Agricultural Crisis in the Ancient Southern Andes: Trajectories and evidence for its archaeological study

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Introduction

When discussing economic crises in the ancient past, those most common and critical have involved shortages in staple foods or breakdowns in systems for their production, storage or preservation. Because of this, the international historical literature frequently contains references to agricultural crises and their serious consequences for past populations. Although this subject has recently gained renewed interest in socio-economic research regarding famines in general, access to food, consequences of the 'Green Revolution', and issues of 'Alimentary Sovereignty', it has also been explored in archaeology from another perspective, where crisis is seen as a driving force behind political and social changes in the past.

In this article, I begin with a review of ideas regarding agricultural crises, and then focus on some methodological issues for the study of Prehispanic and colonial histories in the southern and south-central Andes. In this region, recent archaeological research involving ancient agriculture and *campesino* (peasant) life has begun to regain momentum that had been lost because of the political repression of Marxist thought that took place in South America in the late 1970s. As part of this revival of agricultural studies, it has been necessary to reconstruct the subject's cognitive fabric, a process that has involved research on basic aspects of agrarian systems, such as infrastructure and technology. It now seems that there is a level of maturity in these studies that allows us to go a step further and begin to investigate agrarian rural landscapes in all of their cultural and socio-political dimensions.

The agricultural crisis: Economic breakdown or natural catastrophe?

The field of written history has made repeated reference to various agricultural crises and their specific consequences for past populations. In archaeology, on the other hand, research has focused more on pathways of increasing food production and agricultural intensification, especially since the work of Boserup (1965). Boserup's population-based theory, and others which followed, focused principally on subsistence production needs, and are often structured in terms of per capita caloric returns. These contributions have been important for the development of theory in the discipline, as well as for methodology, giving rise to multivariate approaches that go beyond population to consider issues of agricultural land use, sustainability, and historical contingency that surround local and regional decisions involved in production. Boserup's theories have, however, attracted substantial criticism since the 1960s. For example, Zaro writes (2005: 12), "most notably, her model fails to explicitly recognize environmental and climatic contexts, and it ignores culturally defined mechanisms of production, exchange, and consumption."

Taking into account the fact that planning for adequate production—in terms of both quantity and quality of food—is potentially one

of the most critical and hazardous elements any society faces, crises have often been studied from the perspective of strategies of prevention and avoidance (Halstead and O'Shea 1989). This type of focus puts a strong emphasis on the study of the skills used to respond to 'natural' environmental risks. For example, in the case of agriculture, excess production is treated as a planned strategy for the mitigation of risk and uncertainty (Halstead and O'Shea 1989). In other words, there is a concern with strategies to avoid crises, but less often with strategies to overcome them once they have occurred.

My focus here instead is on the study of more spontaneous and reactive means of resolving the emergency; responses that may involve alternative social actors, *de facto* leadership, and new societal roles that may emerge during a crisis but were developing before it. This is a relatively little-known area within our archaeological knowledge relating to landscapes and agricultural production (see, for example, David and Thomas 2008).

Beginning with a view of agriculture as a highly social product, we are able to make 'visible' in our archaeological analyses those particular social crises that are agricultural in nature. Another aspect that may mark a contrast with risk prevention is the scale of the crisis. Here I am referring not just to the effects of a 'good' or 'bad' year, but a collapse of the production system, whether in whole or in part, and therefore also of the social system that it sustains (e.g. the case of the Mayan or Tiwanaku systems).

On this subject, a line of research that recently has been taken up again with vigour—perhaps through the necessity of viewing historically what today seems to us to be the catastrophe of present-day climate change—is that involving natural disasters that bring serious difficulties (for example, the effects of prolonged droughts, flooding or diseases). Even though a catastrophe is not the same as a crisis, there is an important point of intersection: their consequences. It is for this reason that the tradition of studying natural disasters also provides information related

to this subject: "the study of a particular disaster, offers the conditions of a type of social laboratory, where a series of relationships converge or appear at specific moments, as well as alliances, which at other times may go unnoticed" (Garcia Acosta 1996: 1, translated from Spanish by author). In contrast with a crisis, a disaster is the result of the confluence between an unexpected natural phenomenon and a vulnerable context or society, so that the focus of investigation must fall on both sides (the natural and the social) with equal force. On the other hand, in a crisis the natural factors are not necessarily sudden, although they can be hazardous, and cannot be kept separate from human decisions. Here the political and social factors address and explain the crisis, both those that may bring it about and those that work to overcome it.

A good example of an agricultural crisis caused by nature (through disease), but which appeared through incorrect human decision-making (monocultivation of potatoes) is the great Irish agricultural crisis in the middle of the nineteenth century (Kinealy 1995). Another example could be that of Easter Island (Rapa Nui) that has been considered by some as a case of 'ecocide', since the ancient Polynesians were alleged by some to have recklessly destroyed their environment and, as a consequence, suffered collapse. For archaeology, it is fundamental to understand that agricultural crises represent the result of processes that are triggered or revealed in the context of critical, pre-existing social, economic and political circumstances, and that efforts to resolve crises can create changes that are spontaneous but critical because of the ways in which they may reorganise society. The threat of shortages and famine can lead to significant changes in demographic, political, social and economic systems, affecting both for the immediate functioning and long-term future of a population.

The study of the social context into which the disaster, catastrophe or crisis intrudes can allow determination of the pre-existing degree of vulnerability of the society affected, not only in terms of risks to body and health and of abandonments and migrations by the general population, but also in the vulnerability of the groups affected in terms of their

social and economic hierarchies and privileges, which are generated and maintained across the span of the specific times and places studied. The social attitudes and processes found in the society affected and that are adopted and adapted in response to the crisis, as well as the capacity for recuperation of the various social groups or segments that exist, are elements which allow evaluation of the effects of the disaster. These are derived directly from the specific context and, consequently, may reveal the uneven vulnerabilities that may exist in terms of both physical and socio-economic conditions (Garcia Acosta 1996).

These aspects can be observed with a long-term perspective through study of the land in terms of its own agents and dynamic manifestations, although perceived to be something stable. Such definitions and characterisations cause the average to be perceived as 'normal', but in the collective memory such stability exists in a state of contradiction with periods of instability and crisis. This leads to the development of strategies (technical, political, social and ritual) to reinvent and exercise that structure. Because of this, agricultural crises are important on the whole in long-term histories because their effects are pertinent not only to the specific times when they occur, but also, depending on their intensity, to any new strategies established. These strategies can be effective in leading to structural changes that are often (or perhaps unavoidably) of a political nature, but can also be social, ritual, or technical.

Trajectories and evidence for their study through archaeology

As mentioned above, in the archaeology of the south-central Andes, the development of studies of ancient agriculture and *campesino* life has regained the momentum lost at the end of the 1970s. To accomplish this, it has been necessary first to reconstruct the cognitive fabric through inquiry into infrastructure and technology, as the most basic factors of the agrarian context. Having reached the point where these subjects are better established, new research that addresses the social dimensions of agriculture is now emerging (Quesada 2010; Williams et al. 2010), and therefore is now necessary to augment these results with the aim of

developing theories of ancient production that are neither technocentric nor Eurocentric (Korstanje and Quesada 2010).

The absence of specific theoretical and methodological frameworks for the archaeological study of agricultural crises from a social perspective has led either to the absence of the questions, or to their consideration from strictly geoarchaeological perspectives, where human action is equated with that of other natural agents (Butzer 1982; Roldán et al. 2008) or strictly palaeoenvironmental perspectives, such as those that provide general explanations of collapse (Binford and Kolata 1996; Manzanilla 1996; McAuliffe et al. 2001). In fact, contributions such as these are essential for the subject under discussion, since ecological constraints to particular production strategies are the reality within which agricultural communities function. Such approaches, however, do not exhaust the possibilities for interpreting agricultural crises. *Campesinos*, in any ancient production system, bring their ways of life, systems of work organisation, ancestral traditions regarding how things are done— which may not always be optimal from a cost-benefit economic point of view (see 'the grandfather response'; Halstead and O'Shea 1989)—and the oracles and predispositions of their gods to structure their agrarian practices. It is all of these things that fall into a state of collapse when we speak of a crisis—the products of the earth as well as the associated values that sustain their production. How then can an archaeological framework be constructed to encompass such complexity?

Methodologically, we are increasingly confident in our ability to observe material collapses: abandonment of fields and cultivation, the signs of droughts and floods, changes in cultivation practices and even complex technologies for the control of diseases, risks and uncertainties. But how can our analysis take into account everything it means when an Andean native says, "Pachamama [Mother Nature] was angry"? Is it sufficient to detect a regional meteorological variation to explain everything that is implied by this conception?

This limitation has been confronted by researchers who have sought to understand the complexities of agricultural landscapes in other cultures. For example, Coil (2004: 70) cites an interesting case from Hawai'i, where according to one ethnographic source there were different names for famines, such as those known by the term *kaha lelelopo* (famine during wartime, with persons seeking food at night for fear of being seen), or a particular post-contact famine called *Hi laulele* (name of a famine during the sandalwood-cutting days when farms were neglected and the people lived on laulele greens; Pukui and Elbert 1986: 110).

It is likely that various situations, which in our eyes are considered famines, but may be called something different by locals, demand subtlety in their interpretation. Such subtleties, even if they unavoidably elude us in the material record, should at least oblige us to think beyond the general functionalism of conventional agricultural studies. In an example from the Andes, Zimmerer (1996: 26) brings up the fact that general words meaning crop or food plant do not exist in the Quechua or Aymara languages, because each crop and every landrace is given a specific name: "by naming their food plants so exhaustively, the farmers are able to voice a litany of multi-faceted specificity—agroecological, culinary and nutritional, and cultural-symbolic". Similarly, Sayre (2007) points out that in Quechua it is not possible to speak of 'agriculture', since there is no exact tradition for this Western concept. The concept that is applied is *tarpuy*, which in reality is more related to a nurturing activity. Again according to Sayre (2007: 231), "*tarpuy* bridges dichotomies that typify traditional conceptual frameworks for interpreting agriculture, such as nature/culture and wild/domesticated". An Andean *campesino* will explain that the relationship between himself and his cultivated plants is like that between a mother and her child. It is a relationship that goes far beyond the mere pursuit of an economic 'product'. Without both practical and ritual interaction with the plants it is impossible to have success with extensive or intensive agriculture in the Andean landscape. The conception that everything exists in the universe as a living thing, with its own life, is considered by all as fundamental to the prosperity and abundance associated with their lives in the Andean landscape. All things have the will to

grow up and be nurtured into a state of balance with the world, through concepts involving the emotional sharing of reciprocity, redistribution, and understanding.

With this perspective, an archaeological literature is beginning to appear that tries to give a place to such representations as an alternative to strictly Western concepts for the study of Andean *campesino* life (e.g. Haber 2007). However, we are still far from being able to gain understanding without some degree of reliance upon direct ethnographic analogy or anecdotes with little empirical support.

It should be considered, then, that the lessons provided for the study of history by the French *Annales* school (Aguirre Rojas 1999; Duby 1992) will be able to help us to better contextualise our increasingly substantial and sophisticated battery of methodologies applied to understanding the material record (such as geoarchaeology, soil science, landscape archaeology, ethno- and archaeobotany, agroecology, remote sensing, etc.). Perhaps, if we are able to do away with the failed methodology that involves separation of the past and present, and better place ourselves within a local cultural context, then we will be closer to understanding a particular phenomenon—in this case, the agricultural crisis—in a contextual manner that takes into account all possible factors, both social and natural, but also going beyond this dichotomy. If we prioritise the reading of a long-term perspective, while always starting in the present and reading towards the past (following Bloch 1978), the present will not be an analogical source for studying the past, but will be part of the same analysis and thereby the hazards of analogy may be mitigated. If we begin from the present in our efforts to observe changes in the agrarian landscape in the past, then periods of abandonment of cultivated fields, for example, which we may consider *a priori* as a clear manifestation of the fact that an agricultural crisis took place, will lead us to an understanding of the before and after in terms of their structure and conjuncture (*sensu* Braudel 1976), where the conjuncture is the crisis that we are interested in analysing, which may or may not have led to a new structure.

For example, for southern Peru, Zaro (2005) makes distinctions between systematic and incremental change; whereas systematic change involves the addition of new fields and associated technologies prior to cultivation, incremental change refers to gradual transformation of fields in conjunction with cultivation. If such a reading takes place in reverse—in other words, from the whole to the parts, as has begun to take place through the study of stratigraphic sequences of wall construction and use of GIS in Argentina's Bolsón Valley (Quesada and Maloberti 2010)—it may also allow us to distinguish the innovations that take place following a crisis, although these will not always result in permanent changes to the landscape. Innovation may manifest itself in more abstract ways such as shifts in land tenure. The conceptual distinction is that innovation occurs as a new practice or combination of practices, as opposed to the intensified application of already existing labour or capital inputs within a technological system (Morrison 1994; Zaro 2005).

We can think contextually, in terms of the *longue durée*, about various causes of agricultural crises in human history, all of which have implications for interpretation when proceeding from the present to the past:

- environmental and meteorological changes (droughts, excessive rain, storms, etc.)
- depletion of resources by intensive practices (soil, water, sacred ponds, poor seed stock, etc.)
- diseases, infestations, and technical problems (monocultivation, bad practices, etc.)
- population increases and land shortages
- political conquests and loss of territory, as well as increases in tributes or taxes.
- one crisis being caused by another, with permanent consequences (mortality, epidemics, sudden demographic declines, migration)
- crises based upon the loss of values that sustain the system (corrupt religious figures, non-belief, scepticism, predation, disorganisation, lack of social solidarity, etc.)
- temporary out-migration or inter-regional redistribution of populations
- reciprocity, family networks, out-residence in, or 'charity' from, nearby districts;

- permanent migratory responses
- reliance upon famine foods
- diversification of production
- changes in production schemes, with alternation of species
- introduction of new species more resistant to the factor that affected previous ones
- expansions or modifications to irrigation networks and water storage systems
- changes in the structures of land division and associated systems of political power

In the Bolsón Valley (Catamarca, Argentina), where our research group is studying agricultural landscapes and Prehispanic *campesino* life, the theoretical invisibility of agricultural crises has led to explorations of the social production and organisation of work, as well as of intensification (Korstanje 2010). We observed that in one of the sites with the greatest recurrence and persistence in the use of space over the long-term, known as El Alto El Bolsón, the structuring, layout and reuse of constructed agricultural areas may be reflecting not only episodes of production expansion, but also the tangible signs of retrocession. In this site the cultivated parcels are located close to the houses, but there is also great diversity in the techniques used to delimit and construct agricultural spaces, using low, quickly-constructed stone walls, which produce a variety of forms of land parcelling in the area: a transverse linear design, which involves simple dividing walls; terraces with a single lateral wall, which contain central alignments, or *melgas*, which cut across the slope and are contained by the lateral wall parallel to the slope; terraces with two lateral walls, the same as the previous but with the *melgas* connected by two lateral walls that run parallel to the slope; and double circles, or *canchones*, which are large, round enclosures associated with a second of a similar size. All of these seem, by their design and manner of construction, to be clearly meant for agricultural production.

To test this, we have been applying a series of technical analyses that provide abundant details of the activities that were conducted within them, a first for open-air sites in the region (Korstanje and Cuenya 2008,

2010). Through collaborations by an interdisciplinary team of geologists, pedologists, palynologists and archaeologists with various specialisations, we are observing the existence of micro-changes at the environmental and landscape level that, tracked over the long term, may succeed in revealing larger-sized agricultural crises, which occurred in advance of the great collapse that reflects the arrival of European colonisation in the seventeenth century. This research may present us with a totally different point of view when interpreting our study area's cultural or historical sequences from architectural and material culture perspectives.

Conclusions

In this article I have reflected upon the need to archaeologically identify critical moments within an agricultural history, especially those considered as crises and which lead to changes in social responsibilities, regardless of whether or not unexpected natural phenomena were involved. My focus of interest is on those episodes of crisis, famine or scarcity that are interrelated with situations of stress provoked by these same social practices.

I have emphasised the importance of applying a basic outlook in which responses to crises may have involved more spontaneous social rearrangements during emergencies. Such a perspective can take into account situations of replacement or reordering of leadership and work organisation, which are in themselves conjectural but which contribute to the structure of regional histories of agrarian life.

From a methodological point of view, our archaeological research team is following the type of interdisciplinary approach that has been successful for the study of catastrophes, risk, agricultural intensification, palaeoclimate and production, while emphasising the long-term scale involved in working from the present to the past. This is being done in a way that may allow us to see not only developments and expansion in the landscape history under study, but setbacks and retrogressions as well. We also emphasize the importance of always thinking about that

same agrarian landscape within the cultural context that has produced it, for which a long-term perspective is also a necessity.

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