



Pro-Poor  
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## Dynamic Poverty Processes and the Role of Livestock in Peru

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## PREFACE

This is the 39th of a series of Working Papers prepared for the Pro-Poor Livestock Policy Initiative (PPLPI). The purpose of these papers is to explore issues related to livestock development in the context of poverty alleviation.

Livestock is vital to the economies of many developing countries. Animals are a source of food, more specifically protein for human diets, income, employment and possibly foreign exchange. For low income producers, livestock can serve as a store of wealth, provide draught power and organic fertiliser for crop production and a means of transport. Consumption of livestock and livestock products in developing countries, though starting from a low base, is growing rapidly.

A community-based qualitative-quantitative poverty methodology called the Stages-of-Progress approach was used to assess household poverty dynamics and the role of livestock in 40 communities and over 3,800 households representing two different highland regions of Peru (Puno and Cajamarca). Key to the approach used was to define with the participating communities a common understanding of poverty. The major reasons for movements into or out of poverty were elicited at both the community and household-level, and in particular, the role that livestock play in the different pathways was examined.

We hope this paper will provide useful information to its readers and any feedback is welcome by the author, PPLPI and the Livestock Information, Sector Analysis and Policy Branch (AGAL) of the Food and Agriculture Organization (FAO).

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## Keywords

Poverty, livestock, Peru, diversification, intensification, livelihoods

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## EXECUTIVE SUMMARY

A community-based qualitative-quantitative poverty methodology called the Stages-of-Progress approach was used to assess household poverty dynamics and the role of livestock in 40 communities and over 3,800 households representing two different highland regions of Peru (Puno and Cajamarca). This approach has been implemented and improved after extensive field investigations with over 25,000 households in five countries (see <http://www.pubpol.duke.edu/krishna> ).

The proportion of households that have managed to escape poverty over the last 25 years was ascertained, as well as the proportion of households that have fallen into poverty during the same period. The major reasons for movements into or out of poverty were elicited at both the community and household-level, and in particular, the role that livestock play in the different pathways was examined.

Key to the approach used was to define with the participating communities a common understanding of poverty. What, for example, does an extremely poor household do when a little bit of money becomes available to the household? Which expenses are usually the first to be incurred? As a little more money flows in, what does this household do in the second stage? The third stage? And so on.

We found broad agreement across all 40 communities studied on the sequence of these stages. The results show that households typically move out of poverty by first taking care of their household food requirements, then investing (in the following order) in clothing, shelter, small animals such as chickens and guinea pigs, basic education for their children, a small plot of land, followed by indigenous breeds of larger livestock, including sheep, cattle, alpacas, and llamas. Beyond these initial stages of progress, households are no longer considered poor.

In the communities studied, households were beyond the poverty threshold drawn by community members (i.e. considered non-poor) when they were able to purchase a larger plot of land or buy improved breeds of livestock. Community members were then asked to describe each current household in the village in terms of what stage they were at 25 years ago (a full generation), 10 years ago and today. The reasons why particular households had moved into or out of poverty were then discussed at the community-level and followed up in more detail with individual households. The researchers conducting this study received considerable facilitation training towards delving in detail into the reasons, many of which are 'nested' or linked, for household movements into and out of poverty.

In utilizing the local definition of poverty - which, interestingly, was the same across all forty communities that we studied - we found that households in these communities have experienced quite dissimilar fates. While some formerly poor households have come out of poverty, some formerly non-poor households have become impoverished during the same period. Making progress in poverty reduction will require accelerating escapes while simultaneously slowing down descents. Different policies will be needed to keep households from falling into poverty versus helping lift those already in poverty out of it.

Across all 40 communities, 19 percent of households escaped from poverty over the past 10 years, while another eight percent of households simultaneously fell into poverty. Over the entire 25-year period (1979 to 2004) this gap widens. Twenty-nine percent of households escaped poverty during the 25-year period, while at the same time, 10 percent of households became impoverished.

While large movements into and out of poverty were found in both regions, significant regional differences exist. In Cajamarca, 17 percent of households managed to climb out of poverty in the last 25 years, while 15 percent fell into poverty at the same time. In Puno, 42 percent of households escaped poverty, while five percent became impoverished during the same period.

Over the more recent 10-year period, a similar trend was seen in Cajamarca, with 13 percent of households escaping poverty and 11 percent becoming poor. In Puno, however there were still a relatively high proportion of households that moved out of poverty, 24 percent, with five percent moving into poverty.

Overall, households in poverty fell from 36 percent to 34 percent in the 20 Cajamarca communities and from 41 to 21 percent in the 20 Puno communities over the past 10 years.

Over the twenty-five-year period, too, households in Puno have fared better, on average, compared to households in Cajamarca. Twenty-five years ago, poverty was much higher in the 20 Puno communities – 59 percent – compared to 36 percent in the 20 Cajamarca communities. At the present time, however, average poverty is 21.5 percent in these Puno communities, and it is much higher, 34 percent, in the Cajamarca communities studied. Differential rates of escape and descent have reversed the relative positions of communities in Puno compared to communities in Cajamarca.

The factors or events (often a chain of events) leading to upward and downward movements were remarkably similar across all 40 communities, but the relative importance of specific factors influencing poverty did vary by region, suggesting targeted interventions and policy responses are needed.

## Explaining escapes

We found that escaping poverty is primarily about diversification of income sources, but that this is accomplished through different means in our two regions. In Puno, diversification of income through livestock and off-farm sources is key, while in Cajamarca, crop-related diversification strategies help us better understand why some households are able to escape poverty while others aren't.

Gains from entrepreneurial, largely informal business ventures also helps to explain escapes in both regions. This factor was associated with 27 percent of escapes in communities of Cajamarca and 22 percent of escapes in communities of Puno.

Steady employment, and the remittances often associated with it, plays a key role in poverty escapes. Families with someone holding a private sector job were 7 times more likely to have escaped poverty in Puno than those without such employment.

Improvements to roads and market-related infrastructure has clearly played an important role in improved household welfare – the odds of escaping poverty in Cajamarca were 53 times greater than for staying poor for households that had seen their market access improve.

We found that livestock plays a key role in poverty escapes in Puno, but not in Cajamarca. In Puno, households that had improved the quality of their livestock (through breed upgrading) were much more likely to have escaped poverty. Livestock-related activities, particularly dairy, has also helped Puno households to diversify their income and improve welfare. This 'cargo net' function that dairy can play (i.e. helping households climb out of poverty) needs to be further examined.

## Explaining descents

The principal reason found to be associated with households' descent into poverty in both regions was ill health and health-related expenses. Cajamarca households were twice as likely and Puno households twelve times as likely to have fallen into poverty if they had experienced significant health problems. We also found evidence that the

importance of health as a precipitator of descent has increased over the past 10 years.

Reducing descents more effectively will therefore require paying considerable attention to health-related factors. Not only does ill-health reduce the earning capacity of a household's members; in the absence of affordable and easy-to-access healthcare facilities, it also adds considerably to the household's expenditures, thereby striking a double blow, which quite often results in households' falling into chronic poverty.

Large family size, death of the principal income earner, and social and customary expenses on marriages (includes expenses related to setting up a new home) constitute an important set of factors often associated with descent in Cajamarca.

Factors associated with descent vary across regions, and they also vary over time. Health, disability and marriage expenses have increased in importance over time as propellers of descent and maintainers of poverty, and land division has assumed importance in Puno though not in Cajamarca communities.

Livestock are playing an important 'safety net' role, keeping households from falling into poverty in both regions. In Cajamarca, it is beef and dairy cattle that are playing this role, while in Puno, beef and camelids are key assets helping to mitigate poverty descents.

Determining appropriate specific interventions and policies for different regions will require local communities, civil society organizations and governments working closely together with this information.

## INTRODUCTION

Between August and October 2004, a study of household poverty dynamics was undertaken in forty rural communities in two regions of the Andean highlands of Peru to ascertain how different households have fared over time. This study took the same community-based 'Stages-of-Progress' approach designed for studying poverty dynamics and the role of livestock as did several similar studies conducted earlier in different parts of India, Uganda and Kenya (Krishna, 2004, Krishna et al., 2004, available at: <http://www.pubpol.duke.edu/krishna> along with Stages-of-Progress manual). The Kenya study was also supported by FAO-PPLPI, ILRI and Duke University (see Kristjanson et al. 2004, available at: <http://www.fao.org/ag/pplpi.html> ).

The main objectives of this study, as with the others, were to determine how rural households in Peru define poverty, to describe the poverty dynamics, or households' movements into and out of poverty over two different time periods, and explore the reasons for these movements. With the earlier studies demonstrating the import and complex role that livestock play for poor households, a particular focus of this study was to delve into the role of livestock in poverty dynamics as deeply as possible. A secondary objective was to be able to draw policy and other lessons from the similarities and differences found in applying the same methodology across the 3 very different continents. This paper covers the main objectives only; a synthesis paper covering the second objective is in process.

Section 2 describes the study area, site selection and methodology. Section 3 discusses the results, examining the rates of escape and descent observed over two different time periods, the last ten years and the last twenty-five years. The longer time period corresponds roughly to one generation in time. Since households formulate their own anti-poverty strategies with generational time horizons in mind, it seemed worthwhile to consider the longer time period in addition to the shorter one while tracing the trajectories of all 3,817 households currently resident in these forty communities. The reasons for ascent and descent that were explored in the case of 1,041 randomly chosen households are then described. Section 4 concludes with a brief overview of policy implications.



## STUDY AREA AND METHODOLOGY

The Stages-of-Progress approach was developed in order to ascertain better the reasons that are associated with households' movements into and out of poverty within a particular region. This method, described briefly below, was applied in a group of forty communities of two regions, Cajamarca and Puno. Figure 1 indicates the location of the study sites on a map of Peru.

Figure 1: Location of study sites.



This study did not attempt to replicate the national representativeness of the large-scale household surveys that are the basis of poverty comparisons in Peru. Instead, selection of the two study regions, Puno and Cajamarca Departments, and the four Provinces within each of these regions, was made on the criteria of, first, high rural poverty rates, and second, areas where livestock plays an important part in rural livelihood strategies. Within the selected Provinces (see Figure 1), twenty diverse communities were chosen. We attempted to capture diversity with respect to five criteria that largely define rural households' livelihood options: altitude, agricultural activities, market access, size of community, and ethnic group and language. The site selection process followed was not designed to make inferences about the larger populations from which the samples were drawn. Rather, the purposive fieldwork selection procedure, from Departments to Provinces to communities, was designed to allow us to identify and describe a range of poor rural households engaged in agricultural activities ranging from mixed crop-livestock to primarily livestock-based systems. Studying livestock's role vis-à-vis poverty reduction was an important aspect of this project.

The communities we selected are located from a low of 1,900 meters to a high of 4,500 meters above mean sea level. Economic activity varies as a result, for example, households in lower lying communities are more dependent upon cattle raising as a principal activity, while communities at much higher altitudes are dependent more upon alpacas. Market access also varies considerably. At one end are communities such as El Aliso, which can be accessed only by a steep and narrow foot trail and is twelve kilometers away from the nearest market town, Pizon. At the other end are communities such as Cochapampa, only 2.5 kilometers by all-weather road from the market town of Cochilla and served by regular bus services. The number of households per community varies from a low of forty-one (in Santa María) to a high of 441 (in Hayrapata). Ethnic group and language also vary. Spanish is the spoken language in the Cajamarca communities, while in Puno the selected communities include twelve that are Quechua speakers and eight that speak Aymara. Although this mix of villages is not representative in the statistical sense of the term, it does represent different patterns of rural settlements that are commonly found in these regions.

Returning to Figure 1, some brief observations about the regions and communities selected for research are made that will help in interpreting the results described later.

Puno Department is located in the Peruvian Altiplano, which is a high Andean plain centred geographically and socioeconomically on Lake Titicaca. The plain rises from the lake level at 3,800 meters to over 4,500 meters altitude and is bisected by the international border between Peru and Bolivia. There are four agroecological zones that vary with distance from Lake Titicaca (Swinton and Quiroz, 2001). These are the Lakeside zone, Suni zone A, Suni zone B, and the Dry Puna zone. The communities selected are located in the latter two zones. Suni zone B is characterized by a frost-free period of 3 - 5 months, risky cropping and range-fed livestock production. The Dry Puna zone has a frost-free season of less than 3 months, and annual precipitation of under 600 mm., and the agricultural production systems are predominantly oriented towards grazing, primarily sheep and alpacas. District-level poverty in Puno ranged from 63 percent to 95 percent of households with at least one unmet basic need (2002).

The Cajamarca area includes several micro watersheds within the district, which lies between 2,800 and 3,700 meters above the sea. Most households have around forty percent of their land on slopes. Land is classified into three agro-ecological zones: Jalca (upper hillsides), Hillsides and Valley (including lower hillsides).

The Hillside production system is based on the cultivation of diverse annual crops including cereals, legumes and Andean roots and tubers. In the past, lack of water between May and September did not permit farmers to grow perennial forages for their livestock on the hills. Recently, however, many farmers have obtained access to irrigation that permits them to grow ryegrass pastures and increase the number of dairy cows they manage. The use of oats and barley hay for animal feeding is also widespread. Cows are also used for animal traction, an important additional benefit for farmers. The feeding of livestock is based on crop residues, natural pasture and cultivated pasture.

Areas of the Jalca (above 3,500 meters) face lower average temperatures than Hillside areas and therefore many crops from Hillside cannot grow there. However, the deep organic soils have formed there due to the lower temperatures favor water retention and the growing of annual and perennial pasture and off-season potato crops. The cultivation of rye grass for livestock feeding is significant as is supplementation in the dry season with oats and barley hay.

Land-use systems in Cajamarca are different from those found in the central and southern Andes of Peru. For example, unlike Puno, there is not much communally

managed land in Cajamarca, and household access to different production zones is limited.

Characteristics of the selected communities (20 in Cajamarca and 20 in Puno) are shown in Table 1. The Puno communities, on average, are located at much higher altitude, and are located further from secondary schools and health facilities than are the Cajamarca communities. Livestock income is more important for the Puno communities, with roughly  $\frac{3}{4}$  of total community income coming from livestock and livestock-related activities compared to  $\frac{1}{2}$  in Cajamarca. In general, a greater percentage of Cajamarca communities have access to services within their communities, including access to clean water and telephone services. However, only 15 percent of the Cajamarca communities, and 10 percent of the Puno villages visited had electricity.

*Table 1: Characteristics of surveyed communities (20 in Puno and 20 in Cajamarca).*

Average for communities surveyed	Cajamarca	Puno	Both regions
Altitude (m)	2879	4093	3486
No. of households	100	106	103
No. of households with land	90	101	96
No. of households without land	11	6	9
No. of primary schools	1	1	1
Distance to secondary school (km)	4.1	7.6	5.8
Distance to health facility (km)	5.1	6.6	5.8
Distance to the nearest trading center (km)	13.9	13.2	13.6
Area of community	1605	3095	2369
Percent of income from livestock	53	76	65
<b>Percent of communities with:</b>			
Access to clean water	90	35	67.5
Telephone services available	60	25	42.5
Access to electricity	15	10	12.5
Regular transport services available	75	85	82.5
Veterinary services available	90	100	95
Accessible village link road (number of months in a yr)	10	9	9
<b>Percent of communities citing these economic activities as important*:</b>			
Livestock production	100 (1)	90 (1)	98 (1)
Crop agriculture	95 (2)	55 (3)	75 (2)
Trade in livestock products	30 (3)	35 (2)	33 (3)
Casual labor	30 (5)	55 (4)	43 (4)
Handicrafts	35 (4)	15 (8)	25 (5)
Business	25 (6)	35 (5)	33 (6)
Livestock trade		25 (6)	8 (7)

\*The figures in brackets represents the order of importance of each of these activities in terms of economic contribution to incomes

While virtually all communities in both regions were involved in livestock activities, only 55 percent were engaged in crop agriculture in Puno, compared to 95 percent in Cajamarca, reflecting the greater agricultural options in the lower altitudes. 55 percent of the communities in Puno casual labour as an important economic activity for their community, compared to 30 percent of the study sites in Cajamarca. Handicrafts is an important economic activity in Cajamarca, while livestock trade is equally important in Puno.

A total of 3,817 households are currently resident in these villages, and by following the participatory, community-based methodology outlined below we reconstructed the poverty trajectory followed by members of each household over the previous twenty-five years. In addition, for a random sample of households - 1,041 households in all - we also ascertained the reasons associated with their particular trajectories.

Two teams of twelve individuals each conducted these investigations in Puno and Cajamarca. We trained together for ten days in the Stages-of-Progress methodology. During this time we also went out to two communities where we learned how to implement this methodology in practice. Some changes were made following these investigations, and the methodology was adapted in part to better suit the particular circumstances of these highland Peruvian communities. The refined methodology, described below, was applied in each of the forty selected communities.

## STAGES-OF-PROGRESS APPROACH

The following steps were followed in the Peru study.

### ***Step 1. A representative community group was assembled***

Prior information was provided by letters of invitation written ahead of time to the authorities of the communities studied. Upon arrival in the community contact was made first with these local authorities (including the Lieutenant Governor, Municipal Agent, Neighborhood Mayor or President of the *Campesino* Security Patrol).

A representative community group was convened separately in each village; at least thirty members of each community and as many as eighty in some cases took part in these meetings. This group of participants was made up of men and women of different ages, and they participated actively in these discussions. We took particular care to ensure that poorer, lower status members, and women in particular were present at these meetings.

### ***Step 2. Study objectives were clearly presented***

We introduced ourselves as researchers, and we made it clear that we did not represent any government agency or NGO, so there would be no benefits (or losses) to anyone who spoke freely and frankly with us. We mentioned these facts in order to remove any incentives people might have had for misrepresenting the poverty status of any household in their village.

### ***Step 3. Coming to a collective definition of poverty***

We asked community groups in each village to consider the situation of an extremely poor household, and we asked them to delineate the locally applicable stages of progress that such a household typically follows on its pathway out of poverty. What does a poor household in your community typically do, we asked the assembled villagers, when it climbs out gradually from a state of acute poverty? Which expenditures are the very first ones to be made? 'Food' was the answer invariably in every single community that we studied. Which expenditures follow immediately after? 'Some clothes' we were told almost invariably. As more money flows in incrementally, what does this household do in the third stage, in the fourth stage, and so on? Lively discussions ensued among villagers in these community groups. However, the answers that they provided, particularly about the first eight to ten stages of progress, were relatively invariant across all communities.

'After crossing which stage is a household no longer poor?', the community groups were asked. The placement of the poverty cutoff, and also the nature of the seven stages below this cutoff, did not vary across all forty communities. While some differences did arise in the exact order different communities gave to these first seven stages, there was no difference in the identification of these items, indicating a common understanding of poverty in these forty village communities based upon a lack of the same assets and commodities.

### ***Step 4. Treating households of today as the unit of analysis, households' poverty status today, ten years ago, and twenty-five years ago was elicited***

In this step the complete list of all households in each village was used (in most cases, this list was prepared in advance, as we had requested in our initial letters; in others, this list was prepared afresh after arriving in the village).

This list of households and the locally applicable stages of progress were recorded in large letters on flip charts that were pasted prominently for all assembled members to see. Referring to the shared understanding of poverty developed in the previous step,

the assembled community groups identified separately for *each household* its stage at the present time, its stage ten years ago, and its stage twenty-five years ago.

Households of today formed the units of analysis for this exercise. When we asked about poverty today, we spoke in terms of households that exist today, and when we asked about poverty ten years or twenty-five years ago, we asked in reference to members of the same households. Many younger households did not exist at that time; such villagers lived in their parents' or guardians' households twenty-five years ago; and in their cases we asked about poverty in relation to these earlier households. What we were examining in such cases was inherited acquired status: Did a person who was born to poverty remain poor, or did s/he manage to escape from poverty in the past twenty-five years? Is another person who was part of a non-poor household twenty-five years ago still non-poor, or has her household acquired poverty anew during this time?

#### ***Step 5. Households assigned to particular categories***

After ascertaining their poverty status for the present time, for ten years ago and for twenty-five years ago, each household was assigned to one of four separate categories:

- Category A. Poor twenty-five years ago and poor now (Remained poor);
- Category B. Poor twenty-five years ago but not poor now (Escaped poverty);
- Category C. Not poor twenty-five years ago but poor now (Became poor); and
- Category D. Not poor twenty-five years ago and not poor now (Remained not poor).

A separate categorization was also developed, which compared households' stages ten years ago and today.

#### ***Step 6. Inquiring about reasons for escape and reasons for descent in respect of a random sample of households***

Reasons associated with movements upward and movements downward were ascertained in this step. We took a random sample of about 25 percent of all households within each category, and we inquired in detail from the community groups about causes and contributory factors associated with each such household's trajectory over the past 25 years. These event histories were compiled for each selected household. They were reaffirmed through separate interviews with individual members of the selected households.

#### ***Step 7. Following up by interviewing household members***

At least two members of each household selected were interviewed separately in their homes. Members of the study team spoke individually with each household member. Thus multiple sources of information were consulted for ascertaining reasons associated with the trajectories of each selected household. Discrepancies, if any, were cross-checked and triangulated between the community groups and individual households.

Completing these investigations within each selected community took between two and three days, depending on the size of the community. The community assembly was held on the first day, and it lasted for an average of five hours. The next two days were utilized for household interviews and data compilation.

The Stages-of-Progress method provides a useful methodological device, a benchmark or yardstick, for placing households within these four separate categories and for assessing how high up the ladder of material prosperity a particular household has climbed within a particular region. Compiling these trajectories of stability and change helped us to assess the overall situation of poverty over time. More

important, learning about the reasons for change in each individual case helped to identify chains of events that were associated, respectively, with escaping poverty and falling into poverty.

Uncovering and working with a locally relevant definition of poverty was very useful for these purposes. People understood these poverty measurements clearly, and they could relate to the changes that were described for each of them. Because each stage represents a large or lumpy movement, and because it refers to some easily remembered achievement or possession, household members could quite easily recall their previous status in terms of stages of progress. We worked in rural communities that are quite close knit and that have lived together for long periods of time, so community members could also recall and verify each other's status in previous periods.

While quantitative approaches to poverty appraisal have tended to dominate policy debates of the past decade, there is increasing recognition of the value of qualitative approaches. The use of qualitative methods has been increasing, particularly by development agencies and policy makers (Narayan et al., 2000). Increasing, the two approaches have been seen as highly complementary in addressing complex poverty issues, and there have been recent calls for more mixing of approaches and for those in the qualitative tradition to include more numerical information and statistical analyses (Kanbur 2001). Recognizing that the 'qual-quant' divide is in fact more complicated, poverty researchers from both camps re-characterized the two traditions along five different dimensions (we have indicated where our method falls within each in brackets):

1. Type of information on population: non-numerical to numerical (both, with a lot of effort put into quantifying some of the qualitative information)
2. Type of population coverage: specific to general (specific, with site selection not based on a statistical frame, but based strategically on criteria to allow some extrapolation of results )
3. Type of population involvement: active to passive (both)
4. Type of inference methodology: inductive to deductive (both)
5. Type of disciplinary framework: broad social sciences to neo-classical economics (broad social sciences)

Thus the Stages-of-Progress method cannot be categorized as either qualitative or quantitative, but as a mixture of both. As such, it captures many of the advantages of quantitative approaches, e.g. the ability to aggregate numerical information. However, it is not based on a statistical sampling frame and thus cannot be said to be representative of the entire country, although site selection was done strategically using certain criteria to allow some extrapolation of results (that crosses borders). The more active and communicative nature of the approach leads to results immediately useful to the poor themselves, and thus is much less 'extractive' than traditional quantitative poverty approaches.

Oral histories present challenges of reliability and require triangulation. This is why the Stages-of-Progress approach triangulates the reasons for household poverty status and movements at both the community and household levels. Distinct stages, or investments that community households' make as they progress out of poverty, are defined. These stages are visible to all in the community, so community members are able to say which households are at each stage, both now and in the previous time periods chosen. What this means is that the risks associated with subjective responses (e.g. a common feeling that 'everything was better in the past') is limited.

This local definition of poverty is closely related to some other indicators, more usually utilized to rank differences in material status. For instance, there is a

monotonically increasing relationship between household stage and average number of assets owned, as Table 2 shows.

*Table 2: Households' stages and average asset ownership.*

Stage at present time	Average number of assets
1	1.33
2	1.90
3	2.37
4	2.88
5	3.11
6	3.31
7	3.58
8	4.07
9	4.56
10	4.62
11	5.27
12 and higher	5.78

This close correspondence between stages and asset ownership suggests that our method of assessing poverty is not dissimilar to the asset-based approach proposed by Carter and Barrett (2004). These figures also suggest that communities' rankings of households in terms of stages correspond quite closely to *material* poverty. Other dimensions of poverty, including social exclusion and political disempowerment, are not directly reflected within these assessments.

We found that the most important validation of the method came from the community response, i.e. its degree of involvement and appreciation of the knowledge they gained by going through the exercise with the research team. As pointed out in Kanbur (2001), however, the 'tensions are ever present' between those that believe in the 'quantitative', i.e. neo-classical economics approach compared to a 'qualitative', more participatory approach. We think that it is inappropriate to directly compare the income/expenditure approach (measuring flows) to the Stages-of-Progress approach (measuring certain assets, or stocks). Shaffer (2002) points out that different validation approaches are required for the consumption approach to poverty measurement (which relies on the notion of an idealised subject whose personal predilections and prejudices do not affect research outcomes) compared to the participatory poverty approach (which rejects the notion of an idealized subject because subject and object are inextricably entwined via the dialogue approach taken). Accordingly, he suggests, truth or validity in the participatory approach relies on the notion of an 'ideal speech situation', i.e. has the voice of the 'invisible' poor been heard, a genuinely participative dialogue taken place, etc. In other words, validation of our approach should focus on the approach and not on trying to compare the results of two approaches based on 'different epistemological positions taken by the approaches with regard to the basic unit of knowledge and validity criteria' (Shaffer, 2002, pg. 4.)



## LOGIT ANALYSIS

A binary logistic regression analysis (SPSS, 2002) was undertaken to determine which factors were significantly associated with upward and downward poverty movements. The binary logistic regression is most useful when modeling the event probability for a categorical response variable with two outcomes. It is a type of generalized linear model that extends the linear regression model by linking the range of real numbers to the 0-1 range. The model directly estimates the probability of an event occurring. The binary logistic regression is specified as:

$$\pi_i = \exp(z_i) / (1 + \exp(z_i)) = 1 / (1 + \exp(-z_i)) \quad (\text{Equation 1})$$

or

$$z_i = \log (\pi_i / (1 - \pi_i)) \quad (\text{Equation 2})$$

The variable  $\pi_i$  is the probability of the  $i^{\text{th}}$  case experiencing the event of interest and  $z_i$  is the value of the unobserved explanatory variable for the  $i^{\text{th}}$  case. The model also assumes that  $z$  is linearly related to the predictors. Equation 3 is expressed as:

$$z_i = b_0 + b_1x_{i1} + b_2x_{i2} + \dots + b_px_{ip} \quad (\text{Equation 3})$$

The variable  $x_{ij}$  is the  $j^{\text{th}}$  predictor for the  $i^{\text{th}}$  case,  $b_j$  is the  $j^{\text{th}}$  coefficient, and  $p$  is the number of predictors.

In the logistic regression model, the relationship between  $z$  and the probability of the event of interest is described by the logit link function. Unlike a common linear regression based on Ordinary Least Squares (OLS), the regression coefficients are estimated through an iterative maximum likelihood method (i.e. the coefficients that make our observed results more likely are selected).

Using the binary logistic regression procedure in SPSS, we ran four separate regressions to model the probability of escaping poverty and probability of falling into poverty for each region. First, the analysis was restricted to households that had stayed poor over the 25-year period (classified as 0), and households that were poor 25 years ago but had managed to escape poverty (classified as 1). In other words, we grouped all households that started out poor in order to examine which factors help explain why some previously poor households escaped poverty, while other poor households continued to remain poor.

Similarly, households that were non-poor 25 years ago but were now poor (classified as 1), and households that had stayed non-poor over the 25 year period (classified as 0), were analyzed together in order to look at the most important factors that explain why some previously non-poor households fell into poverty, while other non-poor households continued to remain non-poor.

In the first case, the reasons for staying poor and factors mentioned as pertinent to household escapes out of poverty, as well as important household-level characteristics such as age of household head, level of education, number of income-earning activities, livestock asset holdings, size of land holdings and gender of household head, were used as explanatory variables in the regression for each region. In the second case, reasons given for descent into poverty and staying non-poor and similar household-level characteristics were used as explanatory variables. The reason/factor-related independent variables were measured as binary variables, i.e. equal to one if the reason was mentioned, and 0 otherwise. Since the reasons were first elicited at the community level, then followed up at the household level, the research team met each evening to triangulate results and discuss cases where there

was a discrepancy (which turned out to be a very small percentage of cases, <5%), at which point they made an informed decision as to the final set of reasons that went into the logit analysis.

## RESULTS

### Stages-of-progress

Although there were considerable differences found across the villages studied, remarkably all these communities described virtually the same Stages-of-Progress (Figure 2). This implies a commonly known and agreed-upon understanding of poverty for these villagers. Working with this local, yet common and comparable, definition of poverty is very useful for better understanding the strategies that households pursue in order to deal with poverty and the reasons that some households are able to escape poverty over time and why others fall into poverty.

*Figure 2: Stages of progress.*

1	Food
2	Some clothes
3	Basic housing/house repairs
4	Small animals (chickens, guinea pigs)
5	Basic education for children
6	Purchase small plot of land
7	Indigenous breeds of livestock (sheep, cattle, alpacas, llamas)
<hr/>	
	Poverty Cutoff
8	Purchase larger plot
9	Improve/expand house
10	Improved large breeds of larger animals
11	Secondary/tertiary education
12	Small business
13	Buy plot/house in city

The horizontal line in Figure 2 represents the poverty line as it was constructed and perceived socially by community members for these 40 villages. Households that have not been successful in progressing beyond Stage 7 considered themselves to be poor in these localities - and they are commonly regarded as such by other community members.

Lack of food, clothing, and basic housing, and inability to possess even smaller or indigenous breeds of animals, to have even a tiny bit of land, and to provide for even basic education for children define the conditions of poverty as locally understood in all forty communities. It is a commonly known and widely agreed-upon understanding of poverty, and this everyday understanding of poverty is much more real for these community members than any definition that is proposed from the outside.

### Poverty movements of households

For the current 3,817 households in the forty communities studied, we found that 38 percent were poor ten years ago, and 28 percent are poor at the present time. Overall, therefore, there has been a 10 percent improvement. Considering the longer 25-year period, poverty has fallen even further, from 47 percent in 1979 to 28 percent

at the present time. As can be seen in the overall national trend for Peru, poverty in these 40 communities has continuously declined in the last two and a half decades, with a net improvement of 19 percent.

Very different paths have been taken, however, by different households within the same communities. While 19 percent of households escaped from poverty over the past 10 years, another eight percent of households simultaneously fell into poverty. This difference seen between incidence of escape and descent is even greater when one considers the longer period of 25 years. Twenty-nine percent of households escaped poverty during the 25-year period (from 1979 to 2004), but another 10 percent of households became impoverished concurrently.

The identities of the poor changed because at the same time some households were moving up, others were moving down. Not all presently poor households have always been poor. Of the 28 percent of households that are poor at the present time, 18 percent have remained poor over the 25-year period, and another 10 percent have fallen into poverty anew during this period. More than one-third of currently poor households were not always poor, but they have joined the ranks of the poor during the last 25 years.

So although governments, NGOs, donors and other agencies have been devoting resources toward the reduction of poverty, we see that they have not succeeded in stemming the flow of newly impoverished households. This means that finding appropriate policies and programmatic supports to reduce these descents will be critical for achieving the Millennium Development Goal of halving and eventually eliminating poverty. We will discuss in the next section what policy changes should help achieve this goal in these two regions.

Poverty dynamics differ somewhat in these two different regions of Peru (Table 3). Puno households appear to have been more successful in lifting themselves out of poverty in the last decade (25 percent of households), compared to Cajamarca (13 percent of households). More households slid into poverty in Cajamarca (11 percent) than in Puno (5 percent) in the last 10 years as well, based on our sample of communities. According to community members' own perceptions of the percentage of households that were poor, Puno went from a poverty incidence of 40 percent to 21 percent (Categories A+C) in the last decade, whereas Cajamarca's percentage of poor households declined from 36 percent to 34 percent during the same period.

*Table 3: Poverty trends over the past ten and twenty-five years (percent of households).*

Region	Remained Poor	Escaped Poverty	Became Poor	Remained Not Poor	Poor at the Start of the Period	Poor at the End of the Period
<b>Last ten years (1994-2004)</b>						
Cajamarca (n= 1948)	22.9	12.8	10.9	53.4	25.7	33.8
Puno (n=1920)	16.1	24.5	5.4	54.0	40.6	21.5
Both Regions	19.5	18.6	8.1	53.7	38.1	27.6
<b>Last twenty-five years (1979-2004)</b>						
Cajamarca	18.7	17.1	15.1	49.2	35.8	33.8
Puno	16.8	42.0	4.7	36.5	58.8	21.5
Both Regions	17.8	29.4	9.8	43.1	47.2	27.6

Over the 25-year period, too, households in the 20 Puno communities studied have fared better, on average, than the 20 Cajamarca communities. Twenty-five years ago, poverty was much higher in Puno - 59 percent - compared to 36 percent in Cajamarca. At the present time, however, average poverty is 21.5 percent in these Puno communities, and it is much higher, 34 percent, in our Cajamarca communities. Differential rates of escape and descent have reversed the relative positions of communities in Puno compared to communities in Cajamarca.

So why do we see such large movements, both up and down, for households that are basically facing the same economic and policy environments? Addressing this question involved delving into what these households had experienced that caused them to improve their levels of well-being or cause them to become worse off.

## Interpretation of the binary logistic regression results

The results of the logit models are given in Tables 4 and 5 for the households that escaped poverty and those that fell into poverty, respectively. When households were being probed regarding the events, factors and reasons behind their particular poverty trajectory, they gave both positive and negative influencing factors. In Table 4, for those households that escaped poverty, the positive factors outweighed the negative ones mentioned, and they were able to progress upwards. In Table 5, for those that fell into poverty, the 'positive factors' associated with falling should in fact be interpreted as factors that increase the probability of falling into poverty, whereas the 'negative factors' were reasons associated with keeping them from falling.

Measures of goodness of fit of our logit model include the log pseudo-likelihood and Wald  $\chi^2$  statistics, seen in Tables 4 and 5, which show that the models are all significantly different from the null or intercept-only (i.e. know-nothing) model. How well the models correctly predict where households are classified (those that stayed poor versus those that escaped poverty in Table 4, and those that stayed non-poor versus those that fell into poverty in Table 5) is another indication of goodness of fit. These measures are presented in Tables 4 and 5 and all show over 75% of households are predicted to be in the correct categories. The parameter estimates of the variables that are significant differ across regions. The meaning of logistic regression coefficients is not straightforward. While the  $\beta$  is convenient for testing the significance of the predictors,  $\exp(\beta)$  is easier to interpret. The  $\exp(\beta)$  represents the odds ratio, or the ratio-change in the odds of the event of interest, in our case of either escaping or falling into poverty, for a one unit change in the predictor (it is calculated as  $\text{Exp}(B)$ ). For variables that are significant, an odds ratio greater than one indicates that the relevant factor tends to accelerate escape (Table 4) while an odds ratio lower than one indicates that factor tends to deter ascents. In Table 5, for variables that are significant, an odds ratio greater than one indicates that the relevant factor tends to accelerate descent, while an odds ratio lower than one implies the factor tends to avert descents into poverty.

**Table 4: Results of the binary logistic regression for poverty escape (households that were poor 25 years ago and escaped poverty in comparison to those that stayed poor) in Puno and Cajamarca.**

	Puno			Cajamarca		
	B	Odds Ratio	Robust Std. Err	B	Odds Ratio	Robust Std. Err
Constant	-3.00**	0.05	1.19	-2.30	0.10	1.60
<b>Factors (reasons) that increase the probability of escape from poverty (expected sign positive)</b>						
Improved livestock quality	2.51***	12.26	0.87	0.17	1.19	1.25
Community organization	1.51**	4.51	0.67	-1.74	0.18	1.14
Business gains	2.86*	17.43	1.61	2.93***	18.75	0.71
Crop diversification	1.09	2.98	0.76	1.72***	5.56	0.56
Livestock diversification	0.92*	2.52	0.49	0.19	1.21	0.65
Non-agricultural/off-farm diversification	0.80	2.23	0.58	1.86***	6.44	0.53
Improved market access	0.36	1.43	0.82	3.97***	52.99	0.95
Private job	1.97**	7.19	0.94			
Gains from inheritance	0.95	2.59	0.77	0.71	2.03	0.63
Help from relatives and friends	0.44	1.55	0.62	1.20*	3.33	0.66
<b>Factors (reasons) that decrease the probability of escape from poverty (expected sign negative)</b>						
Land division	0.38	1.47	0.79	1.82	6.15	1.81
Large family size	0.03	1.03	0.57	-1.65	0.19	1.44
Death of income earner	0.53	1.70	0.70	-1.89	0.15	2.09
Polygamy	-1.41	0.24	1.23	-1.31	0.27	1.72
Lack of/no inheritance				-0.11	0.90	1.53
Heavy expenses related to death	-0.03	0.97	0.72	-0.38	0.68	1.16
Health	-1.33**	0.27	0.59			
<b>Household characteristics</b>						
Gender	0.62	1.86	0.50	-0.70	0.49	1.05
Age (squared)	0.00	1.00	0.00	0.00	1.00	0.00
Level of education	-0.17	0.84	0.53	0.70	2.02	0.77
Proportion of children in school	0.29	1.33	0.48	0.83	2.29	0.68
Influence of relatives working outside the community	-0.54	0.58	0.52	-1.17*	0.31	0.68
<b>Land and livestock holdings (in 2004)</b>						
Household landholdings (log)	0.44	1.55	0.37	0.50	1.64	0.40
Beef cattle	-0.01	0.99	0.07	0.33	1.40	0.29
Dairy cattle	0.18*	1.20	0.10	0.27	1.31	0.20
Sheep	-0.02	0.98	0.03	0.05	1.05	0.10
Camelids (Alpacas & Llamas)	0.00	1.00	0.02			
Proportion of household income from livestock	1.91**	6.77	0.91	0.49	1.64	1.40
Wald chi2 (df)	97.80 (27)			94.17 (25)		
Prob >chi2	0.000			0.000		
Log pseudolikelihood	-85.80			-56.5		
Pseudo R-square (McFadden's)	0.50			0.59		
N	290			202		
% Correctly Predicted:						
Escaping poverty	90.5			87.5		
Staying poor	77.2			89.7		

\* Significant at 0.1 probability level; \*\* Significant at 0.05 probability level; \*\*\*Significant at 0.01 probability level. To correct for possible problems of heteroscedasticity in our model above, we used a robust standard errors option; we then tested for the possibility of omitted variables/specification errors using the *linktest* option (both in STATA), which showed that this was not a problem.

**Table 5: Results of the binary logistic regression for falling into poverty (households that were non-poor 25 yrs ago and stayed non-poor compared to those that fell into poverty) in Puno and Cajamarca.**

	Puno			Cajamarca		
	B	Odds Ratio	Robust Std. Err	B	Odds Ratio	Robust Std. Err
Constant	1.15	3.15	1.50	0.45	1.57	0.98
<b>Factors (reasons) that increase the probability of falling into poverty (expected sign positive)</b>						
Land division	0.87	2.39	1.01	1.14	3.13	1.28
Large family size				2.75***	15.66	0.80
Marriage expenses				1.57***	4.82	0.73
Crop losses				0.96	2.61	0.85
Livestock losses	-1.07	0.34	1.11	0.46	1.59	0.77
Death of income earner	0.07	1.08	1.52	1.76*	5.84	0.93
Disability				1.08	2.95	1.23
Health	2.47**	11.79	1.03	0.90*	2.45	0.54
<b>Factors (reasons) that decrease the probability of falling into poverty (expected sign negative)</b>						
Business gains				-1.00	0.37	0.93
Crop diversification				-0.93	0.39	0.60
Livestock diversification	-2.25***	0.11	0.68	-0.12	0.89	0.60
Non-agricultural/off-farm diversification	-2.51**	0.08	0.97	0.05	1.05	0.53
Private Job	0.40	1.49	1.37			
Inheritance				-2.03*	0.13	1.11
<b>Household characteristics</b>						
Gender	-1.76***	0.17	0.68	-0.43	0.65	0.51
Age (squared)	0.00***	1.00	0.00	0.00	1.00	0.00
Level of education	0.36	1.44	0.89	0.01	1.01	0.56
Influence of relatives working outside the community	-1.16**	0.31	0.62	0.23	1.26	0.50
Proportion of children in school	-0.06	0.94	0.75	-0.69	0.50	0.48
<b>Land and livestock holdings (in 2004)</b>						
Household landholdings (log)	-0.34	0.71	0.44	-0.15	0.86	0.33
Beef cattle	-0.59***	0.55	0.22	-0.96***	0.38	0.30
Dairy cattle	-0.20	0.82	0.17	-0.39***	0.67	0.14
Sheep	0.01	1.01	0.03	0.06	1.06	0.08
Camelids (Alpacas & Llamas)	-0.04**	0.96	0.02			
Proportion of household income from livestock	-0.37	0.69	0.95	0.75	2.13	1.04
Wald chi2 (df)	69.86(18)			73.47(23)		
Prob >chi2	0.000			0.000		
Log pseudolikelihood	-38.41			-74.66		
Pseudo R-square (McFadden's)	0.58			0.58		
N	239			276		
% Correctly Predicted:						
Falling into poverty	80.0			85.0		
Staying non-poor	94.9			92.9		

\* Significant at 0.1 probability level; \*\* Significant at 0.05 probability level; \*\*\*Significant at 0.01 probability level. To correct for possible problems of heteroscedasticity in our model above, we used a robust standard errors option; we then tested for the possibility of omitted variables/specification errors using the *linktest* option (both in STATA), here the addition of 2 interaction variables corrected the problem.

## Reasons for escaping poverty

The major factors contributing to household escapes in the two regions have very few commonalities, suggesting targeted intervention and policy responses are needed. However, gains from business played a role in household escapes in both Puno and Cajamarca (Table 4). These are typically informal local enterprises such as carpentry, agricultural trading, selling vegetables, etc., and such activities were associated with 27 per cent of escapes in communities of Cajamarca and 22 per cent of escapes in communities of Puno. Our results suggest that the odds of escaping poverty are 17 and 19 times greater than for staying poor in Puno and Cajamarca, respectively, for households that have gained from small business-related activities.

Additional factors significant in Cajamarca (but not in Puno) include improved market access - the odds of escaping poverty are 53 times greater than for staying poor for households that have seen their market access improve - and diversification of income through crops and off-farm activities. Households that had diversified their income sources via crops and off-farm pursuits were 6 times as likely to have escaped poverty in Cajamarca than those that had not diversified.

Alternatively, in high altitude Puno, circumstances important for explaining poverty escapes include the ability to improve the quality of livestock - the odds of escaping poverty are 12 times greater for households that had improved the quality of their livestock herd. Improved livestock quality largely refers to breed upgrading of cattle ('ganado mejorado') from the traditional indigenous ('criollo') breeds, through artificial insemination or purchase of improved animals. Diversification of income through livestock-related activities was also significant in Puno, with an odds ratio of 2.5. Fifty-seven percent of households in Puno that had escaped poverty pursued livestock-related diversification strategies.

Assistance from community organizations and a private sector job were other important contributing factors for families that had escaped poverty in Puno. In Puno, assistance through community organizations refers largely to the 'Comunidades Campesinas' (CCs), Ministry of Agriculture-related organizations formed after the Agrarian Reform that managed communal lands and forests. The CCs in some of the communities investigated in Puno had allocated small amounts of land to young couples. In Cajamarca, similar community organizations do not exist.

Perhaps somewhat surprisingly, household characteristics (e.g. level of education of household head or proportion of children in school) and landholdings do not help explain why some households were able to escape poverty when others remained poor. Health and health-related expenses, however, are important factors that deter households from escaping poverty.

The results suggest that livestock assets, in particular dairy cattle, play a role in poverty escapes in Puno, but not in Cajamarca. Households with dairy are more likely to have escaped poverty in Cajamarca than those without these important income-generating assets.

For households that have escaped poverty, or those that have remained not poor, it is not necessarily the case that they have been unaffected by some of the same problems that have beset households that have fallen into poverty (described below). Members of these households have also suffered from ill health, for example, and they have also borne expenses related to marriages and funerals. In their cases, however, the effects of these negative factors have been more than offset by the operation of some positive factors.



*Box 1: Escaping poverty.*

Victor Tapara Ancco of Santa Cruz Sincata in Puno told us: 'When I was a child, my dad and my mom were shepherds of the landowner. We never had land. My brothers and I could only go to primary school and no further. We also grew up working as shepherds... I got married, and my wife was also a shepherd... Six years ago the community awarded me with a piece of land. Little by little I have bought cattle and now I sell milk to the cheese plant... One's own land always helps to be better off, we can have more livestock, and we can live more peacefully. The community also helps when someone is sick or in need. It is through their support that I am better off today'.

Another factor that has helped households in their efforts to diversify income sources has been improvements in physical infrastructure. This showed up very clearly in Puno. All but one among the twenty communities that we studied in Puno have motorized road transport services - and all of them obtained these services within the past 10 years, which provided another important impetus for escape.

This combination of collective action and access to basic public transport services and infrastructure may be critical in understanding why escapes from poverty have been so much higher over the past 10 years in Puno communities compared to Cajamarca communities. While 25 percent of households escaped from poverty in the Puno communities, only 13 percent of households were able to do so in the Cajamarca communities.

Common to both regions, however, is the fact that diversification of income sources has helped lift households out of poverty. However, households in these two distinct regions have managed to diversify their income in different ways. In Puno, the most important way to diversify income has been through livestock and livestock-related investments. Pursuing income diversification strategies through livestock investments has also been important for at least a generation in most Puno communities. Fifty-five percent of escapes in the first time period and 52 percent of escapes in the second time period were largely due to this livelihood strategy. Rosalia Muñoz Saldaña of Vista Alegre (Cajamarca) told us, '25 years ago, I always had livestock, cattle and small animals. I also harvested crops, but for me, livestock is the one that helped me more to improve my living. Livestock, especially cattle, helps... When we need something in the family, we can sell an animal. It also helps for my business of cheese... Raising more animals we are better off, the problem is that there is not more pasture [and] we need irrigation infrastructure'.<sup>1</sup>

Acquisition of additional non-agricultural income sources was the second most important reason for households' movements out of poverty in Puno communities. Unlike Cajamarca, diversification of crop incomes has not been particularly important for escapes in this region, reflecting the lower productive capacity of agricultural lands in these communities.

Diversification of income sources through non-agricultural options was the most frequently cited reason for escapes in Cajamarca. Diversification of crop incomes came next, and diversification of livestock incomes (which was most important reason for Puno communities) was third in order of importance for Cajamarca communities.

<sup>1</sup> Livestock diversification preceded status improvement in other cases too, as verified during household interviews. It was not merely a result of improvement.

In communities of Cajamarca, however, 45 percent of escapes during the first period and 36 percent of escapes in the second time period were associated with diversification of income sources through growing new crops.

Clearly, a number of households in both regions have been diversifying income sources simultaneously across a range of different activities, including livestock and crops, and many also have one or more members earning income in the non-agricultural sector. Household members are working informally close by (e.g. as labourers, carpenters, traders, etc.), or have found a job or trade in some city, often located quite far from their home village.

Households in Cajamarca have particularly benefited from remittances sent back by these city-based members. This factor, also identified in the analysis by Escobal and Valdivia (2004), was associated with 25 percent of escapes from poverty in the first time period and with 29 percent of escapes in the second time period in these Cajamarca communities. In the 20 Puno communities, however, this factor was not significantly associated with escape in either time period.<sup>2</sup>

Households which have remained not poor have benefited from the same sets of factors as households escaping poverty. These factors, including diversification of income sources, improved market access, and progress in business have helped them to offset the negative effects brought on by illnesses or customary expenditures. As in the case of households escaping poverty, livestock incomes have been relatively more important in Puno households, while non-agricultural incomes have mattered more in households of Cajamarca.

Factors that were not mentioned as important for significant numbers of relatively successful households include outside assistance from government or non-government programs, so more research would be needed to explore how much, if any, influence such programs have had. Altitude, which was suggested to us initially as a likely propeller of poverty, also has had no significant influence on how many stayed poor and how many fell into poverty in these 40 communities.

Interestingly, education is also not a predictor of escape or descent. People who have obtained jobs in the city are in general better educated, but all people who are better educated do not have jobs, i.e., education might be an important aspect of escaping poverty but it is neither a sufficient condition (not all educated people have jobs) nor even a necessary condition (people have escaped poverty through other means). Investments in education alone are likely to be insufficient for raising poor households out of poverty in communities such as these.

## Cargo net strategies for helping households escape poverty

In terms of development strategies, what do these findings imply? Barrett (2003) refers to policies and strategies that help households climb out of poverty as 'cargo net' policies. For communities at lower altitude, with relatively good access to services, with some cropping potential and less reliance on livestock as the primary livelihood option, approaches for helping to lift rural households out of poverty include: income diversification strategies, including crops, livestock and non-farm options (e.g. small businesses). Community-level organizations are currently not playing an important role, so looking at the challenges to improved collective action,

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<sup>2</sup> Permanent migration out of these communities is not reflected, however, in the results presented here. It is a limitation of this methodology in its present form that it cannot take account of households that have migrated out, leaving no trace behind. Because we work with present-day households as our units of analysis, we cannot take account of such households that are no longer part of the community. We intend overcoming this limitation for subsequent field research and welcome readers' suggestions in this regard.

particularly in market and income-generating projects may be in order. How exactly dairy has been able to act as a 'cargo net' strategy here, helping households climb out of poverty, needs to be explored further as there may be lessons applicable to wider areas of Peru.

For areas of higher altitude (over 4000 metres) on the other hand, with more reliance on community rangelands and livestock as the primary livelihood strategy, investment strategies aimed at improving market access, livestock production and marketing may help more households escape poverty. An entry point here may be through the community organizations that successful households have mentioned as being important to their upward movements out of poverty.

## Reasons for falling into poverty

Descents into poverty tend to occur gradually and cumulatively and not from one moment to the next. No single reason is usually associated with falling into poverty; multiple factors that are linked are usually involved. Successfully addressing any one of these main factors can severely reduce the incidence and probability of descent.

The major factor affecting families that had descended into poverty over the last 25 years common to both areas is health-related problems and expenses (Table 5). The odds of falling into poverty were 12 times greater for households with major health issues in Puno and 2.5 times greater for households facing health-related challenges in Cajamarca.

The importance of health as a precipitator of descent has also increased over the past 10 years. Over the first period (1979-1994), health was a factor of descent for 30 percent of descending households in the Cajamarca communities and 23 percent in the Puno communities. Over the second time period (1994-2004), the deleterious effects of health and health expenses increased substantially. For 52 percent of households in the Cajamarca communities and as many as 67 percent in the Puno communities, health was a principal reason for descent in the second period.

Age and gender of household head were additional reasons showing up as important in Puno but not in Cajamarca, implying that households headed by men and older people are much more likely to fall into poverty than female-headed households (a somewhat surprising finding) and younger families.

Mitigating factors helping households from falling into poverty are seen in Table 5 for those variables with a negative  $\beta$  coefficient. In Puno, having relatives working outside the community decreases the probability of falling into poverty, a factor also identified in the analysis by Escobal and Valdivia (2004). Household members have gone out to work a trade or an occupation in some city, sometimes close by but often quite far from their home village (Hill, 1988; Sabates, 2000), and the family benefits from remittances sent back by these city-based members.

Diversification of income through livestock-related activities and off-farm sources show up as significant mitigating factors in Puno, and beef cattle and camelid assets also play a role in keeping households from falling into poverty.

Unique to Cajamarca are marriage-related expenses that contribute greatly to the probability of households' falling into poverty. The likelihood of falling into poverty increases, with an odds ratio of 5, for households where expenses related to marriages (i.e. new households) were considered an important contributing reason to their descent. Large family size and death of the major income earner also show up only in Cajamarca as significant contributing factors to household descents into poverty. Larger households, and those that have suffered the loss of a major income earner, are 16 and 6 times, respectively, more likely to fall into poverty (mean family size for those that had fallen was 5.2 compared to 4.4 for those that stayed non-poor).

Inheritance serves as a mitigating factor in Cajamarca, helping to keep households from descending into poverty. Beef and dairy cattle holdings are key assets in this region that decrease the probability of falling into poverty.

## Safety net strategies for keeping households from descents into poverty

What do these regional differences and similarities tell us in terms of strategies and investments towards keeping more households from falling into poverty more generally?

Perhaps the biggest message is that investment and attention to increasing access to health care and reducing its costs to poor households is universally needed. It is clear that policymakers will need to pay considerable attention to health-related factors if they are to keep more households from falling into poverty. Not only does ill-health reduce the earning capacity of a household's members; in the absence of affordable and easy-to-access healthcare facilities, it also adds considerably to the household's burden of expenditure, thereby striking a double blow that in many cases drives households into poverty.

### *Box 2: Falling into poverty.*

Marcos Honorio Carrera of Cholocal in the district of Cachachi, Peru had the following story to tell: 'I was much better off than my neighbors when my wife of 25 years became ill with cancer of the uterus. I was obliged to sell my animals, cows, oxen, and donkeys, and I also went into debt in order to care for her, and later, bury her. Today, old and sick, I have to find work as a day laborer'.

Assisting new households seems to be another safety net strategy that cuts across regions that could help households from descents into poverty.

Safety net strategies for lower altitude, higher potential crop areas such as Cajamarca should focus on reducing crop- and livestock-related losses, e.g. through increased investment in research and development and promotion of sustainable crop-livestock systems. Beef and dairy cattle assets serve a key safety net role here, decreasing households' likelihood of falling into poverty.

Issues surrounding land subdivision (related to lack of inheritance) arise in the higher altitude regions where households are more dependent on livestock for their livelihoods and suffer more from accidental loss of assets (due to drought, extreme cold, floods, fire or theft), so exploring possible collective action approaches (since these are also areas where community organizations and practices such as collective grazing are stronger) may have potentially high payoffs in these areas. Our results suggest strategies and policies aimed at enhancing households' holdings of camelids and beef could act as important safety nets for poor households in Puno.

Factors associated with descent vary across regions, and they also vary over time. Health, disability and marriage expenses have increased in salience over time as propellers of descent and maintainers of poverty, and land division has assumed importance in Puno though not in Cajamarca communities.

Households that have remained poor have suffered limitations imposed by a similar set of descent-inducing factors. Thirty-nine percent of these households in Cajamarca communities and 45 percent in Puno communities cited ill health and healthcare

expenses as a principal contributing cause for their persistent poverty. Physical disability was mentioned by another 17 percent of Cajamarca households (but not by many Puno households), while accidental asset loss was mentioned by 17 percent of Puno households (and not many Cajamarca households).

## LIVESTOCK FINDINGS

In addition to the livestock-related reasons that were elicited and discussed above, a household-level livestock survey component was applied to 1,041 households in order to gather more detailed information on:

- Livestock holdings by species and indigenous (criollo) versus improved breeds, now and 10 years ago
- Livestock production and sales, now and 10 years ago

Following up on the Stages-of-Progress approach with a fairly detailed livestock questionnaire allowed us to examine the differences in livestock holdings and recent changes in those holdings for households that had escaped versus those that had fallen into poverty. Given the inherent limitations of recall data over such a long period, the objective was to look for broad trends regarding intensification (shift to improved breeds) versus extensification (larger herds), and diversification strategies (shifts to new species, products) being pursued by these different categories of households<sup>3</sup>. This allows us a rather unique opportunity to directly address the issue of the role that livestock may play in poverty alleviation; a complex question that is challenging to answer, and one that most livestock studies do not address. Table 6 summarizes the findings regarding livestock holdings in Puno and Cajamarca, 10 years ago and now. It shows the importance of cattle, sheep, chickens, alpacas and llamas for households in Puno, and beef, dairy, sheep, guinea pigs, chickens and pigs in Cajamarca.

*Table 6: Livestock holdings by region, 10 years ago and now*

Livestock species	Puno (n=538)				Cajamarca (n=505)			
	10 years ago		Now		10 years ago		Now	
	No. of hhs	Percent of hhs	No. of hhs	Percent of hhs	No. of hhs	Percent of hhs	No. of hhs	Percent of hhs
Beef indigenous	296	55	245	46	234	46	193	38
Beef improved	62	12	128	24	9	2	10	2
Dairy indigenous	317	59	287	53	284	56	295	58
Dairy improved	98	18	207	38	27	5	39	8
Sheep indigenous	436	81	366	68	325	64	249	49
Sheep improved	64	12	167	31	11	2	25	5
Alpacas	174	32	197	37				
Llamas	191	36	185	34				
Chickens	304	57	294	55	421	83	394	78
Guinea pigs	64	12	34	6	421	83	404	80
Pigs	178	33	151	28	335	66	274	54

As can be seen in Table 6, the Puno households we surveyed reported a decline in the importance of indigenous beef and an increase in holdings of improved beef breeds

<sup>3</sup> This relatively brief livestock survey does not allow us to address issues of productivity or returns to the various livestock-related activities. It would be useful to revisit these communities and supplement this information with such data, plus a more in-depth look at marketing issues.

and dairy cattle over the last 10 years. In Cajamarca, while the percentage of households owning indigenous beef cattle has declined, we see only a slight increase in ownership of improved dairy cattle over the same period.

## Role of intensification strategies in poverty escapes

Focusing in on households that had escaped from poverty, we examined evidence of intensification by looking at shifts from indigenous (criollo) breeds of cattle and sheep to improved breeds<sup>4</sup>.

In Puno, we found evidence of such a strategy playing a role for households that had escaped poverty: more than twice as many of these successful households now own improved dairy and beef cattle breeds in comparison to 10 years ago. Similarly, we found declining livestock assets for households that have fallen into poverty:

- Fewer of these unsuccessful households own indigenous breeds of sheep, dairy and beef cattle, and they have smaller herd sizes;
- Ownership of improved breeds has actually declined for these households compared to 10 years ago.

In Cajamarca, for households that have escaped poverty, ownership of improved breeds of cattle (beef and dairy), however, is insignificant and has not increased over the last decade. More of these successful households now own indigenous dairy cows (an increase from 58 percent to 70 percent) and indigenous beef cattle than did 10 years ago (an increase from 36 percent to 44 percent). And small animal ownership has declined for this category of households. A logistic regression analysis was undertaken, aimed at explaining adoption/ownership of improved breeds for Puno (where approximately 50 percent of the households have adopted improved breeds), and examining which household factors help explain whether households are holding improved breeds (cattle or sheep). Our dependent variable was defined as 1 if a household had any improved breed of dairy cattle, beef cattle or sheep. The explanatory variables included in the analysis were gender of the household head, age, level of education of household head (1 if above primary; 0 otherwise), proportion of children in school, amount of land owned, dependency ratio, involvement in multiple income-generating activities and whether a household has relatives working outside the community. The results are presented in Table 7.

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<sup>4</sup> These tables are not presented here for space reasons, but are available upon request from the authors.

*Table 7: Results of binary logistic regression for adoption/ownership of improved breeds (dairy cattle, beef cattle and sheep).*

	B	S.E.	Wald	Sig.	Odds Ratio	95 percent C.I. for odds ratio	
						Lower	Upper
Constant	-0.86	0.74	1.32	0.2500	0.42		
Gender	0.46	0.24	3.58	0.0584	1.59	0.98	2.56
Age squared	0.00	0.00	0.07	0.7935	1.00	1.00	1.00
Education (1 if above primary level; 0 otherwise)	0.46	0.21	4.62	0.0316	1.58	1.04	2.40
Proportion of children in school	0.02	0.35	0.00	0.9595	1.02	0.52	2.00
Log of land owned	0.12	0.07	3.10	0.0783	1.12	0.99	1.28
Dependency ratio	-0.49	0.67	0.53	0.4677	0.61	0.16	2.29
Involvement in multiple income generating activities	0.65	0.23	8.07	0.0045	1.91	1.22	3.00
Influence of relatives working outside the community	0.50	0.19	7.10	0.0077	1.65	1.14	2.38
-2 Log Likelihood	698.921						
Pseudo R square	0.084						
N	529						

Table 7 shows that gender of household head, level of education, ownership of land, involvement in multiple income generating activities and having relatives working outside the community are all positively and significantly related to ownership of improved breeds. Male-headed households in Puno are 1.6 times more likely to own improved breeds as compared to female headed households. Similarly, household heads with secondary education and above are more likely to own improved breeds compared to households with less than secondary education. Households with more land, involved in multiple income-generating activities and with relatives working outside the community are 1.2, 1.9 and 1.7 times more likely to own improved breeds than households with little or no land, involved in only one activity and with no relatives working outside the community.

## Role of extensification strategies/increasing herd size in movements out of poverty

In Puno, for households that escaped poverty, we see evidence of larger herds of improved dairy cows (which increased from an average herd size of 6.4 to 10.4 per household compared to 10 years ago), and the same trend for llamas (which increased from an average of 9.7 to 13.8 per household), but average alpaca herd sizes have not increased (Table 8).

In Cajamarca, on the other hand, households that had escaped poverty did not accumulate larger herds of cattle or sheep, and they own fewer chickens and guinea pigs than they did 10 years ago (Table 8). So, it does not appear that increasing the number of livestock assets has been a pathway out of poverty for these communities in Cajamarca (and given the frequency of non-farm diversification and crop diversification as important reasons for escaping poverty in this region, this supports



the argument that these factors have played a much more important role than has livestock in terms of a pathway out of poverty).

**Table 8: Mean herd size (number of animals) for households that escaped poverty, Puno and Cajamarca, 10 years ago and now.**

Livestock species	Puno (n=125)				Cajamarca (n=73)			
	10 years ago		Now		10 years ago		Now	
	Mean Herd Size	Valid n	Mean Herd Size	Valid n	Mean Herd Size	Valid n	Mean Herd Size	Valid n
Beef indigenous	3.1	58	4.5	55	2.2	26	2.1	32
Beef improved	4.3	15	3.7	34	-	-	1.0	1
Dairy indigenous	3.4	77	4.0	78	2.4	42	2.5	51
Dairy improved	6.4	18	10.4	47	2.5	2	3.5	2
Sheep indigenous	18.0	95	14.7	85	4.5	43	3.4	39
Sheep improved	49.6	15	17.1	45	5.0	1	7.0	3
Alpacas	22.0	34	20.4	45	-	-	-	-
Llamas	9.7	29	13.8	35	-	-	-	-
Chickens	5.3	70	3.3	81	6.9	58	5.4	56
Guinea pigs	13.6	12	7.6	7	14.7	61	9.8	62
Pigs	3.4	41	1.7	47	1.6	48	1.4	43

## Role of marketing and diversification strategies in movements out of poverty

We looked at how exactly households were diversifying their livestock activities in comparison to 10 years ago (as was reported as being an important reason for households' poverty escapes). In Puno, for households that escaped poverty:

- Production and sales of milk, wool and alpaca fiber have increased significantly over the last 10 years
- Milk production has doubled, with 4 times as many households selling milk, and over twice as much, than was the case 10 yrs ago
- A large number of these successful households were new at producing fiber, cheese, eggs, milk and mutton (i.e. had diversified into new livestock products)
- Significantly more of these successful households own alpacas than 10 years ago

In Cajamarca, for these relatively successful households:

- The percentage of sampled households that produce milk increased from 47 percent to 73 percent over the last 10 years
- The data show significantly increased milk production and sales for these households
- There were no significant changes in the percentage of households producing other products

Another indicator of diversification strategies is evidence of a large number of households that were not engaged in particular livestock activities 10 years ago, but are undertaking them now (Table 9). We see such evidence in Puno for alpaca fiber production, camelid hides and meat, eggs and milk. In Cajamarca, a significant number of households are now engaging in production of eggs, guinea pigs, milk and wool compared to 10 years ago.

*Table 9: Households engaged in livestock production activities that they were not engaged in 10 years ago.*

Species	Puno			Cajamarca		
	No. of hhs	Percent	Valid N	No. of hhs	Percent	Valid N
Alpacas fiber prod lbs/yr	34	24.3	140			
Beef prod kgs/yr	31	81.6	38			
Camelid hides prod no/yr	36	27.5	131			
Camelid meat prod kgs/yr	27	22.5	120			
Cheese prod kgs/wk	56	22.8	246	12	32.4	37
Chickens prod no/mo	75	27.6	272	32	12.5	256
Dried meat prod kgs/yr	27	40.3	67			
Eggs prod no/wk	73	27.7	264	50	16.3	306
Guinea pigs prod no/mo	16	44.4	36	51	12.8	397
Milk prod litres/day	68	16.2	420	90	30.6	294
Mutton prod kgs/yr	59	18.4	320	7	14.6	48
Pork prod kgs/yr	15	36.6	41	8	27.6	29
Wool prod lbs/yr	59	14.5	407	47	24.7	190

## CONCLUSIONS

In each of the forty Peruvian communities investigated here, while some households are coming out of poverty, others are falling into poverty. New poverty is being created even as old poverty is being destroyed. The reasons why people are becoming poor are not the same as the reasons why people are coming out of poverty. The implications of this finding are that the policies needed to stop people from falling must deal with the reasons for falling. The policies needed to help people escape poverty must address the reasons households escape. Because these reasons are different, two different sets of policies are needed - one to halt descents and one to promote escapes.

Our findings suggest that for communities at lower altitude, with relatively good access to services, with some cropping potential and less reliance on livestock as the primary livelihood option, 'cargo net' strategies for helping to lift rural households out of poverty should focus on: income diversification strategies, including crops, livestock (especially dairy) and non-farm options (e.g. small businesses). Community-level organizations are currently not playing an important role, so looking at the challenges to improved collective action, particularly in market and income-generating projects may be in order. For areas of higher altitude (over 4000 metres) and more remote villages, with more reliance on community rangelands and livestock as the primary livelihood strategy, investment strategies aimed at improving market access, livestock production and marketing may help more households escape poverty.

With respect to safety net strategies and investments aimed at keeping more households from falling into poverty, clearly investment and attention to increasing access to health care and reducing its costs to poor households is universally needed. Assisting new households seems to be another safety net strategy that cuts across regions that could help households from descents into poverty. Our analysis comparing households that stayed non-poor with those that fell into poverty also suggests that livestock assets are serving a 'safety net' role in Cajamarca (beef and dairy cattle) as well as in Puno (camelids and beef), decreasing households' probability of falling into poverty.

Safety net strategies for lower altitude, higher potential crop areas could focus on reducing crop- and livestock-related losses, e.g. through increased investment in research and development and promotion of sustainable crop-livestock systems. Land-related issues need attention in the higher altitude regions where households are more dependent on livestock for their livelihoods.

These policies are region-specific and may often even be community-specific. We found that some reasons for falling into poverty, or for escaping poverty, are similar in both places, but some are different. National policies are important, but our study shows that there are very good reasons for having regional and local pro-poor policies.

Households in these Puno and Cajamarca communities have escaped from poverty in large numbers, and for them, escaping poverty has in large part been due to successful diversification of income sources. This finding is supported for rural Peruvian households in Swinton and Quiroz, 2001 and Escobal, 2001. We found that diversification of income sources through livestock and off-farm activities was particularly important for helping households to escape poverty in Puno and Cajamarca, and also through crops in Cajamarca.

Improvements in livestock quality (i.e. breed and health improvements) are also related to movements out of poverty. Households that were able to improve the quality of their livestock were much more likely to escape from poverty as those that were unable to invest in this strategy. Employment in the private sector, gains from small businesses, improved market access, community organizations and inheritance

from parents were also found to be positively and significantly associated with escaping poverty.

Our data show quite a bit of evidence supporting the notion that livestock (via intensification strategies or increasing productivity and marketing, rather than through increased herd sizes) have helped Puno households get out of poverty; but little evidence that this has been the case in Cajamarca. The number of households that escaped poverty and are producing milk in Puno not only doubled in the last 10 years, but these families are also selling more than twice as much milk as they were previously. A significantly larger number of these successful households are also selling more cheese, wool and alpaca fiber.

Thus intensification of livestock strategies (e.g. moving to improved breeds) seems to be helping households escape poverty in Puno, but not in Cajamarca. Livestock production and marketing has appeared to suffer in Cajamarca over the last 10 years, in fact, according to our household survey evidence, although there is some evidence that livestock diversification is happening for households that have escaped poverty there.

Helping prevent households from falling into poverty will require:

- improvements in access to affordable health care
- improvements in access to appropriate crop and livestock technologies and perhaps access to insurance to limit catastrophic crop/livestock-related losses
- improved safety nets for the disabled and elderly

Improved rural roads is one way to help households diversify and is supported by our evidence that improved market access has played a role in poverty escapes, as well as that of Escobal and Torero, 2003. Helping households escape poverty will also be aided by investments in:

- Improved market access to support income diversification efforts
- Collective action efforts (e.g. strong community groups) in the areas of crop and livestock production and marketing activities

This approach has allowed us to provide information on how rural people define and deal with poverty and an opportunity for them to share their situation with policy makers. One drawback is that we cannot generalize broadly throughout Peru with this approach, but we have managed to capture some regional and local situations important for policy makers to understand.

Another limitation of the methodology to note is that the scale of differentiation (13 stages of progress) is not a finely divided one, thus smaller changes in material status are not picked up. Comparisons with results from standardized income- or consumption-based measurements are also not immediately possible, as these relate to flows and this asset-based approach refers to stocks.

One of the advantages of the method is the scope for adding on to the findings, thus fully utilizing the time and effort already put in by the researchers and community members. In this case, for instance, it would be useful to add an historical review of Peruvian policies (local, regional and national, including land, agriculture, health, etc.) in order to explore the implications of the poverty findings in the light of policy trends, since this approach uncovers proximate and local rather than structural or national causes of household poverty movements. Thus, for example, the effects of international trading regimes or national macro-economic policies are not reflected, except insofar as these get translated into effects such as healthcare-related reasons, for example. The objective of the approach is to provide information that is useful to different types of policy makers, from local to national levels, to feed into the policy debate and stimulate further investigations where needed. Identifying broader

causality in the sense of ultimately tracing the relationship of poverty movements to national or global events is not what we are seeking to accomplish with this method: rather, the effort is to expose more clearly how, within the same policy environment, different households have experienced very different pathways. In this sense, this methodology complements others that look toward national and international events. Combined with other methods, including panel data studies and participatory poverty appraisals, the Stages-of-Progress approach can generate more comprehensive knowledge about the nature and causes of poverty, and lead to improved progress in poverty reduction.

With respect to the livestock survey component, this approach could also benefit from an additional module aimed at eliciting additional information on historical livestock production and marketing-related issues and policies to enhance our interpretation of the broad intensification, extensification and diversification trends elicited here.

These results provide informative baseline information on poverty dynamics upon which to pursue more specific policy options - e.g. an opportunity to revisit these villages and identify specific strategies/policy options together with community leaders and local policy makers. Important next steps include building upon this new knowledge and working closely with these same communities on specific, targeted interventions to address the reasons that they have identified for households in their communities both falling into, and coming out of, poverty.

For example, in some Puno communities, appropriate livestock interventions may include building upon existing groups/collective action in the area of fattening beef, or establishing selective breeding strategies for alpaca. In Cajamarca, livestock-related interventions may include credit programs targeted to women and small animals, or some communities may want to try interventions aimed at improving group efforts related to dairy marketing, for example. It is only through working closely with these diverse communities that specific and appropriate interventions and policy options will be identified, thus it seems a logical next step for those interested in these findings to pursue. This will require the formulation of new interdisciplinary teams that include the technical expertise required, and more thought as to how best to link the knowledge generated using this participatory, qualitative-quantitative research approach to specific development and policy-related actions in different regions.

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