	68
		6.7. ACCOMPANYING THE CELEBRATION OF RITUALS TO HARMONIZE WITH THE PACHA	70
		6.8. WATER HARVESTING	70
		6.9. CONSUMPTION OF WILD PLANTS	71

The testimonies included in the text have been collected by the Nuclei for Andean Amazonian Cultural Affirmation (NACA). They are being published with the previous informed consent of the community members who have shared their knowledge in friendly exchanges. Any further use of them must recognize the source by name, community and location.

Photographs have been contributed by the NACAs. Their name is indicated at the end of the title. When no institutional name is given, the photograph corresponds to Grimaldo Rengifo, PRATEC.



Introduction



Periodic climatic fluctuations have been constant in the life of the Andean peoples. Throughout the Andean climatic history there have been prolonged dry and cold periods, followed by extended humid and hot spells. This fluctuation is reproduced in medium term periods, and in annual periods and daily occurrences. Drastic climatic oscillations are usual in the Andean life world.

These climatic oscillations are documented and had influence on demography, social organization, and productive strategies, and have promoted cultural changes in the Andean peoples. Thus, for instance, in cold and dry periods, when the snow line went up –approximately 500 meters in a period of 100 years according to some studies- the human population then settled in high places migrated to the intermediate and lower zones. The increase in population thus provoked led to increase in production by the incorporation of new areas by modification of the slopes in the Andean mountains. The construction of *andenes* (terraces in the slopes) and irrigation systems have been dated and attributed to these periods. These new agricultural systems had the purpose of increasing agricultural production and productivity, and nurtured plant and animal diversity in a reduced vertical space.

The demographic movements also implied the need for organizational arrangements between the originary ethnic groups and those that arrived to create settlements and led to the reorganization of political life in the form of Pan Andean federations.

As a product of this history of adaptation and tuning among ecology, population, social organization and culture, the Andean peoples have developed a range of productive strategies, in particular, nurturing soil, climate, water, and the diversity of plant and animal species, forms of habitat (dwellings and villages), and modalities of regional displacements to attain productive, social, and cultural long term sustainability.

These strategies, practices, and knowledge are still alive in the present Andean life world as a heritage of this cultural tradition, and, along with incorporated techniques, and knowledge, constitute, the Andean wisdom for agriculture. It is on this basis that the Andean peoples are expected to face the challenge caused by the disturbances that result from an unusual process of climatic change associated with the ecological problems aggravated in the past half century to an almost irreversible process due to its rapidity and scope.

Perhaps the most visible and well-known expression of climatic change in the Andes is the rapid melting of the

glaciers of the Andean massif, that is presently affecting the dynamics of production and society of the Andean peoples. Scientific assessments¹ indicate that the central Andes will be the third most affected region in the planet by climate change due to water scarcity. Presently drastic changes are being observed in the frequency and intensity of rain, frost, hail, and drought.

The effects are already being felt. In the past five years, according to figures from the Peruvian Ministry of the Environment, 22% of glacier volume (some 7 thousand million m³) have been lost. This is the equivalent of the capital city of Lima's water consumption in ten years. What is worse, for 2025, glaciers below 5500 meters above sea level will have disappeared, drastically reducing the supply of a vital resource.

For the time being, some groups consider the situation as beneficial while for others it is becoming threatening. For

1 "Peru is the third country with the highest climatic risk in the planet, after Honduras and Bangladesh. Our perpetual snows below 5000 meters above sea level will inexorably melt in the next twenty years. Our water sources are in danger and we must preserve our high Andean ecosystems, birthplace of water, our source of life." N. Brooks, y N. Adger, Tyndall Center U.K. 2003. In: **Cosecha de agua, una práctica ancestral. Manejo Sostenible de las praderas naturales**. DESCO. Programa Regional del Sur. March, 2008. Arequipa.

those who live in areas below the snow line, the production for subsistence and for market has increased due to a larger water supply. This has happened in particular in areas whose supply comes from glaciers. Their rapid melting produces a larger volume of run-off water, and with it, the possibility of increasing the irrigated area, thus ensuring crops and the increase of the duration of the agricultural season. This has modified their rigid seasonality. As a consequence, food supply is larger than the one available two decades ago. A consequence of this is the higher monetary income for the peasant families that have been favored by this situation and the potential economic improvement. This, however does not happen in places distant from the Andean massif.

In places relatively distant from the Andean massif what can be observed with the ascent of the crops – not only of potatoes but of maize and fruit trees as well- is the drastic loss of pasture areas, the wild areas where biodiversity of wild relatives of cultivated plants is found.

Formerly maize was sown only in the Quechua ecosystem (lower regions). Now maize has adapted to the areas of intermediate altitude. Now maize is being cultivated more intensely in this zone. There is now a larger maize diversity as the crop is still cultivated in the lower zones. The adaptation has had consequences because the herders of the upper ranges of the intermediate zone, now also

cultivate maize and do not visit the Quechua zone to exchange as they used to.

With the breakdown of these relations, the agricultural area is increasing while the natural pasture areas, the wetlands and the tree stands in the highlands, decrease. The decrease of pastures and climate change are producing the following effects:

- a. Water flow is reduced in the watershed and, in some cases, appears contaminated.

Reduction of the water flow in the watershed. In the Andes, the *puna* region is where water is collected. Natural pastures, along with native bushes, form a hydric sponge with two functions: water and humidity retention, and its gradual release to streams and water springs, especially in the dry season. If this cover is lost, the water flow and the regularity of the water supply to the intermediate and lower zones is negatively affected. Less water for crops, animals and *chacras* or cultivated fields, means a reduction in cultivated area, in production, and increases forced migration of people. Besides this, the crop area is contaminated with excess chemicals, and water flowing through the intermediate and lower zones is contaminated with chemical residues.

- b. Peasant herds are reduced.

Reduction of the animal stock per family. If the

pasture lands decrease, both in the wetlands and in the rainfed areas, two phenomena are observed: a lower population of animals per family in the high altitude zones; and the forced displacement of the herds to the lower zones. A consequence of this reduction is the change in land use. Some agricultural areas in the lower zones are used for cultivated pastures and the livestock is now stabled. This change can be attained if the family has free plots, besides those used for sustenance, but if not, the only option left is to dispose of part of the family herd. This depends on the family economic condition but interfamily conflicts is also becoming more common due to the animals invading the cultivated areas. What used to be a close sincronization between the local agricultural calendar and livestock herding, is presently seriously threatened. In addition, the deterioration of the enclosures and stone walls for conserving natural pastures, the tanks for the processing of potato and oca, and other infrastructures in the *puna* area is being observed.

- c. Higher soil erosion.

Soil erosion. The decrease or disappearance of the grazing lands by overgrazing or by changes in land use, causes the laterization or mineralization of soils by the exposure of soil to intense solar radiation

added to the removal of the arable top soil and its erosion under the action of the heavy rainfall that is characteristic of the zone.

d. Wild fauna tends to disappear.

Reduction of the wild fauna: wild ducks, herons, frogs, fish, birds of all kinds, are becoming a rare sight due to the loss of the plant cover where they found their sources of sustenance was located. On the other hand, much of the wild flora has medicinal uses, virtues that are lost in this modification. The human capacity for reading the “signs” from nature is impaired. “Nature does not speak now as it used to”. The sharp reduction of tree cover, native wild shrubs, wild relatives of native cultivars like potato, *mashua*, oca, olluco, which hold the major part of its variability, the plant and animal climatic indicators (fish like the *qaqas*, the frogs, etc.) contribute to the loss of wisdom, affection and respect of humans toward nature. Communities are conscious that many Andean forests have disappeared and the ones that are still in place do not have the wealth of diversity that they enjoyed forty years ago. A disequilibrium has now appeared between the populations of *cabuyas*, *tunas* (prickly pear), *retamas* (broom), *tara* (divi-divi), and other bushes, causing a lack of “mutual protection”, which is the reason for the

drastic 90% reduction of *retama*, the product of a mixed plague of coleopterous, fungi, and fleas.

e. Traditional authorities in care of the *sallqa* or wild areas disappear, and with them the tradition of nurturance of these areas.

In a similar way, traditional authorities in care of the *puna* zones are being lost. They were associated with the collective management and nurturance of these zones as well as of ritual offerings to the sacred mountains.

“Climate is changing” is a phrase that is being heard widely in the Andes. The rain pattern has changed. It does not rain or it rains little in the months in which traditionally it used to rain with more intensity. Short droughts, frost, and hail, are now presenting themselves at formerly unseen dates and intensity. In this situation, the possibility of obtaining harvest is strongly threatened since Andean agriculture is mainly rainfed (85% of the cultivated area). It depends on climate and the possibility of tuning oneself in conversation with nature.

High frequency of frost and hail is the event with the most negative influence on crops in the Andean region. In Ayacucho the sown fields were devastated by frost in February 2007 (the most damaging was on the 17th) and by hail in May 2007. The loss of the crops forced many

family heads to migrate to other communities for food and seeds, including also to look for work as hired hand.

An additional factor is public investment policies that privilege mining that locates its operations in the areas of pastures and that encourage for a change in the traditional crop pattern for an other promoting the cultivation of crops for biofuels or for transgenic crops.

What is now happening in the Andes with climate change is a generalized upsetting of the agricultural systems that have prevailed in the communities during the past two decades. The systems are being displaced according to ecology, plot size, altitudinal location, degree of complementarity between agriculture and husbandry, and other factors to be identified. These displacements are leading the communities to scenarios that cannot be easily foreseen. They are leading the Andean agricultural system to a gradual collapse in some cases or to its adaptation. Both trends can be presently found at work.

In some communities, the families are taking measures to adapt to the variation in rain pattern, frost and hail, that are becoming more unpredictable. The measures range from the close watch of the climatic indicators, to rituals to harmonize the *pacha* or life zones, the constitution of action groups for preventing hail and frost, for rainwater harvesting, and for sowing plants that nurture water (like *putaqa*), among others.

The communities have also undertaken activities linking the communal management capacity for the defense and protection of water and agrobiodiversity, in face of the threat of the mining corporations and the growing pressure for the introduction of transgenic crops and the production of crops as inputs for biofuels. However, the reactions are not similar. In other zones, climate change reduces harvests and forces people to migrate. Presently, the Upper Amazon region is receiving more migrants than ever.

The peasant testimonies included in this book are the result of initial explorations carried out in 17 locations² in the high Andes and the Amazon by local institutions known as “Nuclei for Andean amazonian Cultural Affirmation”. They refer to climate change as experienced by the communities and how the family are implementing adaptive measures in order to regenerate their own life world.



² NASA, Paqalqu, Suma Yapu, Qolla Aymara, Arunakasa, Chuyma Aru, ASEVIDA, CEPROSI, Vida Dulce, ABA, APU, AWAY, PERCCA, Urpichallay, Chacras, NUVICHA, Choba-Choba and Waman Wasi.

1. CLIMATE CHANGE IN THE ANDES: THE FACTS

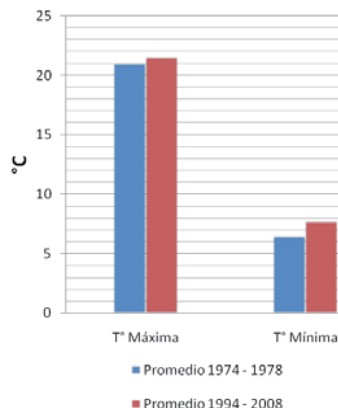


Figure 1: Variations of maxima and minima temperatures in the past 34 years. From data from the Weberbauer Meteorological Station, National University of Cajamarca.

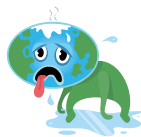


Figure 1 shows that over a period of 34 years (1974-2008) the average maximum temperature has increased in 0.5 °C over the first average calculated for a period of five years (1974-78) contrasted with the average of the last fifteen years (1994-2008). Over the same period and with similar averages, the minimum temperature has increased in 1.2 °C. The data corresponds to the Cajamarca valley, where the National University of Cajamarca's Meteorological Station is located.

In the communities of Ayacucho in the central south Andes climate change is being perceived by drastic alterations

occurring in the past years, and by very rapid changes. The signs of climate change are:

- The rise of average daily temperatures both at day and night
- The increase in severity and frequency of storms, hail and frost
- The increase in severity and frequency of rainfall
- The reduction of total rainfall in the season
- The lowering of the water table, with desiccation or decrease of spring flows
- The rapid ascent of agriculture to higher levels, now the *puna* zone. The slopes of high mountains are becoming potential areas for the nurturance of cultivated agrobiodiversity and as risk-free areas
- The feeling that the duration of day and night shortens. According to don Teodosio Flores from Llacatahurán, Quispillaccta, Ayacucho, formerly you could complete a *macha* (fulling of a spindle) of *kawpu* (twisted woolen thread) in a single day. Today you are finishing the following day.

In San Martín, in the Upper Amazon region, some 110 dwellings in the district of San Hilarión in the Picota province, were affected by an unusual fall of rain and hail, followed by hurricane winds that destroyed roofs and the

higher levels of the dwellings. It is said that 300 persons have been injured.

Among the main internal factors that contribute to climate change and militate against the possibilities of mitigation are deforestation, provoked by the commercial extraction of wood, and the promotion of monoculture. These have attracted the increasing migration of high Andean peoples in the past four decades.

2. THE ANDEAN PEASANT PERCEPTION OF CLIMATE CHANGE

Don Heriberto Escobar, an elder from Anapia Island in the altiplano area shared with Bolivia offers the following testimony on the aymara experience of the agrofesteive calendar:

We cultivate potato, quinoa, maize, barley, and vegetables in the island. We sow them in different moments. We need to know the signs (or indicators) for the proper time. For the present potato planting the intermediate sowing had the best results, that is, those made around the end of September to mid October. Also, the sowings in the lower cultivation zones or plain areas, did better. There are seasons when the sowings in the higher zones do better. And, the diversity of potatoes are growing well.

2.1. THE PERCEPTION OF CHANGE IN TIME: THE FEELING OF REDUCTION OF TIME DURATION

In contrast, some other elders find that times have changed. Doña Anastasia Fores from the community of Ccota, Platería, Puno, reports:



Formerly it seemed that days were long, because one could sow potato in a workday and we had time to prepare breakfast and lunch, then milk the cows and feed them. Then you could take the sheep to graze in the fields, and then gather them in the afternoon and bring them back to the pen. You still had time to sit behind the house to warm in the afternoon sun doing some weaving or washing clothes, or even for sowing some other *chacra*. Now the day goes by very fast. Time passes very rapidly. We now go to our chores and when we return, it is already midday while we cook or milk the cows. In the afternoon as soon as we gather the sheep, there is just time to feed the cows while the sun is already setting. When I comment on this with the young, they insist that time is one and the same. Formerly there were the same amount of hours and now it is just the same. The day cannot be shortened. That sounds true but still I am not convinced. I continue believing that day and night have shortened and days are passing very fast. I am sure of this; it was not like this before.

Nicanor Huacho Chahuaylacc from the community of Perccapampa, Lircay, in Huancavelica, in the central southern highlands says:

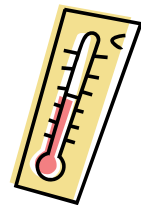
We are already living different times. They are not the same as those our grandparents and parents lived, and maybe, some of us elders. It is not the same as before.

Don Alfredo Añamuro Condori from the Wilajhe Sector in Puno refers also to changes in the agricultural cycle:

In fact time is changing. When I was young the day seemed very long. The day now is very short. We are now reflecting and realizing that my parents here used to start sowing the *chacras* in September and we harvested our crops in May or some years even in June and July. Nowadays, we start sowing in mid October and in April we are already harvesting until May, hastily escaping from the worms. Seeing all this I think that due to the intense heat that we now have, production is maturing in a shorter period. It was not like this before. Furthermore, today the produce is not well matured. Formerly they matured because they had more time in the fields. As we eat products that are *wawas* or *qollas* (not mature) people are also weak. I think that climate change is bringing disadvantages to us.

2.2. THE RISE OF DAILY TEMPERATURE

There are comments on a hotter sun. Trinidad Fernández from Cajamarca, says: *“Time is changing. Now the sun is burning too much. It was not like this before. Now you cannot bear working in the sun”*.



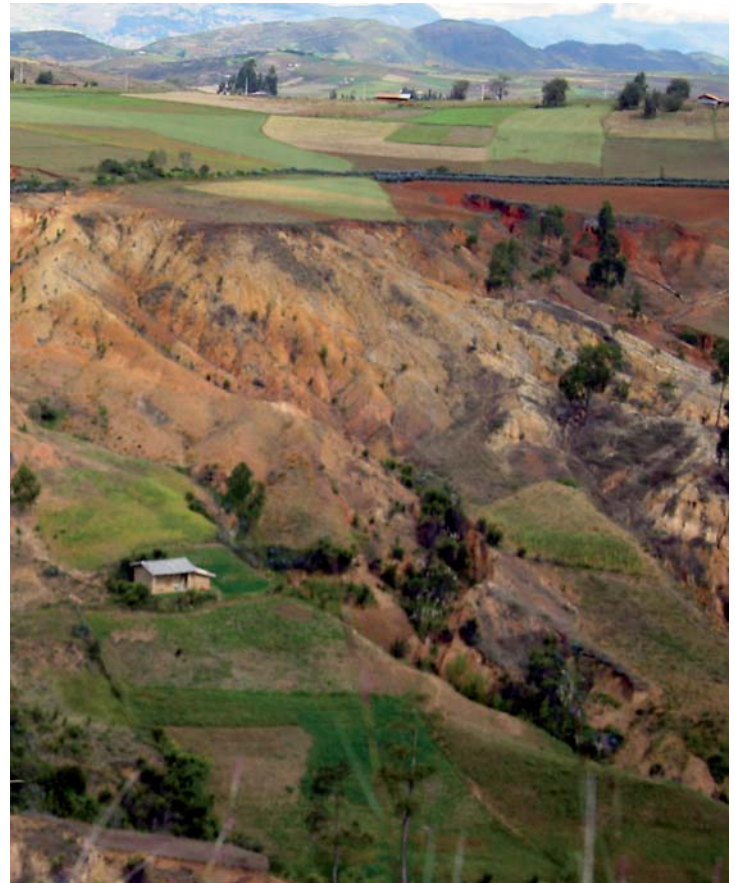
While Cipriano Mamani Quispe from the community of Wisachata in Puno tells us:

I remember very well that when I was young I used to wash my baize cloths, I hung them out and it usually took two or three days to dry. Now when we wash baize clothes, they dry in a single day, even a single afternoon. Actually the times have changed and the sun hits ever harder.

New illnesses are associated with the hotter weather. Guillermo Gutiérrez Condori from the community of Ch'ipoqoni, Moho, Puno in the northern portion of lake Titikaka says:

Our community is located by the lake shore and we live in a slope with a nice view of the lake. Since our ancestors' times we have nurtured our *chacras* and animals, but in these past years the climate has changed a lot. Since we live on a slope, starting at noon and until the late afternoon we feel the sun's heat that makes our crops and soils dry fast. Our younger children and

elder people, especially women become sick with fever as a consequence of the sunstroke. When children go grazing the sheep and are exposed to the sun, their behavior is very clear. They tremble, feel cold, become sad as if they were sick and their body ached. They surely are feverish. What we do is bathe them with urine repeatedly until the fever lowers and they get well. Or sometimes we wash them with *chuño* water, prepared with flour made of processed potato, and giving them some herbal infusions, with part of the herbs roasted or burnt. It is now becoming common to see women with their backs covered or with a cloth or a white flour sack on. This is used as a shawl. Sometimes these clothes are soaked in water and with them they covered their backs. Even dry, this cloth does not transmit heat to the body. On the contrary, they reflect it back like a mirror. Women protect themselves in this way, while the men do not use this white cloth. Rather what we do is to keep in constant movement always doing something. If we lay for an hour, it is certain that we will fall sick. We cannot sleep in the sun as we used to do near the *chacra* after lunch or in the lake shore after collecting *the totora* or bulrush.



Increasing temperature causes erosion and drying of soils. Matara, Cajamarca.

Jesusa Quispe from the community of Qamata in Chucuito, Puno, comments:

It is very hot these times. We cannot leave the house. Sometimes I go to the lake shore. There I can take some breath at least. What times we have to live nowadays! How will our children live in future? Perhaps they will be scorched by the sun. These times we keep falling sick all the time.

2.3. THE MELTING OF THE GLACIERS

Perhaps the most visible sign of climate change in the Andes is the melting of the glaciers. We present here some testimonies:



Formerly we only walked on the *chaqui nani* (bridle paths). We walked by the *Shayash Jirca* mountain by the ice. Now the ice is higher up. In the *jallqas* (high altitude zones) we used to see many deer, *taruca* or Andean deer, pigeons of different colors. The foxes walked along with our sheep, and were not concerned with eating them. Our waters were crystal clear. We could drink any time. Now we cannot drink water from our rivers. Water is *raccha* (dirty or contaminated). Now when I go to my *puna* I come back thirsty. I have to drink boiled water. *Georgina Llanos Robles (80). Huallanca. Ancash.*

When I was a child you could notice the volume of water that came down from the glaciers. Now as they have retired, you cannot see the water flowing down. *Willi Meza Durán (80). Vicos. Ancash.*

Even eighth years ago, Apu Tambraico had the juicio-riti or perpetual snow at its base. From a far it seemed that the mountain had its white poncho. The disappearance of the perpetual snow makes our Apu tame and that probably causes the Apu not to have the same strength as before. Donato Chavez, community of Ichpas. Lircay, Huancavelica.

Testimonies obtained by Asociación Vida Dulce from Andahuaylas, Apurímac in the southern highlands corroborate the impressions registered in other places throughout the Andean sierra:

- “Baize clothes that used to dry in two years, now dry in a few hours”.
- “Formerly we went to the *chacras*, without a hat. Now you have to use it; otherwise you get carcinogenic *erysipelas*”.
- “The soil now dries quickly and we have to water it more frequently”.
- “The *poncho* from Cajamarca is no longer used in plain sun because it is too hot”.
- “Formerly there were more plots irrigated with artificial canals. Now 73% of the cultivated land is rainfed and

depends on rains whose average is only 90 days per year”.

- “24% of agricultural units depend on water springs”.
- “We have lost 30% of the water coming from the glaciers”.
- “Warming is causing the loss of food sovereignty and biodiversity”.
- “Global warming is a problem that must be solved forming federations because we still have our own wisdom to meet this challenge”.
- Water scarcity is already notorious in the altiplano.

It seems that the water problem has already appeared in several places because its flow is gradually decreasing, and this situation has brought conflicts among families and communities. Many people attribute it to climate change, global warming that is causing the perpetual snow in the cordillera to melt and the springs to diminish their flow. For instance, the community of Ch'añajari in the district of Moho is upstream from the community of Chunkani. Both share a temporary river. Upstream there are three water springs whose flows join in the river. Downstream in Ch'añajari, people used to take part of the water to water their crops, and the rest went downstream for the use of the families of Chunkani. The sharing of water as customary rights has been



Achachila Winqasi with snow. Puno. Qolla Aymara

practice since ancestral times. Presently, because of the reduced water flow from these springs, the families of Ch'añajari do not let water go downstream because they feel it lacking. This causes conflicts between the communities. The same situation arose regarding potable water, since Ch'añajari has a larger population than Chunkani. They had to find another water source. This was located almost at the border between both communities. The families of Ch'añajari made the legal claim paying the dues without consulting with Chunkani. Finally, they appropriated for human consumption the water used to water the fields of the community downstream. This has also brought many conflicts between families. *Guillermo Gutiérrez Condori. Parcialidad de Ch'ipoqoni. Puno.*

Don Apolinario Ccama Mamani (84) from the community of Yanapata, Puno, comments also in the change in rain patterns:

In these past years the snow-covered peaks are changing. Formerly they appeared shining white but now they look *laramtata* (bluish in Aymara). I hear say that the snow covering the mountains will disappear and there will be water shortage. From the snow-covered mountains comes the water that feeds the lake. I observe the Illimani (high mountain in La Paz, Bolivia), the Sorata and the Khiwipa; they were white formerly, covered

with snow (*Kha Khiwipa uka tuqij niya laramt'ataw*). Illimani is still white. If the Khaya Jacha Surata, and Jacha Khiwipa thaw, that would be serious. Climate has been more noticeably changing for the past decade. The sun heat is strong and the cold is more intense (*lupij wali qhatintasij ukat mai thaitanij waliraki thaitij*). It was not like this before. It rains quickly, but it also dries fast. Water does not seep into the ground. It has to rain calmly so that water is retained in the soil. Formerly in St. Andrew's Day (30 November) it used to be half the rainy season (*chika jallupacha*). Now it is not raining on that day. We are close to Christmas, and it will surely rain with delay. Looking at the signs, one can see that there is water in the wells (*phuju*). They have not dried. It will surely rain late. I have seen the *tuqi*, a bird that is sign for water. It has made its nest at half height of the bulrush stalk (*chika totora*). Maybe it will rain late.

Don Cipriano Choque from the peasant community of Jachocco Lacarapi, Puno, adds on the changes of patterns in snow and frost:

It used to rain long and leisurely. There also were water springs that did not dry in the year; now they dry. There was water in the pastures where our animals took water. Now there is water in a few places only, a situation that has brought us concern in the past three years. Formerly when it snowed, the snow lasted three

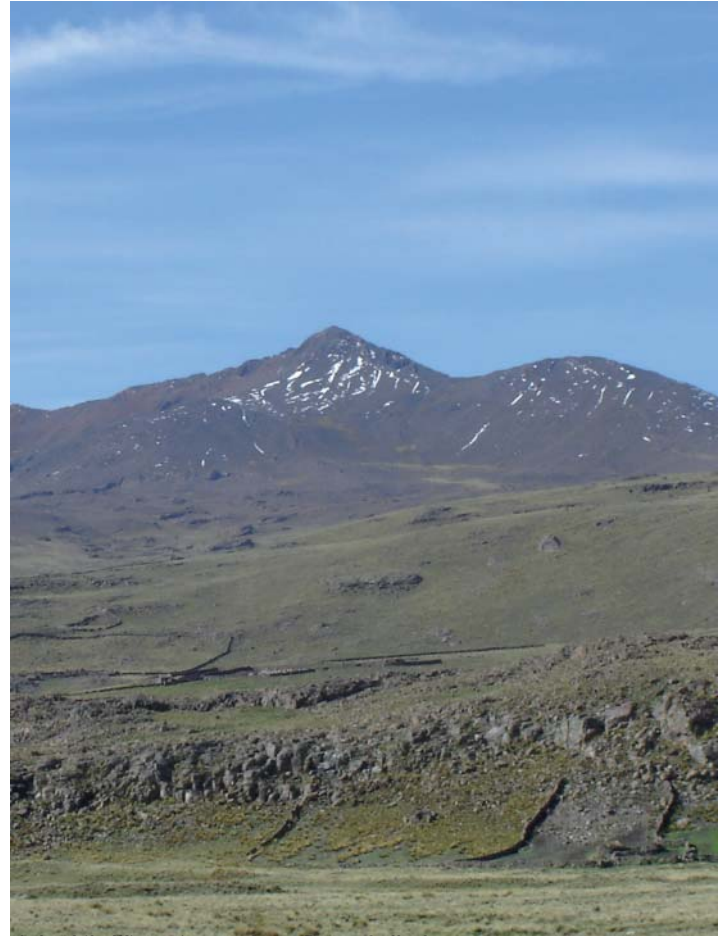
nights. The first night it used to snow a lot, then the second night a little less, and the third was little like *vicuña* fleece. Now the snow only lasts one night and then frost visits us. Now we are worried by the appearance of our *pacha* or local world. When we see clouds, our hearts gladden and we think that it is going to rain. Then during the day it becomes totally cloudy; even the sun hides and when night falls it clears and frost comes.

Don Remigio Cutipa from the Ayrumas Carumas village, Puno, says:

The snow peaks have thawed since the 1983 drought. From that time on, the mountains like Winqasi, Kimsachata, Arichua, Jaakila do not wear their white *poncho* (their peaks are not covered with snow). I remember that when I was a child, before 1983, these mountains were covered with snow the whole year. They fed the springs in the Rio Blanco watershed.

Changes in wind patterns have also been perceived. Don Carlos Quispe (58) from the community of Yanapata, Puno, indicates that:

In fact, time is changing and we can realize by observing the winds. For November the first sowings should be green because it is the half period of the occurrence



Achachila Winqasi years later. Puno. Qolla Aymara.

of the rains (*chika jallupachjamiriw*). These years it is not being like this. This is why I say that time is changing. There are clouds but the wind takes them away. Some nights ago, it was about to rain for three times, but the wind would not let it (*purjataskiw thayaj apanukujarakiw*). As it did not rain, the fields are dry. With this climate change the sowing of the crops is being delayed. Now it is November when the fields used to be green, but now it is dry in sandy (*ch'alla*) soils. In wet areas it is green. The occurrence of rains now is completely irregular. Only some drizzle falls like it does in the coastal area. Formerly it used to rain leisurely and the rain moistened the soil.

3. HOW CLIMATE CHANGE IS AFFECTING THE ANDEAN AMAZONIAN COMMUNITIES

3.1. ASCENT OF CROPS. ALTITUDINAL RELOCATION OF CROPS AND ANIMALS

Due to changed conditions, crops are ascending the Andean slopes. Thus the following testimonies:

Formerly in the high places it was very cold; it is warmer now. Maize that you could only find in Huashcapampa, in the lower zones before, now you can see in Vicos Pachan. The highlands



now produce maize. Maize has gone up to the zones of Urancancha and Huasipampa at the entry of Quebrada Honda. The seeds themselves have adapted. At my place, I had mixed my ocas with maize. I sowed it to prove. It did nicely. It had a small maize cob. I tried the following year and then my maize adapted well. Maximiliana (95). Vicos. Ancash.

Don Nazario Arratia, an elder from Anapia Island in Puno, comments on exotic vegetables growin in their ktchen garden:

Six years ago we realized that we could have tomatoes in this island at 3850 masl. In those times there came merchants with sail boats bringing vegetables and we exchanged them with our products: potato, maiz, fava beans, peas, quinoa to obtain vegetables like onion, tomato, carrots. When they finished the exchange they washed their boats at the lake shore. Thus the seeds stayed, sprouted and grew between the stones. They produced longish small berrylike fruits. They were green. It was very impressive. Many of the folks did not know how to grow tomatoes and the nurturance they required. I was one of the ones who tried in a small garden in my house. I consulted with people who had known it, because many of them had been

in the coastal valleys and they had seen how tomato was cultivated. Tomato seeds now sprout, grow and produce in our island. Certainly their fruits are not large but they are tasty when cooked.

Also in Anapia, don Froilán Limache, an elder reports on trying new crops:

In Anapia, we did not cultivate *kiwicha*, but I tried and it grew very well. I have relatives in the Apurímac region. When I visited them they gave me seeds. I knew that the plant grew in the valleys; it required a temperate zone. As it was not a plant of our region, I did not know how to cultivate it. So I mixed it with the Quinoa and did not care much about them. In the following season we used its production as seeds, and many larger and multicolor plants of quinoa and *kiwicha* appeared in our *chacras*. From that time on I started selecting the plants and harvested only *kiwicha*. I was told that they eat it roasted. They taste very well.

Similarly, Don Francisco Limachi, an other elder from Anapia in the altiplano area says that:

Fruit trees are now common in the island. Climate is always changing and now we can grow fruit trees. I grow plums, figs, cherries, prickly pears, passion fruit, and even apples.



Ascent of tubers cultivation in traditional areas of natural pasture.
Huanta. Ayacucho.

Don Félix Limachi, elder from the island of Suana, Puno, comments on the appearance of new fish species and the disappearance of others:

In the past five years the *mauri* (catfish) appeared in the lake. Formerly we fished the sand smelt. We used to go two or three hours in sail boat from the island to set our fishing nets for the sand smelt and we used to get a good load. Now there is no smelt. When we set our nets we get five to ten sand smelts. But now catfish abound. Formerly there was not much but we have changed our nets to get the catfish. This is the fish we eat more nowadays. We do not go very far. The catfish lives near the place where bulrush grows.

Doña Nieves Mamani, an elder woman from the island of Anapia in Puno says about the wild relatives of native grains:

When I was a child my grandparents and parents used to say that you must eat the wild species that grow on the slopes of the hills. For instance, the wild relatives of Quinoa which we call *añara* in the community were eaten in years of food shortage. Presently we do not value them, we do not think of their importance. Quinoa is grown for its grain and there is no interest in the wild relatives. My

grandparents used to say that *añara* is very nutritious, even more so than quinoa itself. I remember that my grandmother prepared dishes with *añara* and I still can do it myself.

My grandfather said that the terminal roots of the bulrush (*tatora*) that grows in Titikaka Lake, that we call *saq'a* were consumed. Bulrush gave you food. One entered the lake in the midst of bulrush and looked for tender roots. They are white and very tasty. They say that it is rich in iodine content, as is the bulrush *chhullo* (stem). My mother also used to cook a soup called *laqo juchhacha*, a porridge made with a plant that grows in the lake shores. She used to collect it from between the stones and made it dry in the sun. Then she ground it in a *batán* (grinding stone) into a flour, that she used with other ingredients to cook a porridge. They also ate *cha'co*, a very fine clay that is also known as medicine for gastritis and ulcers.

Doña Eugenia Mamani, another elder woman from Anapia, Puno makes a comment on exchange with communities in the higher zones and its present decrease caused by climate change:

In the past three decades of the last century, the communities in the higher zones where alpacas,

llamas and sheep are raised, used to come to the island of Anapia for exchange. They looked for our products like fava beans, potato, maize, and we needed llama and alpaca wool. They also brought clothes and ropes. Now they do not come because in their communities where plants were not cultivated they grow them and have no need to visit the island for exchange.

Don Antonio Pineda Pelaeyz from the community of Chimboya, district of Corani, Puno, in the quechua part of the altiplano also reports on the exchanges with herding communities:

Formerly continuous traveling with llama troops used to be undertaken to bring potato, maize, barley and other products from the Cusco region, because we barely sowed bitter potato and other crops would not grow. Now we plant everything in our community. We make lots of *chacras*. We even grow lettuce, carrots, onions. In communities where only alpacas and llamas were raised now potato is produced. Maize was only cultivated up to Marcapata; now it has ascended. They sow it even in the higher zones of Marcapata. Time has changed a lot and that has also made that travel with llama troops diminish. Now we only travel looking for maize. We are raising llamas



Lacking pasture areas in the high zones, sheep are moved to lower zones. Quispillaccta. Ayacucho

for harvesting, *astapacuy* (helping in the harvest) in our communities. Travel will be forgotten during this period because of road construction and the appearance of *qhatos* (temporary marketplaces) in all communities in the altiplano.

Orestes Quispe Pongo from the community of Choqo Koniri in Juli, Puno, also comments on crop changes:

Formerly this community in the altiplano of Puno produced a lot of bitter potato and the sweeter varieties did not grow because the frost would take them. But in these past years, the sweeter potato varieties are getting used and producing well. Perhaps the frost does not fall in its time now. In this cordillera it was always cold but now it is much warmer. Last year oca was produced here. Formerly only *cañigua* (a native grain) grew, now sweet quinoa is being cultivated. It is because time is changing and as we live of the *chacra*, we should be aware of these changes and adapt to them as our ancestors have done. There are good years, bad or strange years as our grandparents say. For that we need to keep company with time. Now also winds are strong and have brought different pasture seeds to the community. New varieties of pastures and medicinal plants have begun to grow and we do

not know if they are as effective as where they come from. We are going to see that with time.

From the northern department of Cajamarca, don Manuel Huatay, reports on the ascent of fruit trees:

We have the feeling that climate is ever different with each year. Plants from places of the coastal area, that we have not seen before like avocado, are now planted and after a few years is already giving fruit.

Also from Cajamarca, don Marcelino Pérez comments:

Climate has been changing little by little, but the change has become stronger recently, some five to eight years. Formerly some crops did not grow here. Now they do well. For instance, lentils now grow better than in the lower zones. It does better in the high zones. Lentils came here eight to ten years ago. It took time to get accustomed: it got to produce a little, but it did not produce before. You just sowed in vain.

Animals have also moved. According to Leonardo Julcamoro from Cajamarca:

New animals have also come. There are now parrots. They come from the seaside, from the coast, but now they are here and feed on *choclos* (maize cobs). Another bird that has appeared is the thrush.

While in the central south highlands of Lircay, Huancavelica, Alberto Marcos reports:

The crops are now going up. When have we seen our parents sowing potato at the foot of the Tambraico in Churia, Qerulla. It has been two years now that people harvest good potatoes. It will possibly reach Tambraico (the local mountain deity). And what about our animals? Where are they going to graze if everyone in the community of San Juan de Dios start planting?

3.2. CHANGES IN THE PATTERN OF RAINS, FROST AND WINDS

Changes in the patterns of rainfall, frost and winds are being widely reported throughout the Andes and upper Amazon regions causing changes in cultivation patterns. Marcelino Pérez from the northern region of Cajamarca says:



Rains now do not fall heartily; they do not fall at the time they used to. Time is completely changed. In the past few years it is raining very hard one day and then the rain is gone. The sun shines the following day in a way that you cannot bear and the *chacra* is dry. Formerly it was cloudy after the rains and the fields did not dry quickly.



Unusual snowfall on the shores of Lake Titicaca Moho. Puno. Chuyma Aru

On winds patterns and also from Cajamarca, Manuel Huatay says:

There are winds that are strong some days and others that are gentle. The winds coming from the North do not bring rain, but the winds from the South do. That is a rule; it is a sign that does not deceive us, but now those winds are not being felt. What is now being felt is a chilly wind, a sign that is confounding us. But we realize that chilly winds bring frost. There is now no wind with rain. Because of this, we do not see rain falling.

Leonardo Julcamoro from Cajamarca adds:

Winds now bring frost. These winds bring dry mist. Mist thickens and next day frost falls. This did not happened before. When you see the mist in the evening you are happy and say it will rain at dawn as it was formerly. A lie: no rain; on the contrary it dawns windy and besides it frost falls.

The following reports comes from Georgina Llanos Robles (80), from Huallanca, Ancash in the highlands north from Lima:

Formerly it used to rain in its proper time and frost affected our crops only a little. Now it rains in different moments and frost falls anytime. In former

times it rained on the eve of the set dates, and frost did not fall. In the recent years it clears or does not rain and frost falls.

Agripino Jayo, as a member from a Quechua community in Andahuaylas says:

Kunanqa parakunapas manañan tiempumpiñachu chayamun, aywanqullañam, chikchillañam, amarullañam qatarin quchakunamanta. Pukiokunapas chakichkanñam. (In these times, rains do not fall in their proper time. It is more wind mixed with drizzle and hail. The Amaru deity raises from the lakes. The springs are drying).

The rest of the testimonies in this section come from the altiplano area. Guillermo Gutiérrez Condori from the community of Ch'ipoqoni, Puno refers to the rain pattern:

Rain does not want to fall and this year is worse. Since sowing it does not rain, and if it rains it is not enough. We are very worried. Many people say that the world is heating up and times are changins. It seems that it has not always been like this. For instance, we have had a damaging frost in the communities of the lower zones close to the lake shore. Formerly this did not happen. Our authorities have talked about this last Sunday.

Jerónimo Patana from the community of Nuñuni Tikani, Puno, adds:

I remember that when I was a child, climate was very different from today's: rains fell in their proper time and besides the rivers had water in September. When it rained, the streams flowed gently, they did not make grooves in the fields. Now they are very torrential. Regarding sowing, formerly the climate was cold and people sowed in advance. Our uncle Torres who is on the slope, used to sow *luk'i* (bitter) potato on September 8. After a few years he was sowing on 29 September. Now he is sowing on 18 October. I believe times are changing and the earth is warmer. The sun can not be borne; it scorches. Another change refers to plagues. Formerly, there was no *yawa* in the *chacras*, nor so many worms. One could live with serenity. Now the *yawa* is a major plague and the Andean weevil also attack the potato plants. As different chemicals can be bought, people want to forget our ancestral practices. Formerly the *marani*, the traditional authority in charge of the *chacras*, was always making rituals at critical moments. Nowadays people do not care, and this authority is lacking in most communities. But there is the municipal agent and he is the one to conduct the prayers when droughts come.



Frost in Ccota. Puno. Qolla Aymara.

It is the same pattern observed by Jacinto Bautista Cerezo from the community of Viluyo, Puno, who reports on the changes in the relationships among community members:

I now see that formerly rains fell end of August and part of September. Now it is very variable. It falls in November, sometimes in December, and then it disappears in the most important period for the *chacra*. But it seems that we are changing as well. We are ever more envious. We do not help each other. We only want to accumulate products or money without sharing with the families of our community. I have lived through periods of scarcity that made you repent. There was no food. You had to eat with moderation, but Mother Earth took pity on us and gave us food like *jut'is*, *sik'is*, *sank'ayos* y *qarwaqarwas*, food from the wild. In those times these products presented themselves. Nowadays we have need of those times to realize that we are mistaken forgetting our good customs. We do not want to work as we wait for support without toil and this attitude also makes times change.

Laureano Aguilar, de Chucuito, Puno, a migrant to the zone comments on the diminishing opportunities in the area due to climate change:

What am I going to do in Chinchera? There is nothing to live on. I had to go to Arequipa and live off fishing in Camaná. Here we do not have water as we used to. Making *chacra* is not enough. We sow and frost takes our crop. Hail falls anytime. There are too many worms. The increasing amount of fertilizer I have to use makes everything worse. It is difficult for me to live here. In Camaná even collecting *machas* (clams) I can support my family. Times have changed a lot.

Catalina Calderón Velásquez, from Puno, adds:

Last year frosts have been very strong. They lasted until September, and have thus affected the birth of the alpacas. The broods of the dry period have been affected by the frosts and many have died. It was not like this before; the brood used to develop normally. In December, another birthing period the broods have died for lack of rain. The broods in this period feed on *pillis* (a wild vegetable). For lack of rains there were no *pillis*, and some broods have died. The change in times has affected the raising of animals. We have to reflect on the immense wealth of knowledge of our ancestors

that must be recovered to pass these times that our grandparents were able to live with their wisdom.

Don Jorge Condori Flores from the community of Ccollpa, Puno, says:

When the rain falls, it begins to cool, the natural pastures green, the lizards and snake go out to drink, but now rain is becoming scarce and when it rains, it comes down in a short period, then leaves. Besides, it falls in one place. It does not fall everywhere as it used to. Some people are building small reservoirs, but this is not like rain which irrigates all and for everyone.

Don Martín Mendoza from the community of Huilacaya, Puno, says:

In former times frost fell in its proper opportunity and we who live with the *chacra* knew that very well. Frost always came in May, June, July. In August the weather became warmer (*pacha junt'uchjhewa*) but now it is not the same. Frost comes at any moment, especially in the period of nurturing the *chacra* and that is a very serious concern because it freezes the *chacras*.



Hailstorm in Ccollpa. Puno. Qolla Aymara

Don Florentino Gómez Cruz from the community of Perka Norte, Puno, says:

Now this *pacha* is not good. Everything has changed. For instance, rain falls for some little while or at time during the night and then frost comes. Sometimes in the mornings we see clouds forming. We think that it is going to rain but later the wind from the East (*Suni thaya*) blows and takes the rain away and the whole cloud disappears, it clears and a strong frost falls. You cannot trust this weather.

Finally, a testimony from the Upper Amazon regions Máximo Mundaca Vallejos from the community of Selva Andina San Martín, comments:

I came from Chontali, Jaén, because there was no longer good farmland. In my village Páramo there was scarcely a stream. We search our own disaster, felling trees without conserving the river border. Now climate in Selva Andina is changing. Rains have changed a lot. The stream flow is reducing every year (Máximo Mundaca Vallejos. Comunidad Selva Andina. San Martín).

3.3. CHANGES IN THE SITUATION OF WATER.

Asociación Paqalqu, a Nucleus for Andean Cultural Affirmation (NACA) that is based in Yunguyo in the shores

of Lake Wiñaymarka reports on the situation of water in their zone in the altiplano area.

There were formerly small streams coming down from the Qhapia mountain that irrigated pastures, *chacras*, and made stone mills operate. Their water reached lake Wiñaymarca (one of the lakes in the Titikaka system). Their flow was continuous in the year and their water sheltered fish like *mauri* (catfish) and *ispi* (a small native fish). Presently some are dry and some have a minimal flow but no fish. There are some fish upstream in the higher zones. In old riverbeds, filled with earth and sand, water runs only in periods of strong floods. Such is the case of the rivers Chinumani, Qupaphujo, Jurana, Sacacatani, and Chicanihuma. The ones with permanent flow are conducted by pipes for human consumption

Rainwater

Lately rains are not very intense. Rains from the South predominate. Northern rains (*qaqsapi*) are less frequent. It is now only raining in the cities and the lake but not in the cultivation fields.



Hailwater

In the few past years it is becoming more intense and frequent but also falls for a short time. It causes a superficial

runoff provoking soil erosion and gullies. The hail grains are larger like small stones whose impact damages the leaves of the plants. It occurs owing to human disharmony with deities. Traditional authorities call the community to conduct rituals for harmonization (*Chijchi taqa*).

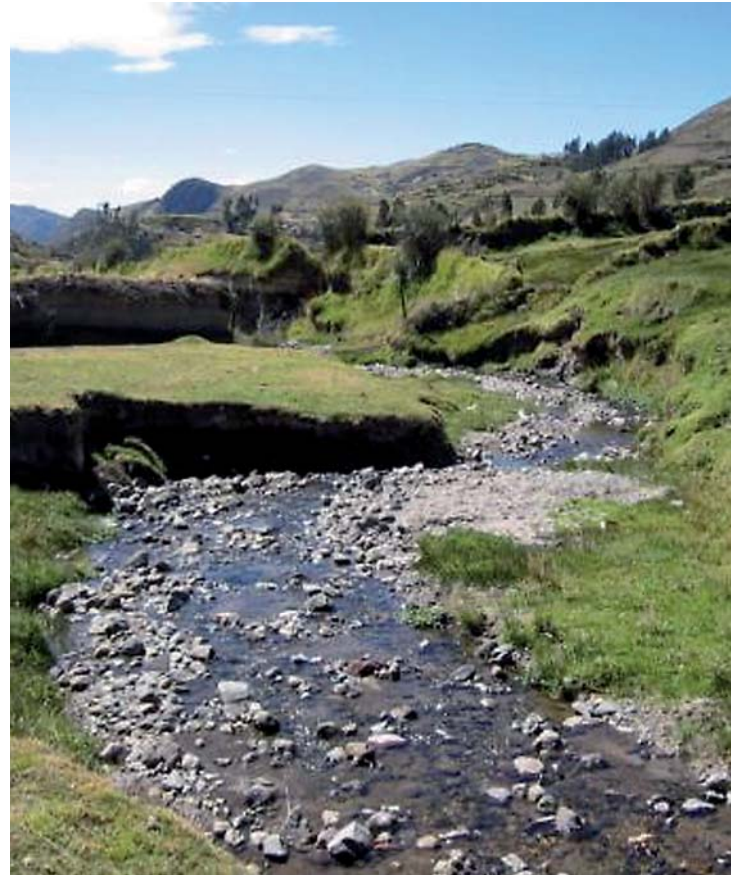
Hail used to have its period and a known path, but presently it is occurring when plants are green. Traditional authorities pay respect to hail, while others consider it a natural phenomenon.

Water in lakes

Lakes are known as *qutañas*. The water surface that was permanent the whole year has been disappearing in the past years. It is only present in the rainy season. The lakes are used to water animals. Their contention dams are not being maintained. Families do not care for them as their ancestors did.

Water in Lake Wiñaymarca

The water level has descended. For lack of rains in the altiplano, its descent will be larger in the present season. Formerly crystal clear the water is ever muddier. There are few species of fish, and aquatic plants for fodder (*llima*). Bulrush stalks are dirty and fibrous. The watersprings near the lake are drying and there is no place to water the animals. The small springs that used to provide freshwater



Percamayo river. Lircay. Huancavelica

have become salty and are filling with earth. The wells for human consumption have been abandoned since the families are now supplied by a pipe water system whose sustainability is uncertain. People do not know if the spring where the water comes from will not eventually dry.

Spring water

Known by the Aymara peasants as *uma jalsu*, it is diminishing its flow by neglect. The springs are used for the elaboration of *tunta*, processed potato. They are seen as wetlands (*bofedales* or *occonales*). Presently frogs and tadpoles have disappeared. Their croaking is not heard. In the wells that still hold water, there are conflicts for their use in the communities. In practice what used to be a common good has been privatized since the community leaders do not allow water to be taken by other without permission.

Well water

In the wells the water level has dropped. It is not located one meter deep as it used to. Now it is at two meters and others have dried. They serve as garbage deposits. In former times they supplied water for human consumption. Presently they go unnoticed because the public rural potable water network has replaced the wells. Don Mamani Inta from Villa Yanapata, Yunguyo has this to say: “The wells were

regarded with respect. Our parents and elder people told us not to dirty them. In the well the extended family gathered, the children played, the young people stroke up friendship and the adults conversed on community matters. Now without the space of the wells we go about uninformed.” Some families have realized that water from the wells is healthier since it is not contaminated with chlorine. This is notorious when you water the animals for fattening. Animals watered with the community water network take longer for fattening compared with animals watered with water from wells.

Wetlands

Recently due to climate change, wetlands are getting smaller. The *chilliguas* (native pasture) that grow there dry by the proliferation of contaminants (plastics, bottles). There is an abundance of wild guinea pigs and the pastures that grow there are not wanted by cows and sheep. As a consequence, the families are forced to burn the pastures to get them sprout.

Snow water

The snow that occurred in June does not fall now. When it fell we used to say that it was the fertilization of the *pacha*. Plots turned over after the snows had eliminated



the weevil's larvae by freezing them and thus the incidence of the plagues in the coming season was sharply reduced. Presently the snow that is falling is similar to low density hail.

3.4. CHANGES IN THE BEHAVIOR OF ANIMAL.

Don Fermín Catacora, member of the community of Quimsaphuju from the village of Ayrumas Carumas, Puno, says:

I remember that when I was a child there were plenty of frogs in the rivers. Now they are gone. I think that besides climate change, mining enterprises are contaminating rivers from upstream to downstream. This explains the absence of frogs and fish. We can say that frogs are the most sensitive animals to climate change and especially to contamination of water.

3.5. CHANGES IN THE AGROFESTIVE CALENDAR

NUVICHA, a NACA operatin in Cajamarca in the northern part of Perú reports changes in the sowing season:

In former times the land for cultivation were prepared in November and December. It was done to get the grass well decomposed and to sow in June. Now we prepare in March or April to sow in August or September. We do it for our seeds not to suffer for water, because the rain pattern has changed. Now it rains less and at any moment.



Unknown disease in alpacas. Ccolpa. Puno

Similarly other testimonies from other regions assert:

Regarding sowing it has changed a lot. Now the sowing of maize is being advanced to July and August. Formerly maize was sown in November. Victor Alonzo Díazco, (84). Huallanca, Ancash.

The rainy season has shortened. Only a decade ago rains started in September, when the first sowing of maize was done. Now the rains become more intense only in the first days of January, and they continue only until March, in practice only three months of effective rain. This explains the delay of the sowing period. Plants do not mature like they used to. Balvino Zevallos. Lircay. Huancavelica.

Regarding the *chacra*, our plants, year after year they lack rain. As everyone is noticing, we are no longer sowing when we used to. About the fava beans and wheat we always sowed in October. But as there is no rain, the sowings are being delayed. Only some varieties of maize that we sow with the first scarce rains in September are sprouting, while the other crops, nothing... We are still expecting the rain. The *chacras* now look like maize *qallpares* (fallow land). Nicanor Huacho Chahuaylacc. Perccapampa. San Juan de Dios. Huancavelica.

3.6. UNUSUAL PRESENCE OF PLAGUES IN HIGH ALTITUDE CROPS AND DISEASES IN ANIMALS

Not only crops are moving up. Plagues and pests are also appearing in unusual places. The testimonies come from places throughout the territory:



Now everything is full of plagues.

We cannot cultivate potatoes because beginning February and March, the *rancha* (a fungal disease) appears when the potato plant is just flowering. We lose everything. Sometimes we sow earlier but it does not rain. We cannot understand the weather. Arcadio Huaccha. Cajamarca.

It is the same with the *ocas*. It is with plagues. It was not eaten by the worms before, but now they attack it even before flowering. In former times we had plenty of *ocas*, *ollucos* even to fatten pigs. Julio Tanta. Cajamarca.

Different diseases have appeared in the potato plants in recent years: *rancha*, *seca seca*, worms, and in fava beans *roya*; in maize, *cashra*. Sara Urdanibia Falcón (78), Huallanca.

Never before had we seen our animals die with heat. If ever this disease came we cured them with herbs,

now not even herbs have any effect. It seems as if these diseases have become more frequent in our animals and they are more difficult to cure. If it not one disease then another is coming until they cause death. To avoid it, we have to recur to medicines. Marcelino Tillasuca Flores. Yanaututo, Lircay, Huancavelica.

Don Sabino Mamani Subieta from the community of Quelcaya in the district of Corani, province of Carabaya, Puno, gives his testimony on competing demands on the high altitudes ecosystems from mining concerns with perverse consequences:

Doctors who know how to cure the diseases of alpacas and llamas and how to improve the stocks have arrived to our community. Along with them have come the engineers from mining companies with machines using a lot of water. Since their arrival we see that the litter of our animals are not the same as we used to have. Now when we slaughter them their entrails show many diseases, they have stinky water balls, cysts, tumors. When we are grazing them they die of strange illnesses. The litter have become very weak, the females frequently abort, and the litter die with deficient growth. Other animals are born without ears. Herbs will not cure them; they can only live with



Graphical representation of the agricultural calendar in an Andean community. Cusco.

medicines, and make us spend a lot of money that we have to get working in the mines, leaving our families. Many of us are supporting the mining companies for the money we get to cure our animals. If we could get a good price for their fiber as we used to and if their meat brought a little more money, perhaps we would not work in the mines... Our customs are being neglected. It used to be nice living here, now we do little because life is becoming very expensive.

3.7. DISAPPEARANCE OF WILD RELATIVES OF CULTIVATED PLANTS.

There are also reports on the disappearance of wild relatives of the native cultivated plants. Their habitat is progressively being put in cultivation. A testimony from the northern sierra of Perú follows:

What is disappearing now is the *olluco* of the fox, the potato of the *gentil* (deceased ancestor). Everything is changing. Etelvina Vásquez. Cajamarca.

3.8. FLOW REDUCTION AND DISAPPEARANCE OF WATER COURSES.

Reduction of flow and the disappearance of streams is reported in the highlands and the Upper Amazon. Here are some samples. The first testimony comes from the southern central highlands of Huancavelica.

River Perccamayo is drying. It used to maintain an optimal flow in the dry season (May to September). Now it has a minimal flow. It is a drying stream with its old bed as a fill of stones and dry sand in August and September. The introduction of cultivars like fava beans and peas, alfalfa and maize, dependent of irrigation, has caused a larger consumption of water in the high zones. The extinction of the main water sources like springs, rivers is accelerating. There are changes in climate, soil, floods, droughts and desertification. Balvino Zevallos. Lircay. Huancavelica.

Bernardo Aguirre Contreras from the community of Ccollpa, Puno, by Lake Titikaka observes:

Nowadays springs are drying up little by little and the rain falls only one day or a night. Then it leaves but it was not like this in former times. Rain used to fall during a whole week and the streams were constant. There was water for our animals. But now everything is drying. There is no water and people are fighting for the little water flowing from the pipes. When we have potable water we have more conflicts. When we did not have it, we had the water of our springs which received maintenance, offerings and duties with the proper rituals that are

now being neglected. This is why our water sources have been drying and disappearing.

The two following testimonies belong to communities in the Upper Amazon region of San Martín:

The streams are drying. Many have made *chacra* up to the border of the stream and we are finishing ourselves off. Pedro Sangama Sangama. Community of Congompera. San Martín.

In droughts that last longer than usual this spring dries. Maybe it is because we have finished its forest off and we do not care for it as we should. Otilia Sangama Guerra, Community of Alto Pucallillo, San Martín.

3.9. DISAPPEARANCE OF BUSH AND TREE SPECIES

Changes in the woodlands are also noticeable in the central southern highlands of Huancavelica and in the altiplano as well as the Upper Amazon region of San Martín. According to the Asociación APU in Ayacucho.



Members of the communities in Ayacucho are concerned regarding the reduction in size of scrublands and woodlands and native species population and diversity. The families and communal authorities are neglecting the conservation and improvement of these zones. The clearer



Wild relative of oca (*Oxalis tuberosa*). Raqchi. Cusco

evidence of this is the low quality of the roof of the village houses and that of the huts in the pasture lands. The strips and beams are made of slender wood that sink or collapse when snow falls.

Balvino Zevallos from Lircay, Huancavelica, reports that:

The impacts of climate change affect wild plants, as is the case of the retama (broom) strongly attacked by greenflies to the point of the whole disappearance of its habitat. Many hectares of prairies in the lower zones do not offer the yellow color and natural fragrance that was so common there. Climate change is not only observed in the disappearance of shrubs. There are plants that have speeded up maturation, like the *capulí* (cherry), which used to mature for Carnivals every February. These alterations in flowering and fructification disconnect the pollinating insects and birds from their natural cycle, and are threatening the normal development of the crops. A probable consequence is the loss of seeds and genetic erosion at large.

The massive disappearance of *molle*, a native tree, is for us a sign that we are nearing the *muchuy tiempo* (time of scarcity) in which rains start decreasing. Teodoro Malleco Ventura. Community of Lircayccasa. Lircay, Huancavelica.

3.10. BREAKDOWN OF THE RELATIONS OF RESPECT TO THE COMMUNITY AUTHORITIES AND AMONG FAMILY MEMBERS

Balvino Zevallos from Lircay, Huancavelica, reports that:

The ascent of maize from a zone to another as an effect of climate change broke the relationship between groups of *ayllus* because its production is market oriented now and little is exchanged. In former times, at harvest season, people from the high zones went down with llama troops to help move the products from the *chacras* to the warehouses. They received maize in reciprocity, besides bartering dried meat, textiles, wool and *chuño* (dehydrated potato) for maize. Now we do not have this exchange or it is now minimal since the roads have replaced the ancestral roads.

Also from the south central highlands the loss of traditional authorities is reported by the Asociación Pacha Uyway (APU) with comments on the consequences:

We have lost our traditional charismatic authorities, for instance, the *pasto campos* (authority of the natural pastures), who were in charge of controlling the rotation of animals in the pastures, especially in situation of scarcity of pasture. The variability and diversity of species have been reduced by the loss of knowledge, rituals, and festivities that assembled the community and the families.

In Apurímac, Julio Quispe Enciso from the community of Pumachocha observes that:

Now no one is paying attention to anyone else. We do not attend the assembly meetings, not even the authorities attend. They go when there is *aypu* (gifts of food or clothes). Besides they do not pay attention to the authorities because they become community president without the exercise of the duties as minor authorities.

Rómulo Ccopa Chipana from the same community adds:

When the president of our community puts on his Japanese cap and rubber shoes, he does not look like our authority from afar. He looks like a common man. In former times, authorities wore a baize coat, and a hat and carried a staff of *chonta* (hard wood), and he was respect itself from afar.

Don Alejandro Mendizábal *Chajra Alcalde* from the community of Santa Cruz, district of Orurillo, province of Melgar, Puno, explains extensively on the role of the traditional authorities in maintaining the ancestral way of life:

In the time of the haciendas, their owners loved to bring their knowledge to make *chacra* and raise animals. They liked to improve their cattle and sheep. They brought everything moder. They made



Vicunas hunted by poachers in Andahuaylas. Vida Dulce.

business in the same way. Those who lived in the communities were their shepherds and suffered to learn those fashions. As we did not learn quickly they despised us. But we, despite the abuse of hacendados and professionals those years, we have always made *chacra* and nurtured animals with knowledge and secrets that our grandparents taught us. We made rituals, held festivals, ate our foods, made our clothes and made life happy. Now time has changed. It is not the time of the haciendas or business people, but there is no water, the sun overheats, there is frost, worms. I believe it is because we all have gone to towns and want to live as townspeople. We do not want to make *chacra* and live according to our customs. We want to live as we want without respect to anything. But those of us who have stayed and live in the communities keep on practicing our customs and harvesting the food that *Pachamama* gives us to nurture us. What we need for the former times to return is to recover respect for everything in life.

He then comments on the importance of wearing the traditional clothes as authority of the *chacra*, showing respect and commanding respect:

The clothes we use in order to take charge of the duties of *señor justo juez*, a local authority, are

all important because they constitute the respect we hold for *Pachamama* and for our *ayllumasis* (brethren), but now this is changing. Schooling has caused us all to lose respect among ourselves. Young people and many professionals tell us who live in the communities that we are backwardness. They say that our exercise as authorities are to fall into the vice of chewing coca leaves and drinking alcohol. Our clothes are useless they say. They are only to make tourists happy. Times have changed a lot. No one wants to be like us, not even our children. Then hail hits us hard. Frost feels welcome. The sun wants to burn us because we do not show respect. The *mosq'o venturo* (the wind's ritual name), the *q'asqa machu* (ritual name for hail) felt well with us because we wore our clothes and they respected us. There was respect among all of us. Now it is not the same, but even now we are keeping our customs, to be able to make *chacra* and collect the food for our children and our *ayllumasis* in spite of their living in the village.

3.11. DISAPPEARANCE OF NATURAL PASTURES IN THE HIGH ZONES

The ascent of the crops in the highlands implies the reduction of pastures. Some testimonies from Ayacucho, in the Central southern highlands refer to the consequences of this reduction:



Alas, our good life! How we miss life as it used to be. In former times the *ichus* and pastures in the high *puna* were abundant. But now? There is almost nothing. Our roofs that were formerly made with ichu are now made of tin. Without enough pastures in the *puna*, our animals invade the *chacras* and cause conflict between families and with our authorities. But all this can be better with our effort. Jesús Collahuacho. Ayacucho.

In former times, there was abundant *ichu* that we used to make our roofs with. These roofs lasted twenty years, and more if they were well braided. Furthermore houses with *ichu* roofs are cooler in summer and warmer in winter, while the tin roof brings diseases and plagues that affect people and seeds in the warehouse. Evaristo Yance C. Ayacucho.

Less pasture land also implies less fodder and a decrease in the animal stocks as Albert Callo Apaza from the community of Ch'ujuk'uyo, Puno, observes:

Times have definitely changed a lot. Formerly families in the high zones did not make *chacra*. They lived nurturing animals, but now they cultivate their land. For instance, in former times only those of us who live in the communities by the lake shore, like Ch'ujuk'uyo had fava beans among our products.



Grassland area taken over by crops. Andahuaylas. Vida Dulce

But now in the past decade the families of Jhojhoria (community located in the high zones of Moho, Puno, at approximately 4000 masl) also have fave beans. When we converse with these families they tell us that they used to cultivate only bitter potato and very little fodder. Now they usually have the sweeter varieties of potato, and their bitter potato has ascended up the slope to the communities of Huayrapata (province of Moho) at more than 4000 masl.

3.12. THE WEAKENING OF THE CEREMONIES OF RESPECT TO THE ANDEAN DEITIES

Andean communities are unanimous in attributing climate change to loss of sacrality in daily life. According to Elena Pardo from the NACA CEPROSI in Cusco.

The loss of the sacredness in the nurturance of the *chacras* is evident, especially in the interandean valleys close to towns. The respect for the seeds and Mother Earth have been lost. Rituals are considered a waste of time and agriculture has become an investment that must generate profits. However, there are still *yachaq* or wise people who can bring us back to the respect and sacredness in nurturing the *chacras*.

3.13. CHANGE OF THE MEANING OF CLIMATIC SIGNS OR INDICATORS.

Don Mateo Mamani, *Chajra Alcalde* from the community of Vizcachani, district of Orurillo in the province of Melgar, Puno, comments on the change in the usual meaning of the climatic indicators:



In former times the fox knew a lot. He advised us when to sow and told us on the production of the year. Now acting on his advise we are failing a lot. The same is happening with the lizards who used to tell us of the occurrence of frosts. Now the advise is not as it should. The same is happening to us in the communities. We are no longer watching these signs. Our children and ourselves have become real sleepyheads. We are lazy and do not know all together. Now other signs have appeared. There are giant rabbits that are eating our *chacras*. When they are many it indicates that we will have a small harvest. Also more deer are appearing, *joskas* (tragacanth) abounds, wild relatives of the turnip with yellow flowers and we do not know what they want to tell us.

Don Antonio Pineda Pelaeyz from the community of Chimboya, district of Corani in Puno, reminds us that watching the signs was a permanent concern in daily life:

Taking our llama troops we visited our Q'anchis friends in Cusco. We carried cooked meat, *moraya* (processed potato), products that we had in our communities. They gave us their maize, medicinal herbs, and herbs for rituals. We used to walk several days. We crossed *apachetas* (places that distinguish one ritual region from its neighbor). There we met the majority of *Apus* or mountain deities. We greeted all of them. They were always with their white *ponchos*, telling us of every event. In the *apachetas* we talked. They told us how the harvests would be. Sometimes they were expecting us with plenty snow, some others with hard ice, sometimes a dry path. When we traveled we were always seeing and knowing. To ensure harvests we carried a stone from lower places to the *apacheta* and we placed it there to *panpachar* (leave) our sins. We also put the stones on others to propitiate getting more loads. We sweated but did it with respect, the same as children and young people. When we returned we also had many rituals. In the *apacheta* called *Yana Runa* there was a stone llama, which is the *enqa* (spirit) of the traveling llamas that bring food. It had always been there and together with our llamas loaded with maize, we used to make the *samey* (a ritual of travel) to the



Agricultural ritual performed in a rural school in Cusco. CEPROSI.

food, thanking *Pachamama*, the llamas, the *apus*. *Samey* was for the loads we brought not to lose weight, because the *q'anchis* had a secret, They say that the “spirit of the maize accompanied us only up to the *apacheta* Yana Runa, and then went back because the *q'anchis* made their rituals with their secrets for the spirit of their maize to return”, but we also had secrets. Our llamas deceived the spirits with their bells. In the *apacheta* we deceived them. That was the *samey* for. Now we do not have those rituals. Community members with other beliefs have torn down our stone *enqas*. The ones who travel are a small band of friends. Furthermore, food has changed to rice, noodles, because we believed the speech of the *misti*, the dominant outsider, in our communities. Times have changed.

3.14. LOSS OF HEALING POWER OF PLANTS

Among the changes observed by the Andean communities we find the loss of the healing power of medicinal plants:

Our ancestors knew how to cure animals with herbs. If it was scabies they cooked fat with other inputs, but they also knew when to make this treatment. In *urta* (full moon) animals must not be treated because



the disease can propagate uncontrolled. In nurturing animals we know when an animal is sick and how to cure it. We used to know to treat with herbs like *ajana ajana*, *chachakuma*, *kiswara*, *ajenjo*, *paiqu*, *waicha* and some pure alcohol (1/4). We also knew how to control the lice attack in alpacas. We used ash and the *jamaku* dies suffocated. I remember that our grandparents used to give the *ajana ajana* tea for the internal parasite of livestock in small bottles of one quarter liter. To control internal parasite in animals, bitter plants or *jaru qullas* are good in general. Now times are changing; the plants that we used to cure animals are not now as effective. Treatment has to be applied once or twice and only then cure begins. My grandparents say that they have not matured as they should because time has changed. Luisa Aquino Quispe. Puno.

Don Paulino Salamanca from the community of Huayllani from the Ayrumas Carumas village, Puno, adds:

For me time has changed. For instance, rain does not fall in its proper time as it used to do. Snow does not fall for three nights as it did before. The signs or natural indicators like the birds, plants, reptiles tend to vary in its meaning. I might say that the signs are not as faithful as it was formerly, but it is also

possible to say that we are not understanding what the signs are saying. I say that time is changing.

3.15. CHANGES IN THE BEHAVIOR OF ANIMALS

Asociación Paqalqu, a NACA based in Yunguyo on the shore of Lake Wiñaymarka, reports on.

3.15.1. The fish in the Lake

Carlos Mamani Apaza (23) from the community of Yanapata, Puno, comments:

Of climate change I know from fish. Elder people tell me that there were fish of diverse size: the large ones were: *qhisi*, *suche*, *boga*, *umantu*, *mauri* (catfish), that I have not been able to know. I only fish small fish like *karachi*, *ispis*. Not very long ago, when we went fishing we brought two buckets at least. Nowadays there are not as many. Water in the lake is already muddy. When we go to collect *totor*a, *llima* (forage crop) for our animals we take out plastics. When we throw our fishing nets we find lots of plastic. Fish is becoming scarcer in the lake because people is indiscriminately fishing with hooks, using *ispis* (small fish) as bait to get larger fish. They do not allow fish to grow.



Medicinal plants in the upper Amazon. San Martín. Choba Choba.

3.15.2. Amphibians, reptiles and birds:

Frogs

In Lake Wiñaymarka there were giant frogs that fishermen caught in their nets and were run aground by the waves in times of strong winds. They also were abundant in wells with permanent water. As a consequence of climate change, this species has disappeared from the lake. Their skin was smooth and sticky, they had large eyes and marks in the skin. Our ancestors use them as medicine to cure amnesics.



Toads

Climate change has definitely caused the disappearance of toads. It is now infrequent to hear them croaking at night or see them in the *chacras* where they were abundant a decade ago. Now running them across makes one happy and feeling affection for them. They are now absent from rivers, lakes and poodles, their roe are not seen, nor their tadpoles.

Reptiles

Another consequence of climate change is the reduction of snakes and lizards, that were abundant in former times. Snakes lived in the stones and bushes while the lizards had their lair



in the holes made by the *tikitiki* (a bird indicator of the direction of wind and rains). It is now infrequent to find them. Some people comment that they are being captured and dissected to sell as remedy.

Flamingos

Flamingos used to gather in groups of 50 or 60. Now there are solitary birds that are not afraid of humans. In the communities of the high zones they would not approach rivers, now one finds them there. It is said that rivers have dried in Chile and the flamingos have migrated towards the altiplano. They were a sign for rains crossing the blue sky from North to South. Nowadays they seem disoriented. They wander aimlessly.



Mijo

Better known as pato chanco (pig duck) due to the cry it emits that is similar to the pig's. It is a black bird that was abundant in Lake Wiñaymarca. It flies well and also dives underwater. It fed on native fish (*bogas* and *carachi*). At noon it announced wind changes, displaying its wings and facing the side where the wind would come from or the appearance of a whirlwind from the same side. Peasants knew it associated with winds and whirlwinds from 10 in the morning to early afternoon. When the weather was completely calm, the

mijo extended its wings and called the wind. Presently there are few and isolated in rivers that still have fish.

Seagulls

There are now more seagulls but not in the lake. They used to be only in the lake looking for food among the abundant fish. Now that fish population has drastically reduced they go to the cultivated lands and are abundant in fallow areas. They come in flocks, are not afraid of humans and feed on earthworms and insect larvae.



Cranes

Cranes now make a strange sight in the shores of Lake Wiñaymarca. They remain close to the cows in wetlands. They have been seen pecking the nose and mouth of the cattle in the pastures. They fly and are not timid. Their feathers are white and show a lock in the neck.

Panas

Panas (web-footed birds) with a blue beak used to be abundant but are now few. They are ducks that feed on *llachu*, fodder plant that grows in the lake area. Now that *llachu* is disappearing the population has decreased. To see groups of 10 or 20 was frequent.



Now they are few and isolated. Their large eggs are collected making their reproduction more difficult.

Chhuqha

These birds do not fly but run over the water surface aided by their agile feet. They are herbivores feeding on aquatic plants like *llachu* and *llima*. They were abundant fifteen years ago. They lay their bluish white eggs in nests placed in the *totorá* fields. Its population has dropped due to the disappearance of *llima* and *llachu*, caused by contamination and the warming of the water of lake Wiñaymarca.

Huallatas

There were *huallatas* (web-footed birds) in the rivers close to the wetlands. The increase of population density in the areas around the lake Wiñaymarka has made them disappear. Now they are only observed in Chacachaca (Pomata). Formerly they were frequently seen in pairs and in larger flocks in the high altiplano areas like Mazo Cruz and Pizacoma.

Owls

Known as *tiptiri*, the owl had its habitat in zones with few dwellings. The present generation does not know the owl because it disappeared a decade ago.



Its disappearance is the consequence of the use of chemical pesticides like Aldrin.

All testimonies from communities throughout the Andes and the Upper Amazon point to loss of respect toward the deities, estrangement from Mother Earth, and lack of affection and respect among humans as the cause of the pernicious consequences of climate change:

4. THE ORIGIN OF CLIMATE CHANGE ACCORDING TO ANDEAN COSMOVISION: LACK OF RESPECT

Prolonged summers without rain come as a consequence of our own bad behavior. I remember that in those drought years, rains were very scarce. That made the crops fail and indeed food was scarce. When



this occurred, many people left with the whole family to the coast looking for work. Those who remained in the community, survived eating cactus, *atoq* papa, or fox's potato, a wild potato among other wild fruits. In those times people roasted *mutuy* pods, a leguminous native shrub, ate *totorá* stems, and the inflorescence of the maguey, among other plants. I used to hear people say, we are living with

the *micuy* (comida de la naturaleza), and we are only left to helping each other not to give up. They were a spell of drought years, when we could not harvest, in spite of the families sowing their crops. Virginia Escobar Sánchez. Lircay.

Muchuy (times of scarcity) arrives for our bad behavior. My father used to say to the *alwaceres* (lieutenants of the traditional authorities): “If you are going to be authority, you have to take charge serving the *parajes* (strong places) in their moment and with what they are asking for. If you are not going to do as the *apus* are asking, you had better not promise to assume the charge. You would be ashamed, because you would be authorities that call for drought, hail, or frost. You have to be aware of the weather, ready with the stuff for the rituals, taking care of the crops to keep animals from eating them, calling the attention of young people to behave”. Gregoria Janampa Chocce. Comunidad de Rumichaca. Huancavelica.

In the life world of the peasant folks, the climatic alterations arise because there is disharmony between humans and their environment, and neglect of the most powerful *parajes*, the protecting deities that shelter the communities. Balvino Zevallos. Lircay. Huancavelica.



Aymara ritual asking for rain. Puno. Paqalqu.

It is our own fault if there is bad weather. Here in Antaccacca, none of us had taken interest in paying attention to how the *Machu Antu* (old Antu, the late don Antonio Choccelahua) made the ritual offerings when we carried the cross up to Yanaorcco, the local mountain deity. Let us see: tell me, who knows the mouth (where offerings are placed) of that *paraje* when hail falls the day after we carried the cross up? No one! Then we blame the *alwaceres* and the other authorities. As we have seen, someone else placed the offering this time and, for sure he did not do it well, or maybe he put it in the wrong place. Not only that, but we have had been warned for two successive days by thunder of the occurrence of hail. No one has dared to correct the way the offering was being made. Our *alwaceres* were over-confident. This is because they do not understand what the *paraje* is saying through thunder. They are not like our old people. Florentino Huarcaya Chocce. Community of Antaccacca. Huancavelica.

Now, who of us of the *qepa huiñay* (new generation) knows at least to make a good offering to avoid the presence of frost or hail? Maybe the children or relatives of the *nombrados* (Andean sages) are the ones who might know something. We ourselves have changed. We do not have the heart for our *parajes*,

in spite of the increasing delay of rains year to year. Now when they fall they come hard as if someone were pouring a lot from heaven. And then it goes quickly washing away the topsoil. Emilio Huacho Chancas. Antaccacca. Huancavelica.

According to members of the Asociación Pacha Uyway from Ayacucho, the organicity of the *pacha* or local world has deteriorated:

- A noticeable “disorganization” of the human communities for the nurturance of the *sallqa* or wild.
- Loss of knowledge, neglect of festivities, and rituals, where conversation, affection and sharing among humans, nature and deities becomes more dense.
- Development projects that promote the neglect of practices of regeneration of the *sallqa* (wild) and include activities of division and private ownership of natural pastures with the explicit aim of improving Andean animal stock.

Asociación Vida Dulce from Andahuaylas, Apurímac, reports the following testimony:

The *apu* Qarwarazu that you can see, does not have now its snow scarf because the people of Larcay

have insulted him calling him *wetqe* (crust in the eyelids) and Chilean miners have tamed him. And the *waka mana tupana* (sacred and untouchable) lakes have dried because humans have tamed them with cement and pipes. Fausto Enciso Gutierrez. Pomacocha. Andahuaylas. Apurímac.

Asociación Bartolomé Aripaylla (ABA) reports on the effects of modern water works:

For the consumption of piped water, ancestral techniques that help regenerate water and nature were left aside. The ceremonies and rituals for water aim at healing and reconciliation. In most cases, with the water itself to appease the spirit of the spring offended by the technicist rigor of developing water collection works, and the insults and mistreatment by evangelic community members, for whom springs are the devil.

By challenging the springs with inadequate tools, or by taking water from them in inappropriate moments or with inadequate utensils like blackened pots, they dry or move to other places. Such are acts of cruelty that not only desecrates their spirit but kills the spring. Delacruz Cisneros Fernández. Socobamba. Ayacucho.



Thanksgiving ritual. Puno. Paqalqu

The testimonies from the altiplano region are also very eloquent on the identification of the origin of disharmonic with nature:

Nowadays time is changing a lot. When it warms it is like burning. One cannot be out in the sun for long. What is going on? It would seem that the sun is closer and you are talking about the ozone layer. The springs are drying; there does not flow much water from them. Another problem is that pastures are drying very quickly. It was not like this in former times. It only used to happen in October and November. Now the rain does not want to fall and for this reason we are asking how is this year going to be. It seems that it might be dry. Some brethren tell us that they went to see the *Ch'amakanis* (fortune-tellers) and there they were told that the *Anqari* (spirit of the wind) is asking for a good offering. This makes me think that the wind must be hungry because it is like people. It would be good to attend it with much respect. I think it is angry. In former times, the great healers conversed with all deities, including the wind. When they did not need it, they had to tie it with a large ritual. Now we are thinking of this. Félix Hanco Pomari. Comunidad de K'iri K'iri. Puno.

The authority of the community of Mallkusuca has complained with the governorship that several

dump trucks loaded with material were washed in the river of our community and the river is being contaminated. We have complained to official authorities both in Moho and in Puno, the capital of the department, asking that the mining company stop its operation. No one has payed any attention to our request. The community has organized to force them to leave. The mining company do not let us come near the camp. The guard are well armed and even the workers threaten us with sticks and whips. They secretly continue bringing material from the Untuca mine to dump in our river at night. We have heard that other communities have denounced the company to official authorities who have ordered the suspension of its activities. The company however has continued working and bringing their dump trucks to wash. Then the drivers burn material at night. People say that they burn sulphur or some other substance to send rains away. Guillermo Gutiérrez Condori, community of Ch'ipoqoni. Puno.

In effect, the world is changing, but we are also changing. We want all the easy way and forget about *Pachamama* (Elías Apaza Mamani, community of Ch'añajari).

In former times we were very close to each other in the community. Anything that happened made us gather. In those years I remember that we had a

very long drought, There was no food because rain would not fall and the authorities made all sorts of rituals and said prayers in the mountains. I think that in those times we got little and it seems that the Lord gave us His blessing. The little you had sufficed. The little that you ate filled your stomach. But in those times people were hardworking. One had to look for food and even traveled to other places where there were products. We brought food from those places. Policarpo Gutiérrez Patana. Comunidad de Nuñuni Tikani.

Aurelio Espillico Wiracocha. Puno, says:

We always keep in mind (*amtastana*) our *Quta Awicha* (the Lake Titikaka as grandmother and deity), *Suana Awicha*, *Jichhu Qullu*, San Carlos Achachila we call them, Santo Domingo. We call others as well. We remember *Chila Pucara*, *Chuqurasi*, *Pucara Awicha*, *Qaraqullo*, San Bartolomé, *Sapa Qullo*, *Pinaw Qullo*, *Pachamama*, Santa *Uywiri*, *Quri tapa*, *Qulqi tapa*, blessed souls, mother Candelaria, and God. All these deities we invoke, we ask permission before undertaking any activity. Now some, especially the young people, do not remember calling our deities. We are walking through life in this manner. For this reason time is



Ritual for the Ispallas (deities of the tubers) in Conima. Puno.

changing and Mother Earth is neglecting us. One has to respect the Santa *Uywiri* –Blessed Earth – otherwise hail comes. To prevent it one makes an *aytu* mesa, an offering; likewise for the frost. We take out the Saints from the church, designate a saint that can make rain fall. With this purpose we take him out in procession. We remember the saints, among them Saint Mark who is the saint for the animals. In carnival time we do the *ch’alla*, or ritual sprinkling, and it is customary to do the *jatha katu* or carnival in every place. We also *sprinkle* the animals. On that date we also visit our godparents. This is the custom in our peasant life world. The lieutenants take over their charges from the former authorities. They take flowers to the ceremony. We are neglecting these forms of respect, and for this reason time is changing. We should not forget this.

María Tacora Murillo, adds:

In fact there is lack of affection for our *chacras*. The potato is like us, a person. During some time it will be *wawa* (a baby). It grows and then it is an adult. Then that potato is like people who live, eat and walk. Similarly, the frog tells us whether this year is going to be rainy or dry, or it tells us: “in this plot there is going to grow potato”. When we are

blind and deaf we cannot see nor hear. The potatoes have their birthday just like us. In their day we must celebrate them with affection. One has to wrap them up and hill the soil on time. One has to give it its *kilu* (shelter). Otherwise, where is it going to produce in? They say that mother Candelaria asks the potato: where are your *kilus* where you are to keep your children in? The potato answers: “they have not given them to me” and the mama says: “you have no children”. The families in former times had a lot of respect for the *chacras*; they loved them. Nowadays we make the *chacra* cry, we work in inappropriate days, we make it dry in the sun when attacked by worms, or we give the potatoes to the pig. There is no strong feeling. We should recover this feeling for the well being of everyone. In these times, weather is ever stranger, not even the pig want worm-ridden potato. But some people continue nurturing with affection.

On the affectionate relation with the deities in the Upper Amazon, Maximo Pinchi Sangama, from the community of Tres Unidos, Picota province, San Martín, comments:

These prolonged summers perhaps occurred because we were taking their land off the *Supay* (deity of the

forest). They got angry and punished us taking their rains away. Now we do not know where they are gone. Formerly we left their sugar cane liquor, their cigarettes, and thus they felt respected. We respected the place where they lived, for instance the Chapanillo mountain, where the *Supay* lived. One greeted them before entering their forests in the following way: “Good morning, uncle Chapanillo; uncle Chapanillo, you will help me”. You greeted him with a loud voice, but with respect. You did not laugh. There you heard the song of different birds, the barking of the dogs, but loud. You found *zungales* (fern roots, forming a mat on the forest floor) that would not let you go in (Máximo Pinchi Sangama. Tres Unidos. Picota. San Martín).

4.1. ABUSE OF PACHAMAMA USING CHEMICAL INPUTS

On the introduction of the Green Revolution in the altiplano area, Eustaquio Mamani Velásquez, Puno, reminds us:

You must have realized that our lands were healthy in those years when the hybrid seeds came with their technological package. The agronomists talked about it: what is a technological package? A technological package contains hybrid



Manuring fields in the shores of Lake Titicaca. Puno. Paqalqu.

seeds, machinery, three fertilizers, NPK. It also includes pesticides: insecticides, fungicides, etc. These agronomists kill *Pachamama*. In those years *Pachamama* was healthy and we have given it these *qullas* (chemicals) with the idea that if we added these *qullas* there would be a good output. Of course, the potato was large and our native seeds in comparison were very small. When we saw this we started replacing our varieties and presently we have almost lost our variability. Only now are we recovering our diversity. We need to recover our varieties for the coming times that look strange. Presently some continue using the hybrids and the soil is degrading. One cannot produce and we say: “The potato has got used to the *qulla*”. It is not that it has become used to it, but we have killed the microorganisms that prepared the soil. Using fertilizers we have contributed to contaminating our *pacha*. Now we observe consequences in the change of weather.

Marcelino Huayta Cotrado, Puno, adds:

Applying the *qulla* not all insects die. Some get away and become more resistant, This is happening. If you apply *qullas* we are going to get into more problems because plagues reproduce faster and will

beat us in the race. The biological controllers which worked for us were exterminated, for instance, the ants eat the weevils in the stage of larvae and egg. There are other like the *pankatayas* that also eat the *chuqi laqus* (worms of potato). When we do the fumigation they are the first to die. In these times we complain that there are no frogs. They ate the insects and as these had ingested poison the frogs die also. For this reason there are few frogs. The *laqatus*, the *añuthayas* are beneficent but as they eat contaminated food then we are now eating poisoned animals and vegetables. The quinoa is attacked by a worm *qhuna qhuna* and these are eaten by a fly. When we put *qulla*, the *qhuna qhuna* becomes resistant and with the warmer weather the plagues multiply quickly. Thus we have poisoned our soils and are suffering the consequences. Mother Earth is ill and we have to cure her with our good customs.

5. WHAT ARE THE ANDEAN AMAZONIAN COMMUNITIES DOING TO ADAPT – CONVERSE WITH CLIMATE CHANGE?

5.1. SOWING LAKES

Asociación Urpichallay bases in Ancash reports that:

In the Black Cordillera in Ancash, the communities are “sowing water”



which consists in gathering rain water in *cochas* or lakes built by the highlands people. They make it with rituals and showing deep respect. For instance, the lakes Ayacocha and Condor in the province of Aija, in the village of Qeru Uran. In this village we have also seen spring water being used to irrigate the family kitchen gardens.

5.2. TAKING CARE OF SPRINGS

Caring for springs is a traditional practices in communities throughout the Andean Amazonian region. Some testimonies follow:

We always have water from the spring because we grow the plants *palma palma*, *yerba santa*, *aliso*, *ruqui*, *quenual*. Near the springs eucalyptus must not be planted, because its roots absorb water from the subsoil. It dries the spring. María Sánchez (67). Vicos, Ancash.

I live in the highest part of this community. We have always lacked water. There has been improvement with the new water supply but its flow is insufficient. Here not a drop reaches us. The problem is widespread. For this reason I have started looking for water. There was this spot that was wet and there was no eucalyptus. I started digging and found this water leaking. I left it and when I returned a



Cultivation of trout in built lakes. Quispillaccta. Ayacucho.

few days later I found that some water the size of a small washing bowl had gathered. I dug a little more and made a small pool with *ch'amphas* (mud blocks). I made it with care, and this small *qocha* started gathering the water from that filtration. Now my pool is more compact, the water fills it up and I can water my kitchen garden weekly or byweekly. The important thing is that with that little water I have something to eat. That makes me very happy. I treat my *qocha* with affection and make it offerings
Fortunato Quispe Apaza. Community of Ch'añajari. Puno.

As you told us last year: "Look for water and build *gochitas* (small pools)" we have been obedient and have searched and found a small leak. Together with members of my group we dug and build a sort of *qocha*. We were discouraged because very little water gathered and this small pool was very far from our plots. We asked for pipes, but were not attended. Almost a year passed and the pool is steadier and holds more water. Sometimes it fills up. That has encouraged us a lot and now we bring that water using our hoses. We cannot build a canal because our place is full of *andenes*, terraces. The other families would not let us. The little water we have would be wasted. Moisés Calla Añamuro. Community of

Ch'ipoqoni. Puno.

The situation is different in the Upper Amazon region but communities realize the need of caring for their springs:

We must conserve the land, because the water, the mountains, the animals are there. In our communities we have agreed not to fell the trees in the forest because the springs start there in the sources of the water upstream. We are not cutting trees down because there are laws advising to leave a free area of 50 meters from the streams. Antenor Altamirano. Community of San Juan. San Martín.

Springs must be nurtured with pleasure. When I take water, I talk with it, sometimes I even sing to it. Such nice water that we are given and always accompany and nurture us. It does not leave us even in the short droughts that are severe. Delia Sangama. Community of Congompera. San Martín.

The *puquio* (spring) is part of our family. It nurtures us and we also nurture it. We clean it where we walk, taking care that it does not fill with debris. We keep its small forest maintained with plants that nurture water. We also keep a small *pate* (bowl made of a local palm shell) for any passerby to drink fresh water. This spring has a mother; otherwise, it would dry. It is like us. Jaime Amasifuen Cachique,

Community of Alto Pucallpillo. San Martín.

5.3. NURTURING KITCHEN GARDENS

According to Balvino Zevallos from the NACA PERCCA in Lircay, Huancavelica, Kitchen gardens furthers food sovereignty:

Nurturing *yuyoqenchas* (areas with diversity of plants), where one keeps associated species secures harvesting the majority of crops. This ancestral practice is being recreated and is the most sustainable since it guarantees access to fresh vegetables for the peasant families of the communities of Huayllay grande, Huayllay chico, Perccapampa among others.

Asociación Vida Dulce from Andahuaylas has been very active promoting kitchen gardens in their zone:

The surface area of each kitchen garden varies from a few square meters to a hectare. They consist of groves in whose underside a range of *asnapos* or aromatic plants is grown, aside from flowers and ritual plants. A member of the community said: “if there is no kitchen garden, there is no *saminchay* (rituals).

The *llullucancha* or kitchen garden lasts forever and



Kitchen garden in Conima. Puno Chuyma Aru.

offers healthy food to humans, birds. The species in the kitchen garden and its contours of agroforest produce ecosystem services in the form of oxygen, rain clouds, carbon capture and the generation of microclimates benign to human, nature and deities, and a microlandscape that gladdens the heart.

5.4. STRENGTHENING OF RITUALS

The experience of the NACA PERCCA in Lircay, Huancavelica, according to Balvino Zevallos has been that for the communities, climatic alterations are a reminder of the need for harmonizing the community life world. The ancestral authorities are in charge of making the ritual offerings for harmony to return to the human communities and to nature itself. Before beginning the agricultural season, these authorities must make their offering to the deities in what are called *parajes* (strong places). The community of Perccapampa makes its offering to the *paraje* Ccanchi, so that people live together in harmony. This *Apu* is the mountain deity that protects the community. Thus, during the year, few people die in the community. In the same way, these ancestral authorities are in charge of the rituals for harmonizing with climate. They say: “for a good crop there must be a good ritual offering.” However, it is

not only a good offering that secures a good year. The *nombrado* (Andean priest) must be in constant conversation with the *parajes* so that during short dry periods the *paraje* can be appeased with a ritual offering. In the same way when there are excess rains he makes his offering to another *paraje* asking for an end to the rains. The ancestral authorities are in charge of the harmonization between climate and nature.

Further south, in Andahuaylas, Fausto Enciso Gutiérrez from the community of Pomacocha details on rituals to deliver rain:

When I assumed the charge of community lieutenant, all the authorities got together and agreed to beseech the *yachaq* (wise men) Felix Córdova and Max Laymi to make an offering. We bought all their *recados* (message carriers that go in the offering): *willka*, *llamawira*, *oroypimienta*, wine, *kuti*, among others. Besides this, a rope of seven arm-lengths. As community lieutenant I had to contribute coca leaves and liquor and to convoke people. The offering was made by the *uywaqnin*, the one who nurtures the *Apu* of the lake. This was the previous day. The day of the *oslo apayku* (carrying a plant that nurtures water in a gourd with a little water) we took water

from the lake to the maize fields. The *yachaq* go to the José Soria lake and provoke it, hurling insults like *pampachirino weqte* (Pampachiri people with goo in the eyelids), *chaqmana* (insult to provoke disorder). This lake being *waka mana tupana*, sacred and untouchable, gets angry and it is at this moment that you throw the gourd tied to the rope. The gourd is filled with water with a little *oslo*, a sacred aquatic plant, and then taken on a race horse without looking back. A dark cloud forms. On your way you have to avoid the *llaqta runa* or townspeople. You have to make a *muyu* (going round) and you have to reach the maize *chacra* of Saint Phillip located in the sacred plain of Willcabamba. In general, you arrive along with the storm, lighting, thunder and rain. This way we carry the rainwater from the lake to the *sara chacra* (maize fields). This ritual is for people in the know and must be done well and completely. Several people who did not fulfill these sacred norms have died. Presently, our authorities in the municipality do not contribute to the *Oslo Apayku*. It has been six years that we do not practice it and now we are without rain well into December.



Ritual for the Ispallas (deities of the tubers) in Conima. Puno. Chuyma Aru.

In Cusco rituals during sowing season are practiced by the families. A rural teacher tells of her mother:

Starting in August we used to do the *q'intu*, a ritual that my mother carried out. For my mother these days were festive. She got ready during the previous week. She prepared *chicha* (maize beer), she bought coca and the *mesa* or offering. She also talked with the *yachaq* or *pago* (Andean priest) with anticipation. When the *pago* would not come, my mother cried. I was a small girl but I did not believe in it, and I used to anger my mother telling her that she believed in foolish things. Maximiliano Esperilla. Raqchi, Cusco.

Finally, testimonies from the altiplano area of Puno attest the present ritual practiced in communities:

In the middle of the agricultural season, sometimes a short drought comes. Soils quickly dry and the plants begin to wither. Potato is attacked by the *yawa*, and then, led by our authorities, we make ceremonies invoking the rain, and the rain always comes. For the *yawa* we spray the plants with *t'amata* (fermented urine). Sometimes we spray the plants with ash. This cures them. Alejandro Quispe Tito. Community of Ch'ujuk'uyo. Puno.

When droughts came in former times, my parents used to tell me that they made rituals invoking water to come

(*tollqa qamayaña*). There are clouds but the wind blows them away and it does not rain. The ritual is similar to the one for hail. What I have learned shows me that the most important thing in sending the wind away is to have bird eggs or those of partridges or pigeons. You make the ritual with them. All the ritual elements must be *qollos* (messages to counter). When this ritual is conducted, the wind or *Anqari* goes away and does not carry the rain clouds. Rain starts to fall. The bird eggs we are looking for now, but as it is not their season we cannot find them. Vicente Ramón Mullisaca Tintaya. Community of Nuñuni Sico. Puno.

5.5 NURTURING THE WILD

Communities in the south central highlands of Ayacucho practice rituals in nurturing the wild spaces. According to Asociación Pacha Uyway (APU) particular attention is given to the community's relationship with the *sallqa*:

Sallqayay means that the *runas* or humans have more *ánimas* (spirits) of nature in their body in order to recover the empathy and sensitivity to changes in the *sallqa* produced by climate change for a closer relationship with nature and their Andean deities. To attain the *sallqay*, the spaces of festivals and rituals must be recreated where the *runas* incorporate in their bodies the spirits of minerals, sacred plants, seeds, etc.

Sallqayachiy is helping that all components of the local world recover their quality of *sallqas lisos* (fresh like nature). For instance, it means helping the *Apu suyus* (regional deities), *apus Huamanis* (local mountain deities), *mamaqochas* (deities of the lakes), to be *sallqas* (wild) again. It also has to do with “awakening” other Andean deities that were important deities in ancient times like the fish, the *pumas*, the snake, the frogs, etc. The latter have practically disappeared from the Andean communities the past five years. For them to return to this *pacha*, they have to be considered deities as friends of the rain. The rain always comes when they call it. *Sallqayachiy* is also nurturing with greater affection the mother of the main crops. For instance for the community of Huarcaya the mother of maize is the variety called *illichway*. We still do not know which variety is the mother of the potato and other Andean crops.

5.6. RECOVERING THE OPERATION OF PREHISPANIC INFRASTRUCTURE.

Asociación Vida Dulce, a NACA based in Andahuaylas, Apurímac reports on activities oriented to recovery of prehispanic water works:

In contrast to the plastic pipes and concrete reservoirs that generate technological dependence and do



Recovery of the sacredness of the mountain. Andahuaylas. Vida Dulce.

not share the water with the diversity of wild and cultivated flora and fauna existing along their length, the buried *pinchas* or canals made of stone and clay, the reservoirs and canals, of prehispanic origin, weaved with *kikuyo* continue operating today, like the *pincha* and *qocha* (reservoir) in Kaquiabamba.

This is located 300 meters from the main square of Kaquiabamba. We have no idea how water is collected but it is said that it comes from the lake of Paqoqocha. The fact is that it is still operating, conducting a flow of 2 liters/sec in June during the dry season. At no time in the year the water gets cloudy. It is a buried canal, with a base of flat stones, sides of rectangular stones and covered with slabs, sealed with a sort of clay that expands when wet and seals any hole or fissure. This *pincha* feeds a *qocha* or small reservoir, ten meters long, eight meters wide and one meter deep, used by several families. The reservoir presently waters a singular peasant kitchen garden that shelters more than sixty species from all ecological levels of the zone, from *muña*, a medicinal shrub to sugar cane. The water is also conducted to several *chacras* through open canals, but it branches underground in three smaller ones. We do not know where they lead but the remains are there, clogged and neglected.

The same kind of small buried canals we have observed in the ceremonial centers of Sondor and Vilcashuamán. Presently the terrace systems of Pomacocha, Huayana, Humamarca, laced with the *pinchas* or canals, are still in partial operation.

5.7. RECOVERING KNOWLEDGE ABOUT PLANTS

Recovering traditional knowledge about plants and animals and their characteristic ways, is a widely shared need throughout the Andean Amazonian region. The testimonies come from the altiplano area of Puno:

What we are missing is to know more of our plants because they know if it is going to be a rainy year or a year with scarce rains, if it is going to be a year of grains or a year of tubers. Now if climate change brings diseases and plagues, that can be solved with our forms of curing. We do not have to go to the rural medical center for a pill or an injection. We have our medicinal plants; what we need is to know them better and give them value. For the *yawa* we have the *ñusaqata*, *muña*, *juyo* ash. The bitter plants must be tried, since we cannot always buy insecticides. We have nutrients to enrich the soil like guano, even human dung. There are plants that help crops grow. What we need is to remember what our parents used to do. Elías Apaza Mamani. Community of Ch'añajari. Puno.

Don Natalio León Apaza from the community of Chimboya, district of Corani, province of Carabaya, Puno, says:

Formerly in my community, we did not make much *chacra*. Now I have *chacras* of potato and *kañihua*. I am sowing more. Similarly I do not forget taking my llama troops to the communities which grow maize. I barter. The food I get traveling lasts a lot because we bring it with affection and much *k'intu* (triplet of coca leaves offered to the deities). Since we started reflecting and recovering our customs, I make my rituals with more affection: the feasts for the *machus* (llamas), to the *chuños* (corrals for the alpacas), to the *moyas* (wetlands). We are also building canals to bring water for the pastures. I am refurbishing my *leguas* (small areas for *chacras*) with stone terraces. We are curing the diseases of llamas, alpacas and *chacras* with herbs. We also cure ourselves with those herbs. We are watching the signs to better nurture our animals and *chacras*. We are recovering the secrets of nurturance as well.

Francisca Juli Choqueza, from Puno, adds:

In my community rains are more intense. Sometimes they do not come in the proper moment. It falls in *auti pacha* (dry season). Our elders say that there were years of plenty and years of scarcity, and that



Sowing plants that nurture water. Andahuaylas. Vida Dulce

in such times, the only thing that can save us is the *chacra*. For such changes like droughts and floods, we have to know the varieties that are adequate for each circumstance. There are varieties that require a lot of water and varieties that need only a little; potato varieties that endure frost and hail. Thus we have to know our varieties better and store a diversity of seeds for those times and be ready for the circumstances.

Plants and animals also provide signs for climatic conditions as Alejandro Calderón Clemente from Puno comments:

As time is changing we watch different *lomazas* (signs or indicators). We even watch our dreams. This year I have seen that there is a lot of orange, apple, and pears have appeared. These fruits are *lomazas* for potato. For the fava beans we have the *qila* that is flowering very well. There are signs of animals and those we are also watching, all signs that we are watching and listening to make *chacra*.

5.8. RECOVERING ANCESTRAL PATHS

In many highland zones throughout the Andes undertaking long journeys for the purpose of exchanging products is an on-going though vanishing custom. Families now feel that recovering this practice would strengthen food

sovereignty. Here some testimonies from the altiplano region of Puno:

As for our family, my brother used to go to Marcapata in the dry season. For the event we used to prepare the male llamas. They went with their *cencerros* (cowbells) on at least three llamas so they come happy. The cowbells call the spirit of the food. If you bring it with spirit, stored maize does not finish. When they arrive we receive them with affection. Nowadays it is not like it used to be. Little by little that has been lost. After the llamas we also used donkeys and horses but we did not make offerings. Now it is worse, young people only want to use the car because they can take their pets. There is no affection, everything is done for money only. Delfina Tinta, Pacaje, Puno.

The elders tell us that the families from the high zones came here to barter. They brought *charki* (dried llama meat) in llama troops. They also went to Tarata, Candarave, in the lower zones. They took meat and brought maize, fruits like figs, apple, *k'isas* (dried fruits). They put cowbells to the animals and that was to call the spirit of the products. It is a secret that when food is with its spirit it will not finish. They also went to the *yungas* (interAndean

valleys of Bolivia). They took their llama troops and spent the night in the *cachis* (yard). They walked. In our zone, the families came with their llamas and they slaughtered them here. The meat was then exchanged for potato, *chuño*, textiles. They practiced the *chari* (exchange). They tell of former times of scarcity. Presently there is no scarcity. That was not the case formerly and exchanges took place. Similarly for the *chhala* (exchange at the family level) our families prepared *kispiñas*, *thuxtus* (quinoa bread), textiles and they took them and exchanged them for barley, fava beans. Presently this is not practiced because there are products; there are no *macha maras* (years of scarcity) but with climate change years of scarcity will come when money is worthless, and the exchange is product for product to acquire food, and barter will allow us to get food. It is necessary to recover these exchange modalities that have allowed our ancestors to survive in those years of scarcity. Angel Choquegonza, Puno.



A Troop of Llamas to the lower zones. Huancavelica.

5.9. PROTECTION AND CARE OF THE FORESTS

Communities in the Upper Amazon region are very sensitive to caring for their forests. Julia Bayona Benítez, community of Tres Unidos, San Martín, tells us why:



Forests are very important because they give us oxygen, attracts rain, provide us with wood and many things. That is why I say that we have to work well, caring for our forests to keep the rains coming. Now we see times are changing. Ten years ago the time corresponding to the present season used to be rainy, and now it does not rain. If we do not care for our forest, we are going to be like Nuevo Lima, a dry land that does not produce well. This is the reason why I conserve my forest. A stream originates there and I do not fell the trees because the damage is for myself, because water can finish and the first people affected will be my own family. Furthermore when forests are abundant, the rains are constant and that benefits our crops.

6. ACTIVITIES OF INSTITUTIONAL ACCOMPANIMENT OF ADAPTATION TO CLIMATE CHANGE

The Nuclei for Andean Amazonian Cultural Affirmation are active accompanying community efforts of adaptation. As

an example, Asociación Vida Dulce, based in Andahuaylas reports on its accompaniment.

6.1. STRENGTHENING THE KITCHEN GARDENS

Vida Dulce accompanies families in the communities for the revitalization of the kitchen gardens since 1997, with some visible progress. In this period of warming, the *chacra huerta*, as the communities call them, is the space for the “compressed verticality” where the ecological diversity of the zone can be found, and where more than 50 different species ranging from *puna* plants to cultivars found in the valleys like fruits, vegetables, maize and potato. The surface area of each *chacra huerta* ranges from a few square meters to one hectare.

6.2. RECOVERY OF COLLECTIVE FALLOW LAND: THE LAYMES

Vida Dulce is also involved in revitalizing the system of *layme* (sector rotation) in the sector Titaywa in Pomacocha, we are recovering the nurturance of the sweet varieties of potato, bitter potato, ocas, *maswa*, ollucos, *maca*, Quinoas, *qañiwa*, barley. It is an integral part of *in situ* conservation of cultivated plants and its wild relatives. The dynamics of climate, time and space is placed in tune again.

6.3. PLANTING SPECIES THAT NURTURE WATER

Aside from the fashionable reforestation and carbon sequestration, and the promotion of plants that nurture water there is a range of knowledge for the increase of water flow. There is no simple explanation, physical or chemical, but it is a lot more. With this traditional knowledge well applied, the water flow increases in the dry season or *chiraw*. The springs that Vida Dulce has helped protect are: Cocairo, 4 springs; 3 in Ccotahuacho; 2 in Manchaybamba, and 2 in Santa Elena. Other NACAs have been very active in this effort by Andean communities in the central southern higlands and in the altiplano of Puno.

6.4. PROTECTION OF SPRINGS

Since 2004, Vida Dulce has focussed on community or family springs, unprotected, contaminated, or without plants that nurture water. The cattle took water directly from the spring and placed their dung in the live water.

6.5. REVIVING CEREMONIAL CENTERS TO CONVERSE WITH CLIMATE AND GLOBAL WARMING

During the past decade, in order to harmonize with the deities and to converse on environmental problems, we have been visiting the ceremonial center at Sondor, *Apu Wakokuri* and the Timani mountain, which are places of high cosmic energy and islands of tranquility. In these



Putaqa, a plant cultivated for nurturing water. Quispillaccta. Ayacucho

special places we converse with the sun, the moon, and the stars, that advise us on the climate. Besides that, they constitute a sophisticated agroastronomic calendar. They are ECIs or spaces of intercultural trust, where one arrives ill and leaves healthy.

6.6. RECOVERING THE ROLE OF THE TRADITIONAL AUTHORITIES IN THE CARE OF THE ENVIRONMENT

There are still places in the Andes where in 2009 “the authorities of the *puna* in charge of the environment” exist, as in the case of the community of Quispillaccta (Ayacucho).



They ensure the “controlled access”, the nurturance and harvesting of water, take care of the community herds and the environment. In Pomacocha (Andahuaylas), there is a *Kamayug*, authority in charge of the *laymis* or communal cultivated lands.

CEPROSI, a NACA based in Cusco, has focus its accompaniment on the recovery of traditional authorities and on the rituals in the agrofestive year:

We have resumed respect for all the activities that take place in the *chacra*, listening to the teachings, assuming the petitions and recommendations of the elders. We have reestablished the authorities in charge of the chacras: *arariwas*, *qollanas*, and *gaywa qollanas*. These authorities teach us with

affection and respect the secrets in the nurturance of the *chacra*.

The role of the traditional authorities (Marani in the case of the altiplano of Puno) is clear from the following testimony of Rosendo Condori Gutiérrez from the community of Nuñuni Tikani:

According to my father-in-law, in those times, before 1950, there was a drought when rains fell for only a short period and then it was dry and you could not cultivate. They had to get food walking far away. He said that we used to go to the Bolivian side of the lake, especially to Puerto Acosta in order to buy some food, but these products did not last much maybe because they did not come with their spirit. They were quickly used up. Those years of scarcity they had to endure. Now I well realize, that when we produce our food ourselves, they are whole and last longer. It does not finish quickly and when you eat, it nourishes you and fill your stomach up. In those times in spite of the fact that you were eating, you quickly got hungry.

In those years of scarcity of rain and food, the *Marani* (traditional authority in charge of the *chacras*) and his lieutenants tried hard making the rituals of petition for rain. They went to diverse springs and

brought water from them as *tollqa* (son-in-law). In those years we used to say: “Surely the rain has gone to other places because we have angered it”. In those times petitions were intense and all families participated. The authorities were respected and they wore two *ponchos*, their traditional cap, and scarf. The Marani dressed well. The same with his wife with a *chuku*. Nowadays that has changed.

With climate change not only people suffer but the domesticated and wild animals as well. We now look at the signs. They tell us how the year will be. For instance, I look at the sign of *t’iki t’iki*. When the nests of this birds were taken by other birds, it indicated that there would be no crops. Sometimes the *sank’ayu* sank and sometimes it cracked. That indicated that years of scarcity would come.

Time has changed. In former times, here only *luk’i* (bitter) potato and *qañiwa* was produced. Now we have the sweeter potato varieties, fava beans, oca, *izaño*. Higher up no potato was cultivated, now *luk’i* potato is produced. It seems that climate is changing. It feels warmer and that also make diseases appear, both in humans, and in animals and plants. The sun is not as it used to be; now it seems fire itself. It cannot be borne long. It burns and consequently the



First fruit ceremony in carnival in Conima, Puno. Chuyma Aru.

springs are drying. It did not use to be like this. This is something of concern.

6.7. ACCOMPANYING THE CELEBRATION OF RITUALS TO HARMONIZE WITH THE *PACHA*

CEPROSI, a NACA based in Cusco reports on its accompaniment for the celebration of rituals:

In these *ayllus* now called peasant communities, the relationship of affection and respect is expressed in the rituals thanking *Apus* (protecting mountains), *Pachamama*, the sun, the moon, the rivers, the lakes, the sacred places, and our ancestors. Every day and in every moment of our lives, we ask for permission and thank the deities with *k'intus* (triplet of coca leaves), a *ch'alla* or sprinkling with *chicha* (maize beer) or a ritual. This offering is made before the initiation of any activity as an expression of respect and affection, invoking protection for the activity we are undertaking, so that it goes well and in harmony among all of us.



6.8. WATER HARVESTING

Asociación Bartolomé Aripaylla has undertaken an extensive program supporting community initiatives for water harvesting:

Another community activity that is being supported is rainwater harvesting and the protection of water

sources through community work. In the lower zones water harvesting is done in rocky places for human consumption by digging wells. In the lakes sowing young fish and planting species that “call water” or are “mother of water”.

On water harvesting don Bernardo Aguirre from the community of Ccollpa, Puno, in the altiplano area comments:

Since I was a child, I have always seen these *qotañas* (rainwater reservoirs) in the higher zones where there were no water sources. In the rainy season, we, alpaca raisers go out to the high zones in the mountains, and when it rained we saw that rainwater was stored in these small lakes. Now from the reflections and motivation promoted by the Asociación Qolla Aymara, we have started building *qotañas* in Ccollpa. They are a very important water supply for our animals and to water natural pastures.

Don Remigio Cutipa from the community of Jampaturi of the Ayrumas Carumas, Puno, village also accompanied by Asociación Qolla Aymara reports:

We are building small *qotañas* in the high zones where our huts are located. Until now we have completed fifteen *qotañas*. Water is drying in these times and making the *qotañas* will allow the

filtration of water to the lower zones. We also expect the water flow in the springs to increase.

6.9. CONSUMPTION OF WILD PLANTS

The traditional consumption of wild plants has been gradually abandoned. Alfredo Añamuro Condori, from the Wilajhe sector in Puno, remembers that:

In those times that we call *mach'a maras* (time of scarcity) people mostly went to the valleys in Bolivia to get some food. Here we could not produce because we had no rain. Animals also died for lack of pastures. Those years were full of worries, but we have not died of hunger. We always had a way out. Mother Earth gave us *jut'is* (wild plants), their roots. Thus we survived. Those times have taught us to value our produce.

I remember well that when I was studying in primary school the bad times began. There were no rains, and as a consequence we could not cultivate and the animals were dying, little by little growing thinner because pastures were scarce. With respect to food I remember that all we had stored in previous years was running out and life became more difficult. Sometimes we ate only once in the day. People looked for *tikas*, a plant whose heart is edible, the *jut'is* and other plants that grew in those times. On



Group of peasants with wild plants for planting in the puna.
Andahuaylas. Vida Dulce

the other hand, the families from the Bolivian side came bringing maize, rice, and other products to exchange for animals. For instance, some 30 kg. of potato for a sheep. In those times also, the *Maranis* and their lieutenants made their daily *t'inkhas* offerings to the mountains.

Once again the recovery of respect towards the deities and nature is pointed out as central in adaptation to the present change in the voice of Nestor, Province Mullisaca, from the community of Nuñuni Central, Puno:

Maybe it was out of distress that people were more respectful, closer to each other, and looked after their food. Not a single grain was thrown out. Time passed by and things started improving gradually. Cultivation gave returns. In former times, in these lands only bitter potato, quinoa and *cañihua* grew. Now it seems that the weather has changed and the sweeter varieties of potato, fava beans, oca, *izaño*, are being cultivated. Climate is changing, it feels warmer during the day. After raining the soil dries quickly with the strong heat. Truly, climate has changed and the change not only affects humans but the soil, the pastures, the animals. Now is the time to recover respect to the *Achachilas*, Mother Earth, asking them not to abandon us.

Formerly famine had presented itself many times, because rain would not fall and people looked for food. Our Mother Earth does not forget her children and in those times *tikas* (a bromeliaceae) were abundant. People organized themselves around this plant and used to have their own authority. People used to eat *tika*. We had to go far to get food, especially to the Upper Amazon to exchange. We brought maize from that place. My wife used to go to Conima to do the *chhala* (small-scale exchange) on Sundays. In those times all families made rituals for rain and those rituals were more profound. Everybody cried, prayed, asked Mother Nature as their children. There was unity, respect. But when times get better, people become spoiled, ungrateful. We provoke God and the earth and these things happen. Patricio Patana Torres Community of Nuñuni Tikani. Puno.

Doña Micaela Wiracocha Anchapuri, Puno, adds:

In the rural area we live making *chacra* and raising animals. Our children should know how one cultivates and raises animals from early childhood. They must be taught because learning later will cost them a lot. In these times that life is changing when they learn on time, they walk tuned to their time,

as we walked tuned to our time. Are we teaching our children to eat *layu*, *chijuras*, *llaytas*, *sankayu*, wild plants that our ancestors used to eat? I believe that presently we live in paradise, because in former times there were years of scarcity and one survived because one knew how to eat what the *sallqa* (wild places) offered. Now our children would surely die with hunger because they have not learned to get acquainted with the food available in the zone. They need to know everything about the food that the *sallqa* gives.



A peasant woman carrying wild plants for planting in the garden.
Andahuaylas. Vida Dulce.