

CHAPTER 10

Andean Meltdown: Comments on the 'Declaration of Recuay'

Mattias Borg Rasmussen

Abstract

This chapter examines the impact of global climate change in the Peruvian Andes by addressing the issues posed by the Declaration of Recuay in 2008. It is a document signed by communities residing in the Ancash highlands, who are beginning to feel the dire effects of global warming on their livelihood. By examining the main points of the Declaration of Recuay, this chapter shows how the local effect global climate change is integrated into a broader framework of rural resistance, attacking the neo-liberal politics of the government and its general negligence of the rural highlands. By putting the Declaration of Recuay into hydrological, socio-political, and geo-cosmological context, it argues that in order to investigate the social responses to climate change, it is necessary to focus on resilience at different scales, and on how different levels of socio-political organization relate to each other.

In July 2008, Lima based newspaper *Peru21* reported serious problems in the Ancash peasant community of Catac in the Peruvian highlands due to the melting of the glaciers and the subsequent lack of water in the community. According to the person interviewed, American geographer Jeffrey Bury, the Yanamarey glacier had by then retreated so much that serious water scarcity in the community was imminent. This was by no means the first account on irregular climate events by the media in Lima, itself highly vulnerable to cli-

mate change due to its position on the arid Pacific coast, and once more, the urban *Limeños* were reminded that the emblematic, snow capped peaks of the Andean highland were in danger of disappearing. In this case, as often before, it was the marginalized rural poor who were the first to be affected by the consequences of climate change originating elsewhere.

Climate change is generating instability, social insecurity, and conflict throughout the world. As a result, global warming has become an important security issue on the political agenda in the Global North that is concerned about the current overexploitation of such natural resources as oil, timber, and minerals. However, to many people in the Global South the global climate change results in the lack of a resource of far more vital importance: Water (Whiteford & Whiteford 2005). As in the case of Catac, the current climate change has severe consequences for populations inhabiting mountain regions that rely on melt water from glaciers and permanent ice layers, not only for drinking and washing in the household, but also for agricultural irrigation and other purposes (Orlove et al. 2008a).

In May 2008, representatives from the surrounding communities had gathered in the provincial capital Recuay in the high Andes of Ancash, just some 10 kilometres north of Catac. The result of this meeting was a short five-page document, the 'Declaration of Recuay', addressing the issue of global warming in the region and the vulnerability of the communities, and fiercely attacking the neo-liberal politics of the national government. The government was blamed for their part in the global warming that is now beginning to show its dire effects in the Andes, and for its lack of appropriate action regarding the suffering communities of the highlands (cf. Carey 2005, 2008). The problem is not limited to that of water scarcity in itself, but also to the increasing demographic pressure on the land and water resources (cf. Beniston 2003: 14). The Peruvian Andes is a virtual hotspot for the effects of global warming, as put clearly by geoscientists Bradley et al.: 'It is in the tropical Andes that climate change, glaciers, water resources, and a dense (largely poor) population meet in a critical nexus' (2006: 1756). In this short chapter I will address the issues posed by the Declaration of Recuay, and discuss how to handle ethnographically the intra- and inter-

community experience of global climate change and the theoretical challenge of identifying and measuring the scales of resilience posed by it.

Scales of resilience: a segmentary model

Understanding the complex relation between nature and society in the context of current climate change requires analytical concepts that capture not only how the physical environment changes, but also how social and political institutions respond to these changes. In the growing body of literature on natural disasters and environmental crisis, the concept of resilience is often used to describe the dialectic interaction between nature and society (Norris et al. 2008). Resilience is closely related to stability (Holling 1973), as it denotes the ability of a given system to return to equilibrium after a disturbance, and thus a community's adaptive capacity (Tompkins & Adger 2004; Folke 2004). It resembles Bateson's definition of flexibility (1972: 497) in that resilience can be described as *a process of ongoing adaptation to change generated by both natural and social forces* rather than the ability to overcome a single natural disaster by restoring a former state of equilibrium. The theoretical challenge is to grasp how climate change as an infinite event is encapsulated and absorbed locally. Resilience, then, is a process and not an outcome, insofar as it describes momentary social dynamics and interactions that relate to the potentialities of the future, the state of the present, and the disruptive events of the past.

As shown in numerous studies on irrigation in the Andes (e.g. Gelles 2000; Trawick 2006; Pærregaard 1994), water and water management is closely linked to power relations, both within the communities, between the communities, and between the communities and other agents such as the grand haciendas, the mining corporations, and ultimately the Peruvian state. This linkage between water and power, which is clearly reflected in the Declaration of Recuay, reveals that it is important to focus on different scales of resilience. In order to identify the resilient units it might be fruitful to look at Evans-Pritchard's classic description of the Nuer (1940) and his much cited concept of a system of segmentary oppositions. In a seg-

mentary system any socio-political group, any segment, exists only in relation to another segment on the same scale. In an Andean context this implies that two households combined is a community, two communities united form a district, all communities are Quechua, Quechua and Aymara are indigenous and so forth. The solidarity, writes Evans-Pritchard, is more pronounced the closer you get to the centre of these concentric circles, and conflict with others is an important engine of social and political integration on different scales. A conflict with a neighbouring community brings the households of the community close together; a conflict between the communities and, for example, the mine brings the communities closer together. By looking at resilience as a socio-political process, and bearing the insights of Evans-Pritchard in mind, it is possible to look at how the social and political institutions at different levels, for instance the head of household, the water manager, the district mayor etc, react in the situation of a conflict, and how actors of different segmentary scales relate themselves not only to the segment at play, but also to segments of greater or smaller scale. When studying the impact of global warming on Andean society, the question is which role it is ascribed in the articulation of local conflict, and where the disruptive events are placed in the narrative structure of global climate change. An enlightening example of how climate change is integrated into the local power structures and struggles is the Declaration of Recuay.

The Declaration of Recuay: addressing colonial mentality

The Declaration of Recuay, signed during the *II Encuentro 2008 de Comunidades Campesinas de la Provincia de Recuay*¹ by a number of peasant communities, hamlets, and peasant groups (28 in total), addresses the issues of national government behaviour in the rural areas before 'Ancash, Peru, and the World'. It begins by stating that globalization and the neoliberal model is designed purely for the extraction of the natural resources of Ancash, where the government's role is

1. The 2nd 2008 Meeting of Peasant Communities from the Province of Recuay

to provide all the facilities to the multinational companies. Mining concessions are being granted indiscriminately, as if ‘the holy headwaters of the Rio Santa Valley (...) were a waste dump for mining residues’. It continues by criticizing infrastructural planning, stating that road projects and the like are being initiated without consulting or paying attention to the local communities and their needs, solely to comply with the requirements of the transnational companies operating in the region. The last main point is the supposed attempt by the government to neutralize the law of peasant communities (Law N° 24656) by way of new decrees, introducing the concept of ‘abandoned lands’, which is hardly compatible with the fallowing cycle system of the Andes and the Amazonian lowlands. According to the authors, this is a reflection of the ‘colonial mentality’ of the national government that secures the continued existence of the ‘golden centralist bureaucracy’, in which politicians and their staff seek only to enhance their own wealth at the cost of the poor marginalized peasant communities. Before posing a number of demands, the Declaration of Recuay reaches a lyrical crescendo in a passage, which is worth citing at length:

To the government, and to those who today decide the destiny of our *patria*, with the authority of being heirs of the wise and insuperable Andean culture, we are warning them: The neo-liberal destruction of the Andean Sierra and the Amazon, will rapidly rise the global temperature from the 0.7 degrees C to the terrifying 2 degrees C of the global apocalypse. Therefore, our peasant and native struggle is literally and precisely for our survival, and the survival of the entire humanity. And that is an inalienable destiny (Declaration of Recuay, p. 2).

The main text is followed by eight demands concerning the points mentioned, and the declaration is concluded by a 12-point list of agreements on future action to be taken by the communities themselves, including social mobilization in order to confront the challenges of the region by planning a national strike, strengthen the local and regional defence fronts, and call for a new meeting of the peasant communities of Recuay in order to secure the continued struggle.

The authors of the declaration highlight three intertwined points that are affecting the region: the corruption of the state bureaucracy, the neoliberal model, and global warming. The latter is presented as the ultimate threat to not only the peasants of the region per se, but humanity as such, and, more importantly, conceived as a direct result of government policies, i.e. the former two points. In other words, in order to reverse or slow down global climate change, drastic measures within the national administration and international order is required.

The Rio Santa watershed: the lay of the land

The Declaration was formulated in the provincial capital of Recuay. At 3400 meters above sea level Recuay and its 4500 inhabitants are placed in between the Cordillera Negra to the west and the Cordillera Blanca to the east. The Rio Santa flows at the bottom of the narrow valley between the two ranges, and is the main watershed, i.e. drainage basin or catchment, of the highland area known as Callejón de Huaylas. It means the Alley of Huaylas, and has taken its name from a small, but emblematic Quechua community situated in the northern end of the valley (see Doughty 1968). The river, which is the largest and one of the most important westward rivers in Peru, originates in the Conococha Lake to the south of Recuay, and receives a substantial amount of water from the many tributaries, mainly from the Cordillera Blanca. A large amount of the stream discharge stems from glacier runoff from the Cordillera Blanca, and as the glaciers continue to melt the river is also likely to diminish (Coudrain et al. 2005: 931). It runs north through the regional capital of Huaraz (approx. 60.000 inhabitants) some 25 kilometres downstream from Recuay. Around Huaylas it turns to the west, entering the deep Cañon del Pato, where a huge hydroelectric plant, *La Central Hidroeléctrica de Cañón del Pato*, is situated close to the community Huallanca, some 1800 metres above sea level. The plant demarcates the upper Rio Santa watershed, the Callejón de Huaylas, an area of approximately 4900 km² (Mark et al. 2005: 977). From there on it descends rapidly towards the narrow, dry coastal line and reaches the Pacific just north of industrial boomtown Chimbote.

The communities of the Callejón de Huaylas are mainly placed at the bottom of the valley on the brink of the Rio Santa. Recuay, being district and provincial capital, still relies largely on agriculture, as does the neighbouring peasant communities such as Catac and Olleros. Like pearls on a string the communities, small towns and Huaraz itself are placed on a south-north axis along the Rio Santa with rather limited distances in between them. The community territories stretch along an east-west axis on either side of the river, in the case of Catac reaching altitudes up till 5000 metres above sea level (CEDEP 1986: 65).

The Andes features a dramatic continental divide; to the east lays the lush, humid Amazon basin, and to the west one of most arid deserts of the world (Vuille et al. 2003: 78). It is a rather dry mountain range, especially the deserted western slopes, and in the dry season, glacial meltwater from the Cordillera Blanca constitutes the main river flow (Coudrain et al. 2005: 930). The high Andean mountain range effectively blocks the clouds, both coming in from the Atlantic Ocean to the far east and those forming over the Amazon basin close by, meaning that the clouds discharge their precipitation when reaching the Eastern slopes of the Andes. As an effect of this, 98% of Peru's available water is located in the Amazon basin east of the Andes, while it is the Pacific coast that constitutes the demographically and economically most important region. However, being a desert, the coast is highly dependent of runoff from the high Andes (Vergara et al. 2007: 261), and as much as 80% of the water on the densely populated pacific coast of Peru stems from the highland glaciers. Therefore, the coastal area, which includes the capital city of Lima and a number of important agro-industrial facilities, will be hit hard by the melting glaciers of the highlands.

Recuay and the Callejón de Huaylas are situated west of the Cordillera Blanca, receiving year round glacial melt water which secure their water supply even in the dry season. The Cordillera Negra to the west is lower and dryer, gradually turning into desert as it reaches the coast of the Pacific Ocean. The peaks of the Cordillera Blanca are the highest in the Peruvian Andes, with Nevado Huascarán reaching an altitude of 6768 metres above sea level as its highest point. The highland Quechua peasants are well known for their diversifi-

cation of crops and their domination of a variety of different ecozones each with its characteristic set of flora and fauna.

Anthropologist John Murra (1972) introduced a model of ecological verticality in order to describe the way in which the communities, both as agriculturalist and pastoralists, seek to enhance their probabilities of a successful harvest by exploiting a maximum number of ecological levels. This is in itself a reflection of the ecosystem that they inhabit: Due to the drastic shifts in altitude, mountains are home to a high biodiversity and a number of rare and endemic species of flora and fauna (Beniston 2003: 6). Rising temperatures pushes the flora and fauna upwards, following the ecological zone to which they have adapted. This means that due to the cone shape of the mountains, as the eco zones move upwards, the surface diminishes, and competition between species will tend to increase with a number of possible extinctions as the outcome. Likewise, the rise in temperature, even as modest as it might seem, may lead to an alteration of the crops available for the peasants (cf. Beniston 2003: 16). For the farmers, this vertical ecological displacement could actually be one of the more positive results stemming from the rising temperatures as they potentially could be allowed to grow crops which used to belong to the lower regions of the Andes. This is, however, hypothetical because of the complexities of global warming, and the benefits from a rise in temperature might very well be minimal compared to the problems emerging, especially the issue of water scarcity.

Glacier retreat: communities under threat

Mountain glaciers are highly sensitive to changes in both precipitation and temperature, and they therefore provide some of the clearest and most visible evidence of climatic changes (Beniston 2003: 10). Concerning global warming, Bradley et al. (2006) state that the highest increase in temperatures are predicted to occur in the high mountains of Ecuador, Bolivia, Peru and northern Chile. And they continue: 'If the models are correct, the changes will have important consequences for mountain glaciers and for communities that rely on glacier-fed water supplies' (ibid.: 1755). In their study on 20th cen-

ture climate change in the tropical Andes, geoscientists Vuille et al. (2003) show that since the 1950, temperature has increased by 0.15 degrees C per decade. This includes the variation associated with the El Niño phenomenon,² but also shows that over the last 25 years the warming rate of the Andes has almost tripled (2003: 83). Bradley et al. (2006) put the average estimate to a 0.11 degrees C per decade, but still, compared to the global average of 0.06 degrees C per decade, this is a substantial increase (ibid.: 1755).

The Cordillera Blanca of the Peruvian Andes is the world's highest and most extensively glaciated tropical mountain range, and the glacier runoff contributes a significant percentage of the running water of the region. There has been a general trend of glacier retreat in the Andes in the 20th century, and there is clear evidence that the glacier retreat has accelerated over the last two decades, and data shows that for example the Qori Kalis Glacier, which tops the Cordillera Vilcanota of the Cordillera Oriental in south-eastern Peru, in the period between 1983 and 1991 has been retreating at a rate almost 3 times that of the period between 1963 and 1978. And in the Cordillera Blanca glaciers have lost between 11 and 30% of their mass over the last 40 years (Bury et al. 2008: 332). It is indeed a complex process, and glacier retreat can not only be attributed to increasing temperatures, although evidence suggests that this is the main cause, but also to alterations in precipitation, humidity, wind, and cloud cover (Vuille et al. 2003: 75-6). Projections have been made, indicating that a great portion of the lower-altitude glaciers may completely disappear within the next 10-20 years, such as has already happened with for example the Cotacachi in Ecuador (Vergara et al. 2007: 261, see also Rhoades et al. 2008).

2. El Niño is a recurrent climatic phenomenon associated with elevated temperatures of the otherwise cold Humboldt Current. This leads, among other things, to increased rainfalls on the northern coast of Peru, and an alteration of temperature and precipitation patterns in the Andes. According to the Peruvian meteorological institute, the SENAMHI, 2010 is going to be an El Niño year (Peru21b). This may prove to be an instance of the ethnographical task of distinguishing between immediately disruptive events and the long term, gradual climate change (see also Frida Hastrup, this volume).

Coudrain et al. (2005: 930) note that in spite of a virtually unchanged precipitation in the Andes, river runoff has been increasing over the last decades. However, the general increase in water in the rivers of the Cordillera comes at a price: the shrinkage of the 'natural water towers' (Bury et al. 2008: 323), which means that the momentary increase in the rivers are not likely to last long. Glaciers serve as important runoff regulators, and provide water in the dry season. With increased glacier retreat, both the Andean highland and the coast will be affected dramatically (Vergara et al. 2007: 261). While the retreat of glaciers initially leads to an increase in the outflow of the glacial streams, on longer terms it will lead to a partial or complete dry-out of many riverbeds. As glaciers disappear, so does the buffer that secures the Andean highlands with a stable water source, independent of the rainy season (Bury et al. 2008: 332).

In their study of changing melt water contribution to stream discharge, hydrologists Mark et al. (2005) examine the Yanamarey Glacier mentioned in the introduction, which is situated just above Recuay and Catac, and which is the main contributor to the Querococha Lake that continues downhill to the Rio Santa. It is one of the 722 glaciers of the Cordillera Blanca, averaging a size of approximately 1 km², which has been counted by the Glacier Inventory in Peru, and with a size of 1,3 km² it is very much like the majority of glaciers in the region. In recent years it has had an extensive recession (Mark et al. 2005: 977). By subtracting the Querococha discharge from precipitation (and in the process eliminating evaporation and groundwater recharge which is both estimated to be minimal), the scientists are able to reach an estimate of the recession of the Yanamarey Glacier.³ They found that whereas in the period from 1998-1999 glacier melt outflow contributed 35% (+/-10%) of the annual discharge, in the period from 2001 to 2004 it had increased to 58% (+/-10%). This coincides with measurements of the glacier that show 'continuous and dramatic recession over the same period' (Mark et al. 2005:981). This obviously leads to an immediate increase of water in the valley,

3. This is of course a simplification of a rather complicated measuring process which I shall not deal with in details.

but the data also shows that the peak discharge period from the glacier has changed and now coincides with the peak of the wet season (*ibid.*). So, with at least 40% of the Rio Santa discharge deriving from the glaciers of the Cordillera Blanca (*ibid.*: 986), the *comuneros* of Catac, Recuay and the other communities in the valley are likely to experience both periods of excess of water and periods of drought. This means that they will have to find alternative ways of exploiting the soil and managing the water flow.

The increased runoff from the melting glaciers may cause flooding of rivers and the formation of glacial meltwater lakes. Glacial lakes are a direct result of the retreat of the glaciers, leaving unstable pockets of meltwater where the glaciers were previously situated. These are a potential threat to the communities below, as floods caused by continued melting or calving of ice chunks into the lakes do happen from time to time (Coudrain et al. 2005: 931). A similar threat is that of avalanches caused by dislodged glaciers, as happened with the town of Yungay north of Huaraz. In 1970, following a massive earthquake, a single flood and landslide killed as many as 15000 people and left the town buried in mud and residues from the lake above (Carey 2005, 2008; Oliver-Smith 1986). The town is now relocated, but the death toll and the story is a reminder of the forces at play in the high Andean mountains. From 1951, when scientists completed the first inventory of glacial lakes, to 1997, the number of these lakes have risen from 223 to 374 (Carey 2005: 125), increasing to probability of outbursts and avalanches considerably.

Hydropower account for 80% of the total energy production in Peru, but in areas such as the Rio Santa watershed in Ancash, where one of the major hydroelectric plants is situated in the Cañon del Pata, glacier contribution to the watershed is diminishing rapidly with serious problems ahead for the Peruvian power supply⁴ (Vergara et al. 2007: 261). Thus, glacier retreat is not a local problem, af-

4. Based on data from the Peruvian Ministry of Mines and Energy, Vergara et al. estimate that a 50% decrease in glacier runoff from the Cordillera Blanca, which contributes to the Rio Santa, would lead to a decrease in the yearly energy output from the Cañon del Pato hydropower plant from 1540 gigawatt hours to 1250 gigawatt hours (Vergara et al. 2007: 261).

fecting merely local level *comuneros*, although these are those to be hit first. It is a phenomenon that relates to all levels of society, affecting a variety of scales from the single household, the ayllu, community, communities on district level, regional and ultimately to the national and international level. The effects vary, and solutions and responsibilities are found and ascribed in very different ways, as shown by Rhoades et al. (2008).

The overall increasing water scarcity in the Andes is most likely to contribute to an enhancement of already existing and emerging conflicts, as has already been seen in other regions of the world (e.g. Shiva 2002). The task is how to address these different scales of conflict ethnographically. It is important to assess the way that people act and react when put under pressure by their environment, threatening their livelihood. In the case of Yungay, Carey (2008) shows how decisions are made not just as a response to the immediate threat, in this case in the form of glacial lake flooding, but are put into a wider conceptual framework. While analytically we may identify the pressure from the changing hydrological cycle on different socio-political scales in a variety of forms, people live composite lives in which all of these challenges are intertwined. People tend to seek coherence in their everyday lives, and as the glaciers melt, so does a core element of the Quechua cosmology.

Cosmology: the retreat of symbols

As was most clearly demonstrated by the finding of a sacrificed twelve- or thirteen-year-old girl from the time of the Incas at the summit of Mount Ampato, mountain worship, and sacrifice is central to the Andean cosmology. The Incas might have been extreme in their measures, but still today the sacred geography of the Andes attributes agency, authority, and ultimately power to the glaciated mountain peaks (Gelles 2000: 80). Thus, another corollary, much less tangible but of great importance, is the impact upon cosmology that a continued glacier retreat might have (Vergara et al. 2007: 261). The mountain deities, the Apus, are those who secure the wellbeing of the Quechua of the Andean highlands. In the case of Cabanaconde,

in the southern regions of Peru, water originates primarily from Mount Hualca-Hualca. It is associated with the mother's milk, and 'remains the most essential, highly valued, and ritually elaborated natural resource of the community' (Gelles 2000: 79). By way of sacrifice of coca leaves, llama fat, and alcohol, the Quechua communicate with the gods, who in turn secure the necessary water for agriculture and consumption (cf. Pærregaard 1989).

Irrigation rituals likewise hold a central position in the annual cycle of ritual in the Andes. They constitute a powerful medium for transmitting and reproducing beliefs about fertility, disease, power, authority, and ethnic identity and are therefore an important means to secure the continued flow of water (Gelles 2000: 78). Water is thus linked to perceptions of power and authority within the Andean communities, being not only a valuable resource, but also an essential symbol of ethnic identity. In the Andes, irrigation and water management are closely linked to the Pachamama, the Earth Mother, who is the foundation of the Andean worldview. According to this view, the Earth is alive and animated, but requires constant attention in form of worship in order not to upset her. The landscape, the mountain peaks, and the Pachamama are seen as extensions of the social world (*ibid.*: 83), and changes in the landscape require changes in social organization and/or perception. Rhoades et al. (2008) demonstrate how in the case of Cotacachi glacier in Ecuador, even though the ice layer has now disappeared, rendering a dark grey surface where the mountain was once shining white, the people continue to conceive the mountain as being snow covered. However, as Orlove et al. (2008b) highlight, global climate change is always framed culturally, and glacier retreat is likely to affect the cosmological order, and therefore the power relations within the community, as those responsible for the irrigation ritual are no longer able to communicate efficiently with the mountains deities. This means that glaciers are not limited to being chunks of ice on mountaintops, but age-old totems of deep cultural and emotional meaning. In turn, this could mean a subsequent impact on political authority in the communities as the glaciers continue to melt, eroding the very foundation of subsistence in the Andes.

Local economies: the need for diversification

The uses of the Rio Santa are manifold and diversified along the flow: From irrigation and drinking in the small highland communities, through the major city of Huaraz, where the river is also an important means of waste disposal and where it supplies an important part of the energy production at the hydro plant, to its final dispersal as irrigation water on the coast and main source of drinking water for Chimbote's still expanding population. And high above all this, vertically as well as economically, in the middle of the fragile highland ecosystems of the Cordillera Blanca lies the great mine of Antamina, which accounts for the vast majority of income in the region of Ancash and constitutes an important part of the ever growing mining industry upon which Peru's economy depends so heavily.

In terms of infrastructure, Peru continues to be a country designed for extraction-based economy; a grid which was initially laid out by the Spanish. From the early *conquista* to present day, the Peruvian economy has been largely founded on the extraction of raw materials: First to supply the Royal Spanish Court with silver and gold, and after independence different economic booms of e.g. *guano*, rubber, saltpetre to the present day highland mining of cobber, silver and gold, and the large scale timbering of the Amazon (see Contreras & Cueto 2000). From the highland towns and mines roads lead to the harbours on the coast, while the connections between the highland cities are often in a poor state, wherefore travel in the highlands continues to be quite time consuming. This reflection of the ways in which the Peruvian national economy is still structured is to a large extent mirrored by the signing of the Free Trade Agreement (TLC) at the beginning of the new millennium, which was one of the main points of the protest posed in the Declaration of Recuay. As emphasized by geographers Bebbington and Williams (2008), global climate change and the continued expansion of mining in the Peruvian highlands combined are likely to put an enormous amount of pressure on the available water resources. Thereby, the extraction-based economy introduced by the Spanish and its exploitations of natural resources such as water is brought into question. Estimates are that mining uses about 5% of Peru's freshwater, but as in the case

of Antamina and the neighbouring smaller mines closer to Catac and Recuay, they are placed in headwater areas in the high Andes. Its effects on water resources are not merely quantitative, but also qualitative, implying that the pollution of the water extends far beyond the extraction site (*ibid.*: 191), as was also stressed in the Declaration of Recuay.

Furthermore, the Cordillera Blanca and neighbouring Cordillera Huayhuash comprise one of the tourist hotspots of Peru, with a number of trekking routes encircling the white peaks and deep blue glacial lakes. In this area, the above mentioned village of Catac is the starting point of tours to the famous Pastoruri Glacier, which has been declared near extinction a number of times by the Lima based press (e.g. *El Comercio*), but none the less seems to be surviving so far. As highlighted by geographer Jeffrey Bury (2008) in the case of Huayhuash, a growing number of communities depend economically upon the tourist sector. But tourism also contributes to the increased pressure upon both mountain resources as such and on the resources of the local communities in particular (Beniston 2003: 6). And as the glaciers disappear, the peasant economy increasingly dependent on tourism will once more have to be restructured, and as often before the solution is likely to be outward migration towards the coast (see Pærregaard 1997), which, as mentioned, itself is likely to be hit hard by the changing hydrological cycle of the highland. It is therefore important to analyse the re-configurations of the socio-political landscape of the Andes by looking at how institutions at different levels handle the impacts of climate change.

Local-level resilience: tracking the watershed

In the formulation of The Declaration of Recuay the communities of the region united to confront a shared foreign threat, but the question is to which extent the politics of water on one level continue to be compatible with those of another level. As Orlove writes in this volume (chapter 2), because water is always shared among people and among localities, it is inextricably linked to forms of control and power. Focusing on the way the watershed of Rio Santa is shared and contested we may shed light upon the fight for water rights, thus

offering an analytical perspective on how climate change transforms the interactions of local, regional, and national institutions.

In the case of the Ecuadorian Andes, Niels Fock argues 'that it is the partition of water that gives rise to the socio-political segmentation and the existing oppositions' (1981: 407). A map showing how irrigation canals bifurcate simultaneously reveals the power structure of the region, and the spatial and territorial division is therefore closely connected to the watershed. Thus, the binary system of political organization in Cañar resembles the model of segmentary oppositions in that the two localized groupings of the community, who at one point stand in opposition to each other, together stand in analogous opposition to the neighbouring community. On the other hand, the Declaration of Recuay challenges Evans-Pritchard's model of segmentary oppositions in that the communities very actively dissociate themselves from the Peruvian state. Like in Evans-Pritchard's account on the Nuer in Sudan, the (post)colonial order embraces everything in the Andean highlands, and according to Evans-Pritchard it is actually the presence of the colonial administration that enhances the segmentary organization (e.g. 1940: 189). However, contrary to the colonial administration, the Peruvian nation-state is expected to secure the rights and wellbeing of all its citizens, and that is the central issue addressed by the Declaration of Recuay.

In the Declaration of Recuay, the local effects of glacier retreat and global warming are closely associated with the neo-liberal politics of the national government, and are inscribed in a long-term struggle for land and water rights. In the case of the now disappeared glacier on Cotacachi in Ecuador, Rhoades et al. (2008) show how conflict over water arises on different scales among the people below the volcano: From the individual farmers who compete internally over the decreasing resources while basing their claims on outdated flow figures, to problems with state grants of water concessions favouring the economically and politically powerful, and the haciendas' excessive (mis)use of water (ibid.: 223). Conflicts are likely to burst in the densely populated Callejón de Huaylas as well, where communities, mining concessions, townspeople, and *hacendados* all compete for the same fundamental resource.

People employ a variety of strategies in order to cope with the en-

vironmental disruptions. As Carey (2008) demonstrates in the case of Yungay, the place where people live is a historically produced space that implies deep cultural, economic, social, and political meaning. This means that relocating and reorganizing the way of life is no easy task, implicating 'major compromises and significant risks to their livelihoods, connection with ancestors, material well-being, social status, and political power' (ibid.: 229). When trying to understand the resilience of a community at any scale, it is important to consider these risk calculations, and identify exactly what is at stake in any given situation: What is gained and what is lost by any action, collective or individual. As we saw above, cosmology is embedded in everyday life in the Andes, where ritual practices form part of the interactions between people and people, and between people and environment, and thereby acting as an important constituent of authority, power and identity (Gelles 2000). Climate change put the socio-political organization of the Andean communities under severe pressure, as the cosmological and economic basis of their lives continues to retreat further up the steep Andean mountains. The ethnographical challenge is how to identify and measure the impact on the socio-political organization of the Andean highlanders. As demonstrated by putting the Declaration of Recuay into hydrological, socio-political, and geo-cosmological context, a good place to start is to identify the resilient units on different scales, and to scrutinize how these different segments and levels of Peruvian society relate to each other both vertically and horizontally by tracking the watershed.

Conclusion: identifying units of resilience

As it has been shown throughout this chapter, a number of different interests are aligned along the watershed. Warmer climatic conditions will enhance the hydrological cycle of the mountains by reaching higher rates of evaporation and changing precipitation, seasonality and the water storage capacity of the glaciers affecting soil, groundwater and the frequency of drought and flood incidents (Beniston 2003: 7, 10). This may lead to changing patterns in water distribution and management, and it is therefore important to track

the watershed and identify the possible zones of conflict and analyze how this is dealt with by the local communities. In the Declaration of Recuay the communities are united in order to address the issue of water scarcity towards an outer opponent. However, as earlier studies such as Trawick (2006) and Gelles (2000) have shown, conflicts are likely to occur not only between communities but also within one single community. These are the socio-political processes to be tracked in order to identify not only the resilience of a community, but to broaden the perspective to include different the units of resilience on a variety of scales. Likewise, as stressed by Orlove and Caton in this volume, watersheds themselves vary in scale. Thus the Rio Santa contains a number a sub-watersheds, and it is precisely this, as highlighted by the account of Fock (1981), which provides a stepstone for identifying units of resilience in terms of socio-political organization. As a process that describes momentary social dynamics and interactions, resilience highlights questions of disturbance, change, and stability. By focusing on both the intra- and intercommunity experience of global climate change it is possible to explore how these environmental perturbations are handled socially and politically on different institutional levels, and how these relate themselves to each other.

As noted by Orlove et al. (2008b), the people who experience the effects of glacier retreat can do very little about it in their daily lives. The causes of global climate change are on a completely different scale than the effects. Even so, this is an issue that is also reflected in the Declaration of Recuay, where responsibility is placed with the government and its association with multinational corporations. Thus, the inhabitants of the communities are not only existentially threatened directly by increasing temperatures and the mines, but also indirectly by a state incapable or unwilling to act against its immediate economic interests. Global warming is thus integrated into a broader framework of rural resistance, and in the eyes of the signatories to the Declaration, it becomes yet another symptom of the negligence and greediness of the national government.

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