



# Language Dispersal Beyond Farming

*edited by Martine Robbeets  
and Alexander Savelyev*



John Benjamins Publishing Company

# Proto-Quechua and Proto-Aymara agropastoral terms

## Reconstruction and contact patterns

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This chapter presents reconstructed Proto-Quechua and Proto-Aymara lexical items related to cultivation and herding, and draws conclusions about language and subsistence in the ancient Andes. The patterns of lexical borrowing between the two lineages offer a novel empirical perspective on how early Quechuan and Aymaran speakers lived. When the many layers of borrowing are stripped away, it is clear that both were engaged in agropastoral economies before the languages first came into contact. Furthermore, the presence of terms from a wide range of ecological zones, from the high grasslands to (in the case of Quechua) the tropical lowlands, suggests that both languages cross-cut elevations in a manner consistent with the typically Andean system of ecological complementarity.

**Keywords:** Quechua, Aymara, Andes, agropastoralism, language contact

### 1. Introduction

The Quechuan and Aymaran languages are spoken by millions of people across a vast expanse of the Central Andean region. Both families are closely associated with agriculture and pastoralism, and the Central Andes is one of the few regions on Earth where these modes of subsistence – as well as the complex social formations that they support – developed independently.

Given these facts, it is of interest to know what the relationship might have been between agropastoralism and the early history of the Quechuan and Aymaran lineages. The wide geographical distribution of both families, for instance, makes them candidates for consideration within the Farming/Language Dispersal Hypothesis, which proposes that language families expand when “farmers and their culture replace neighboring hunter-gatherers and the latter’s culture” (Diamond & Bellwood 2003: 598). However, the Andean case does not constitute a straightforward test of

that hypothesis: the Aymaran and Quechuan families first expanded around one or two millennia BP into landscapes that had already been occupied by herders and cultivators for thousands of years. Indeed, a broad range of domesticated animals and plants, agropastoral practices, and farming and herding technologies were already in place in the Andean highlands well before those expansions, including camelid herding by 5500 years BP (Pearsall 2008; Wheeler 1995); maize by 3600 to 4000 calibrated years BP (Perry et al. 2006; see also Tykot et al. 2006); and irrigation by 3500 years BP (Zimmerer 1995). It is no surprise, then, that many of the languages with which the Quechuan and Aymaran families came into contact during their initial dispersals already had agricultural lexicons. Regarding this poor fit between the time depths of the emergence of agropastoralism (3500–5500 BP) and the Quechuan and Aymaran dispersals (1000–2000 BP), Heggarty and Beresford-Jones (2010) argue that the extreme diversity of Andean environments delayed the intensification of agriculture – and thus, the attendant linguistic expansions – until later.

However, there are other ways of approaching these questions beyond merely correlating the respective time depths of the advent of agropastoralism and the Quechuan and Aymaran dispersals. In this chapter, we use reconstructed Proto-Quechua and Proto-Aymara lexical items related to cultivation and herding to draw some conclusions about the kinds of subsistence activities practiced by speakers of those languages. Indeed, fully developed vocabularies for the crops, animals, techniques, tools, and products associated with cultivating and herding constitute evidence that the speakers of those languages engaged in these practices; thus, reconstructions of these lexical domains afford a perspective on how the early speakers of these languages might have lived.

This endeavor is greatly complicated by the multilayered history of contact between the Quechuan and Aymaran languages, which resulted in intense lexical borrowing and profound structural convergence (for summaries, see Adelaar 2012a, 2012b). This contact began before the respective proto-language stages, which requires us to consider hypothetical periods before the first contact: Pre-Proto-Quechua and Pre-Proto-Aymara. As much as a third of the Proto-Aymara lexicon may have been borrowed from Pre-Proto-Quechua during this first contact (Emlen 2017); thus, before the early lexicons of both linguistic lineages can be adequately characterized, it is first necessary to identify and strip away the layers of borrowing between them. The reconstructions presented in this chapter are part of a larger effort to disentangle these contact influences, and to reveal what Pre-Proto-Quechua and Pre-Proto-Aymara might have been like before their first contact (Adelaar 1986; Emlen 2017; Emlen to appear).

To be sure, the complexity of this language contact situation makes interpreting any aspect of the ancient Andean linguistic panorama a daunting task indeed. However, the patterns of borrowing themselves may offer a novel empirical vantage

point on this issue. For if one or the other linguistic lineage had a privileged association with farming or herding, or with a particular crop or ecological zone, then we would expect that language to be a source of borrowing for terms regarding those practices. This borrowing might have taken place within the Quechua-Aymara relationship itself, as well as with other languages in the region. On the other hand, if the early speakers of both the Quechuan and Aymaran lineages were already engaged in herding and cultivating economies before their first encounter, then we would expect each lineage to exhibit a full range of relatively independent – that is, non-borrowed – terminology related to those practices. Furthermore, if the lexicons of both proto-languages include separate terms for domesticates found in a variety of different ecological zones (along with their associated techniques, tools, products, etc.), then we can be confident that speakers of both languages accessed land in those zones. This would be consistent with the vertically distributed system of land-holding typical of Andean societies, whereby social groups herd and cultivate on land at a variety of elevations – often discontinuously – to support different kinds of crops and domesticated animals (Murra 1972). In fact, as will be shown in this chapter, this is what we find: when the many layers of Quechua-Aymara lexical borrowing are stripped away, it becomes clear that the early speakers of both lineages were engaged in sophisticated cultivating and herding economies from the high, wind-swept grasslands above 4000 meters; to the lush intermontane valleys above 2300 meters; and, in the case of the Quechuan lineage, perhaps into the tropical lowlands below 1600 meters.

In this manner, the examination of the lexicons of each proto-language may also help clarify some unresolved issues regarding the prehistoric linguistic dynamics of the Central Andes. First, if Pre-Proto-Quechua and Pre-Proto-Aymara were both distributed across social networks spanning ecological and elevational zones (perhaps discontinuously), this might suggest a sociolinguistic ecology in which languages were interspersed across the landscape rather than representing blocks on the map (this would be similar to the situation during the Inka period in Southern Peru, described by Mannheim 1991). This scenario would help explain the complex and gradient patterns of historical contact effects among the Andean languages, and it would require conceptualizing linguistic contacts and continuities that straddle different elevations and environments from the highlands to the lowlands (a common pattern in the region; see Emlen 2016).

Second, knowing what kinds of economic activities were practiced by the speakers of the Quechuan and Aymaran lineages before their initial contact might shed light on the sociolinguistic circumstances of that contact. As Muysken (2011) notes, the particular contact effects that emerged between the two lineages must be understood as the outcome of a particular political-economic encounter – involving, for instance, dominance, prestige, language shift or maintenance, or some

other type of sociolinguistic relationship – which may have correlates in the archaeological record. Information about the subsistence activities and elevational distributions of each group before their first contact would certainly be relevant to identifying this scenario.

Third, this approach offers a separate line of evidence regarding the aforementioned proposal of Heggarty and Beresford-Jones (2010) that the intensification of maize cultivation by Aymaran speakers was the ultimate cause of that family's dispersal across the Andes during the Early Horizon. If this was the case, we might expect Aymaran maize terms, and the techniques and products of maize cultivation, to have been borrowed into the languages with which the Aymaran family came into contact during its expansion (including Quechuan languages). However, it appears that the neighboring Andean languages already had vocabularies related to maize cultivation before their contact with Aymaran languages, and in the cases in which such terms are borrowed, they often come from Quechuan languages. These observations do not necessarily contradict Heggarty and Beresford-Jones' proposal, but they do suggest a more complex picture that might be clarified if we examine the kinds of subsistence activities that are encoded in the early lexicons of each linguistic lineage.

This chapter begins with a brief introduction to the history of the Quechuan and Aymaran lineages (Section 2), with a special focus on the multilayered contact between them. Our reconstructions of the agricultural and pastoral lexicons of Proto-Quechua and Proto-Aymara are presented in Section 3, including a brief discussion of the apparently innovative character of some of the Proto-Quechua terms. We conclude with some comments about these findings and their implications for the relationship between agropastoralism and the early Quechuan and Aymaran lineages.

## 2. The Quechua-Aymara relationship

Before describing the place of agricultural and pastoral terminology within the early history of the Quechuan and Aymaran languages, it is first necessary to present a concise historical summary of those linguistic lineages and the contacts between them. This is a very complex language contact situation, both because of the profound transformations that both lineages underwent as a result of their initial contact, and because various Quechuan and Aymaran languages have subsequently come into contact in other places throughout their long shared history. Thus, any question regarding the early Quechuan and Aymaran lineages must be answered within a framework that accounts for this contact.

The Quechuan and Aymaran families each comprise a group of closely related languages spoken by millions of people across a vast and overlapping expanse of the Central Andean region (for thorough introductions to these families, see Adelaar & Muysken 2004: 179–319; Cerrón-Palomino 1987; Cerrón-Palomino 2000). Varieties of Quechua are found more or less continuously from Southern Colombia in the north to Bolivia, Northern Argentina, and Northern Chile in the south; they are also found far into the Amazonian lowlands east of the Andes, and they were attested on the Peruvian coast until the colonial period. The Aymaran family comprises two surviving branches: the Southern Aymaran languages, spoken in Southern Peru, Bolivia, and Northern Chile, and the Central Aymaran languages, spoken in a few villages in the Department of Lima in Central Peru. Aymaran languages were probably also spoken further north, as attested anecdotally (Hardman 1966: 15), by the ubiquity of Aymaran toponymy in the Central Peruvian highlands, and by post-dispersal Aymaran loans in the Quechuan languages spoken there (see also Cerrón-Palomino 2008b). Furthermore, the Quechuan and Aymaran lineages underwent early contact before their dispersal across the Central Andes; and since Quechua appears to have spread from Central Peru, the ancestor of the Aymaran family must have been spoken there as well (for more, see Adelaar 2012a; Cerrón-Palomino 2000; Emlen 2017).

The Quechuan and Aymaran families are both relatively shallow – perhaps comparable in scope and time depth to the Romance languages, or slightly less (Heggarty & Beresford-Jones 2010: 172). Thus, a reasonable subjective estimate for the Proto-Quechua and Proto-Aymara stages and subsequent dispersals is 1000–2000 years BP. Both families appear to have dispersed from Central Peru. The comparative reconstruction of Proto-Quechua (Cerrón-Palomino 1987) and Proto-Aymara (Cerrón-Palomino 2000) does not present major problems; a more vexing challenge for scholars of Andean linguistics has been accounting for the great number of resemblances between the Quechuan and Aymaran languages. The languages share a substantial proportion of their basic and non-basic lexicons (15–30%, by most accounts); their phonemic inventories are nearly identical; and their heavily agglutinating morphosyntactic structures exhibit notable structural isomorphism (Cerrón-Palomino 2008a), though most of the grammatical morphemes themselves are different in form. Furthermore, some Quechuan and Aymaran varieties that share overlapping territories in Southern Peru and Bolivia exhibit similar series of glottalized and aspirated consonants (e.g. Mannheim 1991), including in many lexical items that are shared by both families (Emlen 2017: 324–332).

These resemblances have led some scholars to advocate for a Quechua-Aymara (or Quechumara) genetic grouping (e.g. Orr and Longacre 1968), a notion that has been entertained since at least the 17th century (see Cerrón-Palomino 2000 for a thorough overview). However, as linguists began to conduct systematic descriptive

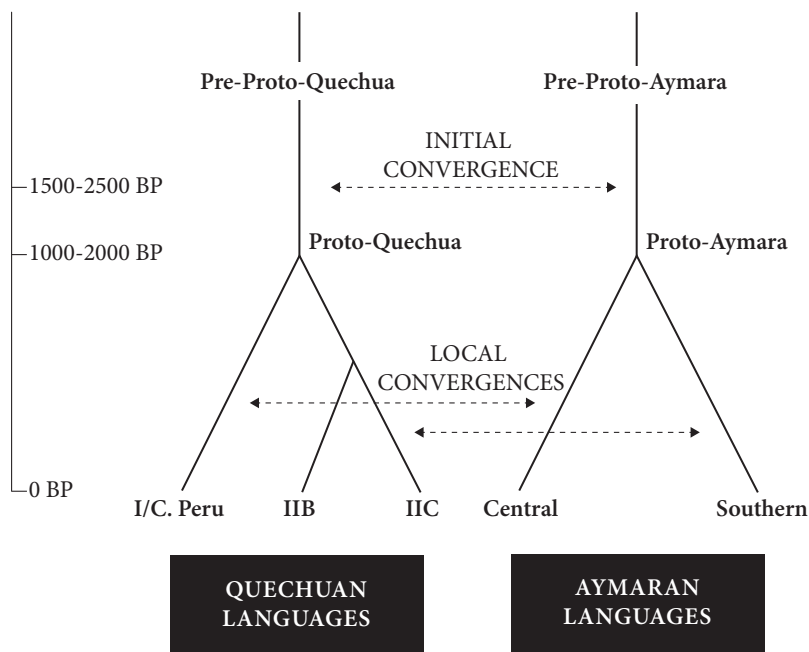
and comparative studies of Quechuan and Aymaran languages beginning in the 1960s, consensus emerged that many of the resemblances between the families were better explained as the product of intense language contact. Of course, this does not rule out the possibility that a deeper genetic grouping can eventually be discerned once the contact influences are accounted for (Adelaar 1986; Campbell 1995; Emlen 2017).

## 2.1 Pre-Proto-Quechua and Pre-Proto-Aymara

One of the biggest problems for interpreting the Quechua-Aymara relationship is the fact that all of the Quechuan and Aymaran languages exhibit the effects of their mutual contact; there are no (known) languages from either family that have developed outside of that contact. In other words, the earliest stages of Proto-Quechua and Proto-Aymara that can be reconstructed through comparison of their respective daughter languages existed after the first contact between the lineages had already taken place. This situation requires that we look even further back in both lineages, to the periods before the initial contact, to what Cerrón-Palomino (2000) and Adelaar (2012a) (among others) call Pre-Proto-Quechua and Pre-Proto-Aymara (note, however, that these were not necessarily static languages, but rather hypothetical periods before the first moment of contact; see Emlen 2017: 308). This also requires that we make a clear distinction between two periods of contact: those that took place between the two pre-proto-languages, before the stages of the proto-languages – what Adelaar (2012b) calls the “initial convergence” – and the subsequent “local convergences” that took place among individual Quechuan and Aymaran languages, after those families ramified and dispersed across the region. These terms will be used throughout this chapter.

The initial convergence probably took place a relatively short time before the proto-language stages of each family, since most of the roots borrowed during this time remained phonologically identical, or nearly identical, in Proto-Quechua and Proto-Aymara. Thus, if the proto-languages can be subjectively dated at one or two millennia BP, the initial convergence between Pre-Proto-Quechua and Pre-Proto-Aymara may have taken place around 1500–2500 years BP. If the Quechuan and Aymaran lineages do in fact descend from a common ancient language, it would have existed earlier than this period (perhaps much earlier); however, little evidence of such a connection remains once the contact influences of the initial convergence are taken into account. Of course, these figures should be taken as ballpark estimates, since the comparative method generates relative rather than absolute chronologies. Figure 1 gives a simplified graphic representation of this

history (dotted lines indicate known instances of language contact). Note that the image in Figure 1 is not to scale.<sup>1</sup>



**Figure 1.** Simplified history of the Quechuan and Aymaran lineages

The directionality of influence during the initial convergence appears to have been asymmetrical: Pre-Proto-Aymara took on a large quantity of Quechuan loans at this point, including non-basic and basic vocabulary such as the numerals \**kimsa* ‘three’ and \**piçqa* ‘five’. At the same time, the morphosyntax and perhaps the phonology of Pre-Proto-Quechua were reformatted on the Aymaran template (Adelaar 2012b; Emlen to appear; Muysken 2011). Both of these processes suggest a situation of stable, intimate, and possibly long-term multilingualism.

In order to understand the prehistoric dynamics of agriculture and pastoralism in the Andes, we must focus on the earliest discernible stages of each lineage: Pre-Proto-Quechua and Pre-Proto-Aymara. This requires disentangling the history of borrowing between the two lineages – both during the initial convergence and the subsequent local convergences – in order to clarify what their early lexicons

1. In the Quechuan diagram, the terms I, IIB, and IIC refer to branches identified by Torero (1964). C. Peru refers to the Quechuan varieties of Central Peru that do not fit easily into a branching representation of the family.

might have been like. To this end, Adelaar (1986) proposes that three categories of lexical items can be isolated within the Proto-Quechua and Proto-Aymara lexicons: (a) non-shared Proto-Quechua roots, which are attested across the Quechuan family but unattested in Aymaran languages; (b) shared roots, which can be reconstructed in both proto-languages; and (c) non-shared Proto-Aymara roots, which are attested across the Aymaran family but unattested in Quechuan languages. All things being equal, the non-shared roots in categories (a) and (c) are most likely to descend from Pre-Proto-Quechua and Pre-Proto-Aymara (respectively), and to retain the phonological characteristics of those pre-proto-languages. These phonological characteristics can then be used as diagnostic features to determine the provenance of some of the shared roots in category (b). Much of the Proto-Quechua and Proto-Aymara lexicons can be sorted accordingly. Emlen (2017) applied this methodology to a large corpus of reconstructed Proto-Quechua and Proto-Aymara roots, and posited several hundred Pre-Proto-Quechua and Pre-Proto-Aymara roots that descend from a period before the initial convergence. According to that analysis, as much as a third of the reconstructed Proto-Aymara lexicon may have been borrowed from the Quechuan lineage during the initial convergence. For more about these reconstructions, including the data and methodology, see Emlen (2017, to appear).

### 3. Agricultural and pastoral terminology in the early Quechuan and Aymaran lineages

The question addressed in this chapter is how terminology related to agriculture and herding fits into the history of Quechuan-Aymaran contact outlined above. The early agricultural and pastoral lexicons cannot be understood except with respect to this history; in addition, the borrowing patterns themselves may help answer important questions about the relationship between ancient languages and subsistence practices in the Andes. For instance, consider the following three possibilities: (a) we might find, once all of the borrowing has been accounted for, that only one pre-proto-language had a fully developed agricultural and herding vocabulary. It would be reasonable to conclude from this scenario that the political-economic context of the initial convergence was an encounter between people who were engaged in a mixed agricultural and pastoral economy, and people who were not. Or, we might find (b) that one pre-proto-language was associated with agriculture, and the other with herding, as in the more recent relationship of complementarity between Quechua-speaking cultivators in the intermontane valleys and Aymara-speaking camelid pastoralists in the high grasslands of the Andes (Urton 2012). If such a relationship functioned between the pre-proto-languages, we might expect

to find that asymmetry reflected in the subsistence lexicons. Or, finally, we might find (c) that both pre-*proto*-languages had fully developed agricultural and pastoral vocabularies. This would indicate a political-economic context in which both languages were already spoken by people engaged in mixed agricultural and pastoral economies before the initial convergence. In this scenario, each language would have been distributed across a range of ecological and elevational zones – what John Murra (1972) called a “vertical archipelago” of often discontinuous parcels in which a wide variety of crops and animals could be tended. These three scenarios illustrate how we might interpret the agricultural and pastoral vocabularies of each pre-*proto*-language and the subsequent patterns of borrowing between them. As will be clear from the following discussion, it appears that (c) is the most likely scenario.

The reconstructed Proto-Quechua and Proto-Aymara terms regarding agriculture and herding are presented in Table 1–Table 6 below. The terms are grouped in the following categories: crops and plant parts (Table 1); agricultural techniques, tools, structures, and materials (Table 2); food products derived from agriculture, and their associated tools and techniques (Table 3); domesticated animals (Table 4); herding techniques, structures, locations, and materials (Table 5); and weaving techniques and technology (Table 6). Terms that appear only in the Proto-Quechua or Proto-Aymara column are not shared by the other *proto*-language, and thus descend, according to our analysis, from Pre-Proto-Quechua and Pre-Proto-Aymara (respectively). Reconstructed terms that appear in both columns are shared by both *proto*-languages (e.g. \*kuka ‘coca’ in Table 1). These shared items are **outlined**, and in cases in which it is possible to determine their provenances, they are indicated in the center column. There are several diagnostic criteria for identifying such provenances: roots that begin with \*w or \*y, or that have internal non-resonant codas or final consonants, are likely Quechuan in origin (Emlen 2017). These are marked with ‘Q’. Initial \*l is one of few indicators of Aymaran provenance, as in \*lampa ‘shovel, hoe’ in Table 2. This is marked with ‘A’. Shared terms that do not exhibit these diagnostic criteria cannot be definitively attributed to one lineage or the other, and are indicated with a question mark in the center column (as with \*kuka ‘coca’ below). However, because the directionality of borrowing during the initial period appears to have been overwhelmingly from Quechua to Aymara, it is likely that most of the shared items presented below follow the same pattern.

Table 1 presents terms for Proto-Quechua and Proto-Aymara crops and plant parts. These include (a) tubers; (b) maize; (c) other high-elevation crops; (d) tropical crops; and (e) herbs. The terms in Tables 1–6 are presented alphabetically.

Table 1. Crops and plant parts<sup>2</sup>

Proto-Quechua	Provenance	Proto-Aymara
<i>(a) Tubers</i>		
*čawča ‘potato variety’		
*mašwa ‘tuber variety’		*šuta ‘potato variety’
*uʎuku ‘olluco (tuber variety)’		
*uqa ‘oca (tuber variety)’		
*wayru ‘potato variety’		
<i>(b) Maize</i>		
*čuʎpi ‘maize variety’		
*muruču ‘maize variety’		
*panqa ‘corn husk’		*paru ‘toasted, golden-brown, maize variety’
*sara ‘maize’		*suq’u ‘corn husk’
		*tunqu ‘maize’
<i>(c) Other high-elevation crops<sup>2</sup></i>		
*kinwa ‘quinoa’		
*tawri ~ *tarwi ‘lupine’		
<i>(d) Tropical crops</i>		
*kuka ‘coca’	?	*kuka ‘coca’
*šawintu ‘guava’		
*uču ‘chili pepper’		
*utku ‘cotton’		
<i>(e) Herbs</i>		
*wakatay ‘ <i>Tagetes minuta</i> ’		
*waʎwa ‘ <i>Psoralea glandulosa</i> ’		

A few observations can be made about the reconstructions in Table 1. First, despite the great overlap between the Proto-Quechua and Proto-Aymara lexicons, they each exhibit separate terms for tubers and maize. There are more terms for tubers in our Proto-Quechua lexicon, but this may be because the reconstructed Proto-Quechua lexicon is larger (824 roots) than the reconstructed Proto-Aymara lexicon (496 roots). Furthermore, there is reason to suspect that Proto-Aymara in fact had separate terms for many of the Proto-Quechua items listed in Table 1: Southern Aymaran exhibits its own set of such terms, but they are not reconstructable in Proto-Aymara because they do not have Central Aymaran cognates. These earlier Aymaran terms may have been replaced in Central Aymaran by Quechuan terms

2. It is possible that the Southern Aymaran term *hup<sup>h</sup>a* ‘quinoa’ is related to Central Aymaran *uhara* [uɸara] ‘maize’.

during the local convergence in Central Peru – indeed, the Central Aymaran lexicon appears to have borrowed around a quarter of its lexicon from neighboring Quechuan languages at this time (Emlen 2017: 337). No terms for tubers and maize crops in our corpus are shared at the level of the proto-languages. This suggests that speakers of Pre-Proto-Quechua and Pre-Proto-Aymara each cultivated these crops before the initial convergence, and that neither language had a special association with either maize or tuber cultivation before that time.

Furthermore, the reconstructions suggest that speakers of both languages cultivated crops at a range of different elevations: the tubers in Table 1 are mostly grown in the high *suni* and *puna* zones from 3500 meters to above 4000 meters (Pulgar Vidal 1987; Sandweiss & Richardson 2008), while most maize is grown in the *qheswa* zone between 2300 and 3600 meters, and in some places as high as 4100 meters (Staller 2016). This is consistent with a scenario in which both pre-proto-languages were distributed across ecological and elevational zones (as described above).

A notable difference between the Proto-Quechua and Proto-Aymara reconstructions in Table 1 is that tropical lowland crops (coca, chili pepper, cotton, guava) can be reconstructed in Proto-Quechua, but not in Proto-Aymara. This may suggest that the geographical range of Pre-Proto-Quechua extended further into the lowlands than that of Pre-Proto-Aymara (for instance, Gade 1975: 194 reports that guava is grown below 1600 meters in Southern Peru). However, this disparity may be due instead to the larger size of the reconstructed Proto-Quechua lexicon. Furthermore, the Aymaran languages that survive today are all found at high elevations – unlike today’s Quechuan languages, which are found across many elevations – so if there were once Aymara terms for lowland crops, they simply might not have been retained among today’s speakers. For example, it may be the case that Proto-Aymara had a term for ‘cotton’ (cf. Southern Aymaran *q<sup>h</sup>iya* ‘cotton’), but that its reflex does not appear in Central Aymaran varieties because their distribution today is far from the lowland areas where cotton is grown.

Table 2 presents Proto-Quechua and Proto-Aymara terms for agricultural techniques, tools, structures, and materials.

The patterns of borrowing found in Table 2 confirm those in Table 1: Proto-Quechua and Proto-Aymara each have rich lexicons regarding agricultural techniques, tools, structures, and materials, and only a few of these terms are shared between the two languages. This constitutes further evidence that speakers of Pre-Proto-Quechua and Pre-Proto-Aymara were both sophisticated agriculturalists before the initial convergence.

Unlike in Table 1, however, most of the reconstructed terms in Table 2 do not suggest particular elevations, but rather refer to techniques or tools used for a variety of crops (with the exception of some terms that refer specifically to the harvesting of potatoes). For this reason, these reconstructions tell us that the speakers

Table 2. Agricultural techniques, tools, structures, and materials

Proto-Quechua	Provenance	Proto-Aymara
		*ali 'plant, stem'
*a <sup>h</sup> la- 'to harvest potatoes'		
		*at <sup>h</sup> a 'seed'
*čakma- 'to plow earth'		
*čaqu- 'to clear land for agriculture'		
*tšakra 'agricultural plot'		
*(h)a <sup>h</sup> lma- 'to turn soil'		
		*hipi- 'chaff, to shear, thresh'
		*hunu- 'to dig, harvest potatoes'
*išku- 'to shell (grain)'		
*kantša 'corral'		
*lampa 'shovel, hoe'	A	*lampa 'shovel, hoe, flat'
		*lama- 'to harvest, harvest potatoes, pick'
		*mač'a- 'fallow, dry season, to irrigate'
*mu <sup>h</sup> u 'seed'	?	*mu <sup>h</sup> u 'seed'
*murka- 'to thresh'		
*pa <sup>h</sup> la- 'to harvest, pick'		
*parqu- 'to irrigate'		
*pata 'terrace, platform'	?	*pata 'terrace, platform'
*pirwa 'granary, storage'	?	*pirwa 'granary, storage'
*qu <sup>h</sup> lpa- 'granary; to store'		
		*qurpa 'furrow, ditch, boundary'
*rawma- 'to prune'		
		*sa- 'to sow seeds'
*šikwa- 'to broadcast seeds'		
*šuka 'furrow'		
*tak <sup>h</sup> la- 'foot plow, to plow'		
*tarpu- 'to sow seeds'		
*wanu 'guano (fertilizer)'	Q	*wanu 'guano (fertilizer)'
*yapu- 'to plow'	Q	*yapu 'agricultural plot'
*yura 'plant'		

of Pre-Proto-Quechua and Pre-Proto-Aymara practiced agriculture, but not which crops they cultivated.

Table 3 presents food products derived from agriculture, as well as the tools and techniques used to produce those foods.

The patterns in Table 3 are more difficult to interpret than those in Table 1 and Table 2. Here, we see that Proto-Quechua has a robust lexicon of agriculturally derived food products, as well as terms for the tools and methods used to prepare them. Proto-Aymara also has roots that refer to grinding and flour, but most of

Table 3. Food products derived from agriculture, and associated tools and techniques

Proto-Quechua	Provenance	Proto-Aymara
		*aku 'flour'
*anka- 'to toast beans or corn'		
*api 'a gelatinous porridge'		
*aswa 'chicha (corn beverage)'		
*čučuqa 'corn-based dish'		
*čuñu 'dehydrated potato'	?	*č'uñu 'dehydrated potato'
*čuqʷu 'corn on the cob'	Q	*čuqʷu 'corn on the cob'
*kaʷana 'pan for toasting grain'		
*kamča- 'toasted corn, to toast'		
*kaspɑ 'ear of corn'		
*matʃka 'toasted grain flour'		
*muti 'boiled corn kernels'	?	*mut'i 'boiled corn kernels'
*pʷiqa 'corn flour'		
*qawi 'dried oca'		
*tanta 'bread'	?	*t'anta 'bread'
		*t'iki- 'to grind, mix'
		*utʃɑ- 'porridge, mush, to gulp'
		*uʷɑ '(over)cooked or spoiled potato'
*upi 'corn juice'		
*wayunkɑ 'ear of corn hung up to dry'		

\*\* The term \*tanta may have had a different meaning in Proto-Quechua.

the Proto-Aymara terms for agriculturally derived food products themselves are shared with Proto-Quechua (and likely come from the Quechuan lineage, since that was the primary directionality of borrowing during the initial convergence). It is not clear why Proto-Aymara terms for food products would be borrowed from the Quechuan lineage, if the crops and techniques used to make them already existed in Pre-Proto-Aymara. This might suggest an Aymaran adoption of Quechuan cultural products, or it may simply be an artifact of the data samples. Note too that maize-related terms in Proto-Aymara come from the Quechuan lineage (e.g. \*čuqʷu 'corn on the cob' and, probably, \*mut'i 'boiled corn kernels'); this does not support a scenario in which the Aymaran lineage has a privileged association with maize cultivation, at least at this early time.

Table 4 presents the reconstructed Proto-Quechua and Proto-Aymara lexical items that refer to domesticated animals.

The reconstructions in Table 4 show that terms for domesticated animals can be reconstructed in both Proto-Quechua and Proto-Aymara, and that each lineage has largely distinct terms for these animals. Thus, speakers of Pre-Proto-Quechua and Pre-Proto-Aymara likely both had domesticated animals before the initial

Table 4. Domesticated animals

Proto-Quechua	Provenance	Proto-Aymara
		*k'uyi 'guinea pig'
*lama 'llama'		
*paqu 'alpaca'		*qawra 'llama'
*uña 'juvenile domesticate'		
*uywa 'domestic animal'	?	*uywa 'domestic animal'

convergence. While this small sample does not support many generalizations regarding types of domesticates, one conclusion can be drawn: the fact that each lineage has separate terms for domesticated camelids indicates that speakers of both pre-*proto*-languages practiced high elevation camelid pastoralism before the initial convergence. If this is the case, then the two languages not only cross-cut elevational and ecological zones – in this case, extending to the high *puna* grasslands (4000–4800 meters) where camelids are herded – but were also spoken by herders as well as cultivators.

The reconstructed lexical items referring to herding techniques, structures, locations, and materials are presented in Table 5.

Table 5. Herding techniques, structures, locations, and materials

Proto-Quechua	Provenance	Proto-Aymara
		*ana- 'to herd'
		*awati- 'to graze, pasture'
*t̥saqna- 'to hobble an animal'		
		*(h)ik <sup>h</sup> a- 'to herd'
*miči- 'to pasture, feed'		
*puna 'high grasslands'		
*qarqu- 'to expel, drive out of a corral'		
*qati- 'to herd, drive (animals)'		
*qayku- 'to drive into a corral' <sup>3</sup>		
*qint̥sa 'corral, enclosure'	?	*qint̥sa 'corral, enclosure'
*qiwa 'fodder, pasture grass'		

3. The Proto-Quechua terms in Table 5 that relate to herding (\*qarqu- 'to expel, drive out of a corral', \*qati- 'to herd, drive (animals)', and \*qayku- 'to drive into a corral') are lexicalizations of an earlier Pre-Proto-Quechua monosyllabic root \*qa 'to move, displace, herd (animals)' (Emlen to appear). Proto-Quechua probably also had other terms comprising \*qa and the other directional suffixes: \*qarku- 'to turn earth, drive animals uphill' and \*qarpu- 'to push downward, drive animals downhill'. These terms survive in some Central Peruvian varieties of Quechua.

Proto-Quechua	Provenance	Proto-Aymara
		*uyu ‘corral’

The reconstructions in Table 5 demonstrate that a wide range of techniques, technologies, and materials connected to camelid pastoralism were used by speakers of Proto-Quechua and Proto-Aymara, and that each linguistic lineage has a rich and mostly separate vocabulary related to herding. This constitutes further evidence that speakers of both pre-proto-languages likely engaged in this subsistence activity before the initial convergence, and that the geographical reach of both languages included the high *puna* grasslands.

The use of fibers from alpacas and vicuñas is an important part of Andean domestic production, and it is closely connected to pastoralism. The reconstructed lexical items related to weaving techniques and technology are presented in Table 6.

**Table 6.** Weaving techniques and technology

Proto-Quechua	Provenance	Proto-Aymara
*awa- ‘to weave’		
*awáí- ‘to warp, weave’		
		*tʂ’anka ‘yarn, woolen thread’
		*tʂ’isa- ‘fuzz, lint, to card, comb wool’
*iáawa ‘shuttle, warp’	?	*iáawa ‘shuttle, warp’
*kaáwa ‘weaving instrument’		
*kurur ‘ball of yarn, clew’		
*miáwa ‘wool’		
*mini- ‘weft, to weave’		
*piruru ‘whorl’	?	*p <sup>h</sup> iáuru ‘whorl’
		*p’ita- ‘to weave’
		*p <sup>h</sup> awi- ‘to wind, spin thread’
*pučka- ‘spindle, to spin thread’		
		*qapu- ‘spinning wheel, to spin thread’
*qaytu ‘strand, thread’		
		*sayu- ‘to weave’
*šukšu ‘part of spinning wheel’		
		*t’apra ‘wool’

Like in the other reconstructions given above, the Proto-Quechua and Proto-Aymara terms that refer to weaving and spinning in Table 6 are mostly distinct. This suggests that speakers of both pre-proto-languages likely produced textiles from camelid fibers. These patterns, along with those found in Table 4 and Table 5, constitute evidence that pastoralism was practiced in the high *puna* grasslands by speakers of both Pre-Proto-Quechua and Pre-Proto-Aymara.

### 3.1 The innovative character of some Proto-Quechua agropastoral terms

A final observation can be made about Proto-Quechua agricultural and pastoral terms. As part of a process that took place across the whole of the Proto-Quechua lexicon, some of these items appear to be lexicalizations of archaic, monosyllabic Pre-Proto-Quechua roots (see, for instance, Adelaar 1986; Adelaar 2008; Emlen to appear; and Muysken 2011). Significantly, some of these were not originally related to agropastoralism.

For instance, \*parqu- ‘to irrigate’ appears to comprise an archaic Pre-Proto-Quechua root \*pa- ‘to fall (water), wetten’ and the well-documented directional suffix \*-rqu ‘outward motion’, which still exists in some Quechuan languages. The resulting Proto-Quechua root \*parqu- would have meant ‘to distribute water outwards’. But while irrigation is central to Andean agriculture, \*pa- did not have a specifically agricultural meaning in Pre-Proto-Quechua: it appears to be lexicalized, to give just a few examples, in Proto-Quechua roots such as \*paqča ‘waterfall, stream of water’; in Central Peruvian Quechua roots such as *paqa-* ‘to wash, bathe’ and *patška-* ‘to splash water’; and in Southern Peruvian Quechua roots such as *p<sup>h</sup>awchi* ‘waterfall’, *p<sup>h</sup>api-* ‘to moisten dry corn to remove husk’, *p<sup>h</sup>aspay* ‘light irrigation’, and *para-* ‘to rain’ (Academia Mayor de la Lengua Quechua 2005).<sup>4</sup> Therefore, it appears that speakers of Proto-Quechua innovated this term for irrigation from a non-agricultural root already present in the lexicon.

Similarly, Proto-Quechua \*tarpu- ‘to sow seeds’ and \*takła- ‘foot plow, to plow’ both contain a Pre-Proto-Quechua root \*ta- that refers to hitting, knocking, and pushing (cf. \*taka- ‘to punch, knock’; \*taqła- ‘to slap, punch’; \*tanqa- ‘to push’). \*tarpu- ‘to sow seeds’ also includes a well-documented directional suffix \*-rpu ‘downward motion’; the resulting bimorphemic construction would have meant ‘to hit or push downwards’. Other examples of roots lexicalized from Pre-Proto-Quechua \*ta – just from the Cuzco variety (Academia Mayor de la Lengua Quechua 2005) – include *t<sup>h</sup>aqta-* ‘to flatten earth’; *t<sup>h</sup>aqti-* ‘to stomp, especially during dancing’; *t<sup>h</sup>aqpa-* ‘to throw earth onto’; *t<sup>h</sup>aya-* ‘to turn earth with plow’; *t<sup>h</sup>asta-* ‘to flatten, shorten’; *t<sup>h</sup>armi-* ‘to smash, stomp’; *t<sup>h</sup>almi-* ‘to dig, scratch, look for leftover tubers’; and *t<sup>h</sup>awi-* ‘to dig, looking for roots or tubers’. Such roots, some of which refer to agricultural techniques and some of which do not, are also ubiquitous across the other Quechuan languages.

If speakers of Pre-Proto-Quechua constructed novel pastoral and agricultural terms on the basis of earlier roots (like \*pa- and \*ta-, among many others) that did not have such meanings, this may suggest that agropastoralism was adopted at this

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4. Note that it is not always clear what the adjoining morphology in these roots might have been.

point in the Quechuan lineage. As discussed in the introduction, this might have taken place between 3500 and 5500 years BP, when agropastoralism first developed in the Andean highlands. On the other hand, it is not necessarily the case that the speakers of Pre-Proto-Quechua adopted agropastoralism upon its first emergence in the Andean highlands (for instance, if Pre-Proto-Quechua made its way to the Andes from another part of South America where agropastoralism was not practiced). However, other Quechuan agropastoral terms do not appear to have been formed this way, and the nature of this process itself is still poorly understood (for more on this topic, see Emlen to appear).<sup>5</sup>

#### 4. Conclusions

A few conclusions can be drawn from the foregoing presentation of agricultural and pastoral terminology in Proto-Quechua and Proto-Aymara. To begin with, some comments are in order regarding the relevance of this case to the Farming/Language Dispersal Hypothesis that is the topic of this volume.

Despite the fact that the Quechuan and Aymaran languages are widely distributed across a landscape with a long history of agriculture and pastoralism, they do not constitute a straightforward test of the Farming/Language Dispersal Hypothesis. That hypothesis proposes that the languages of agriculturalists replace the languages of neighboring hunter-gatherers. However, as discussed in the introduction to this chapter, the initial dispersal of the Quechuan and Aymaran families (perhaps one or two millennia BP) took place long after an agropastoral economy had already developed across the Central Andes (between 3500 and 5500 years BP). Thus, the Quechuan and Aymaran families spread across a landscape that had already been populated by farmers and herders, rather than hunter-gatherers, as the Hypothesis asserts. Furthermore, many of the languages with which the Quechuan and Aymaran families came into contact during their dispersals already had their own agricultural lexicons. This is not consistent with a scenario in which the Quechuan and Aymaran families were propelled across the landscape because their speakers possessed a subsistence advantage over their hunter-gatherer neighbors.

This leaves open the question of what economic and social forces propelled the families across the region. On this question, Heggarty and Beresford-Jones (2010) refine the Farming/Language Dispersal Hypothesis for the Central Andean context

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5. It is interesting to note that some of these monosyllabic elements are the basis of ideophones in Quechuan languages (as well as others across Western South America). To give just one example, Nuckolls (1999: 242) reports that in Pastaza Quechua, *tak* (related to Pre-Proto-Quechua \*ta discussed above) refers to “the sound of contact between two firm surfaces.”

by arguing that it was not the advent, but rather the later intensification of maize cultivation, long constrained by the diversity of Andean micro-environments, that led to the more recent dispersal of the Aymaran family. Our findings do not point to an alternative scenario for the initial Quechuan and Aymaran dispersals, but rather simply suggest that any link between the adoption of agropastoralism (or particular domesticates) and the expansions of those families is indirect at best.

It should be noted in passing that the history of Quechuan and Aymaran agropastoral terms can be correlated with the dates offered by the archaeological record, in a manner similar to the analysis put forth by proponents of the Steppe Hypothesis of Indo-European origin. According to that hypothesis, the presence of terminology referring to wheeled vehicles in the earliest periods of Proto-Indo-European suggests that the speakers of that language cannot have lived earlier than 6000 years BP, when wheeled vehicles first appear in the archaeological record (Anthony & Ringe 2015; Mallory & Adams 2006; see also Chang et al. 2015). Similarly, the presence of agricultural and herding terminology in both Pre-Proto-Quechua and Pre-Proto-Aymara suggests that the speakers of those languages cannot have lived before the advent of agriculture and herding in the Andes, which developed between 3500 and 5500 years BP. However, since Pre-Proto-Quechua and Pre-Proto-Aymara were likely spoken much later than these dates (see Figure 1), this merely confirms what was already evident.

But while the relationship between the adoption of agropastoralism and the Quechuan and Aymaran dispersals remains murky, our reconstructions do yield a number of other novel insights regarding cultivation and herding among speakers of Pre-Proto-Quechua and Pre-Proto-Aymara. Indeed, when we begin to disentangle the layers of lexical borrowing between the two lineages – a methodological prerequisite for any consideration of Quechuan and Aymaran prehistory – two notable facts become clear.

First, the parts of the Proto-Quechua and Proto-Aymara lexicons that refer to agropastoralism, including the names of domesticates, tools, techniques, products, etc., are mostly separate. This indicates that speakers of both Pre-Proto-Quechua and Pre-Proto-Aymara were likely both engaged in mixed agricultural-pastoral economies before the initial convergence some 1500–2500 years BP. If they were not, we would expect some degree of borrowing in these lexical domains, particularly during the initial convergence when the Aymaran lineage took on around a third of its lexicon from Pre-Proto-Quechua.

Second, both pre-proto-languages exhibit terms for cultivation and herding at a wide range of ecological and elevational zones, including camelid pastoralism above 4000 meters; the cultivation of tubers above 3500 meters; maize agriculture from 2300 to 3500 meters – and in some places as high as 4100 meters (Staller 2016); and in the case of the Quechuan lineage, tropical crops like guava, grown

below 1600 meters. The speakers of both pre-proto-languages, in other words, appear to have moved or sustained contact across elevations and engaged in various subsistence practices – perhaps, in the case of Quechua, into the tropical lowlands. This would be consistent with the typically Andean model of ecological complementarity, as well as with an integrated vision of highland-lowland socio-economic and linguistic continuities in Western South America (Emlen 2016). This discontinuous settlement pattern may have created a sort of Jackson Pollock-esque array of overlapping social contacts, generating what Mannheim calls, referring to the Southern Peruvian Andes some time later, a “mosaic of territorially interspersed languages” (Mannheim 1991:60). Such a scenario, in which a variety of related and unrelated languages were likely spoken side by side in a multilingual environment spanning ecological zones, may help explain the pervasive and continuous language contact effects found in the Central Andean region. Furthermore, since ecological complementarity was the foundation of robust Andean economies, the inter-elevational nature of Quechuan and Aymaran-speaking social networks may itself have contributed to the dispersals of both language families.

## Acknowledgements

Thanks to Martine Robbeets, Alexander Savelyev, Anna Berge, and Bruce Mannheim, who all provided helpful comments on earlier versions of this chapter. Thanks also to Sophia Nicolay. The research leading to these results received funding from the European Research Council under the European Union’s Seventh Framework Programme (FP7/2007–2013)/ERC grant agreement number 295918.

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Why do some languages wither and die, while others prosper and spread? Around the turn of the millennium a number of archaeologists such as Colin Renfrew and Peter Bellwood made the controversial claim that many of the world's major language families owe their dispersal to the adoption of agriculture by their early speakers. In this volume, their proposal is reassessed by linguists, investigating to what extent the economic dependence on plant cultivation really impacted language spread in various parts of the world. Special attention is paid to “tricky” language families such as Eskimo-Aleut, Quechua, Aymara, Bantu, Indo-European, Transeurasian, Turkic, Japonic, Hmong-Mien and Trans-New Guinea, that cannot unequivocally be regarded as instances of Farming/ Language Dispersal, even if subsistence played a role in their expansion.

ISBN 978 90 272 1255 9



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