Weeds and Farmer Decision-Making in Cochabamba

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To be included in a larger report by the PROMASSEL Team.

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Preface

Quechua words are in **bold** and Spanish terms are in *italics*. Words and phrases that are blends of the 2 languages are in ***bold and italics***.

1 Number, Timing and Method of Weeding

For each principal crop, how many weedings are normally carried our? When (DAS)? Using what method/equipment?

1.1.Number of Weedings

The number of weedings per crop is shown in Table 1. For an exact count of the number of weedings, please see the coding sheets (file name: agricultor_entry.jwb2).

For this study, I define the major crops as:

- Andean tubers (potatoes, oca, papa lisa, isaño)
- Maize
- Small grains (wheat, barley, oats and any other similar, European grain)
- Habas (broad beans?)

Definition of "weeding": any human behaviour that removes or damages wild, annual plants in farmers' fields, after sowing.

Table 1: Number of Weedings per Major Crop

Crop	No. Of Weedings	Description
Andean tubers	2-3	Usually 1 weeding with hoes, and 2 *aporques* (hilling-up, or furrowing) made with an ox plough or with a pointed hoe).
Maize	2-3	Usually 1 weeding with hoes, 1 *aporque*, with plough or pointed hoe, and 1 harvest of weeds with a sickle, late in the cycle (the weeds are then fed to oxen and other livestock).
Small grains	0-1	1 hand-pulling of tall weeds, especially *Brassica campestre*, both for eliminating weeds, their seeds, and for cattle forage. Unlike the other crops, which are planted in rows, small grains are sown by broadcasting, and farmers say that weeding them with tools would damage the crop.
Habas	2	1 hoe weeding and 1 *aporque*, similar to those done for maize. The habas usually shade out weeds later in their cycle, so that there is little to harvest for oxen by February or March.

1.2 Timing of Weeding

Please see coding sheets.

1.3 Equipment and Methods of Weeding

List of equipment

Team of oxen (*yunta*). Traditionally used with a wooden ard plough. Since the early 1980s often replaced by a small, metal plough, introduced by the Swiss-funded CIFEMA Project.

Hoe (*azadón*). A commercially-available, steel hoe blade, fixed to a home-made wooden handle.

Pointed hoe (called a **chhujchuka** in Esteban Arce, a **lampa** in Tiraque and a **qallu** in Ayopaya). Like the hoe described above, except that the blade is shaped like a triangle, with the handle hafted onto one of the sides, and the farmer works the soil with the opposite point of the triangle. This tool works as a kind of hand-held plough for small or steep fields.

Weeding tasks

Aporque is the Spanish term for hilling-up (or furrowing, ridging). The Quechua language generally distinguishes between first and second *aporque*s. For example, in Tiraque the first *aporque* is called **ch'ixtana** and the second aporque is **jallmana**. The first *aporque* tends to be shallower, both because the tubers/roots are smaller when it is done, and because the first *aporque* is done to break the soil and dry it out. This helps manage tuber rot, besides controlling weeds. The main purpose of *aporque* seems to be soil and water management, rather than weed control. Farmers showed us several fields of Andean tubers that were virtually weed-free, yet the villagers said that the field was due for an *aporque* soon. They say the tubers will spread out and break the soil surface, if they are not covered in a high, steep ridge of soil. In a dry year, or in dryer fields, farmers may skip at least one of the *aporques*.

The preferred method of hilling-up is with an ox-drawn plough. If the field is large and the farmer is short of labour, the plough may be the only tool used for this task. But generally, the farmers go back over their fields with a hoe and finish hilling and weeding near the crop plants. If the weeds are especially sparse, small, or if the people need feed for their livestock, the farmers may hand-pull the weeds close to the crops.

Qhuray is the verb for "weeding." Like the English verb "to weed", the Quechua verb is based on the noun for "weed" (**qhura**). Weeding is with a hoe. It is often done a few days before hilling up, to clear the field of weeds and to give the ox team easier passage through the rows.

Ruthuy ("to cut") is the word farmers use to describe hand cutting of weeds with a sickle. This is generally in March, near the beginning of the dry season. The crops are not yet ripe and the ground must be broken in fallow fields for the next cycle. Farmers harvest the weeds in one crop (especially maize), wash them, and take them to a nearby fallow field to feed to oxen. In San Isidro, farmers described this task as ***masida*** or **masichiy**, words based on the noun **masi** ("cat"). They said they did it to keep mice from climbing up the weeds and onto the ripe ears of corn, although they sometimes did feed the weeds to their animals.

Urquy makiwan ("to remove by hand"). Farmers hand-pull certain tall weeds, especially *nabo* (*Brassica campestre*), especially from among the small grains. They do this for 3 reasons: to eliminate the weeds, to kill future weed seeds, and to feed the *Brassica* to their cattle.

Although there are other, shorter weeds growing under the grains, besides *nabo*, farmers say that the grains will shade most of them out, and that most that remain will be fed to livestock. Wheat and barley are for household consumption (or for sale as grain) and

farmers harvest them by cutting the stalks off at about 30 cm above the ground. Later, they pasture their animals on the stubble. Oats are for livestock, and so farmers cut them off near the ground, weeds and all, and feed the whole bundle to their livestock. Either way, the animals end up eating the weeds. One of the few farmers who used any herbicide, in Piusilla, did so on a large field of oats, that he intended to sell to a dairy farmer in Quillacollo. Farmers we talked to have no objection to weedy oat fodder for their own animals (few of which are dairy cattle). Farmers complain that **muni** is a serious weed in small grains, and that because it has thick roots, they cannot pull it out without damaging the grain plants. **Muni** grows in potatoes, but farmers simply hoe it out.

Crop rotation

Although crop rotation is not a weeding activity, rotation fulfils many purposes in Andean farming systems; rotation wears many hats, one of which is to control weeds. The basic rotation is something like this (with one crop per year):

Fallow→potatoes→other Andean tubers→maize and/or habas→small grains→fallow

There are many variations on this rotation, some involving only 2 or 3 crops, but the above rotation seem like the basic one to me.

Other options include:

Fallow→potatoes→small grains→fallow
(for extensive crops on large, dry fields)

potatoes→haba→potatoes→haba
(intensive gardening with irrigation)

potatoes→small grains (in the same year)→maize & haba (same field)→potatoes
(i.e. 3 plantings every 2 years; intensive, with irrigation)

There are still other types, e.g. potatoes→potatoes, but I consider the above rotations to be the main ones.

The main constraints to rotation are:

- potatoes must follow fallow
- small grains (or sometimes, habas) are preferred to end the cycle.
- small grains always end the cycle, if there is a fallow
- in the more intensive systems, small grains may be eliminated or moved to the middle of the cycle, in order to fit 2 crops (potatoes and small grains) into one year. These systems are heavily weeded and ploughed.

Potatoes are usually the only crop that is fertilised, or at least the only one that is heavily fertilised. Other crops use nutrients banked during the potato crop.

When we asked farmers why they ended the cycle with small grains, they said it was because grains improved the soil, or fed the soil for potatoes. But farmers frequently said things like “not even oats can eliminate X weed” which suggested that farmers were aware that small grains out-compete weeds. When I explicitly asked some of the

farmers if they ended a cycle with small grains in order to eliminate weeds, they said yes.

2 Land Preparation

Do timing and method of land preparation vary according to weed type?

The "default value" is to plough fields with oxen, during the dry season. It is common to plough twice, with the second one at right angles to the first (the traditional Latin American "*cruzada y arada*"). In the study area, special conditions usually lead to the following modifications in land preparation.

Long fallow
After a fallow of 7-10 years, the ground is covered in native vegetation (**ichhus** and **yapa khishka** etc.), thick tussocks of bushy grasses. Farmers consider this vegetation to be a sign that the field is ready to be planted again, and they tend to avoid planting until the vegetation becomes thick. After ploughing, farmers leave the uprooted vegetation to dry for several weeks, then pile it up and burn it, or less frequently, toss it off the edge of the field (especially near the edges).

Large flat fields
These are common only in Sacabamba, and less so in Qulqi Xuya and Pairumani. They can be ploughed with hired tractors, late in the dry season, when the soil is dry and hard, without having to hurry to plough early in the dry season when the earth is still moist. This seems to be an option for farmers with slightly more capital. These tend to be fields that are cropped for 2-4 years, then fallowed for 1-2, so that the native vegetation is not still mostly weedy annuals.

Very steep or small fields
Farmers hand-turn the soil in these fields, with picks and pointed hoes. An ox team with a plough needs about 7 meters to turn around, so fields of less than a few hundred square meters cannot be ploughed with oxen, unless the field has a turn-around space off the field (e.g. in the field of a friendly neighbour). On very steep fields (perhaps over 50º, please correlate with slope data taken by S. Pérez) oxen cannot work. Farmers say the cattle stumble and make crooked rows. One man described an ox team tumbling to the bottom of a particularly steep field. In Cochabamba, farmers carry their ploughs over their shoulder, not tied between their oxen. No doubt, the thought of lugging a 25 kg. plough for an hour up a slope as steep as a staircase is enough to cause some farmers to reach for their pointed hoe, instead of the plough.

Intensive farming with irrigation
Irrigation is correlated with intensive farming, growing crops year after year, sometimes all year long, often in fields that diminish to the size of gardens. In these fields weed populations may be passed on from year to year, farmers may be unwilling to allow long breaks between ploughing and sowing, and irrigation water may allow farmers to soften the soil at any time of year. These fields, especially in Yunkataki, are flooded a few weeks or days before sowing, to make ploughing easier. In Yunkataki, the most intensively cropped area we studied, farmers plough twice (*arada y cruzada*), then harrow the soil, allow it to sit for about 3 weeks, then plough it again. This seems to be

an attempt to use a lot of ploughing to knock down weed populations early in the cycle. Some farmers in Yunkataki even plough between potatoes and grain, which is unusual (see following section). Again, this seems to be a kind of weed control for intensive agriculture (or gardening), although farmers did not explicitly say this. (When asked, they made statements like "if we didn't do this, we could not produce anything.")

Some of the farmland in Yunkataki is heavily eroded. Farmers have abandoned some fields on slopes facing the village, and others above it, because the topsoil has eroded away completely. They are now adopting live barriers of *Phalaris* grass (introduced by the DfID-funded Hillsides Project) and are aware of the need to control further erosion.

Effect of previous crop
Andean valley farmers pay close attention to the sequence of crop rotation. Land that is cropped without a fallow is called **qallpa**. When farmers plant crops following potatoes (that is, when they plant in **papa qallpa**) they usually do not plough the soil, but sow directly into earth, already heavily worked during the potato harvest. One exception we found was in San Isidro, where farmers planted maize following broad beans (that is, maize in ***haba qallpa***); they ploughed once, at a 45º angle to the old bean furrows, to break up the ridges. They would have liked to have ploughed at a 90º angle, but the slope was too steep to plough straight down hill.

Direction of furrow
Farmers consistently cut furrows as a gentle slope, almost on the contour, if the field is steep. They say that they do this to allow water to drain, but slowly. On fields that are almost flat, farmers cut the furrows in the direction of the slope, so that excess water does not puddle at the head of the field. These practices are done to manage water, but are consistent with soil conservation.

3 Slope and Likelihood of Soil Erosion

Are weed management decisions affected by slope/likelihood of erosion?

Farmers voiced little concern over erosion. When they did, they often used the Spanish word "*erosión*," even when speaking Quechua, which suggests that they learned the concept from extension agents. Farmers chose from the following technical options for working soil, based on slope, but their decisions are influenced much more by the ease of working on slope than by their concern over erosion:

Tractors—used only for land preparation and only on the larger (4,000 square meters and more), flattest fields.

Oxen—chosen for moderately flat land and medium-sized plots. On sloping land, farmers may plough with oxen, but then ridge the soil with a pointed hoe; this is because the ploughman wants greater precision while making the earthen ridges around the crop. An ox that stumbles while ridging may step on and damage a healthy maize or tuber plant.

Hilling with hand-tools—as mentioned above, is an option for small or steep fields. Farmers say that when hand-hilling (*aporcando*) on flat land, the soil moves in both

directions away from the pointed hoe. However, when hand-hilling on slopes, the soil always moves downhill. Farmers are only slightly concerned about this, and say that it cannot be helped, that the soil tends to move downhill on steep slopes.

Potato harvesting—We watched one group of people hand harvest a small, steep field of potatoes in San Isidro. They stood downhill from the plants, and popped them out of the ground one at a time with a pointed hoe. Each plant that was unearthed brought several litres of soil 30-50 cm further down the slope. Some small potato fields are sunken 50 cm below the surrounding ground surface, as a result of harvesting and other soil-moving tasks.

4 Menus of Weed Control Types

Each farmer is likely to have "menus" of field types and control methods. A categorisation will be made of control types vs. field type/weed type.

Much of this information has been presented in previous sections. The Table 2 summarises it.

Table 2: Menu of Control Options and Field or Weed Types

Control type	**Field or weed type**	**Reason**
Weeding with a hoe	Andean tubers and maize and habas, especially early in the growing season.	To eliminate weeds quickly and early in the season, especially to clear the ground before *aporque* (hilling or ridging) with an ox plough.
Aporque with a plough	On flat or moderately sloping fields, especially if the field is not too small.	To dry the soil and to manage soil-born pathogens, as well as weeds, and especially to pile a ridge of soil over roots and tubers, which keeps them from surfacing and helps prevent wind lodging.
Aporque with a pointed hoe	On small or steep fields of Andean tubers, maize and haba.	For the same reasons as above, but is more labour-intensive. Used where an ox team is not convenient.
Hand pulling	Tall, flowering weeds, especially *B. campestre*, especially in fields of small grain.	Eliminate weeds, keep them from producing seeds and provide fodder.
Cutting weeds with sickle	Mature weeds, late in the cycle, especially in maize fields.	Prevent rodent damage and provide fodder in the hungry season.

When we asked farmers to describe how they decided to weed, they often looked at us as though they thought the answer was obvious and uninteresting. They occasionally volunteered the information that they were waiting for the soil to dry more before doing the next aporque (1999-2000 was a wet year). They said they wanted to work the soil when it was neither muddy nor very dry, but simply moist (a condition they described with the word **phiri**). They weed and ridge less in dry years, because they are fully aware that this dries the soil.

Before cutting mature weeds from a maize field (for rodent control), farmers said that they would wait until the pollen had fallen from the maize tassels. Otherwise, the maize would not form grain properly.

When we asked, farmers said they decided to weed when there was "a lot" (**ashka**) of weeds, or "when weeds appear" (**qhura rikhuxtin**). It seemed so obvious to them that they resisted further questioning on the subject. I suggest that for further research we might select several fields with different weed densities and take farmers to them, to ask them which they thought needed weeding, and what kind, to try to objectify the meaning of "weeds have appeared" or "there are a lot of weeds."

5 Other Notes on Weeds

Labour
In general, the smallholder farming systems of Cochabamba are labour-intensive; farmers weed often. Some of the Andean tuber fields seem over-weeded, with tall, bare ridges of soil heaped over the base of the plants.

Near the Agricultural College, farmers told us that they weeded if they "had the time." This is because they are part-time farmers, with wage jobs. Few people in any of the 6 rural communities said they ran out of time to weed. Weeding was a priority for these professional farmers. We saw few very weedy fields, either among the fields we studied or among the fields we walked past.

Pesticides
Farmers use very little herbicide. Insecticide and fungicide use is common, especially on potatoes.

Soil amendments
Farmers seem to use as much animal manure as they can, especially on potatoes, especially nearer the farmstead and especially in Pairumani & Qulqi Xuya (Tiraque), where farmers can buy manure at the farm gate, from merchants who bring it on lorries from Punata. In Piusilla & San Isidro (Ayopaya) farmers use a moderate amount of manure, since they have a fair amount of range land and keep sheep & goats.

Chemical fertiliser is used, especially on potatoes, especially further from the farmstead, and especially in Yunkataki & Sacabamba (Esteban Arce), where they have low access to purchased manure and keep fewer animals themselves, because of limited rangeland.

Local knowledge
Farmers demonstrated a knowledge of weed seeds, e.g. they knew that:
- seeds are produced after the weed flowers (e.g. *nabo*),
- animal manure contains a heavy load of weed seeds,
- and farmers were able to find tiny weed seeds in soil.

6 Suggested Future Research Topics for PROMASSEL

Planting densities for oats and other small grains. (Hypothesis: high densities are more effective at shading out weeds than short varieties; compare yield etc.)

Continue oat-vetch intercropping trials started by the DfID-funded DAP Project.

Varietal trials of habas. (Hypothesis: tall varieties are more effective at shading out weeds than short varieties; compare yield etc.)

Inventory weed seeds in manure.

Research a control for **muni** in small grains.

Confirm that the land preparation techniques in Yunkataki contribute to soil erosion, and perform trials of less ploughing but more weeding, or some other technique. (Hypothesis: an alternative weed control strategy may lead to less soil erosion than triple ploughing).

Annex A
Preliminary Ethnobotany of Weeds in Cochabamba

Table A.1 Folk Species of Weeds Recorded near the Facultad de Agronomía (Cercado)

Quechua or Spanish common name	**Translation (when possible)**	**Scientific name or description**	**Incidence, damage etc.**	**Control**	**Uses**	**Other observations**
Jat'aqu *Cojo pollo*	limping chicken?	*Amaranthus* sp.			Is cooked as food for humans. Cattle also eat it.	
Jaya qhura	Hot, spicy weed	*Skurria pinnata*?			It is made into a broom to sweep houses, to rid them of fleas.	
Chamiku		*Datura* sp.			Is poisonous for cattle.	
Ch'ulqi ch'api		*Xanthium spinosum*	It is considered to be a serious weed.			
Muni		*Bidens* sp.	The seeds stick to ones clothing.		The seeds can be made into a cough medicine.	
Tepe		*Pennisetum clandestinum*	It fills an alfalfa field, and it is hard to get rid of it.	It can be eliminated by ploughing 3 times.	Fodder for livestock.	
Botón botón	Button button	*Anoda cristata*	Is a serious weed.		Fodder.	
Nabo		*Brassica rapa*	Is a serious weed		Is good fodder, does not spoil the taste of cows' milk.	One farmer thought there were different kinds of *nabo*, some with bigger seeds. (Perhaps different spp. of *Brassica*?)
Laq'u laq'u		*Rumex lanceolata*	Is a serious densely-growing weed. It does not let other plants grow.	It can only be hoed out, otherwise, it dries and it sprouts again from the roots.	Cattle will not eat it. It is too spicy.	It has a large root. Some kinds grow their roots deep, others near the surface.
Yuyu		*Amaranthus* sp.	Is a serious weed.	Agronomists recommend herbicide.	When it is small, before growing seeds, it can be cooked and eaten.	
Khuchi watana	For tying up hogs	unidentified	It is serious. It is eliminating alfalfa fields, and is spreading.	Hoe weeding is the only way.	Cattle will not eat it.	
Verdolaga		*Portulaca oleraceae*	It has many seeds and as a weed it can fill a field. Can be a serious weed.	Hoe weeding. In maize farmers leave some, and pull up some to eat or for cattle.	It is delicious in **k'allu** (a cheese and vegetable salad). Fodder.	People can only eat it when it is tender, and a family just cannot eat it all.

Table A.2 Folk Species of Weeds Recorded in San Isidro and Piusilla (Ayopaya)

Quechua or Spanish common name	**Translation (when possible)**	**Scientific name or description**	**Incidence, damage etc.**	**Control**	**Uses**	**Other observations**
Yapa khishka	Adds thorns?	Unidentified, tussock-forming grass	Forms in fallow land and makes it difficult to plough.	Plough, pile and burn it.	The ashes make good fertiliser. Is otherwise worthless. Cattle will not eat it.	
Layu		Clover (*Trifolium* sp.?)	It grows in fallow land and makes it difficult to plough.		Is used to make a medicine for drunks. Fodder. Is good for the soil.	
Leche leche	Milk-like					It is a folk genus with "male" and "female" species.
Chhujlla		*Paspalum* sp.?	A serious, abundant weed.	*Aporque.* Not even oats get rid of it.	Sheep fodder.	Even if removed, it has many roots and does not die.
Apharuma ***Loma papa***	Mountain potato	*Solanum* sp. Wild potato	There is little of it.	Hand remove and toss off the field.	Useless. Cattle will eat it if mixed with other plants.	
Paku		Unidentified grass		Hand pulling and hoeing.	Has many roots, controls erosion.	
Sultaki		Unidentified		Digging and removing manually.	Toothache medicine. Fodder.	
Janu q'ara		Crucifer?	A serious weed, only appears in crops.	Pull out by the roots, shake off soil and let dry.	Fodder	
Qhuchi ichhu	Wetland *Stipa*	*Stipa* sp.	Occurs in fallow land. Not abundant.	Not a weed. Grows on field edges.	Used to line **q'ayrus** (potato storage pits). House roofing.	Good for erosion control.
Wira wira	Fat-like	*Gnaphalium* sp.	One cannot get rid of it.	With a pick.	Cough medicine.	
Uqa uqa	Oca-like	*Oxalis* sp.	Not harmful. Grows in and outside of fields.		The root is nice to eat.	
T'ili t'ili		Unidentified grass or iris	Grows only in well-rested fallow soil.	Disappears when the soil is cultivated.	Indicates good soil for potatoes. Firewood. **Llujt'a** (ash to chew with coca).	
Qalti		Unidentified	Transmitted in manure.	Hand pulling.	Livestock eat a little of it.	
Llantén		*Plantago laneolata*	Bothers potatoes in lower parts of the canyon.	Not even oats get rid of it.	Good fodder.	
Ch'iki		*Pennisetum clandestinum*	The worst weed in wheat.	Hand pulling. *Arando y cruzando.* Try to remove the nodules .	Good fodder. Improves soil. Potatoes grow well in its ashes. Protects the soil and keeps it dry.	Has many roots. Spreads fast, like squash, and soon covers a field. It grows from its nodules.
Nabo		*Brassica campestre*		Remove by hand, to eliminate seeds.		
No name		*Rumex* sp.	The worst weed. Even after removing it by hand it does not die.	Pull out by the roots.		

Table A.3 Folk Species of Weeds Recorded in Pairumani and Qulqi Xuya (Tiraque)

Quechua or Spanish common name	**Translation (when possible)**	**Scientific name or description**	**Incidence, damage etc.**	**Control**	**Uses**	**Other observations**
Asna qhura **Yurax t'ika**	Stink weed White flower	*Spergula* sp.	It is the worst weed. Even when pulled up, it grows back. It is bad for the fields. It can rapidly destroy a crop. It occurs in maize.	Hoe weeding. Timely *aporques* in potatoes and oca, using a pointed hoe.	Harvest it with oats and the sheep and cattle eat it well. It recovers quickly and it fattens animals quickly.	Not known here until 5 years ago.
Puka qhura **T'una luq'u luq'u**	Red weed Small *Rumex*	*Rumex acetocella*	It is bad, worse than ***comino qhura***.	Where the soil is deep, plough it twice when it is cold, in June & July, and dry it. Cattle can get rid of it. It cannot be eliminated in sandy or stony soil.	Sheep eat a little of it.	It is new here.
Paywaru ichhu	Maize-tassel *Stipa*	*Stipa* sp.	It appears in fields. The other *Stipas* grow in higher country, and not in fields.	Throw it off the field when ploughing.	Roofing houses. Fodder. As a boundary marker. To mix with adobe and to stuff mattresses	
Awja awja	Needle needle	*Erodium cicatarium*			Fodder for sheep and others.	
Nabo		*Brassica campestre*	Occurs in maize and is the worst weed in barley. It is the only weed that must be pulled from oats.	Hand pulling, although sometimes it cuts peoples' hands, because it is tough.	Cattle eat it if there is no grass, but they do not like it.	
Wira wira	Fatty	*Gnaphalium* sp.			Cattle will not eat it.	
Cojo pollo	Lame chicken?	*Chenopodium album*. Wild quinoa	Grows in maize.		People eat it.	
Cebadilla	Little barley	*Bromus* sp.			Cattle fodder.	
Comino qhura	Cumin weed	*Spergula arvensis*	It is the worst weed. Weed it and it grows back.	Not even oats get rid of it.	Farmers don't remove it from oats, because the oxen like to eat it.	It flowers and right then it spills its seed.
Muni		*Bidens* sp.	A serious weed.	Hoe weeding in potatoes. But in oats or barley farmers leave it, because when they pull it out, it takes out a whole clod.		
Garrotilla		*Medicago hispida*	It does not damage habas.		Cattle fodder. It improves the soil.	
Asna qhura	Stink weed	*Erechites hieracifolia*	It damages the whole crop. It grows in January with the barley.	Hand pulling, but it has a lot of roots.	Animals will not eat it.	Wind carries its seeds to other crops. It flies like a feather and appears in the rainy season.

Table A.4 Folk Species of Weeds Recorded in Yunkataki and Sacabamba (E. Arce)

Quechua or Spanish common name	**Translation (when possible)**	**Scientific name or description**	**Incidence, damage etc.**	**Control**	**Uses**	**Other observations**
Grama dulce	Sweet grass	*Pennisetum clandestinum*	Is the worst weed, the one farmers most want to get rid of. It keeps potatoes from growing.	Ploughing, shaking, drying & burning it.	Potatoes grow well in its ashes. Sheep eat the tips of it.	Each nodule has its seeds, many of them. It spreads and even climbs walls.
Mach'a **Asna qhura** **Wila qhura**	Sticky Stinking weed	*Spergula arvenses*	It can destroy a crop.	Hoeing, while it is hot, and drying, ploughing. Herbicides kill it. When the soil is moist, it can be removed by hand.	It can be cut as fodder. Livestock can be tied up in a field of it. Sheep and oxen eat it.	It has a lot of seed, which can sleep in the soil for a year. Animals eat its seed, but do not grind it up, so their manure spreads it. Appeared 18 years ago.
Chhujlla **Sara sara**	Maize-like		There is a lot of it.			
Pajarilla	Little bird	*Tropaoelum cochabambensis*		Herbicide will kill it.		
Cebada cebada pasto	Barley-like grass	*Eragrostis* sp.		Not even herbicide will kill it.		
Ajara		*Chenopodium album*	When it appears, there is a lot of it.	Hand pulling or cutting with a sickle.	Fodder.	

File name: WeedsAnthroJan2000-1