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Author: Arias, Eliézer

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Eliézer Arias

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Agricultural market reforms initiated by successive Venezuelan governments in the 1990s have triggered a complex set of coping strategies in the Venezuelan Andes. A case study in the Pueblo Llano valley showed that

some of the most important livelihood strategies used by farming households to cope with economic uncertainty during the period of research (1994–1999) were land expansion, plot dispersion, and an increase in sharecropping arrangements. However, in constructing these strategies, farming households had to draw on social and cultural resources (ie kinship) as a mechanism to access more land, inputs, and labor.

Keywords: Livelihood strategies; market reform; land access; Andes; Venezuela.

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Introduction

Recent studies on the Tropical Andes have focused on processes such as deforestation and changes in land use and their biophysical consequences, including their impact on biodiversity, soil erosion, and soil fertility, among others (Sarmiento et al 1993; Ataroff and Rada 2000; Drost et al 2002). But few studies have focused on the complex livelihood strategies displayed by local people who are directly responsible for many of these changes and their ecological consequences (Sarmiento 2000). When studies focus on these issues, they mainly center on identifying the social and economic drivers of changing land use, without examining how these strategies can be both expected and unexpected responses to national and global policies, and what role social and institutional factors may have in triggering these responses.

A relevant context for researching these issues is a study of the recent market-led policies adopted by successive Venezuelan governments during the 1990s, and their effect on potato production in the Venezuelan Andes. The promoters of these policies alleged that substantially reducing the level of public intervention in agricultural input and output markets, and currency devaluation, would produce a shift in production activities towards those sub-sectors and commodities in which Venezuela has a comparative advantage (Nielson 1997). This assumption produced a limited understand-

ing of the series of barriers that can constrain the movement of resources to other crops and techniques. In the Venezuelan Andes, even within this new context, local small farmers have unexpectedly been able to continue producing and expanding crops such as potato. This apparent flexibility seems to be connected to their ability to adapt land tenure arrangements through the control and deployment of social resources (networks, reputation, kinship, reciprocity, patron–client) that allow them to access not just more land and plots, but also scarce and now expensive inputs such as fertilizers, labor, seed, and pesticides. This process of potato expansion has, however, occurred within the context of diminishing land quality, and conflict over the use of the frontier highland or *páramo*, a humid tropical ecosystem that harbors significant global biodiversity interests (Sarmiento et al 1993; Drost et al 2002).

The present article seeks to contribute to an understanding of how social institutions enable access to land and other productive factors by farmers, and how this has shaped land use in the high valleys of the Venezuelan Andes. Focusing on a longitudinal study of a high valley located in the northernmost spur of the Andes in Venezuela, it examines the effects of market liberalization on land access strategies amongst a group of potato producers. The findings not only suggest linkages between policy and land access changes, but also indicate that social practices may shape and facilitate how people respond and adapt to these policies.

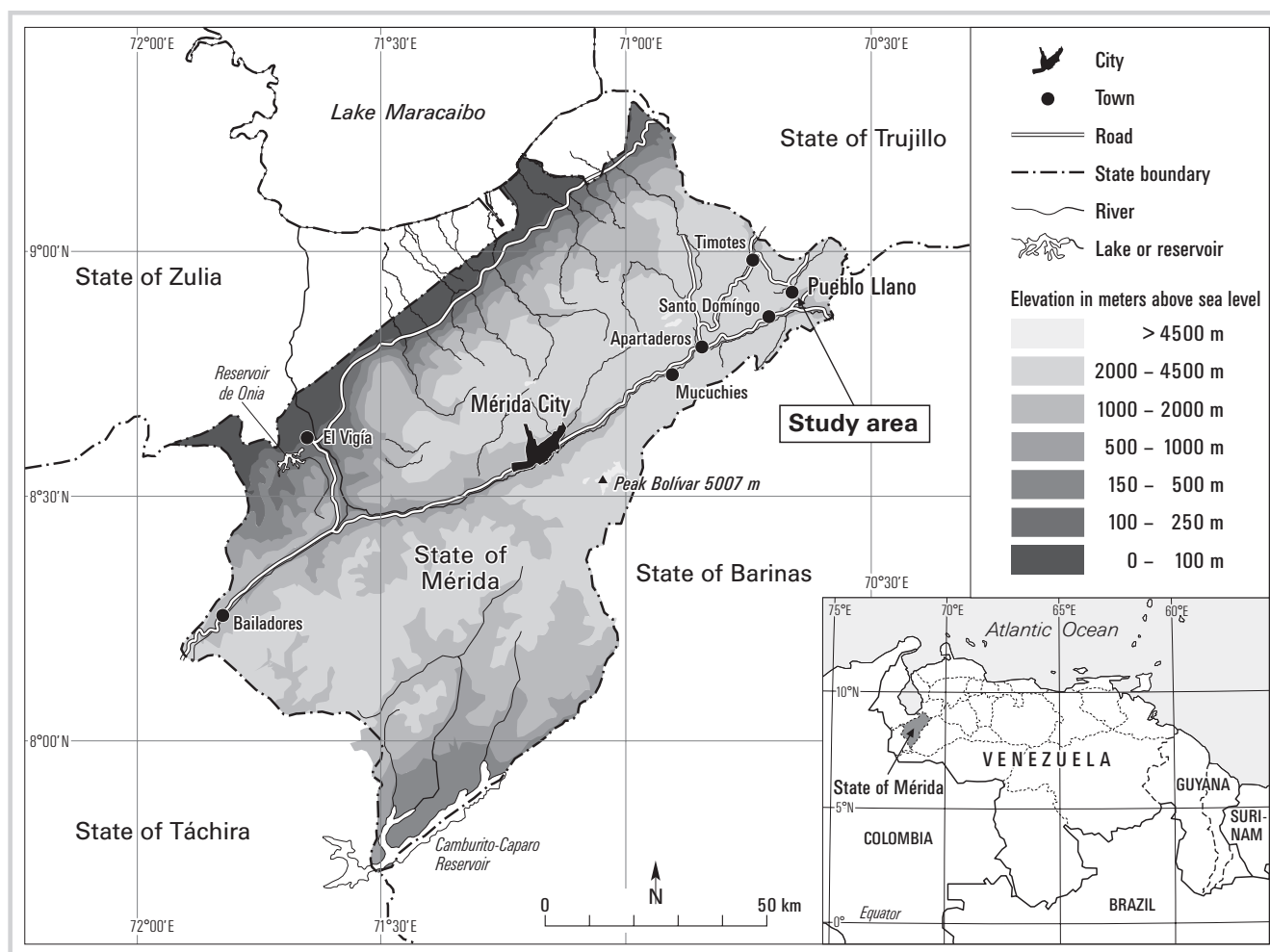
The study area: Pueblo Llano watershed

The Pueblo Llano watershed lies between 8°53' N and 9°1' N latitude and 70°34' and 70°43' W longitude (Figure 1). The Pueblo Llano watershed's geographical boundaries coincide with those of the municipality of the same name. It covers an area of approximately 9550 ha and, according to the last census, has a population of about 10,000 (INE 2001). This watershed is one of 3 headstreams of the Santo Domingo Basin and is representative of conditions in large parts of the alpine and tropical Andes climate and agro-ecological belts in the northeastern highlands of Mérida State (Monasterio 1980). Most soils are stony, formed on slopes with steep gradients which are unstable (Figure 2). The valley features altitudes between 2000 and 3500 m. The mean annual precipitation is 1200 mm, with most rainfall occurring between May and June; the mean annual temperature is 10°C.

Pueblo Llano's agricultural system mainly centers on potato, with 2460 ha farmed in 1999, representing 56.4% of the total farmed area. The second most important crop is carrot. By 1999, according to official data, the two main crops covered 93.2% of the total cultivated area in Pueblo Llano, which was 4365 ha. The

FIGURE 1 Location of the study site in the Venezuelan Andes. (Map by Eliézer Arias and Yheicar Bernal, revised by Andreas Brodbeck)

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specialized cropping strategy used by most of the farmers in Pueblo Llano is to rotate plantings of potato and carrot. This means that a plot, after being cultivated with potato, will be cultivated with carrot. This is most common in plots under irrigation, as these are suitable for double and even triple cropping over a year. In the case of single cropping (particularly of potato), farmers are careful to rotate seeds from plot to plot and avoid sowing the same seed in a plot where it was already grown in the previous season. Those farmers who have enough land can farm both crops at the same time.

Methodology

This paper is based on data from farming households in Pueblo Llano collected from surveys and field study interviews in 1994 and 1999. A sample of 64 households was randomly selected in this valley in 1994 to carry out a household survey that focused on collecting primary data on agricultural activities, i.e. the access to and use of land, labor, capital, yield levels, and other physical and socioeconomic information. In 1999 a follow-up survey was carried out on all farming households surveyed in 1994. The earlier data from the sample house-

holds helped in the analysis of causal linkages between farmers, their previous resource endowments, and their performance outcomes over time. The field studies also included qualitative methods such as semi-structured interviews and life histories, to record experiences of change in the community studied.

Results

Economic reform and its local effects

The opening up of economic markets with Colombia—the largest potato producer in South America—in the early 1990s exposed Pueblo Llano's farmers to strong competition and increasing economic vulnerability. Official data show that local price variability tended to increase after the reform. The coefficient of variation in monthly prices increased from 48.2% to 54.5% after the signing of the bilateral agreement in 1993 (Arias 2002). On the other hand, and according to the research data (Table 1), it seems that even when the nominal price of potatoes increased during the study period, this did not match the increase in inflation and in exchange rate variations. These factors, along with yield reductions and an increase in the relative price of

FIGURE 2 Panoramic view of the valley of Pueblo Llano. (Photo by Eliézer Arias)**TABLE 1** Estimated prices, costs, and returns for potato production in Pueblo Llano, per hectare (1994–1999).
(Sources: MAC, several years; fieldwork 1994–1999)

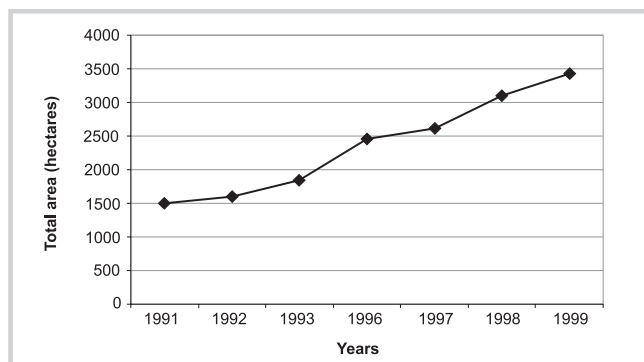
Year	Unit price		Unit cost		Yield	Gross margin		CPI in July—Base: 1997=100	Exchange rate Bs:US\$
	(Bs/kg)	US\$/t	Bs/kg	US\$/t		Bs/ha	US\$/ha		
1994	56.9	335	21.5	126	16,354	578,932	3,405		170.00
1995	63.1	372	49.0	289	16,600	234,060	1,380		169.75
1996	126.6	392	100.9	313	17,300	444,610	1,377		475.81
1997	184.3	376	114.3	233	18,000	1,260,000	2,573		503.76
1998	198.1	371	177.2	332	15,200	318,010	595		564.24
1999	189.4	312	177.3	292	14,882	218,731	297		648.97
In constant prices, base 1997									
1994	265.7		100.4		16,354	2,703,555		214.0	
1995	189.2		146.9		16,600	701,619		33.4	
1996	178.5		142.3		17,300	626,829		70.9	
1997	184.9		114.7		18,000	1,264,045		99.7	
1998	144.0		128.8		15,200	230,855		137.6	
1999	111.9		104.7		14,882	106,350		169.3	

seed potatoes and agrochemical inputs, as subsidies for these commodities were eliminated, have resulted in the real margin of profitability falling since 1995.

Consistent with the substitute effect of neoclassical theory, in the current context of lower and erratic potato prices, a significant fall in Pueblo Llano potato production and/or a switch to the production of other

crops was expected. On the contrary, this crop underwent an increase in the area cultivated of 120% between 1991 and 1999 (Figure 3). Consistent with these results, it seems that orthodox microeconomic analysis does not take into account how easily farmers can make the necessary adjustments to adverse agricultural factors such as changing markets, less capital, and

FIGURE 3 Total area under potato in Pueblo Llano over several years (in ha). (Source: MAC 1991–1999, data missing for 1994–1995)



less labor and land in particular. What are the responses of those farming households that do not have the capacity to move production to other, less vulnerable crops? Addressing these questions requires more realistic explanations that take into account not only price constraints, but also the impact of other institutions which influence how adjustments in use of and access to resources are made.

Land fragmentation

It has been highlighted in the past that one of the main characteristics of Pueblo Llano and other Andean high valley communities is that a high percentage of households have access to their own land (Scorza 1983). Another historical feature of the land tenure system is that the subdivision of land and fragmentation into small plots has mainly occurred due to the prevailing rules of divisible inheritance. However, the current data collected show that neither historical patterns of land ownership nor inheritance explains the fragmented and diverse landscape. On the one hand, taking into account only the land directly owned by each household in the sample, we find that there is a high proportion (29.7%) of landless households (Table 2). It is apparent that 25% of the household sample (middle and large landowners) own 74.3% of the total landhold-

ings. On the other hand, the sample data show that, of 109.6 ha owned by the households, just 15.4 ha were gained through inheritance, which represent only 14.1%. Furthermore, among the 19 landless, we found only 4 who possessed the right to inherit land from their parents, and these are currently farming their parents' plots. Table 2 also reveals that all household classes have been compelled to access more land. According to these data, the total cultivated area in 1999 was 208.6 ha, which represents nearly twice the area in ownership. The data also report an increase in the land farmed during the period 1994–1999. While in 1994 the total area was 195.1 ha, in 1999 the area increased to 208.6 ha, which represented a 6.9% increase during the period.

It seems that in Pueblo Llano the structure of the land system based on small plots and geographical conditions shows a correlation between the expansion of land under cultivation and the increase in the number of plots farmed along the valley. According to the aggregated data, during 1994 there were 166 plots under operation in contrast to a total of 210 plots reported in 1999, of which only 19 were inherited. This change represents an increase in the number of farming plots by 26.5% during the period. As shown in Table 3 for the period 1994–1999, 5% of the households managed a single plot in 1999, in contrast to 25% in 1994. Table 3 also shows a considerable increase in those households farming more than 3 plots: from 23.4% to 35.9% during the same period. The results also show that while in 1994 the median size of land was 1.7 ha, it was 1.9 ha in 1999. However, this does not mean that the households were cultivating the same plots or the same expanse of land in 1999 as they did in 1994. Obviously, for some farming households land dispersion and expansion strategies varied according to the opportunities or constraints they faced in accessing land, labor, and input capital.

TABLE 2 Access to land among farming households in Pueblo Llano, 1999. (Source: Fieldwork 1994–1999)

Category	Total cultivated land				Total land owned			
	Number of households	%	Total area (ha)	%	Number of households	%	Total area (ha)	%
Landless	1	1.6	0.0	0.0	19 ^{a)}	29.7	0.0	0.0
>0–2.5 ha	34	53.1	52.8	25.3	29	45.3	28.2	25.7
>2.5–5 ha	20	31.2	71.6	34.3	12	18.8	39.7	36.2
>5 ha	9	14.1	84.2	40.4	4	6.2	41.7	38.1
Total	64	100	208.6	100	64	100	109.6	100

^{a)} Of these 19, only 4 expect to inherit land.

TABLE 3 Changes in plot number, land tenure, and labor strategies in Pueblo Llano (1994–1999). (Source: Fieldwork, 1994–1999)

Aspect	1994		1999	
	Number	%	Number	%
Land tenure				
Plots owned/hired labor	51	30.7	57	27.1
Plots with fixed rent	10	6.0	12	5.7
Plots sharecropped	105	63.3	141	67.1
Total cultivated plots	166	100	210	100
Number of plots per household				
Households with 1 plot	16	25.0	5	7.8
Households with 2 or 3 plots	33	51.6	36	56.3
Households with more than 3 plots	15	23.4	23	35.9
Households sharecropping at least one plot	50 (of 64)	78.1	56 (of 64)	87.5
Duration of sharecropping arrangements				
<1 year			35	25.4
2–4 year			46	33.3
>5 years			57	41.3
Relationship between sharecropper and landowner (in relation to total cultivated plots)				
Blood relations	49	46.6	85	60.3
Family ties by law	12	11.5	19	13.5
Non-family ties	44	41.9	37	26.2
Labor arrangements (in relation to total number of households)				
Use of reciprocity (<i>mano vuelta</i>)	18	28.1	23	35.9
No use of reciprocity	44	68.8	40	62.5
No answer	2	3.1	1	1.6

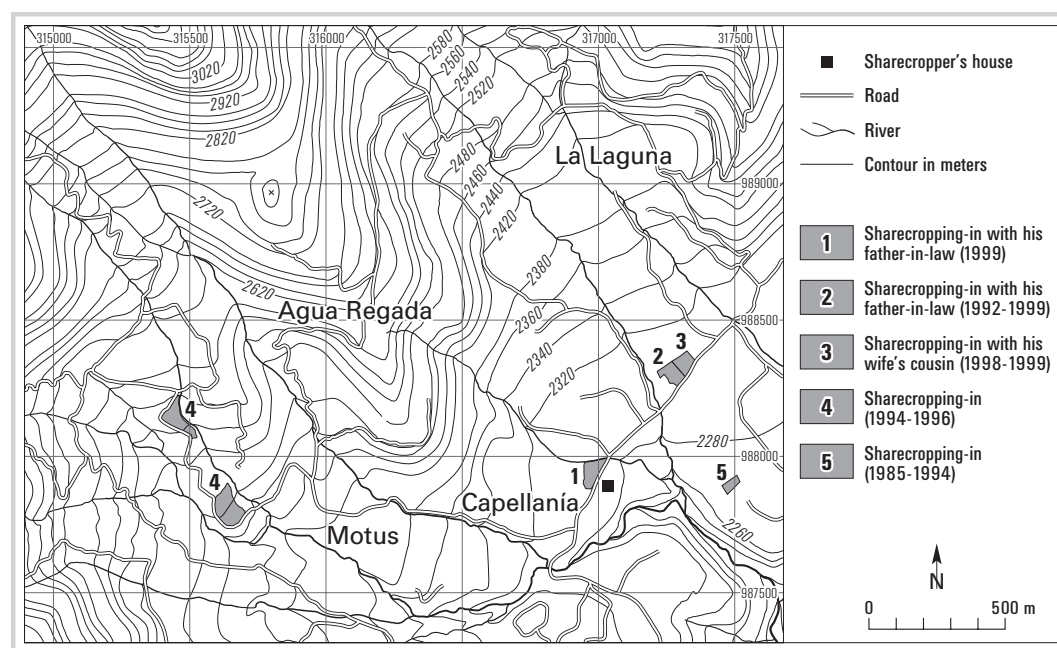
Land transaction strategies

At the aggregated level it seems that Pueblo Llano farmers have been given an incentive to increase their land area and the number of plots under cultivation. However, given the unequal distribution of land ownership and the context of scarcity of labor, the question is, how have these farmers been able to expand their access to land and the labor of others?

The data revealed the use of a variety of forms of land tenure arrangements. Fixed rent tenancy agreements are quite rare; they have changed little since (see Table 3). Owner cultivation decreased in the same peri-

od, from 30.7% to 27.1%. According to the data collected during the period 1994–1999, it would appear that access to most of these newly productive plots in recent years was via *medianería* (sharecropping) contracts. In 1994, *medianería* was common, with 63.3% of the total plots under *medianería*, in contrast to other types of land/labor arrangements. In 1999 an increase in sharecropping contracts of nearly 4% was recorded from a total of 67.1% of the plots under cultivation by this form of tenure. Table 3 also shows a remarkable 87.5% of farming households operating at least one plot in sharecropping relationships in 1999, in comparison to

FIGURE 4 An example of a household's increasingly diversified access to land between 1994–1999, in Pueblo Llano. The map shows how this household managed to gain access to different plots under various tenancy structures with regard to location and duration. (Map by Eliézer Arias and Yheicar Bernal, revised by Andreas Brodbeck)



78.1% in 1994. These data contrast with the apparent insignificance of sharecropping during the years of the economic boom in Pueblo Llano in the 1980s, which according to historical data was only engaged in by about 20.0% of the total number of cultivated farms (Scorza 1983; MAC 1985).

It is important to point out that farmers, depending on their access to land and other resources, divide up their plots using different types of land contracts (Figure 4). Some plots can be farmed using wage labor and others by sharecropping arrangements within the span of one season. A landowner can concurrently be a landowner sharing land with somebody else and a *mediero* (sharecropper) on other plots. Accordingly, it would appear that sharecropping the land of others (sharecropping-in), is the main source of access to land by the landless households in Pueblo Llano. It was found that in 1999, 27% of the sample used this type of contractual arrangement. The second and third most important types of tenancy are landowners who combine wage labor arrangements with sharecropping-in (19%) or sharecropping-out (renting their land to others; 14.3%). The former method is used mainly by smallholders who own little land, or land located on infertile tracts where returns are too low to maintain their income. According to the interviews, sharecropping-in provides them with access to more and/or better quality land belonging to other landowners. Sharecropping-out is commonly practiced by landlords who control more land, but lack farm labor and, in the current economic context, lack capital to invest in more farmland.

Sharecropping and social relations

According to Table 3 the durability of the relationships (>5 years) for households sharing land is the most important element of the agreement, with 41.6% of all plots sharecropped under these terms. Other households were found in short-term arrangements (20.3%). It was also found that intra-family sharecropping has increased in recent years. Table 3 shows how in 1994 the percentage of sharecropping contracts between both blood relations and relatives by law was 58.1% out of a total of 105 cases. By 1999 this percentage had increased to a total of 73.8% of the 141 plots under all types of sharecropping contracts, while the percentage of contracts without any kind of family ties decreased from 41.9% to 26.2% during the same period.

Access to land is also linked to control and negotiation in the labor market. Those who control access to labor can bargain for better land access and better contractual terms. This is particularly important in localities such as Pueblo Llano, where labor is a scarce resource. Table 3 shows that one of the main strategies for accessing labor for some households has been a type of reciprocal exchange called *mano vuelta* (exchange of hands). This traditional institution had apparently disappeared in Pueblo Llano by the early 1980s, but was reported by some households to have re-emerged in today's socioeconomic environment (Scorza 1983). In 1999, 35.9% of the household sample mentioned having used this agrarian institution, by contrast with 28.1% in 1994.

Discussion

Some authors have shown that plot dispersion or fragmentation can be a strategy to cope with the challenges presented by the topographic and ecological heterogeneity that distinguishes highland systems, such as the Pueblo Llano watershed (Bentley 1987; Goland 1993). For example, fieldwork interviews show that cultivating plots in different geographical areas may reduce variations in output because the risks caused by diseases and pests, which have increased in recent years, are spread. In addition and as shown above, in the context of increasing price uncertainty, farmers may gain some benefits from plot dispersion. According to farmers, the dispersal of plots helps them to cultivate crops during different periods of time (crop scheduling) and in so doing, they become less vulnerable to price fluctuations. The reasons behind a farmer's decision to retain or increase levels of fragmentation may be the key to understanding how they have managed to adapt to market liberalization within the existing geographical and historical economic context.

How do farmers negotiate access to more land and labor? The results of this study show that access to land seems to be dictated by institutional factors such as social networks that facilitate the use of this strategy. For instance, the opportunities for some lower class farmers to adequately farm quality plots are limited. Those households that have inherited or bought poor quality plots perhaps in need of upgrading (eg de-stoning or drainage systems, etc), or those that are quasi-landless (29.7% of total sample), may have to negotiate access to more and better quality land or irrigation facilities in order to maintain adequate yields and income levels. But according to local farmers, this process may be highly competitive due to the scarcity of "good" quality land in the area. Farmers have therefore had to negotiate access to these plots by deploying not only capital inputs but, more importantly, human and social resources.

According to the research data *medianería* arrangements have been re-adopted in order to access more plots and/or accommodate further land extensions and the acquisition of other resources, material and/or human. It is argued here that plot dispersion can be both a consequence and a cause of the increase in sharecropping contracts in Pueblo Llano. In other words, farmers can easily share a small plot of land and/or other resources with fellow farmers from a similar economic class or kinship. It may be part of either party's strategy to seek to disperse and share risks not just over space, as discussed above, but also over time. This involves engaging in a cluster of *medianería* contracts over different time periods on different plots. On the other hand, land dispersion may produce a relative-

ly high supervision cost associated with transport costs; hence the demand for sharecropping may increase. Additionally, in light of the fact that agricultural reforms have increased the cost of inputs and reduced official credits, sharecropping seems to be an institution that allows farmers to share and gain access to scarce financial and material resources.

It was also found that most of these tenancy arrangements are still informal, oral contracts based on loyalty and trust between the partners. Consequently, it is interesting to learn how households that provide land or labor for *medianería* create bonds that sustain contracts over the medium and longer term, as was largely evident from the household sample. In some cases these long-term contracts allow the landless some degree of independence and room for maneuver in deciding how to manage the farm. For others, this is demonstrated by the importance attached by the tenant to creating bonds with the landowners, not purely to maintain access to land, and to receive other help such as credit or housing, but also to accumulate knowledge about the predictability of the landlord's future actions. Obviously, these long-term contracts can imply, in some cases, a coercive element. It was found in the fieldwork study that some tenants have accumulated large debts towards their landlords and are often obliged to continue working for them until debts are reimbursed.

Other households had short-term arrangements (20.3%), which indicates that they try to negotiate contractual terms that give them the flexibility to change unfavorable contracts and re-negotiate with others. This can be particularly important given the decreasing quality of some plots because of pests, low fertility, and deteriorating irrigation facilities. However, the implication drawn from this may be that tenants have behaved opportunistically in terminating their contracts and taking their next-best employment opportunity in better-quality plots. The trade-off arising from this strategy may be the loss of the tenant's reputation and social honor for failing to meet contractual obligations. Others may enter into short-term contracts in order to access one or more scarce resources under particular circumstances, such as a lack of potato seed.

Finally, it appears that the expansion and dispersal of cultivated land, together with the scarcity of existing labor, has provided a motive for some households to recreate traditional forms of reciprocal labor. The use of these institutions by households may vary according to whether they control their own material resources, and to what their economic and non-economic expectations are. Smaller farmers generally depend on labor reciprocity as a lever to gain access to land and negotiate sharecropping contractual terms with landowners. The biggest landowners have indirect access to this

resource through allocation of land for sharecropping to those that control this social network.

Conclusions

This description and analysis of the diverse on-farm strategies used by different households shows the ambiguity of the effects of and responses to market liberalization on Pueblo Llano producers. On the one hand, it was found that the main strategy used by producers to maintain profitability has been to increase output by improving access to land plots and other people's labor. On the other hand, the declining role

of the state in regulating markets has resulted in a rise in informal transactions (such as a diversity of sharecropping arrangements and labor reciprocity). The case study illustrates how the operation of these strategies has been interlocked and modified by local institutions and patterns of social relations (networks, reputation, kinship, reciprocity, patron–client). Further studies are needed to reach clearer conclusions about the real level of land dispersion in the area and how it may or may not be used as an adaptive strategy to cope with economic and geographical uncertainties and their effects on farm productivity and profitability.

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AUTHOR

Eliézer Arias

Department of Anthropology, Instituto Venezolano de Investigaciones Científicas (IVIC), Carretera Panamericana Km 11, Caracas 1020A, Apartado Postal 21827, Caracas, Venezuela.
earias@ivic.ve

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