

# **Cattle Ranching, Land Use and Deforestation in Brazil, Peru and Ecuador**

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Abridged Proposal

## I. Statement of the Problem

A critical dimension of global environmental change is the high rate of deforestation taking place as landholders convert primary and secondary growth into pastures for raising cattle. In the Brazilian Amazon, the expansion of cattle ranching is occurring at such a rapid pace that concerned analysts have coined the term "pecuarização" (cattlelization) to depict the extraordinary increase in the cattle herd among landholders of all sizes. The problem is greatly compounded by the fact that a high proportion of the pastures being created are based on unsustainable management practices. The result is pasture degradation, which compels ranchers to clear additional forests to maintain their herd.

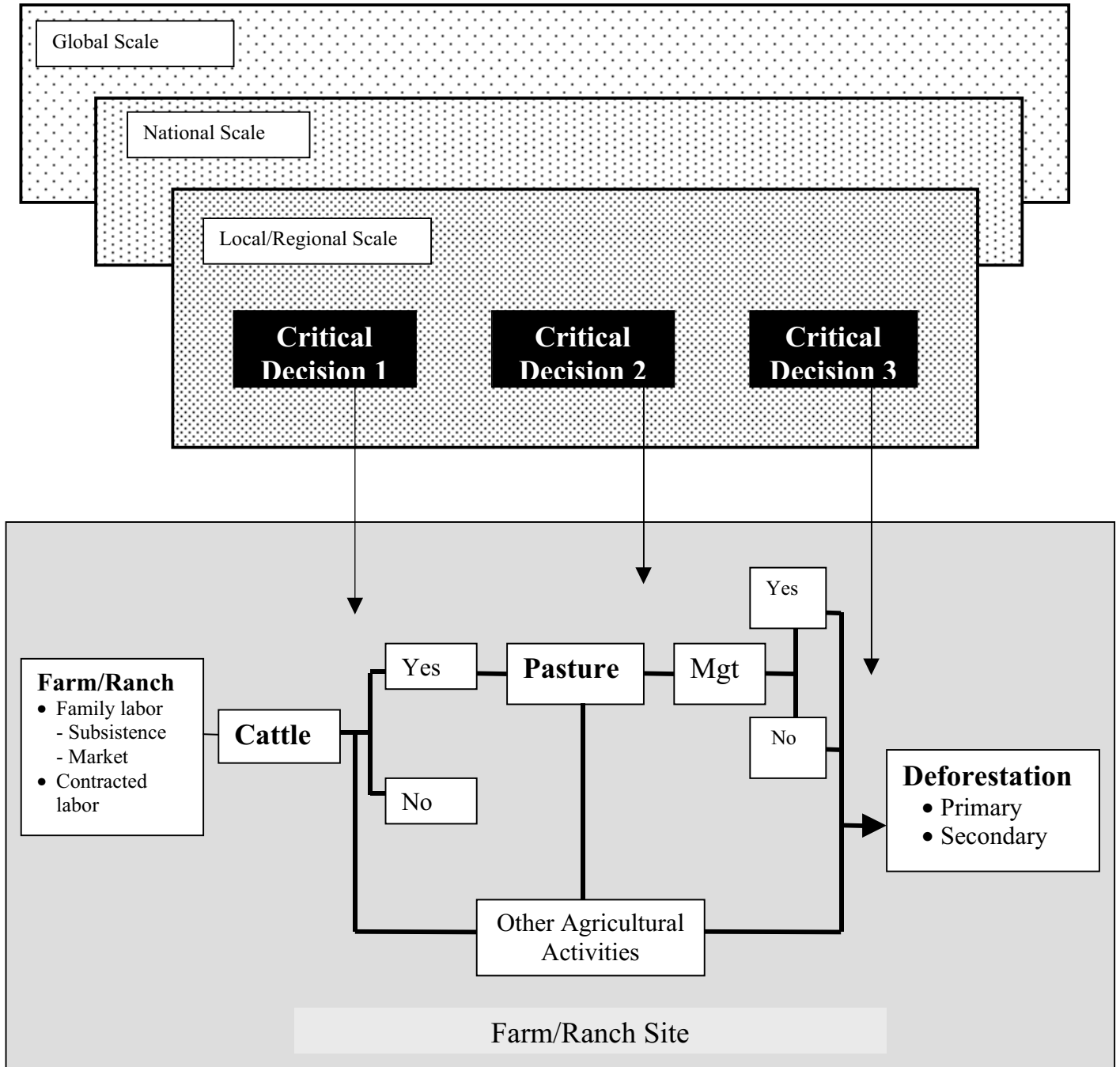
The expansion of cattle ranching based on unsustainable pasture management is also underway in Peru and Ecuador, although the trend in both places appears to be quite different compared to that observed in Brazil. Among other things, the process is occurring at a slower pace in Peru and Ecuador, and is happening in response to different social and economic incentives, and as a consequence of different national-level development policies.

The marked differences between the three countries present a unique opportunity to carry out a comparative analysis. By analyzing the presence of an attribute in one context and its absence in another, and by documenting the way different socioeconomic and policy environments produce different outcomes, it is possible to generate a comprehensive understanding of the various factors that lead to the expansion of cattle ranching.

## II. Conceptual Framework

Key elements of the proposed conceptual framework are visually depicted in Figure 1. At the center of the diagram are boxes labeled "Critical Decision 1," which refers to the choice of investing in cattle or not, and "Critical Decision 2," which refers to the choice of sustainable or unsustainable pasture management practices, and "Critical Decision 3," which refers to deforestation. All three decisions are embedded in boxes that refer to drivers that operate at the Local/Regional, National and Global Scales.

Figure 1



## A. Land Use, Pasture Management Decisions, and Deforestation

Fundamental to the design of the project is the assumption that, within the limits of the information at their disposal, landholders make rational choices when they allocate the resources at their disposal in the production of a livelihood, or in the pursuit of profit. According to this approach, when the landholder considers how to invest his resources, he will assess the costs and the benefits of various alternatives, taking into account his objectives, as well as the land, labor and capital at his disposal. Additional elements that enter into the decision include a host of factors that make up the profile of opportunities and constraints, and incentives and disincentives that are presented by the local context. The latter are determined by such variables as the cost of inputs and transportation, the relative prices of different commodities, access to bank credit, and so on. The research objective is to document the elements that enter into the micro-scale decision process that determine the observed land use and pasture management outcomes.

Figure 1 highlights a number of relationships that are central to the objectives of this study. For example, it is understood that the decision to invest in cattle (Critical Decision 1), as well as the decision to engage in pasture management (Critical Decision 2), are choices that are made in the context of the overall farming system. The farming system includes the labor and financial resources invested in other agricultural activities (shown in the lower portion of Figure 1). “Other Agricultural Activities” include the cultivation of annual food crops, the planting of perennial fruit trees, and the decision to allow designated plots to return to secondary growth. Cattle ranching and pasture management are therefore conceptualized as activities that are closely interrelated with other aspects of the farm/ranch site.

To the right of Figure 1 is the box labeled “Deforestation,” treated as the outcome of two fundamental processes: (a) the land clearing associated with “Other Agricultural Activities,” and (b) the land clearing associated with the creation of pasture (both managed and unmanaged). Deforestation is a general concept that can be usefully broken down into two fundamentally different components: the clearing of “primary forest,” and the clearing of “secondary growth.”

The distinction is an important one for many reasons, including the fact that the proportion of primary to secondary forest that is cleared varies over time. As frontier areas become consolidated, and land become increasingly scarce, secondary growth comprises an increasingly greater proportion of the areas that is deforested. The proportion of deforestation of secondary growth also varies according to the land management strategies that the farmer/rancher may use. For example, the felling of secondary growth can be the result of a deliberate strategy, based on an anticipated rotation of fallow and cleared areas. Alternatively, the clearing of secondary growth may take place as a last resort as landholders face degraded pastures and plots that were abandoned due to low fertility. The distinction between the clearing of primary and secondary growth is also important from a bio-physical standpoint inasmuch as the clearing of

primary forest has fundamentally different environmental implications in terms of critical factors such as carbon release and biodiversity.

## B. Elements of a Multi-Leveled Approach

From the standpoint of the farmer/rancher, the profile of opportunities and constraints that comprise the local decision context are taken more or less for granted. Yet key elements of the local context are themselves the outcome of processes that operate at higher levels of social and spatial organization. For example, one may find that the cost of transportation is a critical feature of the local context, and that transportation costs that figure prominently in the farmer's decision to raise cattle. Transportation costs, in turn, are determined by the interplay of a variety of factors that operate one step, or several steps removed from the rural producer. This second level (meso/regional scale) is comprised of other stakeholders, such as truck owners and drivers, who make decisions within their own incentive structure. The latter, in turn, are the net result of factors removed still further from the rural producers, such as the cost of petrol, bank credit policies, and state-financed road construction budgets and priorities (macro/national scale).

The research objective is thus to comprehend, not only the micro decision processes made by farmer/ranchers, but also the decision processes made by stakeholders at successively more distant levels of social organization, at the meso and macro scales. When this is accomplished, the result is an understanding of the factors that operate within, and interact across, the various levels. Taken together, these factors comprise a system of variables and relationships implicated directly or indirectly in the resource allocation decisions made by landholders in rural areas. The varying density of the shades in Figure 1 are meant to depict the relatively strong effect of the local/regional drivers compared to the progressively weaker effects of the national and global contexts.

## C. Targeting Critical Classes of Landholders/Producers

Figure 1 represents the major concepts and relationships that are the primary focus of this study. When we use this general framework to guide data collection, we anticipate that the results will demonstrate fundamental differences according to the "type" of farm/ranch involved. Rather than conceptualize all landholders as the same, the objective is to draw a distinction between classes or types of landholders who operate in terms of fundamentally different principles.

Whereas analysts often speak of "small," "medium" and "large" landholders, we have concluded that the size of the establishment is not the critically distinguishing factor. Instead, the most significant distinction concerns the difference between farm/ranches that have salaried workers or routinely hire laborers (firms), and those that rely primarily if not exclusively on family labor (family farms). Within the family farm category, we can further distinguish between establishments that are basically subsistence oriented and those that regularly sell commodities on the market.

Figure 2 identifies three types of Critical Producers (critical, that is, to the objectives of this study). Types 1 and 2 rely on family-based labor but have different orientations to the market (i.e., subsistence vs. market oriented). Type 3 producers, on the other hand, can be thought of as firms or enterprises that rely mainly on contracted labor, includes managers, permanent employees, and day laborers. The reason for targeting the three different types of producers is because we hypothesize that the factors that influence Critical Decisions 1, 2 and 3 will vary according to the kind of establishment at hand. We therefore anticipate that we can advance our understanding of landholder decision making if we take into account the idea that all of the relationships presented in Figure 1 are likely to vary by producer type<sup>1</sup>.

Figure 2

Orientation to the Market	Labor	
	Family-based	Contracted
Mainly Subsistence	1	--
Mainly Market	2	3

### C. Critical Links in the Marketing Chain

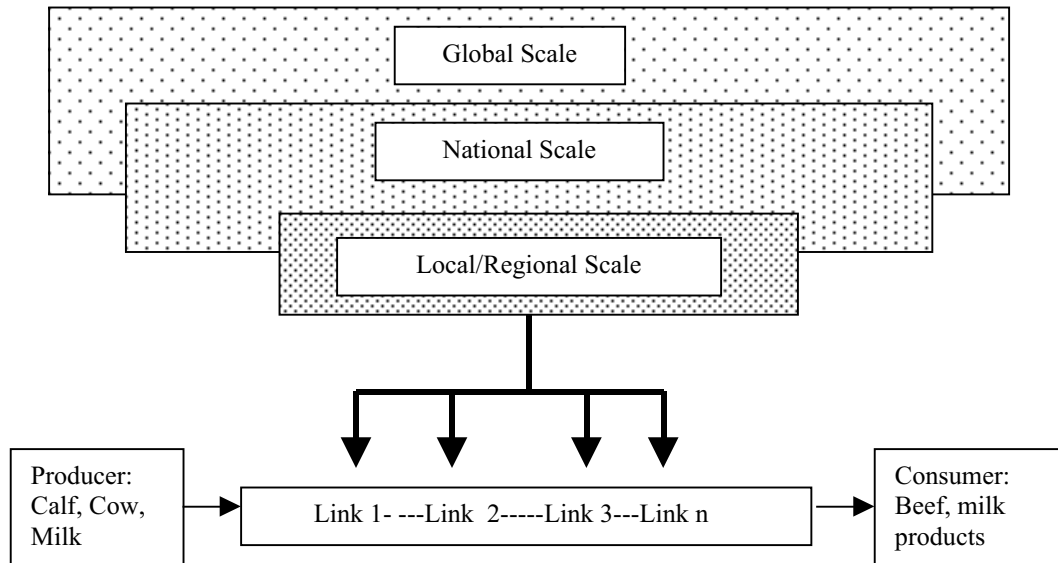
Further analysis of cattle ranching will focus on the stages that link the birth of a calf, to the final consumption of beef. Critical links in the marketing chain are defined by specific activities, such as purchasing, transport, fattening, slaughter and butchering. Each activity along the way involves a set of more or less distinct social actors whose decisions -- like those made by ranchers -- are conditioned by local/regional, national and global level factors, as shown in Figure 3.

The marketing chain is an important consideration because it potentially affects all three of the Critical Decisions that have been identified as priorities in this study. The marketing chain has this effect because it determines the prices and the quality standards that the landholder faces at the moment of selling cattle or milk products.

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<sup>1</sup> Using a metaphor drawn from statistics, we can say that -- when we compare Types 1, 2 and 3 -- the “between-group” variance (in the relationships depicted in Figure 1) is greater than the “within-group” differences. Put another way, Types 1, 2, and 3 represent clusters of producers that represent more or less distinct “production logics,” and should therefore analyzed separately and comparatively.

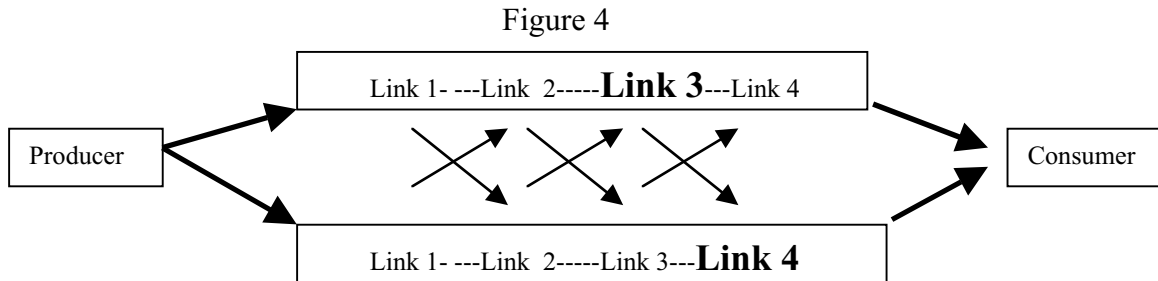
Figure 3



The framework shown in Figure 3 is a useful starting point for an analysis of the marketing chains for cattle and milk products, but it does not depict important features of the real situation observed in rural areas. Additional concepts and relationships are depicted in Figure 4. Three major considerations are worthy of note, as follows:

1. Producers of cattle and milk products often face more than one marketing chain, each of which may present different prices and specifications. Hence, at the point of sale, the landholder is often faced with a choice of buyers, who are, in turn, embedded in different marketing systems.
2. The various links in the marketing chain are comprised of different actors who do not all share the same level of power (defined as the degree of control that they exercise over the context in which they operate and as they interact with other actors in the chain, both above and below them). We can represent these differences by presenting some links in the diagram with a larger font size. Link 3, for example, could represent a large slaughter house that stands between the buyers of cattle (Link 2) and, say, urban butchers. Alternatively, as shown in the lower portion, Link 4 could represent powerful supermarket chains that purchase beef products in large quantities, and thereby dictate not only the price, but also the quality specifications of beef and milk. In this way, major players along the marketing chain have an influence on the relationships that join all other links in the chain, both forward and backward.

3. Finally, it is important to recognize that the, when multiple marketing chains are present, they rarely exist independently of one another. Products can flow between the various chains at different linkage points. These relationships are shown as crossing arrows between the two marketing chains.



Analysis of the marketing chains potentially contributes to the development of policies that can influence the outcomes that are of interest to this study, namely the three critical decisions. Hence, the objective of the study is not only to describe the structure of the marketing chain and show how it influences landholder behavior, but also identify mutable points within the architecture of the system that are amenable to changes that can alter pasture management and deforestation.

The analysis of marketing chains thus play a central role in the comparative research design. The hypothesis that guides this design is based on the prediction that both the structure of the chain, and its influence on landholders' decisions, vary from one region to another within Brazil, and between Brazil, Peru and Ecuador. By being alert to these comparative differences, we may find that the same outcome (e.g., poor pasture management; high deforestation) may be the common results of strikingly different contexts. Such insights are essential to an understanding of the factors that drive landholders to make the decisions that they do, and to the development of environmentally sound public policies.

### III. Comparative Design

The principal spatial comparison is between the three countries. In Peru, the focus will be on the Alto Huallaga and Pachitea regions. In Ecuador, the focus will be on the Valle de Quijos. Compared to Brazil, where the terrain is low lying, relatively flat and comparatively dryer, the study sites in both Peru and Ecuador are in higher elevations (Selva Alta), on sloped terrain (subject to erosion), and in areas characterized by high average rainfall (3,000 to 3,500 mm per year). The Selva Alta areas are connected to the metropolitan areas of Lima and Quito by all-weather roads. Despite these similarities, the presence of cattle ranching in the Valle de Quijos in Ecuador is considerably older compared to the Alto Huallaga and Pachitea regions of Peru, where the expansion of cattle ranching has taken place only the last five to ten years.

In Brazil, the analysis will be carried out in the Eastern, Central and Western

regions, each of which displays more or less distinct characteristics. The Eastern Amazon region encompasses the southern part of the state of Pará, the northern portion of Tocantins, and the western half of the state of Maranhão. The area was the target of much of the intense in-migration of people during the 1970s who settled in planned and unplanned colonization sites. The Central region comprises the territory traversed by the Transamazon Highway, and includes older riverine communities located in várzea areas subject to annual flooding. The Western region is an area characterized by the presence of rubber tappers who came into the state of Acre early in the century during the days of the rubber boom, as well as more recent migrants, mainly from southern Brazil.

#### IV. Data Collection

The analytical challenges presented by the multi-leveled comparative design call for methods of data collection that are fundamentally different from conventional survey methods. Traditional survey techniques rely on a large sample of randomly selected respondents as a means to produce a data set capable of providing generalizable quantitative results regarding the frequency of attributes (e.g., the percent of Type 1,2 and 3 landholders in a given area), and the strength of the relationship between measured attributes. This project will take advantage of just these kind of data, by analyzing surveys of small farmer/ranchers that the investigators already have in hand.

But, valuable as such data sets may be, survey techniques are notably limited in their ability to address the issues presented by the multi-leveled framework proposed in this study. The alternative approach used in this project is to carry out interviews, not with hundreds of randomly selected respondents, but with a smaller number of systematically chosen key informants. A key informant is an individual who, by virtue of occupying a central position in the system, possesses knowledge and information relevant to project goals.

The design of the sample is therefore dictated by the conceptual framework itself, which identifies the loci of data collection, beginning most obviously with interviews with family farms (subsistence and market oriented) and with firms (based on contracted labor). Moving from there to address the stakeholders that comprise the various links in the marketing chain generates a list of key informants that includes buyers, truckers, merchants, bankers, and slaughter houses. The progression continues to the macro scale, to include national-level policy makers in various sectors, such as transportation and rural development agencies. The approach calls for an interdisciplinary team capable of integrating the insights from different specializations.

Note: Detailed descriptions of the research methodology are presented in two documents called “The Interactive Interview,” and “Collecting and Analyzing Data.”