

Agrarian Change and Privatization of *Ejido* Land in Northern Mexico

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This paper uses the findings of a 1999 case study of ejidos (collective landholdings) in the Yaqui Valley, Sonora, a prominent agricultural region of northwest Mexico, to examine responses to a series of economic and legal reforms enacted as part of Mexico's 'Reform of the Countryside', which began in the late 1980s. In particular, it analyses reactions to the 1992 amendment to Article 27 of Mexico's Constitution, which legalized the rental and sale of previously inalienable ejido land and created programmes and institutions to officially certify ejido members' land rights. The paper concludes that the complex of economic and legal reforms – combined with the specificities of Sonoran agriculture – has generated a visible change in ejidos with respect to land operation, setting the stage for an accelerated shift towards the privatization of agricultural land in northern Mexico.

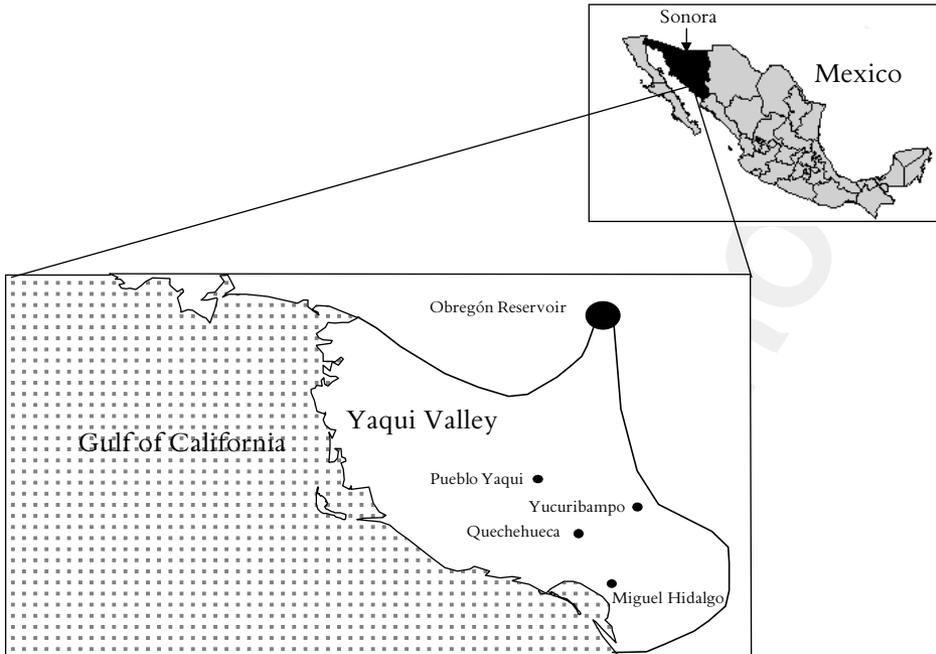
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INTRODUCTION

The push towards economic privatization and world market integration that took Mexico by storm in the 1990s brought with it a wave of reforms aimed at the liberalization of Mexican agriculture. Pivotal among these was the amendment to Article 27 of the 1917 Mexican Constitution, which ended over 70 years of land redistribution and fundamentally altered the long-standing relationship between *ejidatarios*¹ and their land. Enacted in the new Agrarian Law in 1992, the amendment granted *ejidatarios* the right to rent, sell or mortgage their previously inalienable land; created programmes and institutions to officially certify and

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¹ *Ejidatarios* are members of Mexican *ejidos*, collective landholding units first established following the Mexican Revolution when land was expropriated from large landholders and redistributed to the peasantry. *Ejido* land accounts for approximately half of total agricultural land in Mexico (INEGI 1990). [For the purposes of this paper, the terms '*ejidatario*' and '*ejidatarios*' refer to both male and female *ejido* members, unless explicitly stated otherwise.]



record *ejidatarios'* rights to their land; and allowed for the formation of joint ventures between *ejidos* and the private sector.

Preliminary analyses of Article 27 reform predicted that the legal changes, together with other national privatization efforts, would result in the mass sale of *ejido* lands, increase land concentration and heighten poverty in *ejido* communities (Bartra 1991; Collier 1992; Stanford 1994). These predictions have not played out in the short term. In fact, the majority of studies to date conclude that the anticipated impacts of the 1992 legal reforms – including a surge in private investment, an increase in *ejido* land sales and rentals, and a displacement of the rural population – have yet to materialize (Murphy 1994; Cornelius and Myhre 1998; Klepeis 1999; Turner 1999).

Although this may hold true for more remote, forested areas of southern Mexico, where subsistence agriculture dominates the landscape, regional variation makes it hazardous to generalize about all *ejidos* in Mexico. The response of any single *ejido* to tenure and economic reform depends on a combination of factors, including type of land and access to it, agricultural management practices, proximity to the USA, ethnic composition of *ejido* population, and history of agricultural practice and agrarian reform in the region.

This paper presents a case study of *ejidos* in the Yaqui Valley, Sonora, a prominent agricultural region of northwest Mexico characterized by high crop

yields and a long history of commercialization. A survey of 70 farmers in the Valley conducted by the author in March 1999 (see Appendix) provides the basis for an in-depth assessment of *ejidatario* response to the various national privatization efforts beginning in the late 1980s, including the much-debated effects of the 1992 legal changes to Article 27. Patterns of *ejido* land rental in the Valley provide the main platform for analysis of these various reforms.

Specifically, the paper suggests that the reform of Article 27 has served to amplify the impacts of economic privatization in the Valley. It illustrates how the complex of reforms – combined with the specificities of Sonoran agriculture – has already elicited a visible response in *ejidos* with respect to land operation and social cohesion and has helped set the stage for an accelerated shift towards private land ownership in the Valley. The paper concludes by considering what the future may hold for *ejidos* in the Valley and the policy implications suggested by this one small but important agricultural region of Mexico.

BACKGROUND

The Mexican Ejido: Origins and Evolution

The Mexican *ejido* was created to counteract the trend in land concentration that prevailed throughout the nineteenth century and intensified under the 34-year dictatorship of Porfirio Diaz (1876–1910). By the end of Diaz' dictatorship in 1910, 1 per cent of the population owned 97 per cent of the land and 96 per cent of the population was landless (Diaz-Cisneros 1983).

The bloody Mexican Revolution of 1910–1917 produced the *Plan de Ayala*, which mandated that one-third of all lands owned by large landholders be distributed among landless peasants grouped into collective holdings, called *ejidos* (Katz 1996). The general demands of the *Plan de Ayala* took official form in the Agrarian Reform Decree of 1915 and later in Article 27 of the 1917 Mexican Constitution. Together, these two laws established the main tenets of land reform that would help shape the Mexican countryside for most of the twentieth century.

First and foremost, Article 27 declared that all land and water in Mexico belonged to the nation, which has the right to impose on private property conditions prescribed by public interest. It established a limit on private property ownership of 100 irrigated hectares or its non-irrigated equivalent, and it fixed the size of the *ejidatario* parcel at a minimum of 10 ha of irrigated land (Diaz-Cisneros 1983). Finally, it declared *ejido* land to be owned collectively by the *ejido* and to be inalienable.

The first mass land distribution did not occur until the 1930s, when the government of Lazaro Cardenas redistributed 20 million ha to approximately 800,000 people over a six-year period (1934–40). In doing so, the Cardenas administration decreased the number of landless labourers by over 50 per cent (Thiesenhusen 1996). Today, there are more than 3.1 million *ejidatarios* and 27,000 *ejidos* that account for over half of Mexico's arable land (INEGI 1990).

Agrarian Reforms of the 1980s and 1990s

*Economic reforms*² The administration of President Carlos Salinas launched a national 'Reform of the Countryside' in 1989, intended to open Mexican agriculture to international markets and decrease state regulation of the agricultural sector (Salinas and Solís 1994). The early 1990s witnessed the privatization of the previously government-run and government-subsidized fertilizer, water and electricity industries, increasing the price of these inputs to farmers. In 1994 Mexico joined the North American Free Trade Agreement (NAFTA).³ The implementation of NAFTA was pre dated by the elimination of most agricultural input subsidies and the replacement of crop price supports with the direct income support program PROCAMPO. The *ejido* sector, which had long benefited from government aid in the form of input subsidies, crop guarantee prices, and additional credit and housing programmes, was hard hit by these changes in the level and composition of government support to agriculture.

An additional blow came with the sharp decline in credit availability from national development banks beginning in 1989, when several key banks serving the public sector restructured their lending policies.⁴ As a consequence, the total amount of credit in pesos received by the *ejido* sector decreased by 20 per cent between 1990 and 1994 (de Janvry et al. 1997).

The decline in credit availability and overall government support exacerbated a profitability crisis in agriculture arising from the combination of a continuously appreciating real exchange rate and falling real prices of key crops.⁵ Whereas the Mexican economy experienced modest economic growth from 1990 to 1994, the real value added in agriculture declined at an average yearly rate of 4.5 per cent (de Janvry et al. 1997). The abrupt depreciation of the Mexican currency in December 1994 led to a rise in inflation of approximately 50 per cent in 1995, adding to farmers' credit woes as nominal interest rates soared (OECD 1997). The already high interest rate in Mexico, averaging 27 per cent in nominal terms

² An excellent review of the economic reforms enacted beginning in the late 1980s and their impacts on financial and economic profitability in Yaqui Valley agriculture is presented in Naylor et al.'s 'Policy Reforms and Mexican Agriculture: Views from the Yaqui Valley' (2001).

³ NAFTA was the first trade agreement between a developing country and industrialized countries that included most agricultural trade. The initial terms of NAFTA discouraged the use of export subsidies and domestic price-supports, though these were not officially restricted (OECD 1997; Naylor et al. 2001).

⁴ The National Rural Credit Bank (BANRURAL), the main development bank serving the *ejido* sector, fundamentally restructured its credit lending policy in 1989. Prior to 1989, BANRURAL distributed credit either to the entire *ejido* as a unit, or to smaller 'solidarity groups' petitioning for credit within the *ejido*. Due to the high incidence of *cartera vencida* (overdue loans), BANRURAL began distributing credit through individual producer-bank contracts, which established the usufruct rights to the *ejidatario's* parcel and the goods deriving from that parcel as collateral for the loan (BANRURAL 1999). Since before 1989 the majority of credit transactions were managed by the leaders of the *ejido* or of the smaller credit groups within it, most *ejidatarios* lacked the skills necessary to petition effectively for a loan, and many struggled to get credit.

⁵ Between 1990 and the third quarter of 1994, Mexico's real exchange rate appreciated at an average annual rate of 4.9 per cent. During this same time period, the real price for maize, beans and wheat declined at an average annual rate of 11.4 per cent, 13.3 per cent and 5.6 per cent, respectively (de Janvry et al. 1997).

and 8 per cent in real terms over the period 1989–94, shot up in 1995 to rates of 61 per cent and 19 per cent in nominal and real terms, respectively (USDC 1997; IMF 1989–97).⁶ It was amidst these unfavourable economic circumstances that the legal reform of Article 27 was unleashed in 1992.

Legal reforms In the final months of 1991, President Salinas announced an end to more than seven decades of agrarian reform and land redistribution as part of his government's 'Reform of the Countryside'. The amendment to Article 27, mandated in the new Agrarian Law of 1992, was enacted with the intention of modernizing the ejido, considered by its critics to be one of the main obstacles to agricultural growth. The insecurity of collective tenure, the relatively small size of individual plots and the underinvestment held to characterize the ejido sector were viewed as barriers to economic efficiency and progress (Gates 1993). By formally establishing ejidatario rights to their land and by 'liberating' ejidos from state control,⁷ the new Agrarian Law sought to increase efficiency and encourage investment.

Specifically, the main reforms to Article 27 (i) ended mandatory government redistribution of land; (ii) introduced PROCEDE (Program for the Certification of *Ejido* Land Rights and the Titling of Urban House Plots) to officially certify *ejidatario* rights to their land; (iii) granted *ejidatarios* the right to rent,⁸ sell⁹ or mortgage their land; (iv) cancelled the previous law requiring *ejidatarios* to work their parcels personally in order to maintain rights to the land; (v) opened the *ejido* sector to private, including foreign, investment through the formation of joint ventures; and (vi) allowed for the creation of production groups within *ejidos* to take advantage of economies of scale (Cornelius and Myhre 1998).

Securing land tenure through formal certification was expected to increase *ejidatario* willingness to invest in farming. Perhaps more importantly, official

⁶ Although farmers suffered from the associated increase in real interest rates and the higher prices of imported inputs as a consequence of the 1994 peso crisis, they profited from an increased competitiveness of their export crops (Naylor et al. 2001).

⁷ Whereas a purported end-goal of the reforms was to liberate the *ejido* from government intervention, manipulation and control, several scholars suggest that the regulatory bodies created to implement and monitor the Article 27 reforms (the *Procuraduría Agraria*, the *Registro Agrario Nacional* and the *Tribunal Superior Agrario*) actually increased the level of state visibility in *ejido* affairs (Pisa 1994; Nuijten 1995).

⁸ The officials of the *Procuraduría Agraria* administer the legal certification of *ejidatario* rights to land through the PROCEDE programme. Two types of certificates are distributed through PROCEDE: the *certificado parcelario* (certificate of rights to an individual parcel) and the *certificado de derechos de uso común* (certificate of rights to common use of land). The former is issued in 'individual *ejidos*' (see below) and certifies *ejidatario* rights to a specified plot of land measured by the National Institute of Statistics, Geography, and Informatics (INEGI); the latter is given in 'collective *ejidos*' (see below) and establishes an *ejidatari*'s shared rights to a certain percentage of total land in the *ejido*. Although *certificados parcelarios* are not distributed in 'collective *ejidos*', unofficial land parcelling occurs among members of this *ejido* type as well.

⁹ Once an *ejidatario* has received the *certificado parcelario* through PROCEDE, he/she may petition within the General Assembly of their *ejido* to apply with the *Registro Agrario Nacional* (RAN) for a title of *dominio pleno* (full domain) for his/her parcel, which converts the land from *ejido* land to private property. Entire *ejidos* may also vote to convert their total land area to private property by attaining full domain from RAN. Only after an *ejidatario* has received the title of full domain can the land be sold legally.

certificates of ownership were purported to increase *ejidatarios'* access to credit by providing collateral for a loan. Permitting *ejidatarios* to rent and/or sell their land would theoretically increase efficiency and productivity, since those individuals not interested in or not adept at agricultural work would be replaced by others with the resources and commitment to farm efficiently. In addition, the permission of associations between *ejidos* and outside interests was expected to increase private and foreign investment in rural Mexico, thereby increasing agricultural productivity.

As noted above, most studies to date have downplayed the impacts of Article 27 reform on *ejido* communities. However, a close look at one region in Mexico – detailed in the following case study from the Yaqui Valley – suggests that the legal amendment to Article 27 has been an integral component of a tightly bound legal and economic package that has already produced a series of notable changes within and among *ejidos* in terms of land operation and community cohesion.

THE YAQUI VALLEY: A CASE STUDY

The Yaqui Valley, an expanse of primarily desert land fed by the waters of the Yaqui River, has long been a site of agricultural modernization and experimentation. Collaborative efforts between the Mexican government and United States development organizations beginning in the 1940s initiated a process of agricultural intensification that would come to define the Valley, an intensification marked by new crop varieties, mechanization, high chemical inputs and high yields. Wheat yields in the Yaqui Valley are currently among the highest in the world. The main wheat experiment station of the International Maize and Wheat Improvement Center (CIMMYT) is located in the Valley and attracts scientists and farmers nationwide with its cutting-edge research.

Ejidos in the Yaqui Valley

The first land redistribution in the Yaqui Valley did not occur until 20 years after the passing of Article 27. In October 1937, the reform-minded Cardenas administration expropriated and distributed 17,000 ha of irrigated land and 24,000 ha of non-irrigated land from large private landholders to 2160 *campesinos* grouped into various *ejidos* in the Valley (Dabdoub 1980a).

Other minor land redistributions occurred sporadically throughout the 1950s and 1960s, but the majority of state support continued to favour large landholders amidst a rapid advance of agricultural modernization. By the early 1970s, a heightened recognition of this seemingly one-sided favouritism towards the private sector led critics to create the term '*neolatifundismo*'¹⁰ to describe the situation in the Valley (Dabdoub 1980a). In 1976, after years of land solicitations and failures by *campesinos* culminating in various peasant revolts, the Echeverría administration announced the redistribution of an additional 37,000 ha of irrigated

¹⁰ *Latifundismo*, from *latifundista*, synonymous with *hacendado* or large landholder. The term *neolatifundismo* expressed the perceived inability of agrarian reform to fight the domination of large private estates in the Valley.

land and 62,000 ha of non irrigated land, constituting 62 new *ejidos* in the Valley (Cristiani 1984).

These *ejidos* were created under Echeverría to promote the collective ownership and operation of *ejido* land. At the time of the 1970s distribution, most *ejidos* in the region had largely abandoned collective forms of management, parcelling out plots for each *ejidatario* to manage individually. The term 'collective *ejido*' is used in the Valley to distinguish between those established under Echeverría and the 'individual *ejidos*' created during the original 1937 expropriation.¹¹ Sixty-seven 'collective *ejidos*' and 45 'individual *ejidos*' are currently located in the irrigation district of the Yaqui Valley, with total areas of approximately 35,000 ha and 88,000 ha, respectively (Coalición de Ejidos 1999). These numbers reflect the differential in average holdings between the two types; the average area per *ejidatario* in 'collective *ejidos*' is approximately 5 ha, compared to a minimum of 10 ha per *ejidatario* in 'individual *ejidos*'.¹²

The total representation of *ejidos* (both 'collective' and 'individual') in the Yaqui Valley parallels the national percentages: *ejido* land comprised 56 per cent of total agricultural area and 72 per cent of all producers in the Valley in 1996 (CNA 1998). However, the history of agricultural modernization in the Valley has produced a unique subset of Mexican *ejidos* worthy of separate analysis. In contrast to *ejidos* in regions of Mexico where subsistence agriculture prevails, for decades *ejidos* in the Valley have relied on relatively higher levels of government support in the form of agricultural credit and production subsidies, which have allowed them to maintain pace with modern, high-input production techniques in an export-oriented region. It may be true, as argued by many scholars, that the rapid intensification of land use in the Yaqui Valley, and accompanying high levels of state support, forced *ejidatarios* into a cycle of government dependence and state control from an early stage (Dabdoub 1980a, 1980b; Velasco Toro 1988; Stanford 1994). If this is correct, then *ejidos* in the Valley would suffer disproportionately from the drastic scaling-back of government support to agriculture starting from the late 1980s.

And that is precisely what happened. With the withdrawal of adequate government support, an increasing number of *ejidatarios* began renting out their land, lacking the capital to compete in a highly mechanized agricultural environment that favours land consolidation and large farm sizes. The following results, based on 1999 survey data, indicate that the various economic reforms of that decade induced a strong response by *ejidatarios* in the Yaqui Valley with respect to land operation. Analysis of the 1992 reform of Article 27 suggests that this legal amendment combined with economic changes to create a fundamental shift in land tenure throughout the Valley.

¹¹ Although the majority of the collective *ejidos* also began to operate more individually within several years of their formation, the terms 'collective *ejido*' and 'individual *ejido*' are still commonly used. For the purposes of this study, the terms 'collective' and 'individual' *ejidos* are used in reference to year of formation and average holdings only.

¹² The two 'individual' *ejidos* studied by the author had hectare-per-*ejidatario* ratios of 20 ha and 28 ha. The largest average holding in the Valley is in *ejido* Francisco Javier Mina with 60 ha per member.

Survey results

In the four *ejidos* surveyed, 70 per cent of *ejidatarios* were currently renting out their land, with 96 per cent of these rentals to private (i.e. non-*ejido*) farmers.¹³ The reasons cited by *ejidatarios* for renting out their land included limited access to credit, high input prices and low crop prices, high water prices and lack of water supply, and lack of affordable machinery (Table 1).

Table 2 combines several variables in a logistic regression, providing a rough estimate of their impact on current *ejido* land out-rental.¹⁴ The data indicate that, when taken together, the following economic and demographic variables – access to credit, ownership of machinery, opinion on community, gender and form of land receipt – explain to a significant degree whether an *ejidatario* will choose to rent out or to farm his/her land (*R*-squared value = 0.55). The magnitude of the odds ratios for the first three variables – access to credit, ownership of machinery and opinion about *ejido* community – underscores the high level of correlation between these particular variables and decisions to rent. Together, they account for 0.467 of the equation’s total *R*-squared.¹⁵

Since the 1990s witnessed such a rapid and simultaneous onset of a multitude of economic, institutional and legal changes, it is difficult to examine the impacts of each reform independently. However, a separate analysis of selected variables

¹³ In contrast, only three of the 70 *ejidatarios* surveyed were currently renting in additional land, in all cases from fellow *ejido* members.

¹⁴ By non-linear transformation, the logistic regression model is able to measure the impact of explanatory variables on a dependent variable that is non-continuous. In this case, the dependent variable ‘current rental’ is non-continuous and binary, taking a value of 1 if the *ejidatario* was currently renting and a value of 0 if the *ejidatario* was not currently renting. Taking the simple case in which ‘limited access to credit’ is the only explanatory variable, the ‘log odds’ of current rental is expressed by the following equation:

$$\log [p/(1 - p)] = \beta_0 + \beta_1 * (X_1 = \text{limited access to credit}),$$

where *p* = probability of current rental, $p/(1 - p)$ = odds of current rental and $\log [p/(1 - p)]$ = log odds of current rental. Substituting the coefficients for credit access,

$$\log [p/(1 - p)] = -8.436 + 3.214 * X_1.$$

Exponentially, the odds of current rental are,

$$P/(1 - p) = e^{-8.436} * e^{3.214 * X_1}.$$

If access to credit is not limited ($X_1 = 0$), the odds of current rental are

$$p/(p - 1) = e^{-8.436} = 2.169 * 10^{-4},$$

and if access to credit is limited ($X_1 = 1$), the odds of current rental become

$$p/(p - 1) = e^{-8.436} * e^{3.214} = 5.397 * 10^{-3}.$$

Thus, the odds ratio is $5.397 * 10^{-3} / 2.169 * 10^{-4} = 24.9$. In other words, limited access to credit raises the odds of current rental by a factor of approximately 25.

¹⁵ The two latter variables – gender and form of land receipt – do not affect the rental odds ratio to the same degree as the first three factors. It should be noted that the exclusion of Variable 4 (gender) from the equation results in a higher odds ratio and a higher *p*-value for Variable 5 (form of land receipt), and vice versa, suggesting that one variable is picking up some of the effects of the other. This result derives from the higher percentage of female *ejido* members who have inherited their land relative to male *ejido* members; it was only with the Federal Law of Agrarian Reform of 1971 that women were granted equal rights to qualify for *ejido* land (Stephen 1996).

Table 1. Ejido land rental and reasons cited for renting out

<i>Ejido land rental</i>	(%)
Renting out	70
Renting in	4
<i>Reasons cited for renting out</i>	
Limited credit access	88
High agricultural input prices	67
High water price	63
Low crop prices	61
Lack of water	31
Lack of affordable machinery	24

Source: Author survey, 1999

can shed light on the relative impact induced by each. Results from the following individual analyses of selected variables are compiled in Table 3. A more indepth analysis of the changes to Article 27, including a discussion of its subtle interplay with a variety of the below-mentioned variables, is reserved for the subsequent and final section of the paper.

Credit

Ejidatarios with limited access to credit were significantly more likely to rent out their land. Several from the two 'individual' *ejidos* surveyed admitted that they did not have the administrative skills to solicit the credit they needed; others stated that they preferred to rent out their land and 'avoid the hassle' of filing for credit. Another cited problem in attaining credit was the high collateral requirement demanded by BANRURAL for a transaction. Although one of the intended benefits of PROCEDURE initiated under Article 27 reform was to provide *ejidatarios* with certificates to be used as collateral, those interviewed maintained that these certificates alone did not suffice for a credit transaction.

Input subsidies and price supports

The high input prices and low crop prices cited as reasons for renting out are by-products of trade liberalization and the government scale-back of input subsidies and price supports. The government replacement of these subsidies with the 15-year direct income support programme, PROCAMPO, has done little to ease farmers in the Valley through their transition towards liberalization. The PROCAMPO payments *have* benefited the approximately 2.5 million subsistence farmers in Mexico by providing rural aid based on land farmed as opposed to amount of grain produced for sale (Johnson 1995). However, the orientation towards exports and the high-input farming practices that characterize the Yaqui Valley made smaller-scale farmers in this region dependent on the higher

Table 2. Effects of selected variables on current ejido land out-rental

<i>Logistic model coefficients table. Dependent variable: current land out-rental</i>						
	Coefficient	Standard error (SE)	Coefficient/SE	Chi-square	P-value	Odds ratio
Constant	-8.436	2.447	-3.447	11.883	0.0006	2.170 E-4
Variable 1 Limited access to credit: 1	3.214	1.016	3.163	10.004	0.0016	24.868
Variable 2 No machinery owned: 1	4.648	1.644	2.827	7.994	0.0047	104.415
Variable 3 Decrease in community: 1	2.917	1.091	2.673	7.147	0.0075	18.487
Variable 4 Female: 1	1.667	0.999	1.669	2.786	0.0951	5.296
Variable 5 Land inherited: 1	1.168	0.893	1.309	1.712	0.1907	3.217
<i>Logistic summary table</i>						
Log likelihood	-19.409					
Intercept	-42.761					
log likelihood						
R squared	0.546					

Source: Author survey, 1999

Table 3. Chi-squared calculations: analysis of *ejido* land out-rentals

<i>Ejidatario response</i>	<i>Renting</i>	<i>Planting</i>	<i>Total</i>
<i>Credit constraints and ejido land rental</i>			
Access to credit limited	40	6	46
Access to credit not limited	9	15	24
Total	49	21	70
Chi-square = 18.370			
<i>p</i> -value = <0.0001			
<i>Ownership of machinery and ejido land rental</i>			
Machinery owned	1	9	10
Machinery not owned	48	12	60
Total	49	21	70
Chi-square = 20.000			
<i>p</i> -value = <0.0001			
<i>Community decline and ejido land rental</i>			
Community decline since 1992	46	16	62
No community decline	3	5	8
Total	49	21	70
Chi-square = 4.543			
<i>p</i> -value = 0.0331			
<i>Gender and ejido land rental</i>			
Male	29	18	47
Female	20	3	23
Total	49	21	70
Chi-square = 4.690			
<i>p</i> -value = 0.0303			
<i>Form of land receipt and ejido land rental</i>			
Original <i>ejidatario</i>	18	15	33
Inherited	31	6	37
Total	49	21	70
Chi-square = 7.101			
<i>p</i> -value = 0.0077			

Source: Author survey.

production-based subsidies previously provided by the government. PROCAMPO payments were fixed in real terms at one level across the country, despite a wide degree of variation among *ejidos* with respect to level of technology and production orientation (OECD 1997). Thus, although farmers in intensive agricultural regions were much harder hit by the drop in production subsidies, they have not been compensated at a level comparable to their relative loss. This drastic drop in government support to agriculture in the Valley has not been felt by *ejidatarios* alone; all farmers in this region, including large commercial farmers, have suffered from the switch to a direct payment scheme.

Machinery

Prior to the reforms of the late 1980s it was not uncommon for *ejidos* to receive free or subsidized machinery and technical support via government programmes aimed at improving productivity in the 'public' sector. The retreat of government support to agriculture associated with economic liberalization included the termination of several of these programmes, with the result of a decrease in production capital within *ejidos*. Only 14 per cent of *ejidatarios* interviewed owned a tractor individually or as part of a small intra-*ejido* group, and 24 per cent cited lack of affordable machinery as a reason for currently renting out their land. *Ejidatarios* who do not own appropriate agricultural machinery are more likely to rent out their land.

Water

The new Water Law of 1992 transferred the management of irrigation districts from the government to its users. Hitherto farmers had received water at substantially subsidized prices, paying approximately 85 per cent of total water costs in the early 1960s and approximately 15 per cent by the late 1980s (Whiteford and Bernal 1996). These subsidies were significantly reduced with the new water law, and government transfers to support on-farm irrigation decreased from US\$102 million in 1992 to US\$36 million in 1995 (OECD 1997).

Of the *ejidatarios* interviewed who were renting out their land, 63 per cent cited the prohibitively high price of water as a principal reason. A prolonged drought from 1996 through the time of the survey¹⁶ added to irrigation woes in the Valley, prohibiting many farmers from planting second cycle crops and approximately halving producers' yearly income. Whereas wealthier producers continued planting year-round by purchasing additional water permits, smaller farmers with fewer resources were unable to do so. Thirty-one per cent of *ejidatarios* cited lack of water supply as a reason for renting. The low levels of the reservoirs feeding the Valley's irrigation canals made water either too expensive or simply unavailable, or both, for the majority of *ejidatarios* in the Valley at the time the survey was conducted.

Ejido community

Almost 90 per cent of *ejidatarios* stated that feelings of community within their *ejido* had decreased since 1992. Explanations given included lack of interest in *ejido* matters by fellow *ejidatarios*; poor attendance at *ejido* meetings; poor administration and/or corruption by *ejido* leaders; the 'individualization' or 'sectorization' of the *ejido*; and the increased rate of land rentals. There is a positive relationship between negative opinion about community and land rental. As feelings of unity decreased among *ejidatarios*, individual members have had fewer qualms about renting their land to persons outside of the *ejido* nucleus. Although several *ejidatarios* interviewed reminisced fondly about a past time when their *ejido* worked collectively

¹⁶ Sustained drought plagued northern Mexico from 1996 to 2000.

and prospered, the majority did not foresee a return to such a condition and preferred to manage their parcel independently or as part of a smaller intra-*ejido* group.

The effective operation of a cooperative requires a combination of mutual trust, competent leadership and active participation of its members. A breakdown in any of these factors can precipitate a rapid downward spiral with respect to community and proper *ejido* functioning. The prevalence of intra-*ejido* conflict and factionalism in rural Mexico explains why so few collectively-run *ejidos* remain; a 1988 survey conducted by INEGI reported that almost 90 per cent of *ejidatarios* nationwide farmed individually (INEGI 1990). When an *ejido* falls on economic hardship, as intensified recently with the decline in credit availability and government support, the potential for community erosion becomes more pronounced.¹⁷

Gender

The number of women in the labour force has increased steadily over the years in rural Mexico. Nevertheless, the majority of rural women continue to assume their traditional role of working in the home. The traditional responsibility of a woman to household maintenance is a plausible explanation underlying the significantly higher percentage of land rentals by women compared to men. Eighty-seven per cent of women interviewed were currently renting out their land, compared to 62 per cent of men.

Form of land receipt

Other analysts of *ejido* communities have underscored the importance of age as a determinant of land rentals and sales (Murphy 1994; Stephen 1994). Since the children and grandchildren of *ejidatarios* are not as historically tied to their land, higher rental rates by younger generations have been predicted. The survey results of this paper did not indicate a significant difference in rental rates among *ejidatarios* of varying ages. However, the data do suggest that *ejidatarios* who had inherited their land were more likely to rent out than *ejidatarios* who were the original grantees of a government-mandated redistribution. It could be posited that *ejidatarios* who inherit from their relatives are farther removed from direct struggles waged to gain land, and for this reason are often more willing to transfer control of its management.

¹⁷ Also contributing to the lack of community cohesion in the Yaqui Valley is the presence of indigenous populations spread out among the various *ejidos*. Whereas the majority of indigenous Yaqui and Mayo populations are grouped into *comunidades agrarias* (agrarian communities) on the northwestern and southeastern borders of the irrigation district, respectively, the mass land distribution in 1976 under Echeverría involved several of these indigenous groups. The two 'collective *ejidos*' surveyed in this study, Yucuribampo II and Miguel Hidalgo, both contained significant Mayo populations. The fostering of community cohesion in these particular *ejidos* has thus faced the additional challenge of language barriers and cultural differences.

DISCUSSION AND CONCLUSIONS

Agrarian Legal Reform: A Catalyst for Change

The 1992 reform of Article 27 facilitated land rental by eliminating much of the risk and uncertainty associated with illegal transactions. Although it was common for *ejidatarios* to rent out their land prior to legalization without serious (if any) repercussions from the government, they were easily cheated due to the undercover nature of the rental process. All *ejidatarios* interviewed for this study stated that the reform of Article 27 had facilitated renting out their land. Whereas only 17 per cent had rented out their land prior to 1992, 76 per cent had done so since 1992.

The combination of various economic changes with the reform of Article 27 makes it difficult to assess the impact of each factor independently. The *ejidatarios* interviewed found it very difficult to distinguish between the many changes that had taken place concurrently throughout the 1990s. For example, many tied the reform of Article 27 to the decline in credit availability, while others associated it with the implementation of NAFTA and the elimination of input subsidies and guarantee prices. Still others believed the reform of Article 27 to be part of 'a government plot to make the *ejido* sector disappear'.

Analysis of the impact of changes to Article 27 independently of shifts in government support and credit policy is difficult. Yet, the very interconnections of these legal and policy reforms serves to reinforce the key role of Article 27 in the recent and ongoing changes in *ejidos* throughout the Yaqui Valley. The Article's legalization of *ejido* land rentals has facilitated the transfer of agricultural operations towards private (non-*ejido*) commercial farmers in a region characterized by high-input technology and correspondingly high production costs. Although few *ejidatarios* to date have officially privatized their land via the formal channels established by Article 27, the mass out-rental of *ejido* land to private farmers is indicative of a significant step in this direction. The combination of a high incidence of rentals and a significant number of unofficial 'sales' already transacted by *ejido* members has contributed to the decline of community sentiment. This has led, in turn, to a greater inclination by *ejidatarios* to rent out their land, perpetuating a downward spiral towards *ejido* disintegration.

The Future of Ejidos in Northern Mexico

The results from the Yaqui Valley case study confirm that a combination of economic and legal changes has spurred a fundamental shift in *ejido* land operation in the region. The next question is whether or not this shift in land operation via rentals will ultimately lead to a transfer of land ownership on a similar scale. Although as of March 1999 only 434 *ejidatarios*, representing 6 per cent of total *ejido* land in the Valley, had solicited and received the titles needed to convert their land to private property (RAN 1999), the majority of *ejidatarios* interviewed responded that they were eager to follow suit. Reasons given in favour of this formal privatization included the desire to sell their land, to achieve

independence from *ejido* authority, to receive better access to credit, and to increase the property value of their land. Given this enthusiasm, there is considerable potential in the Yaqui Valley for a more general shift towards individualized private ownership and management of land.

Adding to the disintegration of *ejidos* is the migration of younger generations to larger cities in search of alternate employment. The Yaqui Valley's proximity to the United States makes northward migration far easier for *ejidatarios* in the Valley compared to those originating in more southern zones. In addition, the revised Article 27 no longer requires *ejidatarios* to work their land personally in order to maintain ownership rights, adding further impetus to out-migration. The creation of jobs in United States–Mexico border towns and cities following the implementation of NAFTA has attracted many members of *ejidatario* households seeking employment. Approximately one-third of those interviewed had sons and/or daughters residing in border cities and/or in the United States, and several were receiving remittances from these children accounting for up to 40 per cent of their total household income. As more young generation *ejido* members migrate to establish themselves in other locations, both physically and financially, the value of *ejido* land as family patrimony will decrease. *Ejidatarios* who are not preoccupied with the future economic security of their children will be more willing to sell their land as they reach old age.

The 'Reform of the Countryside' set in motion by Salinas was touted as an end to the paternalistic relationship between the Mexican government and *ejidos*, which was characterized by restrictions, one-sided support and dependence. By cutting back its economic support, the government's stated aim was to make *ejidos* more efficient and self-reliant in the long run. Likewise, the reform of Article 27, by lifting several restrictions governing *ejidatarios'* control of their land, was purported to benefit *ejidos* by making them more independent, productive and efficient. However, the Mexican government has failed to establish an adequate programme of support to help *ejidatarios* adjust during a difficult transition period. For example, the direct income support system, PROCAMPO, has provided meagre compensation for an otherwise drastic scale-back in government subsidies. Perhaps more damaging than this decrease in financial aid has been the lack of institutional support necessary to educate *ejidatarios* about their newly granted freedoms, responsibilities, opportunities and risks under the revised agrarian law. In the words of the president of one of the *ejidos* surveyed, the Mexican government 'let go of the *ejidatario's* hand before he had learned to walk'. In the Yaqui Valley, where historic levels of government involvement have been higher than in other regions of Mexico, it is not surprising that *ejidatarios* have stumbled without adequate transitional support.

Even if the transitional storm can be weathered, questions remain about the long-term impacts of the reforms on *ejidatarios* in the Yaqui Valley. The cutback in government support served to reduce farm production opportunities, leading to a significant drop in income for many *ejidatarios*. For some, however, the right to receive cash from the legal rental of their land has raised their incomes relative to what they earned when they farmed the land themselves. This is particularly

true for those who have been able to secure off-farm wages in addition to their rental income. Whether or not *ejidatarios* are better or worse off on average as a consequence of the reforms is a question that requires further study.

Ejidos are deeply rooted in Mexican culture and rural identity. They serve as a continuing reminder to *campesinos* of the blood shed by their ancestors in the fight for equitable treatment. It is not surprising, then, that the legal and economic reforms of the 1990s and their impacts on *ejidos* are considered so significant in contemporary Mexican history, and thus will continue to be a topic of conflict and debate in Mexico for years to come.

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APPENDIX: FIELD SURVEY METHODOLOGY

The case study providing the empirical data for this paper is based on a March 1999 household survey conducted by the author in two ‘collective’ *ejidos* (Yucuribampo II; Miguel Hidalgo) and two ‘individual’ *ejidos* (Pueblo Yaqui; Quechhueca). They were purposively selected to include both *ejido* types and to allow for a broad geographical representation of the Valley. Fifteen to 20 members were then chosen at random from each *ejido* and interviewed informally in their homes, making a total of 70 *ejidatarios* for the entire survey (35 from ‘collective’ and 35 ‘individual’ *ejidos*). The number of men and women interviewed was consistent with each *ejido*’s male: female gender ratio. Summary data for the four *ejidos* are presented in Table A1.

Table A1. Summary data for four Yaqui Valley *ejidos*

	Total <i>ejido</i> members	Female <i>ejido</i> members	Male <i>ejido</i> members	Hectares per <i>ejido</i> member	Year of <i>ejido</i> formation
<i>Collective ejidos</i>					
Yucuribampo II	154	45 (29%)	106 (71%)	5.8	1976
Miguel Hidalgo	108	24 (22%)	84 (78%)	6.7	1976
<i>Individual ejidos</i>					
Pueblo Yaqui	285	117 (41%)	168 (59%)	20	1937
Quechhueca	104	41 (40%)	63 (60%)	28	1937

Source: Author survey.

The survey was designed with the purpose of determining (i) whether or not significant transformations had occurred in each *ejido* over the past decade, and (ii) the main factors driving these transformations. These objectives required many of the survey questions to be open-ended, allowing respondents to answer in an unrestricted format. In order to minimize response bias, *ejidatarios* were asked questions of the form, 'What are the main obstacles preventing you from producing?', 'Has the feeling of community in your *ejido* changed at all since the beginning of this decade?', and 'Do you believe the reform of Article 27 has caused any changes for you and your *ejido*?', as opposed to, 'Does lack of credit prevent you from producing?', 'Has the feeling of community in your *ejido* decreased over the past ten years?', and 'Do you believe that the reform of Article 27 has negatively affected you and your *ejido*?'. It was not until an *ejidatario* indicated the presence or absence of a particular problem or change that more specific questions were asked.

A similar story emerges through analysis of all four *ejidos* in the present study that suggests a consistent set of trends for the Yaqui Valley as a whole. Due to the variation among *ejidos* in the Valley, however, a more comprehensive understanding of *ejidos* in this region requires a larger sample. For this reason, the household survey presented in this paper was supplemented by a companion land-based survey conducted in winter 1999 by Dagoberto Flores of CIMMYT's Economics Department. Flores' survey was based on a random sampling of approximately 100 agricultural blocks in the Valley and thus involves a much broader sampling of the Valley's approximately 110 *ejidos*. Preliminary calculations from Flores' survey agree with the results presented in this paper.

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