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Acronyms and Abbreviations

AGROSTAT	Agriculture Statistics On-Line from FAO
ARD	Agriculture and Rural Development
ASERCA	Apoyos y Servicios a la Comercialización Agropecuaria
BAAC	Bank For Agriculture and Agricultural Cooperatives
BANSEFI	Banco del Ahorro Nacional y Servicios Financieros
BRI	Bank Rakyat Indonesia
CBTA	Centro de Bachillerato Tecnológico Agropecuario
CAP	The Common Agricultural Policy
CBTIS	Centro de Bachillerato Tecnológico Industrial y de Servicios
CEPAL	Comisión Económica para América Latina
CETIS	Centre For Educational Technology Interoperability Standards
CGAP	Consultative Group to Assist the Poor
CIMMYT	Centro Internacional de Mejoramiento del Maíz y el Trigo
CLAD	Centro Latinoamericano de Administración para el Desarrollo
CMDS	Consejo Mexicano para el Desarrollo Rural Sustentable
CONACYT	Consejo Nacional de Ciencia y Tecnología
CONAPO	Consejo Nacional de Población
CONASUPO	Compañía Nacional de Subsistencias Populares
COPLADE	Consejo de Planeación del Desarrollo
CSO	Central Statistics Office
CTMP	Comité Técnico para la Medición de la Pobreza
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuária
ENCASEH	Encuesta de Características Socioeconómicas de los Hogares
ENCEL	Encuesta de Evaluación de Hogares
ENE	Encuesta Nacional de Empleo
ENET	Encuesta Nacional de Empleo Trimestral
ENHRUM	Encuesta Nacional de Hogares Rurales de México
ENIGH	Encuesta Nacional de Ingresos y Gastos de los Hogares
EU	European Union
FAIS	Fondo de Aportaciones de la Infraestructura Social
FAO	Food and Agriculture Organization of the United Nations
FGT	Foster, Greer and Thorbecke poverty indicators
FIRA	Fideicomisos Instituidos en Relación con la Agricultura
FIRCO	Fideicomiso de Riesgo Compartido
FISM	Fondo de Infraestructura Social Municipal
FONDEN	Fondo de Desastres Naturales
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GGAVATT	Grupos Ganaderos de Validación y Transferencia de Tecnología
GP	Gross Profit
GVO	Gross Vale of Output
IICA	Instituto Interamericano de Cooperación para la Agricultura
INDAP	Instituto de Desarrollo Agropecuario (Chile)
INEGI	Instituto nacional de Estadística, Geografía e Informática

INIFAP	Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias
INTA	Instituto Nacional de Tecnología Agropecuaria
LAC	Latin America and Caribbean
LAG	Local Action Group
M&E	Monitoring and Evaluation
MxP	Mexican Pesos
NAFTA	North America Free Trade Agreement
NBFI	Non-Bank Financial Institutions
NGO	Non Government Organization
O&M	Organization and Management
OECD	Organization for Economic Cooperation and Development
PAPIR	Programa de Apoyo a Proyectos de Inversión
PEC	Programa Especial Concurrente
PET	Programa de Empleo Temporal
PITT	Programa de Investigación y Transferencia de Tecnología
PROCAMPO	Programa de Apoyos Directos al Campo
PROCEDE	Programa de Titulación de Derechos Ejidales y Certificación de Solares
PRODESCA	Programa de Desarrollo de Capacidades en el Medio Rural
PROFEMOR	Programa de Fortalecimiento de Empresas y Organización Rural
PROMAP	Programa de Modernización de la Administración Pública
PRONAF	Programa Nacional de Agricultura Familiar
PSP	Prestador de Servicios Profesionales
RD	Rural Development
RDS	Red Para el Desarrollo Sostenible de México
RNF	Rural Non-Farm
ROA	Roles of Agriculture
SAGARPA	Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación
SCT	Secretaría de Comunicaciones y Transportes
SE	Secretaría de Economía
SECODAM	Secretaría de la Función Pública
SEDESOL	Secretaría de Desarrollo Social
SEGOB	Secretaría de Gobernación
SEMARNAT	Secretaría del Medio Ambiente y Recursos Naturales
SEP	Secretaría de Educación Pública
SHCP	Secretaría de Hacienda y Crédito Público
SIACON	Sistema Agropecuario de Consulta
SINDER	Sistema Nacional de Extensión Rural
SRA	Secretaría de Reforma Agraria
ST	Secretaría de Turismo
STPS	Secretaría de Trabajo y Previsión Social
TFP	Total Factor Productivity
UNAM	Universidad Nacional Autónoma de México
USD	United States Dollars
VA	Value Added
WB	World Bank

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1. EXAMINING RURAL POVERTY IN MEXICO: WHY AND HOW

The purpose of this introductory chapter is to explain the rationale for studying rural poverty in Mexico today, discuss the approach, indicate some structural issues that are at the core of Mexican poverty, and present the plan of the study, data sources and issues.

STUDY RATIONALE

This study is part of the second phase of a long-term programmatic work on poverty in Mexico in three phases being carried out by the World Bank at the request of the Government of Mexico (GOM). The first phase has already concluded, resulting in a report with an assessment of conditions, trends and government strategy on poverty in Mexico (World Bank, 2004). The second phase consists of three studies: the present one on rural poverty and two companion reports on urban poverty and social protection. The third phase will concentrate on issues related to quality and delivery of services, especially to the poor in the framework of decentralization. While the work has benefited from extensive collaboration with government and independent Mexican specialists working on issues related to rural poverty, the views expressed are those of the authors alone.

Why a study on rural poverty? First, because of the size and intensity of the phenomenon, poverty and inequality in rural Mexico are a matter of concern not only from the well-being of the poor point of view but also from that of the expansion of internal market, inclusion of large sectors of the population traditionally excluded from the economic and social mainstream, and the political integration and stability of the country. Poverty incidence in rural areas, in particular extreme poverty, is much higher than in urban ones. Although most of the country's moderate poor live in urban areas, most of the extreme poor are rural, even if the rural population is only one quarter of total. Poverty issues have received considerable attention in Mexico over the last decade from academics and policy makers but there is no recent comprehensive review of rural poverty.

Rural poverty differs from urban poverty in many important aspects. There are differences in sources of income between rural and urban poor. Also, rural environment poses specific constraints for provision of social infrastructure and services. Furthermore, institutions and culture tend to differ between rural and urban areas. The presence of indigenous groups is much larger in rural areas and the production systems, the economic and other risks faced by rural poor and their coping strategies usually differ from those of their urban peers. Urban poor are surrounded by services and opportunities -even if they have limited access to them- not available to rural poor, who often need to migrate in order to potentially enjoy those facilities (Warman, 2001: 30). By the opposite, rural poor benefit from safety nets such as subsistence agriculture, access to forest resources, and local community ties not available to the urban poor.

Mexico needs to move away from a fragmented social protection system to a unified framework which nonetheless tailors different programs to different contexts in rural and urban areas. Consistent and equitable strategies for poverty reduction requires (1) a unified

framework for social policy, such as *CONTIGO*, rather than separate approaches for rural and urban areas, and (2) a unified system for setting policy priorities which consider simultaneously rural and urban needs. Programs, however, and other instruments for income poverty reduction and the provision of basic infrastructure and social services should be designed and implemented within specific circumstances of the target group in mind. These circumstances usually differ between rural and urban areas, although they may overlap in the semi-urban segment of the rural space. Even programs targeting similar needs, like education and health, normally require different implementation systems in rural and urban areas. Examples of differences in rural and urban program needs are provided in Box 1.1.

Box 1.1. Differences between Rural and Urban Program Needs

All programs related to agriculture and natural resource management are specifically rural. Micro-finance programs, experience shows, operate differently in rural and urban areas and should be adjusted accordingly. Rural roads programs are rural by definition. Social infrastructure (electricity, drinking water, transport infrastructure, housing) is required in both urban and rural areas, but the specific demands, the cost of providing the services, the engineering, the O&M systems and the forms of community participation are usually different. In rural areas, environmental priorities are typically linked to air pollution, collection and disposal of domestic and hazardous waste, water scarcity and occupation of fragile/risky areas for residential purposes, whereas in urban areas they focus on deforestation, loss of biodiversity, soil degradation, fertilizer and pesticide contamination of soil and aquifer, and health hazards in their application. Urban marginality and violence are distinctly urban, linked to family breakdown, drug use and trafficking, degraded neighborhoods, opportunities for specific types of robbery, close contact between the destitute and the well-off, and tribal youth cultures. Marginality and violence exist in rural areas too but in a different way. Rural marginality is related to income, employment, geographical constraints and often to ethnic characteristics, and does not carry negative moral implications. There are no “street kids” in rural areas. Rural violence exists but is typically linked to land conflicts and the desperate fight of rural organizations for human or economic rights, thus differing from the individual and mob criminality of the cities. Only domestic violence seems to cut across the rural-urban divide.

APPROACH TO POVERTY AND STRUCTURAL ISSUES

Approach

This study is policy-oriented: it examines poverty in the rural areas of Mexico in order to examine strategic approaches to rural development, as well as policy options to promote pro-poor rural economic growth.

More efficient use of existing resources is a key aspect. Attention is paid *inter alia* to institutional and public administration issues related to the implementation of rural development programs. There are two reasons for this: first, under conceivable circumstances of availability of fiscal resources and public expenditure allocation, significant increases in the already high federal expenditure budget in rural areas are not likely. Second, there is room for improvements in the design and implementation of rural development programs, particularly those related to productive activities.

An important result of the first phase of the Programmatic Poverty Study is that while considerable progress has been made in meeting basic needs in rural and urban areas over the last two decades, progress has been much lower in income poverty (World Bank, 2004). The present study concentrates, therefore, on the analysis of income poverty and on

examining options for fighting it. In particular, we do not discuss issues and programs related to health, education and social infrastructure. This is not to ignore that there are important complementarities between basic needs and income programs, and hence that both types of programs should be carried out within an integrated framework particularly at the local level.

Rural areas are understood in a broad way, including country towns and considering both farm and non-farm activities. For statistical purposes we use two definition of rural: a narrower one consisting of disperse populations in localities of less than 2,500 residents, which is the definition used by *INEGI*, and a broader one which includes semi-urban populations in localities between 2,500 and 15,000 residents. Semi-urban areas can be seen as transition regions between rural and urban spaces. They are an important part of the rural system formed by the interaction of countryside and rural towns. In the study we contrast the performance of different variables under these two statistical definitions of rural.

We treat poverty as a multidimensional phenomenon intrinsically relative, with deep cultural aspects, and discuss the merits and limitations of quantifying poverty in terms of measurable incomes and income lines. To analyze the incidence and evolution of rural poverty we take first a more quantitative, income-based approach, used in the first chapters of the study. This approach is relaxed further down, particularly in chapter 7, in order to examine the heterogeneity of poverty, the varying sources of vulnerability, and the coping strategies of rural poor. The analysis of poverty friendliness of agriculture and rural development policies and programs and the policy recommendations are also based on a more multidimensional and nuanced view of poverty.

Spatial factors are important for rural poverty, which is unevenly distributed in the Mexican geography. To the extent possible we take into consideration these factors using a space-conscious approach. The main way in which this is done is by contrasting the performance of different regions regarding a number of variables. In particular, since the Southern region concentrates a disproportionate number of rural poor, we often compare the situation of this region with that of richer ones.

Long-term Structural Issues

Rural poverty in Mexico has strong historical roots resulting from the interplay over time of institutions, political power and market development in a highly varied geographical setting. We try to keep this in focus in the study by examining how poverty, its characteristics and determinants have evolved, and comparing situations at different points in time. We don't intend, however, tracing a history of Mexican rural poverty, for we look at the last decade only. To put things in perspective, however, it is useful to mention right from the beginning some long-term structural issues that gravitate on contemporary poverty in Mexico. We do that briefly in next paragraphs.

The high incidence of rural poverty, particularly extreme poverty, in marginal areas is the first structural issue. Combining survey data from *ENIGH* 2000 and 2002 with municipal level data from the 2000 population census, following a methodology proposed by Bigman *et al* (2000), CIMMYT has prepared a poverty and food security map for Mexico, where the municipal distribution of poverty is shown. CIMMYT's map illustrates a "non-uniform distribution of poverty, i.e. islands of poverty within Mexico. Poverty is concentrated in mountainous and indigenous areas, mainly in Central and Southern Mexico, but also in the mountainous regions of NW Mexico" (Bellon *et al*, 2004:20). There is strong correspondence between poor communities and municipalities identified in the poverty map and marginality as defined by the *CONAPO*

marginality index used by *SEDESOL*.¹ Extreme rural poverty is hence prevalent in marginal areas. From a historical perspective marginal areas are traditional *zonas de refugio* (shelter zones) of indigenous and other destitute populations, characterized by physical isolation and hard topographical and/or agro-climatic conditions (Aguirre Beltrán, 1967). Strong incidence of extreme poverty in these areas is important from a policy perspective, for much can be done to reduce core poverty by focusing efforts there. In fact, the Mexican government had a program to promote productive development in these areas recently ended—the Marginal Zones Development Program (*Proyecto de Desarrollo de Zonas Marginales*)— and has an on-going program, *Microrregiones*, to promote clustered investments in these areas, which is examined in chapter 5. Incidence of extreme poverty in marginal areas with a harsh geographic environment is also evident in other regions of the world with large indigenous peasantries, such as the Peruvian Andes (see World Bank, 2002a). Geography not only affects poverty directly by, for instance, making agriculture less profitable and more hazardous, but also and perhaps more, indirectly, by reducing the availability of public and private assets in marginal areas (Escobar and Torero, 2000). Thus, geography and history combine to produce high incidence of extreme poverty in certain rural areas. According to CIMMYT's poverty map, poor rural municipalities are dominantly placed in the mountain.

A second issue is the difficulty of raising the productivity of rural labor. The bottom-line of poverty persistence in contemporary middle income countries with highly dualistic economies, such as Mexico, is the inability of the economic system to absorb the labor force engaged in low productivity “refuge” occupations into high-productivity employment. This applies to both urban informal and rural marginal laborers. High productivity employment, capable of offering returns to labor above the poverty line, is the only way in which income increases and poverty reduction can be sustained. Only if the economic system is capable of offering increasingly more high-productivity employment to low-productivity rural labor can rural development succeed. This was the case in contemporary developed countries with a history of large populations of small farmers living in poor conditions, for example in much of Southern Europe. Here, rural development took place under a combination of three circumstances: (1) a strong pull of surplus labor away from agriculture into more productive occupations both within rural areas and outside them; (2) relatively low natural population growth; and (3) fast overall economic growth, which allowed considerable investment in the expansion of high productivity employment and the modernization of rural areas (FAO-WB, 2003).

These conditions are not yet in place in Mexico. It is true that there is strong rural-to-urban and rural-to-USA migration, but the demographic turning point has not yet been reached: the rural population is still growing and only expected to stabilize around 2020. Also, most of permanent migrants to urban areas in Mexico seem destined to swell the ranks of urban informal sector where labor productivity may be larger than in marginal rural areas, but remains very low. Second, fertility rates in rural Mexico are falling but are still large. Finally, Mexico's long-term

¹ Thus, as explained by Bellon *et al* (2004a: 12-13): “Close to 83 percent (n= 33,752) of the predicted extremely poor rural communities from our model occurred within the priority zones defined by the Mexican government for anti-poverty programs, and of those 33,752 communities 99 percent occurred within either “high” or “very high” marginality municipalities. At the municipal level, the model predicted 1,020 municipalities to be below the food poverty line. This compares to 1,314 municipalities classified as of either “high” or “very high” marginality by the Mexican Ministry for Social Development (*SEDESOL*). Out of the 1,020 predicted food poverty municipalities, 89 percent (n=909) coincide with highest marginality rankings of *SEDESOL*”. We do not know, however, if poverty “density”, i.e. the number of poor per km², is higher in these marginal areas than in highly populated non-marginal ones.

economic growth has been disappointingly low, at an annual average of around 0.3% per capita from 1981 to 2003.

STUDY PLAN AND DATA SOURCES

Study Plan

This report is organized as follows.

- Chapter 2 provides an overview of the evolution of poverty and inequality in the rural areas of Mexico in the decades between 1992 and 2002. We examine the positive and negative factors influencing that evolution and propose a broad interpretation. The chapter concludes by looking at poverty profiles and comparing the correlates of poverty in 1992 and 2002.
- Chapter 3 looks more closely on what happened to rural incomes, employment, labor markets and the characteristics of rural labor force between 1992 and 2002. Five major themes are analyzed: the evolution of the demographic and employment characteristics of the rural labor force; how rural wages have changed and what determines them; sources of income in rural areas and their evolution over the decade; the nature and growing importance of non-agricultural rural employment; and the correlates of the participation of rural households in non-agricultural occupations.
- Chapter 4 is devoted to examine the relation between poverty and the agricultural economy. We discuss first the role that agriculture has in poverty reduction and review the evolution of agriculture in Mexico over the last two decades. Using survey data we examine then the profitability and efficiency of the small farm sector in Mexico.
- Chapter 5 reviews the main agriculture, land and rural development policies and programs operating in Mexico, and examines them from the perspective of poverty-friendliness. Options are examined to increase poverty-friendliness without harm to the primary objectives of policies or programs, which do not need to be related to poverty.
- Chapter 6 starts with a theoretical discussion of the issues and challenges usually faced in the implementation of development policies and programs. It moves then to examining concrete institutional problems faced in the implementation of rural development programs, and to examining options to improve program implementation in Mexico.
- Chapter 7 brings a more multidimensional and qualitative view, looking at how different types of rural poor can experience their poverty situation, including strategies to survive, manage risk and achieve petty accumulation. We also examine the vulnerability of the rural poor, and discuss the incidence on this of some government programs. We include political and cultural dimensions and recognize the heterogeneity of poverty situations.
- Chapter 8 concludes with a summary of policy options to reduce rural poverty in Mexico.

Data Sources and Methodological Issues

Four main sources of data are used in the study. The first source is the well-known *Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH)* carried out by Geography, Statistics and Surveys National Institute (*Instituto Nacional de Estadística Geografía e Informática*, INEGI) every two years, which contains standard income-expenditure household survey information. *ENIGH* is used by *SEDESOL* and the Poverty Measurement Technical Committee (*Comité Técnico de Medición de la Pobreza, CTMP*) to estimate poverty levels in Mexico. The last survey available is for 2004. *ENIGH* data for 2004 became available shortly before this report was going to print. It has not been possible, therefore, to incorporate this information fully in the analysis. Also, *ENIGH* data previous to 1992 is not entirely comparable with that from 1992 onwards. For these reasons we show poverty figures for 2004 but confine most statistical analyses using the *ENIGH* source to the period 1992-2002. Because of the recent availability of the 2004 *ENIGH* results, it has not been possible to measure poverty based on consumption expenditures and a consumption poverty line. Nor has it been possible to calculate the poverty gap and poverty severity measures (FGT1 and FGT2).² Hence, the only poverty measure reported for 2004 is the incidence of income poverty or FGT0. Questions have been raised as to the comparability of *ENIGH* results of 2000 and 2002 because of some changes in survey design and in the questionnaire. There have also been some changes in 2004. We discuss this further down.

ENIGH is designed to be representative at the national, rural and urban levels, not at the state or regional levels. We use, however, information at the regional level, but it should be bear in mind that these are survey results, not necessarily representative of the true situations in the regions. Perhaps more importantly, *ENIGH* is not designed to give statistically significant results for the separate sources of income of the households, only for the aggregate. However, we use abundantly in our analyses information on the individual sources of income to which the same caveat as before applies.

The second source of data is the National Jobs Survey (*Encuesta Nacional de Empleo, ENE*) carried out by *INEGI* every three months, which gives information on the characteristics of the labor force at the individual level, including education, gender, age, occupation, labor status, and other variables. Panel data were included since 2000 following individuals during five quarters. *ENE* uses a large sample which is representative at the rural and urban levels, for all states and regions, and for the 48 major cities in the country. Data from *ENE* surveys previous to 1995 are not entirely comparable with those for the following years. For this reason, when using *ENE* data we examine the period 1995 to 2003.

The third source of data is the Mexican Rural Homes National Survey (*Encuesta Nacional de Hogares Rurales de México, ENHRUM*), carried out in 2002 in collaboration between *INEGI* and *El Colegio de México*. *ENHRUM* covered 1,782 rural households in localities between 500 and 2,500 residents. *ENHRUM* provides data on assets, production technology, sources of income, and socio-demographic aspects including migration. Results are representative for the entire country and *INEGI*'s standard regions (*Centro, Sur-Sudeste, Centro-Oeste, Noroeste and Noreste*).

Finally, we have used Agriculture, Cattle Farming Rural Development and Fisheries Ministry (*Secretaría de Agricultura, Ganadería, Desarrollo Rural y Pesca, SAGARPA*) on-line agricultural data base, the Agriculture Consul System (*Sistema Agropecuario de Consulta,*

² These measures are explained in chapter 2.

SIACON), for information on crops, area, yields, and prices, and on-line information from INEGI's Economic Information Bank (*Banco de Información Económica*) for other relevant economic and demographic data.

For convenience we use point estimates in our tables and text and we make comparisons between them without explicit reference to the underlying confidence intervals. We should bear in mind that the point estimates used to assess poverty incidence and other relevant measures are just one of many possible estimates within confidence intervals to which a certain probability is assigned. We should not attach other value than this to the estimates. No definite value should therefore be attached to the figures, more so since in many cases the disaggregate level used for results based on the *ENIGH* survey makes them not statistically significant under the design of the survey.

Doubts have been raised on the comparability of poverty incidence and other results from *ENIGH* surveys for 2000 and 2002 because of some changes in the questionnaire, larger size of sample and some change in sample design in 2002. Because of this, the decrease in poverty incidence between the two dates shown by *ENIGH* data has been challenged, particularly in view of the fact that this was a period of economic stagnation. The *CTMP* has expressed its views on the comparability of both surveys,³ which can be summarized as follows:⁴

1. The decrease of rural poverty between 2000 and 2002 indicated by the point estimates from the *ENIGH* surveys is statistically significant for the extreme poor (food poverty line) but not for the moderate poor (assets poverty line) and for the capacity poor (capacity poverty line). Even for extreme poverty, where the decrease is statistically significant, the precise change indicated by the point estimates is contained within confidence intervals and cannot be taken as the *true* change.
2. The larger sample size in 2002 than 2000 does not seem to introduce sample biases that affect comparability at the aggregate level.
3. Independently of comparability, the changes introduced in 2002 result in an improvement in the survey and in the measurement of poverty.
4. There are doubts as to the comparability of specific sources of income of rural households because of the changes in the questionnaire and/or sample size and design.
5. In particular, there are differences in the comparability of incomes derived from public transfers, where the amount registered in the surveys could be compared with the disbursement figure in the public accounts. Public transfers seem to be better measured in 2002 than in 2000, giving considerably higher estimates for the former year. This is of particular importance for the poorer sections of the population.
6. Changes in the questionnaire create doubts on the comparability of certain expenditure categories. This is particularly the case for non-monetary expenditures

³ The *Comité* is an independent body of academics specialized in poverty analysis created by SEDESOL to provide technical advice on issues related to poverty measurement in Mexico. Some technical staff from SEDESOL participate in the Committee but without voting capacity.

⁴ See Cortés (2003), Vences-Rivera (2003), CTMP (2004), World Bank (2004), Scott (2004), and (CTMP 2005).

and especially for the substantial increase registered in the amount reported for the imputed value of own housing.

The poverty figures shown in this report for 2004 are those of income poverty of the CTMP, calculated on the basis of ENIGH 2004. The calculation was made according to CTMP's poverty measurement methodology, which is the one officially adopted in Mexico. In the document reporting the 2004 figures, the *Comité* points out that *INEGI* has indicated the existence of some changes in the questionnaire and sampling framework between 2002 and 2004 that were considered by *INEGI* not to affect poverty estimates. The effect of these changes has not yet been examined by the *Comité*. *CTMP* carried out, however, tests of significance of the variations in poverty incidence between 2002 and 2004. Poverty reduction between the two years is statistically significant at the 95 percent confidence level for all three poverty lines at the national level and for rural areas. Changes in poverty incidence are not significant for any of the poverty lines in urban areas, where small increases are reported for extreme and capacities poverty and a slight decrease for moderate poverty.

2. THE DYNAMICS OF RURAL POVERTY AND INEQUALITY IN 1992-2002: AN OVERVIEW

This chapter presents basic figures about rural poverty and inequality in Mexico and how they evolved in the decade between 1992 and 2002.

The main findings from the chapter are as follows:

- Poverty in urban and rural areas, both moderate and extreme, went through a cycle in the decade of 1992-2002 marked by the 1995 crisis, with a strong increase around the 1995 crisis between 1994 and 1996 and decreasing trend thereafter. Rural poverty decline was strong between 1998 and 2004.
- Rural poverty and inequality are comparatively high and did not experience long term progress during the 1992-2002 decade. In 2002, 35 percent of rural dwellers were extreme poorly and 67 percent moderately poor.
- There are large poverty differences within rural areas, with a gradient of poverty incidence that increases from urban to semi-urban and to disperse rural areas and from Northern to Southern regions in the country.
- The lack of overall progress in long-term poverty reduction in rural areas can be explained mainly by the 1995 economic crisis, the sluggish performance of agriculture, and stagnant rural wages. These circumstances were compensated to some extent by the increase in private and public transfers, improved targeting of parts of public expenditure in rural areas, and a notable expansion of employment and income in rural non-farm activities.
- Rural poverty is positively associated with lack of education, living in disperse rural zones and in the South, Gulf of Mexico and Central regions, young households with small age children and being employed in agriculture.

The main areas for policy action derived from these findings are as follows:

- Macroeconomic stability is essential for reducing poverty.
- Maintaining the level of direct transfers to the poor is important in view of their significance for their livelihood, but incremental resources at the margin could better be used to promote income and employment growth.
- Regions and areas where poverty is more concentrated requires specific attention.
- Building up critical investment masses to trigger endogenous growth process using a territorial development approach with participatory planning methods would be more effective than thinly distributing investments.

- Rural education, and technical and vocational training for rural people related to farm and non-farm activities, are key to productive development.
- Young households need specific support to access productive assets to start up independent economic activities.

EVOLUTION OF RURAL POVERTY AND INEQUALITY

*Poverty in 1992-2004*⁵

Poverty saw a moderate increase in 1992-1994, a strong increase in 1994-1996, and a decreasing trend in 1996-2004 (Box 2.1). The evolution of national, urban and rural poverty, both extreme and moderate, between 1992 and 2004 was in fact rather similar (Figures 2.1 and 2.2). Since 1996, with the economic recovery, Mexico has made headway in reducing national poverty, and extreme poverty in particular (Table 2.1). The incidence of extreme poverty in 2002 was similar to that in 1992, of the order of 20 to 22 percent, with around 20 million Mexican living in extreme poverty, i.e. without sufficient income to buy a minimum basket of food. The lack of overall progress registered in the 1990s compounds the unfavorable situation in second part of the 1980s. In 1984-89 poverty increased sharply, with rural areas being the most affected.⁶ A decade was thus lost for poverty reduction. The evolution between 2000, 2002 and 2004 was very positive in rural areas, with a reduction of 2.8 million in the number of extreme rural poor in 2000-2002 and another 2.4 million in 2002-2004. It is interesting that the falling trend in rural poverty since 1998 has taken place under different performances of the macroeconomy, although in the absence of an economic crisis.

Box 2.1. Poverty indicators

This report uses three poverty indicators developed by Foster, Greer and Thorbecke.

The poverty headcount ratio, FGT(0), measures the percentage share of people whose income or consumption falls below the poverty line.

The poverty gap index, FGT(1), measures the depth of poverty, i.e. the distance of the actual income or expenditure of the poor to the poverty line. Unlike FGT(0), FGT(1) can tell us whether the poor are on average very poor, i.e. very far from reaching the income or consumption expenditure benchmarked by poverty line, or whether many of the poor are clustered around that line. FGT(1) can also be interpreted as the cost of eliminating poverty with perfect targeting, i.e. providing each poor enough income to place him or her above the poverty line.

The poverty severity index, FGT(2), measures the relative position of the poor with respect to the poverty line, but distances are squared to give more weight to individuals or

⁵ Throughout this chapter, unless otherwise indicated, poverty refers to extreme poverty and poor to the extremely poor. The *Secretaría de Desarrollo Social* (SEDESOL), following the *Comité Técnico para la Medición de la Pobreza*, uses three poverty lines: a “food-based” poverty line (income required to acquire enough food to cover nutritional needs); a “human needs” or “capacities” poverty line, which includes also the income required to acquire basic education, health, housing, dress, footwear, and transportation; and an “assets-based” poverty line, which also includes other needs. The latter corresponds to the usual broad definition of “poverty”, which we call “moderate poverty”, while the former corresponds to the usual definition of “extreme poverty” (see SEDESOL/CTMP, 2002, and World Bank, 2004, for more information on poverty lines).

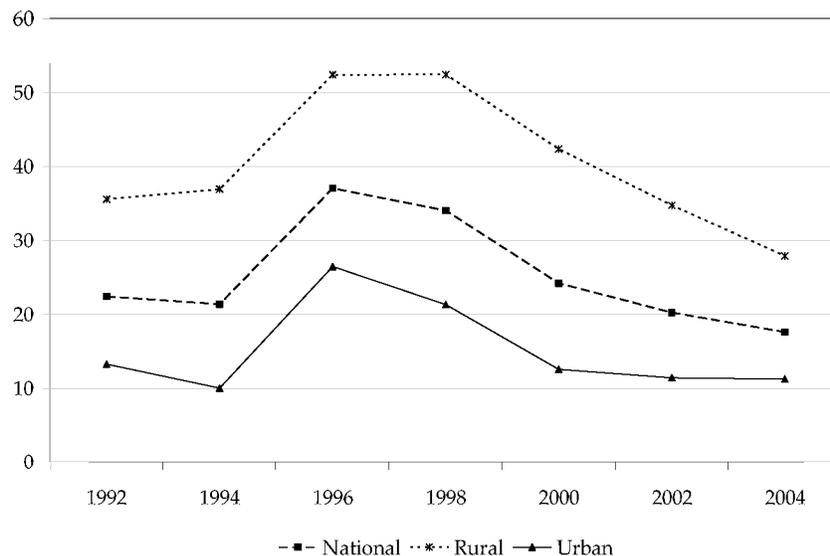
⁶ See Cortés and Rubalcava (1991), Lustig (1992), Székely Pardo (1994), and Hernández Laos (1994) on poverty evolution during the 1980s, and the review of this literature by McKinley and Alarcón (1995), who stress the impact that poverty increases had on rural areas.

households most distant from the line. The poverty severity index picks up changes in the distribution of income within the poor.

See Foster, Greek and Thorbecke (1984).

Extreme poverty is more prevalent in rural than in urban areas. Extreme poverty has declined at a faster rate in rural than in urban areas since 1998, and the gap is hence closing. But poverty incidence in rural areas is still considerably higher. Thus, in 2004, the poverty count measure for extreme poverty was 27.6 percent for rural areas vs. 11.0 percent for urban areas, and the equivalent figures for moderate poverty were respectively 56.9 and 41.0 percent.

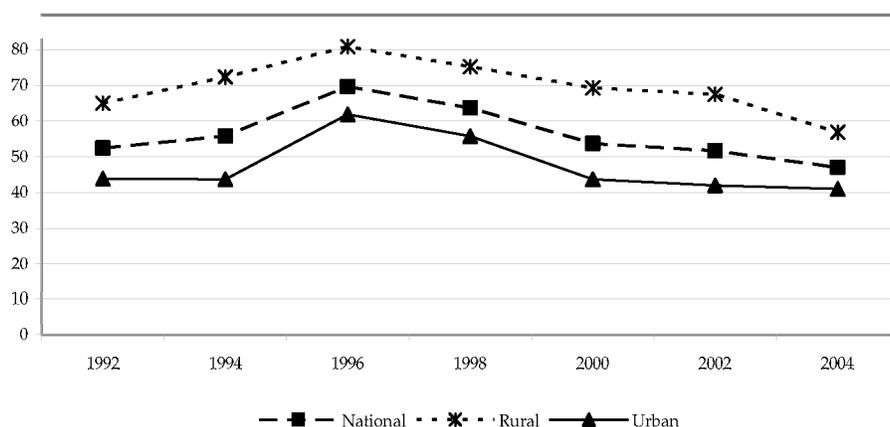
Figure 2.1. Mexico: Incidence of Extreme Poverty FGT(0), 1992-2002



Source: WB staff calculations based on ENIGH.

Mexico has steep gradients in the conditions of living from the more developed urban areas through the urban periphery and smaller towns to the more remote rural areas. In 2002, the incidence of extreme poverty was in fact twice higher in disperse rural localities than in semi-urban areas and close to four times higher than in urban areas (Table 2.1).

Figure 2.2. Mexico: Incidence of Moderate Poverty FGT(0), 1992-2002



Source: WB staff calculations based on ENIGH 1992, 1994, 1996, 1998, 2000 and 2002

The steep rise in poverty along the urban-rural continuum is also visible in the poverty gap and poverty severity indices. The two other FGT poverty indicators confirm the general picture given by the poverty headcount index. As shown in Table 2.1, the poverty gap increases the smaller and more rural the localities are considered. The same holds for the poverty severity index. Thus, people are, on average, poorer —further below the poverty line— in rural than in urban areas, and there are also more people clustered at the very bottom of the distribution. Indeed, the average income of the poor decreases as we move from urban to semi-urban and to disperse rural areas, indicating higher depth of poverty (Figure 2.3). The trends between 1992 and 2002 are also similar, as both the poverty gap and the poverty severity index increase in conjunction with the 1995 crisis, and in spite of the reduction since 1996, remain around the levels prevalent in 1992.

Table 2.1: Extreme poverty in Rural and Urban Mexico, 1992-2002 (percent)

	Headcount FGT(0)			Poverty Gap FGT(1)			Poverty Severity FGT(2)		
	1992	1996	2002	1992	1996	2002	1992	1996	2002
National	22.4	37.1	20.3	7.5	14.1	6.3	3.5	33.9	3.2
Urban (localities > 15,000)	13.3	26.5	11.4	3.6	8.3	2.8	1.4	3.7	1.1
Rural (localities with 1-15,000)	35.6	52.4	34.8	13.1	22.5	12.2	6.5	77.5	6.6
Semi-Urban (localities with 2,501-15,000)	17.4	35.6	21.1	6.0	13.1	7.0	3.0	11.0	3.4
Disperse Rural (Localities with 1-2,500)	44.7	60.8	42.1	16.7	27.1	14.9	8.2	11.4	8.3

Source: WB staff calculations based on ENIGH 1992, 1996 and 2002.

Table 2.2: Average Monthly Per Capita Income of the Extreme Poor and the Non-Poor in Mexico, 1992, 1996 and 2002 (2002 Prices)

Region	1992		1996		2002	
	Non-poor	Poor	Non-poor	Poor	Non-poor	Poor
Disperse Rural⁽¹⁾	1,277.76	329.29	1,163.56	302.80	1,417.20	315.45
Semi-urban⁽²⁾	1,600.69	346.55	1,304.62	349.91	1,521.37	327.74
Urban	2,940.99	520.70	2,470.30	511.12	2,647.41	506.64

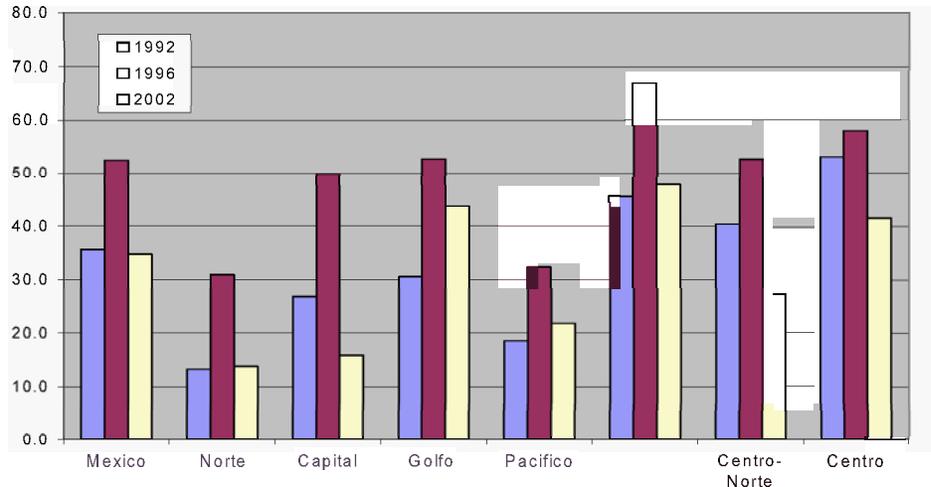
(1) Less than 2,500 residents; (2) between 2,500 and 15,000 residents

Source: WB staff calculations based on ENIGH 1992, 1996 and 2002.

Geographic Factors

Poverty is more prevalent in the Southern regions and the gap between Northern and Southern states increased between 1992 and 2002. Regional area appears to be an important determinant of poverty. There are large variations in income poverty among regions, with a generalized gradient from North to South (Figure 2.3).⁷ In 2002, the poverty rate in rural areas of less than 15,000 inhabitants in the *Norte* region was 14 percent, a third of that in the *Sur* region, where 48 percent were poor. Distance among regions may in some cases matter more for rural poverty than the rural-urban difference. The dynamics of poverty is also sensitive to region, as poverty fell in some regions but not in others between 1992 and 2002. Thus, as shown in Figure 2.3, the *Capital*, *Centro*, and *Centro-Norte* regions experienced a considerable fall in the headcount poverty rate in 1992-2002, with the share of poor people falling by more than 10 percentage points in each of these regions. This compares to the *Golfo* region where it is estimated that poverty increased by more than 10 percentage points, and the *Sur* region where poverty also increased

Figure 2.3: Incidence of Extreme Rural Poverty in Mexico by Region in 1992-2002 (Percentage)

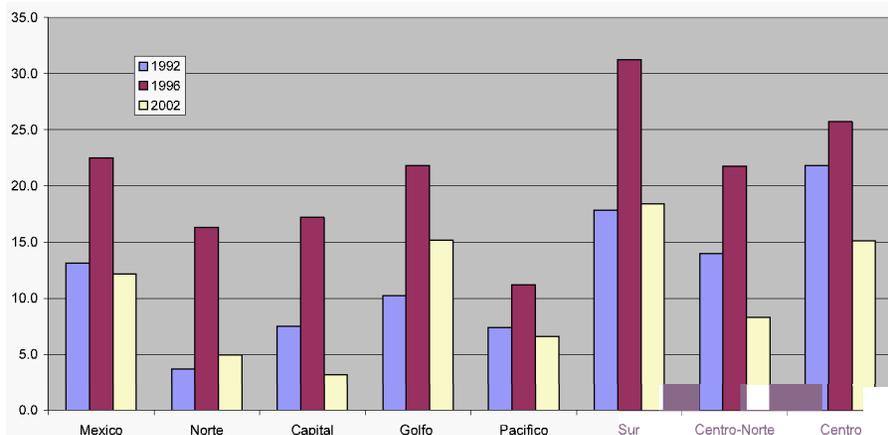


Note: Rural defined as localities of less than 15,000 residents.

Source: WB staff estimates based on ENIGH 1992, 1996 and 2002.

⁷ It is important to note that ENIGH – the basis for the income poverty estimates – is not designed to be representative at a regional level. As a result, the regional numbers on income poverty should be interpreted with care. The differences between regions here presented are statistically significant.

Figure 2.4: Mexico: Rural Poverty Gap, FGT(1), by Region in Selected Years



Note: Rural defined as localities of less than 15,000 residents.

Source: WB staff estimates based on ENIGH 1992, 1996 and 2002.

Poverty is also deeper in the Southern, Gulf and Central regions. If we look at poverty gap figures by region (Figure 2.4) we can observe large regional differences. Thus, in 2002, FGT(1) was less than 5 percent in the *Norte* and *Capital* regions, and more than 15 percent in the *Centro*, *Golfo* and *Sur* regions. During 1992-1996 the poverty gap increased most in regions where poverty was less deep in 1992, such as the *Capital* and *Norte*. As a consequence of the 1995 crisis, the depth of poverty was at its highest for all regions in the middle of the 1990s.

Other measures of regional welfare levels corroborate the regional differences in income poverty. Work on census data confirms the higher prevalence of poverty in the Southern part of the country as well as its persistence over time (see Araujo, 2003).

Inequality

Mexico's income distribution did not improve much during the decade 1992-2002 and remains very unequal. In 2002, the *Gini* coefficient for rural Mexico was 0.517 for household income and 0.492 for household expenditure. As shown in Table 2.3 and Figure 2.5, rural inequality decreased in 1992-96, increased in 1996-00 and decreased again in 2000-02. Altogether, income inequality among rural households did not change over the decade but inequality in household expenditure increased. There were strong variations in both income and expenditure *Ginis* during the period, but as is usually the case inequality in expenditure was generally smaller than in income, with the exception of 2000. Inequality has tended to be counter cyclical for both income and expenditure, with the 1995 crisis having no significant influence, the 1996-2000 recovery a disequalizing one, and the 2000-02 stagnation period being equalizing (World Bank 2004).

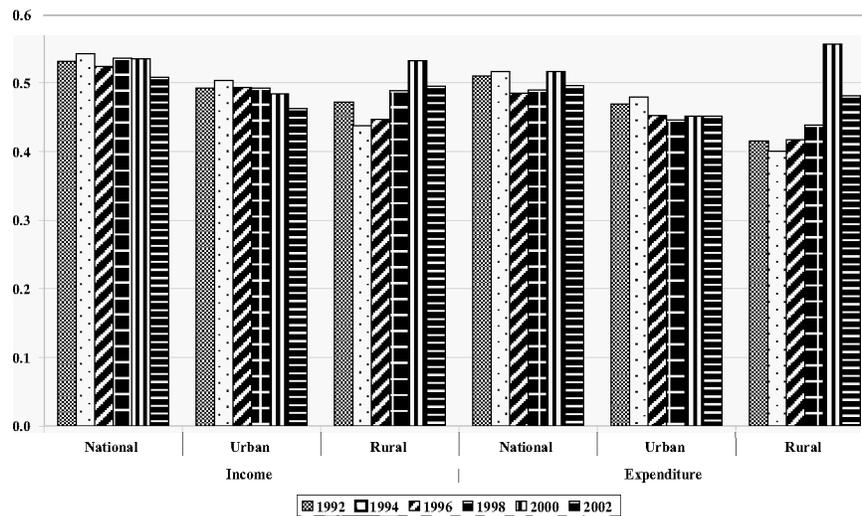
Table 2.3. Mexico: Gini Indices for Individual Income and Expenditure in Rural Areas 1992-2002

	1992	1994	1996	1998	2000	2002
Income	0.47	0.44	0.45	0.49	0.53	0.49
Expenditure	0.41	0.40	0.42	0.44	0.56	0.48

Note: Rural defined as localities of less than 15,000 residents.

Source: *SEDESOL* estimates using *ENIGH*.

Figure 2.5: Mexico: Income and Expenditure Inequality in Rural and Urban Areas Measured by *Gini* coefficients, 1992-2002



Source: World Bank, 2004.

When we compare rural income and expenditure inequality measured by person and measured by household, inequality is consistently smaller for personal than for household income and consistently larger for personal than for household expenditure.⁸ The former follows from the fact that inequality in family size compounds the effect of inequality in personal income resulting in more variation in the income distribution. The latter seems to indicate that there are scale economies in expenditure by families who are also more successful than individuals at expenditure smoothing.

Income distribution is more dispersed for families with diversified income sources and/or who receive transfers and this inequality has increased over time. Income inequality differs markedly according to the dominant source of income of rural families. In Table 2.4, we show Gini coefficients for rural families classified according to their main (more than 50%) source of income. Inequality is smaller for agricultural wage labor families and larger for families with diversified income sources, and for those depending mostly on transfers. The fall in inequality between 1992 and 2002 in families depending on wage labor is probably a reflection of the fall in real rural wages. Contrarily, the increase in inequality in transfer dependent and diversified income families reflects the raising importance of transfers and non-agricultural activities as sources of income and employment opportunities in rural areas, resulting in more variation in the income distribution for these categories of families. Interestingly, as discussed in more detail in chapter 3, the new opportunities seem to have both reduced poverty and increased inequality.

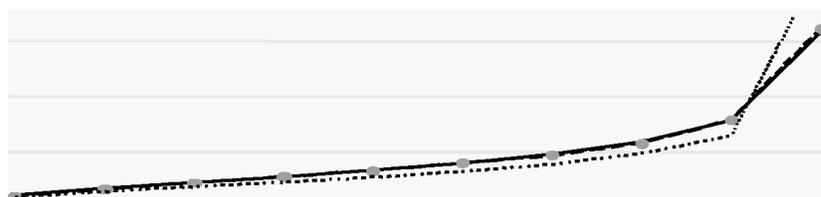
⁸ This assertion is derived from ENIGH data not shown in the tables and figures presented here.

Table 2.3. Mexico: Gini Income Coefficients by Type of Rural Households Classified by their Main (>50%) Source of Income, 2002

	Independ. Farming	Non-ag. Entrepren.	Agricul. wage labor	Non-ag. wage labor	Transfer dependent	Diversi- fied
1992	0.45	0.41	0.36	0.53	0.44	0.36
2002	0.44	0.48	0.33	0.46	0.54	0.55

Source: WB staff calculations based on ENIGH 1992 and 2002.

Figure 2.6: Mexico: Rural Expenditure Share by Expenditure Decile, 1992, 1996 and 2000



Expenditure Decile

Source: WB staff estimates based on ENIGH 1992, 1996, and 2002.

Another way of looking at rural inequality is to focus on how different sectors of the rural population participated in total rural expenditure. We do this in Figure 2.6, where we compare the share of total expenditure by expenditure decile in three years: 1992 (continuous line), 1996 (broken line), and 2002 (dotted line). We observe that there was no alteration between 1992 and 1996 and a worsening of the distribution between 1996 and 2002. The reason was the increase in the share of expenditure at the top of the distribution, i.e. by the 10th decile. Whereas in 1992 and 1996 the expenditure of the top decile was 32 percent of the total, it was 45 percent in 2002. A similar exercise carried out for agricultural families (both independent farmers and agricultural wage labor families) and non-agricultural families (the rest), not shown in the figure, indicated that there was no change in the distribution of the share of expenditure in agricultural families during the entire period. The change, however, between 1996 and 2000, was marked for non-agricultural families. It is hence the non-agricultural families that explain changes in the distribution of expenditure between 1996 and 2002 for the rural sector at large.

The more unequal income is distributed the less effective economic growth is in reducing poverty. In Mexico, even with steady growth, poverty reduction tends to be slow as a consequence of the country's high income inequality. This is also the reason why the poverty indicators of Mexico are worse than those of other countries with similar per capita income (World Bank 2004). Changes in inequality are typically slow, except during periods of radical social and institutional change. Where inequality has fallen, it has usually happened in association with major expansion and equalization in educational attainment, as in Korea and Malaysia in the 1970s and 1980s. Mexico's expansion in education and reduction in education inequalities in rural areas may be too recent and perhaps too segmented in quality to have a significant effect on the composition of skills, and occurred during a period in which the overall return to high skill levels was rising and that to basic skills falling. Mexico experienced a decrease in returns to

tertiary education since the middle of the 1990s, but rural areas experienced relatively little of this fall as very few rural-dwellers hold a university degree.

EXPLAINING THE TRENDS IN RURAL POVERTY AND INEQUALITY

The conclusion from the previous section is that following a period of poverty increase in the second part of the 1980s, rural poverty started a sustained decreasing trend in spite of the lack of progress in rural inequality. Comparing, however, 1992 with 2002, poverty in rural areas remained stagnant. The economic crisis in the mid-1990s, the sluggish performance in the agricultural sector and the reduction in rural wages all had a negative impact on poverty. Such negative developments were somewhat offset by an improvement in non-farm opportunities and an increase in private and public transfers to rural households. These themes are summarized below and developed further in subsequent chapters.

The Economic Crisis of the Mid 1990s

The so-called *Tequila Crisis* in 1995 had a tremendous impact on both rural and urban poverty. There were 3.9 million more rural poor in 1996 than in 1994; the poverty incidence had passed from an estimate of 37.0 percent in 1994 to one of 52.4 percent in 1996. By 2000 rural poverty had not yet fully recovered from the effect of the crisis, notwithstanding the favorable evolution of the macro economy from 1996 to 2000, with an increase of 30 percent in total GDP between these two dates. Not only did the number of poor increase substantially, but the rural extreme poverty gap almost doubled, passing from an estimate of 13.5 percent in 1994 to an estimate of 23.9 percent in 1996.

The crisis hit the rural sector mainly through a fall in rural wages and a reduction of private transfers. Although agricultural GDP increased during the crisis, agricultural real prices and the real value of crop output fell,⁹ but it is not clear how much this was the result of the crisis or of the evolution of international prices and the liberalization of trade. Public expenditure in rural areas fell as well in real terms from 1995 to 1999. From 1992 to 1996 the average monthly income of the Mexican rural worker had fallen by one third, from MxP 3,029 to MxP 2,031 in constant 2002 prices.¹⁰

Agricultural families were hardest hit. There is little information on how the crisis affected different sectors of the rural population.¹¹ From the point of view of spatial distribution, all regions were strongly hit, but the richer and the poorer regions were hit proportionally more (Figure 2.3). Different types of occupations were also hit differently. As shown in Table 2.5, agricultural families, relying mostly on independent farming or on agricultural wage labor, were the worst hit. Percentage-wise, poverty increased more among the non-agricultural entrepreneurial families but poverty levels are much smaller in this group. The relatively small

⁹ The index of the real average price of crops (base 1980=100) fell from 77.8 in 1993 to 63.5 in 1997, while the index of the real value of food crop output fell from 103.2 in 1993 to 90.2 in 1997. Indices are of purchasing power, i.e. deflated by the consumer price index, and were calculated from SAGARPA's SIACON data base. There was no fall, however, in agricultural GDP in 1995. See Chapter 4.

¹⁰ Estimated from ENIGH.

¹¹ Lack of panel data for rural areas for the crisis period prevents an analysis of the distribution of the impact of the crisis among households according to their profiles. The finding of Maloney, Cunningham and Bosch (2003) that in urban areas the impact was generally distributed in a way similar to the distribution of shocks in more normal periods probably applies to rural areas as well, although of course shock intensity was particularly large during the crisis period.

change in poverty in the non-agricultural wage labor families is to be noticed, and it is somewhat surprising in view of the increase in poverty among wage laborers in urban areas upon the crisis.

Table 2.4. Mexico: Incidence of Extreme Poverty in Rural Families Classified According to their Main (>50%) Source of Income, 1992 and 1996

	Independ. Farming	Non-ag. Entrepren.	Agricul. wage labor.	Non-ag. wage labor	Transfer dependent	Diversi- fied
1992	49.2	22.6	50.4	32.7	44.4	49.6
1996	65.8	36.0	65.3	38.7	52.0	62.3

Source: WB staff calculations based on ENIGH 1992 and 1996

Unfavorable labor market conditions appear to have resulted in higher out-migration from rural areas. Figures are not available on the evolution of rural employment, and hence we do not know how important unemployment was as a source of poverty intensification in rural areas during the crisis. As further developed in chapter 7, McKenzie (2003) found that rural workers could not resort to increased labor market participation because of the depressed state of the markets. Unemployment rose in urban areas after the crisis (although the bulk of the adjustment in urban labor markets was via real wages), and this must have affected the possibility of finding urban jobs by temporary migrants, as well as that of coping with the rural crisis by more permanent rural-to-urban migration. *ENHRUM* figures show, however, an acceleration of internal migration from rural areas after the crisis. Rural migration to the USA accelerated even more: rural household members in the USA doubled between 1994 and 1999 (see chapter 7).

Agricultural Performance

The sluggish performance of agriculture and the fall in the agricultural terms of trade also depressed agricultural incomes. Agricultural growth during the decade concentrated on the irrigated and more commercial farming segments, thus deepening the characteristic dualism of the sector. Between 1992 and 2002 average food crop yields increased 1.9 annually, which is not much considering the low yield levels and existing yield potential (see chapter 4). The terms of trade for the food crop sector fell 5.7 percent annually in the decade and the real value of food crop output decreased 3.5 percent annually. The yield of cereals, a particularly important crop for the poor, increased from an average of 2.5 ton/hectare in 1991-93 to an average of 2.8 ton/hectare in 2000-2002, and the real price of food crops fell at an annual rate of 6.1 percent between 1991 and 2002.¹² Falling food crop prices do not have an unambiguous effect on poverty, however. The fall of real producer prices of food crops may translate into cheaper prices of food to consumers, and thus increase the real income of the segment of the rural poor who are net buyers of food. This may compensate for the decrease of income for the segment of the rural poor who are net sellers of food crops.

Rural Wages

Real wages in agriculture fell from an already low level, while rural wages in general stagnated. An index of average real remunerations in agriculture calculated from

¹² Calculated from SAGARPA's on-line agricultural information system. More information on the evolution of agriculture is provided in chapter 4.

INEGI's national accounting data fell from 102.2 in 1992 to 75.6 in 2001 (base 1993=100).¹³ The agriculture hourly wage, calculated from the *Encuesta Nacional de Empleo* (ENE), fell from an average of MxP 8.3 in 1995 to an average of 7.4 in 2003, in constant 2002 MxP, while the average rural wage remained stagnant at around MxP 10.¹⁴ This contrasts with average hourly wages in rural areas for 2002 of MxP 12.3 in manufacturing, 10.5 in commerce and 14.3 in services (see chapter 3). Low agricultural performance and wages have a particularly significant effect on rural poverty because rural poor depend more on agricultural incomes than rural non-poor, and also because of the positive association between agricultural growth and rural poverty reduction (see chapter 4).

Income Diversification

Income diversification out of agriculture was very important in the 1992-2002 decade for all rural families in general, poor and non-poor alike. The weight of agriculture on income passed from one half to one third. Whereas in 1992 agriculture accounted for 51 percent of family income in disperse rural areas, it only accounted for 34 percent in 2002,¹⁵ including incomes from both independent farming and agricultural wage labor. If the wider definition of rural is used (localities of less than 15,000 residents), the corresponding figures are significantly lower: 44 percent, and 17 percent respectively. Conversely, income from non-farm employment in localities of less than 15,000 residents increased from 35 percent in 1992 to 49 percent in 2002. The rural poor and the rural non-poor both benefited from the expansion of non-farm employment opportunities, but it was the non-poor who benefited most from the best opportunities. These changes in employment and income sources mark a deep transformation in the structure of rural markets and the rural economy during the decade, which is analyzed in detail in chapter 3.

Transfers

International migration proved an essential coping mechanism for poor rural households. We have estimated the value of remittances from abroad reaching rural areas,¹⁶ which passed from MxP 5,085 million in 1992 to MxP 12,534 million in 2002 in constant 1993 MxP (see Figure 2.7). The main increase started in 1996 reflecting no doubt the acceleration of rural migration to the USA that took place since 1995-6. As a percentage of family income in disperse rural areas, remittances passed from 2.7 percent in 1992 to 5.9 percent in 2002.

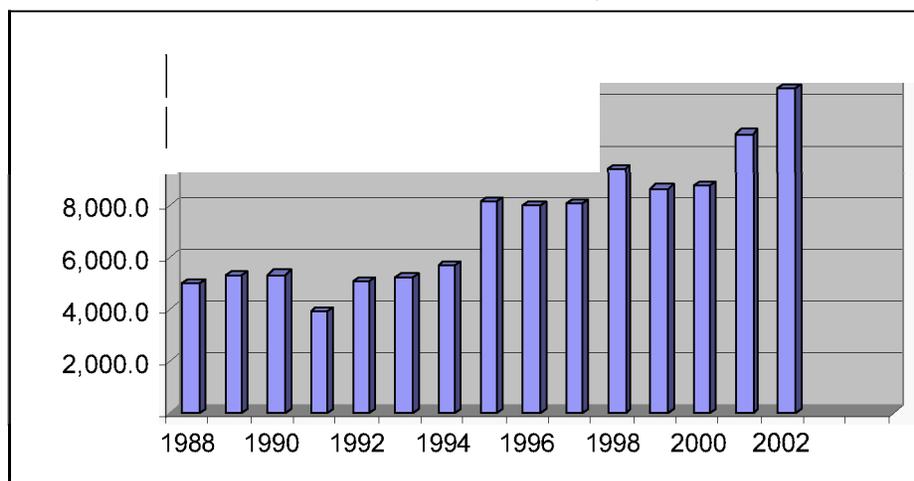
¹³ Calculated from *INEGI's* National Accounts by dividing the sum of all salaries and wages paid in the agricultural sector by the number of all paid workers occupied in agriculture, and deflating with the National Consumer Price Index.

¹⁴ *ENE* figures before 1995 are not strictly comparable with those for 1995 and after.

¹⁵ Calculated from ENIGH (see Chapter 3).

¹⁶ Remittance figures from the *Banco de Mexico* were transformed into MxP using the average exchange rate for the year, and then deflated using the national consumer price index. Of the total remittances in MxP thus calculated a portion was allocated to rural areas according to the percentage of rural remittances in total remittances given by ENIGH for the corresponding year. Percentages for odd years, for which there are no ENIGH surveys, were estimated by interpolation.

Figure 2.7: Estimate of Remittances from Abroad to Mexico Rural Areas in Million MxP at 1993 Prices, 1988-2002



Source: WB staff calculations based on Bank of Mexico remittance figures and the division of remittances between rural and urban areas from ENIGH.

Private domestic transfers to rural families did not increase much during the period, its share in disperse rural areas passing from 4.1 percent of family income in 1992 to 4.4 percent in 2002. The change, however, is bigger if a wide definition of rural is used, particularly in certain regions (*Golfo, Centro-Norte* and *Centro*), where private transfers reached around 8 percent of income in 2002. Private domestic transfers are also more important to the income of the rural poor than to that of the non-poor.

Improved targeting of direct public transfers have partly compensated for the fall in rural incomes. Federal public expending in rural areas did not increase in real terms between 1995 and 2003. After falling in 1995-99, the trend and composition changed (see chapter 4). Expenditure in social and labor programs, which decreased in real terms in 1995-99, then increased until 2002, while productive expenditure, which remained constant in 1998-02, increased in 2003 and were budgeted to increase again in 2004. Of particular importance for rural poverty have been the *Procampo* and *Progres/Oportunidades* programs, which account for the bulk of direct public transfers to rural areas. Altogether, direct public transfers accounted for only 0.2 percent of family income in disperse rural areas in 1992, when *Procampo* and *Progres/Oportunidades* were not yet in operation. In 2002, they accounted for 6.0 percent of family incomes in disperse rural areas and 16.7 percent for the bottom quintile of the rural income distribution. *Progres* alone accounted for 11.9 percent of the income of the extreme rural poor (see chapter 3).

When public and private transfers are added together, they amount to 16.5 percent of income in disperse rural areas in 2002. The proportion is larger for the bottom quintile of the rural population, 23.8 percent, and for the extreme poor, 25.4 percent (see chapter 3). Since only 84 percent of the income of the extreme poor was cash income,¹⁷ direct transfers accounted for 30 percent of the cash income of the extreme poor. The large majority of transfers were not statutory since pensions and other statutory transfers are very small in rural areas.

¹⁷ The remaining 16 percent is self-consumption, imputed house rent, and in-kind gifts and donations.

A PROFILE OF THE RURAL POOR

Who are the rural poor, where do they live, and where do they work? Comparing poverty levels for different categories allows us to examine which population groups are falling behind or are catching up. In the first part of this section we trace the evolution of poverty incidence for various groups during 1992-2002, examining the characteristics of the rural poor and their evolution in the decade. In the second part we discuss the results from an econometric analysis to study more formally the correlates of poverty in rural areas. By no means is the poverty analysis below complete, as many important aspects of poverty beyond conventional income and non-income indicators are missing (**Box 2.2**), including safety, voice and participation, as well as the role of ethnicity in determining poverty (the latter is discussed in chapter 7).

Box 2.2. Other dimensions of poverty.

The poverty analysis provided in this chapter lacks important information identified by the poor themselves in rural Mexico, like safety, peace of mind, good health, sustainable environment, belonging to a community, and freedom of choice and action. In particular, crime, violence and safety are flagged as important problems and obstacles to well-being in poor communities. Unfortunately, *ENIGH* surveys do not contain information on these variables or other important ones for poverty analysis like land assets or ethnic background.

Other studies on poverty incorporate other variables than those used here. Thus, Finan, Sadoulet, and de Janvry (2002) measure the poverty reduction potential of land in rural Mexico using 1997 *ejido* data. They show that for small landholders, an additional hectare of land increases welfare by 1.3 times the earnings of an agricultural worker. The marginal welfare value of land depends much on access to complementary assets and on the context where assets are used. For non-indigenous small farmers with at least primary education and access to a road, the welfare benefit of additional land is seven times higher than for small farmers without these attributes. Ethnicity lowers the marginal value of land, whereas education increases it. Households facing lower transactions costs, measured by access to roads, obtain a return to land two to three times higher than those without access to roads. These findings suggest that land can indeed be an important element in a poverty reduction strategy, but there are specific conditions that must hold for this to be the case.

As mentioned, the *ENIGH* data set does not contain information on ethnic background. Other studies on poverty in Latin America have shown that ethnicity is an important factor related to poverty, controlling for other characteristics. On-going work at the World Bank on ethnicity and poverty in Latin America, should shed light on this issue.

Poverty Characteristics

Table 2.6 presents the poverty profiles for 1992 and 2002 for disperse rural areas, semi-urban areas, and geographical regions. Before commenting on the data we must call attention here again to the fact that the *ENIGH* survey is not designed to be representative at the highly disaggregate levels of Table 2.6. The results in this table must hence be taken as indicative only. Time trends and the differences evidenced among population categories are probably correct, but the point estimates provided should not be taken as reflecting true population values. With this caveat in mind, the following poverty characteristics call our attention:

Table 2.6: Characteristics of the Extreme Poor in 1992 and 2002

Characteristics	1992		2002	
	Disperse Rural	Semi-Urban	Disperse Rural	Semi-Urban
Gender (% who are extreme poor)				
Male	38.2	14.9	36.8	17.0
Female	36.6	4.0	32.1	11.6
Age Cohort (% who are extreme poor)				
15 to 25	27.4	16.3	30.5	6.2
26 to 40	44.5	18.1	42.7	16.9
41 to 60	37.7	10.3	36.0	15.4
>61	31.4	8.2	30.0	15.4
Education (% who are extreme poor)				
No education	46.2	25.2	45.0	28.1
Primary incomplete	38.0	11.4	36.2	21.1
Primary complete	31.0	15.0	36.1	13.7
Secondary complete	22.0	7.0	17.9	8.9
Higher education	0.7	0.4	0.5	0.6
Labor Status (% who are extreme poor)				
Employed	38.5	14.2	37.1	16.5
Unemployed	56.6	39.5	20.4	18.8
Inactive	32.7	6.4	29.4	12.0
Work Position (% who are extreme poor)				
Salaried worker	39.3	13.7	35.7	14.3
Self-employed	42.6	14.5	42.2	20.6
Employer	21.3	16.6	17.2	12.3
Family worker	36.3	-	39.3	-
Work Sector (% who are extreme poor)				
Agriculture	43.7	21.3	45.3	36.0
Extraction	26.2	9.8	7.7	1.1
Manufacturing	24.3	6.4	22.1	7.5
Construction	40.3	16.5	35.8	21.6
Utilities	7.7	-	-	24.3
Sales	25.5	12.0	23.2	7.0
Hotel-restaurant	1.9	0.2	15.4	6.6
Services	23.6	14.6	23.1	14.1
Education	1.4	0.9	1.8	1.1
Government	23.6	0.1	25.1	2.3

Source: WB staff calculations based on ENIGH 1992 and 2002

Education levels are strongly related to poverty. In rural Mexico, as elsewhere, poverty rates fall with educational attainment. Thus, in 2002, extreme poverty in disperse rural areas was estimated at 45 percent for household whose heads had no education. Extreme poverty fell slightly during the decade for households whose head had none or little education in disperse rural areas, whereas it increased slightly for those in semi-urban areas.

There is an important premium to having some education, compared to none, and to having secondary education compared to lower levels. While there is a large difference in

disperse rural areas in the incidence of extreme poverty between household whose heads have no education (45 percent) and those who have incomplete primary education (36 percent), the difference is very small between household whose heads have incomplete and those who have complete primary education. Secondary education makes a big difference; only 18 percent of household whose heads have completed secondary education are poor. Extreme poverty for households with heads who are high school graduates decreased rapidly during 1992-2002, down from 22 percent in 1992. These findings indicate that while education is a crucial element for poverty reduction in rural Mexico, it is not a silver bullet, as the more educated also experience poverty, and proportionally more now than a decade ago in the case of primary education.¹⁸

Very young household heads in semi-urban areas are far less likely to be poor than those in disperse rural areas and the difference has increased over time. Of the households headed by a person of less than 25, six percent are extremely poor in semi-urban areas compared to 31 percent in disperse rural areas. In fact, in semi-urban areas, poverty rates are markedly lower for these households compared to those headed by people above age 25. Furthermore, while poverty among young households has fallen in semi-urban areas, it has increased in disperse rural ones.

Instead, poverty has increased among households headed by elderly persons in semi-urban areas and stagnated in rural disperse areas. Fifteen percent of the households headed by elderly persons (of more than 61 years) were below the food poverty line in 2002 in semi-urban areas—an increase of 7 percentage points from 1992. In disperse rural areas poverty among this group has stabilized at around 30 percent during 1992-2002. Poverty incidence in households with heads in age groups of 25 to 40 and 41 to 60 were stable at around 43 and 36 percent over the decade in disperse rural areas, with an increase in poverty for the latter group in semi-urban areas. Thus, the life-cycle profile of poverty indicates strong poverty incidence for households in age brackets where children are young and the family is expanding, which decreases as the children grow up, and decreases again as the size of the family becomes smaller with old age (Figure 2.8).

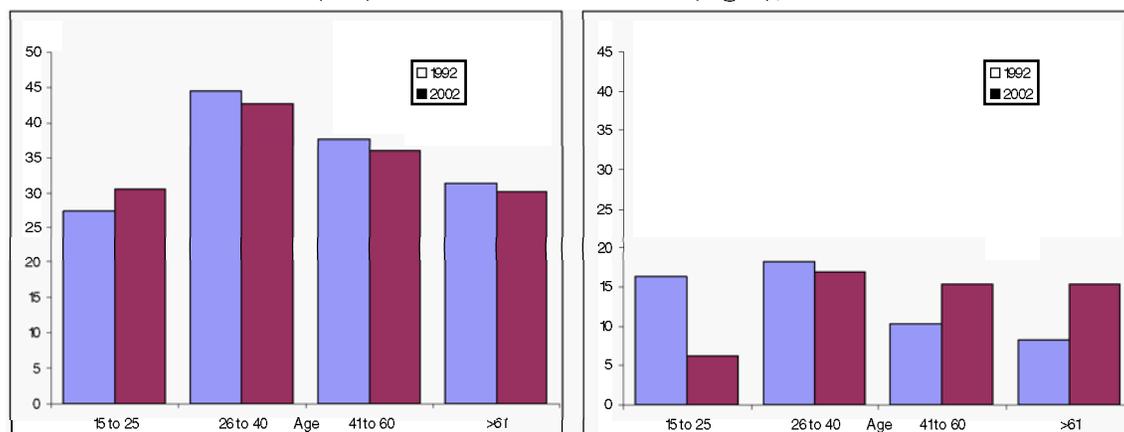
Female-headed households have lower incidence of poverty than male-headed ones in both semi-urban and disperse rural areas. The incidence of poverty among female-headed households decreased in disperse rural areas during the decade, but increased considerably in semi-urban ones. It is risky, however, to use information on household heads as the basis for wider gender-poverty analysis, since income poverty figures are only part of the myriad of factors that affect a poor woman's well being.¹⁹

¹⁸ Skill-biased technical change, changes in the relative supply of and demand for workers with different characteristics, and trade liberalization, have all been mentioned as possible explanations for the changes taking place in the impact of education on poverty in Mexico and Latin America in general (see Blom and Velez, 2001, and Blom, Pavcnik, and Schady, 2001). We will come back to the impact of different levels of education when discussing rural wages and non-farm occupations in the chapter 3.

¹⁹ Gender-poverty analysis based on gender of household head is fraught with difficulties. First, female-headed households are often underreported if migrant spouses are still identified as the non-resident head. Second, it is impossible to separate out individual consumption levels of men and women (and boys and girls) in households headed by either men or women. Yet, women, and perhaps especially girls tend to be disadvantaged in intra-household distribution of goods or investments in human capital. (see e.g. Quisumbing and Maluccio, 1999 and Case and Deaton, 2003) and continue to lag behind in terms of many social indicators. Non-income aspects of poverty, including level of and access to human capital, access to labor markets, health status, etc., are therefore required to properly analyze gender-poverty links.

Households with heads employed in agriculture suffer far more incidence of poverty. Thus, the poverty incidence was 36 and 45 percent in agricultural households in semi-urban and disperse rural areas in 2002, compared to 8 and 22 percent in manufacturing, and 14 and 23 percent in service occupations (excluding sales and hotel/restaurants where it is much lower). Poverty among households with the head employed in agriculture increased by an astounding 15 percentage points in the last decade in semi-urban areas, while in disperse rural areas the increase was only of 1.6 percentage point.

Figure 2.8. Mexico: Poverty incidence by age of household head, in disperse rural areas (left) and semi-urban areas (right), 1992 and 2002.



Source: WB staff calculations based on ENIGH.

Poverty Correlates

The poverty profile is corroborated by the analysis of conditional poverty correlates. Simple correlations can be misleading since it can be difficult to distinguish the influence of the individual characteristics. Probit regressions for 1992, 1996 and 2002 provide information on conditional correlation between poverty and the characteristics of household heads. By running regressions for these three years we also obtain information on the volatility of the impact of the attributes on the likelihood that a household experience poverty during the beginning and mid-1990s and the beginning of the 2000s. Finally, we obtain information on the groups that are particularly vulnerable, as well as changes in these groups over the decade. A detailed analysis of the results together with the probit regression coefficients are provided in Annex 2.A. The main statistically significant results for 2002 and the main trends between 1992 and 2002 are as follows:

- **Households in disperse rural areas were more likely to be poor than those in semi-urban areas.**
- **Formal sector workers in rural areas, i.e. those contributing to the social security system, were much less likely to be poor than their informal sector counterparts,** reflecting an increase in the formal-informal gap since 1992. In contrast to earlier years, households with heads inactive in the labor market were more likely to experience poverty than other households. Surprisingly, among the households with active heads the probability of being poor did not increase with

unemployment. This holds in both 1992 and 2002, but not in 1996, after the crises, when unemployed heads were more likely to experience poverty than employed ones.

- **Employers are the group with lowest probability of being poor followed by self-employed and salaried workers.** In 1992, households with self-employed heads were 4 percentage points less likely to experience poverty than those headed by salaried workers in the off-farm sector. Household with self-employed heads had the same probability of being poor than those headed by non-agriculture salaried workers. During 1992-2002, households with heads self-employed in agriculture experienced a dramatic increase in the likelihood of experiencing poverty. Households headed by salaried workers in agriculture also saw their probability of being poor increased compared to households in the non-farm sector. A second income –whether from spouses engaged in the off-farm sector or from the household head taking a second job– had an increasingly important effect on reducing the probability of poverty for households. We discuss this more in chapter 3.
- **Educational attainment is the single strongest correlate of poverty among the variables included in the analysis, controlling for other variables.** The positive effect of education on poverty reduction increases with the level of completed education of the household head and the spouse. The probability of falling into poverty of secondary school graduates decreased between 1992 and 1996 and increased between 1996 and 2002, reaching in 2002 a level not much different from that of 1992.
- **Having a female household head reduces the probability of poverty.** This was not the case in 1992, however, and this finding is different in some other countries, for example Brazil, where male headed households have been found to have a lower probability of being poor (see Elbers *et al*, 2001), or in Ecuador where there seems to be no association between poverty and gender of the household head (World Bank, 2004c).
- **The dependency ratio of the household is also an important factor.** The presence of children or youth in the household makes it more poverty prone, but the probability of being poor falls with increasing child age. Households with children under 5 are more likely to be poor than childless families, and their higher probability of being poor has been rather constant over the past decade. Households with children between 6 and 11 years have also higher probability of being poor than those without children, although the likelihood is lower than that for families with smaller children, and the probability has increased since 1992. Households with members aged 19 to 25 were significantly less likely to be poor than households with no children. The fact that young members enter the labor market and bring home an income contributes positively to the household's poverty situation. In the *Sur* region, however, households with young members did not experience the same lower probability of being poor in 2002. Finally, the presence of older members (above 65 years of age) in the household makes it more poverty prone. In 2002, households with members of old age experienced a higher likelihood of poverty than those without them but the magnitude was lower than in 1992: 0.3 percent in 2002 compared to 5 percent in 1992.

POLICY IMPLICATIONS

What policy conclusions can be derived from the above findings? The aggregate and rather general type of analysis carried out in this chapter does not allow inferring detailed policy options. We can suggest, however, some general orientations likely to influence poverty positively. More detailed suggestions are made in other chapters.

The first policy implication refers to the importance of maintaining macroeconomic stability. The effect on poverty of the 1995 crisis confirmed what was already known from the 1982-83 crisis and from the experience of other countries: that strong macroeconomic shocks can undo in one or two years long-time improvements on poverty reduction, and that poverty levels take time to recover after the shocks. Macroeconomic stability is hence a necessary element of any poverty reduction strategy.

Another implication refers to the importance of cash transfers for the very poor, since one quarter of their income comes from this source. Transfers have become indispensable for many rural poor families who could not survive without them. Public transfers, particularly those associated with programs like *Procampo* and *Progres/Oportunidades*, are an important part of all transfers received by the poor. There are evident dangers in a rural economy and society which depends always more on transfer incomes, and there is need of revitalizing both agriculture and non-agriculture sources of employment and income in rural areas. But public transfers to the income-poor in rural areas cannot be discontinued without much suffering and the probable reversal of the poverty reduction trend of the last years. It is at the margin, however, where policy decisions are usually made. And the decision in this case is whether to increase *at the margin* public expenditure in direct cash transfer programs or in employment and income generation ones. Our view is in favor of the latter option, but without reducing the current level of cash transfers to the poor, or not at least before new income opportunities become available. This view, however, is conditional on substantially strengthening the efficiency of economically-oriented programs, which as we will see in chapter 6 could be improved in design and implementation. The decision of what to do with *Procampo* when it officially comes to an end in 2008 is related to this policy issue.

It is important to focus actions on areas of concentration of poverty to have maximum impact. The fact that rural poverty is particularly prevalent and acute in some regions, in disperse rural areas, and, as indicated in chapter 1, in an conglomerate of refuge zones, has important policy implications. Focusing actions on poor areas is already the rule in some programs where the allocation of funds or the selection of areas is related to the marginality index or other poverty indicators. This is a good practice which could be extended to other programs. Focusing on poor areas could be combined with an assessment of the capacity of specific programs to promote local development there. Different zones have different potentials, and different programs have different capacities to promote local development in those zones and may do it in different ways. This poses trade-offs between the depth of needs existing in different zones and the cost-efficiency of programs to attend them under the specific conditions of the zones. Population in disperse rural areas present a particular challenge because their needs are usually greatest but the cost-efficiency of programs tends to be low in those areas.

A good principle in connection to these trade-offs is to concentrate investments in particular localities -in the way for instance envisaged by the *Microrregiones* strategy- so as to build up critical masses of infrastructure, services and production-oriented programs to help triggering endogenous processes of local development. The best instrument to prioritize investments locally and identify strategic areas for local economic growth is that of the territorial

approach to rural development and the use of participatory planning methods. We come back to this in other chapters of the study.

Households with children of young age requires special policy attention. *Oportunidades* offers already a mechanism to support these households, but other mechanisms could also be considered. Given the importance of secondary income sources, subsidizing rural child care facilities to allow mothers of young children to participate in the labor market or carry out on-farm productive work are potential areas for policy action. Some programs operating in rural areas like, for instance, *Jornaleros Agrícolas*, operated by *SEDESOL*, already include some support of this type.

A problem discussed in other chapters is the young households lack of access to assets that would allow them to undertake independent economic activities. There is in particular very limited or no access to land, technical assistance, training, and loans for farm investments and to start up on -and off-farm economic ventures. Focusing on young households and supporting them to develop productive activities emerges hence as another policy priority. The *Secretaría de la Reforma Agraria* is starting a program to facilitate the access of young landless workers to land and complementary assets, which is a welcome step in the mentioned direction.

Educational improvements should be part of any effort to reduce poverty in rural areas, for lack of education gives individuals less opportunities, reduces the return to their labor, and hence tends to make them poorer. An advantage of education is that being a “portable asset” it accompanies the individual if he or she decide to migrate. Since progress over the last decades has made primary education now practically universal among young citizens in Mexico rural areas, the focus should be on improving quality, which is lagging behind, expanding secondary education facilities and enrolment, and strengthening different types of technical education and vocational training in rural areas related both to farm and non-farm economic activities.

3. ACTIVITIES, EMPLOYMENT AND INCOMES OF THE RURAL POOR²⁰

This chapter sheds light on the changes that have taken place in employment and income generation in the rural areas of Mexico.

The main findings of the chapter are as follows:

- **The characteristics of the rural labor force are changing, with greater participation of women**, higher levels of education, and considerable ageing of the workforce.
- **Rural employment has fallen, which points to limited employment opportunities and the impact** of rural out-migration. Also, formal employment is not expanding in rural areas.
- **Informal salaried employment has increased at the expense of unpaid workers, as has rural non-farm (RNF) employment** at the expense of farm employment.
- **Rural wages, which fell with the 1995 crisis, had on average just recovered in 2003**, but the average agricultural wage was still below the 1995 level in real terms.
- **Wage levels are largely determined by education levels, but also by gender, experience/age, level of formality, and location.**
- **The importance of agriculture in rural incomes, including independent farming as well as** agricultural wage labor, fell significantly between 1992 and 2002, giving way to rural non-farm occupations. The poor remain more dependent on agricultural income than the non-poor, however, and their access to rural non-farm activities, especially high-return ones, is more limited. Instead, transfers, especially public transfers from *Progres*a and *Procampo*, have developed into a major source of income for the poor and appear to have lowered rural inequality.
- Rural non-farm occupations appear to play a key role for sustaining rural incomes, especially for the moderately poor.
- Access to high-return RNF activities is more limited for women and for workers with little education, located in disperse rural areas, and belonging to an indigenous culture.

The main policy implications deriving from the above findings are:

²⁰ Detailed statistical tables and other relevant materials are presented in Annexes 3A to 3I.

- **There is need for a comprehensive view of rural development which include both farm and non-farm activities.**
- **Rural policy may be more effective if focused on the family rather than the farm,** moving away from the viable farm concept in order to promote competitiveness through multiple interventions embracing small and large farms, full- and part-time farmers.
- **Education -both access and quality, and including vocational and technical training** – together with improved rural infrastructure, microfinance schemes, and technical and management support systems are all key policy areas for raising rural productivity and increasing access to higher wages and RNF activities.
- **A spatial policy could facilitate the geographical concentration of investments** and services for productive development, favor the growth of rural towns and intermediate cities, and encourage the establishment of links between these urban centers and their rural hinterlands.
- **Economic investments to promote the RNF sector could be included in rural development program.** This could be done by decentralizing investment decisions through a system of local participatory planning based on a territorial approach to rural development.

EMPLOYMENT AND THE RURAL LABOR FORCE

Demographic Trends

In 2000, 24.8 million of Mexico's 97.5 million people lived in disperse rural areas (Table 3.1). Expanding the definition of rural to locations with less than 15,000 inhabitants increases this figure to 38.1 million. The national average conceals significant regional difference; however, rural-urban patterns vary throughout the country. For example, in the *Sur*, 47 percent of the population lives in disperse rural areas compared to only 12 percent in the *Norte*.

The rural population share has fallen over time, but the rural population is still growing. Between 1990 and 2000, population growth in disperse rural areas was lower than the national average: 0.6 percent annually compared to 1.8 for Mexico as a whole. This was the result of out-migration since fertility rates in rural areas, though falling, still reached around 4.3 in 1995-2000, compared to 3.1 for cities over one million (Partida Bush, 2004). Thus, in 2000, 25 percent of

Table 3.1. Mexico: Total Population, Rural and Urban Shares, and Annual Growth Rates, 1990,1995 and 2000

Region	Type of Area	1990	1995	2000	Annual Growth (%) 1990- 2000
Mexico	Total	81,249,645	91,158,290	97,483,412	1.8
	Urban (%)	71.3	73.5	74.6	2.3
	Rural (%)	28.7	26.5	25.4	0.6
Norte	Total	13,246,991	15,242,430	16,642,676	2.3
	Urban (%)	84.7	86.5	87.9	2.8
	Rural (%)	15.3	13.5	12.1	-0.1
Capital	Total	18,051,539	20,196,971	21,701,925	1.8
	Urban (%)	91.4	91.5	91.6	1.9
	Rural (%)	8.6	8.5	8.4	1.5
Golfo	Total	10,121,385	11,388,767	12,024,666	1.7
	Urban (%)	59.9	62.5	63.7	2.4
	Rural (%)	40.1	37.5	36.3	0.7
Pacífico	Total	9,077,660	10,177,075	10,745,699	1.7
	Urban (%)	75.7	77.4	78.7	2.1
	Rural (%)	24.3	22.6	21.3	0.3
Sur	Total	12,398,892	13,600,852	14,424,973	1.5
	Urban (%)	48.7	52.0	52.9	2.4
	Rural (%)	51.3	48.0	47.1	0.6
Centro-Norte	Total	10,382,375	11,488,771	12,113,254	1.5
	Urban (%)	59.4	62.9	64.8	2.5
	Rural (%)	40.6	37.1	35.2	0.1
Centro	Total	7,970,803	9,063,424	9,830,219	2.1
	Urban (%)	64.0	66.5	67.7	2.8
	Rural (%)	36.0	33.5	32.3	1.0

Note: Rural defined as locations of < 2,500 residents, urban as locations of > 2,500 residents.

Source: WB staff calculations based on INEGI.

Mexicans lived in disperse rural areas, down from 29 percent one decade earlier and 34 percent two decades earlier. Not all regions followed the same pattern, although in all regions the urban population grew more. In the *Norte* the disperse rural population actually diminished by 0.1 percent annually during 1990-2000. In the *Capital* region, the difference in population growth between disperse rural and urban areas was small, with the rural population expanding at 1.5 percent annually. Population growth in the *Sur* and *Golfo* regions followed closely the national average. The demographic turning point has not yet been reached in rural Mexico: the disperse rural population is only expected to stabilize (at around 26.8 million) by 2020 (CONAPO, 2004).

Changing Characteristics of the Rural Labor Force

The Mexican rural labor force is becoming more feminized, better educated, older, and less dependent on unpaid employment. These trends are summarized in Table 3.2 below and shown in more detail in Annex Tables 3.A.1, 3.A.2 and 3.A.3 of Annex 3.A, based on ENIGH, and Annex Table 3.B.1. of Annex 3.B, based on ENE.

The participation rate of women in the rural labor force increased 45 percent between 1992 and 2002, from a rate of 21.8 percent to one of 31.6 percent. Male migration, lower fertility rates, and the increased importance of non-farm occupations, where women are strongly represented, would seem to be the main reasons for this. The participation of family and

unpaid family workers decreased 3.5 points and that of employers another 3.3 points. The fall in the position of women as unpaid family workers shown by ENE is remarkable: from 39.5 percent in 1995 to 25.0 percent in 2003 (Annex Table 3.B.1).

Table 3.2: Mexico: Composition of the Rural Labor Force in 1992 and 2002 (percentages)

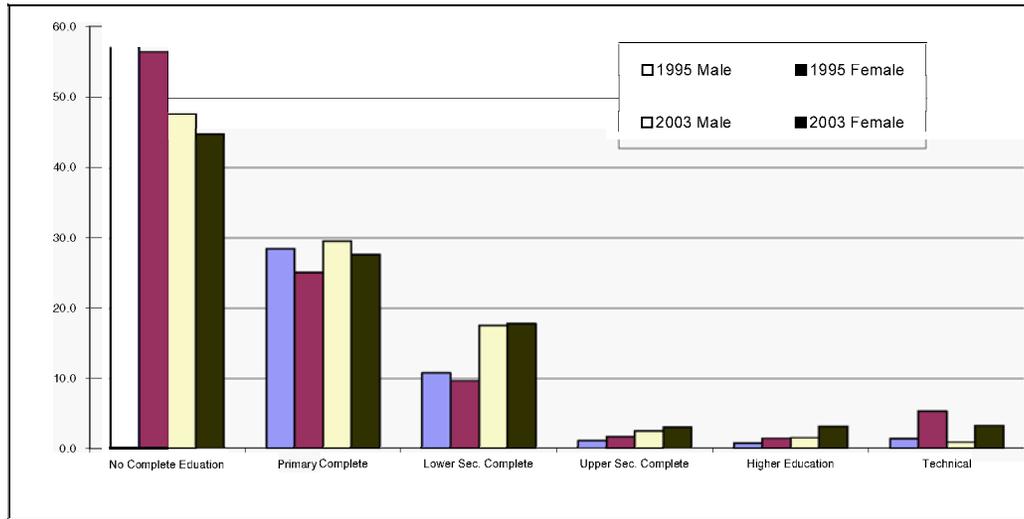
Concept	1992	2002
Gender		
Male	78.2	68.4
Female	21.8	31.6
Labor Status		
Salaried Worker	45.4	48.7
Self-employed	30.9	34.4
Employer	6.8	3.5
Family and unpaid worker	16.9	13.4
Education		
Without or incomplete primary	61.8	51.3
Complete primary	26.7	27.3
Complete lower secondary	9.3	15.3
Upper secondary and higher education	2.2	6.1
Age		
Less than 15	4.7	3.5
15 to 25	31.6	25.4
26 to 40	31.7	30.0
41 to 60	24.0	28.1
61 or more	8.0	13.0

Source: WB staff calculations based on ENIGH.

The improvements in education of both male and female workers are substantial. The average years of education of the 9.3 million people in the rural labor force increased from 4.4 years for both genders in 1995 to 5.1 and 5.4 years for males and females respectively in 2003 (Annex Table 3.B.1). The increased level of education between 1995 and 2003 reported by ENE is shown in Figure 3.1. The percentage of male and female workers with complete lower secondary education increased by 62.2 and 83.6 percent, respectively, in the period. The percentage of workers with complete upper secondary, technical and higher education expanded from 3.6 to 5.3 percent in the case of males and from 8.8 to 9.8 percent in that of females.

The labor force is rapidly ageing in rural Mexico, because of the combined effect of migration of workers in younger age cohorts and the increase in life expectancy. Working men are slightly older than working women; the average age was 37.9 for men and 36.3 for women in 2003, up from 34.8 and 33.6 in 1995 (Annex Table 3.B.1). Rural workers between 15 and 25 years decreased their participation by 6 points in 1992-2002, while mature workers of 41 to 60 and 61 or more increased their participation from 24 to 28 percent and from 8 to 13 percent, respectively, in the same period (Table 3.2).

Figure 3.1: Mexico: Education Attainment of the Rural Labor Force



Source: WB staff calculation based on ENE surveys.

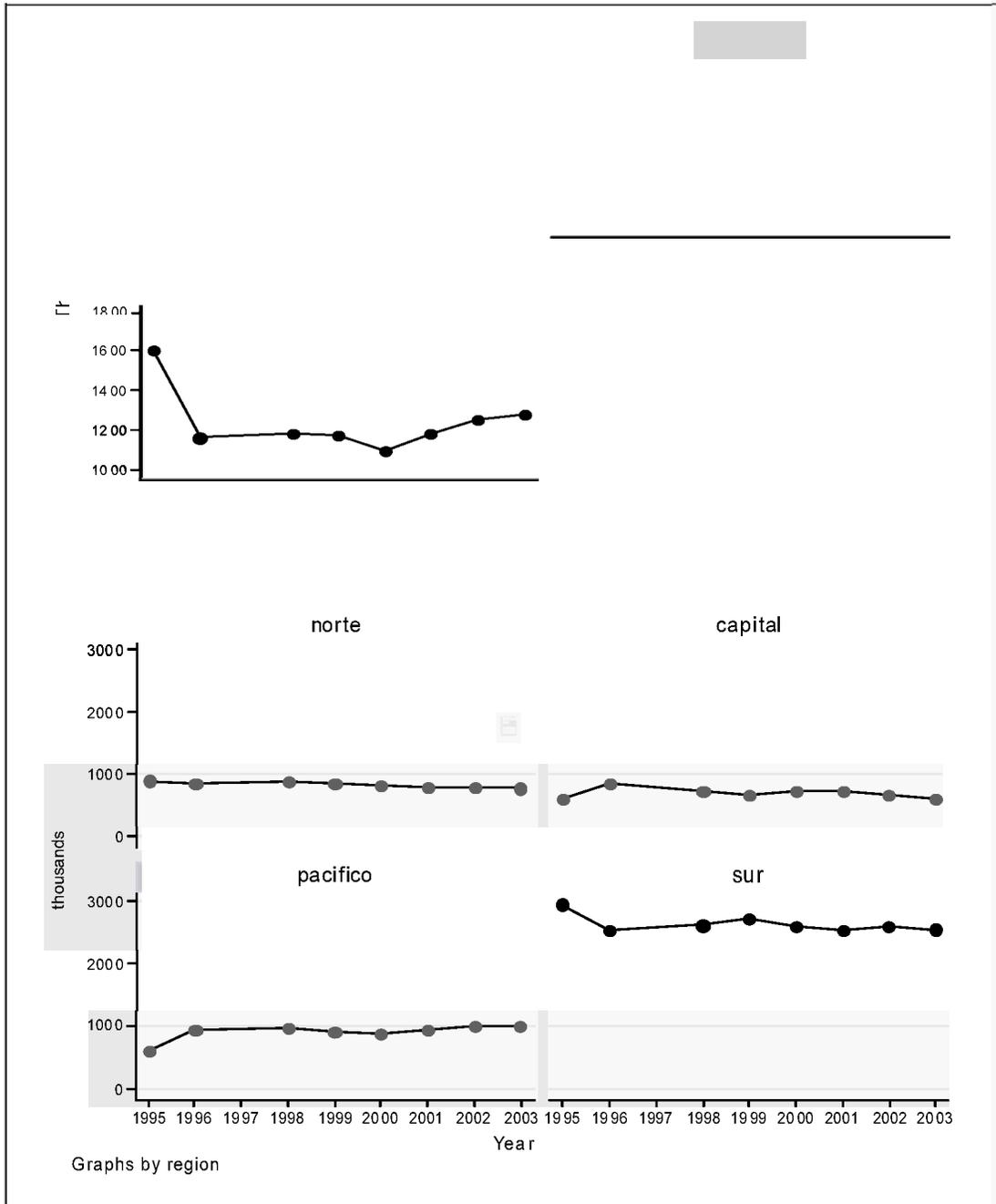
Rural Employment

Rural employment has fallen slightly since the 1990s. From 1995 to 2003, Mexico's rural work force decreased by 0.5 million reaching around 9.3 million in 2003, of which 9.2 were employed, 0.3 million down with respect to 1995 (Annex Table 3.C.1.). The main explanation for the shrinking work force seems to be the migration of the younger age cohorts to urban areas or abroad, which also contributes to the higher age of workers.²¹ Notwithstanding their increasing participation, women are still a minor part of the rural work force; according to ENE there were only 27.0 percent women in the rural work force in 2003.²²

²¹ Rural labor force defined here as individuals above 12 years of age in areas < 2,500 inhabitants.

²² This figure is likely to under-represent the actual female share of the work force, because of the way the question is phrased in the ENE questionnaire. Women participation in 2002, calculated from ENIGH, is close to 32 percent (Table 3.2)

Figure 3.2: Rural Employment by Region in Mexico, 1995-2003



Source: WB staff calculations based on ENE 1995 to 2003, second quarter.

Rural employment followed different paths in the regions as can be seen from Figure 3.2 and Annex Table 3.C.1. The *Pacifico* and *Centro-Norte* regions experienced job expansion of around 200 to 400 thousand workers in 1995-2003, while employment decreased in the *Centro*, *Golfo*, *Norte*, and *Sur* regions, particularly in the latter region where nearly 400 thousand jobs were lost. This pattern seems to be partly due to the expanded production of export crops in the *Pacifico* and *Centro-Norte*, which increased the demand for labor, with workers migrating from other parts of Mexico to grasp job opportunities.

Agriculture is still the main employer, although its share has fallen since 1995. The distribution of the working population in disperse rural areas by main sector of primary occupation is shown in Table 3.3, and a more detailed breakdown is provided in Table 3.D.1 of Annex 3.D. Of the working population of rural Mexico, 56 percent was engaged in agricultural activities in 2003, the vast majority in cultivation. As shown in Annex Table 3.B.1, males had a much greater participation in agriculture than females; 66.9 of rural males were in agriculture against only 25.0 percent of females, who were more involved in services. Agricultural employment has fallen from 63 percent in 1995 to 56 percent in 2003 as the main field of occupation declared by workers.

The share in total occupation of those who declare agriculture as their main area of work is much higher than the share of agricultural income in total income. We can think of three related explanations for this. The first is that being agriculture a cyclical activity many farmers with agriculture as their principal occupation work also in other sectors during the low season. Second, independently of the seasonality factor, there are many part-time farmers who complement agriculture with other activities on a permanent basis. Finally, there are rural dwellers that come from a farming tradition and continue to see themselves as agriculturalists, and hence declare farming as their principal occupation, even if they currently work little in agriculture and derive most of their income from transfers or other sources.

Table 3.3. Mexico: Rural Work Force Shares by Primary Occupation, 1995 and 2003

	1995		2003	
	Urban	Rural	Urban	Rural
Agriculture	9.6	62.8	5.4	55.6
Mining & Extraction	0.3	0.7	0.4	0.1
Manufacturing	24.8	11.0	26.3	18.5
Commerce	21.2	11.7	21.5	10.0
Services	44.1	13.8	46.4	15.8
Total Non Agriculture	90.4	37.2	94.6	44.4

Note: Rural work force defined as individuals above 12 years of age in areas < 2,500 inhabitants.

Source: WB staff calculations based on ENE 1995 and 2003. Individuals of 12 years and more.

Formal rural salaried employment is small. In 2003, 8.1 percent of men were employed in the formal sector, and 12.5 percent of women, many of whom teachers and other government-paid staff.²³ Employers and the self-employed jointly amounted to 40.9 percent of all men and 36.5 of all women employed in rural areas, while the informal salaried and contract workers jointly represented 31.3 percent of men and 21.7 percent of women, and unpaid family workers 16.0 and 25.0 percent, respectively (Annex Table 3.B.1). During the period covered, the percentage of informal salaried workers, both men and women, increased much, while that of family workers decreased much. It is interesting to notice the sharp decrease in women family workers and their larger involvement in self-employment activities. On the whole, trends during the period tended to reduced gender differences in labor status.

²³ The figures for formal employment are probably underestimated because the formal sector is here defined for the purpose of quantification according to whether workers contribute to social security. This means that all "formal" work (i.e. where labor is paid an agreed wage and where the worker's labor time and effort are controlled by the employer) in which labor laws are not respected is classified as informal. Given weakness of enforcement of labor regulations in Mexico, many workers who work under "formal" conditions are considered informal.

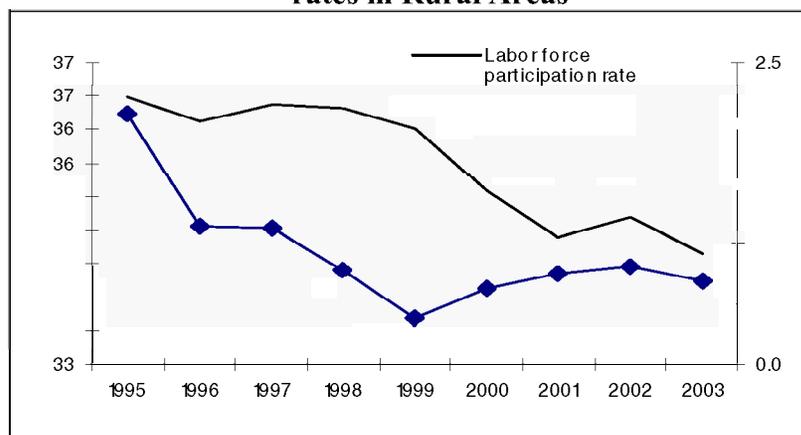
Falling labor force participation rates together with higher informality point to a lack of income opportunities in rural areas. The open unemployment rate is very small, of the order of 0.7 percent, but under employment is estimated to be high.²⁴ At the same time, employment has become increasingly informal over the 1990s, as self-employment and informal salaried work has increased (although unpaid family work has fallen). Moreover, while unemployment has fallen since the mid-1990s, the share of inactive people of working age has increased (Figures 3.3 and 3.4.). Together with increasing informality, this points to the lack of rural income opportunities.

Figure 3.3. Mexico: Informal Employment and Self-employment as a Share of Total Employment in Rural Areas, 1995 and 2003



Source: Annex 3.B, Table 3.B.1.

Figure 3.4. Mexico: Labor Force Participation and Unemployment rates in Rural Areas



Source: Annex 3.C, Table 3.C.1.

RURAL WAGES AND WAGE CORRELATES

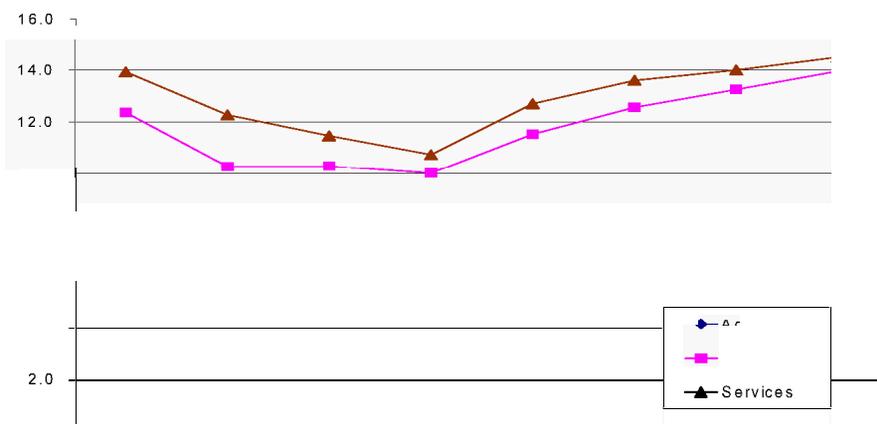
Level and Trends in Rural Wages

Mean rural wages in all occupations fell since 1995 as a consequence of the 1995 Tequila Crisis, and did not start recovering until after 1999. Mean hourly wages by sector of occupation in 1995 and 2003 are presented in Table 3.4., and the evolution by sector between

²⁴ Oxford Analytical, April 2004, estimates under-employment at 20 percent.

these two years is shown in Figure 3.5. Recovery was slower in agriculture than in industry and services, particularly between 2000 and 2002 (Figure 3.5). As a consequence, the rural agricultural wage was 11 percent smaller in real terms in 2003 than in 1995, while real wages in mining, extraction activities, manufacturing and services were slightly higher. The average rural wage rate remained stagnant. Hourly wages in the three sectors followed the same downward trend as unemployment from 1995-99, indicating little trade-off between unemployment and wages as adjustment mechanisms in the rural labor market (Table 3.4).²⁵

Figure 3.5: Rural Average Hourly Wages by Sector (2002 Pesos), Mexico, 1995-2003



Source: WB staff calculations based on ENE 1995 to 2003, second quarter.

Table 3.4. Mexico: Mean Hourly Wage by Occupation, 1995 and 2003

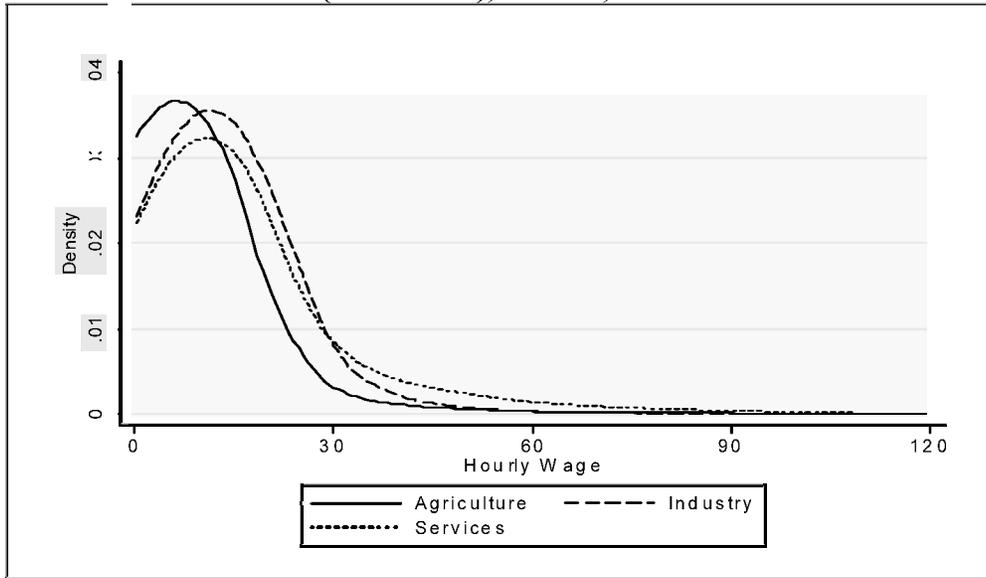
	1995		2003	
	Urban	Rural ^b	Urban	Rural ^b
Agriculture	12.0	8.3	13.5	7.4
Mining & Extraction	18.6	12.7	36.6	16.6
Manufacturing	17.1	11.8	19.1	12.3
Commerce	16.6	10.8	17.2	10.5
Services	21.7	13.9	23.0	14.1
AVERAGE	18.5	9.8	20.3	9.7

Source: ENE 1995 and 2003; a. 2002 MxP per hour of work; b. Localities < 2,500 residents.

Median wages are higher in the non-agricultural sectors. Considering the whole distribution for the three sectors, median wages are higher in the industry and services sectors than in agriculture (Figure 3.6.). The right tail of the distribution of agricultural wages is also less heavy than those of industry and service wages, indicating that more people are being paid higher wages in these sectors than in agriculture.

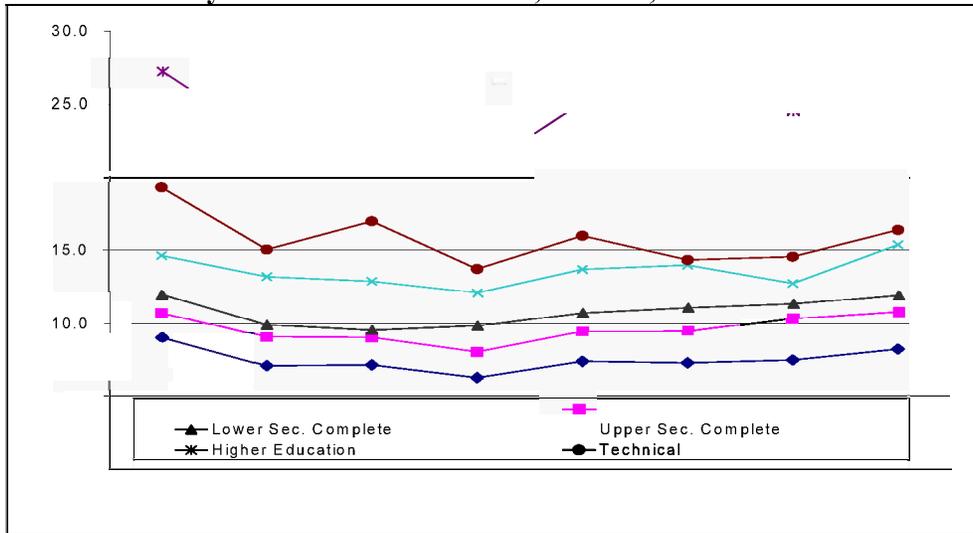
²⁵ Wage figures by gender according to labor status, sector of activity, and education are presented in Table 3.E.1. of Annex E, and wage figures for rural and urban areas broken down by type of activity are provided in Annex Table 3.D.1.

Figure 3.6. Rural Hourly Wage Distribution by Sector (2002 Pesos), Mexico, 2003



Source: WB staff calculations based on ENE 2003, 2nd quarter.

Figure 3.7: Average Rural Hourly Male Wages (2002 pesos), by Education Attainment, Mexico, 1995-2003

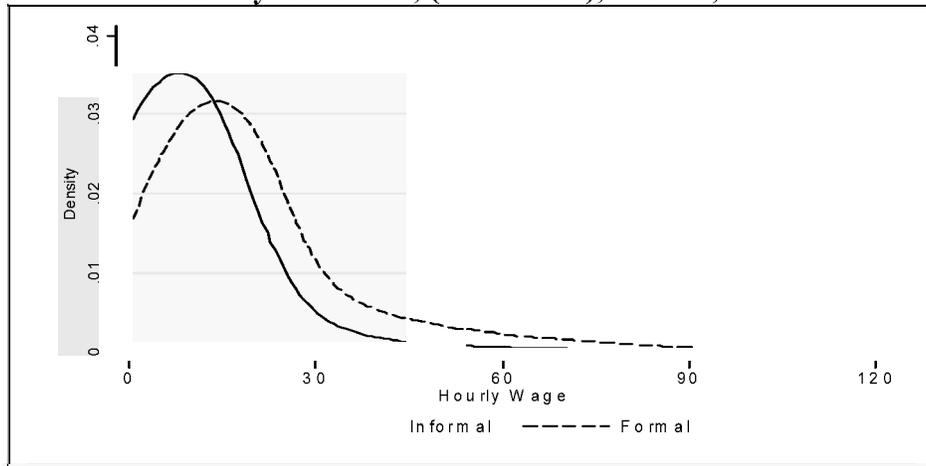


Source: WB staff calculations based on ENE 2003, 2nd quarter.

There are high returns to education. Unskilled workers with less than complete primary education receive an average hourly wage of MxP 8.2 compared to skilled workers with complete high school education who earn MxP 25.0 or more per hour (Annex Table 3.E.1). Hourly wages increase monotonically with the levels of education, as can be seen in Figure 3.7. In 2003, a male rural worker with complete higher education received on average a wage more than three times higher than a similar worker with no education or incomplete primary. Education, however, did not protect workers from wage falls during the *Tequila Crisis*. At all levels of education, real wages of rural workers fell between 1995 and 1999.

Wages are also related to labor status, with self-employed and informal salaried workers showing lower returns to their labor than employers and formal sector employees, two categories with similar returns (Annex Table 3.E.1). Figure 3.8. shows the hourly wage distribution of formal and informal sector rural workers in 2003. Formal workers are defined as those who contribute to social security, and therefore are protected. Median wages are higher in the formal sector and this remained unchanged during 1995-2003. Not only do formal sector workers receive benefits and other social services, but their hourly wages are also larger than those of unprotected informal workers.

Figure 3.8: Distribution of Rural Hourly Wages by Social Security Condition, (2002 Pesos), Mexico, 2003



Source: WB staff calculations based on ENE 2003, 2nd quarter.

Factors Explaining Rural Wages

This section looks at factors correlated to rural wages and investigates the characteristics that differentiate low and high paid workers. We saw in chapter 2 the importance of education and other personal and context characteristics as correlates of poverty. We focus here instead on the impact of these characteristics on rural wages. The results are of course largely connected, since wages are an important component of rural incomes.

We compare workers located at different points in the wage distribution to analyze this issue, using quantile regression based on the ENE survey from 2003 (2nd quarter). Details of this exercise are discussed in Annex 3.F, with the main results presented in Annex Table 3.F.1. Wages are compared across workers grouped by gender, education, experience, labor status, and location. Findings indicate that wages are by no means determined in the same way for high and low paid workers. For example, female workers are paid much less than males workers in the high end of the wage distribution relative to their peers in the low end of the distribution, and returns to lower levels of education are far smaller in the upper income quantiles than in the lower ones. While the detailed results are discussed in Annex 3.F, the main findings are as follows:

Having completed primary education contributes to better wages, and the premium increases rapidly with the level of education attainment. Better-educated individuals in rural Mexico earn much higher wages than their less-educated counterparts. In 2003, the association with the wage level of primary, lower secondary, upper secondary, tertiary, and technical education relative to no or incomplete primary education was positive at all quantiles, controlling

for other individual characteristics. Compared to the wages of non-educated workers and those with incomplete primary, median wages of workers with complete tertiary education were 168 percent higher; the comparable premium for secondary schooling was 58 percent.²⁶ Workers with complete technical education received a 71 percent higher return compared to peers with no complete education.

Returns across the wage distribution do not vary much for workers with complete upper secondary and tertiary education, i.e. workers in the low end of the income distribution are not being paid comparatively less than their peers in the high end. This would seem to indicate that: (1) there is no wide heterogeneity in the quality of education in rural areas across the wage distribution, and (2) the capacity of workers to convert their educational capital into higher earnings through labor market networks is similar for poorer and richer workers. Hence, poor people with education seem to benefit from good labor market connections to the same degree as richer people.

Workers with complete primary and lower secondary education face decreasing returns across the wage distribution, however: those at the low end are paid proportionally more than those at the high end, indicating that workers with the same level of education are not compensated equally. The very poorest (10th quantile) receive a wage premium from completing primary education of 29 percent, while the rich (90th quantile) receive only a 19 percent premium. In the case of lower secondary schooling, workers in the low end (10th quantile) obtain a premium of 52 percent, while workers in the top end (90th quantile), obtain only 30 percent. One possible explanation is that social networks that facilitate labor market connections operate better among the poorer than the richer segments of the rural labor force. Another is that these levels of schooling are more relevant for employers hiring workers at the low than at the high end of the wage distribution.

General experience –here proxied by the age of the worker– increases wages. We use two variables, age and age squared, to take into account possible non-linearities. We investigate two questions: (1) is experience important to explain wages? and (2) are returns to experience homogeneous across the population? The answer is yes to the first question and no to the second one. The impact of experience on wages is positive and increases until workers reach 49 years of age. Thereafter, the returns fall in all quantiles. One explanation may be that older workers adapt less easily than younger ones to new technologies or they are simply less productive because of their age. Returns to experience tend to fall as we move up the wage distribution, but the variation is not large.

Workers in the informal sector obtain a significantly lower pay after controlling for other variables. The negative impact of informality increases across the wage distribution; a worker in the 10th quantile has an 11 percent wage discount because of informality, whereas a worker in the 75th quantile has a discount of 16 percent. The informal sector generally provides lower quality jobs than the formal one. Since higher quality jobs may require more skills, the informal sector variable may be capturing skill differences not signaled by other variables included in the regression. The wage gap may also be due to lower productivity in the informal sector relative to the formal one not captured by education and experience.

The labor status of workers is another important determinant of wages. Looking at the median of the distribution, employers obtain the highest return: 66 percent, relative to the

²⁶ The percentage return is calculated as $(\exp(\text{coefficient estimate}) - 1) * 100$. All figures presented in the following paragraphs are percentage premiums thus calculated from the marginal coefficients in Table 3.F.1.

group “other workers”. For the richest (90th quantile), the premium gap is even larger: 103 percent. The self-employed, informal salaried and contract workers are systematically worse off. It is interesting that in the case of self-employed and contract workers the negative gap decreases sharply as we move up the wage distribution. Thus, richer self-employed and contract workers are not as penalized with respect to “other workers” as poorer ones. The opposite is the case with informal salaried workers.

Large inequalities persist in rural areas between men and women. Female wages are significantly different from male wages at all quantiles. Results also suggest that the gender gap is homogeneous across quantiles for women without children (married and single), but heterogeneous across quantiles for women with children (married and single). Married women with children experience the largest wage gap at the low end of the distribution; they obtain 36 percent lower wages than their male peers in the 10th quantile, with the gap narrowing along the distribution to reach 28 percent at the 90th quantile.

Workers in disperse rural areas are paid significantly less than workers in semi-urban rural areas, after controlling for other factors. The semi-urban –disperse rural wage gap is significantly different from zero for all quantiles and varies across the wage distribution. It increases from the 10th to the 50th quantile and declines from the 50th to the 90th. The semi-urban premium is 12 percent for the median worker. One possible explanation for this gap is that prices, for example that of urban land, are higher in semi-urban areas, and hence the higher wage is a compensation for this — a reflection of the fact that semi-urban workers have a labor supply curve above that of disperse rural workers. Another possible explanation is that work opportunities, i.e. labor demand, are higher in semi-urban areas, pushing up wages.

All regions with the exception of the *Golfo* and *Sur* enjoy a wage premium with respect to the *Centro*, and this is consistent across the whole distribution (except for the *Sur*). The *Norte*, *Capital* and *Pacífico* regions have the highest premiums. Workers in the *Sur* region have an advantage over their peers in the *Centro* (but not over those in other regions) in the bottom part of the distribution, which they soon lose as we move up to higher quantiles.

THE RURAL NON-FARM ECONOMY

The Growing Importance of the Rural Non-Farm Economy

The rural non-farm (RNF) sector is extremely important for income, employment and poverty reduction in Mexico. The significance of RNF activities is being increasingly recognized in the development literature and in applied programs.²⁷ In the traditional view of the growth process, the sector is expected to shrink with economic development, as urban manufactured goods and service provision substitute for low quality traditional local products and services in the clothing industry, shoe manufacturing, housewares, construction materials, local finance, local communication services and many others. With economic development, the countryside was supposed to specialize in primary activities where its comparative advantage lied. The opposite, however, has been the case. Today’s advanced countries have highly diversified rural areas, with agriculture as only one of many economic activities. Also, RNF incomes and employment have expanded rapidly in low and middle income countries. In Latin America, in the mid to late 1990s, RNF incomes accounted on average for some 40 percent of rural incomes (Reardon, Berdegúe and Escobar, 2001).

²⁷ See Lanjouw and Lanjow (2001) and Reardon, Berdegúe and Escobar (2001) for two recent surveys.

Four reasons why the RNF sector should be given policy attention have been put forward by Lanjouw and Lanjow (2001): first, because of its potential to absorb a growing rural labor force; second, because it can slow down rural-urban migration; third, because of its contribution to national economic growth; and finally because it can promote a more equitable distribution of income. Yet, it must be remembered that the RNF sector is very complex and heterogeneous and offers very different opportunities depending on its structure (Box 3.1). In this section, we first examine available data on the importance of RNF employment and income in Mexico, and move then to examine the correlates of the participation of Mexican rural household in RNF activities, and the type of activities in which they participate.

Box 3.1. Heterogeneous Rural Non-Farm Activities

The RNF sector is a complex and heterogeneous one. This is logical given its negative definition, which embraces all economic activities taking place in rural areas different from agriculture. There are, hence, many different RNF occupations with varying productivities and returns to labor. There are also different barriers to entry to RNF activities in the form of the education, skills, and financial or other assets that may be required. Easy to access activities, like petty commerce, are much more competitive and have much lower returns than better-protected ones.

For empirical purposes, some authors distinguish two broad types of activities, which we can refer to as “low return” and “high return” occupations (see for instance Lanjouw, 1999, for the case of Ecuador, and Ferreira and Lanjouw, 2001, for Northeast Brazil). Poor households in poor areas are normally involved in “low return” RNF occupations, which are in a way “the equivalent of ‘subsistence farming’ –low productivity, low wage, unstable, with low growth potential” (Reardon, Berdegúe and Escobar, 2001: 396). These occupations are a “refuge” for poor families with few or no farming assets. They do not offer a route to escape poverty but serve to complement income and make productive use of little tradable family labor, thus alleviating poverty and diversifying risks. They are, hence, useful to the poor.

In our analysis of ENIGH income data by occupations, we have distinguished between low return and high return occupations, using the assets poverty line as the cut off. Occupations providing average earnings below the poverty line are classified as “low return”, those above as “high return”.

EMPLOYMENT AND INCOME IN THE MEXICAN RNF SECTOR

RNF Employment

RNF activities now account for an important share of employment in rural areas. In 2003, about 44 percent of the rural working population declared non-agricultural activities as their primary source of employment. As already mentioned, these figures are likely to be highly conservative estimates of the importance of RNF activities because they do not take into account seasonality and do not consider secondary occupations. Also, the figures refer to a definition of rural as disperse areas. If we include semi-urban areas, the share of workers declaring non-farm activities as their primary occupation rises to 55 percent.

Growth in RNF activities from 1995 to 2003 has been rather general affecting most occupations but in particular construction, food processing and clothing in manufacturing, and within the services sector personal services, hotels and restaurants, and education (Annex Table 3.D.1). There are however some exceptions (beverages, tobacco products, footwear, printing, chemicals, plastic and rubber goods, metal goods, electronic goods, transport, communications,

and financial services), which are revealing because are occupations that tend to be of relatively good quality and demanding in skills.

RNF Income

We should make a distinction between income coming from RNF *occupations* in the form of wages or entrepreneurial earnings, and income from public and private *transfers*. Both are non-farm incomes and both have increased much in the rural areas of Mexico at the expense of farm incomes. The implications, however, are different: while the former can indicate a certain dynamism of the rural economy, the latter points to an expansion of private and public social protection systems in rural areas.

Table 3. 5. Income Shares in Rural Mexico^a, 1992 and 2002

Income Shares	1992		2002	
	All Households	Extreme Poor	All Households	Extreme Poor
Independent Farming	38.5	38.1	12.6	16.8
Agricultural Wage Labor	12.3	19.6	11.3	21.9
Sub-total Agriculture	50.8	57.7	23.8	38.7
Independent Non-Farm Activities	8.1	4.8	5.7	6.8
Non-Farm Wage Labor	20.4	15.9	36.1	17.2
High return	4.9	1.3	23.8	4.4
Low return	15.5	14.6	12.3	12.8
Transfers	8.0	6.0	16.5	25.4
Other Sources	12.6	15.5	17.8	11.9
Sub-total Non-Agriculture	49.2	42.3	76.2	61.3

^a Rural defined as localities of less than 2,500 residents.

Source: WB staff calculations based on ENIGH.

We look first at the composition of rural incomes in 2002. Our results, derived from ENIGH data, are rather consistent with those obtained by other authors from other data sources, e.g. Taylor, Yúnez-Naude and Cerón (2004), and de Janvry and Sadoulet (2001). The main findings can be summarized as follows:

- **Independent farming has little importance for the average rural household but** somewhat more importance for the extreme poor, amounting respectively to 12.6 and 16.8 percent of income (Table 3.5.).
- **While crop income and self-consumption are more relevant for the poor, other** farming activities (mostly livestock) are more relevant for the better off (Annex Table 3.G.6).
- **Agricultural wage labor is a significant source of income** (22 percent) for the extreme poor, second only in importance to transfers (Annex Table 3.G.6)
- **On average, agriculture accounts for 23.8 percent of income**, but its weight grows as we move down from the top to the bottom quintile where it accounts for 46.6 percent of income (Annex Table 3.G.6).
- **Income from RNF occupations is 41 percent of the total for the average** rural household, but considerably less (24 percent) for the poor. RNF entrepreneurial incomes are small compared to RNF employment incomes.

- **High return occupations are a major source of income in general**, more than low return ones, but the latter are of more significance to the poor.
- **Wage income (from farm and non-farm occupations) accounts for 47.4 percent** of the income of the average household and 39.1 percent of the income of the extreme poor. The figure for the extreme poor is lower because of their higher dependence on transfers and independent farm income, and because the figure for the average rural household is inflated by the high wage income earned by comparatively richer households in RNF high return occupations.
- **Transfers, both public and private, are a significant source of income** in general in rural areas, and they are crucial for the poor, amounting to 25 percent of their earnings. *Progresa* and *Procampo* alone account for 15 percent of the income of the extreme rural poor.
- **The significance of remittances grows as we move up the distribution** ladder, whereas that of other private transfers diminishes slightly. In general, remittances are more relevant for the non-poor while other private transfers are more relevant for the poor.

Even among landowning households, the greater share of income is derived from non-agricultural activities. The 1994 and 1997 *ejido* surveys have been used to calculate income shares by several authors. They have the advantage of allowing the breaking down income composition figures by size of family holding (reduced to rain-fed equivalents). In examining these figures we must bear in mind that they refer only to *ejido* households, i.e. households who by definition have access to land, given to them by the agrarian reform. As seen in Table 3.6, even in this sample of land-endowed households, the share of agricultural income for the average household is less than half, and is less than 30 percent for households with 5 hectare or less. The importance of agricultural incomes increases with the size of holdings. Wage income accounts for more than 30 percent of income for all households with less than 10 hectare, and its importance decreases with land size.

Table 3.6. Mexico: Sources of Income in the *Ejido* Sector by Farm Size, 1997

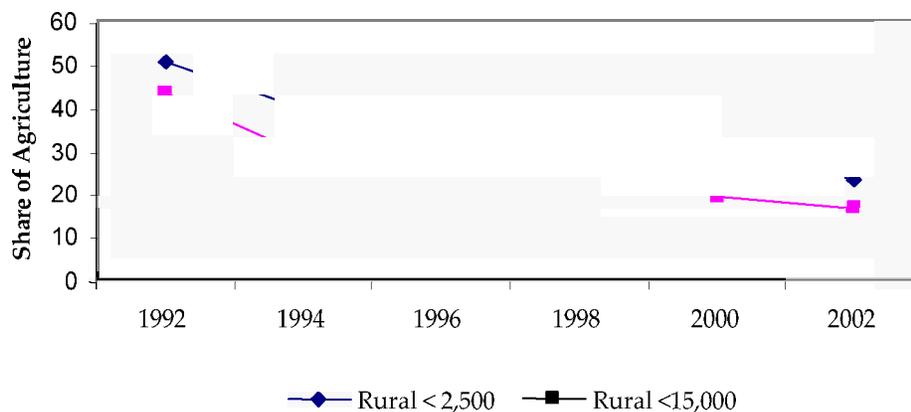
Farm Size ^a	All	<2	2-5	5-10	10-18	>18
Total Income in Pesos	25,953	12,474	17,314	28,368	30,564	44,255
Income Shares (%)						
Total Farm Income	45.1	22.9	28.1	41.8	50.3	62.0
Total off farm income	54.9	77.1	71.9	58.2	49.7	38.0
Wages	24.6	40.3	36.9	30.4	18.2	11.1
Agricultural wages	4.8	10.0	7.5	4.2	5.7	1.2
Non-agricultural wages	19.9	30.3	29.4	26.2	12.5	9.9
Self-employment	9.4	17.1	14.2	4.6	12.1	6.8
Remittances	6.5	2.6	5.4	8.9	6.0	6.0
Other	14.4	17.1	15.3	14.3	13.3	14.1

Source: De Janvry and Sadoulet (2001: 469), based on the 1997 *ejido* survey. ^a Size in rain-fed equivalent hectares.

As expected, the wider the definition of rural area, the lesser the importance of agricultural incomes. We show this in Figure 3.9. where the evolution of the share of agriculture in total income from 1992 to 2002 is shown for our two definitions of rural. Both shares follow the same pattern, but that corresponding to a wider definition of rural is always below. In 2002,

the share of agriculture using a wide definition of rural was 17.1 percent (including both wage and independent farming incomes), 6.7 points below the share corresponding to the more restricted definition.

Figure 3.9. Participation of Agriculture in Family Income According to the Definition of Rural



Source: WB staff calculations based on ENIGH 1992-2002.

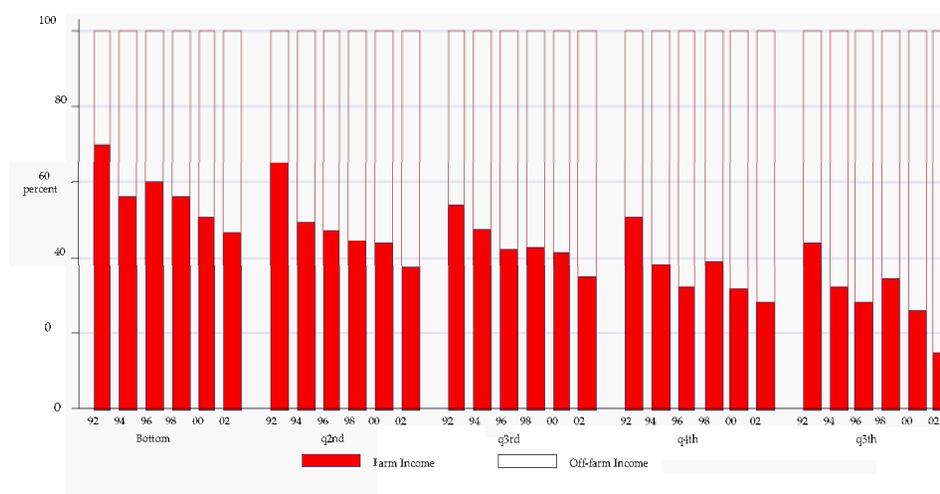
Regional differences matter too (see Annex Tables 3.G.7 and 3.G.8). Thus, agriculture is much more important in the *Sur* (41.2 percent) than in other regions, including both wage employment and independent farming, and less important in the *Pacifico* (12.4 percent). Domestic private transfers are similar across regions but remittances are much more important in the *Sur* and *Centro-Norte*. There is a difference however between these two regions. The relevance of remittances in the former region is due to the high migration to the USA of *Centro-Norte* population. Instead, migration from the *Sur* to the USA is not as large as from other regions, but the impact of remittances on income is significant in view of the low incomes prevailing in that region. RNF enterprises are important in the *Sur*, *Centro-Norte* and *Pacifico*, and high return RNF occupations are particularly important in the *Pacifico*.

We look now at the trends in income shares between 1992 and 2002, which are shown in Table 3.6, Annex 3.G. and Figures 3.9 and 3.10. The main findings can be summarized as follows:

- **A substantial increase in the weight of the RNF sector in relation to the farm sector.** Thus, the share of agricultural income fell from 50.8 to 38.7 percent between 1992 and 2002 (43.9 to 23.8 percent for a wide definition of rural). The increase was also significant but less marked for the rural poor.
- **A substantial increase of wage incomes (farm and non-farm) relative to independent or entrepreneurial incomes (farm and non-farm).** The share of wage income increased from 32.7 in 1992 to 47.4 percent in 2002 (34.8 to 48.2 percent for a wide definition of rural). The increase was not as important for the poor because they participate little in the opening of high return RNF wage earning opportunities.

- **A substantial increase of public and private transfers relative to earned incomes.** The share of all transfers increased from 8.0 to 16.5 percent (6.6 to 15.6 percent for a wide definition of rural). The increase was particularly marked for the rural poor for whom transfers increased more than fourfold.
- **A substantial increase in wage and salary earnings from high return occupations** relative to those from low return ones. The share of earnings from high return RNF occupations increased from 4.9 to 23.8 percent. This expansion hardly reached the poor, however, for whom the share passed from 1.3 percent in 1992 to 4.4 percent in 2002.²⁸

Figure 3.10.: Rural Income Composition by Quintiles in Mexico, 1992-2002



Source: WB staff calculations based on ENIGH 1992 to 2002.

Shares do not tell the whole story of income changes. We also need to look at absolute values. We do that in Table 3.7, where we present both absolute values and shares of different sources of rural family incomes broken down by consumption quintiles. We observe that while the share of independent farming income falls rapidly as we move from the 1st to the 5th quintile, the value of income increases. Hence, on average, rich rural dwellers obtain more income from independent farming than poor ones, but independent farming earnings mean much less to them as a proportion of all their operations. Agricultural wage labor incomes do not change a great deal across quintiles but the share falls rapidly as we move up the distribution ladder. Income from RNF low return occupations has similar importance for the poor and non-poor, being most important for the 3rd and 4th quintiles. The share, but not the absolute amount, falls to less than half for the 5th quintile. Finally, both the income and the share from high return RNF occupations grow much as we move to the upper quintiles but income grows more rapidly than the corresponding share.

²⁸ It is not possible from ENIGH data to establish if richer households have a higher percentage of high return RNF income because these occupations are monopolized by them or because access of poor households to these occupations made them able to graduate from poverty. Absence of suitable panel data prevents establishing this. Both things are probably true, but barriers to entry to high return occupations would lead to believe that it was the richer households who benefited most from them.

The development of the RNF sector opens economic opportunities to the rural population. But who grasps those opportunities, and do they have an equalizing effect or not?²⁹ On the basis of the *ejido* sample, de Janvry and Sadoulet (2001) conclude that agriculture is the main source of inequality in the *ejidos*, and that access to RNF employment has an equalizing impact. Reardon *et al* (2000) suggest that the effect of the RNF economy on equity depends much on the circumstances, and that in general in Latin America it has an equalizing effect, whereas the opposite is the case in Africa. Araujo (2003: 3rd essay) using municipal-level manufacture and service data, along with poverty indicators drawn from the 1990 and 2000 population censuses, finds that rural manufacture and service development tended to decrease Mexico rural poverty in the 1990s.

**Table 3.7. Rural Farm and Off-farm Occupation Income
by Consumption Quintile and Poverty Condition, Mexico, 2002**

	<i>All Househ.</i>	<i>Consumption Quintiles</i>					<i>Extreme Non Poor Poor</i>	
		<i>Bottom</i>	<i>2nd</i>	<i>3rd</i>	<i>4th</i>	<i>5th</i>		
<i>Total Income (2002 MxP/year)</i>	37,263	11,181	18,136	25,256	33,837	97,990	11,884	51,256
INDEPENDENT FARMING								
Income (MxP)	4,695	2,068	2,684	3,536	4,331	10,779	1,997	6,048
Share (%)	12.6	18.5	14.8	14.0	12.8	11.0	16.8	11.8
<i>Agriculture Wage Labor Income</i>								
Income (MxP)	4,211	3,142	4,026	5,177	5,177	3,724	2,603	4,921
Share (%)	11.3	28.1	22.2	20.5	15.3	3.8	21.9	9.6
<i>RNF High Return Wage Income</i>								
Income (MxP)	8,869	313	1,505	2,803	4,771	34,688	523	13,839
Share (%)	23.8	2.8	8.3	11.1	14.1	35.4	4.4	27.0
<i>RNF Low Return Wage Income</i>								
Income (MxP)	4,583	1,286	2,612	4,243	6,429	8,427	1,521	6,253
Share (%)	12.3	11.5	14.4	16.8	19.0	8.6	12.8	12.2
<i>RNF Entrepreneurial Income</i>								
Income (MxP)	2,124	481	1,088	1,919	2,267	4,900	808	2,819
Share (%)	5.7	4.3	6.0	7.6	6.7	5.0	6.8	5.5
<i>Other Income Sources</i>								
Income (MxP)	12,781	3,891	6,221	7,577	10,862	35,472	4,433	17,376
Share (%)	34.3	34.8	34.3	30.0	32.1	36.2	37.3	33.9

Source: WN staff calculations from ENIGH 2002.

What can we say on this subject in the light of the figures presented above?

Rural poor families seem to have benefited from the opportunities opened by the RNF economy. We do not know, however, if these opportunities were taken up because of the fall in other sources of income, thus substituting for them, or were an addition to these sources. If they were not additional, the conclusion is that they did not serve to reduce poverty. Looking,

²⁹ To give a proper answer we would need to carry out a counterfactual analysis of what would have happened to rural poverty and equity in the absence of RNF growth or with a different type of BNF growth. This type of counterfactual analysis was carried out by Paes e Barros, de Carvalho, and Franco (2004) for Brazil, but we will not attempt it here.

however, at the figures and in the absence of a detailed analysis, it is reasonable to assume that there has been additionally, and that the impact on poverty has therefore been favorable.

High return RNF occupations seem to have been mostly taken up by the comparatively better off, although the poor have also participated in them to some extent. Hence, it is likely that the impact has not been equalizing, and the RNF sector has contributed in some measure to the worsening of the rural income distribution. Public and private transfers are a different case; they have definitely helped the poor more than other groups, and have therefore had an equalizing impact.

What Explains Participation in Rural Non-farm Employment?

We have carried out an exercise on the basis of the ENE 2003, 2nd quarter survey, using a Probit model, to determine the probability of individual involvement in non-farm activities as primary occupation, conditional on a range of personal, household and geographical characteristics. Regression results are discussed in detail in Annex 3.H. Because of limitations in the ENE survey, some important variables cannot be considered, including access to land, ethnicity, social networks, and physical infrastructure. The results from other studies using these variables are discussed in Annex 3.H, however. The main findings are summarized below.

- **Women have considerable higher probability than men to participate in RNF activities,** controlling for all other variables. This result holds for married and single women, with and without children, with marginal effects that are not very different among these groups of women. However, women have more limited access to high return occupations and remain confined mostly to low return ones. This does not change with marital status or having children.
- **Age, a proxy for experience, increases the probability of employment in high-return non-agricultural jobs.** The association is negative for low return ones. No evidence was found of the association declining at a certain age. Since this result is at odds with findings in other studies (see Annex 3.H), more research is needed to understand the age factor.
- **Involvement in the non-farm sector is significantly related to education levels.** As education levels rise, so does the probability of being employed in low return and high return occupations. The exception is university and technical education, which, not surprisingly, diminish the probability of engagement in low return RNF activities but increases that of participating in high return ones.³⁰
- **Workers living in disperse rural areas are less likely to be employed in RNF occupations than those living in semi-urban areas.**
- **Workers in high poverty regions are less likely to participate in RNF activities.** Regional differences in poverty levels are mirrored in regional patterns for RNF activities. Relative to those living in the *Centro* region, workers in the *Norte*, *Capital*, *Golfo*, and *Centro-Norte* regions are more likely to be employed in RNF activities. Instead, workers in the *Pacífico* and *Sur* are less likely to participate in the RNF economy than their peers in the *Centro*.

³⁰ It should be acknowledged that the exogeneity of education in these models can be questioned.

CONCLUSIONS AND POLICY IMPLICATIONS

The rural labor market is undergoing a rapid transformation. Labor force characteristics are changing as a result of better infrastructure, education and health services in rural areas, and a general process of social modernization. Agriculture is rapidly losing importance relative to the RNF sector. Wages are becoming the primary source of income for rural dwellers relative to independent entrepreneurial incomes. Public and private transfers have increased dramatically, having become crucial to the survival of the rural poor. Many new RNF occupations have become available in rural areas, although the best of these opportunities can be hypothesized to have been seized by the comparatively better off.³¹

Yet, productivity, employment, wages and income levels remain more or less stagnant. In spite of this structural transformation, the rural economy is not sufficiently dynamic. There is a cleavage between the dynamism of socio-demographic change in rural areas and their limited economic development. Rural employment has fallen by around half a million over the last eight years, notwithstanding population growth and higher women participation in the labor force—a worrying symptom of the effects of the migration process and the paucity of employment opportunities. The latter is also evidenced by the stagnation of rural salaries over the same period. The rural poor, hence, increasingly rely on outside assistance in the form of private and public cash transfers to cover many of their basic needs,

The demographic changes and those in the characteristics of the labor force reflect a rural society in profound transformation—a view reinforced by the increasing extent of migration, and the modification of rural income composition with a substantial rise in non-farm earnings. We have to put these trends in the context of the little encouraging figures on the incidence of rural poverty, the modest performance of agriculture, and the increase in transfer incomes. The picture that emerges is one of a rural society which experiences the impact of social modernization and market exposure but has not yet found a firm way to sustainable economic development.

A comprehensive vision of rural development beyond sectoral approaches is forming in Mexico. The rural world is not an agricultural world, and the rural economy is not an agricultural economy; indeed, the combination of economic activities is the dominant characteristic of rural households and communities in contemporary Mexico. Fortunately, there is a trend in Mexico, both in the public sphere and in civil society, in favor of a more comprehensive view of the rural world, evidenced for instance in the *Ley de Desarrollo Rural Sustentable*. The challenge is how to transform this into full policy reality, including appropriate changes in the institutional set up.

Rural policy could benefit greatly by moving from the farm to the family as the unit of analysis for rural development and the receiver of rural policy interventions. Given the various occupations of rural households and their combined sources of income, the family economy becomes a clearer choice of focus than the farm economy. This would also remove the

³¹ It is worth repeating here the warning regarding causality problems. We do not know if better off households seized these opportunities or households lucky to profit from them became better off. Two considerations offer some comfort, however, for believing that the dominant causation runs from income position to high return RNF employment. The first is that variables like education, age, location, and ethnicity, positively correlated with high return RNF employment, are negatively correlated with poverty. The second is that it is reasonable to expect comparatively better off households to have access to assets that help overcoming the barriers to entry into high return occupations.

dichotomy between “viable farms”, typically the focus of production-oriented programs, and “non-viable farms”, generally supposed to be targeted by “social” policy and relief programs. Instead, more modern visions look at the continuum of farms going from the very small to the large, recognize common interests and possibilities of economic and corporate co-operation between farms of different sizes through contract systems, chain arrangements, joint ventures and other means, and acknowledge that small farmers can reap most of the relevant economies of scale from association and the use of competitive rental markets for indivisible inputs. This approach helps placing economic factors and programs and not only “social” and relief programs at the core of poverty reduction.

Secondary education has been repeatedly found to be strongly linked to participation in the RNF economy, and also to enhance the income obtained from a variety of occupations. This is one more reason to expand the coverage and quality of secondary education in rural areas, in particular for those who are falling behind, like indigenous groups and residents of remote areas. Quality is probably as important or more than coverage if we want to increase the impact of education. Raising education is not enough, however; it is the synergy of knowledge with other productive assets that raises incomes (see De Ferranti *et al*, 2002).

Infrastructure and location characteristics are other important correlates of RNF participation where policy can intervene. Road connections, communications, and energy have been shown to be important for the development of the RNF economy, and of manufactures in particular. Disperse rural areas are systematically associated with lower incomes and employment opportunities, and proximity to urban centers favors RNF development. This is another reason why raising the low levels of investment in rural infrastructure (see chapter 4) could pay off. Population dispersion and proximity to urban centers are long-term undertakings from a policy perspective. But much could be gained from a spatial policy that favor the concentration of investment and services, the development of rural towns and intermediate cities, and the establishment of links between these and their rural hinterlands. The decision for instance of the *Microrregiones* strategy to concentrate investments in some localities to help them become centers of local development, is an encouraging step in that direction.

Rural poor workers need help to overcome barriers to entry to RNF occupations, especially lack of skills and financial assets. Vocational training is a need which could receive more attention. There is a tradition of technical agricultural schools in Mexico, like the CBTAs, but there are not enough comprehensive medium-level polytechnic training centers in rural areas with a modern vision for the provision of vocational training. This is a field with important potential for policy intervention. The promotion of rural finance is recommended in several parts of this study, which is logical in view of the multiple functions of finance in rural development and poverty reduction. Micro-finance institutions have proven in many countries their capacity to promote the growth of micro and small enterprises and help the poor getting started in business. Promoting RNF activities is hence one more reason to advocate for policies to expand the rural finance system and make it friendly to the poor.

Finally, the inherent heterogeneity of the RNF sector would favor a policy approach focused on decentralization through territorial development. A territorial approach to rural development would simplify the implementation of policies to stimulate the RNF economy and would make the specific programs more relevant to the local context. Like in the case of rural finance, we advocate in several parts of this study in favor of a territorial approach to rural development. The reason is that this approach is a policy framework where the many facets of rural development can best be tackled. We summarize in Annex 3.I the characteristics of the territorial approach.

Pursuing RNF growth should not be seen as an impediment or an alternative to pursuing agricultural development; there are strong synergies between the farm and non-farm sectors. In signaling the importance of the RNF sector and advocating more policy focus on the non-farm economy, we do not intend to diminish the importance of agricultural development. There is no contradiction between the development of the farm and non-farm sectors (see Lanjouw and Lanjouw, 2001, and Reardon, Berdegue and Escobar, 2001). The synergies are examined in chapter 4. What is needed is a comprehensive rural development policy where farm and non-farm can find their place and their connections be recognized.

4. AGRICULTURE, POVERTY AND THE SMALL FARMER

This chapter takes a closer look at the agricultural sector to examine what has been and what could be its role in reducing rural poverty.

The main findings of the chapter can be summarized as follows:

- **There is evidence for the case of Mexico that agricultural growth is pro-poor.** The impact is stronger for the worst poverty conditions and is mostly confined to rural poverty.
- **Agriculture experienced modest growth in the 1980s and 1990s of around 1.5 percent per year in each decade, below national growth and population growth.** Output of food crops grew more, at around 2.2 percent in 1980-02, mostly as a result of some improvement in the yield of individual crops and a change of crop mix in favor of higher value crops. Aggregate land expansion did not contribute to output growth due to the exhaustion of the crop land frontier.
- **Agricultural growth was higher in the northern states where agriculture is more commercial, in irrigated lands where commercial farming concentrates, and in the more commercial crops.**
- **Land and labor productivity rose in the 1990s at a rate above 2 percent, and total factor productivity also grew.** However, by international standards, land and labor productivity are low in Mexico, and the gap to the nonagricultural sector is high.
- **Federal government expenditure in rural development is high by international standards.** Social and productive development are the major expenditure areas, while infrastructure and environmental expending are small.
- **Value added per hectare does not increase with farm size, suggesting that land is more productive in small farms.**
- **Access to variable capital, which includes seeds, fertilizer and chemical inputs, is the main factor explaining output in the small farm sector, while labor contribution to output is comparatively small at the margin.** Credit restrictions; however, appear to prevent small farmers from using optimum quantities of inputs.
- **There is no evidence of economies of scale in farm production but there is evidence of substantial inefficiency in farming.**
- **Farmers producing more commercial crops are comparatively more efficient than others.**

The main policy implications deriving from the above findings are:

- **The exhaustion of the land frontier and the comparatively low levels of land and labor productivity in agriculture point to agricultural intensification as the thrust of agricultural policy to increase output and incomes.** This puts focus on how to improve varieties, switch crops, increase yields and reduce the incidence of natural shocks.
- **Poorer farmers need special assistance to move from low to high value crops.** An important element would be the presence of extensive and well functioning research and extension and rural finance systems. These systems are also essential to raise crop yields, which is the other component of intensification.
- **Small farmers tend to face more market failures and need to have services** like research, extension, and rural finance tailored to their needs.
- **While federal government expenditure on agriculture is high, reflecting the importance traditionally given by Mexican governments to rural areas, its efficiency and effectiveness is called into question by the weak historical performance of the sector.**

THE ROLE OF AGRICULTURE IN POVERTY REDUCTION IN MEXICO

Agricultural growth can affect poverty through several mechanisms: (i) higher output of poor farmers, (ii) higher wages for unskilled labor, (iii) indirect demand for rural non-farm activities, (iv) lower food prices, and (v) inter-industry linkages, both upstream, e.g. fertilizers and machines, and downstream, e.g. food-processing industries. Whether agricultural growth is actually poverty reducing will depend on how and where growth takes place.³² This is discussed in Box 4.1.

Box 4.1. How Can Agricultural Growth Help Alleviate Poverty?

Agricultural growth can affect poverty in both urban and rural areas through a wage effect, a production effect, a RNF multiplier effect, a food price effect, and an inter-industry linkages effect (López, 2002).

The wage effect is due to the fact that, because of the high labor mobility observed in many countries, agricultural labor markets are strong determinants of the wage rate for unskilled labor throughout the economy. Agricultural development is likely to raise agricultural wages, and this will translate into higher wages in other parts of the economy. The impact will depend on the distribution of agricultural assets, the existence or not of surplus labor in agriculture, and the way growth came about. If growth resulted from improvements in average labor productivity in the semi-subsistence sector, the wage rate effect may be strong. If, instead, growth originated in the plantation sector and was not accompanied by increased labor demand (or surplus agricultural labor was enough to meet the increased demand), the impact would be small or nil. We can even imagine a negative wage effect, for instance if agricultural growth was the result of widespread labor saving innovations (see, e.g. Arrighi, 1967, who discusses the case of colonial Rhodesia).

³² The role of agriculture in economic development and the connection between agricultural growth and poverty reduction have been discussed for a long time in the literature. See, for instance, Rao and Caballero (1990) for the first theme and Mellor and Desai (1985) for the second. A recent review of issues and literature can be seen in Mellor (2000).

The direct production effect is simply the result of growth itself. If growth originated in the small farm sector, through for instance irrigation, improved technology, better prices or new crops, the outcome will be increased by real incomes in this sector with a direct effect on poverty. If, instead, larger farmers were the main actors involved, the poverty impact may be small or nil. It could be negative, if increased output generated by large farmers displaced from markets that of poor farmers.

The RNF multiplier effect consists of the impact of agricultural growth in the RNF economy (see e.g. Mellor, 1976). The relation refers not only to intermediate links, like the increase in farmers' demand for local transport and marketing services when production grows, but also to final consumption and investment demand, like the increase in the demand for entertainment services or housing or agricultural works when there are bumper crops or particularly good prices. To the extent that the rural poor are engaged in the production of RNF goods and services, they will benefit from expanded demand. The impact, however, depends on whether the incremental demand concentrates on tradable or non-tradable items, on the existence of spare capacity in the RNF economy, and on the degree and type of involvement of the poor in the RNF economy. Differences in these conditions have been shown to result in different outcomes (e.g. research on Indian villages by Foster and Rosenzweig, 2003)

The food price effect results from the fall of food prices that may follow increased agricultural production. Lower food prices raise wages and other incomes in real terms throughout the economy, thus reducing poverty. The effect, however, will depend on the openness of the economy, and on whether production increases center on tradable or non-tradable agricultural items. It will also depend on demand elasticities and on how badly hit are poor farmers by price falls. Falling prices could deteriorate poverty conditions in the rural sector if the increased output is generated by rich farmers, who could collect higher revenues even with lower prices, while poor ones receive lower prices for their stagnant output.

We finally have the inter-industry linkage effect, which refers to the incentive that agricultural growth generates in upstream and downstream-connected industries. The incentive operates via prices and quantities, and depends on how open is the economy, how tradable are the sectors where incremental demand concentrates, if there is or not excess capacity in those sectors, and how good is economic coordination along the value chains. The impact on poverty of this effect will mostly work through the labor market, and will depend on what happens to labor demand and the wage rate of unskilled workers when production expands in the industries stimulated by agricultural growth.

Hence, although there is a good possibility that agricultural growth reduce rural and urban poverty, there is no certainty that this will occur. In countries with a very unequal distribution of agricultural assets, especially land ownership, agricultural growth is most likely to concentrate on the middle and large farming sectors without benefit to the poor who may even end up being worst off. Indeed, research suggests that an agriculture-biased growth pattern directly reduces poverty but indirectly raises inequality due to the unequal distribution of land assets (De Janvry and Sadoulet, 1996).³³ In a dual agricultural economy the question of which sector is the main actor of agricultural growth is of great importance for poverty reduction. The direct production effect and the wage effect will be bigger if the small farm sector is the leading actor. The RNF multiplier effect is also likely to be bigger, for it is reasonable to assume that an increase in incomes would translate into larger local demand if it originated in the small farm sector. The fall in food prices that may accompany expanded production would be less consequential to small producers if they were the ones to generate the incremental output. Inter-industrial effects may not be very different if agricultural expansion is led by small or large farmers except that if led by the

³³ De Janvry and Sadoulet (1996) examine the evolution of Latin American countries between 1970 and 1994 showing that an agriculture-biased growth pattern directly reduces poverty but indirectly raises inequality due to the unequal distribution of land assets. This may lead to an increase in rural poverty as a combined result of both effects.

latter there may be more leakages to imports because of the type of technology they use and the markets in which they operate.

The impact of agricultural growth on poverty has been empirically examined in Mexico by Soloaga and Torres (2003) in the framework of the FAO ROA project.³⁴ Following the approach used for Ravallion and Datt (1996) for India, and using ENIGH data for 1992 through 2000, the authors analyze the impact of agricultural and non-agricultural growth on total, urban and rural poverty. They estimate poverty elasticities to growth using state- and region-level data for both the extreme and moderate poor as well as the impact of both types of growth on distributional equity in rural and urban areas. Using ENE data the authors also estimate the impact of agricultural and non-agricultural growth on labor demand to see if there was some wage effect. They finally check for the existence of a food price effect.³⁵

Both agricultural and non-agricultural growth have a substantial and statistically significant impact on the reduction of total poverty, both extreme and moderate, but the effect of agricultural growth is stronger (Table 4.1). The impact on total poverty of the two types of growth occurs through their separate effects on urban and rural poverty, since the cross effects are not significant. Thus, agricultural growth promotes poverty reduction in rural areas while non-agricultural growth promotes poverty reduction in urban areas.³⁶ A one percent increase of agricultural GDP decreases extreme rural poverty by 1.5 percent and moderate rural poverty by 0.8 percent. Similarly, an increase of 1 percent in non-agricultural GDP reduces extreme urban poverty by 1.6 percent and moderate urban poverty by 0.7 percent. The elasticities shown in the table refer to the poverty headcount or FGT(0). Other measures of poverty, like the poverty gap FGT(1) or the squared poverty gap FGT(2), not shown in the table but also examined by the authors, verify that agricultural growth has higher impact than non-agricultural growth on the poorest population sectors.³⁷ There is variation in the regional impact of agricultural growth, which is related to the share of population in rural areas. Thus, the more rural regions (*Sur, Golfo, Centro-Norte* and *Centro*) have higher elasticities than the more urban ones (*Norte, Capital* and *Pacífico*).

³⁴ The ROA (Roles of Agriculture) project is a study undertaken by FAO on the socioeconomic roles of agriculture in developing countries. It covered 11 countries, Mexico among them, and 5 areas of potential importance of agriculture outside the direct production of food and other agricultural goods. These areas are: environmental management, poverty reduction, buffering economic cycles and shocks, facilitating the viability of rural communities, and contributing to cultural traditions. The study was carried out between 2001 and 2003 (See <http://www.fao.org/es/ESA/Roa//default.htm>)

³⁵ Soloaga and Torres' approach consist of a reduced form equation with change in poverty rates in the left hand side and agriculture and non-agriculture growth rates on the right hand side. They use poverty rates and growth rates for the 32 Mexican states and 7 geographic regions as observations, and apply both OLS and instrumental variables. They use current consumption rather than income as the welfare variable to measure poverty. They use two-in-two year rates of growth from 1992 to 2000 from the national accounts for all the states and INEGI regions for ag and non-ag sectors from INEGI national accounts, and run these against the changes in poverty in the corresponding two years registered calculated from the ENIGHs.

³⁶ Unfortunately, available data does not allow separating growth in the rural and urban non-ag sector. Hence, Soloaga and Torres investigate the impact on poverty of *all* non ag growth. Given the very large dominance of the urban sector in non-ag growth, it is not surprising that the elasticity of rural poverty to non-ag growth is not significant. If the elasticity of rural poverty to *rural* non-ag growth could be computed it would probably be significant and possibly even larger in absolute value than that for ag growth.

³⁷ Thus, the value of the elasticities of the extreme poverty gap FGT(1) to rural growth is -1.7 for total poverty and -2.1 for rural poverty. The corresponding elasticities for the squared poverty gap FGT(2) are -2.1 and -1.1

Table 4.1 Poverty Elasticities of Agricultural and Non-Agricultural Growth in Mexico

Poverty and Growth Sector	Total	Urban	Rural
Extreme Poverty			
Agricultural Growth	-1.3	n.s.	-1.5
Non-Agricultural Growth	-0.9	-1.6	n.s.
<i>Moderate Poverty</i>			
Agricultural Growth	-0.6	n.s.	-0.8
Non-Agricultural Growth	-0.5	-0.7	n.s.

Only instrumental variables results reported.. n.s. indicates no significance.
Source: Soloaga and Torres (2003: Table 4).

Growth in rural consumption reduces inequality at the national level and also in urban areas but has no effect on rural inequality. The positive effect on urban inequality is probably linked to the positive impact of agricultural growth on the demand for unskilled labor. Soloaga and Torres run regression equations for the demand of skilled and unskilled labor with the growth of agricultural and non-agricultural output as arguments, controlling for wage levels and the rental price of capital. They obtain elasticities of unskilled labor demand of 0.6 for the growth of non-agricultural output and 0.2 for that of agricultural output. The elasticity of demand for skilled labor to non-agricultural growth is 0.9 while that to agricultural growth is not significant.

The real exchange rate has an impact on domestic food prices while agricultural growth does not, signaling the openness of the Mexican food economy. Soloaga and Torres check for the presence of a food price effect by regressing food prices on the growth rates of the agricultural and non agricultural sectors, controlling for variations in the real exchange rate. The results indicate that there is no food price effect. Instead, the real exchange rate shows a significant impact on domestic food prices.

In conclusion, we can say that there is good evidence of a positive effect of agricultural growth on poverty in Mexico. The pro-poor impact is stronger for the worst poverty conditions and is mostly confined to the rural sector itself. In view of the impact on poverty, the next question is how is Mexico's agricultural sector performing.

RECENT AGRICULTURAL PERFORMANCE IN MEXICO

Agricultural Value Added and Food Crop Output

Value Added

Agriculture has experienced modest growth over the past two decades, below that of the national average. In 1980-2003, agricultural growth rates have hovered around 1.5 percent per year, close to one percentage point less than national GDP. In per capita terms agricultural growth was negative, although it was positive but less than one percent if computed per capita of the rural population (Table 4.2).

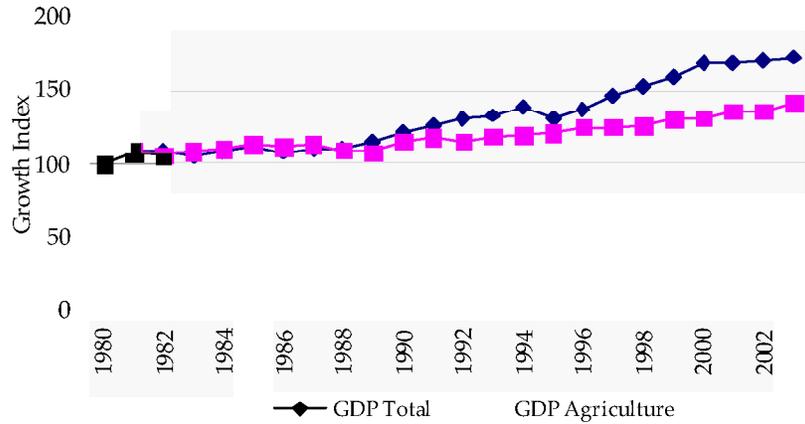
Table 4.2. Mexico: Growth Rates of Agriculture and Total GDP

Periods	Growth Rates (real GDP)			
	GDP	Ag GDP	GDP p.c.	Ag GDP p.c.
1980-91	2.08	1.45	0.00	-0.62
1991-03	2.67	1.55	1.00	-0.10

1980-03 2.39 1.50 0.52 -0.35

Source: WB staff calculations based on INEGI's National Accounts.

Figure 4.1. Indexes of Evolution of Total and Agriculture GDP in Real Terms (1988=100), Mexico, 1988-2002



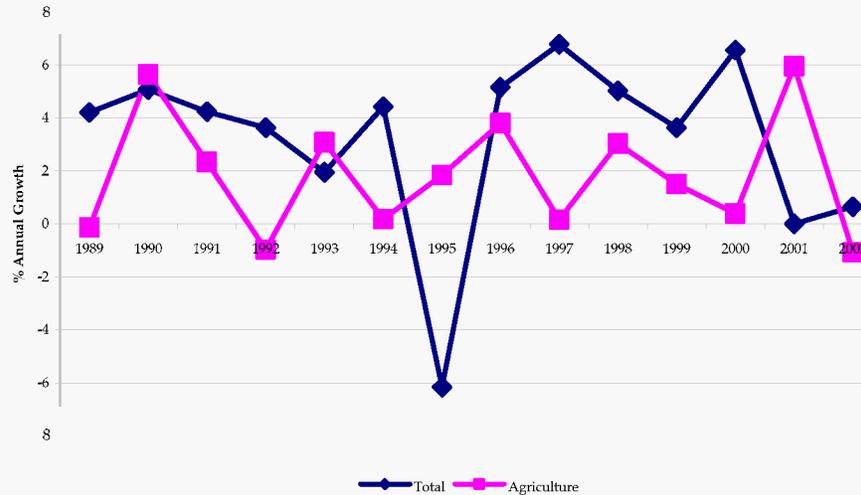
Source: WB staff calculations based on INEGI's National Accounts.

The agricultural and non-agricultural sectors grew in parallel until 1989, when the non-agricultural economy started a faster growth trend (Figure 4.1). Performance was uneven, with “good years” like 1990, 93, 96 and 2001, when growth was above 3 percent, and “bad years”, like 89, 92, 94, 97, 2000 and 2002, when growth was close to zero or negative. The performance of the national economy was somewhat less volatile,³⁸ with a major event, the Tequila Crisis in 1995, and a less dramatic one, the 2002 recession (Figure 4.2). There was no correspondence between agricultural and non agricultural growth,³⁹ which was evident during the 1995 crisis, when agriculture grew at 2 percent.

³⁸ The coefficients of variation for the annual growth series are 123% for Ag GDP and 103% for GDP.

³⁹ The correlation coefficient of the two series is -0.1.

Figure 4.2. Mexico: Real Annual Growth Rates of Total and Agriculture GDP, Mexico 1981-2003



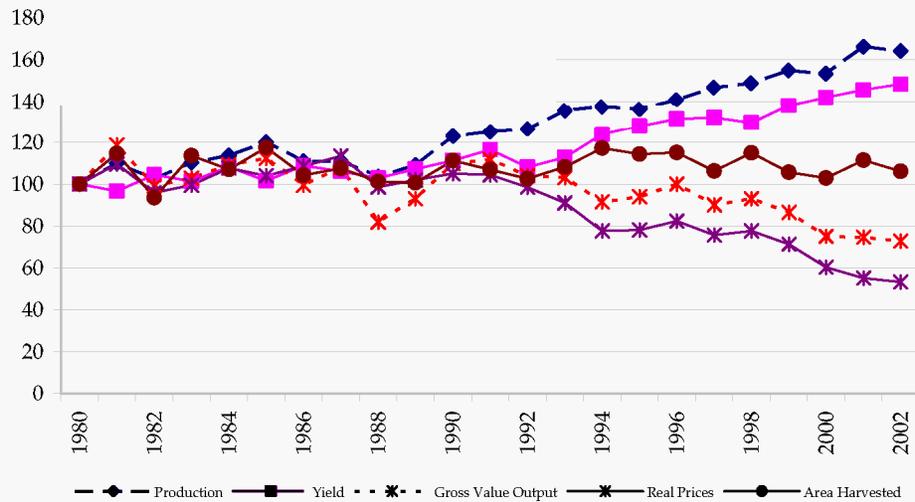
Source: WB staff calculations based on INEGI's National Accounts.

Food Crops

An increase in crop yields, partly due to a shift towards higher value crops compensated somewhat for a dramatic fall in real prices for food crop output. The harvested area increased little in the 80s and nothing in the 90s (Figure 4.3). This points to the exhaustion of the crop frontier in Mexico, a situation which conditions agricultural growth prospects. Real prices fell dramatically, especially in the 90s, largely as a consequence of the opening of the economy. Yields, however, increased; first at a modest rate of 1.4 percent during the 80s, and then at a stronger rate of 2.5 percent in the 90s, which may be interpreted as a positive response to the tightening of international competition. Yield increases were the result of modest and uneven improvements in the yields of individual crops, and of shifts from low to high value crops, particularly into vegetables and fruits, away from cereals and oil crops, with the consequent improvement of the crop mix.

More commercial crops and the irrigated sector provided most of the dynamism to the rural economy while rain-fed farming fell behind. The groups that experienced larger area expansion were vegetables and fruits, whereas oil crops and tubers decreased in area, especially the latter, and cereals remained stable (Table 4.3). Yield expansion was different, however, in irrigated and rain-fed areas, as shown in Figure 4.4. With some ups and downs, food crop yields in rain-fed areas increased in the 1990s somewhat, after being stagnant in the 80s. Yields in irrigated areas increased both in the 80s and 90s through the early 2000s with a particularly strong trend in the latter period. Thus, from 1991 to 2001 the yield index for irrigated production moved from 120 to 180 –a 50% increase, compared to a 23 percent increase for rainfed areas.

Figure 4.3. Agricultural Production, Yields, Area, Value of Food Crop Output, and Real Prices, Mexico 1980-2002. Indexes, 1980=100



Source: WB staff calculations based on SAGARPA agricultural database.

Table 4.3. Mexico: Harvested Area in 2002, and Area and Yield Growth Rates of Food Crop Groups in 1980-2002

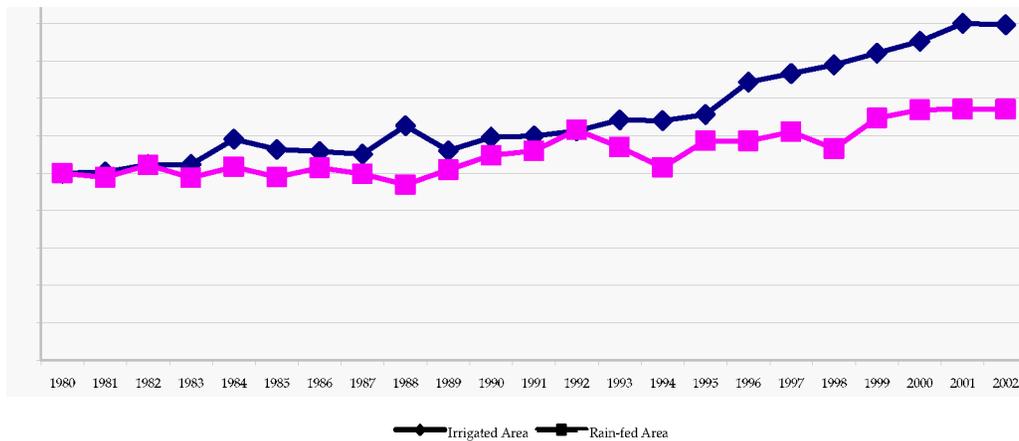
	Cereals	Oil Crops	Vegetables	Fruits	Tubers	Legumes
Area in 2002 (000 ha)	7,848	209	548	1,222	66	2,238
Growth Rates Area (%)						
1980-1991	0.5	-3.7	3.0	1.7	-0.8	2.1
1991-2002	-0.3	-9.1	2.4	2.6	1.4	0.5
1980-2002	0.1	-6.4	2.7	2.1	-1.0	1.3
Growth Rates Yields (%)						
1980-1991	1.2	3.3	2.2	0.3	1.99	0.9
1991-2002	2.1	-3.3	1.2	0.9	3.3	0.9
1980-2002	1.6	0.0	1.7	0.6	2.6	0.9

Source: WB staff calculations based on SAGARPA's agricultural database, SIACON.

Land productivity stagnated in the 1990s in poorer regions in the South Pacific.

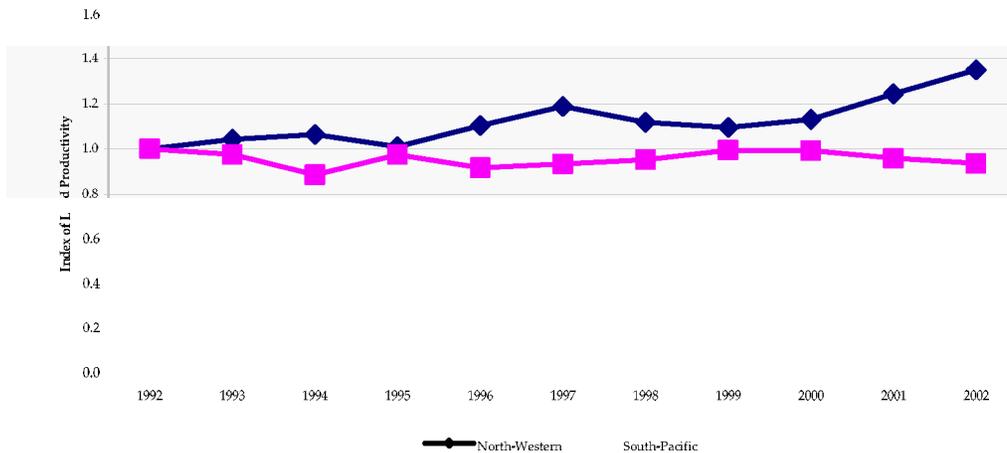
Figure 4.5 contrasts the evolution of land productivity in the North Western region (*Baja California Norte, Baja California Sur, Sinaloa and Sonora* states) and in the South Pacific region (*Guerrero, Oaxaca and Chiapas*). Land productivity increased in the North Western region, characterized by its modern commercial agriculture, while it remained stagnant in the South Pacific region, dominated by a more traditional and peasant type farming. Table 4.4 shows that growth rates for all types of crops were larger in irrigated lands. Not surprisingly, the highest growth rates corresponded to horticultural and fruits crops, which are characteristic of modern commercial farmers.

Figure 4. 4. Mexico: Evolution of Food Crop Yields in Irrigated and Rain-fed Areas. Indexes, 1980=100



Source: WB staff calculations based on SAGARPA’s agricultural dataset.

Figure 4. 5. Mexico: Evolution of a Land Productivity Index in the North Western and South Pacific Regions, 1992=100



Source: WB staff calculations based on SAGARPA’s agricultural database, SIACON.

No data is available on agricultural growth by type of farm that would allow us to show how different type of farming sectors performed during the decade examined. However, the evidence presented —higher agricultural growth in the northern states where agriculture is more commercial, in irrigated lands where commercial farming concentrates, and in the comparatively more commercial crops— points clearly to an uneven type of agricultural development. Thus, agricultural growth was not only modest but concentrated also mostly in the more commercial farming sector. The evidence points hence to an increase during the decade of the dualism characteristic of Mexican agriculture and corroborates the findings in chapter 3.

Table 4.4. Mexico: Annual Growth Rates of Output 1991-02 of Various Types of Crops in Irrigated Lands and All Lands

Growth Rate Output 91-02

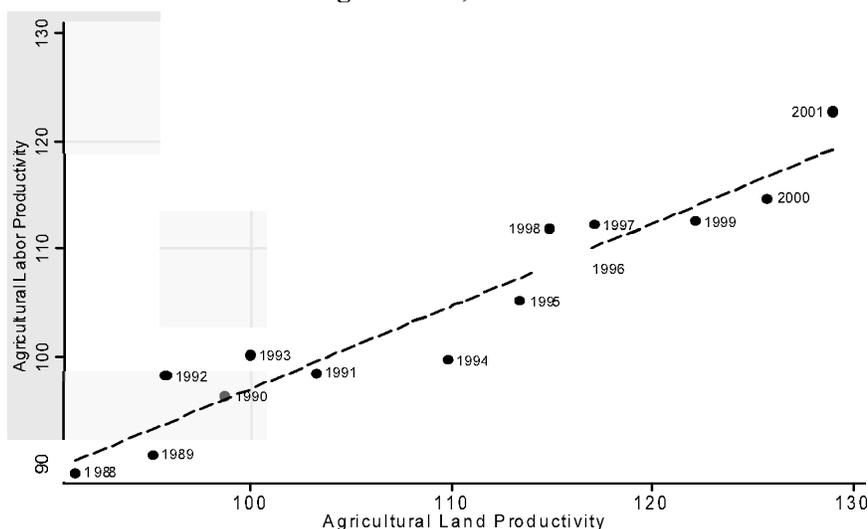
Type of Crop	Irrigated Lands	All Lands
Cereal Crops	2.1	1.9
Oil Crops	-18.7	-11.8
Horticultural Crops	3.7	3.5
Fruit Crops	4.5	0.5
Tubers	2.6	2.0
Legumes	2.9	1.4

Source: WB staff calculations based on SAGARPA's agricultural database, SIACON.

Agricultural Productivity

Land and labor productivity improved in the 1990s. In both cases, growth rates in the 1990s were above 2 percent, which can be considered a reasonable performance. As can be seen from Figure 4.6, the increase in the productivity of land was approximately one third larger than that of labor, indicating a certain land-bias in the technical change taking place.

Figure 4.6. Mexico: Evolution of Land and Labor Productivity in Agriculture, 1988 to 2001



Source: WB staff calculation based on FAO's AGROSTAT.

Land productivity in Mexico is modest in relation to that of comparable countries, however. With the exception of some crops, notably wheat, land productivity, i.e. yields, are fairly low in Mexico. As can be seen from Table 4.6 and Figures 4.7 and 4.8, Mexico is below the LAC yield average in maize and it is also below in the whole cereal group, notwithstanding its advantage in rice and specially wheat. Yields are also below the LAC average in coffee and citrus fruits, and above in sugarcane, cotton and vegetables. LAC averages are a modest standard, however, for a middle income country with a good proportion of land under irrigation, a long farming tradition, and, as we will see, plenty public investment in agriculture. Comparison with Argentina, Chile and Brazil is more appropriate and is not favorable to Mexico, particularly in the case of the first two countries.

Table 4.5 Crop Yields in Selected Countries, Average 2000-2002, (ton/hectare)

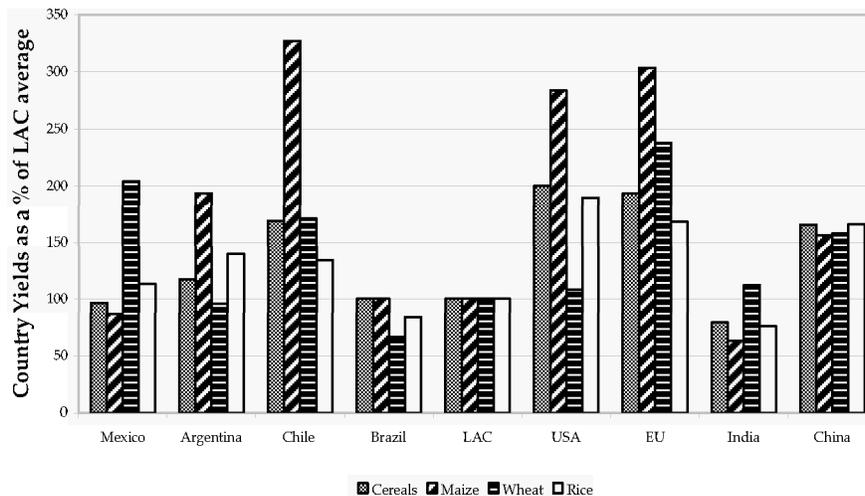
Mexico	Argentina	Chile	Brazil	LAC	USA	EU	India	China
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Cereals	2.8	3.4	4.9	2.9	2.9	5.8	5.6	2.3	4.8
Maize	2.6	5.8	9.8	3.0	3.0	8.5	9.1	1.9	4.7
Wheat	4.9	2.3	4.1	1.6	2.4	2.6	5.7	2.7	3.8
Rice	4.3	5.3	5.1	3.2	3.8	7.2	6.4	2.9	6.3
Sugar Cane	74.1	65.4	--	69.6	64.9	77.2	--	67.3	61.3
Cotton (Seed)	3.3	1.3	--	2.7	2.1	1.9	3.3	0.6	3.3
Coffee (Green)	0.4	--	--	0.9	0.8	--	--	1.0	--
Citrus	12.4	20.1	15.4	22.0	17.0	34.7	18.3	17.8	8.2
Pulses	0.8	1.1	1.6	0.7	0.8	1.9	2.7	0.6	1.4
Vegetables	16.5	17.2	25.6	17.9	14.9	27.1	26.7	12.9	19.2

Wheat is the only field crop where Mexico has shown to be able to produce at top technical levels, surpassing Chile, a country with plenty irrigation, good technology, and a strong wheat producing tradition. It also surpasses the USA and comes close to the EU yield.

Source: WB staff calculations based on FAO's AGROSTAT.

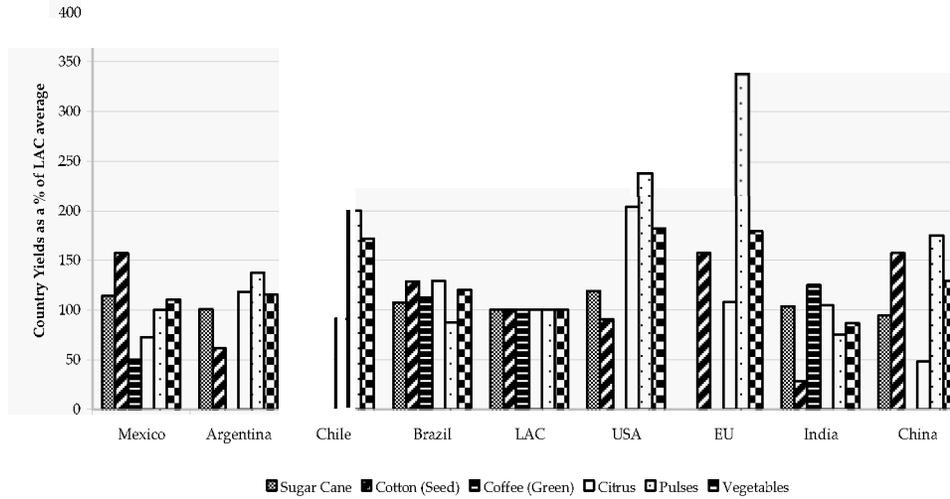
Figure 4.7 Comparative Cereal Yields as Percentage of LAC Average, Average Yields 2000-02



Source: WB staff calculations based on FAO's AGROSTAT.

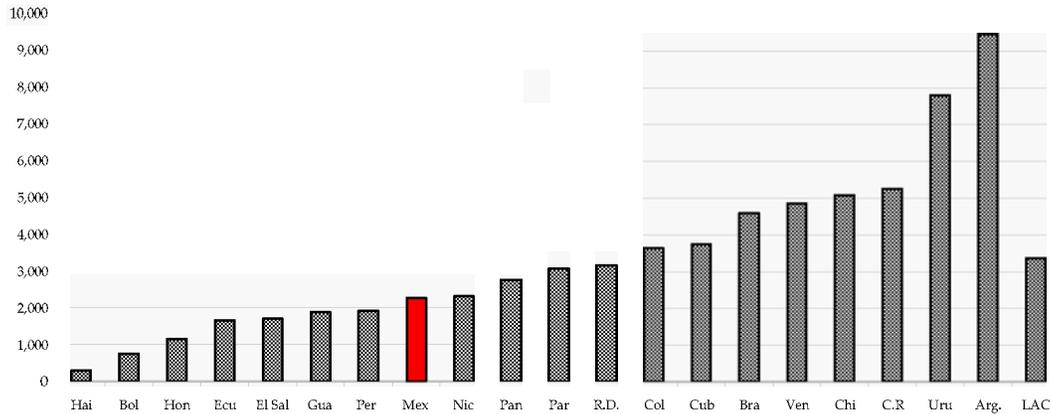
Labor productivity levels in Mexican agricultural sector have fallen behind and are below the average for LAC countries. Labor productivity is compared across LAC in Figures 4.9, 4.10 and 4.11. Not surprisingly, land-abundant countries like Argentina and Uruguay show the highest productivity, but other countries like Costa Rica and Chile, which are land-scarce, come next (Figure 4.9). Of the 20 countries reported, Mexico is in position 13, with a labor productivity of USD 2,265, which is one third below the LAC average of USD 3,368. Moreover, Mexico is not catching up *vis-à-vis* other countries in the 1990s, while countries like Peru and Nicaragua who have also low labor productivity in agriculture are closing the gap, and in countries like Costa Rica, Chile and Brazil, where labor productivity is already high, its growth rate is above the LAC trend (Figure 4.10).

Figure 4.8. Comparative Yields as Percentage of LAC Average, Various Crops, Average Yields 2000-02



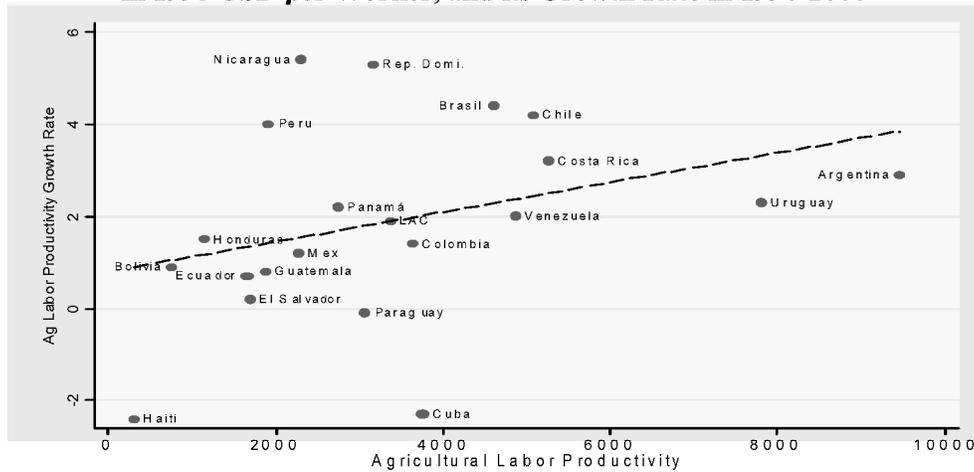
Source: WB staff calculations based on FAO's AGROSTAT.

Figure 4.9. Agricultural Labor Productivity^{1/} in LAC Countries in 2002 Measured in 1995 USD per Worker



Source: WB staff calculations based on CEPAL (for ag value added) and FAO (for ag labor force) data assembled by Dirven (2004). ^{1/} Defined as agricultural value added divided by the agricultural labor force and measured in US Dollars of 1995.

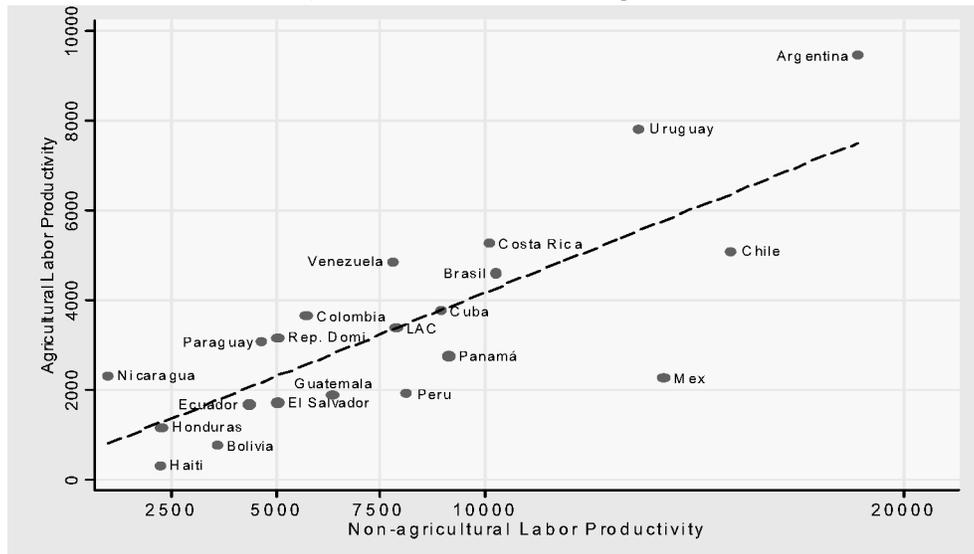
Figure 4.10. Labor Productivity in Agriculture in 2002 Measured in 1995 USD per Worker, and its Growth Rate in 1990-2000



Source: WB staff calculations based on CEPAL (for ag value added) and FAO (for ag labor force) assembled by Dirven (2004).

The gap between agricultural and non-agricultural labor productivity is particularly high in Mexico. In Figure 4.11, we compare labor productivity in agriculture and outside agriculture. In general, it is clear that all countries with the exception of Nicaragua have lower productivity in agriculture. In some countries, like Argentina and Uruguay, labor productivity is high in both sectors, although smaller in agriculture, whereas Mexico shows a marked difference between the high productivity of labor outside agriculture and its low productivity in agriculture.

Figure 4.11. Labor Productivity in Agriculture and Non-Agriculture in 2002, Measured in 1995 USD per Worker



Source: WB staff calculation prepared with data from CEPAL (for ag value added) and FAO (for ag labor force) assembled by Dirven (2004).

Mexico has lost momentum in agricultural efficiency. An increase in total factor productivity (TFP) signals efficiency improvements in the use of inputs (land, labor and capital)

due to better technology, better entrepreneurship or both. Using FAO data for 1961-2001, Avila and Evenson (2004) compute rates of change of TFP in crop and livestock production. The inputs considered for crops are cropland, labor, fertilizer, animal power, and machine services. Those for livestock are pasture land, labor, fertilizer, animal capital, and feed. The results, reported in Table 4.6, indicate that agricultural efficiency gains have slowed down in Mexico, passing from a TFP growth performance in 1961-80 which was 63 percent above the LAC average to one 35 percent below the average in 1980-01. The major fall came about in the livestock sector, which performed strongly in the first period falling to more modest levels in the second one.

**Table 4.6 Growth Rates of Total Factor Productivity
in LAC Countries in 1961/80 and 1981/2001**

Regions and Countries	Crops		Livestock		Aggregate		
	1961/80	1980/01	1961/80	1980/01	1961/80	1980/01	Average
<i>Southern Cone</i>	1.49	3.14	0.72	2.51	1.02	2.81	1.92
Argentina	3.08	3.93	0.90	0.43	1.83	2.35	2.09
Brazil	0.38	3.00	0.71	3.61	0.49	3.22	1.86
Chile	1.08	2.22	0.24	1.87	0.69	2.05	1.37
Paraguay	3.97	-1.01	-0.36	1.29	2.63	-0.30	1.17
Uruguay	1.29	2.02	-0.32	0.53	0.01	0.87	0.44
<i>Andean Region</i>	1.11	1.71	1.73	1.92	1.41	1.81	1.61
Bolivia	1.73	3.14	2.81	1.39	2.30	2.33	2.31
Colombia	2.01	1.27	0.49	2.24	1.37	1.73	1.55
Ecuador	-0.74	2.24	0.98	2.51	-0.16	2.34	1.09
Peru	-0.83	1.86	1.86	2.14	0.36	1.98	1.17
Venezuela	2.42	0.87	3.41	1.07	3.03	0.99	2.01
<i>Central and North America</i>	1.65	1.05	2.77	1.53	2.17	1.32	1.74
Costa Rica	2.86	2.09	1.10	0.75	1.74	1.19	1.47
El Salvador	1.22	-0.87	1.99	1.00	1.77	0.32	1.05
Guatemala	3.31	0.53	0.90	-0.28	1.38	-0.08	0.65
Honduras	1.54	-0.39	2.07	1.91	1.91	1.25	1.58
<i>México</i>	<i>1.53</i>	<i>1.43</i>	<i>3.02</i>	<i>1.63</i>	<i>2.26</i>	<i>1.51</i>	<i>1.89</i>
Nicaragua	1.33	-0.70	2.94	1.92	2.25	0.99	1.62
Panama	2.29	-1.33	1.61	1.49	1.93	0.02	0.97
<i>Caribbean</i>	0.66	-0.89	2.60	2.06	2.03	0.90	1.47
Dominican Republic	0.99	-1.15	1.88	2.60	1.59	1.28	1.43
Haiti	0.60	-1.04	3.44	1.80	2.60	0.50	1.55
Jamaica	-0.65	1.32	3.28	-0.35	2.31	0.12	1.22
LAC	1.46	2.40	1.42	2.21	1.39	2.31	1.85
AVERAGE							

Source: Adapted from Avila and Evenson (2004).

Public Expenditure in Agricultural and Rural Development

The amount spent by the Mexican government on rural development is truly remarkable. It is a fiscal effort without parallel in Latin America, especially when the low tax incidence and fiscal revenues of Mexico are considered. A *Programa Especial Concurrente* (PEC) mandated by the *Ley de Desarrollo Rural Sustentable*, where all federal spending in rural development is lumped together, was assembled for the first time in 2003. *PEC* was not a joint inter-secretaries programming exercise, but was a positive step in that direction. Thanks to *PEC* we have a better knowledge of federal spending in rural areas and of who is responsible for it than used to be the case in the past. We present in Table 4.7 the total amount budgeted for federal spending in rural development in 2003 broken down according to the major expenditure areas

considered in PEC. In Table 4.8 we show how federal *secretarías* involved in rural development contribute to this effort.

PEC amounts to some 30 percent of agricultural GDP. The total budgetary figure for PEC is MxP 117.1 bn (Table 4.7), equivalent to some USD 10.4 bn, which compares to a GDP in agriculture in 2003 of the order USD 33 bn. Not all of this, however, is spent in agriculture, because there are social, infrastructure, and other programs included in PEC. On the other hand, this is only federal spending. Since state and municipal governments also spend in rural development –we do not know how much–, the actual amount of rural public expenditure is more than that reported under PEC.

Table 4.7. Mexico: Federal Spending in Rural Development by Major Areas in 2003 (Million MxP)

Major Rural Development Program Areas	Number of Programs	Budget (Million MxP)	%
Social Conditions	20	45,343	38.7
Labor Conditions	4	2,874	2.5
Land Tenure	2	3,257	2.8
Productive Activities	22	50,687	43.3
Basic and Productive Infrastruc.	6	10,030	8.5
Environment	5	4,905	4.2
TOTAL	59	117,096	100.0

Source: WB staff calculations based on SAGARPA (2004).

Table 4.8. Mexico: Contribution of Different *Secretarías* to Federal Spending in Rural Development in 2003, (Million MxP)

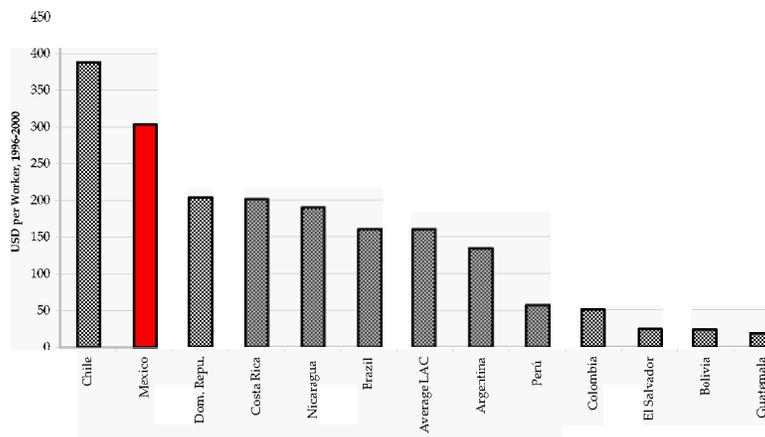
Secretaries	Programmable		Rural	
	Budget	%	Development	%
Economía	5,403	2.1	576	0.5
SAGARPA	41,783	15.9	40,583	34.6
Salud	20,867	7.9	6,829	5.8
SCT	23,124	8.8	1,092	0.9
SEDESOL	18,978	7.2	15,574	13.3
SEMARNAT	17,404	6.6	8,977	7.7
SEP	106,355	40.4	17,554	15.0
SHCP	21,785	8.3	10,310	8.8
SRA	2,759	1.0	3,566	3.0
STPS	3,151	1.2	866	0.7
Turismo	1,459	0.6	16	0.0
Others			11,153	9.5
Total	263,068	100.0	117,096	100.0

Source: SAGARPA (2004).

Table 4.8 shows the total programmable budget of the *secretarías* involved in rural development and thus participating in *PEC*, alongside with the amount actually spent in rural development. Of the MxP 263.1 bn that the *secretarías* have available, MxP 117.1 bn or 44.5 percent is devoted to rural development. If programmable expenditures of *secretarías* not involved in rural development are also considered, which come to another MxP 83.1 bn, PEC amounts to 33.8 percent of all federal programmable expenditure.

The two major expenditure areas in PEC are social conditions and productive development, which together account for more than 80 percent of the total. Infrastructure is a comparatively small expenditure area compared to its importance and need, and so is the environment. Of the *secretarías*, that which contributes most is SAGARPA, followed by SEP and SEDESOL.

Figure 4.12 Public Expenditure in Agriculture per Agricultural Worker in LAC Countries, Average 1996-2000

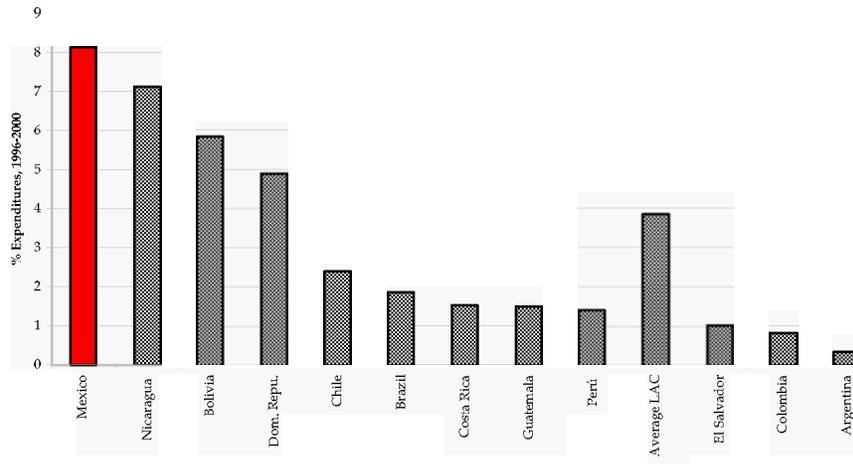


Source: WB staff calculations based on data from Kerrigan (2001).

Mexico spending on agriculture is very high compared to other LAC countries, whether measured per agricultural worker or as share of total public expending. Mexico is the country in Latin America with the smallest share of agriculture in GDP, making the high levels of public spending on agriculture all the more remarkable. Figure 4.12 looks at public expending in agriculture per agricultural worker in LAC countries for the average of 1996-2000. Figures refer to expenditure in production-related programs for agriculture only, not to all rural development expenditures. They are in current US dollars. For some countries the average is for 1996-1999 due to lack of data for 2000. Unfortunately it is not possible to tell from available data how this expenditure breaks down into the provision of public goods, farm modernization incentives, and other subsidies. The dispersion is big, with some countries spending twenty times more per agricultural worker than others. Chile is first, with expenditures per agricultural worker close to USD 400, followed by Mexico with USD 303 per worker. If we consider instead public expenditure in agriculture relative to total public expenditure, Mexico comes out first, followed by Bolivia, Nicaragua and Dominican Republic (Figure 4.13). In contrast to Mexico, these three countries are highly agriculturally oriented, with shares of agriculture in GDP of the order of 14, 35 and 11 percent respectively by the end of the 90s.

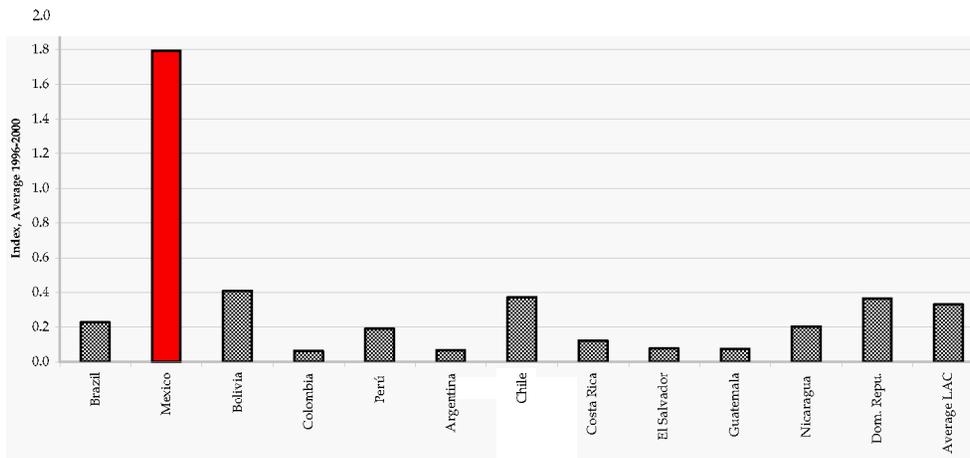
Figure 4.14 shows the distribution of LAC countries according to an “agricultural orientation” index, which is built by dividing the share of agricultural spending in total spending by the share of agriculture in GDP. The index measures the intensity of the fiscal effort in agriculture relative to the economic importance of the sector. Mexico is the only country of those included in the study with an agriculture orientation index of more than one, which is in fact more than four times larger than that of the next countries, Bolivia, Chile and Dominican Republic. Mexico, hence, practices public expenditure discrimination in favor of its agriculture.

Figure 4.13. Public Expenditure in Agriculture as Percentage of Total Public Expenditure in LAC Countries, Average 1996-2000



Source: WB staff calculations based on data from Kerrigan (2001).

Figure 4.14. Agriculture Orientation Index in LAC Countries, Average 1996-2000

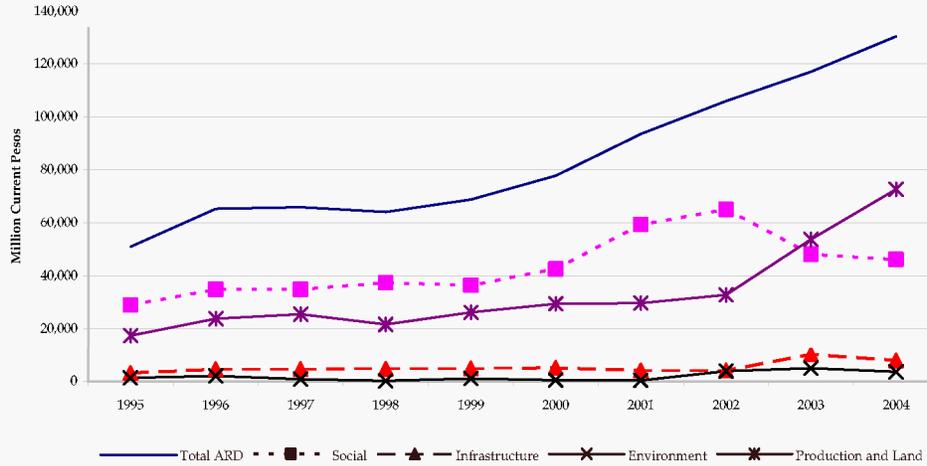


Source: WB staff calculations based on data from Kerrigan (2001).

Rural development expenditures have picked up since the end of the 1990s, due mainly to an increase in productive expenditures. Between 1996 and 1999, while the country was recovering from the crisis, rural development expenditure was stagnant in current pesos and strongly decreasing in constant pesos.⁴⁰ Real expenditure recovered well from 1999 onwards but not completely, resulting in a fall of close to 12 percent between the two extremes of the period.

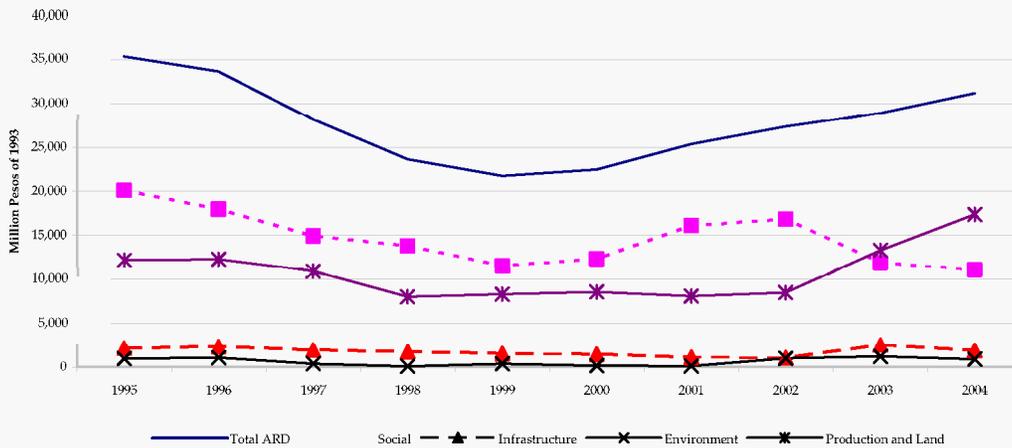
⁴⁰ A public expenditure series from 1995 to 2004 (figures for 2004 are programmed) with information from the SHCP was prepared for this purpose. We have aggregated programs in the same areas as PEC, but have combined social and labor aspects, and land tenure and productive aspects. We are grateful to Oscar Diaz Santos, experienced civil servant and graduate student at UNAM, for compiling these figures for us. Since there have been many changes in programs and subprograms, and in the allocations, names, and location of programs in the public accounting system, it is difficult if not impossible to trace with exactitude the

Figure 4.15. Public Expenditure in Agriculture and Rural Development in Mexico, 1995-2004, in Current Prices (Million MxP)



Source: Annex 4.A.

Figure 4.16. Public Expenditure in Agriculture and Rural Development in Mexico, 1995-2004, in Constant 1993 Prices (Million MxP)



Source: Annex 4.A.

To be noticed are the decrease in social expenditure between 2002 and 2004, and the parallel increase in productive expenditure.⁴¹ Also to be noticed are the low amounts spent in infrastructure and environmental programs relative to other spending areas. Detailed expenditures by programs are presented in Annex 4.A.

evolution of expenditure. A reassuring fact was the correspondence between our own estimate of federal public expenditure for 2003 of MxP 116.7 bn with the MxP 117.1 in the PEC.

⁴¹ The classification is largely arbitrary because many programs have characteristics or components that could lead to their classification under different categories. Also, the concepts themselves of social, productive, and environmental spending are not free from ambiguity. We have followed as much as possible the classification used in the PEC. For the evolution of specific programs consult Annex Tables 4.A.1 to 4.A.6.

PROFITABILITY AND EFFICIENCY OF THE SMALL FARM SECTOR

Profitability

How profitable is the small farm sector in Mexico today? To answer this question we use 2002 data from the *Encuesta Nacional de Hogares Rurales de México* (ENHRUM) survey which, as described in chapter 1, focused on dispersed rural areas and is representative at the regional level. We use a subset of the data covering 661 households of agriculturalists dedicated mostly to crop production. Farm profitability is difficult to estimate (Box 4.2). Thus, for example, we do not investigate the profitability of livestock operations because of the difficulty of establishing for small farms the amount of time dedicated by the household to looking after their animals, and the amount of own inputs used to feed them.

Box 4.2. Estimating the profitability of small farms

Two main problems arise in estimating the profitability of small farms. First, small farms are usually part of larger household operations, and it is artificial to cut farming away from these operations. This is why it is usually better to use “household models” instead of “farm models”. We do not follow this advice here, however, because in the present context we are interested in examining the profitability of agriculture and decision of rural families to participate in different occupations and the income derived from them. We are interested in particular in the income derived from crop production, not that of the entire family economy. Later on, in Chapter 7, we examine the process whereby rural households select different occupations and complement income from various sources. The second problem is the choice of profitability indicator. Small farm behavior in Mexico is generally that of the campesino or peasant producer. As is known, peasant micro-economic behavior is different from that of commercial farmers, in the sense that the objective function and often too the constraints are different.⁴² The reasons are the lack of a contractual link between employer and labor, since the own labor of the farmer and his/her family are used, and the overlap of the production and consumption unit.

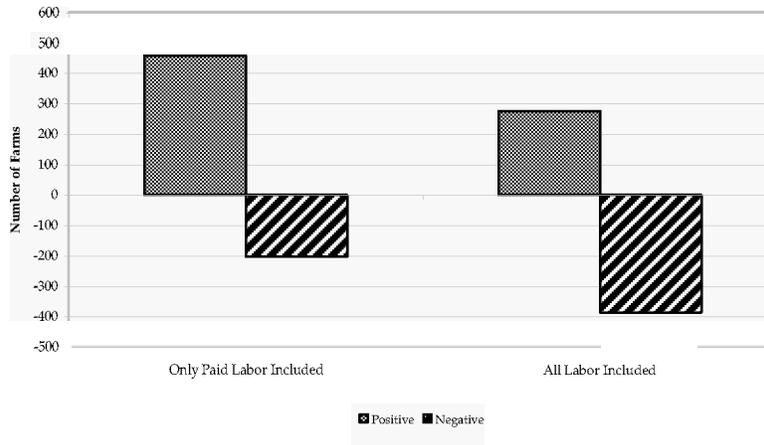
To measure profitability we use several indicators. The first one is the Gross Profit margin (GP), defined as the total value of output, including the estimated value of self-consumption and farm re-employments, minus all direct production costs consisting of labor, bought inputs, re-employments (for instance own seed), and machinery or draft animal services. Managerial costs, depreciation of assets, the rent value of land, and the actual or imputed value of financial services are not included. We use two specifications of GP. In one of them, we include the estimated cost of family labor valued using the local wage rate, while in the other we consider only the cost of hired labor and not that of family labor. The latter specification is better suited to the peasant farm, which does not look to family labor as a cost in the same way that it does with hired labor. A second indicator is Value Added (VA), defined as the value of output minus direct production costs, without including labor (either family or hired). The difference between VA and the second specification of GP is that GP includes hired labor. Reemployments in crop production (for instance seed) are included as part of output and as part of costs in both measures, thus canceling out.

The smallest farmers generally have negative or very low profits when family labor put in the farm is valued at the wage rate prevailing in the area. There are 385 farms with negative GP when family labor is valued and subtracted, against 276 with positive GP (Figure 4.17). This is not surprising; negative profitability of peasant farms measured with commercial

⁴² A classical discussion of this is that of Nicolas Georgescu-Roegen (1960).

parameters is a well know fact.⁴³ It means that family labor used in the farm gets a return smaller than the going wage rate. But there are various reasons why the wage rate is not necessarily a good measure of the opportunity cost of family labor. They include the possible presence of involuntary unemployment, the fact that much of family labor may not be tradable, and the possible effect of risk management considerations that may make farmers prefer to use their labor in their own farm even if at a smaller return. As seen in Table 4.9, the smallest farms have on average negative profits.

Figure 4.17. Number of Farms with Positive and Negative Gross Profit in a Sample of Small Farms, Mexico 2002



Source: Calculated from ENHRUM.

⁴³ See for instance the analysis of Witold Kula (1970) for the Polish peasant economy during the “refeudalization” period.

Table 4.9. Gross Profit and Value Added per Hectare of a Sample of 661 Small Farms, Mexico 2002 (2002 MxP)

	GROSS PROFIT PER HA (MXP)		Value Added Per Ha (MxP)
	W/O Subtracting Family Labor	Subtracting Family Labor	
Size Class 1/			
0 -2 hectares	2,415.2	(440.7)	3,752.1
2 -5 hectares	2,079.3	819.6	2,740.1
5 –10 hectares	2,480.4	1,750.7	2,820.6
10 and more hectares	2,210.6	1,784.6	2,354.3
Type of Ownership			
<i>Ejido</i>	1,822.7	657.4	2,578.1
<i>Comunidad</i>	(32.1)	(1,918.4)	583.0
Private	3,614.4	1,381.2	4,494.8
Mixed	2,275.9	1,141.0	2,481.7

Average sizes for size groups are as follows: 0- 2 hectares: 0.9 hectare; 2-5 hectare: 3.0 hectare; 5-10 hectare: 6.6 hectare; more than 10 Has– 29.4 hectare; all farms: 7.7 hectare.

Source: Calculated from ENHRUM.

Value-added per ha does not increase with farm size, suggesting that land is in fact more productive in smaller farms. Gross profits per ha increase by farm size, but value added per ha is actually larger in farms of less than 2 hectare than in bigger farm categories, and farms in the more than 10 hectare category have the lowest VA per hectare (Table 4.9). Hence, under existing conditions, from the point of view of generating income, land is more productive if it is in small than in large farms.

The low profitability of small crop production can help explain high poverty rates in the rural sector, and why rural non-farm activities play a key role in securing income. We can compare our value added figures with the rural poverty lines for 2002, of MxP 5,937 per person per year for food poverty and MxP 11,363 per person per year for moderate poverty. One hectare in our sample generates a value added from crop production somewhere between 40 and 60 percent of the income required for a person not to be food poor, and between 20 percent and one third of that required not to be poor at all. Put in another way, a family of four would require on average between 6 and 10 hectare not to be food poor, and between 12 and 19 hectare not to be poor, if crop farming were the only source of family income. But, as examined in chapter 7, farming families would usually seek other occupations, starting with some livestock, among which they decide whether and how much to participate and from which they obtain income. The above figures point, however, to the low profitability shown on average by small crop production in Mexico, and help explaining why farming families try to access other income sources. There are of course wide variations, and much depends on the quality of land, the type of crops, and context variables such as road availability and access to marketing infrastructure and channels. For instance, small farms with irrigation producing high value crops can have a much larger value added, and three or four hectares may be enough to keep a family out of poverty without engaging in other activities.

Private farms are also more profitable than farms in *ejidos* or *comunidades* (Table 4.9). The latter are particularly little profitable.⁴⁴ Value added in crop production per hectare in a private farm is nearly eight times higher than in a *comunidad*, and 1.7 times higher than in an *ejido*.

Few inputs are used in small farms. If we compare the gross value of output (GVO) and the GP without subtracting family labor, the difference is the cost of the inputs used in production, including seed, fertilizer, water, chemicals, hired labor, and the cost of mechanical and animal services. The small difference between the two figures shown in Table 9, which on average is of 10 percent, points to the few inputs bought in small crop production. A curious feature is that the difference between GVO and GP is proportionally higher in farms of less than 2 hectare. There may be measurement errors, but a possible reason for this is that the part of output that is re-employed within the farm is more used in crop production in the smaller farms and more in animal production in larger farms. Since we are examining crop operations only, crop reemployments used in the farm's own animals (eg. maize to feed pigs) is accounted as part of output but not as part of costs.

Small Farm Efficiency

How efficient are small farmers? Again using ENHRUM data, we have carried out an exercise to determine the economic efficiency of small farmers. Details of the econometric approach are explained in Annex 4.B. In summary, our method allows to test (i) what explains output, (ii) using this information, which farmers deviate from the efficiency frontier, and to what extent, and (iii) what variables may explain why some farmers deviate from the efficiency frontier.

Table 4.10 reports the results from estimates to explain output. The dependent variable is the gross value of crop output of farms, and the explanatory variables are: variable capital which includes seed, fertilizer and chemicals, fixed capital, which includes the value of machinery and draft animal services, labor, which includes all labor used during the entire production process, and land, which enters in the equation in a standardized form to account for different quality of land (and not only size of land holdings).

**Table 4.10 Value of Elasticities in the Production Function
Regression Equation for all ENHRUM Sample of Crop Farms**

Parameter	Variable	Coefficient	S.E.	P>z
b ₁	Variable capital	0.430	0.0354	0.000
b ₂	Fixed Capital	0.159	0.0353	0.000
b ₃	Labor	0.093	0.3809	0.015
b ₄	Land	0.232	0.0302	0.000
b ₀	Constant	3.259	0.3666	0.000

Note: Using a Cobb-Douglas Production Function. The logarithmic specification implies that coefficients can be interpreted as elasticities.

Source: Staff estimates based on ENHRUM

⁴⁴ Proper analysis would require controlling for farm size and other characteristics that may vary between the private and social sectors, using econometric methods. That work is currently in process and has not been possible to include here.

Variable capital is key in explaining output, with a big difference to other factors, followed by land. A one percent increase in variable capital increases output by 0.43 percent. This may be the result of the underutilization of fertilizer and chemicals due to the lack of access of small farmers to seasonal credit (see chapter 5 on this). Lack of credit to buy inputs prevents farmers from using them optimally, i.e. up to the point when the marginal contribution to production equals the cost to the farmer. A one percent increase in land holdings increases output by 0.23 percent. Labor has little weight, signaling the probable presence of surplus labor in many farms. The sum of elasticities is less than one, which in principle would indicate the presence of diseconomies of scale. However, the confidence intervals of the coefficients are sufficiently large not to reject the null hypotheses that the sum of the coefficients is one. Hence, there is no statistical evidence of diseconomies of scale, but there is little likelihood of economies of scale for the entire sample.⁴⁵

Which type of farms are less efficient? Table 4.11 groups inefficiency residuals by categories of farms, where the average inefficiency of each category of farms is measured as the distance to the efficiency frontier. Thus, for instance, at the national level an effort would be required to increase production by 91 percent with existing factors to reach efficiency, i.e. production would almost need to double.

Farmers that experienced natural shocks, maize and beans farmers, and farmers in the *Sur-Sureste* and *Centro* regions, are the least efficient. Producers of coffee, other perennial crops and vegetables, and producers in the *Noroeste* and *Noreste* regions are the most efficient. While farms in the *Centro* tend to be less efficient, the value of land in this region is the highest (see Appendix 4.B2 in Annex 4.B). The reason could be that farms in the *Centro* are better communicated and closer to markets than in other regions, and population pressure is also high, pushing up the price of land. Another surprising result is the large number of farmers that suffered from natural disasters, and its strong impact on efficiency.⁴⁶ We discuss this more in chapter 7 but we must notice here that this is a frequently overlooked element with important repercussions on efficiency.

Table 4.11. Distribution of the Inefficiency Error Term by Category of Farms

Variables	No. of farms	Average Inefficiency	S.D.
<i>Sur-Sureste</i> Region	211	0.94	0.3809
<i>Centro</i> Region	233	1.03	0.3980
<i>Centro-Occidente</i> Region	122	0.78	0.2391
<i>Noroeste</i> Region	36	0.69	0.4104
<i>Noreste</i> Regions	64	0.73	0.4012
Maize and Beans farmers	456	0.98	0.3845
Coffee Farmers	43	0.65	0.2273
Vegetable Farmers	33	0.69	0.2467
Perennial Crops Farmers	79	0.75	0.3419
Oilseeds and Other Grain Far.	55	0.86	0.4288
Farmers with natural shocks	295	1.05	0.4481
Farmers without natural shocks	371	0.80	0.2862

⁴⁵ Notice that economies of scale in this context do not refer to increased farm size, which is the common meaning in usual parlance, but to the simultaneous increase of ALL factors in the production equation, which is the technical meaning.

⁴⁶ This was defined as farmers who reported having suffered from rains, hurricanes, droughts, frosts or pests and diseases, and whose output was less than 50 percent that of a good year.

All Farmers	666	0.91	0.3870
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Source: calculated from ENHRUM.

There are substantial changes in the elasticities of production factors for different types of producers, although that for variable capital remains always the highest. The stochastic production function regression exercise was carried out separately for various categories of farmers.⁴⁷ The elasticities are shown in Table 4.12. For maize and beans producers the importance of fixed capital is higher than for the entire sample of farmers, while that of labor remains low. This indicates that more use of animal power and/or tractor services for these producers would have a large effect on output. Contrarily, reducing the amount of labor put in these crops would not have a large impact on output. Land elasticity in maize and beans production is surprising low, less than half of that for all farms and for farms without natural shocks. Increasing output in maize and beans production depends hence more on improved technology embodied in variable and fixed capital than on increasing the area. This is good news for small peasant farmers who are the main producers of maize and beans, for it means that they could boost output in their small farms if they had access to better technology. Under present conditions, however, shifting land from maize and beans to other crops would raise total output.

Farmers who did not experience shocks represent “normal” i.e. shocks free, farming conditions,⁴⁸ and their elasticity coefficients and efficiency levels are illustrative of this situation. In the case of farmers who experienced natural shocks, labor is much more relevant than for all farmers in general, and there is no evident explanation for this. Instead, for farmers who did not experience shocks, the importance of land is the highest. Hence, under “normal” conditions land is more relevant than under “abnormal” ones. The presence of a large proportion of maize and beans farmers in the sample, nearly 70 percent, decreases the elasticity of land since, as we have seen, this elasticity is low for these farmers. In farms, therefore, producing other crops under “normal” conditions land must be much more important. An interesting result for the “farmers without shocks” sub-sample is that the inefficiency test failed to reject the hypothesis of no inefficiency. This does not necessarily mean that these producers are all efficient, but points to the strong link between “normality” in production conditions and farming efficiency.

Table 4.12 Production Function Elasticities for Different Crop Farmers in the ENHRUM Sample

Variables	Elasticities			
	All Farms	Maize and Beans	With Shocks	Without Shocks
Kvar	0.430	0.443	0.399	0.391
Kfix	0.159	0.265	0.273	0.183
Labor	0.093	0.107	0.276	0.207
Sland	0.232	0.132	0.171	0.249
Sum Elasticities	<i>0.914</i>	<i>0.947</i>	<i>1.119</i>	<i>1.030</i>
Constant	3.259	3.669	2.658	2.226

All coefficients significant at 95% level.

Source: calculated from ENHRUM.

⁴⁷ We only carried out a separate analysis for these categories of farmers because sample sizes were too small for the other categories.

⁴⁸ But we can see in Table 4.11 that this “normal” condition is not so normal: 295 out of 666 farmers, 44 percent, experienced natural shocks.

Private transfers tend to be associated with less efficiency. One could expect the opposite, thinking that transfers would release liquidity constraints of farmers to buy inputs or fixed capital services or hire labor. But this is already controlled for in the regression carried out on the residuals, and there is no reason why transfers should increase efficiency in this way since the existing utilization of factors is given. A possible interpretation is that the more transfers received by farmers the lesser their dependence on farming for survival and hence the lower their interest in farming operations and good crop husbandry.

More work is needed to understand the causes of inefficiency. Many of the explanatory variables included in the regressions on efficiency, like gender, age, education, existence of services in the community (measured by a services index), land tenure, farm size, and government transfers, were not statistically significant. The reason seems to be that these variables influence more the choice of technology, i.e. the combination of inputs in the production function, than the efficiency of production given a combination of inputs, which is what we investigate by regressing the efficiency residuals on these variables.

HOW CAN PRO-POOR AGRICULTURAL GROWTH BE STIMULATED?

Agricultural growth has a strong potential for poverty reduction in Mexico. As shown, agricultural growth reaches the extreme poor, reduces poverty intensity, and lowers income inequality in society at large. Resolving the challenges faced by the agricultural sector, including increasing labor productivity, and ensuring that smaller farms and the rain-fed sector become more competitive, is therefore essential to rural poverty alleviation. Federal expending in agriculture and rural development is very substantial in Mexico, and a true mark of the importance that Mexican governments have traditionally given to rural areas. We discuss here in general terms how policy could respond to the trends and conditions depicted so as to promote agricultural growth in a way that is friendly to the poor. More specific policy options are discussed in chapters 5, 6 and 7. We organize our discussion around four areas: agricultural intensification; the small farm economy; competitive conditions; and public programs. We should note, however, that land scarcity and surplus labor require also policies to promote the development of non-farm activities in rural areas. This could create a virtuous circle: by raising incomes, intensification stimulates demand for RNF activities, and conversely RNF development absorbs agricultural labor surpluses, improving factor proportions in agriculture.

Agricultural intensification is the best option in view of the exhaustion of the crop frontier and the low average levels of land and labor productivity in agriculture. Labor productivity in agriculture is low in Mexico, and under existing conditions substantial amounts of land are needed on average for a family to pull out of poverty by means of crop farming alone, more than that usually available to small farmers. At the same time, the labor absorption capacity of non-agricultural activities is limited, the rural population is still growing, and the crop frontier is closed. Thus, average farm sizes cannot be increased by enough farmers changing occupation and abandoning their lands, which could then be rented or bought by other farmers. Intensification is hence the best option to increase land *and also* labor productivity in agriculture, and thus agricultural incomes.

Intensification needs to proceed along two ways: changing the crop mix in favor of higher value crops, and raising crop yields. The poorer farmers will need policy assistance to achieve this. Changing the crop mix in line with relative prices and market opportunities is a difficult and long-term process. There is much rigidity in the farming and marketing systems that hinder crop changes. After nearly 20 years of liberalization policies and relative price change, it is reasonable to assume that the “easy” part of substitution has been achieved. The uncertainties and

the transaction and other costs of substitution are probably increasing at the margin. As we have seen, commercial crop farming is more efficient than maize and beans, and there should be market incentives to move from the latter into the former. But there are barriers to that process that many farmers willing to substitute cannot overcome. These barriers are technological, financial, commercial, in knowledge, and in the capacity to bear risk. These are all areas where policy can intervene, and in fact Mexico has a variety of programs to this effect, some of which we examine in the next chapter. Better off farmers, endowed with more agricultural assets, are better equipped to break these barriers if they have not done it already. It is the poorly endowed farmers who face the major difficulties and need more assistance.

This will require a series of programs -research, technical assistance, extension, rural finance, infrastructure, and market information— that jointly create the conditions enabling farmers to carry out this movement by themselves. Some specific interventions may perhaps be required to accelerate the process, for instance in export marketing, the identification of market opportunities, and the linking of small farmers to new major sources of demand such as supermarkets. Work may also be needed in specific crops and production chains. But the essential thing is the presence of extensive and well functioning research & extension and rural finance systems, for both crop diversification and yield increases.

The small farm economy encounters most market failures and must be at the center of a poverty-friendly agricultural growth strategy. Although enabling conditions will often be similar for small and larger farmers, markets tend to fail more for small than for large farmers. Given that there is no evidence of economies of scale, the small-farm sector is a potential carrier of agricultural growth. A “diffuse” intensification strategy should embrace all type of farms, irrigated or rain-fed, small or large, and instruments like research and extension and rural finance need to be specially calibrated to be able to reach small farmers. Raising value added in small farms would not only reduce poverty directly; it would also have a general equilibrium impact on rural and urban poverty through the wage effect. Although we do not advocate a separate agricultural growth program for small farmers, there are interesting experiences of government programs for small farmers in LAC countries, like *PRONAF* in Brazil and *INDAP*’s programs in Chile, which could serve as inspiration for an enhanced policy effort in favor of small agriculture in Mexico.

Rental markets for lumpy inputs are important. We saw that in the case of maize and beans, typical small farm crops in Mexico, fixed capital is an important element to increase production, more than land and labor, and second to variable capital. This points to the importance for small farmers of promoting the development of rental markets for lumpy inputs such as machinery and draft animals.

How can the impact of natural shocks be mitigated? Our research shows that efficiency, and thus competitiveness, is hampered by shocks. Technologies less vulnerable to prevalent risks in particular regions can be developed and promoted through appropriate research and extension, by promoting for instance varieties more resistant to water stress or to pests or maturing at a suitable time according to the local weather calendar. Another possible intervention is facilitating farmers’ change to crops less vulnerable to recurrent shocks in the particular location. Pest control and sanitary measures in general are also means to reduce natural shocks.

Infrastructure is another area of policy intervention to enhance competitiveness. The importance of infrastructure on competitiveness is well known, and we will not expand on it here. The World Bank study of Mexico’s Southern States shows how the lack of communication infrastructure hampers the development possibilities of this part of Mexico (World Bank, 2003a).

We have seen that investment in rural infrastructure is a minor part of public spending in rural areas, and the same is pointed out with respect to infrastructure in general in the Public Expenditure review of Mexico carried out by the World Bank (World Bank, 2004a).

5. POVERTY FRIENDLINESS OF RURAL POLICIES

In this chapter we examine policies and programs relevant for agriculture and rural development. By design, many policies and programs are not directly addressed to poverty reduction but have other legitimate objectives. Yet, a country with high poverty rates and limited fiscal resources like Mexico may need to focus its public resources more clearly on programs which can help remove the dualism of the agricultural sector and target the rural poor. Thus, we look at rural development programs from the perspective of the rural poor, asking if there are ways to make them friendlier to the rural poor without prejudice to their primary objectives.

The main findings and policy implications of the chapter are summarized below.

- **Liberalization policies embarked upon in the late 1990s and carried out throughout the 90s tended not to favor the small-scale farming sector,**
- **The 1992 land reforms brought significant benefits to the rural poor, including more security of tenure.** The impact, however, on land productivity and benefiting mostly instead the more commercial and export oriented farming sector. Since there was little support for poor farmers to reconvert to more promising crops and take advantage of new market opportunities, liberalization was not, overall, pro-poor.
- **This points to the need for liberalization policies to be accompanied by support measures needed for seizing export market opportunities from which small farmers could benefit.** Important programs like *Procampo* and *Aserca* were adopted in connection to the opening of the economy but they were compensatory programs not programs to enhance agricultural investments and hence competitiveness. *Alianza para el Campo* was introduced in 1996 but its subsidies did not follow a restructuring strategy and were only limitedly oriented to small farmers, particularly during the early years. Nor was the economic opening accompanied by the development of a sound financial system for rural areas and the promotion of an agricultural knowledge system friendly to the poor farmers' incomes was small. A major concern is the difficulty faced by young *ejido* residents in accessing land.
- **Agricultural programs have had varied success and are by and large not targeted to the poor.** The most important program, *Procampo*, is comparatively friendly to the poor because of its extensive coverage, but (i) large farmers absorb a majority of the resources, (ii) landless farmers and agricultural workers are not included, and (iii) the program will be discontinued in a few years, and it is not clear what policy initiatives will replace it.
- **Nonagricultural programs could generally be considered to have been more pro-poor.** Programs like *Microrregiones*, *Microcuencas* and the decentralization of infrastructure investments have in general favored a territorial and multi-sector approach, making them more successful in reaching marginal areas and focusing on local priorities.

POVERTY FRIENDLINESS OF AGRICULTURE AND LAND POLICIES

Commercial Policies

Economic liberalization, including that of the agricultural sector, was a main thrust of economic policy in Mexico since the mid-eighties through the late nineties. Agricultural liberalization was stimulated by GATT, which Mexico joined in 1986, and a number of bilateral treaties in the 1990s (Japan, EU, some LAC countries and, of course, in 1994, NAFTA). Most of the conversion of quantitative restrictions to tariffs and of tariff reduction was accomplished before NAFTA. Economic opening was accompanied by internal liberalization of agricultural prices and marketing, the elimination of most subsidies, the phasing out of the state marketing company, *Conasupo*, and the introduction of compensatory programs like *Procampo* and *Aserca* Price and Marketing Supports, and a farm modernization program, *Alianza para el Campo*.

What has been the effect of NAFTA on the agricultural sector? The main conclusions are summarized in the following paragraphs.⁴⁹

There was a large expansion in agricultural trade with a trend of the agricultural balance of trade to deteriorate (Figure 5.1). Imports, particularly those of feed grains, increased much, from US\$ 3.4 billion in 1994 to 5.9 billion in 2003. As a proportion of total apparent demand of agricultural goods, imports increased from 23 percent in 1994 to 39 percent in 2001. In turn, exports rose from US\$ 2.7 billion in 1994 to 4.7 billion in 2003, particularly non traditional exports of fruits and vegetables (which rose from US\$ 1.6 billion in 1994 to US\$ 3.3 billion in 2003, see Figure 5.2). The agricultural balance of trade deteriorated and the agro-food balance (including agro-industrial products) deteriorated even more.

Agricultural prices fell markedly in real terms (Figure, 5.6), following rather closely in nominal terms the evolution of international prices.

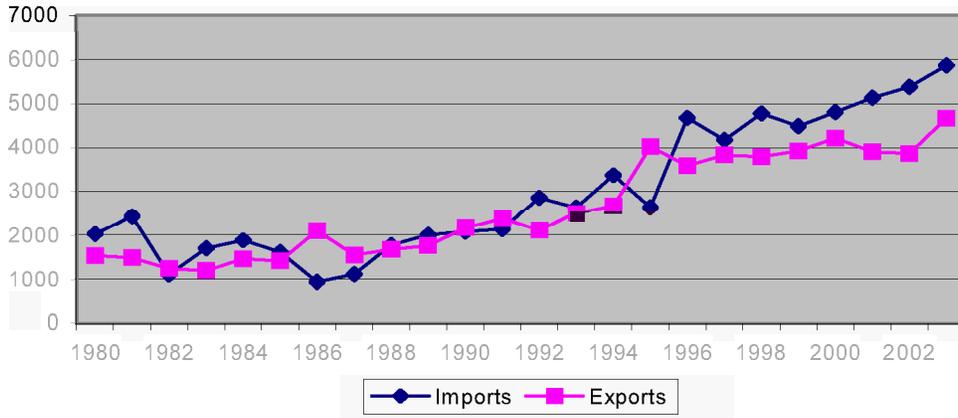
Production of wheat, soy beans and rice fell but not that of maize, contrary to what had been anticipated (Figures 5.4 and 5.5). This was probably due to the fact that (1) maize is largely a subsistence crop, with a good part of output being self-consumed or circulating in local markets only, and is the base of the rural diet, (2) the stimulus to maize production provided by *Procampo* and *Aserca* subsidies, and (3) the fact that maize is a comparably low risk crop, adapted to most parts of the country, well known to farmers, requiring simple technology, with low production costs and well established marketing channels. It is hence difficult to substitute.

Overall production and yields of food crops increased, contrary to expectation, although modestly so (Figure 5.5). As discussed in chapter 4, most of the increase in production and yields took place in irrigated agriculture, commercial farms, richer regions and export-oriented crops, while most of the increase in surface occurred in rain-fed areas. There was a clear rise in fruit and vegetable areas, a significant reduction in that of oil crops, and no obvious difference in cereals, pulses and tubers. Changes were not sufficiently large to constitute a major transformation of the overall crop mix.

As anticipated, agricultural employment decreased (from 8.1 million in 1993 to 6.8 million in 2002), but there was no sign of factor price convergence with NAFTA partners, particularly in wages.

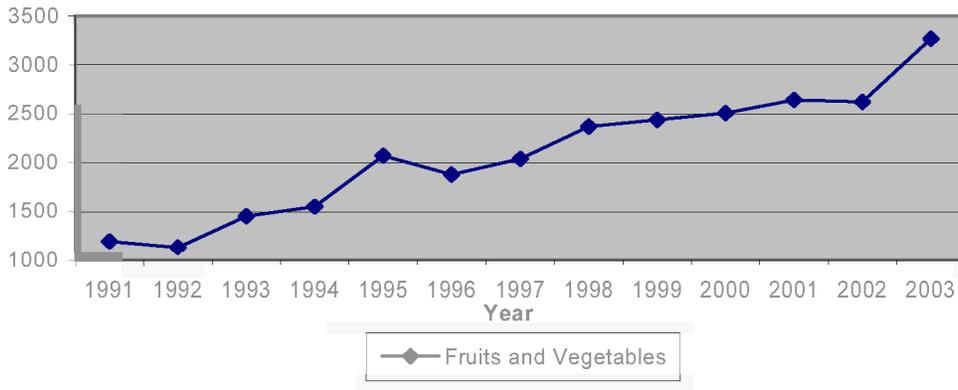
⁴⁹ The conclusions should be considered as a first approximation. More definite conclusions would require decomposition analysis to isolate the impact of commercial policies from that of other variables.

Figure 5. 1. Agricultural Trade. Mexico 1980-2003
(Millions Dollars)



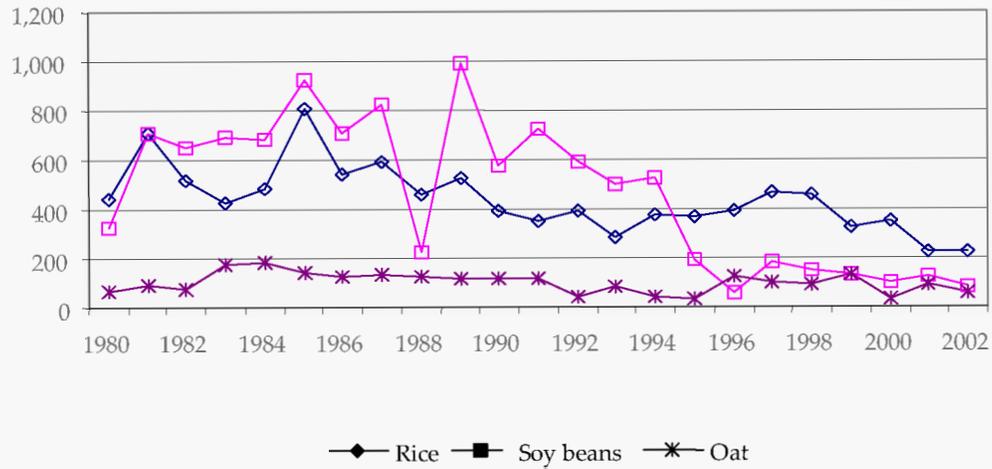
Source: World Bank staff calculations based on SIACOM.

Figure 5.2 Exports. Non traditional Agricultural Products.
Mexico 1991-2003. Millions of Dollars



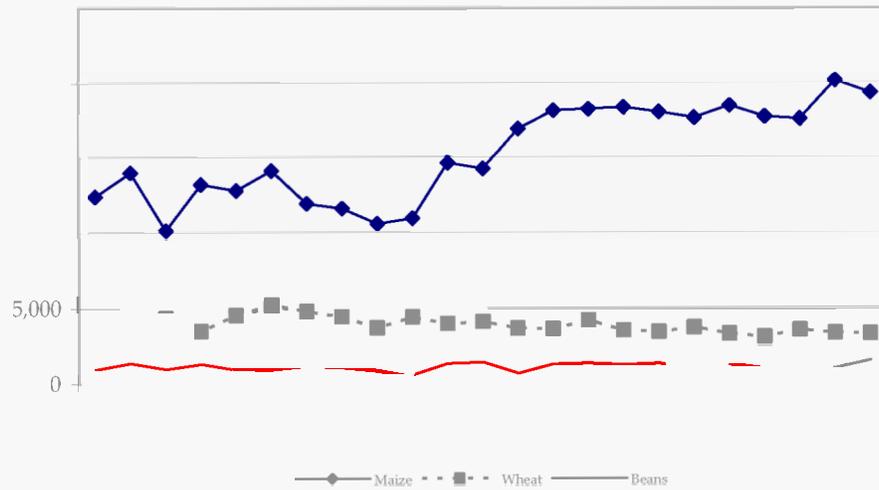
Source: World Bank staff calculations based on SIACOM.

**Figure 5.3. Grain Production
Mexico 1980-2002 (Thousand Tons)**



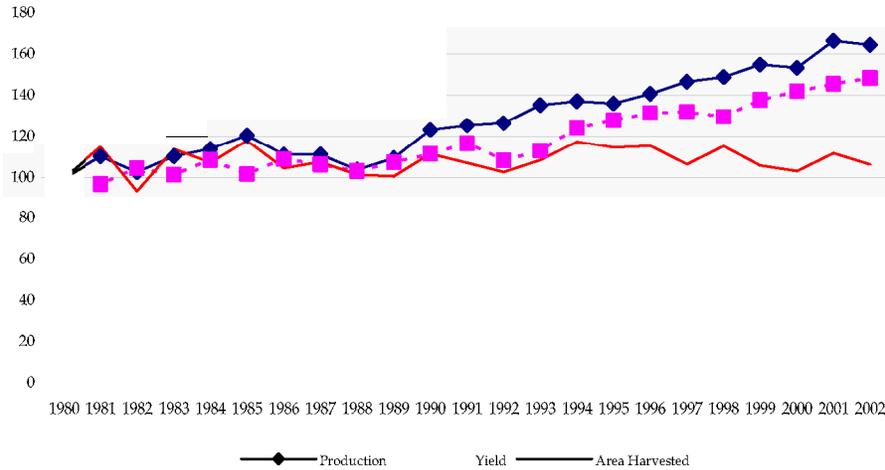
Source: World Bank staff calculations based on SIACOM.

**Figure 5.4. Grain Production
Mexico 1980-2002 (Thousand Tons)**



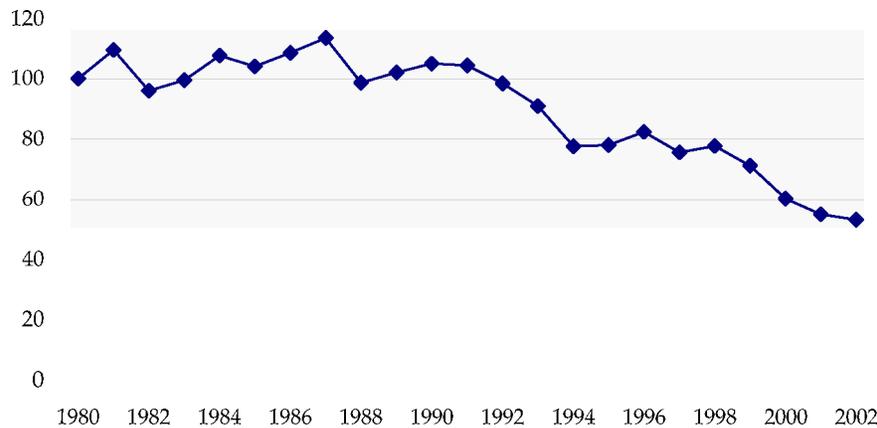
Source: WB staff calculations based on SAGARPA's agricultural database, SIACON.

**Figure 5.5. Agricultural Indices
Mexico 1980-2002 (1980=100)**



Source: WB staff calculations based on SAGARPA's agricultural database, SIACON.

**Figure 5.6. Agricultural Real Price Index
Mexico 1980-2002 (1980=100)**



Source: WB staff calculations based on SAGARPA's agricultural database, SIACON.

In summary, there is no evidence that liberalization policies had the catastrophic effects on agriculture that many feared nor is there evidence that they served to bring the big leap forward that others hoped for. As shown in the previous chapter, the evidence points to an unequal distribution of benefits and losses which generally tended to increase the distance between irrigated and rain-fed areas, between rich and poor agricultural regions, and between commercial entrepreneurs (particularly export oriented) and poor small farmers. The direct effects of commercial policy do not seem therefore to have been particularly friendly to the rural poor. There may be indirect, general-equilibrium type effects through other markets, particularly the labor market, linked to trade liberalization that could partly compensate for this. No systematic assessment is available of these effects, but the evidence on rural poverty and its evolution presented above seems to indicate that if they existed they were weak.

Stronger support measures could help ensure that small farmers can take advantage of liberalization. The outcomes of commercial policy must however be examined in conjunction with what happened to other policies that affect them. The opening of the economy was accompanied by important programs like *Procampo*, *Aserca* and *Alianza para el Campo*, but these were not sufficient (or indeed intended) to enhance the agricultural competitiveness of smaller farmers. Important elements like the development of a sound financial system for rural areas and the promotion of an agricultural knowledge system friendly to the poor were also lacking. These areas are discussed individually below.

A new economic order and regulatory system in rural markets seems to have emerged. Some authors have stressed that deregulation and the withdrawal of the state from the type of heavy handed rural intervention of the 70s and first part of the 80s (powerful institutions for input provision, output marketing and product support, farmers' organizations co-opted by government, and a large, clientelistic extension system), did not result in an institutional vacuum or a complete retraction of the state from the countryside, as could be expected. There was a process of "reregulation" of markets and occupation of positions of economic and social command by new actors (Snyder 2001), which took different characteristics in different regions and economic arenas and resulted in diverse outcomes for the rural poor.⁵⁰ The federal government itself maintains new forms of intervention in the rural economy through "new agencies that attempt to reach producers as individuals rather than as members of organized groups, as in the past. (...) This shift completely changed the terrain of bargaining between the state and peasant movements, since agencies that had been the main targets for producer movements withdrew from their role as shock absorbers between peasants and the market" (Fox, 1995).

*Rural Finance*⁵¹

Mexico's financial markets are shallow compared to other middle-income LAC countries' and the situation is particularly acute in rural areas.⁵² An extremely limited supply of credit results in credit rationing, with many farmers willing to obtain loans at the going interest rate unable to get them. The 2002 rural finance survey showed that only 6 percent of farmers and 5 percent of rural micro-entrepreneurs received loans from formal banking institutions.

Agriculture accounts for a very small part of bank lending (only 4.5 percent in 2001), and practically no commercial bank lending goes to small farmers. Lending to agriculture from public and private sources has fallen in real terms since 1996 as can be seen in Table 5.1. Due to the fiscal crisis and to a large default portfolio, lending by *BANRURAL*, the government bank for agriculture, decreased much in the last part of the 90s and early 2000s. Also, the decision was made that *BANRURAL* would not continue lending to small farmers whose

⁵⁰ Snyder (2001) illustrates this with a detailed study of the *reregulation* of the coffee economy that took place in different growing areas of Mexico.

⁵¹ Much of this section is based on a study carried out in 2002-2003 by the World Bank in association with FIRA on financial markets and the rural economy (World Bank, 2003). As part of the study a survey was carried out in 2002 of credit needs and use of financial services of 1,825 individual farmers, 3,301 individual micro-entrepreneurs in rural towns (of 2,500 to 50,000 residents), 954 agricultural enterprises, and 1,073 non-agricultural enterprises. The survey is representative at the national and regional level.

⁵² Thus, the ratio credit/GDP was 19 percent in Mexico in 2000 compared to 34 percent in Argentina, 46 percent in Brazil and 74 percent in Chile. Financial depth has fallen since the *Tequila* crisis. Also, private banks do not have branches in 74 percent of Mexican municipalities accounting for 22 percent of the country's population.

credit needs would be addressed through special programs such as *Opciones Productivas*. Commercial banks increased their share of agricultural lending upon the reduction of *BANRURAL* operations but within a decreasing total (Table 5.1). *FIRA*'s support to private lending through insurance and rediscount schemes of agricultural loans was not enough to attract major participation of commercial banks, partly because of their little specialization in this line of business and due also to the uncertain situation in the banking sector after the 1995 macroeconomic crisis.

Table 5.1. Evolution of Private and Public Lending to Agriculture, 1983-2000 in Million MxP of 1995

	Public	Private	Total
Amount (annual averages)			
83-90	23,193	19,130	42,323
90-94	14,736	40,690	55,426
94-96	14,825	43,806	58,631
96-00	8,674	26,260	34,934
Distribution (%)			
83-90	54.8	45.2	100
90-94	26.6	73.4	100
94-96	25.3	74.7	100
96-00	24.8	75.2	100

Source: Anexo Estadístico del V Informe de Gobierno. 1993 p.374; 1990-2000, e INEGI. Table prepared by A. Yúnez y F. Barceñas

Instead, small farmers resort to seeking credit from various saving and loan institutions –informal, government, micro-finance, and private money-lenders. Smaller farmers turn to more informal institutions like *Cooperativas de Ahorro y Crédito*, *Cajas Solidarias*, *Uniones de Crédito*, and other civil associations (some of which are regulated and some of which are not), to government programs, such as SEDESOL's *Opciones Productivas* and the *Fondos Regionales* of former INI, to various micro-finance institutions, and to private money lenders. Finance availability from these sources is extremely limited compared to need, however (see World Bank 2003). The distribution of loans by type of lender is shown in Table 5.2. The importance of trade credit (loans from commercial partners like input suppliers, traders and *coyotes*) is evident for both farmers and rural micro-enterprises: it accounts for 42 percent of all loans to farmers and over 60 percent of all loans to micro-enterprises. The primary source of loans for farmers is thus commercial partners, followed by friends and relatives (measured by number of loans, not amounts) and unregulated non-bank financial institutions (NBFIs). The limited access to private and development bank credit for this clientele is also evident from the table.

Table 5.2. Mexico: Distribution of Loans Received by Individual Farmers and Rural Micro-entrepreneurs by Lending Source (percentages)

Type of Lender	Farmers		Micro-enterprises	
	Number of Loans	Amount Disbursed	Number of Loans	Amount Disbursed
<i>Formal Lenders</i>	22.8	52.3	10.5	24.2
Private Banks	2.0	8.7	1.5	7.9
Develop. Banks	5.5	7.2	0.5	1.9
NBFIs Regulated	3.1	21.3	1.8	6.0
NBFIs Unregulated	12.2	15.1	6.7	8.4
<i>Informal Lenders</i>	35.3	15.1	25.7	17.7
Friends & Relatives	28.8	8.4	21.0	15.1
Others	6.5	6.7	4.7	2.6
<i>Trade Credit</i>	41.9	32.7	63.8	58.1

NBFIs = Non-bank financial intermediaries.

Source: World Bank, 2003: Table 5A.2.

Individual farmers and rural micro-entrepreneurs face many credit restrictions, illustrated in Table 5.3. Of all individual farmers interviewed 52.4 percent declared to be willing to take loans from formal sources and 50 percent from informal sources. Yet, only 7.1 and 9.8 percent, respectively, applied for a loan. It is interesting that most of those who applied received a loan (although not always for the full amount requested). One reason why so many potential demanders do not apply is probably because they anticipate being rejected. Transaction costs are high and may also deter loan application. Lack of information of credit sources and eligibility criteria and lack of local credit facilities may be other reasons for not applying. Research suggests that credit restrictions are depressing investment. Moreover, as is often the case, credit restrictions appear to apply most to those who are in greatest need, including people facing adverse shocks and who have few assets (Box 5.1).

Table 5.3. Mexico: Credit Demand of Individual Farmers and Rural Micro-entrepreneurs by Type of Source (percentages)

Demand	Farmers		Micro-enterprises	
	Formal	Informal	Formal	Informal
No Demand	46.6	50.0	52.7	52.9
Demand but not Applied	46.3	40.2	41.2	35.3
Applied (*)	7.1	9.9	6.1	11.8
Applied and Rejected (**)	16.3	1.1	14.3	1.6
Received Loan(*)	5.9	9.8	5.2	11.6

(*) % of total. (**) % of those applying.

Source: World Bank, 2003: Table 7A.1.

There have been positive policy developments in the last years with respect to rural finance, including regulatory reform. One important step is the recent substitution of BANRURAL for *Financiera Rural*. *Financiera Rural* is designed as a 2nd level lending institution, although authorized to operate at 1st level. Other positive steps were the strengthening of the regulatory framework through the 2001 *Ley de Ahorro y Préstamo*, and the approval in 2003 of norms facilitating the use of movable collateral. There is finally the creation of the *Banco de Ahorro Nacional y Servicios Financieros* (BANSEFI) as a support institution for the micro-finance sector, whose focus is primarily rural.

It is illusory to assume that the ordinary commercial banking system will provide the financial services needed by small farmers, rural micro-entrepreneurs and the rural

poor at large. A different system is required. The new system must move from agriculture to rural credit, and should be able to carry out savings mobilization and provide the type of financial services required by the rural poor (saving instruments, personal loans, insurance, money transfers, etc.).

Box 5.1. Causes and effects of credit restrictions, econometric evidence

On the basis of the 2002 rural finance survey an econometric exercise was carried out to investigate the impact on investment of removing credit constraints. The conclusion was that had there been no credit constraints during the period covered, the percentage of micro-entrepreneurs and farmers making investments would have been about 12 to 41 and 34 to 41 percent higher respectively.

The characteristics of farmers associated with a greater probability of being credit constrained *vis-à-vis* formal or informal loans were also examined using econometric analysis. The results were as follows: receiving remittances, selling goods through informal traders, selling outside the municipality, having irrigated land, having few assets, and being affected by adverse shocks, were factors lowering access to both formal and informal credit. Being a waged worker, selling on credit, and planning to improve one's business were factors which specifically restricted access to formal loans, while having a large family and not having formal savings restricted access to informal loans. Of course, some of these characteristics correspond to being a poor credit subject (like being able to offer no collateral) while others correspond to strong incentives to demand loans (like having irrigated lands or suffering adverse shocks).

Source: World Bank, 2003.

Micro-finance institutions are proving useful in the provision of financial services to the poor, both in Mexico and in other Latin American countries (Bolivia, Ecuador, Peru, El Salvador, Costa Rica, Brazil).⁵³ Micro-finance institutions have faced some difficulties in the provision of credit to agriculture as a specialized sector, because conventional micro-credit methodologies tend to rely on short-term loans with frequent repayments, which do not fit well the strongly seasonal requirements of agriculture. There are however microfinance institutions in different countries of Latin America which have successfully expanded into agricultural lending, and whose experiences the Mexican government might choose to consider for policy reform (see CGAP, 2004).

Based on this experience, expanding micro-finance services in the rural areas of Mexico would be facilitated by the following innovations. First, introducing flexibility in disbursement and repayments to adjust to seasonal requirements. Second, introducing flexible collateral requirements, such as personal and group guarantees, movable assets (like animals, farm machinery and stored crops) and household goods, adapted to what rural dwellers may offer. Third, introducing technological innovations that can reduce infrastructure and employee costs, such as smart and debit cards and information technology. Fourth, use to the maximum extent possible existing delivery mechanisms, such as rural post offices, retail stores, rented rooms in schools, government offices, rural clinics, and office sharing with other institutions. This can be combined with the use of mobile staff and mobile credit/deposit units. Fifth, portfolio diversification across clients, activities and rural communities, using a variety of lending instruments adapted to different clients so as to reduce risks associated with systemic shocks. Finally, introducing other financial products such as saving deposit, money transfer facilities, and

⁵³ See issues involved and successful experiences in building micro-finance systems in Robinson (2001), Drake and Rhyne (2002), Otero and Rhyne (1994), Ledgerwood (1999), and Rhyne and Rotbalatt (1994).

insurance schemes. Judicious government incentives to micro-finance institutions could promote the introduction of these innovations.

The Mexican government is making a valuable effort to support the development of rural micro-finance services through BANSEFI, but the repressed demand for financial services in rural Mexico remains large. Isolated rural credit programs from federal agencies such as those under SEDESOL's *Opciones Productivas* umbrella program are clearly of great benefit to those who have access to them, mostly capital constrained rural poor. But these *ad hoc* credit programs cannot substitute for more comprehensive measures *vis-à-vis* the entire system. The option could be considered of reallocating funds invested in these programs to provide more global support to the development of a broader rural micro-finance system, through BANSEFI and *Financiera Rural*.

The new *Financiera Rural* could take an active role in promoting a robust and healthy system of rural financial services based on micro-finance institutions. There are successful experiences in other countries (like Indonesia, Thailand, Chile and Brazil) of development banks setting up micro-finance branches.⁵⁴ Jointly with BANSEFI, the *Financiera Rural* could also help widening the system of micro-finance institutions operating in rural areas and providing second level funding support. Medium-term investment financing is a crucial area for rural development where micro-finance institutions often face difficulties, because the structure of their liabilities makes it difficult for them to tie funds for long periods, and because their usually high interest rates discourage demand. This is an area where the *Financiera Rural* could prove particularly useful. The specific regulatory needs of rural micro-finance type institutions should also be assessed, and the possibility should be studied of adjusting the rules to make them more flexible without harming financial soundness.

The Knowledge System

The agricultural research and technical assistance system has seen important progress in recent years in various areas. Competitive funds have been introduced as a way to allocate research funding, a system to which the government agricultural research institute, INIFAP, adapted rapidly (Roseboom, 2004). More producer friendly formulas for applied research and dissemination, with the involvement of producer groups, such as the *Grupos Ganaderos de Validación y Transferencia de Tecnología* (GGAVATT) have been tried out with success. Unfortunately, no similar experience exists in agriculture (with the exception of the *Clubes de Productores* active in some parts of the Northeastern region) probably because of lack of institutional leadership (FAO, 2002). There was also progress in changing the structure and corporate culture of INIFAP in order to reduce its administrative heaviness and bring it closer to the requirements of a scientific institution, and also to open it up more to collaboration with other research outfits, national and international. Finally, the *Ley de Desarrollo Rural Sustentable* created a *Sistema Nacional de Investigación y Transferencia de Tecnología para el Desarrollo Rural Sustentable*.

On the whole, however, little priority and resources were given to agricultural research during the last decade. Thus, for instance, the number of INIFAP's research staff fell from 2,160 full-time equivalent researchers in 1986 to 1,365 in 1996 and 962 in December 2003 (Roseboom, 2004). Mexico spends in agricultural research some 0.4 to 0.5 percent of its agricultural GDP, which is far from the 1 percent usually considered as a satisfactory benchmark

⁵⁴ BRI's *Desa* Units in Indonesia, BAAC's microcredit unit in Thailand, *Banestado Microempresas* of Banco del Estado in Chile, and *Credito Amigo* of Banco do Nordeste in Brazil.

(IICA 2003). Also, there are no clear and consistent research priorities and guiding policies. In general, there is insufficient recognition of the importance of the knowledge economy, the complementarities of knowledge with other assets, and the high returns of agricultural research investments (De Ferranti *et al*, 2002), and there is little progress in making agricultural research more poverty friendly.

The focus of technology transfer policy in the last decade was the shift from the public to the private domain. While middle and large farmers were basically left to procure and pay for their own technical assistance, there was recognition of the need of an element of subsidy for poor farmers. A *Sistema Nacional de Extensión Rural* (SINDER) was created in 1996 to provide technical assistance particularly to small farmers. The system met with difficulties due to administrative shortcomings in the selection of extension staff and their economic incentives, inadequate supervision and technical back up, and little client accountability, and was discontinued by the present government. It has not been replaced by an alternative system. Instead, technical assistance functions and budgetary resources are distributed in different programs, particularly in the rural development sub-program of *Alianza para el Campo*. Assistance is given by private providers (the *Prestadores de Servicios Profesionales*, PSPs) certified by SAGARPA, and paid by the programs.

Systems of privately provided technical assistance to small farmers have been shown to work well in different parts of Latin America but have been less successful in the Mexican context. This is the case for instance in Chile with INDAP, and in the Southern Peruvian Highlands with the *Marenass* project and its predecessors. In Mexico, however, initiatives were less successful due to (1) institutional and administrative aspects, which have resulted in inadequate incentives, many uncertainties and lack of continuity on the part of providers, and (2) insufficient accountability to the beneficiary/client. Also, technical assistance is usually conceived in the limited sense of providing specialized agricultural expertise to farmers, without connection to managerial, organizational and marketing aspects, and to the multisectoral character of the small farmer economy. Private providers are not organized in networks, do not enjoy a support system and do not have systematic connections to research outfits. The M&E system of technical assistance outcomes and impact is weak. Because of these problems and the limitation of funds, the extent to which poor small farmers benefit from technical assistance is small.

Because of budgetary constraints and lack of a comprehensive strategy, INIFAP has not been able to respond to the needs of small farmers through stronger client orientation and a farming systems approach. Nor have environmental concerns been addressed sufficiently, in particular those related to mountainous and other fragile environments. Also, INIFAP has shown difficulties in responding to farmers' growing demands for innovations in the areas of marketing and agro-industrial transformation (see Roseboom, 2004 and IICA, 2003).

The *Fundaciones Produce*, an initiative to strengthen regional knowledge systems, lack sufficient links with smaller farmers.⁵⁵ Unfortunately, with some exceptions (mostly the

⁵⁵ This initiative was started in 1996. There are 32 *Fundaciones Produce* one per state, supported by federal and state funds. They are civil society organizations led by local farmers, and have the objective of promoting and funding research projects demanded by farmers, and acting as centers for the dissemination of relevant agricultural knowledge. The total budget for the *Programa de Investigación y Transferencia de Tecnología* (PITT) which is the administrative umbrella and funding source of the *Fundaciones*, was some US\$ 30 million in 2002 of which 25 percent from state governments and 75 percent from the federal government. There is hardly any farmers' participation in the funding.

Fundaciones of the Northern states, such as those of *Sonora* and *Sinaloa*), the *Fundaciones* have had limited impact, mostly because of limited resources, frequent disagreements with the *Secretarías de Agricultura* of the states, and insufficient leadership from producer organizations and farmer leaders (IICA, 2003). Also, the *Fundaciones* rely mainly on INIFAP as provider of scientific services, and have not enough access to scientists from universities and other research centers who prefer to work in research projects funded by CONACYT. Since INIFAP has insufficient coverage of innovation in areas of growing demand from farmers like marketing and processing, there is some mismatch between farmers' demands and what *Fundaciones* can offer (FAO, 2003). The research projects financed by *Fundaciones* have been criticized for their short duration, normally one year, and delays in the disbursement of funds, both things related to administrative and budgetary problems to be examined in chapter 6. Territorial organizations and organizations consisting mostly of poor farmers rarely participate in the *Fundaciones*, nor do the *Prestadores de Servicios Profesionales*, who could be closer to understanding the needs of small farmers.

A proposal for *Fundaciones Produce*. FAO (2003) has made an interesting proposal in connection with the *Fundaciones Produce*. It consists of converting them into *Antenas Tecnológicas* of the respective states in charge of the identification, adaptation, and massive dissemination of *tacit* knowledge (for opposition to formal or *codified* knowledge) that already exists and is being used by producer organization, agro-enterprises, research institutions and others. This reorientation of the work agenda of the *Fundaciones* would be welcome, particularly if accompanied by organizational changes and the institutional representation of small farmers' interests, if the *Fundaciones* are going to be of service to the rural poor.

Experience in Mexico as well as internationally could serve as guidance for policy design in addressing shortcomings in the agricultural knowledge generation and transfer systems. There are successful examples of promoting applied research oriented to small farmers through competitive funds (for instance in Colombia, Peru and Ecuador), as well as successful experiences with publicly funded but privately provided technical assistance, which could be used for inspiration. Best practices exist also in Mexico whose replicability should be analyzed, for instance with some technical assistance programs carried out by FIRCO in the past, experiences carried out today with *Alianza* funding, such as that of the GGAVATTs quoted before, and valuable experiments from NGOs and *Sociedades de Producción Rurales* in different parts of the country. Even if the assistance is given by private suppliers, there is an important role for government, not only in the funding but also in helping developing or adapting technology transfer models appropriate for different zones and type of producers, assisting in the organization of technical networks of providers, and facilitating the link with research outfits.

Land Policy

Major land policy reforms were carried out in the 1990s. The key land right reforms are discussed in Box 5.2. The reforms were exclusively oriented to the social sector –*ejidos* and *comunidades*- and were of great importance given the size of this sector, which covers more than half of the country's agricultural land and nearly four million landed families.⁵⁶ With important

⁵⁶ According to the 2001 *Ejido* Census, there were 30,305 *núcleos agrarios* of which 27,786 *ejidos* and 2,519 *comunidades*, with an average of 3,467 ha and 127.8 members with full rights, making a total of 105,067,435 ha and 3,872,979 landed members. In addition, there were 957,638 occupants who were not *ejidatarios* but whose land rights were recognized by PROCEDE. According to the 1991 agricultural census, *ejidos* had 51% of the country's agricultural land. The labor force in the *ejido* sector was 2.3 times that of the private sector,

exceptions, *ejidos* are land poor (in quantity and quality) and have low farm technology, widespread poverty and an aging population. Rural poverty in Mexico is mostly housed in *ejidos* and *comunidades*.

Legal and administrative reforms in the social sector have brought benefits to a large portion of the rural poor. In particular, they: (1) gave more security of tenure and freedom to decide on their lands to the majority of the small farming population, with *Certificados de Posesión* being issued by PROCEDE to more than 3 million households; (2) gave also security of tenure to close to one million land occupants (*Posesionarios*); (3) improved conflict resolution and social peace in rural areas; and (4) improved the functioning of land markets in the social sector (World Bank, 2001a). Also, the application of PROCEDE was accompanied in many *ejidos* by the division of part or all collective lands and their distribution to *ejidatarios* as individual plots. It has been shown (see Muñoz-Piña, de Janvry and Sadoulet, 2003) that this allocation was equalizing since it benefited proportionally more *ejidatarios* with smaller holdings as well as those of indigenous ethnic origin. Division of collective lands was also used to allocate agricultural plots to landless *ejido* residents and include them as *ejidatarios*.⁵⁷

Box 5.2. Land Policy Reform in the 1990s

The reform of land rights in 1992 centered on the change of article 27 of the Constitution and the land law that followed. The main changes were: (1) the agrarian reform was formally closed, thus ending the possibility of land being expropriated for this purpose; (2) land rights in the social sector (*ejidos* and *comunidades*) were improved and made more transparent; (3) a judiciary system of specialized courts (*tribunales agrarios*) was set up to rule on land disputes in the social sector (previously dealt with by government); and (4) a sort of *ombudsman* institution was created, the *Procuraduría Agraria*, to defend the rights and serve the legal needs of *ejidatarios*, *comuneros* and other small farmers. Other than this, a land titling and registration program of social sector lands, PROCEDE, was launched and has been very active, and a national registry for these lands, the *Registro Nacional Agrario*, was created.

There are three types of land rights in the *ejido*: (1) homestead plots with full, unrestricted ownership rights; (2) farming plots individually owned by the *ejidatarios*, which have some restrictions; and (3) collective lands (usually forest and grazing areas) for communal use, without separate rights. Farming plots (average 5 ha per *ejidatario*) can be rented in and out without restriction, freely sold to other *ejidatarios*, transmitted as inheritance, and used to constitute joint ventures with private capital. Farming plots, however, have three legal restrictions: (i) they cannot be sold to non-*ejidatarios* without permission from the *ejido*'s governing body (the members' assembly), (ii) cannot be parceled up (upon inheritance or otherwise), and (iii) cannot exceed certain size limits. *Ejidos* can change to a full private ownership system if 2/3 of members so decides. So far, less than 1% of *ejidos*, mostly periurban ones, have used this legal provision.

Land policy issues are complicated by the fact that the *ejido* (like the *comunidad*) is both a land tenure system and a form of social organization. As a land tenure system it consists of a large tract of land with a collective title issued to a community of beneficiaries who practice individual farming and have collective use of forest and grazing lands. As a social organization it is a system of village governance and constitutes a form of social capital in rural areas. Institutionally, the *ejido* is the historical product of the Mexican Revolution and the *reparto agrario* (land distribution), making its reform a politically complex issue.

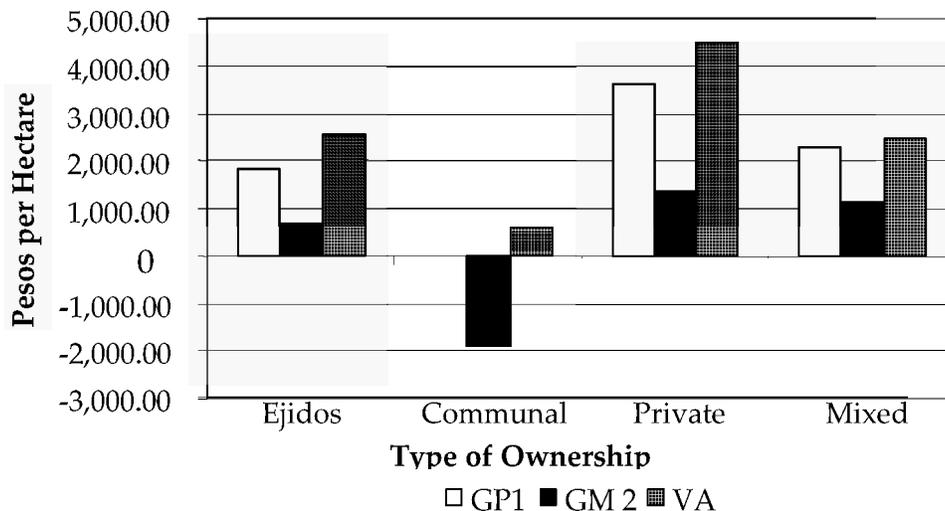
Source: De Janvry *et al.*, 1998, World Bank 1999 and 2001a, Höllinger, 2004.

and *ejidatarios* had around 1/3 of the surface per producer and 1/3 of the heads of cattle per producer of the private sector.

⁵⁷ There is a large literature on the nature and effects of the *ejido* reforms. An interesting reading is the collection of monographic studies edited by Cornelius and Myhre (1998).

The impact, however, of the reforms on land productivity and farmers' incomes in the social sector was small. After more than ten years since the reform, profitability in agriculture in *ejidos* or *comunidades* continues to be low. As indicated in chapter 4, we have made an exercise with ENHRUM data to examine the profitability of farm enterprises according to tenure system, measuring profitability with value added per ha and gross benefit per ha (including as cost the imputed value of family labor, and without including it). On either measure farms in *ejidos* and *comunidades* are less profitable than private farms as shown in Figure 5.7

Figure 5.7 Gross Margin per Hectare with Family Labor (GP2) and without Family Labor (GP1) and Value Added (VA) per Hectare in 2002



Source: WB staff calculations based on ENHRUM.

There are essentially three reasons for the lack of impact of reforms on employment and income opportunities. First, property right changes do not create *per se* economic development, although they may open the way to it. The reforms were surrounded of excessive optimism in this respect. Second, little was done to accompany the reforms with the complementary investments and support systems required to improve land productivity and farm incomes. Finally, under existing business circumstances in agriculture, private capital was not interested in the *ejido* sector with the exception of particularly attractive peri-urban or irrigated *ejidos*.

New major changes in land legislation do not seem politically feasible at present, and it is questionable that they are truly needed at this stage.

For the present legal framework to bring important improvements, the following challenges would have to be addressed:

- **There is a distinct ageing of the farming population in the *ejido* sector.** According to data from PROCEDE, land right holders in regularized *ejidos* have on average 54 years, 60 percent have more than 50 years, and 29 percent more than 65 years. Ageing reduces efficiency in land use since the elder tend to make a more extensive use of the land and are generally less efficient farmers. This has been observed in field studies (Eduardo, Le Moing and González, 2004).

- **The position of young residents of the *ejidos*, who are more educated than their parents but have no access to land, is worrying.** Sons and daughters of *ejidatarios* cannot easily find employment in the *ejido* and hence many are forced to migrate. As residents of the *ejido* but not *ejidatarios*, these young workers are a discriminated group without voice or power in *ejido* decision-making. The market is failing to transfer *ejido* farm land from low productivity users (mostly the elder) to potentially high productivity users (the younger) in a satisfactory manner, and young *ejido* workers suffer from it.
- **The legal norm preventing the fractioning of the land titled to *ejidatarios* obstructs land sales and forces *ejidatarios* to pass it to one heir only, generating efficiency and welfare losses.** The rationale behind the norm is to maintain farm size and if possible expand it through the consolidation of holdings in order to promote a class of viable farms within the *ejidos*. Small farmers, however, have a multisectoral economy. The important thing for them is not viable farms but viable multifunctional family enterprises, of which part-time farming can be a component. Relatively small farms can play crucial complementary roles in the economy of rural families. Part-time farming has proven to be efficient (in terms of both product per ha and family welfare) in many parts of Europe. Finan, Sadoulet and de Janvry (2003) have shown the importance of the welfare effect of even small plots of land in Mexico, an effect very much enhanced by complementary assets and good location.
- **Finally, concern is often voiced about the impact of reforms on the system of local governance,** in view of the double nature of the *ejido* mentioned above. This is very much linked to the issue of the erosion of the social protection and equity functions of social property, and is addressed in chapter 7.

The land-shortage of young landless farmers is being addressed through a new and promising program. The *Secretaría de la Reforma Agraria* (SRA) is starting a program to promote the access to land of young landless farmers through buying and renting, as well as to complementary investments, using as instruments a land fund and an investment fund. This is a welcome response to the above situation particularly in view of the importance that young workers may have in the taking off of the rural economy.

POVERTY FRIENDLINESS OF SPECIFIC AGRICULTURAL PROGRAMS

Alianza para el Campo

***Alianza* is a demand-driven investment support program aimed at farm modernization,** which started operating in 1996. It is a complex program consisting of various subprograms with different rules each that have changed much over the years, but it mostly operates as a matching grant subsidy.⁵⁸ The program is large, with a total budget of some US\$ 1.1 bn in 2003, some 30 percent of which were contributed by farmers.

***Alianza* is not particularly focused on the poor, with the possible exception of the sub-program *Desarrollo Rural*.** *Alianza* was not designed as a poverty reduction instrument. Initially it was oriented to the type of asset investments preferred by large farmers, like tractors, pressurized irrigation equipment, electric fencing, and others, clearly catering for the more

⁵⁸ The main ones are the *Programa de Desarrollo Rural* (36.5 percent of total program cost in 2003), the *Programa de Fomento Agrícola* (36.7 percent), and the *Programa de Fomento Ganadero* (17.2 percent).

commercial sector of the farming community. Over time, however, it moved to address also the needs of smaller farmers, particularly through the *Desarrollo Rural* subprogram,⁵⁹ which in 2003 accounted for 36.5 percent of the cost of the entire *Alianza*. *Alianza* subsidies are not registered separately in ENIGH surveys (contrary to *Procampo's* and, since 2002, *Oportunidades'* subsidies), and hence we do not know how much reaches the poor. FAO's evaluation classifies beneficiaries in five types according to education, farm size, number of animals, value of productive assets, and percentage of output sold, as shown in Table 5.4. (FAO, 2003). The first type and perhaps part of the second can be identified as "the poor". According to this, 32 percent as a maximum of the beneficiaries of *Alianza* in 2002 were poor (Table 5.5), but the figure is probably lower since not all Type II beneficiaries would be poor. The *Desarrollo Rural* program is clearly more targeted, but even so at least 47 percent of the beneficiaries are non poor. Figures were not available of the breakdown of program expenses by type of beneficiary, but the distribution must be worse than that of beneficiaries since beneficiaries classified in higher types typically received larger amounts per capita than those in lower types.

Table 5.4: Type of Beneficiaries of Alianza para el Campo

VARIABLE	TYPE I	TYPE II	TYPE III	TYPE IV	TYPE V
Schooling (years)	Primary (1-6)	Secondary (7 - 9)	High School (10-12)	University (13-16)	University title (17 or more)
Surface (has)	Less than 3	3 to 10	10 to 50	50 to 100	More than 100
Heads of cattle	Less than 5	5 to 10	10 to 50	50 to 100	More than 100
Value of productive assets (MxP)	Less than 5,000	5,000 to 25,000	25,000 to 100,000	100,000 to 500,000	More than 500,000
Percentage of output sold	Less than 20%	20% to 40%	40% to 60%	60% to 80%	More than 80%

Source: FAO (2003).

Table 5.5: Percentage of Beneficiaries of Alianza para el Campo by Type of Beneficiary

Programs	Beneficiaries Type I	Beneficiaries Type II	Beneficiaries Type III	Beneficiaries Type IV	Beneficiaries Type V
Rural Development	23	30	33	13	1
Agricultural Development	4	20	43	27	6
Livestock Development	3	13	41	36	8
All Alianza	11	21	38	25	5

Source: FAO (2003).

⁵⁹ This in turn consists of three subprograms: (i) the *Programa de Apoyo a los Proyectos de Inversión Rural* (PAPIR), an investment fund to finance productive investments, (ii) the *Programa de Desarrollo de Capacidades en el Medio Rural* (PRODESCA), a training/human capital development program, and (iii) the *Programa de Fortalecimiento de Empresas y Organización Rural* (PROFEMOR), a social capital program oriented to the strengthening of farmers' organizations.

Several aspects of *Alianza* prevent it from being a progressive program, whatever its other merits. First, as we have seen, it is mostly oriented to the non-poor. The main reasons for this are (i) wide, untargeted eligibility criteria, (ii) only producers with some capital or access to finance can put up the counterpart contribution required, (iii) asymmetric information: insufficient dissemination of the scope and rules of the program makes larger farmers more likely to be better informed, and (iv) the technical assistance provided with the program is more suitable to the needs of the more commercial farmers (FAO, 2003). Geographical targeting is also lacking. High marginality municipalities (identified by the CONAPO index) have not been a priority in practice, although the rules of the *Desarrollo Rural* subprogram indicate that 70 percent of the funds should go to them.⁶⁰ Finally, like in other agricultural programs, landless farmers are left out.

The program could be made more poverty friendly without major change in its objectives. One way would be through improved selection by filtering out better off farmers likely to carry out the investments without program support. Assistance could be provided to these farmers by helping them obtaining investment credit from established sources through risk sharing or other mechanisms. Another way would be to enhance the *Desarrollo Rural* program and redesign it using a territorial approach to rural development. Other ways are through better dissemination, more focus on marginal areas, and a better link of *Alianza* supports to small farmers with their access to rural finance so that poor farmers without counterpart funds can participate.

A decentralization of the program brings both risks and opportunities. Some 25 percent of the *Desarrollo Rural* funds were being decentralized to municipalities in 2004, and the present administration intends to fully decentralize the program by the end of its mandate in 2006. This brings both risks and opportunities and it is not clear what the effect would be. On one hand, local authorities could be better placed than central ones to identify priorities. On the other hand, local authorities are experienced in local infrastructure and service investments but not in productive development projects, an area in which they have not been traditionally involved. There is hence risk of atomization and lack of focus of the investments. The implementation of a territorial approach to rural development, explained in Annex 3.I., would reduce this risk.

Procampo

***Procampo* is a cash transfer program launched in 1994 to compensate grain farmers from income losses due to increased competition brought by NAFTA.** It is thus an income support rather than poverty program, and is supposed to finish in 2008 when the transition period expires and there is full market integration. The only conditionality is planting of eligible crops (mostly grains⁶¹) three years before 1994, and continued cropping of the land. The subsidy is given to the user of the land, not necessarily the owner, and is seasonal, so that double cropping farmers receive it twice in a year. The payment is of US\$ 80 to 90 per hectare and per season. There is no limit to the number of hectares for which a farmer can receive the subsidy other than the constitutional land ceiling⁶² (Davis, 2003). Like *Alianza*, *Procampo* is a large program with a budget of some US\$ 1.2 billion in 2003 benefiting an average of some 2.8 million farmers per

⁶⁰ Thus, for instance, in 2002 only 15 percent of *Papir* funds (the core subprogram of the *Desarrollo Rural Program*) went to these municipalities.

⁶¹ There was some widening of crop eligibility over the years. The crops currently eligible are maize, rice, wheat, barley, sorghum, beans, soybeans, cardamom and cotton.

⁶² In Mexico there is a constitutional limit to land holdings of 100 hectare of irrigated land or the equivalent in less productive lands.

year with coverage of some 14 million hectare. Payments are made directly to farmers included in the *Procampo* registry, with bank checks, upon verification that the land is cultivated. It is a very popular program among farmers and in rural areas in general. Table 5.6 shows the evolution of *Procampo*'s budget, subsidy per hectare, surface covered, and number of beneficiaries.

***Procampo* has some pro-poor features, including wide coverage and focus on the social sector.** *Procampo* marks an attempt to move from a conventional price and marketing support system to a more decoupled one. Although not a poverty targeted program, it is a considerable improvement equity-wise compared to the regressive system of protection that it replaced. The most positive feature of *Procampo* for the small farmers is its large coverage, which, even if the program is not targeted, allows the vast majority of poor farmers, most of whom produce grains, to benefit from the subsidy in a stable and predictable way (according to the 1997 *ejido* survey, some 85% of *ejidatarios* received the subsidy). *Procampo* also releases somewhat the severe financial constraint faced by farmers, thus facilitating on and off-farm productive investments, which have an income multiplier effect.⁶³ This effect, however, is not equitably distributed, being more powerful for large farmers. Finally, the program has the interesting but little noticed effect of drawing poor farmers closer to the banking system and the use of banking services.

Table 5.6. *Procampo*: Budget, Subsidy and Hectares Covered, 1994-2003

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Budget (MxP mn)	4,848	5,864	6,793	7,533	8,492	9,372	10,379	11,005	11,851	14,191
Subsidy (USD/ha)										
Fall-Winter	98.3	63.9	58.4	61.4	61.9	66.2	75.0	83.9	86.4	82.1
Spring-Summer	114.4	96.0	66.6	71.2	76.5	70.6	82.6	86.7	94.8	86.8
Surface (000 ha)	13,625	13,321	14,306	13,885	13,869	13,528	13,571	13,420	13,698	13,900
Beneficiaries (000)	3,295	2,934	2,987	2,850	2,780	2,724	2,681	2,695	2,792	2,800
Social sector	n.d.	2,445	2,511	2,390	2,343	2,320	2,265	2,267	2,348	2,352
Private owners	n.d.	432	419	405	385	371	365	376	391	392
Mixed ownership	n.d.	57	57	55	52	51	51	52	53	56

Source: IICA (2004: 279) Based on figures from ASERCA.

Income from *Procampo* is important for the rural poor. In 2002 it accounted for 4.7 percent of family income of the bottom quintile of the income distribution of the disperse rural population, and 5.5 percent of that of the extreme rural poor. The share of *Procampo* income in poor farming families is of course much higher. A study by Davis, Handa and Soto (2001) estimated an impact of *Procampo* of five points in the national poverty rate in 1996.

The program also has some less favorable features from the point of view of poverty friendliness: (1) it bypasses landless farmers, and (2) since land is unequally distributed and the subsidy is proportional to the size of holdings, the distribution of benefits is biased towards larger holdings. Seasonal payments favor also farmers with access to irrigation, who can double crop and are normally better off than those who cannot double crop. As seen in Table 5.7, in 2004 farmers with land-holdings of less than 2 hectare received only 13 percent of all subsidies, while one third of all funds were allocated to land holdings above 18 has. In terms of consumption expenditure deciles, in 2002, the first three deciles received 20.8 percent of the subsidy while the top decile received 29.2 percent.⁶⁴ The moderately poor received 53.2 percent of the subsidy and the non-poor 46.8 percent, but only 26.4 percent of the extremely poor (who typically are land-

⁶³ This is partly because of the incremental cash and partly because *Procampo* payments can serve as collateral for loans. By comparing the *ejido* surveys of 1974 and 1997, Sadoulet, de Janvry and Davis (2001) estimated this effect to be between 1.5 and 2.6 for *ejidatario* farmers.

⁶⁴ Staff calculations based on ENIGH (2002). Rural defined as localities with less than 15,000 residents.

less) received the subsidy (Figure 5.8). This said, Ruiz *et al* (2002) have shown a positive impact of *Procampo* on nutrition, similar per MxP received to that of *Progresa*, while a study by González- König and Wodon (2003) found a negative impact on migration, both temporary and permanent.

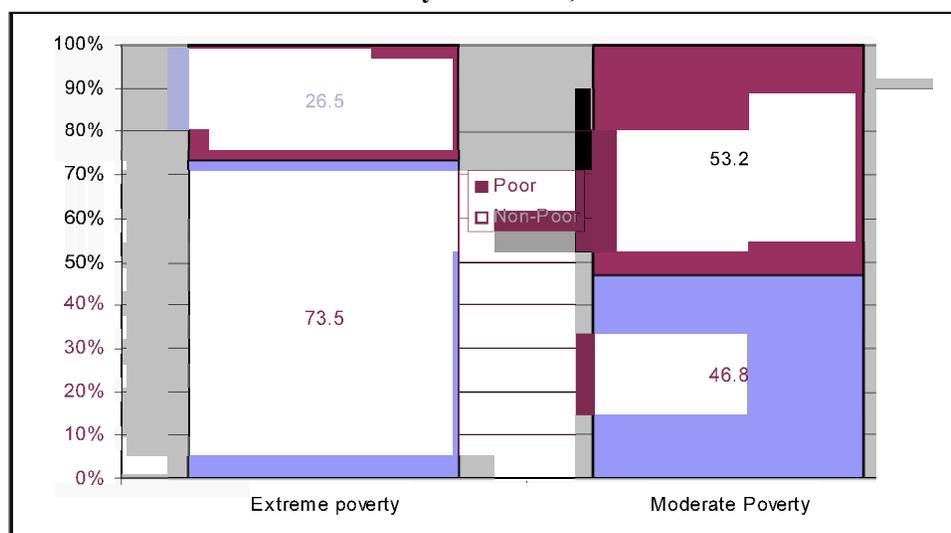
There have been important improvements in the design of *Procampo* in recent times that have made it friendlier to the poor. First, farmers with less than one hectare receive the full payment corresponding to one hectare, and farmers with less than 5 hectare receive a payment per hectare above the norm.⁶⁵ Second, there has been an improvement in timing, which gives producers the possibility of receiving the subsidy before planting so that they can use it to pay for crop inputs. Finally, a long awaited scheme was introduced whereby farmers can receive cash the discounted amount of the remaining subsidy, provided they employ that cash in a productive project.

Table 5.7. Procampo: Beneficiary Distribution by Size of Holdings

Size of Holding	Producers		Hectares	
	Number	Percentage	Number	Percentage
0 to 1	648,785	23.7	594,305	4.4
1 to 2	672,794	24.6	1,201,075	8.8
2 to 5	804,613	29.4	2,836,562	20.8
5 to 10	391,776	14.3	2,925,391	21.5
10 to 18	113,821	4.2	1,543,079	11.3
18 to 100	97,906	3.6	3,384,032	24.8
More than 100	6,375	0.2	1,148,490	8.4
Total	2,736,070	100.0	13,632,934	100.0

Source: IICA (2004: 280) based on ASERCA data.

Figure 5.8. Rural Mexico: Share of Procampo transfers by Poverty Condition, 2002



Notes: (1) Rural areas defined as localities with less than 15,000 residents.

Source: Calculated from ENIGH 2002.

⁶⁵ MxP 1,030 per hectare against MxP 905 per hectare in the 2003 spring-summer cycle.

According to its original plan, *Procampo* should be discontinued in 2008. In view of the popularity and many functions of the subsidy in the rural economy, it is difficult to imagine that this will be politically and socially feasible. The design, however, may change. One possibility is to substitute *Procampo* with a different type of subsidy. Thus, SAGARPA is considering the possibility of introducing some kind of social security system for rural elders as a replacement of *Procampo*.

Aserca Price and Marketing Supports

Aserca (Apoyos y Servicios a la Comercialización Agropecuaria) was created in 1991 to support the marketing of surpluses in an open market environment. It is a government entity operating under SAGARPA. *Aserca* operates the *Apoyos a la Comercialización y Desarrollo de Mercados* program, which was introduced to ease marketing problems of surplus producers of grains and strengthen their capacity to compete with imported produce after liberalization. Until recently, the program consisted of a subsidy for surplus farmers (mostly medium and large ones) covering the difference between the local price and the import parity price. The objective was that all beneficiary farmers received the import parity price irrespectively of transport costs, marketing failures and differences in marketing costs.

The volume of the program has almost tripled since the mid 1990s, the volume of produce covered increasing from 4.5 million tons in 1995 to 12.1 million ton in 2002, and the subsidy from MxP 806 million to MxP 4,005 million, as shown in Table 5.8.

Aserca subsidies are regressive. There were some 67,000 beneficiaries in 2002 who received an average support of around US\$ 5,200 each, i.e. approximately four times the moderate poverty income line. This suggests that the subsidy goes to medium and large commercial farmers. Also, it mostly benefits rich agricultural states as shown in Figure 5.9. Thus, in 2002, *Sinaloa*, *Sonora*, *Tamaulipas* and *Guanajuato* received among them more than 80 percent of the support.

Table 5.8. ASERCA Marketing Support Program, 1995-2002

	1995	1996	1997	1998	1999	2000	2001	2002
Volume (000 tn)	4,528	1,726	8,091	6,531	5,915	8,758	16,052	12,085
Value (million MxP)	806.5	555.4	2,068.0	1,930.6	1,573.6	2,928.5	5,133.5	4,005.0
Subsidy in MxP per tn	178.1	321.8	255.6	295.6	266.0	334.4	319.8	331.4

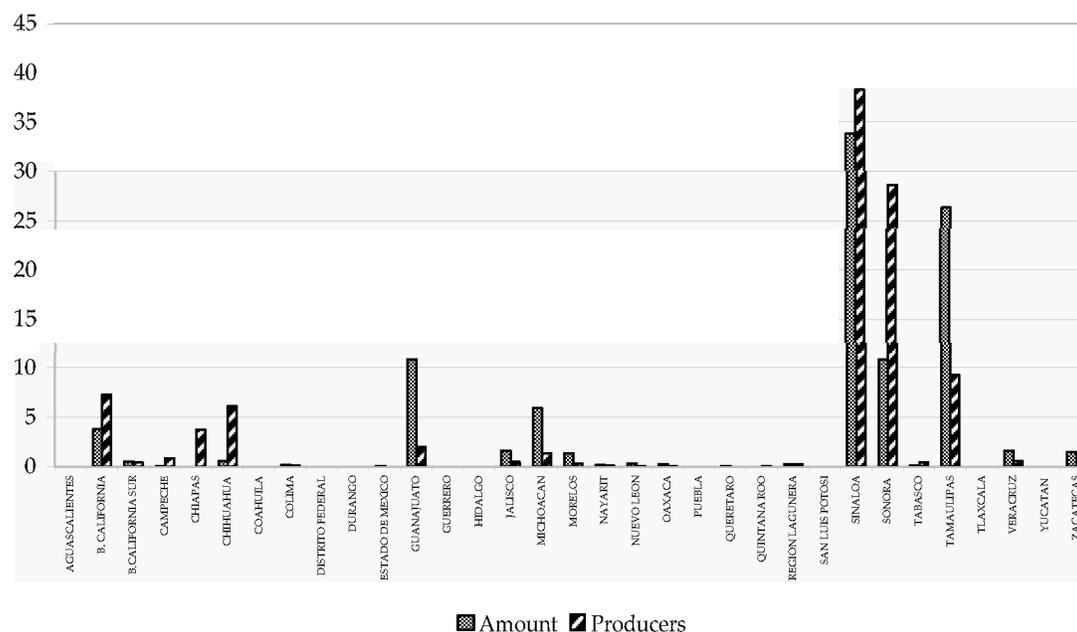
Source: Presidencia de la República. III Informe de Gobierno. Anexo estadístico 2003.

There have been some changes and improvements in recent years. Support has been introduced to compensate for the price fall effect due to international competitors' subsidies. This is done through a system of target income for each product. Also, a 5-year horizon was adopted to give more price certainty to producers. Special programs have been set up to promote shifts from excess supply to excess demand crops, and to promote the rediscount (*pignoración*) of warehouse certificates of deposit.

Poverty aspects aside, the program has some weaknesses. Although *Aserca* supports play an important role in allowing Mexican commercial producers of import-competing grains to compete in better terms, and compensate somewhat for price reducing practices from trade partners, their efficiency and effectiveness may be called into question. One issue refers to the efficiency issues linked to the attempt at pan-territorial pricing implicit in the subsidy. Another refers to the actual possibility of replacing the compensatory subsidy by border protection measures, thus shifting the burden of the subsidy from the taxpayer to the consumer. More

generally, it can be asked to what extent a middle income, fiscally starved country with high poverty rates like Mexico can afford in the long run a heavy subsidy program that does not benefit the poor and is not conditional on improvements in competitiveness.

Figure 5.9. Distribution by State of ASERCA Marketing Supports in 2002, Percentages



Source: World Bank staff calculation form ASERCA data.

POVERTY FRIENDLINESS OF NON-AGRICULTURAL RURAL DEVELOPMENT POLICIES

There are three important trends in rural development policies outside agriculture: (1) decentralization of social infrastructure, which has resulted in an increased role of both state and municipal governments, (2) the promotion of territorial development agendas through federal programs, (3) and the introduction of direct cash transfers to the poor.⁶⁶

Decentralization of Rural Infrastructure

Rural social infrastructure funding has been decentralized. Decentralization is important in many areas of social provision for the rural poor, but we will be concerned here with social infrastructure only. Since 1998, the instrument for decentralizing social infrastructure is the *Fondo de Aportaciones para la Infraestructura Social* (FAIS) of *Ramo 33* of the federal budget. Municipalities are the main beneficiaries of social infrastructure decentralization, since most of this fund (88 percent in 2000 according to the *Encuesta Nacional sobre Desarrollo Institucional Municipal 2000*) goes to municipal authorities under a sub-fund called *Fondo para la Infraestructura Social Municipal* (FISM), and the rest to state governments. On average, FISM accounts for 27 percent of municipal resources, but its importance is much larger for rural and semi-rural municipalities for which it goes from 25 to 75 percent (Cabrero Mendoza, 2002). The largest part of investment (around 22 percent) goes to urban development and the smallest parts

⁶⁶ Education and health policies are not considered here since they are included in World Bank (2004)

to housing improvement and productive infrastructure (around 3.5 percent each). Resources are divided between the municipal capital and other municipal areas in varied proportions according to municipalities but, in general, richer (i.e. less marginal) municipalities tend to devote proportionally more resources to the municipal capital (González de Alba y Garza Navarrete, 2002).

The modification of the *Ley de Coordinación Fiscal* in 1997 and the introduction of *Ramo 33* and FISM brought two improvements in the distribution of resources for social infrastructure: (1) the allocation of funds among municipalities according to objective criteria based on municipal needs –the *carencia municipal*–, which prevents arbitrariness and clientelistic distortions, and (2) the larger autonomy in investment decisions that the present policy gives to municipalities. Some rural municipalities have a system in place that allows the participation of civil society in establishing investment priorities, mainly through municipal development councils operating alongside the *cabildos* as consultative bodies to the *presidentes municipales*. Some of these councils are the heirs of the municipal *Consejos de Planeación del Desarrollo* (COPLADEs) created during the Salinas administration, others are more recent. In some municipalities there is a *Plan de Desarrollo Municipal* approved by the *cabildo*, where the investments are included. Yet, many rural municipalities do not have such councils and municipal plans, and the decision on the use of FISM funds is taken by the *presidente municipal*.

In general terms this system can be considered poverty friendly, but some improvements can nevertheless be made. To the extent that (1) the allocation of funds is made according to municipal needs measured by poverty indicators, and (2) the local use of funds is more efficient and transparent and reflects people’s priorities better, the current system can be considered poverty friendly. Some improvements, however, are possible. The first is to introduce an independent monitoring and evaluation (M&E) system for FISM, which does not exist at present. It could consist of either independent systems operated by the states or one single federal system. The latter seems a better choice because of the advantages of having centralized M&E mechanisms for decentralized operations. Another improvement would be the systematic introduction of participatory approaches for establishing investment priorities and to ensure transparent accountability of the use of funds. Finally, it would be desirable that FISM funds are not used in isolation of other sources of development assistance to municipal areas from federal or state programs or other sources. An integrated approach for the municipal territory, consolidated in a strategic municipal program designed in a participatory manner, would be the best way to exploit synergies between different programs and organize the municipal demand for development assistance.

Promotion of Territorial Development

Several federal programs have tried or are trying to create territorial development systems in rural areas. We can single out among them the *Programa de Areas Marginales*, implemented by SAGARPA, which was developed during the Zedillo administration, the *Microrregiones* program, implemented by SEDESOL, and the *Microcuencas* program, implemented by FIRCO, the latter two started under the Fox administration. Also important to the promotion of local development in rural areas is the *Ley de Desarrollo Rural Sustentable*, passed in December 2001, and the sustainable rural development councils whose creation is mandated by the Law.

The *Marginal Areas Program* was an attempt to achieve rural development in marginal zones through the promotion of productive activities. It started in 1997 operated by SAGARPA in the framework of the rural development subprogram of *Alianza para el Campo*,

and was supported by a World Bank loan. Six marginal areas were selected for a first phase, 3 in *Oaxaca* and 3 in *Las Huastecas* (in the states of *Veracruz*, *Hidalgo* and *San Luis Potosí*), and another 11 for a second phase in the states of *Chiapas*, *Puebla*, *San Luis Potosí*, *Guerrero*, *Michoacán* and *Veracruz*. Matching grants were given to farmers to invest in homestead orchards and small animals, agriculture and livestock projects, land conservation, and transformation units. Funds were also available for extension and training, institutional support, and communal activities and projects. The main novelty of the program was institutional and consisted in the creation in each region of a *Consejo de Desarrollo Rural* of mixed public-civil society composition. According to original design, these councils were to be largely autonomous and strongly empowered with decision making capacity in investment and technical assistance matters, thus capable of playing a crucial role in territorial development as core meso-level economic coordination institutions.

The program is now terminated, but provided some important lessons.⁶⁷ There were four main limitations some of which were slowly overcome as the learning process went on. First, the political will to construct truly representative and autonomous councils and empowering them was not always there. Political traditions, administrative limitations, and a less than full understanding of the advantages of community-driven development, particularly by state governments, which had a strong say in the implementation of the program, were the main reasons for this. Second, the program focused primarily on agricultural development and was not really multisectoral. Also, shared long term visions for the regions future and the strategic programs to carry them out were not constructed. Third, there were problems with the extension system that was put in place under SINDER, which lacked continuity and client orientation, and was not up to the difficult technical and organizational challenges posed by poor farmers in these regions. Finally, there were administrative and financial management limitations (timing in the liberation of funds, eligibility of investments, restriction on certain categories of expenditures, heavy ex-ante controls, and the like), which did not help implementing a program like this which requires plenty opportunity and flexibility in expenditures. Notwithstanding the above limitations, which should be seen as a reflection of the learning process, the program helped improving the incomes and assets of many poor farmers in the targeted areas.

Microrregiones is another federal program oriented to marginal areas. It is implemented by SEDESOL, started operating in 2001 in the framework of *Contigo*, and is currently on-going.⁶⁸ *Microrregiones* is not only a program but also an attempt at developing a new strategic approach to rural development. Activities mainly concentrate on municipalities of high and very high marginality measured by the CONAPO marginality index. There are 1,338 municipalities in these categories, which have been grouped into 263 micro-regions. The strategy has three basic features: (1) investments are not dispersed through the micro-region but concentrate on specific localities, the so-called *centros estratégicos comunitarios*, assessed to have the potential to act as development poles within a certain area of influence; (2) although the program has its own development budget, it mostly tries to promote and coordinate investment and service provision to the *Centros comunitarios* by other government bodies;⁶⁹ (3) achievement is measured on the basis of the supply of missing development services or assets –the so-called *banderas blancas*. Since the end of 2003 the formation has been promoted of *Agencias de Desarrollo Local*, consisting of professionals of civil society or rural organizations who

⁶⁷ The program was discontinued in 2003, and the World Bank project supporting it closed.

⁶⁸ *Microrregiones* can be seen both as a government program with operation norms and a budget line and as a strategic perspective of the rural development process and attempt to coordinate efforts of different parts of government around that perspective.

⁶⁹ There are 14 *secretarías* involved in the program plus state governments and municipal authorities.

encourage and assist endogenous processes of territorial development. Up to the end of 2004 there were 81 of these groups operating in 81 *microrregiones*. They are supported and monitored by the *Microrregiones* management unit.

While the project is pro-poor in targeting, some challenges remain in terms of program implementation. Focusing on marginal areas, working with a territorial approach, clustering investments to achieve critical masses of infrastructure and services, and trying to coordinate the local development activities of different agencies, are all very positive features of the program that make it poverty friendly. Program implementation, however, has come across some difficulties. Thus, it has proved difficult to marshal the type of strong commitment from other federal agencies, state and local authorities and the local private sector and civil society necessary for successful territorial development. One reason is that *Microrregiones* is very much associated in people's minds with SEDESOL, and thus seen as its more or less exclusive responsibility. Also, some technocratic features in the program and some top down approaches, mostly associated with the desire to achieve quick impact, do not help attracting local commitment. It was also difficult to build strategic plans for the micro-regions capable of attracting the imagination of the local private sector and civil and political society. A shared strategic plan for the region built from below would help integrating program investments into coherent strategic plans, and setting in motion endogenous growth processes (see Annex 3.I. on this). This could be done in the framework of the *Ley de Desarrollo Rural Sustentable*.⁷⁰ Instead, investments tend to consist of the juxtaposition of actions by different agencies based on a check lists of what micro-regions are supposed to have as development assets and services. Finally, most investments go to social infrastructure and services, and only a minority to employment and income generation projects. This is not surprising since promoting local productive projects requires much work with local communities in the identification of opportunities and the accompanying of the processes. This in turn requires two resources in short supply to the program: a large running budget, and a large number of specially trained, highly motivated staff capable of building virtuous cycles of public-private synergy (see Evans, 1996, and Tendler, 1997, on building public-private synergies).

The *Plan Nacional de Microcuencas* has a micro-territorial development approach. The program, administered by FIRCO, centers on small basins of some 4,000 ha and 1,300 residents each on average. It is a low budget⁷¹ and low profile but effective program from which interesting lessons can be learnt. The program is national in scope and currently operates in 1030 *microcuencas* located mostly in the middle and upper ranges of the respective municipalities, where the concentration of rural poor tends to be larger, covering some 1.3 million people. Although operational in all states, it is particularly active in *Aguascalientes, Chiapas, Coahuila, Guanajuato, Guerrero, Jalisco, Oaxaca, San Luis Potosí, and Veracruz*. Implementation agreements have been signed with 325 municipalities, 13.4 percent of the 2,427 Mexican municipalities.

⁷⁰ The external evaluation of *Microrregiones* says the following in this connection: "La Ley de Desarrollo Rural Sustentable constituye una visión avanzada con relación al desarrollo rural y representa una plataforma –que tiene la ventaja de tener ya el carácter de ordenamiento legal- para la articulación de las políticas gubernamentales de atención al campo, donde se hace énfasis en las regiones de mayor rezago social y económico; esta Ley no vale sólo para SAGARPA pues integra economía, sociedad y medio ambiente e instituye a los Consejos como mecanismos de concertación. Sin embargo la estrategia de Microrregiones, que es de carácter rural, ni siquiera la considera, evidenciando una balcanización de la administración pública altamente lesiva cuando el desarrollo social se quiere económicamente sustentable y en el campo esto es imposible sin la coadyuvancia de SAGARPA" (Instituto Maya, 2003: XVII).

⁷¹ FIRCO's 2003 total budget for this program was MxP 38.4 million.

The program operates under several principles which can be summarized as follows: (1) natural resources conservation is an important area of intervention but emphasis is also given to economic, social and human development within an integrated approach; (2) program ownership by the municipalities and local organizations is strongly sought; a *Plan de Producción y Conservación* is prepared for the micro-basin in a participatory way jointly with local communities, and must be endorsed and formally approved by the municipal *cabildo*; (3) the program does not have an investment budget; it organizes local development demand through the planning process, and once the objectives and priorities are well established it assists in bringing in investment and service supply from different sources⁷²; (4) emphasis is given to the constitution of a team of motivated technical staff to implement the program⁷³, who are rigorously and formally trained as part of their job, with the assistance of academic centers, which also help in the development of intervention methodologies.

Although no evaluation is available⁷⁴, several elements of the program suggest that it is successful in its objectives as well as cost effective. Contrary to *Microrregiones*, it is not targeted to municipalities with high marginality indexes, but it does work in marginal municipalities, and in general the *microcuencas* selected tend to be located in the poorest municipal areas. Three success elements related to program concept and institutional factors can be singled out: (1) emphasis on ownership by the local population and municipal authorities; (2) the constitution of a well trained and motivated team of implementing staff, which have created positive synergies with the local population, and (3) a long-term approach based on developing a good understanding of local conditions and building good relations with the local population, something difficult to do when there is pressure to disburse budgetary resources and fulfill administrative targets set from the distance. The program, however, cannot be considered a panacea for all rural development ailments. *Microcuencas* programs can be ideal local components of strategic projects for larger territorial spaces, but they are too small to reap the economies of agglomeration and reach the critical mass of assets and supply capacity that are crucial to the development process.

The *Ley de Desarrollo Rural Sustentable* is an ambitious and comprehensive piece of legislation, that favors rural development as a multisectoral endeavor and embraces a territorial approach. It sets the framework for government action in agriculture and rural development. One of its central features in this connection is the creation of *Consejos de Desarrollo Rural Sustentable* at various levels -municipal, district, state and national- with mixed composition of government officials and civil society representatives. Municipal councils are supposed to program rural development in the municipalities, suggest investment programs and clear the use of *Alianza* funds decentralized to the municipalities. SAGARPA has been very active in the formation of these councils particularly at the municipal level and many have already been created.

Shared commitment for the joint implementation of the law is insufficient. One limitation of the territorial rural development system that the Rural Development Law seeks to promote through the councils is that, in spite of being a national law binding all government entities, it is very much associated with SAGARPA in the minds of most state and federal government officials operating in rural areas, many of whom do not know well the law and do not see themselves truly bound by it. Progress has been made in this respect during the last two years,

⁷² By the end of 2003 the total investment carried out in this way in *microcuencas* was estimated in MxP 882 million.

⁷³ Some 400 technicians have been recruited by FIRCO to implement the project.

⁷⁴ An evaluation of six *microcuencas* is being prepared by the *Universidad Autónoma de Querétaro*.

but coordination of activities, budgets and operational norms by the various *secretarías* involved in rural development and also with state governments continues to be a challenge.

Direct Cash Transfers

The main direct cash transfers program and one that has attracted national and international attention is *Oportunidades*. Started in 1997 during President Zedillo's administration under the name of *Progresas*, it continued during that of President Fox under the name of *Oportunidades*. The program consists of a direct transfer of cash to women (household heads or spouses) in poor households with school age children. A supplemental food package is included in case of children malnutrition. Transfers are conditional on children attending school and going through regular medical checkups. The program has three components, education, health and nutrition, and two objectives: to alleviate extreme poverty through a direct cash transfer, and to promote the development of human capital. It is the largest single federal program operating in rural areas with coverage of around 3.6 million rural and 1.4 million urban families and a budget of MxP 25.5 billion in 2004 or some US\$ 2.3 bn. The program has been analyzed in the first part of the Mexico Programmatic Poverty work (see World Bank, 2004) and hence it is not examined here.

6. ISSUES AND CHALLENGES IN THE IMPLEMENTATION OF RURAL POLICIES

This chapter examines the implementation process of rural policies. There are many issues and challenges linked to policy and program implementation which Mexico along with other Latin American countries face.

The main findings and policy implications of the chapter are summarized below.

- **A new vision of social development emphasizes the importance of institutions, the role of civil society in development, and the need for a more active developmental role of the state.** This role consists not just in the provision of public goods and appropriate regulatory frameworks but also in the active support to civil society organization, and the search for public-private synergies.
- **Mexico is in transition between program administration cultures:** from reliance on principles of hierarchy and control, to reliance on transparency, creating consensus between those who design and those who implement the programs, and active commitment of the latter to programs' objectives.
- **The challenges faced by Mexico to improve the implementation system of rural development programs can be grouped in five categories:** political and administrative circumstances of a macro type; operational and budgetary norms; organizational cultures; client orientation and beneficiary empowerment; and the incentive system for program operators.
- Among the **macro type political and administrative circumstances** we highlight the electoral system of local authorities, with short mandate and no reelection, little functional to the continuity required by rural development. Also, the annual budgetary system which works against program continuity and the adoption of a long-term perspective. Finally, the organization of the state apparatus along sectoral lines which is little sympathetic to a multi-sectoral matter like rural development. Sub-national levels could play an important role in overcoming "sectoralism". At the federal level, the Secretaría de Hacienda, which has a multi-sectoral view and is responsible for the quality of public investment, is well placed to take an active role in promoting the integration of federal rural programs with a territorial approach.
- **Appropriate operational and budgetary norms are critical to program success.** Simplifying these norms and making them friendly to the realities of rural areas would improve implementation. One problem is the time factor, for timeliness of support is often more important than amount of support. Not only are there no multi-annual budgets but operational and budgetary norms often allow a few months only to spend the allocated budget, thus introducing distortions. Changes from year to year in norms related to issues like eligibility conditions, subsidy amounts, target areas

and type of benefits are also detrimental to program implementation because they introduce uncertainty among beneficiaries and operators.

- **Another challenge relates to the few recurrent funds usually made available for program operation.** There is a conservative attitude towards allocating recurrent costs for program implementation, which is understandable in view of the abuses of the past but potentially damaging to program success. This is particularly the case with productive programs where the formula for success could be summarized as “recurrent costs + rural finance”.
- **Among the challenges posed by prevailing organizational cultures is there a culture of mistrust,** evident for instance in the reluctance of middle managers to take decisions for fear of breaking the norms, and in the *ex ante* controls that often check operations. The **institutional segmentation culture** adds to the problems created for rural development programs by the sectorial organization of the state. One possible option to overcoming this culture would be through enhanced efforts from SAGARPA to involve more other organizations in the application of the *Ley de Desarrollo Rural Sustentable*. The *Secretaría de Hacienda* and *Presidencia de la República* could also promote more integration of rural development programs in the framework of the law, encouraging the application of a territorial approach to rural development. Strengthening the evaluation culture could be achieved by introducing M&E systems simultaneously with program design, better dissemination of program evaluation results, constructing action agendas for the recommendations made by evaluation teams and monitoring the progress made on these agendas, and adopting participatory M&E methods. Overcoming the culture of short-term achievement could be addressed through the design of a long-term strategy for rural areas as *política de estado* cutting across party lines and administration terms, and the recognition of the importance of “intermediate policy results” and their value to political constituencies. Finally, efforts could be made to move the culture related to decentralized implementation away from the dichotomy between normative functions at the center and operational functions at the periphery.
- **Improving client orientation and beneficiary empowerment is another challenge, which could be addressed in various ways:** enhancing the dissemination of programs and program norms to prevent biases in the beneficiary selection process; disseminating among beneficiaries evaluation results and the action agendas emerging from them; direct accountability from program operators to client/beneficiaries; and measures to detect and prevent opportunistic and rent-seeking behavior on the part of program operators.
- **The last category of implementation challenges discussed refers to improving economic and moral incentives for program operators.** The economic situation of bottom level program operators is generally inconsistent with the importance of their function. It could be revised through linking remunerations to performance and client satisfaction. Maximum performance from bottom level program operators could be sought through a reevaluation of their function, consulting with them on program matters, giving them systematic training, disseminating best practices, carrying out systematic performance evaluations of their work, and promoting networking systems, a client orientation ethic, and a sound esprit de corps.

- **Two measures might help advancing in the transformations suggested above:** the creation of a technical committee to examine the implementation issues of rural development programs and make recommendations; and empowering the *Consejo Mexicano para el Desarrollo Rural Sustentable* to take an active role in the evaluation of rural development programs and the monitoring of the action agendas resulting from program evaluations. The *Consejo* would also be the natural institution to promote the preparation of a long-term rural development strategy to propose to the country as política de estado. It would be difficult for the *Consejo* to carry out these functions without appointing a managing council and having a small technical secretariat.
- **Together with the above measures, two innovations could be considered: the introduction of a system of *oidores*,** consisting of well trained individuals or teams who would informally follow rural development programs at the point of service delivery; and the promotion of process certification, carried out by independent consulting firms or NGOs, who would certify that the processes related to program operation and beneficiary participation are sound.

GENERAL ASPECTS

We review in this part some of the issues and challenges found by governments in the implementation of public policies and programs, discussed in the classical literature on public management. The purpose is to understand how and why implementation is a complex process, and also to realize that many of the issues found in the implementation of rural development programs in Mexico examined in the following part are recurrent ones, not exclusively Mexican, on which there is codified knowledge.

Institutions, Civil Society and the Role of the State

An integrated approach to rural development requires building institutions that involve civil society and the state. A new vision and a new mood have gained momentum among development theorists and practitioners after the adjustment processes and disappointing growth of the 80s and early 90s, when development recipes were based on Washington Consensus premises. The upcoming vision stresses, *inter alia*, (1) the importance that strong institutions have for development (Burki and Perry, 1998), (2) the recognition of organized civil society as a major “third sector” and of its contribution to good governance and the development process, and (3) the need for a more active developmental role of the state. Perhaps more importantly, the new vision recognizes the synergies usually established between the public and private domains in successful development programs, and the contribution that these synergies can make to economic and social progress. In the area of rural development, largely established boundaries between urban and rural areas, agricultural and non-agricultural activities, on-farm and off-farm employment, are being crossed over in favor of a more integrated concept of the rural development process (Tendler, 1998, World Bank, 2002b).

Strong institutions are needed as much for equity reasons — the fight against poverty and inequality (World Bank, 2000, and de Ferranti *et al*, 2004)— as for efficiency reasons —the proper functioning of markets (World Bank, 2002) —, and are important both in the government sector and in the private sector and civil society. Strong government institutions are particularly relevant for the implementation of development programs, because most of the developmental agency of the state is carried out through specific programs, whose characteristics and operation depend crucially on the quality and strength of government institutions.

Civil society organizations play a fundamental role in the promotion of common interests of groups in society. Many also perform public-type functions by providing collective goods to their members as in the management of common property resources (Ostrom, 1990). Of particular relevance for rural development are meso-level civil society organizations that perform economic coordination functions at the regional or sector level (Helmsing, 2001). They are essential for inter-firm economic coordination and public-private interaction, and can be of many types: 2nd level producers' associations, governance organizations of production chains, business societies, 2nd level rural finance associations, territorial organizations like regional or municipal development councils, 2nd level indigenous peoples' organizations and others. Institutional maturity and organizational thickness have been recognized as conditions facilitating endogenous processes of local development (Putnam, 1993).

The state, on the other hand, retains the overarching responsibility for economic development. Other than the classical roles of making war and enforcing internal order, states have acquired in modern times an overreaching role in contemporary developing societies –that of being responsible for their economic transformation (Evans, 1995). This sets the state apart from other social organizations; for no other organization has the recognized role of designing and implementing development policies and articulating the development process.

The new vision asserts that this developmental role consists not just in the provision of public goods and appropriate governance and regulatory frameworks for the market to operate, but also in (1) the active promotion of civil society organization (Tendler, 1997), and (2) the search for public-private synergies (Evans, 1996, United Nations, 2004). Synergy may consist of exploiting complementarities in the co-production of development assets and services, where each part contributes that in which it has advantage, as in rural housing programs where the responsible government agency provides engineering design and supervision and some building materials while the local community provides labor and complementary materials. Synergy may also consist of state officials and the local population going beyond the public-private divide to create a collective action agenda based on the community of interests set by the development objective. The state is here embedded in the development process, working hand in hand with other actors and enhancing their development role, not substituting for it.

The Complex Process of Policy Implementation

The reality of policy implementation includes plurality of interests which may create a gap between design and realization. Policy implementation is far from being a linear, hierarchical process; it is a rather complicated, potentially conflict-ridden game similar to the assembling of a machine of many different parts, each with its own autonomy: financial resources, administrative processes, public and private providers, government regulations, beneficiary attitudes, and so on. It is a process with a life of its own, usually carried out by large and inflexible administrations, open to the distortions of bureaucratic interests. Different games are possible within the “implementation game”, and policy and program objectives can be deeply distorted, even reversed, by these games (Bardach, 1977 and 2001). It is important, therefore, when addressing implementation shortcomings to recognize the plurality of interests that exist in the implementation process, and the ensuing potential distance between objectives and broad design, on the one hand, and hard implementation realities, on the other.

World Bank view on implementation. A World Bank study on service delivery to the poor (World Bank, 2004b) characterizes the process of implementation as a set of relationships among four actors: citizens/clients, politicians/policymakers, organizational providers, and frontline professionals, who “are linked in relationships of power and accountability. Citizens

exercise *voice* over politicians. Policymakers have *compacts* with organizational providers. Organizations *manage* frontline providers. And clients exercise *client power* through interactions with frontline providers” (page 48-9). There are two routes of accountability of frontline providers to clients: a long one whereby citizens influence policymakers and these in turn influence providers, and a short one whereby clients are directly vested with power over providers.

Quality of implementation of development programs is better examined at the intersection between program operators —the frontline providers— and the beneficiary public —the clients. It is at the “point of service delivery” where programs succeed or not, and it is there where we can check the extent to which the operation rules and their application respond to program objectives (Williams, 1980 in Aguilar Villanueva, 1993). From this vantage point we can assess what Berman (1978) calls micro-implementation: the way in which local-level operators adapt to program norms and central instructions putting in place their own operational procedures. We can also undertake from there a “backward mapping” of the implementation process until we arrive to the policy or program decision top (Elmore, 1979-80). This is the opposite of “forward mapping”, the process normally followed in policy design, which starts from the formulation of the policy decision or program objective, and then traces the always more detailed steps that should lead to satisfactory implementation. “Forward mapping” thus assumes that policy-makers or program designers control the organizational, political and technical processes affecting implementation. “Backward mapping”, on the contrary, does not presuppose such control, and questions at each stage the capacity, resources and motivations of the responsible unit or individuals to carry out the operation of the program according to objectives.

Implementation critically depends on bottom-level operators —public servants, contracted individuals, service firms or NGOs— that have direct contact with beneficiaries. It is these “street-level bureaucrats” (Lipsky, 1976) that can make the difference, because (1) they may or may not generate the synergies on which program success will normally depend; and (2) they are the ones who ultimately determine how the program is delivered. To be good, norms must be general since any attempt at disciplining heterogeneous reality by means of complex rules is destined to fail, imposing a straight jacket likely to paralyze implementation. These general norms are interpreted and enriched at all stages in the implementation process. Norm creation thus continues to exist until the beneficiary is reached and the program’s relation with him/her is exhausted. “Street-level bureaucrats” are probably more important than anyone else in this process. This is why their technical and context capacity to do well their job, their understanding of and commitment to program’s objectives, and their empowerment to carry out the assigned task with imagination and confidence are essential to program success.⁷⁵

The approach to the implementation of development programs and the quality of implementation processes are affected by how public administration was shaped over time as a system of concrete organizations with their own corporate culture, and the dominant concept of how the system functions. Elmore (1978) contrasts an organizational model that he calls

⁷⁵ The importance of a committed and innovative attitude of civil servants is recognized in the Mexico’s National Development Plan, 2001-2006. Thus: “A través de la innovación buscaremos reemplazar los sistemas burocráticos por sistemas emprendedores (...) Transformar la orientación del Gobierno sólo será posible si somos capaces de sumar las voluntades de todos los servidores públicos, por lo que debemos dejar atrás los esquemas jerárquicos basados en el control, que inhiben la creatividad y la innovación, para dar pasos a esquemas que faculten y fomenten la participación y el trabajo en equipo” (México, 2001: 64)

“systems’ administration” with another one called “organizational development”⁷⁶. For simplicity we call them Model 1 and Model 2.

In the “systems’ administration” model —Model 1— organizations are supposed to pursue the rational allocation of means to ends so as to maximize some objective function, all organizational behavior being determined by this. The organizing principle postulated is that of hierarchical control, with decision-making concentrated at the managerial top. For each of the organization’s tasks there is an optimal allocation of responsibilities among subordinate units. In this model, program implementation is a dynamic process consisting of (1) carefully defining the objectives, (2) allocating to the subordinate units the responsibilities and performance parameters consistent with those objectives, (3) supervising performance and distributing rewards and sanctions as appropriate, and (4) making internal adjustments to improve performance, particularly in response to change in program environment or demands.

In the “organizational development” model —Model 2— the organization is supposed to work so as to satisfy the individuals’ need of autonomy and control over their own work and the participation in decisions that affect them, and to promote their commitment with the organization’s objectives. Consequently, organizations should be structured so as to maximize individuals’ control, participation and commitment at all levels, which implies minimum hierarchical relations. In this context, effective operation depends on the creation of consensus, strong interpersonal relations among individuals, and the construction of effective task forces. Program implementation in this model consists of creating consensus and adaptation between those who define the objectives and those who have to implement the program, and seeking the active commitment of the latter to the program’s objectives and goals.

The historical process has resulted in Mexico, as in other Latin American countries, in a state administration culture closer to Model 1 than to Model 2. Closeness to Model 1 does not mean that the system operates with the rationality and hierarchical control effectiveness implied in the model’s description. This is prevented by (1) the unavoidable presence of conflict within and across organizations, and of individuals’ and units’ own agendas, and (2) the use of routines to avoid change. What it means is that the perception of how the system should ideally work is based on the concept expressed by Model 1. An illustration of the implementation logic implied in the two models is provided in Box 6.1.

Box 6.1. Illustration of the Implementation Logic under Model 1 and Model 2

To illustrate these logics we can imagine the hypothetical case of a central government organization in the process of launching a new development program. A way to proceed **under Model 1** would be to: (1) design program details at the central level by a selected group of technicians; (2) prepare program norms; (3) inform of program characteristics and operation norms to de-concentrated government units and sub-national authorities; (4) recruit incremental personnel under short-term contracts to implement the program; (5) train that personal on program norms; (6) centrally develop staff work norms and performance parameters, and (7) start operations based on the operation norms, staff work norms and performance parameters.

Under Model 2 we can imagine the routine for launching the program as follows: (1) once a preliminary concept of the program has been developed, consultations are started through a set of workshops with de-concentrated offices, sub-national authorities, organizations representing potential beneficiaries, and other sectors of government and society who may contribute to the program, with the purpose of checking the soundness of the program’s concept, improving it, and

⁷⁶ Elmore considers also another two models called “bureaucratic process” and “conflict and negotiation”.

developing operation norms; (2) the concept is also presented to relevant government organizations to inquire if they want to associated themselves to it; (3) if the organization's staff is not sufficient, new staff is recruited within a framework that would allow satisfactory salaries and job continuity upon good performance, or alternatively a private firm or NGO (or a set of them) are contacted to conduct implementation in the perspective of a medium or long-term implementation contract; (4) the program concept and norms are thoroughly discussed with the recruited staff (or firms or NGOs); (5) pilot operations are carried out to check the soundness of the concept and the applicability of the operation norms, and serve as an experimental ground for the implementing staff (or firms or NGOs); (6) the experience gained during these operations is discussed with the participants and other stake holders, and the program design and operation norms are revised accordingly; (7) a continuous training program and staff networking and support systems are developed jointly with the staff (or firms or NGOs); (8) work norms and implementation parameters are developed jointly with the staff (or firms or NGOs); and (9) program implementation is started.

ISSUES AND CHALLENGES IN THE IMPLEMENTATION OF RURAL POLICIES IN MEXICO

Where are We?

The situation in Mexico can be described as one of transition between a view of state organization and program implementation based on Model 1 to another based on Model 2. This transition in the implementation model reflects wider changes in public administration taking place in Mexico and other Latin American countries towards a **“New Public Management” culture** (CLAD, 1999, Barzelay, 2003). The essence of the New Public Management view, first developed in the U.K. and rapidly expanding to many other countries, consists of (1) transparency in budgetary processes and administration responsibilities; (2) management by results, including performance oriented budgeting; (3) professional status of public servants and civil service careers; (4) accountability to the client-citizen; (5) decentralization towards sub-national governments and specialized agencies; and (6) program and policy evaluation (Guerrero Amparián, 2000, Arellano, 2001 y 2002, Marini, 2002, Arellano and Gil García, 2003). Advances were made in this direction during President Zedillo's administration, under the *Programa de Modernización de la Administración Pública* (PROMAP), when the reform of Mexican public administration acquired weight in the government agenda. They have continued under President Fox, most notably in electronic government, governmental innovation, *federalización*, and under various programs of SECODAM and SEGOB. Support and stimulus are being received from international organizations, in particular OECD and the World Bank. The National Development Plan 2001-06 emphasizes this transition towards a New Public Management when describing the type of government the country needs (Box 6.2).

Box 6.2. The “New Public Management” View in the *Mexico National Development Plan 2001-2006*

“A fin de que esta administración cumpla con su responsabilidad histórica de dar respuesta a las grandes demandas y expectativas de la sociedad, requerimos acciones capaces de transformar radicalmente los esquemas tradicionales de gestión... Necesitamos un gobierno participativo... que de forma constante se someta a una rigurosa rendición de cuentas, no sólo en lo que se refiere al uso honesto y transparente de los recursos, sino también a la eficacia y calidad con que se utilizan. Requerimos un gobierno con un alto sentido de responsabilidad social... Requerimos un gobierno estratégico y competitivo, que sea la vanguardia de la sociedad, que establezca democráticamente las prioridades sociales e invierta de manera eficaz sus recursos financieros, humanos, materiales y legales... Requerimos un gobierno inteligente, capaz de usar los

más avanzados sistemas administrativos y tecnológicos... Queremos un gobierno ágil y flexible, capaz de captar las oportunidades, atender los problemas y adecuarse a las circunstancias rápida y eficazmente... Queremos un gobierno abierto y transparente... Queremos un gobierno descentralizado, que en sus relaciones con los estados y municipios propicie... un nuevo pacto federal. Necesitamos un gobierno austero ... que someta sus procesos a una estricta validación... En suma, queremos un gobierno de clase mundial, un gobierno innovador y de calidad total” (México, 2001: 64)

We examine here some of the issues and challenges in the implementation of rural development programs.⁷⁷ Recognition by Mexican government and society of the need to reform the administration system along the principles set by the New Public Administration School is a big step forward, but the challenges are many. Before examining these challenges, it is important to highlight the different degrees of implementation difficulty according to the type of programs, particularly on whether they focus on social infrastructure, productive development or direct cash transfers.

Productive development programs, such as *Alianza para el Campo* or *Opciones Productivas*, are generally much more difficult to implement (and to succeed) than other programs. They require (1) a medium- to long-term perspective, (2) a particular type of synergy and agency on the part of responsible organizations and street-level bureaucrats, (3) a high quality participation of beneficiaries, and (4) a large recurrent budget for implementation, all of which place them on a separate class. Productive programs have thus special needs in terms of planning horizon, recurrent costs, and public-private synergies, which are extremely important to recognize for their success.

Direct cash transfer programs, like *Procampo* and *Oportunidades*, are comparatively simple to implement, once the technicalities of beneficiary registration, check issuing and the like are straightened out. These programs are based on centrally-established objective targeting criteria and a direct link between the central level and the beneficiary, without community involvement.

Social infrastructure programs, such as those under *Ramo 33* and to a large extent *Microrregiones*, require local participation for efficient allocation of the investments.⁷⁸ Promoting and managing participation places higher implementation demands on social infrastructure than on cash transfer programs, but the works could be completed and the program fully implemented even in the absence of participation, because social infrastructure is finally a collection of well defined investments of a public good type that governments should be capable to provide on their own. This would be impossible in productive projects, which deal essentially with private goods, and where private-public convergence is of the essence.

In the remaining part of this section we examine the main challenges faced in restructuring the implementation system of rural development programs. We organize these challenges in five categories: (1) macro political and administrative circumstances; (2)

⁷⁷ The analysis is based on discussions with managers, operators, evaluators and beneficiaries of various programs, the consultation of evaluation documents of programs and other relevant literature, field visits, discussions with leaders of farmers' organizations and NGO staff, and the many insights in an input paper prepared by Jorge Franco: "Los Programas de Desarrollo Rural: Operación Institucional y Alivio a la Pobreza". The discussion among medium level rural leaders in the consultation "Diálogo para el Desarrollo Rural" that took place in Tequesquitengo on 16-18 May 2004 was also very useful.

⁷⁸ Participation can also serve to reduce costs when works are directly contracted by the communities, as shown by the decentralized poverty alleviation projects in Northeast Brazil.

operational and budgetary norms; (3) organizational cultures; (4) client orientation and beneficiary empowerment; and (5) incentive systems for program operators.

Macro Type Political and Administrative Circumstances

Three macro circumstances place severe constraints on the implementation of rural development (and other) programs in Mexico. The first one is the Mexican electoral process whereby municipal authorities have only three years of tenure and cannot be reelected. Although this system may have merits, it hinders continuity in what needs to be a long-term endeavor. *Federalización* has aggravated the situation in this respect as more rural development responsibilities are being devolved to municipal governments.

The annual budgetary system existing in Mexico makes it difficult to design and operate programs with a long term view, especially productive programs. Only with difficulty is it possible to ensure resource availability for rural development programs beyond the annual budget cycle. Because of their long-term nature, productive programs are the ones to suffer most from this. Annual budgeting also results in uncertainty for producers, since it is not known whether program support will last over time or not. The *Ley de Desarrollo Rural Sustentable* has made clear the importance of giving certainty to producers with respect to government supports,⁷⁹ and SAGARPA is trying to make it happen, but the existing budgetary system does not make it easy. A multi-annual rolling budget would be friendlier to rural development.

The state apparatus is organized along sectoral lines, whereas rural development is a multisectoral phenomenon that is best approached in an integrated manner. This is the result of how the state was historically conformed and how it evolved over the years, and is common to other Latin American countries (Piñeiro *et al*, 1999) and to countries in general. Multisectoral and territorial development approaches to rural development are inherently difficult to handle with the existing organization of the state. Sub-national levels could play an important role, but state governments tend to reproduce the segmented organization of the federal level, whereas municipal governments, which are more territorial in approach, find it difficult to deal with rural development, particularly with its employment and income generation side. A more integrated and multisectoral administrative organization would probably be easier at the state than at the federal level. It is also in the states where an integrated approach is more needed. Administrative innovations by state governments to deal with rural development would hence be valuable. At the federal level, the Secretaría de Hacienda, which is a truly multisectoral organization and has responsibility in looking into the quality of public investment, is well placed to play an important role in promoting the integration of federal rural programs within a territorial approach to rural development (see Annex 3.I. on the territorial approach).

Operational and Budgetary Norms

Establishing operational norms that are simple and friendly to the rural environment in which they have to operate and to the characteristics of the beneficiaries is a major challenge. Inadequate norms may create conflict between what Rein and Rabinovitz (1978) call the “legal imperative” and the “bureaucratic rational imperative”. The former refers to the need to adhere to the norm while the latter reflects the need of operators to act rationally to carry out their work, even against the norm. A case in point is the system of justification of expenses in development programs, for instance in *Alianza*. The new *Ley de Desarrollo Rural*

⁷⁹ See articles 13.III, 70.I, 74.I, II and III, 90.I, and 191 I and II.

Sustentable has introduced a most welcome innovation, consisting of allowing program beneficiaries to procure the goods and services that are part of development program investments. In practice, however, the beneficiary has to submit the justification of expenditure before he or she can access the subsidy. Since very few beneficiaries are in a position to advance the required cash, they some times resort to false invoices obtained from accommodating suppliers --at a price, naturally. Although program operators may be aware of this, they may not pay attention because of the pressure to implement the program; the “bureaucratic rational imperative” takes thus the upper hand over the “legal imperative”. This may introduce an unnecessary element of irregularity in the program, generating transaction costs and opening a door to rent seeking.

Timeliness is key, especially in rural areas, where seasonality is a basic feature of livelihoods. The budgetary process is one of the factors that may interfere with good timing in rural development programs in Mexico. This is not only because of no multi-annual budgets, but also annual budgets depend on the operational norms for the year being submitted by the responsible organization, approved by *Hacienda*, and the corresponding funds transferred to state *fideicomisos* or other accounts in the field. The process may in some cases not be complete before April or May, and disbursement must be finished by November to close the accounts in December. Six or seven months may be left, therefore, to operate the program. The consequence, when this happens, is pressure to disburse during those months which may affect quality. Under-disbursement is another possible consequence highlighted in program evaluations.⁸⁰

Lack of stability in program norms may introduce uncertainty among potential and actual beneficiaries as well as program operators. Change in norms from year to year is a problem faced by some rural development programs. Eligibility conditions, amounts, target areas, crops, and type of benefits may change from one year to the next. This may introduce uncertainty among farmers and other rural dwellers and also among the street-level bureaucracy, who may decide to abstain from action until they know what the new norm would be like (*ver cómo viene la norma*). Stability in program norms is thus another challenge.

Few recurrent funds are made available for program operation. Vigilance from *Hacienda* that program money is well spent, as much as possible of it going to the final beneficiaries, is to be praised, but it must also be understood that shortage of operational funds may jeopardize programs. Recurrent costs are essential for the success of many programs, which often depend on soft more than hard investments. This is particularly true for productive

⁸⁰ Thus, the external evaluation of Microrregiones says: “Uno de los problemas más fuertes que enfrentó el 100% de las Coordinaciones del Programa Microrregiones en la operación de los programas en los estados fue el relativo a la aprobación, liberación y radicación tardía de recursos lo cual afectó de manera determinante la operación del programa en casi todas sus etapas” (Instituto Maya, 2003: VIII). Similarly, the external evaluation of *Alianza* states: “... la operación de Alianza comienza mucho después del 1 de enero, ya que para su inicio es imprescindible la aprobación de las Reglas de Operación que nunca fueron publicadas antes del 15 de marzo. Una vez publicadas las Reglas, el Gobierno Federal acuerda con cada gobierno estatal los Anexos Técnicos que definen la distribución de los recursos... Posteriormente se depositan los recursos federales en los fideicomisos estatales, lo que en la mayoría de los estados provoca que la operación de la Alianza nunca comienza antes de mayo, aunque en algún caso se retrasó hasta agosto... Sin embargo, el mayor problema con este calendario operativo es la obligatoriedad de comprometer totalmente los recursos antes del 30 de noviembre.” (FAO, 2003: 14). Finally, the external evaluation of *Opciones Productivas* complains that “Hay un serio problema de retraso en la recepción de los apoyos que afectan su eficacia; el 45% de la población consideró que los apoyos no les llegaron a tiempo. La mayoría de los apoyos de *Opciones Productivas* [an informal credit program for poor farmers] llegaron en agosto, después de la siembra y en las demás vertientes hasta diciembre”. (RDS, 2004: 14).

development, where the formula for success could be summarized as “recurrent costs + rural finance”. We may notice that one of the most interesting rural development programs in operation, *Microcuencas*, has no investment budget, only a recurrent costs one. If there is no sufficient fiscal space for a program, it may be better to cut its scope than to leave it without sufficient recurrent costs.

Organizational Cultures

The focus on bureaucratic norms based on hierarchical control principles (Model 1 above) results in a system burdened by controls at each level. In such a system, the reluctance by middle management to take decisions because of the fear of breaking the norms, in particular but not only those related to expenditures and financial flows, may result in slow operation and many *ex ante* controls on subordinates. These often check and distort operations.⁸¹

Due to a segmented state system, rural programs often have different breakdowns of geographical regions, different definitions, norms and procedures for similar things, different timings and disbursement methods, and create their own separate counterpart organizations. Program evaluations have highlighted this.⁸² There are, however, many instances of successful joint action by different programs at the local level. This tends to happen when local organization is strong and there is good identification of local needs, mostly arrived at through local participatory planning, so that local populations know well what they want and from where to get it, and can put pressure on program operators. The *Ley de Desarrollo Rural Sustentable* is an important step towards the integration of rural development actions by different actors, offering a good coordination framework. Not all relevant *secretarías*, however, see themselves equally committed to the type of rural development approach and institutionality espoused by the law, since the law tends to be identified with SAGARPA. Enhanced efforts from SAGARPA to involve more other organizations in the implementation of the Law, and of the *Secretaría de Hacienda* and the *Oficina de la Presidencia de la República* to promote more integration of actions within the framework established by the Law would be a possible option to advance in meeting this challenge.

A solid evaluation system is key to the implementation of programs. Evaluations are regularly carried out of most rural development programs by external evaluators, and there are cases in Mexico like that of *Progresas/Oportunidades* where the evaluation methodology has been praised internationally. Yet, there are still challenges in the evaluation of Mexican rural development programs. One is the introduction of evaluation mechanisms for on-going and impact evaluation at the time of project design, so that evaluation is embedded in the working of the program, and feedback is regularly obtained. This would avoid introducing evaluation systems after the program is designed, as a kind of *ex post* appendix to it. Another challenge is to give more relevance to and make more use of evaluation results. Broad dissemination and open

⁸¹ Thus, it was reported in one extreme case that seven signatures and five days of waiting were required in a certain office for a gasoline authorization of MxP 100 for a work visit to a community (Franco, 2004).

⁸² Thus, upon examining program evaluations, Jorge Franco (2004: 18) concludes: “Esta deficiencia de articulación se expresa en la tendencia de cada institución a crear su propia contraparte de organización social con la cual interactuar. Oportunidades, Alianza para el Campo o Microrregiones no dialogan con autoridades o asambleas comunitarias o ejidales, con organizaciones rurales sólidas y estructuradas en torno a sus propios fines. Se dialoga con organizaciones *ad hoc*, sea el Comité de Mujeres de Oportunidades, el Consejo de Desarrollo Rural Sustentable o el Consejo Microrregional, todos ellos formas organizativas creadas desde la acción pública, de acuerdo a sus reglas y con vida útil estrictamente vinculada a la existencia del programa”

discussion of results would be needed for this. Also, mechanisms could be developed whereby recommendations made in evaluation studies are included in an action agenda after discussion and agreement with the relevant parties, and progress on this agenda is monitored. This would give more relevance to the evaluation process, making managers more responsive to it, and would also force evaluators to provide well thought, feasible recommendations. The systematic adoption of participatory evaluation methods is yet another challenge. These methods are important to develop ownership of programs, and to test how well beneficiaries are informed, if programs respond to client expectations, and how results are affected by local context variables.

Another key issue is how to overcome the culture of short-term achievement often present in rural development activity. This culture is characterized by (1) insufficient strategic focus, and (2) attention to pursuing quick results. This has a number of consequences some of which are highlighted in program evaluations. Thus, synergies among programs and cooperation among different levels of government are made more difficult if there is not a rural development strategy that is well known and broadly shared by rural actors. Also, in the absence of a long-term perspective it is more difficult to have clarity as to the wider objectives of specific programs, and rural development efforts may become disperse.

A broad strategic long-term vision for rural development that cuts across party lines would facilitate avoiding excessive focus on “quick results”. It is a political reality that governments, national or sub-national, like to show results, and this is indeed part of the democratic process. Results, however, are of different types. What political leaders often want to show is final results, which leads to concentrating on programs where final results can be achieved in a sufficiently short period of time. Political constituencies, however, are more ready to value intermediate results within a well understood strategy than is often acknowledged. This is because political constituencies are increasingly more sophisticated in the understanding of policy processes, and more influenced by “issue networks” (Hecllo, 1978). These networks, made of academics, specialized government agencies, area professionals and practitioners, civil society organizations, interested individuals, and pressure groups, value strategic approaches and appreciate the merits of intermediate results. Mexico is not an exception to this. In the case of rural development, it would be useful to have a strategic *política de estado* cutting across party lines and administration terms in view of the long-term nature of rural development processes, and also because of the urgency created by the large incidence of poverty and dualism in rural areas, with the frustration and social tensions that this generates.

Decentralization and increased participation by local partners in normative and design functions would increase program ownership on the ground. A common view of decentralization stresses a normative role at the centre and an implementation role in the periphery. An alternative view is one where national and sub-national levels are both seen as having normative and operational functions although of different type. As indicated above, there is a normative continuum going from basic norms to implementation details. There is a fundamental role for central authorities in the design of basic program norms, but those norms would be enriched by discussion and agreement with the sub-national units that will apply them. Similarly, sub-national authorities have a fundamental role in designing norms for the specific application of programs in their territorial area of competence, but it is advisable that application norms are discussed with central agencies, to ensure that they are in line with program objectives.

Client Orientation and the Empowerment of Beneficiaries

Improving the dissemination of programs is an important issue. Good dissemination is needed in all programs in general but it is essential in demand-driven ones; otherwise a bias is

introduced in the selection of beneficiaries by excluding the uninformed. Since the likelihood is that the uninformed are poorer than the informed, the bias is likely to be anti-poor. Thus, attention to dissemination campaigns and the allocation of sufficient resources to this end is conducive to equity and client orientation. Dissemination campaigns are often insufficient in rural development programs in Mexico, as highlighted in program evaluations.⁸³ Most of the dissemination of rural development programs is by word of mouth. In the case of *Alianza* much of it is done by the *Prestadores de Servicios Profesionales*. They approach individuals or communities to induce them to submit eligible projects to *Alianza*, which they would prepare. The process, thus, risks turning from demand- to supply-driven, distorting beneficiary and investment selection. Dissemination campaigns need to use means appropriate to rural areas and the characteristics of the beneficiaries, such as the use of local radios, languages, and organization networks.

Direct accountability of program operators to clients/beneficiaries empowers beneficiaries and enhances the quality of program delivery. A classical example is letting farmers choose who provides technical assistance financed with public money. This is done for instance in *Alianza*. Direct accountability is easier when bottom level implementation is carried out by private providers. It is more difficult when it is civil servants who are at the “point of service delivery”, and still more difficult with respect to middle-level program managers. Direct accountability would be enhanced by the introduction in these cases of a system of incentives for “street level bureaucrats” and middle managers linked to “client satisfaction” and of suitable ways to measure that satisfaction.

Preventing opportunistic and rent-seeking behavior of program operators is another challenge to foster client orientation. The tendency of organizations to provide services to some beneficiaries and not to others has been observed in the literature (Bardach, 2001). This has also been observed in Mexico where, for instance, clientelistic ties may be established between *Prestadores de Servicios Profesionales* and their favorite producers, generating distortions in beneficiary selection. Distortions may also be introduced if low level managers deliberately withhold dissemination of their programs in the fear that more demand would be attracted than they can meet. Criticism has been voiced of the reproduction of relations of subordination between street-level bureaucrats or independent service providers empowered by programs, and beneficiaries. The complain is occasionally heard, for instance, with respect to the *Prestadores de Servicios Profesionales* in *Alianza* and the local teacher or local nurse in *Oportunidades*.⁸⁴ Political biases may be another source of distortions. Thus, the evaluation of *Opciones Productivas* asserts that “the operation of the program is frequently distorted by the political-clientelistic biases in the country’s entities” (RDS, 2004: 13). The use of participatory evaluation approaches is an opportunity for beneficiary empowerment and for finding out and eventually neutralizing opportunistic behavior by program operators.

Incentives for Program Operators

⁸³ Thus, for instance, the external evaluation of *Opciones Productivas* indicates that “En la mayoría de las delegaciones no se publica la convocatoria en un medio de comunicación masivo, más bien suelen pegarla en las presidencias municipales y dejan que de manera “natural” fluya la demanda... El conocimiento de los beneficiarios de sus derechos y obligaciones, así como del proceso operativo del Programa, es sumamente limitado” (RDS: 2004: 12 and 14)

⁸⁴ In *Oportunidades*, teachers must certify the attendance of children to school and nurses the attendance of women to training sessions and of children to medical controls. Since the subsidy depends on certification, teachers and nurses are placed in a position of power, which they are accused to abuse in some cases.

We reflected above on the importance for program success of the commitment to program objectives of street-level bureaucrats and other bottom-level operators. Yet, the way these bottom-level operators are treated by administration bureaucracies in many countries is not always consistent with the relevance of their function. The challenge is to introduce the material and moral incentive systems required to push these operators to give in their jobs the best of themselves and to do it in a way conducive to achieving program objectives.

Program operators dealing with field activities and the interface with clients are generally poorly compensated. The decrease in size of the rural administration part of the Mexican state that took place in the 1990s, and the increase in the number and importance of rural programs, has led to a situation where the better paid, tenured government staff concentrate on administrative or managerial office functions. Field activities and the interface with program beneficiaries are left to individuals recruited *ad hoc* for the task or to contracted technicians or professional bureaus. There are cases when these street-level bureaucrats have no job tenure, no career prospects, are poorly paid, sometimes with delay, and rotate rapidly. In occasions, they are compensated for the precariousness of their position with mechanisms implying a conflict of interests, like when rural development coordinators are allowed to present projects to *Alianza* as if they were *Prestadores de Servicios* (Franco, 2004). Program implementation would be enhanced by ensuring that bottom level operators are fairly treated economically and have reasonable career prospects as government officials or continuity and improvement of contracts if they are contracted technicians or professional bureaus. Resource constraints are not a sufficient reason, because (1) as mentioned before, recurrent costs are too important to the success of programs to make them a saving target upon budget squeezes; it is usually better to cut the scope of programs than to allow insufficient recurrent costs, and (2) many problems have to do with payment delays, length of contracts, and inter contract blanks, which are not due to fiscal constraints but to inappropriate budgetary and financial regulations or simply inadequate management.

Moral incentives are as important as economic ones. Judith Tendler (1997) has shown with the example of the state of *Ceará* in Northeast Brazil the importance in development programs of virtuous circles, where motivated operators receive the recognition of beneficiaries and are empowered by local communities in their work, increasing their motivation. Other than with fair economic treatment, motivation of bottom-level operators can be promoted by measures such as (1) recognizing in different ways the importance of their function, (2) discussing with them program objectives and implementation procedures, and incorporating their ideas to improve the program, (3) introducing systematic training that allows them to broaden their views in addition to being informed about the norms⁸⁵, (4) organizing network systems, (5) disseminating best practices, (5) carrying out systematic and fair evaluations of their work, (6) promoting a client orientation ethic, and (7) valuing their *esprit de corps* as rural development practitioners.

HOW COULD CHALLENGES BE MET?

The challenges above are sizeable but probable not larger or more difficult to meet than in other Latin American countries. They are also mostly long-term, and thus to be met over a long period of time. Government organizations responsible for the design and

⁸⁵ Thus, for instance, SAGARPA is designing with the assistance of IICA and the *Colegio de Postgraduados de Chapingo* an interesting broad-based training program on the promotion of rural development with a territorial approach, mostly oriented to rural development practitioners, especially those supporting the work of the *Consejos de Desarrollo Rural Sustentable*.

implementation of rural development programs suffer the tension generated by the institutional transformations taking place in the country. They also have a difficult bridging function: linking the Mexico of formal institutions to a complex rural milieu with varied cultures. They have to confront a rapidly changing world and an inherently multifaceted sector with instruments which are not always the most appropriate. The need for a modern public administration in Mexico and the path to follow to construct it have been laid down in the National Development Plan 2001-06, as illustrated in Box 6.2. The policy options highlighted in this section belong in that framework. For convenience we summarize them in Table 6.1.

Possible Steps to Advance in the Improvement of Program Implementation

We suggest two possible steps to advance in the improvement of program implementation systems. The first is to create a technical committee to examine the institutional implementation processes of rural development programs and make recommendations to improve implementation. The committee could examine administrative and budgetary processes as well as incentive systems and institutional cultures. It could be integrated by a mix of independent specialists, civil servants and legislators. A significant participation of *Secretaría de Hacienda* would be relevant since the committee would respond to the global need of the nation to ensure the quality of public investment. The second suggestion is to empower the *Consejo Mexicano para el Desarrollo Rural Sustentable* created by the Sustainable Rural Development Law to take an active role in the evaluation of rural development programs, including the adoption of participatory evaluation systems. In order to take more operationally relevant roles, the *Consejo* would need to have a small technical secretariat and it could also elect a small managing council to be able to function in a more practical way, in view of its large size. The *Consejo* could have an important role in monitoring progress in the agenda of actions to implement evaluation recommendations. It would also be the natural institution to promote the preparation of a long term rural development strategy to propose to the country as *política de estado*.

Two Possible Innovations

To conclude, we would like to suggest the possible adoption of two novelties to improve the monitoring of rural development programs: a system of *oidores* and a system of “process certification”. We discuss them below.

A system of *oidores* could improve the monitoring of rural development programs. We propose considering the introduction of a system of *oidores* (listeners) consisting of well trained independent individuals or teams who would informally follow rural development programs at the “point of service delivery” through *ad hoc* visits, which could follow a randomized system, and inform top management of the “mood” of the program there. They would not be Bardach’s type “fixers”, and would have no power over program operators; they would just see, listen (especially to beneficiaries and street-level bureaucrats) and report to top management. *Oidores* would work independently from formal evaluators not substituting for them in any way. The rationale derives from the distance that inevitably exists between top management and street-level operations, particularly when programs are large. Administrative mechanisms makes it inevitably difficult for top managers to have a frank and open two-way dialogue with street-level bureaucrats and receive fresh information and imaginative suggestions from them. In all administrative systems information flowing up is modified according to the perceptions of the middle-level bureaucracy to ensure that the information reaching the top poses

no danger (real or imagined) to the intermediate level. This makes it difficult for managers to develop a feeling of what is the perception from below of how programs work.⁸⁶

Low profile *oidores* sustaining recurrent informal dialogues with frontline professionals and clients would be a way for top managers to have fast and frank information from the bottom on operational problems. Monitoring systems give valuable information on progress in physical and financial parameters, but do not convey much regarding the conditions at the bottom that may or may not facilitate program operation, how beneficiaries and direct operators see them, and a first hand impression of the effects of the program. Traditional external evaluations are too distant apart and are focused on impact, which makes them little suitable to give fast feedback of program operation and possible improvement measures. The system of *oidores* could fill this vacuum. It is important that *oidores* have experience and analytical capabilities to reflect on general issues rather than try to meddle with specific situations trying to correct them. To be effective, the system should be kept very small, informal, flexible, and separate from formal evaluation.

A system of “process certification” to be carried out by independent consulting firms or NGOs, would certify that the processes related to program operation and beneficiary participation are sound, in the sense of proceeding according to program objectives and guidelines and to accepted practice. Certification would be most useful when the implementation of the program or of some components are delegated to third parties (consulting firms, NGOs, 2nd or 3rd level rural organizations), serving to reassure program managers that implementation processes carried out by these parties are sound. “Process certification” is different from evaluation and auditing because it does not attempt to assess program outcomes and it does not deal with program financial management and accounting, or only in a broad way and to the extent that this affects implementation processes. The closest parallel is with environmental certification, and the inspiration is taken from there.

⁸⁶ The work of the *oidores* is similar to that traditionally carried out by Bank project supervision missions, from where the idea is borrowed. Like Bank missions, *oidores* would have the capacity to visit projects in the field, build up an image of how they are working, and report at high level.

Table 6.1. Summary of Options to Improve Program Implementation

Problem Area	Options
Macro type political and administrative circumstances	<ul style="list-style-type: none"> • Multi-annual budgeting • Administrative innovations at the state level to deal with the multisectoral and territorial nature of rural development • An active role of the <i>Secretaría de Hacienda</i> to promote the coordination of federal rural programs
Operational and budgetary norms	<ul style="list-style-type: none"> • Simplifying operational norms and making them more friendly to the realities of rural beneficiaries • Better timing in the delivery of supports and services and closing the gap between the actual expenditure period and the fiscal year. • More continuity in program norms • Attention to needs of recurrent funds, especially in productive programs
Organizational cultures	<ul style="list-style-type: none"> • Changing mistrust cultures by empowering middle managers and rationalizing the system of <i>ex ante</i> controls • Reducing the institutional segmentation culture through (1) Enhanced efforts from SAGARPA to involve other organizations in the implementation of the <i>Ley de Desarrollo Rural Sustentable</i>; and (2) efforts by <i>Secretaría de Hacienda</i> and <i>Presidencia de la República</i> to promote more integration of rural development programs in the framework of the Law and to encourage a territorial approach to rural development • Improving the evaluation culture by (1) introducing M&E systems simultaneously with program design; (2) disseminating better program evaluation results; (3) constructing action agendas for the recommendations made in evaluations, and monitoring progress in these agendas; and (4) systematically adopting participatory M&E methods • Modifying the short-term achievement culture through (1) designing a long-term strategy for rural areas as <i>política de estado</i> cutting across party lines and administration terms; and (2) recognizing the importance of “intermediate results” and their value to political constituencies • Changing the decentralized implementation culture away from the dichotomy between normative functions at the center and operational functions at the periphery
Client orientation and beneficiary empowerment	<ul style="list-style-type: none"> • Improving the dissemination of programs in order to empower beneficiaries and prevent selection biases • Promoting direct accountability of program operators to clients • Preventing opportunistic behavior from program operators through several means including participatory evaluations.
Incentives for program operators	<ul style="list-style-type: none"> • Providing appropriate economic incentives to bottom level operators • Revaluing the function of bottom level operators and providing moral incentives to promote their capacity and commitment through consultation with them, systematic training, networking, fair evaluations, dissemination of best practices, client orientation ethics, and valuing <i>esprit de corps</i>.

The promotion of a system of “process certification” would require the formation of a market for these services, and this in turn entails that a number of independent consulting firms and NGOs specialize on this. A training *cum* promotion program could perhaps be started to that effect. The system would facilitate the involvement of farmers’ organizations in the implementation of rural development programs because it would give government agencies an independent means of knowing if the implementation process is sound. The delegation to farmers’ organizations of implementation functions has been impaired by a history of cases of politicization and abuse in the exercise of the functions delegated. This is not however the rule and many rural organizations have the capacity to implement programs and are better placed to do it than other agencies. “Process certification” would be an instrument to facilitate their involvement.

7. HETEROGENEITY AND VULNERABILITY OF THE RURAL POOR

Poverty is a complex and multifaceted concept which can be approached in many ways each highlighting different dimensions. As a result, poverty programs need not only be targeted to “the poor” but also to “the type of poor”. In this chapter we examine the heterogeneity of poverty and vulnerability in rural areas, and highlight some policy options to decrease the vulnerability of rural poor households.

The main findings and policy implications are as follows:

- **Different poverty situations are characterized by the type and amount of assets owned by the poor or their lack thereof**, as well as by the return on those assets. Economic assets, both tangible and intangible, are important but political and cultural assets are important too. Different combinations of access to economic, cultural and political assets result in multiple poverty situations. Indigenous groups in Mexico are generally deprived of most of these assets.
- **Family characteristics, in particular family size and the family life cycle, are related to poverty**, especially in their interaction with access to assets. Asset position and demographic family conditions act together to form specific poverty situations.
- **Illness is the main idiosyncratic shock whereas natural conditions like pests and diseases and droughts are at the origin of the main covariate shock, hitting farmers in particular.** Rural households in Mexico typically manage vulnerability combining risk reduction, mitigation, and coping instruments. For the poor, increased labor market participation, is the most important response to shock. Income diversification, migration and subsistence farming are part of risk management strategies. There is evidence that rural households in Mexico are very much affected by both idiosyncratic and covariate shocks, but that they are comparatively successful in smoothing consumption. These practices may come at a high cost in terms of future growth prospects, however. Moreover, many mechanisms become ineffective in the face of systemic shocks (e.g. due to labor surplus or risk-pooling).
- **Existing formal agricultural insurance systems, while not appropriate for the poorest, can be useful for farmers in transition**, especially if they want to diversify into high value crops. Similarly, the introduction of parametric insurance systems would increase the insurance options for the rural poor, especially if it goes together with the development of rural finance.
- **Given the difficulties with coping with covariate shocks, programs like Fonden are useful mechanisms to reduce the vulnerability of the rural poor**, especially vis-à-vis covariate shocks.

- **Rural financial systems are multipurpose instruments that serve for risk management as much as for capital accumulation**, technology adoption and personal welfare. They probably are the single most important formal system to assist the rural poor to manage risks, particularly idiosyncratic risks, because they facilitate savings, personal loans, agricultural insurance, and productive loans that encourage income diversification and migration strategies.
- **Strong support to the subsistence economy is a major policy option** in view of its importance as a **safety net for poor producers**. Support to the subsistence economy is probably best carried out at the local level in the framework of municipal or micro-regional plans like those promoted by the *Microcuencas* program.

DIVERSITY OF RURAL POVERTY SITUATIONS

Poverty is a complex and multifaceted concept which can be approached in many ways each highlighting different dimensions (Box 7.1). Because of this and because of the geographical and cultural differences of Mexico rural areas, there are many ways to be a Mexican rural poor. Differences among the poor are not easily recognizable from the distance, or they are but as positions on an income continuum cut off by appropriate poverty lines. They are, however, all too evident for the concerned families. That is why poverty aggregates, however useful for many purposes, always conceal an element of deceit. And that is also why poverty programs need not only be targeted to “the poor” but also to “the type of poor”. Some poverty instruments, such as income support through direct cash transfers or the provision of basic government services (education, health, social infrastructure), have a broad spectrum and can serve many types of rural poor. Other instruments, especially those aimed at employment and income creation or at improving risk and environmental management by the poor, are very specific to the particular circumstances and must be targeted accordingly.

Box 7.1. Different Views and Dimensions of Poverty

Poverty can be seen as failure to keep up with the standard prevalent in a given society or, as the European Union defines it, as the situation of “persons, families or groups of persons whose resources (material, cultural, social) are so limited as to exclude them from the minimum acceptable way of life in the member state in which they live”. Poverty definitions can emphasize basic needs, lack of participation and self-esteem, vulnerability, lack of capabilities and opportunities, and constraints to proper human development. Poverty measures can consist of individual or household indicators, include only private welfare indicators or value publicly provided goods too, consider only monetary components or also non-monetary ones, assess poverty at a point in time or over the life-cycle, include only actual poverty or also potential poverty, use flow or stock measures (e.g. income vs. wealth), use input or output concepts (e.g. income vs. welfare), use absolute or relative indicators (e.g. poverty lines or position in a distribution), and adopt objective or subjective approaches (e.g. assessed income vs. community poverty ranking or self-perceived poverty). See Maxwell (1999). Sen’s concept of poverty is that currently enjoying most popularity among a broad range of scholars and practitioners of different disciplines and persuasions. It is a philosophical concept which sees poverty as people’s inability to choose among different types of possible lives because of the lack of capabilities or opportunities available to them. They are thus deprived of what they could potentially do or be, i.e. have reduced “functionings”, as Sen chooses to put it. Poverty is a deprivation of freedom, because there is an economic dimension of freedom related to an increase in the choice set open to individuals that can only come with development. Hence the idea of development as freedom (Sen, 1984, 1985 and 1999).

Rural Poverty and Access to Assets

We start by examining access of the rural poor to economic assets, which following Siegel and Alwang (1999) can be grouped in two broad categories: tangible and intangible. Tangible assets are the best known ones and those usually measured in surveys, but intangible assets can be equally important to family or individual welfare especially in the event of economic shocks. Intangible assets refer to entitlements or capabilities to access certain sources of employment or income, and hence to future flows of income. While tangible assets can only have positive or zero value, intangible assets can be negative because other parties can have claims on our future flows of income. We list economic assets in Table 7.1.

Tangible assets are of three types: production assets, consumption assets, and financial assets. The first include access to own and collective lands, favorable agro-climatic conditions, irrigation rights, plantations, animals, and tools and equipment; the second includes house and household goods, stored produce and standing crops; and the third includes cash and financial savings. Differences in access to these assets determine different types of material poverty and vulnerability. Thus, there is evident dissimilarity between landless rural laborers that have only human capital as a production asset and farmers who also have land and animals. The sources of income will normally be different and the types of risk and risk strategies too; landless laborers will depend on wage income and face the risk of unemployment, while small farmers will normally depend more on farming income (unless they have very little land) and will face productive and market risks. Vulnerability will also depend on whether the household has cash, liquid savings, stored food or animals to sell in the event of emergencies.

Table 7.1. Economic Assets of the Rural Poor

Tangible Assets	Intangible Assets , with effect	
	Positive	Negative
Own land	Formal or informal entitlement to private or public transfers, including rents	Economic vulnerability to natural and market risks (depends on physical environment, crop technology and mix, diversification of income sources, type of market and market access, and personal characteristics)
Right to use collective lands	Personal goodwill: capacity to readily obtain credit on need (depends on reputation, contacts, and availability of other assets)	
Favorable agro-climatic conditions		
Irrigation rights	Command over the labor market: capacity to readily obtain employment at the going rate (depends on personal characteristics, including gender, experience, education, commitments to other activities like agriculture or caring after own children, and on location and contacts)	Standing debts and commitments to make transfers, including rent payments
Large and small animals		
Standing crops and ready to sell crops		
Plantations		
Stored food or other produce		
Tools and Equipment	Command over off-farm activities: capacity to readily enter off-farm markets as a producer (depends on skills, equipment, access to inputs or operational capital and market contacts)	
Own house and household goods		
Cash in hand and saving deposits	Command over migration: capacity to undertake successful transitory migration (depends on personal characteristics, past migration experience, contacts, and availability of cash to migrate)	
	Human Capital	

Source: Author's construction.

Poverty and vulnerability will be different according to the availability of intangible assets. Thus, for instance a household entitled to *Procampo*, whose family head has a good standing in the community and good market contacts allowing him or her to get local part time employment when required, and has well established migratory links so that he or she can migrate during the low agricultural season and earn a complementary income, is in a much better position than a household without those assets. Access to tangible and intangible assets combine in practice in varying ways producing many different poverty and vulnerability situations.

Poverty is affected by the amount of assets (e.g. land, family members available for work), as well as the return on their asset (e.g. prices, wage rate) Thus, agricultural prices are vital to the owners of farming assets and so is the wage rate to rural laborers. Higher returns on the assets of the poor decreases poverty, and changes in the distribution of returns across different assets affect their value to the poor, altering specific poverty situations.

In addition to economic assets there are other assets not always easy to identify and generally difficult to measure that add new dimensions to the situations of poverty. Political assets are an example of this. By political assets we understand access to things such as not being discriminated on political, religious, ethnic, gender or other grounds, and being able to exercise recognized citizen rights such as voting, parity access to legal, administrative and justice systems, and the right to one's own privacy and identity and to associate with others to pursue specific interests. Political assets are hence an entitlement to citizenship—to be able to fully and equally participate in all things pertaining to the public sphere.

Another example is cultural assets. We can include here things like (1) the confidence and satisfaction derived from having and sharing with others a recognized identity and awareness of one's own origins, and (2) the ability to manage the (often subtle) norms and idiosyncrasies of the forms of life of one's own society, including language, traditions and folklore. Cultural assets can become a form of capital, as when musical or plastic arts traditions are exploited as an attraction in tourist business operations, or when the own style of a community's handicrafts acquires value as a commercial trade mark. As capital, cultural assets can be important to the poor, but they are more than that; they are also a source of self-esteem and a kind of cement binding together many forms of social capital. Social capital is at the crossroads between a productive and a cultural asset. It can generate income or other forms of value and hence it is a productive asset, but it is also "social", thus implying solidarity or connectedness among individuals over and above mutual benefit (Uphoff, 2003).

From this perspective, indigenous groups in Mexico suffer from multiple deprivations. Indigenous groups in Mexico tend to have less political and cultural assets than other groups, and this is generally accompanied by economic deprivation. Thus, results from a recent study by Ramírez and García (2004) show that indigenous workers have much lower earnings than their non-indigenous counterparts after controlling for personal characteristics, education and sector of employment. A 59 percent part of the difference in earnings is explained by those characteristics (higher education of the non-indigenous, better employment sector, and so on), but there is another 41 percent which cannot be explained by them, the only explanation being factors such as quality of education, culture or labor market discrimination. The same is the case with the probability of being poor even within the same educational group or sector of activity. Thus, an indigenous worker in agriculture has a 72 percent probability of being extremely poor against a 34 percent probability of the non-indigenous, and an indigenous person with 6 to 11 years of schooling is twice as likely to be poor and four times as likely to be extremely poor than a non-indigenous person with comparable education. When examining participation of different groups in non-farm income opportunities a similar pattern emerges (Janvry and Sadoulet, 2001). After controlling for other variables, education among them, indigenous groups have more difficulty in accessing non-farm employment. "Young indigenous adults suffer from a double disadvantage for income generation: they lag in educational progress, and they derive lower benefits from education in accessing more remunerative nonagricultural employment" (p. 473).

The distribution of assets is extremely unequal, as shown in Table 7.2 where *Gini* coefficients are calculated for the distribution of different type of rural assets and of rural incomes from different sources. *Gini* coefficients for asset are extremely high with the exception of the average years of schooling. The number of migrants is used as a proxy for migration "capital" and is divided in internal, USA, and total migration assets. All three *Ginis* are very high. Coefficients overstate, however, the extent of asset inequality, because we should not expect all rural households to have access to all assets. Thus, there is no reason why non-farming households should have land or animals. If we could put some value on human and migration

capital and estimate the total value of the assets owned by each family, the distribution of this value would probably be less unequal than that of its separate components. This is the case with respect to income figures; the *Gini* coefficient of total income is smaller than that of most of its components. It is interesting, but not surprising, that incomes from wage employment and government transfers are better distributed than those derived from self-employment (in or outside agriculture) and private transfers.

Table 7.2. Gini Coefficients for the Distribution of Different Types of Assets and Income Sources of Rural Households in 2003

Physical & Human Capital and Migration Assets		Net Income from Different Activities	
<i>Type of Asset</i>	<i>Gini</i>	<i>Type of Activity</i>	<i>Gini</i>
Household Average Schooling	0.25	Agricultural Wage Employment	0.51
Household Head Schooling	0.61	Government Transferences	0.53
Total Migrants	0.79	Natural Resources	0.55
Internal Migrants	0.84	Non Agricultural Wage Employment	0.56
US Migrants	0.90	Internal Remittances	0.64
Landholdings (hectare)	0.85	International Remittances	0.65
Steer	0.95	Non Agricultural Production	0.68
Horses	0.89	Cattle	0.77
Pigs	0.95	Staples	0.77
Large Animals	0.90	Cash-Crops	0.83
Tractors	0.95	Other Agricultural Production	0.83
		Small Animals	0.86
		Gini Net Total Income	0.57

Source: Taylor *et al* (2004). Calculated from ENHRUM.

Poverty and the Rural Family

There are different types of families in rural Mexico, influencing the way poverty and vulnerability affects household members. There are also variations in the concept of family as an institution, even if essential functions like bringing up and socializing the children and looking after the sick and the old remain. The two basic types of families are the nuclear monogamist family consisting of parents and children but possibly also of surviving members of older generations, and the extended family with various related nuclear families forming a single household. In some indigenous groups, like the *mazatecos*, *huicholes*, *tzeltales*, *totonacas*, *coras* and others, there are also polygamist families (Nahmad and Carrasco, 2004). A frequent practice in rural Mexico is the informal adoption of abandoned children or children of migrant relatives or of broken families. Rural families tend to be larger than urban ones, and indigenous families are particularly large. Thus, the average size of rural indigenous families is 6.4, while the size of rural non-indigenous families is 5.8, and that of urban non indigenous families 5.1. The average family size for Mexico as a whole is 5.3.⁸⁷

Family size tends to be an asset in survival strategies and risk management. In principle, large families have four advantages over smaller ones: (1) they have more opportunities of self-insurance through diversified income sources by having family members employed in different works, (2) they have wider networking opportunities because of different member occupations, including more migration contacts, (3) they enjoy economies of scale in

⁸⁷ Data from the 2000 population census compiled by Ramírez and García (2004: Table 9).

consumption, and (4) they can mobilize more family labor when required, which may be important for farming families at harvest time or to contribute to communal construction works or to look after animals or collect firewood.

Yet, young large families with high dependency ratios are at a disadvantage. Size cannot be seen independently of the family cycle and the dependency ratio, whose importance was observed in chapter 2, and has long been recognized in the economic literature on the peasantry.⁸⁸ Young couples with many young children have a particularly hard time because they have many mouths to feed and only their own labor available to earn income, and labor has to be shared between production and very demanding reproduction work. As children grow up and become increasingly able to contribute to income generation and household labor the situation changes. Thus, as reported in chapter 2, in 2002, Mexico's rural families with dependents below 11 years had a probability of being extremely poor 22 percent higher than families without dependents, other things being equal. The probability falls to 14 percent for families with children between 13 and 14 and to 6 percent for children between 15 and 18, becoming negative for families with children of 18 to 25 years of age still living in the household. The asset position of the family is of course important in this respect, acting together with the demographic conditions to form specific poverty situations. Thus, for instance, having access to land is comparatively advantageous for larger families because they can use family labor in agriculture or animal husbandry, and they can produce their own food (or part of it), hence being more food secure. Landless families of similar size dependent on wage labor do not have productive use for family (particularly children's) labor, and have to buy all their food with their wages. They are hence extremely vulnerable to the vagaries of the labor market. Family size is probably not an advantage in this case.

Poverty and the Rural Community

Rural communities are groups of families living nearby who have close interactions and in some ways depend on each other. They may have a collective title on land, as in the *ejidos* and *comunidades campesinas*, or they may not, although the more cohesive communities typically hold resources in common. Mexican rural communities tend to share five characteristics: (1) a set of relations among member families that were formed over time; (2) a defined territory constituting the community's natural environment, collectively owned or not; (3) productive activities common to many members, and widely shared technical knowledge and practices, which usually go together with other forms of identity and shared culture; (4) an organizational structure to ensure governance and natural resources management; and (5) a system of social stratification, which is more important and visible in the larger communities, with divergent group interests coexisting within the communal system (Nahmad and Carrasco, 2004). Rural communities have different sizes and degrees of cohesion and their formal status may also be different. Households in small *aldeas* of thirty to fifty families tend to be more income poor and less supplied with services than those in larger communities of 2,000 to 5,000 inhabitants. There is a hierarchical system of rural communities, which goes from the *ranchería* and *paraje* to the *agencia de policía*, *agencia municipal* and *cabecera municipal*, with marked differences in their access to communications, social services and economic opportunities. Also, the quality of natural resources is often better in the higher ranking communities, because richer areas were usually populated earlier and have also grown more.

⁸⁸ Chayanov (1966) is the classic analysts of the peasant family cycle and how resources and needs change along it, based on the experience of the Russian peasantry at the turn of the 19th century.

It is difficult to say how large can a rural settlement be while still remaining a community in the sense described above, as this depends much on the degree of cohesion. There are fairly large rural settlements in Mexico of say 10,000 to 15,000 residents which still keep a “sense of community”, mostly due to the effective working of communal governance structures and a proud sharing of traditions. There are also rural settlements that never were or were but have stopped being proper communities and function more as pure family agglomerations. Indigenous settlements, even if large, tend to be more cohesive and keep communal traditions more than *mestizo* villages. The special electoral system of local authorities known as *usos y costumbres* that operates in indigenous communities willing to adhere to it contributes to this cohesiveness.⁸⁹ Valuable common resources, such as forests and pasture lands, which need to be commonly managed, do also contribute to keeping communities more united and better structured.

Communities can coincide with municipalities: In Oaxaca, for instance, where municipalities are characteristically small, there are many single-community municipalities. In other cases, rural municipalities consist of various communities, one of which is the *cabecera municipal* and the others *agencias* or simple *rancherías* if very small. Indigenous communities usually have an elaborate system of *ad honorem* authorities or *cargos* with functions of responsibility at the service of the collective. Male members are expected to occupy a progressive succession of these *cargos* along their lives, and they must do so if they want to be respected or even to keep their full communal rights. Reallocation of farm land was a major function of communal authorities in the past, but has decreased in importance with the mounting scarcity of cropping land, the advance of privatization, and the clear delimitation of rights under *PROCEDE*. Decision-making with respect to common property resources continues to be a crucial responsibility of communal authorities.

Four economic functions of communities are relevant to poverty and vulnerability. The first **is their role in the generation of social capital.** Community ties and governance systems are themselves an instance of social capital, but they serve also as facilitating frameworks for more private sources of social capital such as privately organized collective enterprises or labor exchanges or the functioning of special interest groups. These forms of social capital enhance income generation and decrease vulnerability, especially to idiosyncratic shocks. The second relevant function is the management of the community’s common pool resources. The importance of these resources varies among communities but is large in many of them,⁹⁰ allowing members to share in the income and employment generated. Third, communities are distinct providers of public goods. This is the case with many public works, often carried out with voluntary communal labor under *faenas* or *tequios*, and also with things such as the resolution of conflicts and the provision of local policing and petty justice services. Finally, communal authorities and governance systems serve as mediators with the larger society fulfilling a bridging function to attract economic support from government or NGO programs.

Demographic pressures, the advance of the market economy, and increasing migration have diminished the social protection function of communities.⁹¹ The historical decline in the redistribution of communal lands to young generations, mentioned above, is a good example. The same forces that erode cohesion in the communities and reduce their social

⁸⁹ Under *usos y costumbres* indigenous representatives elected in communal assemblies by a show of hands are recognized as valid municipal authorities for political and administrative purposes without need of a formal ballot. The rationale for this system is not to duplicate governance systems at the local level.

⁹⁰ Thus, for instance, 70 percent of Mexican temperate and tropical forests belong to *ejidos* and *comunidades*.

⁹¹ See Platteau (2002) for the analysis of a similar process in a different context.

protection capabilities are the ones that generate increasing inequality. Market development and migration open up new opportunities from which members benefit in different measure. This generates poverty, not necessarily in the sense of some sectors of the community being worst off in absolute terms than in the past, but in that of them falling behind other groups. And, after all, in a very relevant sense, in many political and cultural settings poverty is not but the way in which inequality is historically constructed.

Illustration of Poverty Situations

We present in Table 7.3 three cases of poor rural families indicating their economic characteristics, their social and cultural capital, and their survival and risk management strategies. The cases are hypothetical but are consistent with the figures presented on rural labor structure, poverty correlates and income sources, and also with ethnographic data.

The first family is a young one with children of small age and no land. The characteristics of this family are summarized in Table 7.3.a. We have assumed that this family lives in a small remote location but could also live in the outskirts of a rural town. Other than its crude labor force, the family has practically no assets –a desperate case of lack of “capabilities”. The husband is a casual laborer and the wife hires herself to do agricultural labor to the extent compatible with her family obligations. There are no migrant sons or daughters that can send transfers, because the children are too young. And there is no *Procampo* subsidy because the family has no land. They receive instead *Oportunidades*, and this is of critical importance to their well-being. The husband would like to migrate temporally to make some income when the local labor market is inactive, but has no good connections and very little money to travel and survive while he finds work. If the income of this family were measured it would likely be below the extreme poverty line.

The second family, whose characteristics are shown in Table 7.3.b., is a middle-age one living in a small rural community. It has some rain-fed land on poor soils allowing the family to produce some food for its own consumption and to keep some animals. This is not enough, however, and the husband has to complement family income by working as a casual laborer. He had migrated temporally in the past, and that allowed him to accumulate enough to build a house and help raising their children, but he does not migrate any more; with the food the family produces, payments from *Procampo*, some money from *Oportunidades* for the last child attending school, another money sent by a migrant son, the earnings from his casual work, and some income contributed by the wife who helps in a petty commerce operation run by a neighbor, the family has enough to go by. If the income of this family were measured it would likely be between the extreme and moderate poverty lines.

Table 7.3.a. Illustration of a Young-to-Middle-Age Poor Landless Family in a Remote Small Location

Economic Characteristics	Social and Cultural Capital	Survival Strategies and Risk Management
Main asset: small homestead with a mud house of 1 or 2 rooms without electricity or running water, located outside the village.	Parents without education or primary incomplete. Children attend primary school, not secondary	Rents or borrows a plot of land for seasonal cropping when possible
Small kitchen garden with a few chickens, perhaps a pig.	Wife and small children monolingual (in indigenous areas)	Tries to develop continuing work relations with a local land owner
Uses wood for fuel	No migrant sons or daughters	Wife works occasionally as domestic help or as farm hand or makes some handicrafts (the latter mostly in indigenous areas)
Receives <i>Oportunidades</i>	Few or no visits to medical unit (more now with <i>Oportunidades</i>).	
Does not receive <i>Procampo</i>	Use of traditional medicine (especially in indigenous areas)	In emergencies, they sell small animals and request loan from employer, better off relative or local money lender
Receives some grain help from relatives with land or from employer	Little participation in religious and communal activities	
Main occupation and source of income is casual labor in agriculture	Few relations of reciprocity with relatives and neighbors	Temporary migration if and when possible
Has few migratory connections	No participation in political activities of community or municipality	
	Marked subordination to employer	
	Possible alcoholism and domestic violence	

Source: Author's construction based on Nahmad and Carrasco (2004).

The last family, illustrated in Table 7.3.c., is also a middle-age one living in a small-to-medium rural location. The family owns three or four has of rain-fed land and another two or three hectare of irrigated land. It also has some large animals which are used for work, to provide milk for family consumption, and as a form of investment. Rain-fed lands are used to produce food for the family while a cash crop is grown in irrigated areas using improved technology. The family receives *Procampo* but not *Oportunidades* and has other income from various sources: work done by the husband supervising operations in the farm of a distant relative who moved to the state capital, occasional transfers from two migrant sons, one in the USA who has children staying with their grandparents, and income from the wife who participates in a rather successful women's horticultural group existing in the community. As in the former case, the husband has migrated in the past but does not want to migrate any more. If the income of this family were measured it would probably be in the border between poverty and non-poverty. Vulnerability for this family would mean the risk of falling into poverty.

Table 7.3.b. Illustration of a Poor Landed Family in a Small Rural Location

Economic Characteristics	Social and Cultural Capital	Survival Strategies and Risk Management
Main assets: 2 to 5 has of rain-fed land in hilly soils. House with earth floor of 2 or 3 rooms with tin roof, electricity and no running water. Kitchen garden and a few fruit trees for family consumptions. Has a few small animals or one large animal grazing in communal lands	Parents without education or primary incomplete. Children attended primary school, not secondary	Family diversifies income and risk with casual work and other occupations
Produces maize and beans plus some horticultural products with minimum inputs. Land rotation and fallows. Soil degradation. Stores produce for self-consumption. There is no grain surplus.	Wife and small children monolingual (in indigenous areas)	Parents support migration of elder sons and daughters helping them to keep linked to the community.
Does not use credit or receive technical assistance	Family has migrant son or daughter	Parents try to convince the younger son or daughter to stay in the community to help in the farm and look after them in old age.
Uses wood for fuel. Collects non timber products from communal areas	Few or no visits to medical units (more now with <i>Oportunidades</i>). Use of traditional medicine (especially in indigenous areas)	Husband sticks to his land without fractioning it or passing it to his offspring
Receives occasional transfers from a migrant son or daughter	Participation in minor religious and communal activities	Wife works occasionally in petty commerce or making some handicrafts (the latter mostly in indigenous areas). She may participate in a women's production or savings group
Receives <i>Oportunidades</i> and <i>Procampo</i>	Relations of reciprocity with relatives and neighbors	In emergencies, husband participates more in labor market and wife in trade or handicrafts. They may sell animals and request a loan from better off relatives or a local money lender, or ask migrant children for incremental support
Works part time on his farm and also as casual laborer	No participation in political activities of community or municipality	Husband has been temporary migrant but does not migrate any more.

Source: Author's construction based on Nahmad and Carrasco (2004).

The families discussed do not only differ in their economic condition but also in their social and cultural capital and in the way they manage risk. Culturally, the first family lives in a vacuum of social relations and communal integration that makes its poverty situation more disheartening because not culturally dignified. Alcoholism and family violence are common features in this situation in rural Mexico, and indeed in many other rural areas of Latin America, for example in the Andes (see for instance World Bank 2002b). The second family is better integrated although it plays a modest role in the management of local collective affairs. The third family is fully embedded in the norms and culture of its community, and manages well the part of that culture that consists of knowing how to use the links with the outside world.

Table 7.3.c. Illustration of a Mature Border-Poor Family in a Small to Medium Rural Location

Economic Characteristics	Social and Cultural Capital	Survival Strategies and Risk Management
Main assets: 5 to 10 has some rain-fed and some irrigated (with water rights). House of brick and <i>adobe</i> with cement floor, of 3 to 5 rooms, with tin roof, electricity and running water. Kitchen garden and a few fruit trees for family consumptions. Has several small animals or three or four large animal grazing in communal lands.	Parents without education or primary incomplete. Children attended primary and secondary school.	Family diversifies income and manage risk with crop diversification and other occupations and participating in government or NGO programs
Produces maize and beans plus some horticultural products with minimum inputs for self-consumption. Produces also some commercial crop for sale	Wife monolingual (in indigenous areas)	Parents supports migration of elder sons and daughters helping them to keep linked to the community.
Eventual use of credit and technical assistance	Family has migrant sons or daughters	Parents try to convince the younger son or daughter to stay in the community to help in the farm and look after them in old age.
Uses wood and gas for fuel.	Family combines formal medical services and traditional medicine (especially in indigenous areas)	Husband sticks to his land without fractioning it or passing it to his offspring
Receives occasional transfers from migrant children	Active participation in religious and communal activities	Connection with external agents and development programs is sought as self insurance and for petty accumulation
Receives <i>Procampo</i>	Frequent relations of reciprocity with relatives and neighbors	Wife works occasionally in petty commerce or making some handicrafts (the latter mostly in indigenous areas). She may participate in a women's production or savings group
Husband works part time on his farm and may also have some other occupation but not as casual laborer	Active participation in political activities of community or municipality	In emergencies, the family sells animals, requests a loan from outside connections or a local money lender, or asks migrant children for incremental support
	Husband participates in producers' associations and in committees sponsored by NGO or government programs	Husband has been temporary migrant but does not migrate any more.

Source: Author's construction based on Nahmad and Carrasco (2004).

In view of its asset situation and very small risk pool, the first family is extremely vulnerable and has very few instruments to manage risk. It is the combination of having young children, no land and no connections that makes this family particularly vulnerable. Access to land—if the family could rent it on a continuing basis and had access to credit to farm it—would be a good way for this family to improve its income position and decrease vulnerability. Diversification of income sources and access to public and private transfers make the second family less vulnerable. Not only does it have its own source of food, but has also good command over the labor market which allows it to intensify wage employment if necessary. The risk position of the third family is quite robust; its sources of income are much diversified and it has access to large social capital and a large risk pool. Only under exceptional circumstances, it would seem, would this family fall into an extreme poverty condition. Yet, there are many families in the coffee growing areas of Mexico who were in situations similar to this one only a

few years ago, who have been struggling during the last years to keep on the other side of destitution.

INCOME AND CONSUMPTION VULNERABILITY OF THE RURAL POOR

There are different ways in which families can be vulnerable to income shocks and also different ways in which they can manage risk. In this section we examine the vulnerability of the Mexican rural poor to idiosyncratic and covariate shocks, the reduction, mitigation and coping strategies that they use, and the effect of some formal mechanisms, like crop insurance, and some government programs. The conceptual framework for vulnerability used in our analysis is summarized in Box 7.2.

Box 7.2. Conceptual Framework for Examining Vulnerability

There are three aspects of vulnerability: (1) the risk or risk event, (2) the options for managing risk or risk response, and (3) the outcome of the risk event and its welfare impact (Alwing *et al.*, 2001). Risk management has *ex ante* and *ex post* facets. Measures are taken *ex ante* to reduce risks, for instance when agricultural risks are lowered by using drought resistant low-yielding seeds. *Ex ante* measures can also be taken to mitigate risk, by diversifying for instance assets or income sources. After the risk event or “shock”, steps are taken to cope with its effects, like selling animals or procuring a loan from a relative. A common practice in rural areas is for households to “pool risk”, i.e. to form systems whereby those who have experienced a shock can count on the assistance of those who have not. This can be done formally, like in the Mexican *fondos de aseguramiento*, or informally through traditional mutual assistance systems. The extent to which a household can count on the help of others in the event of shocks is its “risk pool”.

Consumption smoothing mechanisms, while essential to the survival of a household faced with income shocks, can come at a high cost, especially in terms of future income opportunities. Risk events usually affect directly income and as a consequence consumption. Households try to defend their consumption levels through coping measures. The result is “consumption smoothing”, i.e. a smaller variation of consumption than of income. But smoothing is not without cost, and the cost can be dear to the poor, like the distress sale of assets or forced migration. Income itself can be smoothed *ex ante* using risk mitigation measures like those mentioned above. Risk management strategies by individuals would normally combine risk reduction, mitigation and coping instruments according to their accessibility and cost in the particular circumstances (Siegel and Alwang, 1999). Risk strategies do not only serve to protect consumption levels from eventual shocks, but help also households to take higher levels of risk, like adopting more profitable but risky farming technologies or moving from low input field crops into high input niche market crops (Holzman and Jorgensen, 2000).

Shocks can affect either single individuals or very small groups, i.e. be “idiosyncratic”, like most health conditions, or can simultaneously affect a large number of individuals, i.e. be “covariate” or “systemic”, like most shocks related to weather situations. Covariate shocks are more difficult to deal with at the local level because risk pooling mechanisms normally fail, and because these risks are as a rule more difficult to insure against.

How vulnerable are the Rural Poor in Mexico?

Rural households are fairly successful in protecting consumption from frequent income shocks, both idiosyncratic and covariate. Using panel data from ENCEL, the survey applied to evaluate *Progresas/Oportunidades*, for October 1998, June 1999, and November 1999, covering 506 poor villages and 24,000 households, Emmanuel Skoufias has shown in a recent paper (Skoufias, 2004) that covariate risks significantly affect household incomes and consumption, although households do carry out income smoothing practices that partially protect

their incomes from such risks. Systemic shocks, however, are shown to be of secondary importance with respect to idiosyncratic ones. Also, panel data shows that systemic shocks such as weather related risks and natural disasters can have very different impacts on households, and that shocks leading to income changes do not necessarily lead to consumption changes. Successful practices of consumption smoothing make consumption more protected than income.

Illness comes out as an important source of risk. Households whose head is temporally ill experienced income growth rates 20 to 22 percent below those of other households. Interestingly, consumption decreased by 2 percent only, showing the strength of smoothing practices. Longer illnesses had a milder effect on income, probably because the length of the illness made households resort to income smoothing practices. Among production-related shocks, the one to come out more strongly in these panel data is the incidence of pests and diseases. Households who experienced a problem of pests and diseases had an average income growth rate 16 to 17 percent below other households. Again, the impact on consumption was much smaller; a drop of only 3 percent.

Table 7.4. Economic Shocks in Rural Areas in 1989-94

	Sector						
	All	Farm	Non-Farm	Farm & Non-Farm	Bottom two quartiles	Third quartile	Fourth quartile
Percent of respondents that faced an economic crises	59	63	56	60	51	66	66
Type of Shock (%)							
Low Yields	23	48	5	22	11	27	27
Low Prices	6	11	3	4	4	4	11
Low Sales	21	1	34	33	20	21	22
Weak Demand for Services	12	13	18	13	18	8	7
Illness of Entrepreneur	4	6	3	2	3	7	2
Other	9	11	9	5	12	6	9
Subtotal	75	80	72	79	68	73	78
High Expenditure Due to							
Illness of Entrepreneur or Household Member	18	18	18	17	20	22	15
Other	7	2	10	4	12	5	7
Subtotal	25	20	28	21	32	27	22
TOTAL	100	100	100	100	100	100	100

Source: World Bank (1995).

The incidence of shocks is important. A survey of 1,944 rural entrepreneurial households carried out in mid-1994 in *Guanajuato, Puebla, Tamaulipas* and *Veracruz*, reported economic shocks occurred between 1989 and 1994 (World Bank, 1995). The results are shown in Table 7.4.

Fifty nine percent of respondents reported a shock in the period. Incidence was larger among farmers, reflecting the risk of agricultural activities. For farmers, the most frequent shocks were related to agricultural production resulting in low yield, whereas for non farmers low sales was the most common shock. In both cases weak demand comes second as a source of risk. Illness of the entrepreneur (normally the household head) or other household member is an import source of high unplanned expenditures. Poorer households in the two bottom quartiles experienced less shocks than richer ones, probably because the risk-aversion of the poor make

them take lower risks to avoid facing the catastrophic consequences of income shock. Low yields due to production related shocks were significantly smaller in the bottom two quartiles, which can be attributed to the planting of lower risk crops and the use of low risk technology by this group.

Weather related shocks are extremely frequent for small Mexican farmers. The *Encuesta Nacional de Hogares Rurales de México* (ENHRUM) survey of close to 1,800 rural households conducted in 2002 by the *Colegio de México* and *INEGI* gives information on weather-related shocks in that year for 666 crop farmers. The results are shown in Table 7.5. The frequency of weather-related shocks is worrisome: in 2002, they affected 44 percent of farmers throughout the country. Contrary to Skoufia's results from the ENCEL survey reported above, droughts are in this survey the shock most commonly experienced, more than pests and diseases. The high incidence of shocks is corroborated by information from the survey undertaken by the World Bank and FIRA to examine rural financial markets in Mexico (see footnote 3 to chapter 5), shown in Table 7.6. Almost half of all farmers in the survey experienced adverse events in 1999-2002. Importantly, in contrast to micro-entrepreneurs, more than half of the farmers experienced systemic shocks.

Table 7.5. Weather-Related Shocks Registered by Crop Farmers

Problems	Number of producers	Percentage
<i>With problems</i>	295	44.3
Excessive Rain or Hurricane	71	10.7
Droughts	162	24.3
Pests and Diseases	40	6.0
Frosts	22	3.3
<i>Without Problems</i>	371	55.7
Total	666	100

Source: Computed from ENHRUM.

Table 7.6. Mexico: Incidence of Adverse Shocks on Farmers and Micro-entrepreneurs in Rural Towns in 1999-2002

		Farmers	Micro-entrep.
Incidence of Adverse Events	None	53.0	73.3
	Only systemic	19.8	6.7
	Only Idiosyncratic	8.0	11.8
	Both	19.2	8.2
Number of Adverse Events	None	53.0	73.3
	One	20.9	14.8
	Two	9.8	6.5
	Three or more	16.3	5.5

Source: World Bank (2003: Table 9B.1).

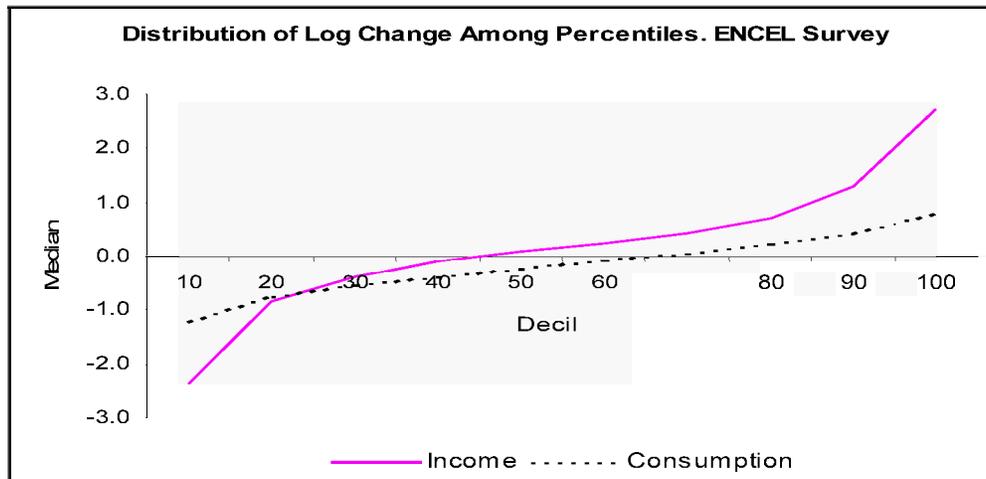
Rural households are affected by shocks differently according to their characteristics. The distribution of shocks is not independent of the distribution of household characteristics such as size, education, field of employment, occupation or location. Using panel data from the national employment survey (ENET) for 2000:2 and 2002:4, Maloney *et al* (2003) have investigated the effects of different household characteristics on the distribution of shocks in rural and urban areas. The results are reported in detail in World Bank (2004) and will be only summarized here. An important finding is that the effect of household characteristics on shocks are rather similar for rural and urban areas, i.e. characteristics such as education, family

composition, being self employed or being formally employed affect the distribution of shocks in the two areas in a similar way. Informal workers and the self-employed show much higher variability in income than formal workers. Thus, income falls in the bottom part of the distribution of shocks and income increases in the upper part between 2000:2 and 2002:4 were much bigger for informal and self-employed workers than for their formal counterparts. Another finding is that higher levels of education do not contribute to reduce negative income shocks. Thus, at the median, less educated households (with primary education or less) experienced higher income increases than those with better education (high school, technical or university levels).

The World Bank rural finance study (World Bank, 2003) examined also the personal and context characteristics correlated to the incidence of shocks. An interesting finding is that the probability of incidence of negative shocks for individual farmers is positively correlated with farms located in *ejidos* and those depending on informal traders (*coyotes*) to sell their produce, and negatively correlated with irrigation and the use of certified seeds. The probability of negative shocks increases for farmers with *Procampo*, for farmers who receive remittances, and for those owning cattle (which may be a consequence rather than a cause of vulnerability).

High income variance does not result in a similarly high consumption variance. Maloney *et al* (2003) use also panel data from the ENCEL survey to compare income and consumption vulnerability between October 1998 and November 2000. Like Skoufias, they observe significant consumption smoothing particularly for large positive and negative shocks. We illustrate this in Figure 7.1 taken from World Bank (2004), which shows how large negative shocks induce a less than proportional fall in consumption and the opposite for large positive shocks.

Figure 7.1. The Pattern of Annual Change in Incomes in a Panel of Mexican Households in Poor Rural Areas, 1998-2000



Source: World Bank (2004: 84).

Risk Reduction, Mitigation and Coping Strategies of the Rural Poor

Households resort to a variety of risk mitigating and coping strategies as a way of self-insurance in order to cope with large idiosyncratic risks combined and in the absence of formal insurance markets and credit constraints. These include the accumulation of assets,

income diversification, sending women and children to work, withdrawing children from school, input and crop choices, precautionary savings, migration, marriage, income transfers among friends and relatives, and other informal risk sharing arrangements such as share cropping or input sharing (Skoufias, 2004). The use of these mechanisms is shown in Tables 7.7 and 7.8. According to the survey of rural entrepreneurs in *Guanajuato, Puebla, Tamaulipas* and *Veracruz* mentioned above, one third of households affected by shocks resorted to sending more family members to work (Table 7.7.). Some 26 percent of households could secure loans and donations, while the percentage of affected households that resorted to selling assets was small, only 8 percent of the total. Defense of consumption levels is evident from the data: 57.7 percent of households that experienced shocks did not reduced their consumption.

Table 7.7. Coping with Economic Crises

	Sector						
	All	Farm	Non-Farm	Farm & Non-Farm	Bottom two quartiles	Third quartile	Fourth quartile
Percent of respondents that faced an Economic Shock	59	63	56	60	51	66	66
Percentage that received credit in the form of:							
Loans with positive interest rate, either formal or informal	7	7	7	9	4	8	11
Loans from friends/relatives	5	5	5	9	5	6	3
Delayed loan repayments	1	1	1	3	1	1	2
Subtotal	13	13	13	21	10	15	16
Percentage that received donations from							
Friends/relatives	12	10	16	6	13	14	11
Government or NGOs	1	1	1	2	1	2	0
Subtotal	13	11	17	8	14	16	11
Percentage that balanced income through							
Sales of Assets	8	10	7	4	6	4	15
Increased labor market participation	34	38	31	42	40	37	26
Reduced consumption	25	22	28	19	22	24	29

Source: World Bank (1995).

Income level is more important for the type of response than being a farmer or not. Differences in the way farming and non-farming households reacted to shocks are small, although farming households tended to sell more assets (probably animals), while non-farming households tended to receive more donations from friends and relatives. In all cases the support received from government and NGOs was minimal. The position in the income distribution affected the response. Not surprisingly, households in the top two quartiles resorted to credit more than those in the two bottom quartiles, who turned instead more to an increased participation in the labor market. Consumption smoothing was more marked among households in the bottom quartiles, which is consistent with the view that the poor, being close to subsistence, can hardly afford to reduce their consumption.

Increased participation in the labor market is an important coping mechanism. The coping mechanisms used by the individual farmers and rural micro-entrepreneurs interviewed in the rural finance survey that experienced shocks are shown in Table 7.8. The first thing to observe is that for farmers two thirds of the systemic shocks were due to climatic conditions, contrary to the case of micro-entrepreneurs for whom economic factors were the main cause of systemic shocks. Increasing the labor supply is the main mechanism to cope with shocks for both farmers and micro-entrepreneurs. Other than this, there are a series of strategies (depleting financial and non-financial assets, borrowing from friends and relatives) which are also used but to a much smaller amount. It is interesting that borrowing is hardly used as a coping mechanism either by farmers or micro-entrepreneurs. The strategies to cope with idiosyncratic and systemic shocks are somewhat different, but not much; they are both dominated by increases in the labor supply, although somewhat less in the case of idiosyncratic shocks.

Table 7.8. Actions Taken by Farmers and Micro-entrepreneurs to Cope with Systemic and Idiosyncratic Shocks

	Systemic Shocks				Idiosyncratic Shocks				
	Total	Climatic	Economic	Others	Total	HH Income	Health	Business Problem	Other
Farmers	100	65.5	33.3	1.2	100	62.0	15.9	19.0	3.1
Borrowing with interest	1.9	1.0	3.5	6.7	4.6	3.8	4.7	6.5	8.0
Borrowing without interest	1.0	0.9	1.2	--	2.0	0.8	3.9	3.2	8.0
Other financial services	1.1	1.5	0.3	--	1.2	1.2	0.8	1.9	--
Depleted financial assets	5.0	4.6	5.7	6.7	8.2	7.7	10.9	7.7	8.0
Depleted non-financial assets	6.6	7.3	5.5	--	5.9	5.0	10.9	5.8	--
Transfers from institutions	2.4	2.8	1.5	6.7	1.4	1.2	0.8	0.7	12.0
Transfers from friends & relatives	5.6	5.8	5.2	6.7	7.3	6.3	11.6	6.5	8.0
Increased labor supply	63.3	61.9	63.4	53.3	57.6	64.4	51.2	45.8	28.0
No strategy	13.1	14.2	10.7	20.0	11.9	9.7	5.4	21.9	28.0
Micro-entrepreneurs	100	38.2	58.8	3.0	100	36.1	22.4	35.5	6.1
Borrowing with interest	0.9	--	1.5	--	0.7	0.3	1.4	0.6	1.7
Borrowing without interest	1.9	0.8	2.4	4.8	1.8	1.7	1.4	2.1	1.7
Other financial services	4.0	4.5	2.9	19.1	3.0	2.9	1.9	4.1	1.7
Depleted financial assets	6.0	6.0	5.4	19.1	6.2	6.1	7.9	5.3	5.2
Depleted non-financial assets	2.6	2.3	2.9	--	6.1	3.8	13.6	3.8	5.2
Transfers from institutions	2.0	4.1	0.7	--	0.6	0.6	0.9	0.6	--
Transfers from friends & relatives	5.9	10.2	3.2	4.8	10.5	9.6	19.2	4.4	19.0
Increased labor supply	63.6	54.9	70.2	42.9	57.5	64.9	43.5	61.1	44.8
No strategy	13.2	17.3	10.7	9.5	13.6	10.1	10.3	18.0	20.7

Source: World Bank (2003: Table 9B.8).

Systemic shocks, such as the *Tequila Crisis*, are more difficult to cope with because mechanisms that work for idiosyncratic shocks fail at the systemic level. Thus, the response to the systemic shock epitomized by the 1995 *Tequila Crisis*, examined by McKenzie (2003), is different from that of idiosyncratic shocks indicated in the tables above. Most specifically, rural workers during the *Tequila* shock could not as a whole resort to increased labor market participation, because of the depressed condition of rural labor markets. Nor could they profit from domestic loans and donations from friends and relatives because of the generalized impact of the crisis on the household economies; only transfers from friends and relatives in the USA,

i.e. sheltered from the impact of the crisis, increased, mitigating the shock to some extent. The situation was also different with respect to consumption smoothing. There was some consumption smoothing during the *Tequila* crisis, but less than that observed upon the idiosyncratic shocks reflected in the ENCEL and ENET panel data and those in Table 7.4. Thus, for families engaged in agriculture, the average fall in income between 1994 and 1996 was 17 percent, that in monetary consumption 13 percent, and that in non-monetary consumption also 17 percent. The main smoothing that took place was through the reallocation of consumption expenditures in favor of the most essential ones, especially food spending which fell only 5 percent (McKenzie, 2003: Table 5).

Risk reduction, mitigation and coping mechanisms cannot always be separated, because some decisions by the rural poor affect simultaneously all of them. Also, decisions which have risk implications may not just be related to risk management but also to economic strategies linked to income and accumulation.⁹² We analyze below some strategies typically followed by the rural poor that have a variety of implications for the management of income, investment and risk. They are: the diversification of income sources, the reliance on the subsistence economy as a safety net, and migration. We also examine some specific features of risk management in old age.

Diversification of Income Sources

Diversifying income through non-farm occupations has been an important way for Mexican rural households to concurrently increase income and mitigate risk. We illustrate this with the diversification of rural incomes that took place from 1994 to 1996 and 1998 as a consequence of the *Tequila Crisis*, already mentioned in chapter 2. Table 7.9. shows rural households reacting to the crisis between 1994 and 1996 by increasing their involvement in non-farm occupations, particularly low return ones which are easier to access. This was probably related to the difficulty of increasing their participation in the labor market due to its depressed state, and to that of increasing farm incomes which requires investment in inputs and labor. The situation was somewhat reversed between 1996 and 1998 when the worst impact of the crisis was over. The shares of independent farming and agricultural wage incomes increased, and that of non-farm occupations decreased.

⁹² As Roumasset once put it, the risks with risk hypotheses is not that they explain too little but that they explain too much (Roumasset, 1976)

Table 7.9. Share of Different Sources of Income in Total Income of Rural Households (percentage)

	1994	1996	1998
TYPE OF INCOME			
INDEPENDENT FARMING			
All households	25.0	22.3	23.8
Extreme poor	27.7	26.7	23.1
AGRICULTURAL WAGE LABOR			
All households	14.6	12.8	15.0
Extreme poor	23.4	20.5	22.3
NON-FARM OCCUPATIONS			
All households	32.7	38.4	34.9
Extreme poor	18.7	28.2	26.7
<i>of which low return activities</i>			
All households	16.5	18.3	17.9
Extreme poor	11.6	17.7	16.1

Source: WB staff calculations based on ENIGH 1994, 1996 and 1998.

Taking the four years between 1992 and 1996, we have estimated from ENIGH data that the number of individuals in rural areas belonging to what we have called “diversified income households”⁹³ passed from 4.4 million (19 percent of the total) in 1992 to 6.5 million (26 percent of the total) in 1996. While income diversification is a structural trend in the rural areas of Mexico, there is little doubt that it was accelerated by the *Tequila Crisis*.

What conditions explain the diversification of income sources? We examined this in chapter 3 with respect to participation in non-farm employment, distinguishing between low return and high return occupations. We saw there that gender, education, region and the larger or smaller size of the rural settlement are all correlated to household involvement in these two types of non-farm activities. Using data from the ENHRUM survey, Taylor, Yúnez-Naude and Cerón (2004) have studied the process whereby rural households decide to participate in different occupations and the incomes derived from them. We show in Table 7.10 the average income shares of rural household from different sources resulting from this survey. The most important source is non-agricultural wages (41%) followed by farm production (18.2%). Transfers account for 17.1 percent of average rural household incomes, of which two thirds from remittances from abroad. These figures confirm our previous finding of large diversification of sources of income in rural areas. Taylor, Yunez-Naude and Cerón further examine how different household characteristics (size, education, experience), asset endowments (land, livestock, tractor, migration capital for domestic and international migrations), and region explain participation in different income sources. They then examine how these variables explain the income obtained from different sources, after controlling for household participation in them.

⁹³ Households with less than 50 percent of their income coming from a single source.

**Table 7.10: Share of Income Sources of Mexican Rural Households
According to the ENHRUM 2002 Survey**

Activities	Shares
Farm Production Activities	18.2
Livestock	3.7
Staples	2.4
Commercial Crops and Plantations	10.0
Other agricultural	2.1
Local Non-Farm Activities	8.3
Commerce	6.1
Services	2.1
Handicrafts	0.1
Renewable Resource Extraction	2.3
Public Transfers	4.4
Private Transfers	12.7
Domestic	1.7
From USA	11.0
Salaries and Wages	54.1
Agricultural	13.0
Non-Agricultural	41.1
Total (Average Household Income in MxP = 53,456)	100.0

Sample Size: 1,782 households.

Source: Taylor, Yunez-Naude and Cerón (2004).

Results are interesting. Not surprisingly, household size is directly related to diversification. Larger households tend to participate more than smaller ones in most activities: traditional and modern agriculture, large and small livestock, the exploitation of natural resources, non-agricultural occupations, and labor markets. They also receive more government transfers. Large households not only participate more in these activities but also obtain more income from them (after controlling for participation). Thus, for instance, an increase in one household member is associated on average with 23 percent more income from agricultural wage employment and 34 percent more income from non-agricultural wage employment. Migration, instead, is not related to household size in the regression equations, probably because of the endogenous factors involved between these variables: larger families may have a higher propensity to migrate, but migration reduces the size of the household. Human capital (family education, experience of the household head) encourages participation in modern agriculture and non agricultural activities, and discourages traditional agricultural, small livestock and participation in the agricultural labor market. Income from migration, both international and domestic, is very much enhanced by the existence of migration networks or “migration capital”⁹⁴; families with members resident in the USA have on average a 65 percent higher probability of receiving remittances, and families receiving remittances have on average an income 1.4 times higher than those who do not. The corresponding figures for internal migration are 32 percent for receiving transfers and 0.67 times for the increase in income. Land increases the probability of participating in traditional and modern agriculture and in livestock, but the contribution in the margin of land to income from these activities is small.

The Subsistence Economy as a Safety Net

The subsistence economy is commonly understood as the production of food crops carried out by farmers in one or several small plots of land for self-consumption, using

⁹⁴ We will see later that not only migration income, i.e. migrant transfers, depends on migration networks, but migration itself also depends on these networks.

family labor. Other components could also be added, like the raising of small animals, a vegetables and fruit orchard close to the homestead, and in most cases access to communal lands for grazing animals and collecting fire wood, wild plants, construction materials and other products. Lands are commonly on fragile or little fertile rain-fed soils, often steep, which forces farmers to use rotations, with fallow periods that have been decreasing under demographic pressure. Maize and beans are normally produced in association, and often a horticultural crop like *calabacita* is also included. Technology is simple and low risk consisting of well-tried *criollo* seeds usually resistant but low yielding, manual and animal labor (the latter if the family has animals or can rent the service), organic manure from own animals and domestic waste, and in some cases a small dose of chemical fertilizer if the family could afford buying it.

Subsistence farming is not exclusive to poor farmers, and is part of a wider family production system. Two things are important to understand about subsistence production. The first is that it is rarely practiced alone, but as part of a wider income and occupation plan of the family, i.e. of its production system. Subsistence production may be combined with other agricultural activities, for instance with the production of coffee or other cash crops, the commercial exploitation of communal forest resources, participation in the local labor market or non-agricultural occupations or temporary migrations. The second important aspect is that it is not exclusive of very poor farmers. Most farmers practice subsistence production to a smaller or larger extent. It coexists side by side with the commercial operations of medium or comparatively rich small farmers intricately woven into them. It is only when the family stops participating directly in manual work that subsistence production is abandoned by commercial farmers.

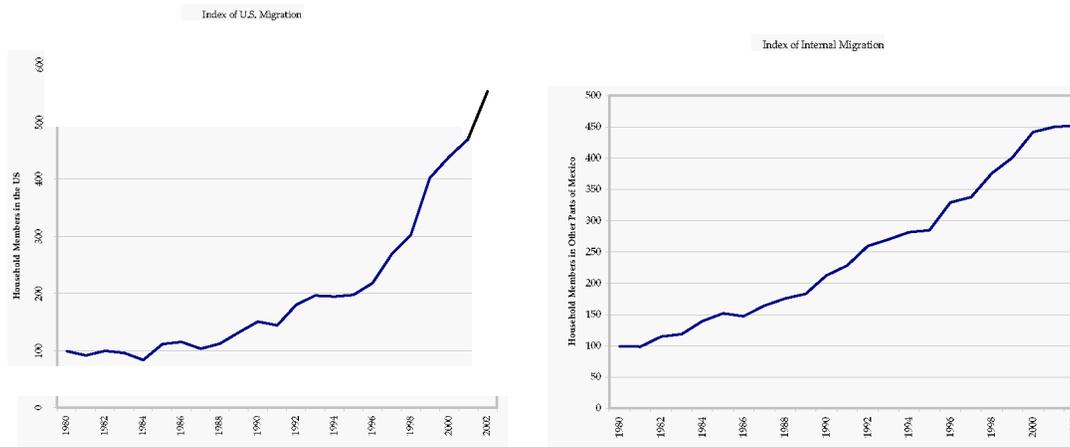
The importance of the subsistence economy has been declining but it still probably is the number one safety net in rural areas and it will probably be for many years. This is why among our recommendations we include that of strong policy support to the subsistence economy. Its role in food security is evident but there are also other more hidden roles which need to be highlighted. Thus, cultivating the soil and producing (some of) one's own food is strongly associated with belonging to a community. It is part of tradition and of what local society expects of an *ejidatario* or a *comunero*, and is a sign of being diligent and having some measure of independence.

Migration

Out-rural migration is an important income, employment, and risk management option for rural households in México. It has accelerated since the mid-90s as can be seen in Figure 7.2, where migration indexes calculated by Taylor *et al* (2004) on the basis of migration histories contained in the ENHRUM survey are presented. Acceleration since 1995 onwards, particularly of migration to the USA, is probably related to the *Tequila Crisis* and can be seen as one more mechanism used by rural households to cope with this economic shock. Migration to the USA is growing more rapidly than internal migration, but this is still much larger; approximately 70 percent of rural migrants in 2002 had migrated within Mexico, and only a small proportion of them (less than 10 percent) were employed in agriculture (Taylor *et al*, 2004).⁹⁵

⁹⁵ Large migration to the USA after the *Tequila Crisis* is also observed by Davis and Winters (2001) among *ejidatarios*.

Figure 7.2 Trends in Rural Out-Migration, Internal and to the USA, 1980 -2002



Source: Taylor, Yúnez-Naude and Cerón (2004), calculated from ENHRUM.

It would be wrong to assume that most rural households have migrant members. We have survey information on this from three sources: the 1994 and 1997 *ejido* surveys, the 1997 ENCASEH survey, and the 2002 ENHRUM survey. Comparison of the 1994 and 1997 *ejido* surveys indicates that 15.9 percent of the 5,260 individuals in the sample migrated at least once in that period, with 5.2 percent going to the USA, and 10.7 percent to other locations in Mexico, of which 1.4 percent to do agricultural work and 9.3 percent non-agricultural work. Of all migrants, 71 percent were male and 29 female, and of migrants to the USA, 80 percent were male and 20 percent female (Davis, Stecklov and Winters, 2002: Table 1). In the ENCASEH 1997 survey, 10.6 percent of the 2,574 rural households in the sample had members who had migrated temporarily during the last year (González-König and Wondon, 2003: Table 1). Finally, in the 2002 ENHRUM survey, 16.2 percent of the 1,782 families in the sample had one or more members living in the USA and 25.8 percent of the families had members living in other parts of Mexico at the time of the survey (January-February 2002).

The figures above are not as large as might be expected given the known importance of out-rural migration in Mexico, but there are two reasons why these figures could be somewhat deceptive. First, there may be, and often are, more than one migrant per household. Thus, when in the ENHRUM survey we measure all migrants against all rural families the result is that at the beginning of 2002 there were on average 0.35 migrants in the USA and 0.71 migrants within Mexico per rural family (Taylor *et al*, 2004: Table 3). Second, the figures refer to members of the nuclear family only. The situation changes if we include siblings and past migration experience. Thus, for instance, it has been worked out from the 1997 *ejido* survey that 44 percent of *ejido* families had some connection with the USA, either because the parents had migrated themselves in the past or had children or siblings living in the USA (Davis and Winters, 2001: Table 1).

There are different types of migration of the rural poor according to their duration, purpose, and role in the life cycle and accumulation strategy of the migrant. Ethnographic data from field studies (Edouard, Le Moing and González, 2004) suggest various types of migration with different functions.

Seasonal migrations of short duration (one to six months) normally have an income diversification function and take place during the low part of the agricultural cycle. Short migrations are often part of a regular pattern where continuing arrangements exist with an employer. This is particularly the case in rural-to-rural migrations when the migrant recurrently

returns to the same farm or agricultural area to help during the harvest. Recurrent short migrations involve different types of workers but are typical of middle age individuals, mostly males, and mostly small farmers, often from communities of origin in the south to agricultural areas in the central and northern parts of the country. There are three common routes. Along the Pacific Coast, migrants work seasonally in the harvest of fruits and sugar cane, and year-round in vegetables. In North-Central Mexico migrant workers help produce key crops such as cotton, apples, and various vegetables (primary between August and January). Along the Gulf Coast, farm operators employ migrants to produce sugar cane, cotton, oranges and coffee, except during July-September. Short migrations can also serve as a coping mechanism upon an income shock, in which case they would not be recurrent, and we would expect them to involve individuals of different age and gender. The use of this coping mechanism is likely to depend on the depth of the migration network of the incumbent, for this determines the possibility of finding work and shelter at the place of destination. Individuals who do not have good migration contacts are likely to use other responses to income shocks.

Resource accumulation is generally the purpose of temporary migrations of much longer duration (one to four years). They are mostly rural-urban and many are to the USA. Their purpose is accumulation more than income diversification. Young rural workers are typical candidates for this type of medium-term migrations, for they need to accumulate in order to *establecerse* (get established), which mostly means buying or building a house and getting married. Migration often works in this case as a sort a passage ritual –a passport to the adult world. Young women do also participate in these long temporary migrations, more probably than in short-term ones. Contact networks are of great importance in these migrations for both USA and domestic destinations and for both men and women but perhaps more for the latter. When migrations are to the USA, male networks are important for the decision of women to migrate but female networks are more important to decide the destination (Davis and Winters, 2001). Middle age married individuals also participate in medium-term migrations. In this case it is mostly the husband who migrates, and the purpose could be either capital accumulation in order to buy property or start some line of business, or to complement income probably to attend the needs of a growing family when local opportunities are very scarce and there are good migration contacts. The situation in these cases of the women left behind is ambiguous; on the one hand they take on new responsibilities as managers of the household and of family property in the absence of the husband, hence becoming more autonomous, but on the other hand the continued absence of the husband generates many uncertainties and incremental work loads.

Land Assets and Risk Management in Old Age

Current inheritance patterns which tend to discriminate against younger generations are part of an old age risk management strategy. Attention has been called in recent years to the inheritance patterns in rural areas in Latin America with respect to the main rural asset, land, and their impact on agricultural productivity, youth exodus, and demographic imbalances (Abramovay *et al*, 1998, Dirven, 2002 and 2003). Mexico is certainly not an exception to this, as indicated in Chapter 5. The resistance of Mexican small land holders of advanced age to pass on their lands to the young generation is part of a broader survival *cum* risk management strategy identified in field studies (Edouard, Le Moing and González, 2004). Being males the main owners of land in rural Mexico, the strategy refers mostly to them rather than to women, and is briefly describe below.

Keeping land ensures control of assets as well as bargaining power over other household members' income. The main perceived risks faced by old land-owning men, whose possibilities of migration, participation in the labor market and venturing into non-agricultural

activities are diminished by age, are (1) to be left alone without anyone to look after them, and (2) to be unable to earn enough income to survive. A response to this situation commonly observed in *ejidos* and *comunidades*, which probably extends also to small private land owners, consists of three aspects. First, old owners cling to their land resisting any pressures to pass it on in life to their heirs. This allows them to keep control of an asset which (i) provides a flow of income, (ii) embodies the main family wealth and hence helps keeping the family together around the parents, (iii) can be bequeathed to the wife or any of the sons or daughters at his discretion, thus giving a good bargaining power to the title holder, and (iv) gives power and status in the community.⁹⁶ Old owners are often afraid that if they pass on the land to a son or daughter, these may sell it and leave, so that he would be left with nothing. This is not an overly unreasonable assumption in view of the breaking of family ties observed in some communities. Second, parents try also to retain in the household at least one of the sons or daughters to look after them and help tilling the land, often with the promise that they will inherit it.⁹⁷ Finally, parents try to keep the family bound together even if physically separated by migration, and try to ensure that transfers keep coming in from distant children. Maintaining uncertainty with respect to the inheritance is a way of achieving this. Another way is helping migrant sons and daughters to maintain ties with the community, by for instance keeping a house there, and also providing services such as looking after the grand children and after the children's property in the community while they are gone. This behavior from old land owners has important consequences on the use of land, the farming practices, and the access to land by young workers.

Government Programs Affecting Vulnerability

We review here various ways in which the Mexican government helps reducing the vulnerability of rural poor people and support their risk management strategies. Many government programs have some direct or indirect effect on the vulnerability of the rural poor, but we will be only concerned here with programs that are either directly oriented to reduce vulnerability, such as agricultural insurance, or have (or could have) a major impact on it. We only deal with economic vulnerability, not covering issues and programs related to health and education.

Agricultural Insurance Systems

Most agricultural insurance in Mexico is oriented to middle and large commercial farmers. Crop and livestock insurance is not relevant for very poor farmers but can be important for sectors of small farmers who are moderately poor but have the conditions to escape poverty through farming. There are three main ways in which government intervenes in agricultural insurance. The first is through the 2nd level activities of *Agroasemex*, the government's agricultural insurance company. The second is through the support provided to the *fondos de aseguramiento*, a private cooperative-type risk pooling system funded and run by the farmers themselves. The third is through *Fonden*, a natural disasters government fund. We examine here briefly these systems and their impact on the rural poor leaving some recommendations to the latter part of this chapter.

***Agroasemex*, which replaced the former government insurance company in 1990 has an overarching role as reinsurance company and insurance development agency.** Unlike *Anagsa*, *Agroasemex* did not try to insure all loans from *Banrural* and concentrated mostly on

⁹⁶ Thus, for instance, only title holders can vote or hold office in the *ejidos*.

⁹⁷ The situation in the *ejidos* is complicated by the fact that, as explained in chapter 5, according to law, properties cannot be divided by inheritance or otherwise. In practice, however, they often are.

high potential and moderate risk areas. It also left room for private companies to participate in the rural insurance market. Private companies at present cover some 57 percent of the 1.5 million hectare insured area and more than 90 percent of livestock insurance. *Agroasemex* main clients were small commercial and middle producers with productive potential. In 2001 *Agroasemex* withdrew from the retail insurance business and became a 2nd level institution with two functions: reinsurance company, and insurance development agency. As a development agency, *Agroasemex* promotes new instruments and links between the finance and insurance markets, and carries out training. It also has two important development roles: to administer the *Programa de Subsidio a la Prima del Seguro Agropecuario*, a subsidy program to the agricultural insurance premium⁹⁸, and to provide technical and organizational support to the *fondos de aseguramiento*, mainly through promotion and technical assistance services. There are no specific activities of *Agroasemex* targeted to small farmers, but those among them who have access to insurance benefit from the subsidy on the premium. Also, the support given to the *fondos* benefits small farmers participating in them.

The *fondos de aseguramiento* have been fairly successful, concentrating on weather, biological and crop establishment risks. These *fondos* are farmers insurance associations, originally started in the early 90s in the prosperous irrigated *ejidos* of the *Mayo* and *Yaqui* valleys in the state of *Sonora*. Although hardly hit by the financial crisis of 1995, they have been rather successful and expanded fast among commercially oriented farmers of small or middle size, mostly in irrigated and good rain-fed areas. They specialize in crop insurance, having gone little into livestock insurance, which is the province of the private sector. *Fondos* currently insure some 622 thousand hectare (42 percent of the insured area) and receive some USD 40 million in premiums. Premiums are collected from participants, and insurance is paid upon assessed damages. They basically insure against weather, biological, and crop establishment risks. There are different types of insurance with different coverage: the investment cost of the input package, the value of the plantation (in the case of plantation crops), and the value of the expected crop. On average, *fondos* have some 350 members with an insured area of some 3,000 hectare each, and an average premium of close to USD 60 per hectare, of which 30 percent is paid by *Agroasemex* subsidy. To deal with covariate risks, *fondos* reinsure with *Agroasemex*, which has a program to that effect. As mentioned before, *fondos* also receive support from *Agroasemex* for training, technical assistance and computing equipment.

The *Fondo de Desastres Naturales (Fonden)* is a federal government insurance fund against natural disasters, which is part of the *Sistema Nacional de Protección Civil*. It covers all major natural disasters, financing the reconstruction of public infrastructure and compensating the rural poor for their losses following large covariate shocks. Small farmers and other rural poor are protected in four ways: (a) they receive support to rebuild their houses if affected by the disaster, (b) receive compensation for crop and livestock losses for a maximum of 5 hectare and 25 heads of cattle at a rate of some USD 33 per hectare and USD 23 per head, (c) they may also qualify for temporary income and employment support, and (d) they benefit from the reconstruction of local public infrastructure (Secretaría de Gobernación, 2003). *Fonden* is a useful instrument to absorb part of the income impact of large covariate shocks of natural origin, but it compensates for part only of the losses and depends on a number of procedures and discretionary actions such as the declaration of emergency that limit its impact. Although useful to the affected individuals, it is

⁹⁸ The subsidy amounted to some US\$ 31 million in 2003 distributed over some 1.5 million hectare and 16 million animals, approximately 60% for agriculture and 40% for livestock. The subsidy was equivalent to 30% of the premium and 3.5% of the insured value (9.2% in agriculture and 1.7% in livestock), and an estimate of 2.8% of production costs in agriculture or MxP 140 per hectare (Instituto Superior Tecnológico de Monterrey, 2004).

probably a better instrument to compensate for the loss of infrastructure and facilitate its reconstruction.

Other Government Support Programs

With the exception of work fare programs, there are no government programs specifically focused on mitigating the impact of risks. Cash transfers programs such as *Oportunidades* and *Procampo* are important at ensuring some minimum income and hence help smoothing consumption in the presence of income shocks. They are not, however, insurance mechanisms as such. Using ENCEL panel data Skoufias (2004) has shown that *Oportunidades* does not provide additional insurance for consumption over and above existing formal and informal insurance systems although it helps smoothing income over time. On the other hand, he also found that cash transfers increase the means available to households to cope with shocks rather than displacing existing informal means of insurance. There is no similar panel data with respect to the impact of *Procampo* but one would expect the situation to be similar.

Other rural development programs such as *Alianza para el Campo*, *Microrregiones* and *Opciones Productivas* do not have a specific social protection function against income shocks, although the credit programs included in *Opciones Productivas* may facilitate some coping strategies following idiosyncratic shocks. Being mostly a social infrastructure program, *Microrregiones* is not expected to have a major short time effect on income vulnerability, although it could have medium and long-term effects if the infrastructure built served to attract other investments and promote local development thus generating more income earning opportunities. Something similar could be said with respect to the support offered by *Alianza* to farm modernization.

The *Programa de Empleo Temporal (PET)* promotes employment of poor people, particularly the extreme poor, in public works in rural areas. This program is mostly the responsibility of SEDESOL but has also some funding from SAGARPA and SEMARNAT. Although its primary function is employment provision to the poor during the low season, it does have an insurance function since incremental funds are usually made available for additional employment in areas that have been affected by systemic shocks due to natural disasters or other causes. The program is oriented to the extreme poor and consists of the provision of employment in labor intensive public works to build infrastructure or in works related to environmental or sustainable agricultural improvements. *PET* is particularly oriented to poor municipalities prioritized in agreement between the federal and state governments. Beneficiaries receive 90 percent of the minimum wage for unskilled workers in the area and can only work for a maximum of 88 days. Under the ordinary program, works are carried out during the low agricultural season.

***PET* successfully combines a poverty alleviation function with a shock mitigating function.** *PET* serves two purposes: absorbing seasonal unemployment in rural areas affecting especially the very poor, thus alleviating poverty, and providing especial assistance in situations of emergency. These two functions are entirely compatible and even synergic, because the experience and capability gained in the implementation of the regular program are very valuable in emergencies situations. It is hence appropriate for *PET* to be both an employment and a social protection program.

POLICY IMPLICATIONS AND OPTIONS

Two Views of Poverty and Vulnerability in Rural Areas

To close the chapter we contrast two views on poverty and vulnerability. Much of the current policy debate can be interpreted as product of the tension between two contrasting views of poverty and vulnerability in rural areas. These models represent different views on poverty, the poor, poverty measurement, poverty correlates, anti-poverty instruments, poverty targeting, migration, social protection and actions to promote rural development. For reasons of simplicity we label these views “social-liberal” and “rural-corporate” and compact them under Model A (“social-liberal”) and Model B (“rural corporate”) in Table 7.11.

Model A stresses the importance of individual agents, private assets and the market as engines of rural development, but recognizes the need for government intervention in the supply of public goods and basic services in underserved rural areas, and in supporting with cash transfers the incomes of rural families fallen into the worst poverty situations. Education, health, social infrastructure and direct cash transfers targeted to the poor are the principal, albeit not only, items in the policy agenda. These items are market compatible and also tend to increase competitiveness by increasing human capital. Education and health in particular result in individual improvements in knowledge and strength. These are portable assets of varied application, which increase labor productivity and hence returns to labor. If the market makes local opportunities scarcely attractive, especially to the young, migration is the answer. Migration under *Model A* is seen as a Pareto improving individual decision that people freely make, rather than as a social process explained by general economic circumstances. People are viewed as individuals rather than structured groups. Vulnerability is something, therefore, more related to individual situations than to that of groups. Self-insurance through the promotion of appropriate financial assets is a fitting answer. The rural poor are seen as an undifferentiated collection of individuals or families with similar needs who have incomes below certain levels. Since measuring the income of each individual or family is not possible, poverty targeting should focus on the observable characteristics that make the individual or family more or less likely to fall under the specified levels.

Model B focuses on rural organizations, especially rural communities, and collective action by these organizations. The need of state intervention is recognized under this model with similar functions to those in *Model A* (education, health, social infrastructure, direct poverty alleviation), but also with emphasis on the promotion of rural economic development through support to productive activities. Migration is seen as an unavoidable process in many rural areas, but one that imposes hardships on the individuals and families concerned as well as socioeconomic disequilibria in the communities. The model is optimistic as to the possibility of reducing migration through the promotion of local development, and proposes working towards situations where people can have a better choice between migrating and taking up local employment opportunities. Population is seen not as an agglomeration of individuals but as a structured set of organizations —territorial, interest-based and others— embodying valuable social capital for development. Participation of these organizations in the targeting and operation of development programs, and unconditioned outside support with freedom for them to decide on investments and development paths, are strongly emphasized. Poverty situations are seen as heterogeneous and hence requiring differentiated actions. Economic development policies coupled with people’s participation and reliance on rural organizations are the policy recipes of this view. The alleviation of extreme poverty situations through direct cash transfers is seen as a positive but transitory and partial measure, secondary in importance to production oriented policies.

**Table 7.11. Visions on Poverty and Vulnerability in Rural Areas:
Two Contrasting Models**

<i>VIEWS ON</i>	Model A “Social-Liberal”	Model B “Rural-Corporate”
Poverty	Emphasis on objective and absolute dimensions	Emphasis on subjective and relative dimensions
The poor	Emphasis on characteristics and needs that are similar among the poor	Emphasis on differences among the poor
Poverty measurement	Emphasis on monetary measures, particularly income-poverty	Emphasis on basic needs, human development indicators and stock measures
Poverty correlates	Emphasis on observable variables: assets, education, location, gender, family characteristics, occupation, ethnicity	Emphasis on both observable variables and little observable ones like social capital and cultural dimensions
Anti-poverty instruments	Emphasis on investment in “mobile assets” (mostly human capital) and direct cash transfer	Emphasis on productive development, CDD and territorial approaches
Poverty targeting	Emphasis on objective, centrally established criteria	Emphasis on self- and community-targeting, importance of context variables and community perceptions
Migration	Emphasis on the virtues of migration as an equilibrating economic mechanism and an opportunity to escape poverty	Emphasis on migration as a “necessary evil” and on the suffering and social disequilibria generated by it
Social protection	Emphasis on market mechanisms and cash transfers	Emphasis on social capital
Actions to promote rural development	Emphasis on the individual, private assets and markets	Emphasis on the community and on collective action

Source: Author’s construction.

A measured policy response to rural development challenges should take into account the views from both models. Each model has its strengths and weaknesses. *Model A* rightly emphasizes the importance of human capital and the need to protect the freedom of individuals to migrate and to place them in the best position to be successful migrants. Its understanding, however, of the migration process is unsophisticated, too narrowly focused on the individual and on existing conditions, without proper attention to the social dimensions and the circumstances generating migration in the first place. The insistence of *Model B* on active policies to stimulate rural pro-poor economic growth is sound; income supports through direct transfers cannot substitute for them, regardless of their possible income multipliers. Direct income supports, however, are important because of their immediate welfare effects, and cannot be dismissed, which is a risk under *Model B*. By recognizing the importance of rural organizations, social capital, and the heterogeneity of the poor, *Model B* takes a more “organic” view of rural society than *Model A*, which is a strong asset for the formulation and implementation of rural policies. Insisting on local participation and the need to support communal and other organizations while allowing them a free hand to decide on the use of resources, is another strong point of *Model B*, but limits and risks need to be recognized. Capture of benefits by local elites is a well-known risk. Also, central authorities and other supporting partners are entitled to their own views and priorities with respect to development programs, and hence to discuss and agree priorities and implementation guidelines with local organizations. They are also entitled to a close watch on the soundness of local processes. These considerations serve as a background for the analysis of policy options below.

Policy Options

Formal agricultural insurance schemes are not particularly useful to the extreme rural poor since for many of them income does not come mainly from independent farming, and when it does agricultural insurance can be comparatively expensive for small rain-fed producers growing traditional crops. Also, these producers use low risk technologies in their farming operations, hardly use seasonal credit, are not exposed to input or output market risks because they buy very few inputs and sell little if any output, and to a certain extent are covered from large natural disasters that trigger the intervention of *Fonden*. For these reasons other type of insurance systems are more appropriate for this bottom sector of the rural poor.

Agricultural insurance, however, can be important to farmers in transition, located between the extreme and moderate poverty lines or immediately above the latter line, especially if they want to diversify into high value crops, which is always a risky operation. *Agroasemex* could make additional efforts to assist creating more insurance groups among this sector. This could best be done in the context of projects promoting crop diversification or technological change among small farmers in a certain area with a modicum of potential for such changes, even if at a small scale, preferably as part of a larger territorial development effort.

An interesting proposal has been made to introduce parametric insurance systems in rural areas linked to weather parameters (World Bank, 2001, Skees *et al*, 2002). The system would be useful to farmers in general, including small farmers. Even the non-farm rural poor could benefit since many rural enterprises and labor opportunities on which they depend are related to weather. To be most effective, the parametric insurance system should work in synergy with the development of rural finance. Micro finance institutions could hold weather derivatives as part of their portfolio to protect themselves against defaults originated in covariate weather shocks. They could also make loans available to the rural poor to buy these bonds. Weather derivatives would also help taking part of the covariate risk off insurance groups, and hence facilitate the formation and operation of risk pool groups such as the *fondos de aseguramiento*. The system has the advantages *inter alia* of being simple, easy to administer and free from the adverse selection and moral hazard problems that affect most insurance schemes. Parametric insurance criteria could also be applied to public insurance programs. Thus, *Fonden* could consider moving to a parametric system of triggers (World Bank, 2001).

Modifying existing cash transfer programs in rural areas to enhance their insurance function is not seen as a favorable option. These programs already fulfill certain social protection functions in addition to their own objectives and it would be dangerous to ask them to perform too many functions. It is better to use other instruments.

Rural financial systems are multipurpose instruments that serve for risk management, capital accumulation, technology adoption, and personal welfare. The possibly are the single most important formal system to assist the rural poor to manage risks, particularly idiosyncratic risks. Their main roles are as follows: (1) they promote savings and facilitate keeping them in forms more adequate to needs than those traditionally used by the poor (cash hoardings, animals, produce, land), thus favoring the use of savings as a self insurance mechanism; (2) they facilitate obtaining personal loans in response to shocks; (3) they also facilitate obtaining crop insurance, which is usually bought together with seasonal crop loans; (4) rural financial intermediaries may directly provide certain types of insurance, such as life or burial insurance; and (5) personal and productive loans facilitate income diversification and migration strategies, which are important self-insurance instruments.

Given the importance of subsistence production as a safety net to poor rural producers, strong support to the subsistence economy is a major policy option. The subsistence economy, like the poor, is there to stay with us for many years, although (hopefully) with a waning away trend over the very long run. As argued in chapter 1, this is a matter of the inability of the economic system to provide high productivity jobs to surplus laborers who take refuge in subsistence production, many in the *zonas de refugio*. The same logic that leads to adopting a social policy of cash transfers to the extreme poor—an underprivileged structural part of society whom we recognize society must help—applies to supporting the subsistence economy. Only that in supporting subsistence production we are not just doing “social” policy; we are also doing production and environmental policy.

There are various ways in which government programs could support subsistence production. First, soil management programs in fragile areas would help redressing one of the main problems in subsistence agriculture: the degradation of soils because of erosion and falling fertility due to shorter fallows, use of steep hill sides for annual cropping, and lack of conservation practices. Second, programs to enhance kitchen gardens, the production of small animals, and some tree crops could be expanded. Third, environment friendly yield increasing technical packages could be promoted for traditional crops. Finally, access to communal resources could be improved and better managed through the promotion of community self-regulation norms that would avoid tragedy of the commons type situations following migration, market development and income differentiation. Communal resources could also be the basis of accessing environmental service markets in the benefit of the community. Support to the subsistence economy is probably better carried out at the local level in the framework of municipal or micro-regional plans such as those promoted by *Microcuencas*. The federal government could have an important role, however, in developing technological and methodological options, disseminating best practices, coordinating efforts and providing financial resources.

8. SUMMARY OF POLICY OPTIONS TO FIGHT RURAL POVERTY

This chapter presents policy options to intensify the fight against poverty in rural areas, building on the Mexican government's policy reforms underway in areas like local development, program implementation, and education. We bring together in this chapter the options discussed in the previous ones.

Policy options for improving rural poverty interventions are organized around four areas:

1. Deepening the territorial approach to rural development as a form to achieve local economic development and reduce poverty through territorially based economic coordination rather than purely sectoral approaches.
2. Revitalizing the rural economy in favor of the rural poor, raising overall productivity in the farm and non-farm sectors, and working to help the poor increase their labor productivity.
3. Improving the design and effectiveness of rural development policies and programs; and
4. Supporting the rural youth as a critical factor for a dynamic rural economy.

GENERAL CONSIDERATIONS

This report has shown that strong policy action will be needed to overcome poverty in Mexico's rural areas. Rural Mexico is marked by poverty. Poor families in rural (and urban) areas are still reeling from the effects of the macroeconomic crisis in the mid-1990s. Extreme poverty exists in all of rural Mexico, but the southern pacific states, far away from economic centers and with large indigenous populations, have particularly high incidences of poverty. While the situation has improved substantially since 1996, poverty incidence is still very high in rural areas. The effects of the *Tequila Crisis* and a slow-moving agricultural sector were instrumental factors in eroding rural households' income sources. The Mexican government has been successful in increasing direct cash transfers to the rural poor, but efforts should also be strengthened to enhance access of the rural poor to non-farm activities as well as more productive agricultural activities and farming methods.

This chapter presents some options for reform to deepen efforts to eradicate rural poverty. The discussion is organized around four areas: (1) deepening the territorial approach to rural development; (2) revitalizing the rural economy in favor of the rural poor; (3) improving the design and effectiveness of rural development policies and programs; and (4) supporting the rural youth as a critical sector for a dynamic rural economy.

These specific policy options, discussed below, should be seen in the context of more general policy implications derived from this report. In particular, we would like to highlight the following issues:

- Maintaining macroeconomic stability as an essential element for a poverty reduction strategy
- Keeping the level of direct transfers to the rural poor in view of their current importance for their livelihood, but using incremental resources at the margin to promote income and employment growth.
- Focussing attention on regions and areas where poverty is more concentrated.
- Concentrating investments to build up critical masses to trigger endogenous growth process.
- Continuing focusing attention on improving rural education, with emphasis on quality, expanding secondary facilities and enrolment, and strengthening technical education and vocational training for rural people related to farm and non-farm activities.

Mexico's success at regaining and maintaining macroeconomic stability after the Tequila Crisis has been important for allowing a sustained fall in poverty since 1996. As we have shown, poverty increased dramatically in 1994-1996, under the effects of the macroeconomic crisis. Mexico's ability to maintain macroeconomic stability over the past decade is probably one of the most important explanations for why poverty has fallen. Prudent macroeconomic policies will need to remain at the core of any rural poverty reduction strategy.

Public transfers are now instrumental to the livelihood of the poor but need to be complemented by enhanced income and employment programs. Public transfers to the poor, especially through *Oportunidades* and *Procampo*, have increased substantially since the mid 1990s. It is likely that the number of poor and the depth of poverty would be starker had these efforts not been made. Clearly, these transfers are essential to the poor, and could not be removed at this stage without much suffering. We believe, however, that this safety net needs to be complemented by more efficient and effective ways of promoting income and employment growth, and that at the present time incremental resources for rural areas would be better used to promote income and employment generation than to expand direct cash transfers.

Location matters. There is a need to focus attention on marginalized regions and areas, where poverty is more concentrated, combining incremental resources with an assessment of the capacity of specific programs to promote local development, and using targeting mechanisms adequate to each type of program. Related to this, investments could be clustered to build up critical masses of productive and support infrastructure to trigger endogenous growth process, rather than disseminated in large areas and many different activities or in a myriad of small unconnected projects.

Education remains the most important correlate of poverty. Education is an important tenet of the Mexican government's social welfare strategy. Continued emphasis needs to be given to access, but also to quality, expanding secondary facilities and enrolment, and strengthening technical education and vocational training for rural people related to farm and non-farm activities.

SPECIFIC OPTIONS TO FIGHT RURAL POVERTY

Deepening the Territorial Approach to Rural Development

The territorial approach to rural development is a means to achieve local economic development through territorially based economic coordination. The main tenets of this approach, which is presented in Annex 3.I, are the emphasis on (1) mutisectoral development, (2) the links between rural and urban areas, (3) the use of participatory territorial planning as instrument for economic coordination and to organize the demand for development interventions, (4) the structuring of interventions around a long-term strategic plan for the territory, (5) the economic potential of territorial assets, and (6) the mobilizing capacity of a shared territorial identity (see Annex 3.H). The territorial approach changes the focus from sectoral to territorial competitiveness, and offers an excellent framework for poverty reduction interventions in rural areas centered on equitable local economic development.

A territorial approach is probably best focused at the level of territories like micro-regions and districts, which are larger than municipalities. The approach can be applied at different spatial levels, including for instance the *microcuenca* and the *municipio*, but larger territories of the size of present SAGARPA districts and SEDESOL micro-regions are the most promising for strong development impact. These larger territories can be articulated with broader rural-urban regions sharing integrated labor pool watersheds. In this connection, a spatial policy would be useful to facilitate the geographical concentration of investments and services for productive development, favor the growth of rural towns and intermediate cities, and promote the establishment of links between these urban centers and their rural hinterlands.

For the territorial approach to work in practice it would be useful to have a policy and planning agency of mixed public-private-civil society composition in each territory, empowered to carry out participatory planning and articulate local development demands. The *Ley de Desarrollo Rural Sustentable* provide the instrument to create these agencies in the form of *Consejos de Desarrollo Rural Sustentable*. District level *consejos* could be particularly important to carry out economic coordination in their territories.

Economic diversification and the commercial exploitation of territorial assets are key aspects of the territorial approach. There are three basic modalities: (1) increased value added of goods or services already produced in the territory, (2) improved use of territorial advantages through the introduction of new commercial products, and (3) the establishment of synergies between different sectors of activity in the territory. The European Union Leader Program, based on a territorial approach similar to that summarized above, offers many examples of these modalities (Box 8.1).

While there are several programs and mechanisms in place with a territorial focus, the diverse initiatives could be brought together under a unified policy framework. The *Ley de Desarrollo Rural Sustentable* favors a territorial approach to rural development, and there are rural development programs in operation designed with a territorial approach, such as *Microrregiones*, the *Desarrollo Rural* sub-program of *Alianza* or *Microcuencas*. SAGARPA has been active in establishing rural development councils at the municipal level. More actions at the federal and regional level, consistent with the Law, could be carried out to advance along this path. A *política de estado* to promote rural development with a territorial approach would be required, supported by the Oficina de la Presidencia de la República and the Secretaría de Hacienda. Dissemination of the advantages of a territorial approach among state governments would also be essential because territorial policy is —or should be— their responsibility.

Four policy actions are possible at the federal level. First would be to empower the *Consejo Mexicano para el Desarrollo Rural Sustentable* (CMDRS) to act as national agency for the promotion of the territorial approach to rural development. The *Consejo* could establish a plan for the progressive introduction over time of the territorial approach and monitor its progress. Second possible action refers to the harmonization of the operational rules of rural development programs of federal agencies, and the national coordination of their activities, which could be done within the framework offered by the CMDRS and with the support of the Secretaría de Hacienda. Third action would be the progressive introduction of a system to coordinate the budgeting of rural development programs by federal agencies. Finally, a national territorial development fund could be created to finance territorial investment programs submitted by territorial agencies operating under competitive bidding principles.

Box 8.1. The European LEADER Program

The LEADER program of the European Union first launched in 1991 is an attempt at fostering a territorial approach to rural development in Europe. Based on the identification of problems and potentials of specific rural areas, strategic plans are formulated and priority investments co-financed. There are three basic principles: innovation, partnerships, and multisectoral integration. The central characteristics of LEADER can be summarized as follows:

- Each LEADER program intervenes in a territory relatively homogenous, defined by the local actors, of between 10 and 100 thousand residents.
- A vertical partnership among three different levels of government (European, national and regional) establishes the general orientations, some general rules for the selection of subprojects, the financial contribution of each partner, and the M&E procedures.
- A horizontal partnership, known as Local Action Group (LAG), is established as a civil association integrating local public and private actors: municipalities, producer associations, chambers of commerce, savings and loans associations, unions, cooperatives, traders and entrepreneurs, NGOs and other CSOs. With the assistance of a very small technical group, the LAG prepares a strategic plan for the development of the territory, formulates an operational program for the 5 or 6 years of operation of LEADER financing, and receives, examines, approves and supervises the execution of the subprojects submitted for co-financing. Within the general LEADER norms established by the vertical partnership, each LAG has plenty room to decide investment priorities.
- Integrated, innovative and multisectoral investments are generally favored. They are mostly oriented at exploiting the comparative advantages and assets of the territory, the strengthening of local clusters of medium and small enterprises, and the exploitation of synergies among different local economic sectors, as means of increasing the competitiveness of the territory. Since farm production is supported by other instruments of the European CAP, LEADER support concentrates on off-farm investments (including agro-processing). LEADER financing typically supports marketing innovations, environmental improvements, adding value to local products, small local industrial and services firms, and agro-tourism.
- Sub-projects are co-financed with European and national funds and beneficiary contributions. The latter varies according to the norms established by the vertical partnerships and the specific LAG but is typically of the order of 50 to 60 percent.
- LAGs receive some small technical assistance, particularly at the beginning, are supported in their accounting and other ways by participating municipalities, are organized in networks to share experiences through the national and European

“Leader Observatories”, often cooperate with each other in various ways, and usually intervene in discussions and policy decisions related to local economic issues.

Source: FAO-World Bank, 2003.

At the regional level, five possible actions could be considered. First, establishing shared *regionalizaciones* in each of the states, agreed upon by federal agencies and state governments, who could take the leadership in this. Second, advancing in the creation of territorial economic coordination agencies. The *Consejos Distritales de Desarrollo Rural Sustentable* regulated by the *Ley de Desarrollo Rural Sustentable* could be the legal form for these agencies. To ensure local ownership, their formation would best be approached as a bottom up process involving the active participation of all relevant federal and state agencies and territorial actors. Third, as territorial councils are being formed, the *Centros de Apoyo al Desarrollo Rural Sustentable* mentioned in the law (art. 29) could be created to act as technical secretariats of these councils. Fourth, setting up a system of *ventanillas únicas* in the territories to provide information and to process demands related to the various rural programs. Finally, formulating strategic plans for the territories using participatory planning methods to identify the development axes around which territorial investments could cluster. This task could be promoted by the territorial agencies.

Revitalizing the Rural Economy in Favor of the Poor

Rural development needs to build on a comprehensive approach including both farm and non-farm activities. It is suggested that the focus move from the farm to the family as the unit of analysis for rural development and the receiver of rural policy. This implies abandoning the concept of “viable farm” as a guide for policy interventions in agricultural development, and promoting agricultural competitiveness through multiple interventions embracing small and large farms, full- and part-time farmers.

Agricultural intensification offers a way forward to increasing output and incomes. The exhaustion of the land frontier and the comparatively low levels of land and labor productivity in agriculture suggest that intensification is needed. We advocate a policy of “diffuse intensification”, embracing all types of farms, irrigated and rain-fed, small and large. Policies are needed to create the conditions enabling farmers to carry out crop diversification and increasing crop yield. In particular, poorly endowed farmers with little physical and human capital will need help to move from low to high value crops. Extensive and well functioning research and extension systems, as well as rural finance systems, are essential for this. These systems are also essential to raise crop yields, the other component of intensification.

The small farm economy is the logical center of a poverty-friendly agricultural growth strategy. Focusing on small farmers is a recognition of the fact that markets tend to fail more for them, that instruments like research and extension and rural finance need to be specially calibrated for this farming sector, and that there is a merit want quality in the needs of small farmers. A positive discrimination spirit from policy designers and program operators would favor overcoming the class and technical biases in favor of large farmers that usually characterize agricultural programs in Mexico as elsewhere. Encouraging participation of small farmers in rural value chains and their governance organizations and in *asociaciones integradoras* could also be part of these policies.

In order to improve the poverty friendliness of rural programs, it would be useful to intensify the dialogue between program managers and government officials, on the one hand, and leaders from farmers’ and other rural organizations, on the other. Intermediate rural leaders

have an especially important role to play in highlighting rural needs and priorities in the geographic or sub-sectoral areas of their competence, and giving feedback on rural programs. Rural organizations have also an important role to play in the implementation of rural development programs.

Education –access and quality– as well as access to better infrastructure are important means of increasing access to non-farm activities and better wage opportunities for the rural poor. Policy should pay attention to variables strongly correlated with better rural wages and enhanced participation in rural non-farm activities. Education—in particular at secondary level—is one of them. But education coverage and incentives to attend school are not enough; quality is also important, as well as combining education with other productive assets. Road connections, communications and energy are other correlates of better rural wages and enhanced RNF employment.

Economic investments to promote the RNF sector are integral to rural development-cum poverty alleviation programs. Investment decisions in the RNF sector could be decentralized through a system of local participatory planning based on the territorial approach. This would be the best way to address the inherent heterogeneity of the RNF sector and its different opportunities, while exploiting investment synergies and making investment programs easier to implement and more relevant to the specific context.

Technology

Poorer farmers need enhanced access to agricultural research and extension services to increase land and labor productivity. Rural technology enhancement has many stakeholders. To determine exactly what to do, it would be useful to organize an intensive debate among interested parties on how the agricultural knowledge system should evolve in the medium- and long-run to ensure competitiveness with equity. This could lead to the formulation of a national strategy to enhance rural technology. Of particular importance is how to accommodate poor farmers needs in the research and extension agendas and methods, and how to mainstream environmental concerns into research and extension.

There is need to discuss the technical assistance and extension models most appropriate for different type of farmers and regions. Together with the use of more traditional methods such as demonstration plots, that of more modern ones already tried in localized pilot experiences could be mainstreamed, including methods such as farmer to farmer extension and farmer field schools for pest control, soil management, conservation agriculture, and agro-forestry systems. These models are probably best established at the state level through discussion of local scientific institutions, farmers' organizations, federal and state authorities, and NGOs working in the area. SAGARPA and state authorities could jointly promote these fora.

The agricultural knowledge system could benefit from a modernization of the curricula of agricultural learning centers, particularly those of the technical agricultural schools, like the CBTAs. The new curricula could pay more attention to new crops, processing industries, and commercial and managerial aspects. The promotion of vocational training and technical-level degrees in non-agricultural areas would also be important for local development. It could be achieved through a larger deployment in rural areas of CETIS and CBTIS type centers.

Environmental Assets

The commercial exploitation of environmental assets by local communities could bring dynamism to the rural economy. Cultural and landscape assets and biodiversity offer good opportunities for rural tourism and eco-tourism enterprises. Environmental services like carbon sequestration, water regulation and watershed management, and biodiversity stewardship offer also good economic opportunities, which have started being exploited in Mexico often with NGO support. Areas rich in environmental assets are often income poor, like the Southern Mexican states, and hence support for the sustainable commercial exploitation of these assets is usually poverty friendly.

Forestry resources are a case in point. Although community forestry is rapidly and successfully developing in Mexico, *ejido* and community forests are still insufficiently exploited. Intensification of community forestry programs is an option. Their scope could be broadened to include the sustainable exploitation of timber and non-timber resources, watershed protection and management, reforestation, agro-forestry systems, commercial forestry plantations, and timber and wood processing industries.

Rural Finance

An accessible and viable rural finance system is essential to help the rural poor build assets over the long term and cope with economic shocks in the short term. Rural financial systems are a multipurpose instrument that serves for risk management as much as for capital accumulation, technology adoption and personal welfare. Three policy actions could be considered. First, expanding BANSEFI and *Financiera Rural* operations with the resources currently used for *ad hoc* credit programs so as to mainstream and unify rural finance policy. Second, using the *Financiera Rural* to assist in the development of the rural micro-finance system. Third, supporting with judicious incentives the introduction of innovations in rural micro-finance operations, such as flexibility in disbursement and repayment to adjust to the agricultural cycle, flexible collateral requirements, use of smart and debit cards and information technology, use of existing rural infrastructures for loan delivery, and introducing different financial products.

There is a large collection of formal and informal institutions and programs providing financial services in many rural areas of the country. Stronger coordination among these institutions would facilitate making information available to users on existing financial products from different sources, thus making the market more transparent. It would also help reaching agreements among suppliers to improve the distribution of financial services in the territory, and to combine financial services to better serve clients. This could best be done at the state level, where fora of the relevant institutions could be stimulated to discuss local needs of financial services and provide a framework for economic coordination. BANSEFI and the *Financiera Rural* could take an active role in the promotion of these state fora, but strong leadership from state governments would also be useful.

Vulnerability

Policy can help building better insurance and coping mechanisms against natural shocks. Natural shocks are a major source of vulnerability in rural areas. Policy interventions in technology, changes in crops and crop varieties, and sanitary measures could help reducing the incidence and income impact of these shocks. Formal agricultural insurance systems are of little help for the bottom sector of the rural population, but could be useful for farmers in transition, especially if they want to diversify into high value crops. Insurance support to this sector would best be carried out in the context of projects promoting crop diversification or technological

change. The introduction of parametric insurance systems would increase the insurance options for the rural poor, especially if it goes together with the development of rural finance.

Fonden and PET are useful mechanisms for reducing the vulnerability of the rural poor, especially vis-à-vis covariate shocks. Modifying existing cash transfer programs in rural areas to enhance their insurance function is not considered a good option, however. These programs already fulfill certain social protection functions in addition to their own objectives and it would be dangerous to ask them to perform too many functions.

Rural financial systems are probably the single most important means to assist the rural poor to manage risks, particularly idiosyncratic ones. Financial systems can facilitate savings, personal loans, agricultural insurance, and productive loans that permit income diversification and migration. Reducing vulnerability is hence another reason for recommending the enhancement of rural financial systems accessible to the poor.

The Subsistence Economy

Strong support to the subsistence economy is another major policy option in view of its importance as a safety net for poor producers. Supporting the subsistence economy is not only a “social” policy; it also favours productive development and environmental improvement. Support to the subsistence economy can take the form of soil management programs in fragile areas, promotion/enhancement of small orchards, small animals and some tree crops, promotion of environmentally friendly, yield increasing technical packages for traditional crops, and more intensive use of communal resources subject to better environmental management. Support to the subsistence economy is probably better carried out at the local level in the framework of municipal or micro-regional plans like those promoted by the *Microcuencas* program.

Improving the Design and Effectiveness of Rural Development Policies and Programs

Federal expending on rural development is high and a true mark of the importance traditionally given by Mexican governments to rural areas. The challenge is to increase the efficiency of the use of these substantial fiscal resources. Program implementation is an important area where efficiency and effectiveness could be enhanced. Quality of implementation is better examined at “the point of service delivery”, where program operators and beneficiaries/clients intersect. As indicated in chapter 6, good implementation critically depends on bottom-level operators —the “street-level bureaucrats”. They may or may not generate the synergies on which program success normally depends, and they are the ones to ultimately determine program delivery.

A new public management culture is developing based on creating consensus and adaptation between those who define the objectives and those who implement the programs, and on seeking the active commitment of the latter to program’s objectives. A movement in this direction was endorsed in Mexico by the National Development Plan 2001-06, but the new paradigm still needs to be fully translated into practice. The “New Public Management” approach that is gaining momentum in many countries is characterized by transparency in budgetary processes, management by results, professional status of public servants, accountability to the client/citizen, decentralization, and program and policy evaluation.

There are different degrees of difficulty in program implementation. Cash transfer programs are the easiest ones to implement once the technicalities of beneficiary registration, check issuing and the like are sorted out. Social infrastructure programs require local participation for efficient resource allocation, which may complicate them, but they can achieve their

immediate goals with limited or no participation because outcomes are essentially technical. Productive programs are the most difficult to implement, because they basically deal with private goods and because public-private synergies are crucial to their success. They also require considerable expenditure in recurrent costs.

The challenges faced by Mexico to improve the implementation system of rural development programs can be grouped in five categories: political and administrative circumstances of a macro type; operational and budgetary norms; organizational cultures; client orientation and beneficiary empowerment; and the incentive system for program operators. These challenges are summarized below.

Macro-Type Political and Administrative Circumstances

Here, challenges include the electoral system of local authorities, characterized by a short mandate and no reelection, little functional to the policy continuity required by rural development, which is a long-term endeavor. The annual budgetary system existing in Mexico does not favor program continuity and the adoption of a long-term perspective in rural development. Finally, the organization of the state apparatus along sectoral lines is little sympathetic to a multi-sectoral matter like rural development. Sub-national levels could play an important role in overcoming “sectoralism”. Administrative innovations in this sense from state governments would be most welcome. At the federal level, the Secretaría de Hacienda, which has a multi-sectoral view and is responsible for the quality of public investment, is well placed to take an active role in promoting the coordination of federal rural programs within a territorial approach.

Operational and Budgetary Norms

Simplifying operational and budgetary norms and adapting them better to rural areas is suggested. One problem is the time factor, since timeliness of support is often more important than amount of support. Not only are there no pluri-annual budgets, but operational and budgetary norms sometimes allow a few months only to spend the allocated budget, thus introducing distortions. Changes from year to year in norms related to issues like eligibility conditions, subsidy amounts, target areas or type of benefits are also a damaging factor when they occur because they introduce uncertainty among program beneficiaries and operators.

Another challenge relates to the few recurrent funds often made available for program operation. There is frequently a conservative attitude toward recurrent costs, which is understandable in view of the abuses of the past but is potentially damaging to programs. This is particularly the case with productive programs where the formula for success could be summarized as “recurrent costs + rural finance”.

Organizational Cultures

The institutional segmentation culture adds to the problems created to rural development programs by the sectoral organization of the state. To overcome this culture enhanced efforts from SAGARPA to involve more other organizations in the application of the *Ley de Desarrollo Rural Sustentable* would be useful. Efforts from the Secretaría de Hacienda and the Oficina de la Presidencia de la República to promote more integration of rural development programs in the framework of the law, and to encourage the application of a territorial approach to rural development would also be useful.

Strengthening evaluation mechanisms is also suggested by introducing M&E systems simultaneously with program design, better dissemination of program evaluation results, putting

together action agendas following the recommendations made by evaluation teams and monitoring progress on these agendas, and systematically adopting participatory M&E methods.

An excessive focus on short-term achievement is a hindrance to the continuity and long-term focus of rural development programs. Two policy options could be considered in this connection: the design of a long-term strategy for rural areas as *política de estado* cutting across party lines and administration terms, and the recognition of the importance of “intermediate policy results” and their value to political constituencies.

Client Orientation and Beneficiary Empowerment

Improving client orientation and beneficiary empowerment is another area where the implementation of rural development programs faces important challenges. There are several options. The first is to enhance the dissemination of programs and program norms to prevent biases in the selection process. The dissemination among beneficiaries of evaluation results and of the action agendas emerging from them is also suggested. Direct accountability from program operators to client/beneficiaries is a major way to empower beneficiaries which could be expanded, although it may not always be easy to introduce. Finally, measures could be introduced to detect and prevent opportunistic and rent-seeking behavior on the part of program operators. Good program dissemination and participatory evaluations are ways to achieve this.

Incentives to Program Operators

Economic and moral incentives for program operators are key to program success. The economic situation of bottom level program operators is often inconsistent with the relevance of their function, because of low salaries, no job security, and payment delays in some cases. Revising the economic situation of these operators and linking it to performance and client satisfaction would encourage good performance. Maximum performance from bottom level operators would also be encouraged by revaluing their function, consulting with them on program matters, giving them systematic training, disseminating best practices, carrying out systematic evaluations of their work, and promoting networking systems, a client orientation ethic, and a sound *esprit de corps*.

Other Specific Proposals

To advance in the transformations suggested above two policy actions could be considered. The first is the creation of a technical committee to examine the implementation issues of rural development programs and make recommendations. The committee could be integrated by a mix of independent specialists, civil servants and legislators, and could have significant participation from the Secretaría de Hacienda. The second action is to empower the *Consejo Mexicano para el Desarrollo Rural Sustentable* to take an active role in the evaluation of rural development programs and the monitoring of the action agendas resulting from program evaluations. The *Consejo* would also be the natural institution to promote the preparation of a long-term rural development strategy to propose to the country as *política de estado*. The creation of a managing council and of a small technical secretariat of the *Consejo* would be important for it to be able to carry out these functions.

Two innovations could help raise program efficiency. One is the introduction of a system of what we call *oidores*, consisting of well trained individuals or teams who would informally follow rural development programs at the “point of service delivery” through *ad hoc* visits, and directly inform top managers of the situation of the programs and the views on them from the bottom. The other innovation consists of a system of **process certification**. This could be carried out by independent consulting firms or NGOs, who would certify that the processes

related to program operation and beneficiary participation are sound, in the sense of proceeding according to program objectives and guidelines and to accepted practice. The logic is the same as with environmental certification or auditing, only that applied to implementation processes. The system is expected to facilitate the delegation of program implementation functions to rural organizations, since it would give government agencies an independent means of knowing if the implementation processes are sound.

Supporting the Rural Youth as a Critical Sector for a Dynamic Rural Economy

Young male and female workers constitute an important strategic capital for the development of rural areas. They could be a fundamental actor in the modernization of rural areas in view of their higher level of education and more familiarity with the realities of the market and globalization than those of the previous generation. Their potential and energies are frustrated, however, by their conspicuous lack of access to assets. Land is held by the older generation, and market and inheritance mechanisms fail to transfer it at a sufficient pace from ageing landholders to young farmers. Lack of credit to buy land and to exploit it prevents also many young rural workers from acquiring land or renting it in and exploiting it with modern methods. Similarly, young rural workers may have the knowledge and entrepreneurship to start independent RNF operations but do not normally have the necessary capital. Thus, rural youth, on which a strong educational effort has been made, is severely constrained by failures in the financial and assets markets. Inter-generational renewal in farm operations would open an opportunity for farming intensification, since young farmers could carry out the type of changes in technology, crop mix and farm management required by intensification, if they have access to finance and technology.

Government can intervene in various ways in this situation to facilitate the access to assets of the rural youth. One form is to set up a land fund oriented to young workers to make accessible to them the financial means to acquire land or to rent it in on a medium or long-term basis. As a complement to this, there is need for an investment fund to allow young farmers to have access to the investments and technology necessary to get started as successful farmers. As mentioned before, the Secretaría de la Reforma Agraria is initiating a welcome program along these lines in the social sector to facilitate entrepreneurial development of young farmers.

To facilitate the inter-generational transfer of land other measures may also be needed. One possibility is allowing the division of *ejido* holdings, which would permit old *ejidatarios* to keep part of their land for themselves and transfer the other part to one or more of their offspring. Another form is a program for granting some sort of social security benefits to old farmers who decide to transfer their lands. A better understanding is also needed of the reasons preventing at present the natural operation of land renting markets for medium- and long-term leases. Once this is better understood, measures could be introduced to facilitate this type of leases.

Young rural workers also need access to rural non-farm occupations to increase income opportunities. Since good farm land is scarce in Mexico and farm holdings are small, even the most optimistic assumption of land transfers to young farmers would fail to satisfy potential land demand in many places. There is need, therefore, to facilitate the access of young rural workers to RNF occupations through the support to technical and vocational training, and to the establishment of RNF enterprises. As mentioned before, the rural economy offers many latent opportunities outside agriculture that could be taken up by young workers. A program for the access to assets of the rural youth could hence include both farm and non farm opportunities.

The best option for carrying out a program of this type in the social sector would be to rely on the communities themselves to discuss which old *ejidatarios* or *comuneros* are willing to pass on their lands to young local landless farmers and under what of the possible program modalities, and for the young farmers to put together a plan for the exploitation of these lands, with the technical assistance that may be required. Local governance institutions would need to play a key role in this. Community level plans for land transfers would be the result of these decisions. Program operators could facilitate and technically assist in the preparation of these plans, which could be largely implemented and monitored by the community themselves. The plans could include not just farm operations but also RNF activities, and should have a middle- and long-term perspective to take into account not only the needs of the current local youth in search of employment but also those of the local adolescents that would be entering the labor market in the coming years.

A program of this type would benefit from an organizational component to promote the formation of youth organizations and the networking among them. An important dimension could be the empowering of rural youth in the decision making processes of the rural space, promoting their self-confidence, facilitating their leadership in their communities and other rural organizations, and helping them build a generational project that would make the most of their potential as agents of social and economic change in rural areas.

Annexes

Annex 2.A: Correlates of Poverty

Annex 3.A: Rural Labor Force Characteristics in 1992, 1996 and 2002

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Annex 4.A: Public Federal Expenditure in Rural Areas

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ANNEX 2.A. THE CORRELATES OF POVERTY

This annex investigates the marginal impact of individual characteristics such as labor market association and human capital on the likelihood that a household fall below the poverty line. The analysis is carried out using Probit regression techniques, and is based on three ENIGH surveys, for years 1992, 1996, and 2002. This allows evaluating the evolution of poverty over time and that of the main variables determining it. Separate regressions are run for each of these years, using data from localities of less than 15,000 inhabitants. The analysis reveals: (i) conditional correlation between poverty and the characteristics of household heads; (ii) information about the volatility of the impact of the attributes on the likelihood that a household experience poverty during the beginning and mid-1990s and the beginning of the 2000s; and (iii) information about groups that are particularly vulnerable, and changes in these groups over the decade. We also performed a similar exercise comparing the *Sur* region with the whole of Mexico.

The status of the household —poor or non-poor— is regressed on relevant individual and household characteristics. The dependent binary variable takes the value of one when income is below the food poverty line and zero otherwise. We use six sets of explanatory variables: (1) attributes of household head: gender, education, and age; (2) labor market connections: whether the household head works, the type of relation with the labor market, and sector of employment; (3) family variables: age of the household head and dependants; (4) spouse characteristics: education and labor market connection; (5) region; and (6) type of rural area.

Probit coefficients are not easy to interpret, since they do not indicate the standard marginal effects of ordinary linear regression coefficients. We chose, therefore, to present marginal effects, which have a straightforward interpretation.⁹⁹ The Probit regressions should be interpreted as descriptive, i.e. indicative of association between explanatory and dependant variables but not of causation. Results are shown in Tables 2.A.1 and 2.A.2. In the following paragraphs, only the statistically significant coefficients in the regressions are discussed. We summarize below the results for some of the main poverty correlates.

Rural living

Households in semi-urban areas were more likely to escape poverty than those in disperse rural areas. In 2002, households in disperse rural areas were around 12 percentage points more likely to be poor than those in semi-urban areas. Rural dwellers in disperse areas in the *Sur* were more likely to experience poverty than those in Mexico as a whole in 1992 but not in 2002.

Labor Status and Sector of Work

Formal sector workers in rural areas, i.e. those contributing to the social security system, are much less likely to be poor than their informal sector counterparts. The likelihood of formal

⁹⁹ The marginal effects for a household head i in the Probit model are given by:

$$m_i = \frac{d \Pr(y_i = 1)}{dx_i} = \phi(x_i \beta) \beta$$

This represents the marginal changes in the probability of a household head i being poor due to changes in the regressors. Marginal effects are evaluated at the mean of the data. Since similar conditions apply for marginal effects as for Probit coefficients, the same tests can be applied.

sector workers escaping poverty increased during 1992-96 and remained fairly constant since. In 2002, households whose heads were formal sector workers were 24 percentage points less likely to fall into poverty than those whose heads worked in the informal sector.

Table 2.A.1 Probability of Being Poor in Rural Mexico in 1992, 1996, and 2002^{1,2}

	1992			1996			2002					
	dF/dx	SE	P> z	dF/dx	SE	P> z	dF/dx	SE	P> z			
<i>Household Characteristics³</i>												
Dependent below 5 years old+	0.215	***	0.017	0	0.234	***	0.016	0	0.225	***	0.016	0
Dependent 6 – 11 years old+	0.174	***	0.017	0	0.25	***	0.015	0	0.218	***	0.015	0
Dependent 12 - 14 years old+	0.114	***	0.019	0	0.119	***	0.017	0	0.135	***	0.017	0
Dependent 15 - 18 years old+	0.026		0.019	0.177	0.053	***	0.018	0.003	0.057	***	0.017	0.001
Dependent 18 - 25 years old+	-0.069	***	0.019	0	-0.046	**	0.018	0.012	-0.059	***	0.017	0.001
Dependent 65 and over+	0.047	**	0.02	0.018	0.051	***	0.019	0.007	0.003		0.017	0.839
<i>Head</i>												
Age +	-0.008	***	0.003	0.009	-0.016	***	0.003	0	-0.021	***	0.003	0
Age Square +	0	**	0	0.031	0	***	0	0	0	***	0	0
Female Head+	-0.03		0.028	0.295	-0.089	***	0.024	0	-0.037	*	0.021	0.087
<i>Education</i>												
<i>Head</i>												
Primary Complete+	-0.102	***	0.02	0	-0.082	***	0.02	0	-0.097	***	0.016	0
Lower Secondary Complete+	-0.167	***	0.027	0	-0.232	***	0.027	0	-0.18	***	0.022	0
Upper Secondary Complete+	-0.21	***	0.042	0	-0.343	***	0.033	0	-0.239	***	0.029	0
<i>Spouse</i>												
Primary Complete+	-0.075	***	0.021	0.001	-0.069	***	0.021	0.001	-0.095	***	0.018	0
Lower Secondary Complete+	-0.116	***	0.034	0.002	-0.182	***	0.031	0	-0.171	***	0.024	0
Upper Secondary Complete+	-0.213	***	0.051	0.003	-0.364	***	0.046	0	-0.273	***	0.032	0
<i>Sector of Activity and Labor Status</i>												
<i>Head</i>												
Unemployed+	0.083		0.095	0.365	0.205	***	0.063	0.004	0.074		0.092	0.414
Not in the labor force+	0.06		0.038	0.103	0.05		0.032	0.128	0.105	***	0.03	0
<i>Agriculture</i>												
Self employed+	0.006		0.025	0.808	0.031		0.025	0.213	0.219	***	0.024	0
Salaried worker+	0.166	***	0.026	0	0.155	***	0.023	0	0.216	***	0.023	0
Employer+	-0.156	***	0.026	0	-0.185	***	0.033	0	-0.054		0.041	0.199
<i>Off-farm Sector</i>												
Self employed+	-0.04		0.03	0.195	-0.044		0.029	0.126	0.046	*	0.027	0.083
Salaried worker+												
Employer+	-0.255	***	0.034	0	-0.356	***	0.039	0	-0.141	**	0.051	0.015
Second Employment +	0.01		0.017	0.55	-0.031	*	0.017	0.07	-0.061	***	0.016	0
Social Security +	-0.206	***	0.02	0	-0.251	***	0.024	0	-0.235	***	0.019	0
<i>Spouse</i>												
Employed in agriculture +	-0.017		0.031	0.595	-0.019		0.027	0.487	0.065	***	0.026	0.01
Employed in off-farm activity+	-0.067	***	0.023	0.005	-0.123	***	0.021	0	-0.133	***	0.017	0
<i>Region</i>												
Norte +	-0.166	***	0.022	0	-0.155	***	0.026	0	-0.051	**	0.024	0.041
Golfo Region+	0.061	**	0.026	0.017	0.117	***	0.023	0	0.222	***	0.024	0
Pacifico+	-0.145	***	0.022	0	-0.152	***	0.025	0	-0.01		0.025	0.696
Sur+	0.134	***	0.029	0	0.161	***	0.024	0	0.19	***	0.023	0
Centro+	0.037		0.024	0.113	0.096	***	0.025	0	0.155	***	0.025	0
Capital+	-0.113	***	0.038	0.008	0.014		0.05	0.778	-0.086	***	0.029	0.005
Locality < 2,500 inhabitants+	0.085	***	0.02	0	0.132	***	0.017	0	0.12	***	0.015	0
Number of observations =	4752				6165							6481
Log Likelihood=	-2442.4				-3176.2							-3145.7
LR chi2(24)=	1360.4				2180.1							2448.7
Prob>chi2=	0				0							0
Pseudo R2=	0.218				0.256							0.28

Source: Authors estimations based on ENIGH 1992, 1996, and 2002. ¹ Rural area defined as localities with less than 15,000 inhabitants. ² SEDESOL's capacity poverty line, (+) dF/dxis for discrete change of dummy variable from 0 to 1,*** sign. at 1%, ** sign. at 5%, * sign. at 10%.

Households with heads inactive in 2002 were more likely to experience poverty than those with active heads. This was not the case in the early and mid-1990s, as the difference in the likelihood of falling into poverty for the two groups was not statistically significant. Surprisingly, the probability of being poor of households with unemployed heads¹⁰⁰ is similar to that of households with employed heads. This holds in both 1992 and 2002, but not in 1996, after the crises, when unemployed heads were more likely to experience poverty than employed ones.

Employers are the group with lowest probability of being poor followed by self-employed and salaried workers. In 2002, households headed by employers in non-agricultural activities were 14 percentage points less likely to be poor than those headed by salaried workers, down from 26 percent in 1992 and 36 percent in 1996. In 1992, households with self-employed heads were 4 percentage points less likely to experience poverty than those headed by salaried workers in the off-farm sector. By 2002, this had changed and household with self-employed heads had the same probability of being poor than those headed by non-agriculture salaried workers. In 1992 households whose head was self-employed in agriculture were not worse off than those headed by wage workers in the non-farm sector, but were 4 percentage points more likely to be poor than those headed by self-employed in the non-farm sector. During 1992-2002, households of heads self-employed in agriculture experienced a 22 percentage point increase in the likelihood of experiencing poverty.

Households headed by salaried workers in agriculture saw their probability of being poor increase by 5 percentage points between 1992 and 2002 compared to households in the non-farm sector. Households where spouses were engaged in the off-farm sector had lower probability of being poor than households where spouses were engaged in agriculture or not working. This became stronger throughout the 1992-2002 period.

In 1992 and 1996, households whose heads took a second job were neither more nor less likely to escape poverty than households whose heads did not have an extra job, but in 2002 households with a second job were 6 percentage points more likely to escape poverty. The effect of a second job became hence poverty reducing after 1996, and a way for some rural families to escape or reduce household poverty. We discuss this in more detail in chapter 3.

Education and Skills

Complete levels of education of the household head and spouse are very important to escape poverty. All education variables in the three models are statistically significant and negatively correlated with the probability of being poor, starting with completed primary education. Controlling for other variables, educational attainment is the strongest correlate of poverty among the variables included in the right hand side of the regression. The negative effect of education on poverty (i.e. the positive effect for poverty reduction) increases with the level of completed education of the household head and the spouse.

The association between the likelihood of escaping poverty and having completed primary education in comparison with no or incomplete primary education has been rather constant, at around 10 percent over the last decade. The association of secondary education is larger. Between 1992 and 2002, households headed by persons with completed lower secondary education had a probability of being poor between 17 and 24 percent lower than their peers with no completed education. It is interesting that the probability of falling into poverty of secondary

¹⁰⁰ Notice that unemployed is different from inactive. The latter indicating persons who are not in the labor force like for example retired persons, students, and other people not seeking employment.

school graduates decreased between 1992 and 1996 and increased between 1996 and 2002, reaching in 2002 a level not much different from that of 1992. This is probably related to labor market adjustments after the *Tequila* crises (see Chapter 3). High returns from education in rural Mexico were observed by Taylor and Yúnez-Naude (2000) using different data: a sample of rural households in the states of *Michoacán*, *Jalisco*, *Coahuila* and *Puebla*. They show increases of 10 percent in household income per every year of household head schooling and 5.5 percent per every year of average schooling of other household members.

Human capital has many components. An important one, apart from formal education, is experience. In the labor market literature, experience is often proxied by the age of the worker. We include age and age squared as regression variables, the latter to capture possible non-linearities in the data. In all three regressions, age is positively associated with the probability of escaping poverty, becoming increasingly more poverty reducing during the decade. One more year of age decreases the likelihood of being poor by 2 percentage points in 2002, up from less than 1 percentage points in 1992. There does not seem to be a turning point in age when the probability of being poor starts to fall, since the age-square variable is not significantly different from zero.

Table 2.A.2 Probability of Being Poor in the Rural Areas of the Sur region and in those of Mexico as a whole, 1992 and 2002^{1,2,3}

	1992						2002									
	<i>Variables multiplied by Sur Region dummy</i>						<i>Variables multiplied by Sur Region dummy</i>									
	DF/dx	SE	P> z	dF/dx	SE	P> z	DF/dx	SE	P> z	dF/dx	SE	P> z				
<i>Household Characteristics⁴</i>																
Dependent below 5 years old+	0.21	***	0.018	0	0.069	0.056	0.205	0.216	***	0.017	0	0.025	0.039	0.521		
Dependent 6 - 11 years old+	0.181	***	0.018	0	0.028	0.056	0.604	0.2198	***	0.02	0	-0.033	0.038	0.392		
Dependent 12 - 14 years old+	0.118	***	0.02	0	-0.006	0.055	0.911	0.1341	***	0.02	0	0.023	0.042	0.582		
Dependent 15 - 18 years old+	0.021		0.02	0.29	0.085	0.063	0.162	0.0542	***	0.02	0.004	-0.011	0.041	0.785		
Dependent 18 - 25 years old+	-0.075	***	0.02	0	0.127	*	0.069	0.058	0.0729	***	0.02	0	0.093	**	0.046	0.037
Dependent 65 and over+	0.055	***	0.021	0.01	0.013	0.064	0.835	0.0081		0.02	0.671	0.045	0.04	0.265		
<i>Household Head</i>																
Age +	-0.01	***	0.003	0.002	-0.007	0.005	0.146	-0.022	***	0.003	0	0.002	0.003	0.471		
Age Square +	0	**	0	0.016	0	0	0.15	0	***	0	0	0	0	0.441		
Female Head+	-0.035		0.029	0.24	0.049	0.094	0.596	-0.025		0.024	0.295	0.047	0.055	0.384		
<i>Education</i>																
<i>Head</i>																
Primary Complete+	-0.091	***	0.021	0	-0.134	**	0.057	0.041	-0.128	***	0.019	0	0.086	*	0.052	0.094
Lower Secondary Complete+	-0.167	***	0.029	0	0.047	0.141	0.735	-0.196	***	0.022	0	0.123	0.08	0.113		
Upper Secondary Complete+	-0.205	***	0.044	0.001				-0.25	***	0.031	0	0.07	0.124	0.565		
<i>Spouse</i>																
Primary Complete+	-0.086	***	0.022	0	-0.022	0.081	0.785	-0.122	***	0.02	0	0.049	0.06	0.403		
Lower Secondary Complete+	-0.138	***	0.033	0	-0.117	0.148	0.482	-0.186	***	0.024	0	0.047	0.086	0.583		
Upper Secondary Complete+	-0.229	***	0.051	0.003	-0.035	0.284	0.905	-0.268	***	0.035	0	-0.204	0.143	0.274		
<i>Sector of Activity and Labor Status</i>																
<i>Head</i>																
Unemployed+	-0.01		0.087	0.908				-0.017		0.092	0.855					
Not in the labor force+	0.044		0.039	0.249	-0.158	0.09	0.16	0.078	**	0.032	0.014	0.044	0.083	0.589		
<i>Agriculture</i>																
Self employed+	-0.026		0.026	0.318	0.091	0.091	0.3	0.19	***	0.026	0	0.1387	**	0.07	0.03	
Salaried worker+	0.144	***	0.027	0	-0.053	0.085	0.546	0.224	***	0.025	0	0.0459	0.07	0.48		
Employer+	-0.165	***	0.027	0	-0.004	0.103	0.965	-0.054		0.048	0.274	0.0619	0.11	0.55		
<i>Off-Farm Sector</i>																
Self employed+	-0.065	**	0.031	0.046	0.105	0.113	0.335	0.07	**	0.029	0.014	-0.071	0.06	0.29		
Salaried worker+																
Employer+	-0.277	***	0.031	0	0.078	0.29	0.782	-0.165	***	0.053	0.008	0.1408	0.19	0.45		
Second Employment +	0.039	**	0.018	0.029	-0.076	0.045	0.115	-0.054	***	0.018	0.003	-0.013	0.04	0.75		
Social Security +	-0.235	***	0.019	0	-0.027	0.111	0.81	-0.241	***	0.019	0	0.0097	0.1	0.92		
<i>Spouse</i>																
Employed in agriculture +	-0.023		0.033	0.498	0.068	0.107	0.511	0.038		0.031	0.218	0.1236	**	0.06	0.03	
Employed in off-farm activity+	-0.085	***	0.024	0.001	0.178	**	0.084	0.029	-0.135	***	0.02	0	0.0607	0.05	0.21	
<i>Region⁴</i>																
Locality < 2,500 inhabitants+	0.039	*	0.022	0.089	0.22	***	0.075	0.003	0.111	***	0.017	0	-0.078	**	0.04	0.05
Number of observations =	4743								6478							
Log Likelihood=	-2483.4								3223.9							
LR chi2(53)=	1269.1								2286.8							
Prob>chi2=	0								0							
Pseudo R2=	0.2035								0.262							

line, (+) dF/dxis for discrete change of dummy variable from 0 to 1,*** sign. at 1%, ** sign. at 5%, * sign. at 10% level

Source: Authors estimations based on ENIGH 1992 and 2002. Note: 1Rural area defined as locality with less than 15,000 inhabitants; ² SEDESOL's capacity poverty

Gender

Gender made a statistically significant difference for poverty in 1996 and, with smaller significance, in 2002, when female-headed households were less likely to be poor than male-headed ones. Instead, in 1992 the probability of female-headed households being poor was not statistically different to that of male-headed households. This finding is different from that for other countries, for example Brazil, where male headed households have been found to have a lower probability of being poor (see Elbers *et al*, 2001), or in Ecuador where there seems to be no association between poverty and gender of the Household head (see World Bank, 2004c).

Household Composition

The presence of children or youth in the household makes it more poverty prone, but the probability of being poor falls monotonically with increasing child age. Households with children under 5 are more likely to be poor than childless families, and their higher probability of being poor has been rather constant over the past decade. This indicates that households with young children are vulnerable relative to those without children. One direct policy intervention would be to facilitate access to childcare. The poor often find the shortage of affordable childcare a large obstacle to their daily chores, and for mothers in particular an obstacle to find employment outside their homes. Households with children between 6 and 11 years have also higher probability of being poor than those without children, albeit the likelihood is lower than that for families with smaller children. For these households, the probability of being poor compared to those without children increased from 17 percent in 1992 to 25 percent in 1996, and fell to 22 percent in 2002. Households with young members between 15 and 18 experienced the same pattern in the likelihood of falling into poverty as households with children in the 6-11 year bracket, but the impact was significantly smaller.

The picture changes dramatically when the age of young household members increases to 19-25 years. Households with members aged 19 to 25 were significantly less likely to fall into poverty than households with no children. Having members in the household aged 19 to 25 can hence be considered a protective factor against poverty. The fact that young members enter the labor market and bring home an income contributes positively to the household's poverty situation. In the *Sur* region, however, households with young members do not experience the same lower probability of being poor in 2002, although the situation was different in 1992. This may be related to higher migration in 2002 with the drainage that this may entail of the more skilled and able.

The presence of older members (above 65 years of age) in the household makes it more poverty prone. In 2002, households with members of old age experienced a higher likelihood of poverty than those without them but the magnitude was lower than in 1992: 0.3 percent in 2002 compared to 5 percent in 1992.

Regions

Households in the *Norte*, *Pacifico*, *Capital*, and *Centro* were in general less likely to be poor than those in the *Centro-Norte* throughout the decade. On the contrary, households in the *Golfo*, *Centro*, and *Sur* were more likely to be poor than those in the *Centro Norte*. In 2002, households living in the *Sur* and *Golfo* had roughly 20 percent more probability of being poor than households in the *Centro-Norte*. If we look at trends, the *Centro-Norte* improved its position *vis-à-vis* all other regions during the decade, since comparing 2002 with 1992 rural households in all regions had increased their probability of being poor relative to the *Centro-Norte*.

ANNEX 3A - Table 3.A.1. Rural Labor Force Characteristic by Household Dominant Source of Income in 1992

	Household Type ^c							Total
	Independent farming families	Non-farm entrepreneurial families	Agricultural wage labor families	Non-farm wage labor families	Transfer dependent families	Diversified occupations families		
Total Population	7,486,627	1,165,979	3,510,766	4,285,611	1,808,813	4,756,415	23,004,211	
% of the total pop	32.5	5.1	15.3	18.6	7.9	20.6	100	
Dependency ratio (%)	32.2	37.9	30	29.4	46.7	33.3	33.3	
Mean family size	5.1	4.7	5.3	5	3.7	4.8	4.9	
Individuals age 12 and over	4,840,289	749,240	2,206,363	2,738,874	1,176,516	3,118,553	14,829,835	
Labor Force	2,524,375	378,880	1,153,762	1,414,281	440,279	1,726,559	7,638,136	
Labor Force participation rate (%)	52.2	50.6	52.3	51.6	37.4	55.4	51.5	
Employed individuals	2,499,682	360,726	1,127,923	1,342,466	417,300	1,670,952	7,419,049	
% of the employed	33.7	4.9	15.2	18.1	5.6	22.5	100	
Below the Food Poverty Line (%)	49.4	22.6	50.4	32.7	44.4	49.6	44.7	
Below the Assets Poverty Line (%)	70.4	57.7	84.7	66.3	73.7	75.6	72.5	
<i>Labor force Characteristics</i>								
Male (%)	82.5	72.4	84.9	78	66.3	71.6	78.2	
Female (%)	17.5	27.6	15.1	22	33.7	28.4	21.8	
<i>Labor Status (%)</i>								
Salaried Worker	11.7	13.7	89.6	82.8	29.8	46.9	45.4	
Self-employed	45.6	58.8	6.4	9.6	43.7	33.5	30.9	
Employer	12.4	7.2	0.5	1.9	11.9	4.9	6.7	
Family worker/No -payment	30.4	20.3	3.6	5.6	14.6	14.7	16.9	
<i>Education Status (%)</i>								
No education	28	18.1	21.7	15.9	27.4	25.2	23.7	
Primary incomplete	38.3	31.2	48.3	30.5	31.1	40.2	38.1	
Primary complete	25.5	33.7	23.6	33.5	25.9	23.9	26.7	
Secondary complete	7	12.6	6.1	14.2	14	9	9.3	
Higher education	1.2	4.5	0.3	5.9	1.6	1.7	2.2	
<i>Age Cohort (%)</i>								
<15	5.8	1.3	4.8	2.1	3.3	6.1	4.7	
15 to 25	29.5	33.8	37.7	36.3	26.9	27.3	31.6	
26 to 40	29.3	31.7	35.4	35.9	25.6	30.7	31.7	
41 to 60	24.5	27.8	18.9	22.7	28.9	26.2	24.1	
>61	10.9	5.3	3.2	3	15.4	9.7	8	

ANNEX 3A - Table 3.A.2. Rural Labor Force Characteristic by Household Dominant Source of Income in 1996

	Household Type ²					Total
	Independent farming families	Non-farm entrepreneurial families	Agricultural wage labor families	Non-farm wage labor families	Transfer dependent families	
Total Population	4,871,358	1,455,542	3,589,069	5,240,082	3,299,338	6,854,238
% of the total pop	19.25	5.75	14.18	20.7	13.04	27.1
Dependency ratio (%)	37.1	35.5	36.1	35.7	49.8	36.4
Mean family size	5.7	4.4	5.5	5.2	4	5.5
Individuals age 12 and over	3,174,679	988,851	2,303,657	3,432,518	2,075,416	4,588,715
Labor Force	1,995,618	599,509	1,307,653	2,060,679	978,172	2,948,224
Labor Force participation rate (%)	62.9	60.6	56.8	60	47.1	64.2
Employed individuals	1,976,992	591,623	1,281,215	1,975,215	947,653	2,874,460
% of the employed	20.5	6.1	13.3	20.5	9.8	29.8
Below the Food Poverty Line (%)	65.8	36	65	38.7	52	62.3
Below the Assets Poverty Line (%)	86	62	93	75.8	82	88.1
<i>Labor force Characteristics</i>						
Male (%)	71.9	67.2	81.4	71.4	58.1	64.7
Female (%)	28.1	32.8	18.6	28.6	41.9	35.3
<i>Labor Status (%)</i>						
Salaries Worker	8.9	11.9	83	81	29.5	40.3
Self-employed	41.8	53.3	9.2	11.8	40.9	35.9
Employer	9.6	13.6	0.2	0.9	9.2	3.8
Family worker/No -payment	39.8	21.3	7.6	6.3	20.4	20
<i>Education Status (%)</i>						
No education	25.1	12.3	20.5	10.2	20.8	21
Primary incomplete	38.9	34.9	40.4	27.8	41.2	36
Primary complete	26.3	27.6	31.3	28.7	25.5	28
Secondary complete	8.3	19	6.9	24.8	10.3	14
Higher education	1.4	6.2	0.9	8.6	2.2	3.1
<i>Age Cohort (%)</i>						
<15	8.8	4.1	5.6	3.1	8	5.2
15 to 25	29.5	25.5	35.9	34.1	26.6	31.6
26 to 40	27.7	32.3	30.8	39.4	25.6	27
41 to 60	25	27.4	21.3	18.6	22.7	26.2
>61	9	10.7	6.5	4.8	17.1	10
						9
						23.5
						30.4
						31.4
						5.8
						19
						36
						28
						14
						3.1
						19.7
						30.2
						45.1
						69.3
						30.7

ANNEX 3A Table 3.A.3. Rural Labor Force Characteristic by Household Dominant Source of Income in 2002

	Household Type ²						Total
	Independent farming families	Non-farm entrepreneurial families	Agricultural wage labor families	Non-farm wage labor families	Transfer dependent families	Diversified occupations families	
Total Population	2,164,003	1,818,435	4,092,171	6,441,023	5,139,094	5,139,094	25,052,549
% of the total pop	8.64	7.26	16.33	25.71	20.51	21.6	100
Dependency ratio (%)	33.23	36.13	34.65	29.79	48.88	32.6	36.54
Mean family size	4.3	4.49	4.53	4.66	3.6	4.5	4.31
Individuals age 12 and over	1,617,957	1,236,674	2,854,929	4,582,467	3,663,794	3,983,943	17,939,764
Labor Force	1,000,811	753,194	1,566,733	2,685,628	1,628,238	2,527,241	10,161,845
Labor Force participation rate (%)	61.9	60.9	54.9	58.6	44.4	63.4	56.6
Employed individuals	997,008	743,086	1,557,815	2,572,599	1,600,000	2,501,172	9,971,680
% of the employed	10	7.5	15.6	25.8	16	25.1	100
Below the Food Poverty Line (%)	39.2	28.2	48.7	18.5	49.4	47.1	38.5
Below the Assets Poverty Line (%)	68.4	53.2	85.5	57.6	79.2	75.7	71.1
<i>Labor force Characteristics</i>							
Male (%)	69.6	64.1	80.4	69.1	62.1	65	68.4
Female (%)	30.4	35.9	19.6	30.9	37.9	35	31.6
<i>Labor Status (%)</i>							
Salaried Worker	6.9	7.1	79.6	81.1	24.3	40.9	48.7
Self-employed	59.5	57.4	13.1	14.3	52.1	40.3	34.4
Employer	8.9	7.7	1	0.5	5.9	2.9	3.4
Family worker/No-payment	24.7	27.8	6.3	4.2	17.7	15.9	13.4
<i>Education Status (%)</i>							
No education	26.3	14.4	21.5	11.1	29.6	24	20.7
Primary incomplete	36.2	25.9	38.7	22.6	33.9	31	30.6
Primary complete	23.1	32.8	27.9	28.7	24.9	27.2	27.3
Secondary complete	11.3	20.4	11.7	22	10.8	13.8	15.3
Higher education	3.1	6.6	0.3	15.6	0.8	3.9	6
<i>Age Cohort (%)</i>							
<15	2.7	5.4	2.7	1.9	6.2	3.8	3.5
15 to 25	20.2	19.1	29.3	30.8	17.9	25.9	25.4
26 to 40	28.1	36.7	30.4	36.9	21.4	26.7	30
41 to 60	31.7	25	26.6	25.1	29.9	31	28.2
>61	17.3	13.8	10.9	5.4	24.6	12.6	13

Notes to Tables 3.A.1., 3.A.2., and 3.A.3.

Rural area defined as localities with less than 2,500 residents

Dependency ration defined as children below 12 and adults over 65 as a proportion of family size

Households classified according to the source of current income (measured per capita) in the following way:

- **Independent Farming:** Households with more than 50% of their income from independent farming and self-consumption
- **Non-farm Entrepreneurial:** Households with more than 50% of their income from independent non-farm activities
- **Agricultural Wage Labor:** Households with more than 50% of their income from agricultural wage labor
- **Transfer Dependent:** Households with more than 50% of their income from public and private transfers, including gifts
- **Non-Farm Wage Labor:** Households with more than 50% of their income from non-agricultural wage labor
- **Diversified Occupations:** Households with less than 50% of their income from any of the above

ANNEX 3B - Table 3.B.1. General Indicators of the Rural Labor Market, by Gender in Mexico¹

Variable	1995		1996		1998		1999		2000		2001		2002		2003	
	Male	Female														
GENERAL LABOR FORCE STRUCTURE																
<i>Employed</i>																
Mean Age	34.8	33.6	34.8	33.5	35.5	33.8	35.6	34.5	36.4	34.3	37.3	35	37.6	36	37.9	36.3
Years of Schooling	4.4	4.4	4.6	4.7	4.8	5	4.8	4.9	5	5.2	4.9	5.1	5	5.2	5.1	5.4
Hours worked per week	40.8	29.3	43.4	31.5	41.7	30.7	43.7	31.8	41.7	31.4	40.7	30.9	41	32.2	40	31.5
<i>Labor Status</i>																
Employer	3.7	1.1	4.9	1.6	2.7	0.9	2.7	0.9	2.7	0.6	3.5	1	3.2	1.1	3.1	1
Self-employed	36.3	29	36.7	26.4	37.2	29	38	29.7	37.2	30.2	38.1	34.2	37.3	34.8	37.8	35.5
Informal Salaried	18.7	13.9	18.7	15.4	20.7	15.9	22.4	14.8	23	16.5	24.7	16.1	26.2	17.7	27.5	17.8
Formal Salaried	9.2	10	8.6	9.1	9.3	9.1	8.8	9.9	9.4	10.8	9.8	13.2	9.2	10.5	8.1	12.5
Contract	5	2.8	3.8	3.7	4.7	4.2	3.4	4.5	5.2	6.4	3.8	5	3.5	4.5	3.8	3.9
Family Worker	20.8	39.5	21.3	39.5	20.4	35.3	19.5	35.2	16.4	30.2	15.6	26.2	16.8	26.3	16	25
Other	6.4	3.8	6	4.3	5.1	5.7	5.1	5	6.1	5.3	4.5	4.4	3.8	5.1	3.8	4.3
<i>Sector of Activity</i>																
Agriculture	71.6	37.7	71.7	40.9	68.8	34.3	71.5	36.1	66.7	29.1	68.8	26	68.5	27.4	66.9	25
Industry	12.3	10.1	13.9	15.9	15.7	20.4	13.4	20.5	17.7	25.1	16.2	27.2	15.4	23.7	16.8	23.6
Services	16	52.1	14.4	43.2	15.5	45.3	15.1	43.4	15.6	45.7	15	46.9	16.1	48.9	16.3	51.4
<i>Labor Force Education Status</i>																
No education / Primary Incomplete	57.1	56.5	54.7	54.3	52.7	51	52.8	51.1	51.5	48.8	51.2	48	49.4	46.4	47.7	44.8
Primary Complete	28.5	25.1	28.7	27	29.9	28.9	29	27.9	29.3	28.1	28.7	28.7	29.2	28.5	29.5	27.7
Lower Sec. Complete	10.8	9.7	12.1	10.9	12.9	12.3	14.1	12.6	14.2	14.4	14.8	14.9	16	16.1	17.6	17.8
Upper Sec. Complete	1.2	1.8	1.7	1.4	2.1	2	2	2.3	2.4	2.7	2.4	2.6	2.7	3.1	2.6	3.1
Higher Education	0.9	1.6	1.2	2	1.1	1.8	1	1.9	1.5	2	1.5	2.3	1.5	2.5	1.7	3.3
Technical	1.5	5.4	1.7	4.4	1.3	3.9	1	4.2	1	3.8	1.4	3.6	1.2	3.5	1	3.4

Source: ENE 1995-2003, 2nd quarter.

¹ Rural areas defined as localities with less than 2,500 inhabitants.

Annex 3.C. - Table 3.C.1. Rural¹ Labor Markets Indicators in Mexico, by Region.

Not in the labor force									
Region	1995	1996	1997 ²	1998	1999	2000	2001	2002	2003
Total	7,279,960	7,168,950	8,175,566	7,134,766	7,373,689	7,918,307	8,288,969	8,320,254	8,599,179
Norte	822,433	655,958	722,777	605,943	637,113	674,210	695,430	718,416	715,469
Capital	477,821	375,912	587,016	452,521	527,124	516,253	565,549	623,060	705,628
Golfo	1,531,541	1,276,139	1,308,778	1,285,842	1,291,970	1,380,364	1,630,660	1,602,782	1,614,280
Pacifico	517,435	657,019	808,074	678,244	738,489	749,667	683,514	727,102	702,618
Sur	1,581,378	1,849,748	2,027,270	1,788,119	1,775,037	2,033,804	2,169,255	2,248,395	2,403,730
Centro-norte	1,178,860	1,411,504	1,808,104	1,414,121	1,457,901	1,462,524	1,498,163	1,393,099	1,458,492
Centro	1,170,492	942,670	913,547	909,976	946,055	1,101,485	1,046,398	1,007,400	998,962
In the Labor Force									
Region	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total	9,808,413	9,316,996	10,915,253	9,463,444	9,490,050	9,302,190	9,128,347	9,430,459	9,265,957
Norte	898,803	856,325	1,268,799	881,232	856,799	816,414	790,204	788,055	779,539
Capital	604,507	858,955	1,100,605	736,685	674,049	737,411	721,378	665,976	605,635
Golfo	1,768,582	1,538,406	1,470,448	1,677,011	1,708,643	1,730,994	1,507,139	1,556,638	1,540,116
Pacifico	589,533	934,075	1,169,803	955,607	889,055	869,426	937,779	983,581	977,527
Sur	2,944,769	2,535,458	2,879,795	2,619,908	2,718,212	2,596,868	2,545,112	2,605,679	2,549,012
Centro-norte	1,397,501	1,435,311	1,639,633	1,415,729	1,470,445	1,459,124	1,443,330	1,581,671	1,538,886
Centro	1,604,718	1,158,466	1,386,170	1,177,272	1,172,847	1,091,953	1,183,405	1,248,859	1,275,242
Employed									
Region	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total	9,605,455	9,210,159	10,792,852	9,389,503	9,454,164	9,243,682	9,060,090	9,354,843	9,202,363
Norte	879,776	842,808	1,244,061	868,143	848,743	809,473	776,213	774,597	766,160
Capital	587,435	835,218	1,073,021	721,862	673,813	728,755	718,698	653,356	603,310
Golfo	1,725,884	1,523,797	1,450,252	1,666,032	1,702,035	1,723,682	1,495,798	1,547,849	1,537,097
Pacifico	574,003	920,261	1,153,411	949,795	883,310	863,937	931,328	974,269	973,019
Sur	2,914,843	2,526,662	2,876,724	2,615,837	2,715,399	2,585,943	2,538,637	2,595,379	2,539,804
Centro-norte	1,347,671	1,417,006	1,630,967	1,405,679	1,461,728	1,448,949	1,433,406	1,569,048	1,516,329
Centro	1,575,843	1,144,407	1,364,416	1,162,155	1,169,136	1,082,943	1,166,010	1,240,345	1,266,644
Unemployed									
Region	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total	202,958	106,837	122,401	73,941	35,886	58,508	68,257	75,616	63,594
Norte	19,027	13,517	24,738	13,089	8,056	6,941	13,991	13,458	13,379
Capital	17,072	23,737	27,584	14,823	236	8,656	2,680	12,620	2,325
Golfo	42,698	14,609	20,196	10,979	6,608	7,312	11,341	8,789	3,019
Pacifico	15,530	13,814	16,392	5,812	5,745	5,489	6,451	9,312	4,508
Sur	29,926	8,796	3,071	4,071	2,813	10,925	6,475	10,300	9,208
Centro-norte	49,830	18,305	8,666	10,050	8,717	10,175	9,924	12,623	22,557
Centro	28,875	14,059	21,754	15,117	3,711	9,010	17,395	8,514	8,598

Source ENE 2nd quarter, various years.

¹ Rural area defined as localities with less than 2,500 inhabitants

² The 1997 survey has some sampling problems for the rural areas, according con INEGI's staff

ANNEX 3.D. - Table 3.D.1. Share of the Workforce by Primary Occupation^a

	1995				2003			
	Labor Composition		Mean Hourly Wage ^c		Labor Composition		Mean Hourly Wage	
	Urban	Rural ^b	Urban	Rural	Urban	Rural	Urban	Rural
<i>Agriculture</i>	9.63	62.82	12.04	8.3	5.4	55.61	13.46	7.44
Cultivation	7.71	53.75	11.4	7.79	4.25	43.38	12.92	6.76
Animal rearing	1.35	5.13	14.47	9.18	0.69	6.02	14.3	9.3
Forest product	0.09	1.02	11.98	13.35	0.04	1.27	12.12	9.44
Fishing	0.47	2.92	13.17	11.37	0.41	4.95	16.74	11.1
<i>Mining/extraction</i>	0.34	0.68	18.63	12.67	0.39	0.13	36.55	16.59
<i>Manufacturing</i>	24.75	11.05	17.14	11.78	26.26	18.51	19.07	12.35
Food processing	3.26	1.23	14.11	13.11	3.75	3.22	16.57	10.85
Beverages	0.69	0.18	15.12	13.93	0.68	0.18	19.69	10.51
Tobacco products	0.05	0.02	21.11	14.19	0.01	0	26.86	
Textiles	0.74	0.87	15.75	10.13	0.98	0.94	15.88	7.14
Clothing	2.05	1.44	13.91	9.53	2.24	2.44	14.55	9.2
Leather	0.19	0	17.08	9.08	0.14	0.11	22.37	8.64
Footwear	0.61	0.04	15.05	8.75	0.52	0.01	19.58	7.51
Wooden goods	0.48	0.45	18.16	10.44	0.44	1.08	17.95	9.22
Furniture	0.91	0.62	14.72	11.84	0.95	0.82	18.45	12.78
Paper	0.39	0.08	16.01	10.91	0.35	0.11	18.27	12.83
Printing	0.91	0.06	17.81	18	0.72	0.02	21.31	13.36
Chemical	0.86	0.21	26.03	15.06	0.48	0.03	31.87	19.8
Plastic/rubber	0.81	0.16	20.73	12.03	0.77	0.13	18.48	12.93
Ceramic/cement	1.08	0.55	17.97	8.7	0.83	1.13	18.03	12.28
Pharmaceuticals	0.22	0	27.21		0.2	0.02	32.99	24.36
Cosmetics	0.26	0	15.75		0.23	0.09	17.8	11.56
Metals	0.38	0.04	23.06	17.4	0.26	0.03	24.1	16.96
Machinery	1.98	0.21	17.75	11.32	2.07	0.55	19.92	15.47
Electronic goods	1.08	0.12	16.66	9.49	1.17	0.08	19.94	13.34
Vehicles	1.39	0.1	17.39	15.09	1.51	0.49	20.31	14.29
Precision instruments/others	0.43	0.03	19.31	13.04	0.56	0.09	18.11	16.44
Construction	5.68	4.59	17.28	12.46	6.75	6.81	19.61	14.53
Utilities	0.31	0.05	26.8	19.34	0.66	0.12	26.75	18.31
<i>Commerce</i>	21.15	11.66	16.6	10.78	21.54	9.97	17.16	10.53
Wholesaling	3.05	0.72	21.49	12.72	3.33	0.7	21.25	13.01
Formal sales	14.33	8.99	15.36	10.09	18.21	9.27	16.33	10.3
Street sales	3.77	1.95	16.66	12.67	0	0	0	0
<i>Services</i>	44.14	13.79	21.74	13.94	46.41	15.77	23.02	14.13
Hotel/Restaurant	5.74	1.6	15.37	11.26	6.31	2.32	16.99	12.18
Transport	4.78	1.84	18.21	13.82	4.88	1.56	19.99	14.28
Communications	0.46	0.13	25.83	14.48	0.58	0.06	27.58	9.01
Financial services	1.25	0.04	35.14	24.38	0.9	0.03	31.19	21.16
Professional services	2.92	0.29	24.52	9.98	4.05	0.44	25.19	13.48
Education	6.15	1.78	34.73	26.4	5.89	2.13	37.7	26.28
Arts/entertainment	1.25	0.26	22.58	16.21	1.42	0.35	25.06	16.27
Medical services	3.06	0.47	25.28	16.55	3.41	0.64	30.13	18.07
Servicing/repair	8.26	2.57	17.08	12.38	7.33	2.21	18.24	13.53
Personal services	4.81	2.98	12.63	10.19	5.71	3.96	14.18	9.65
Renting services	0.23	0.05	26.09	10.81	0.25	0.02	26.33	13.94
Government	5.12	1.72	24.18	12.81	5.66	2.04	27.28	15.98
NE	0.11	0.08	12.62	8.87	0.03	0	14.68	
<i>Non-agricultural Total</i>	90.37	37.18			94.6	44.39		
<i>Employed</i>	24,267,941	9,605,455			31,430,834	9,202,363		

Source: ENE 1995 and- 2003.

^aPeople age 12 and over. ^bLocalities with less than 2,500 inhabitants. ^c2002 pesos.

ANNEX 3.E. - Table 3.E.1. Mean Hourly Wage (2002 Pesos) for Rural Laborers by Gender in Mexico. Selected years 1995-2003¹

Variables	1995		1996		1998		1999		2000		2001		2002		2003	
	Male	Female														
<i>Labor Status</i>																
Employer	13.2	14.9	11.3	10.1	14.8	10.9	14.5	13.6	15.8	15.3	15.1	9.6	15	13.9	16.7	13.1
Self-employment	8.5	9.5	6.8	8.2	6.7	7.4	5.6	7.2	6.7	8.2	5.9	7.9	6.4	7.7	6.9	8.5
Informal Salaried	9.1	8.9	7.5	6.4	7.6	6.2	7.2	6.2	8.3	7	9.2	7.7	9.7	8.5	10.9	8.8
Formal Salaried	14.2	17	12.3	13.5	12.9	14	12.1	12.8	14.1	14.3	14.3	13.9	14.7	15.1	15.7	16.1
Contract	12.2	9.6	11.2	8.8	10	7.8	9.8	8.1	10.1	6.7	11.7	9	12.1	7.7	12.7	9.1
Other	11.1	9.4	8.7	8.9	8.9	10.6	9.2	8.7	10.6	11.3	11.8	10.7	11.9	12.1	13.2	14.5
<i>Sector of Activity</i>																
Agriculture	8.3	7.9	6.7	6.8	6.8	7.3	6	7.2	6.8	7.1	6.6	7.6	6.7	6.9	7.4	7.4
Industry	12.4	9.5	10.3	7.6	10.3	7	10	7.3	11.5	8.3	12.6	8.6	13.2	7.9	14	8.9
Services	13.9	11.4	12.3	9.4	11.5	9.3	10.7	8.5	12.7	9.8	13.6	9.8	14	10.5	14.5	11.4
<i>Labor Force Education Status</i>																
No education /	9	9.2	7.1	7.4	7.1	6.8	6.3	6.7	7.4	7.4	7.3	7.8	7.5	7.2	8.2	8.2
Primary Incomplete	10.7	9.2	9.1	7.5	9	7.8	8	7.7	9.4	8.7	9.5	8.9	10.3	9.2	10.8	9.6
Primary Complete	12	10.2	9.9	9.2	9.5	9.2	9.8	8.8	10.7	9.7	11	9.9	11.3	10.5	11.9	10.9
Lower Secondary Complete	14.6	16.5	13.2	16.8	12.9	16.7	12.1	10.4	13.7	12.6	14	12.7	12.7	14.1	15.4	16.8
Upper Secondary Complete	27.3	34.5	22.5	28.7	23.8	26	20.4	21.8	25.2	27.5	25.3	27.1	24.6	27.8	25	28.2
Higher Education	19.3	18	15.1	14.4	17	14.2	13.7	13.8	16	15.1	14.3	15.8	14.6	14	16.4	16.2
Technical Education																

Source: ENE 1995-2003, 2nd quarter. ¹ Rural areas defined as localities with less than 2,500 inhabitants

ANNEX 3.F. WAGE CORRELATES USING QUANTILE REGRESSION

A. Methodology

Economic model

The underlying economic model used in the analysis will simply follow Mincer's (1974) human capital earnings function extended to control for a number of other variables that relate to location. In particular, we apply a semi-logarithmic framework that has the form:

$$\ln y_i = \varphi(x_i, z_i) + u_i \quad (1)$$

where $\ln y_i$ is the log of earnings or wages for an individual i , x_i is a measure of a number of personal characteristics, including human capital variables, ethnicity, etc.; and z_i represents location specific variables—for instance, metropolitan living. The last component, u_i , is a random disturbance term that captures unobserved characteristics. The functional form is left unspecified in equation (1).

Quantile regression

Labor market studies usually make use of conditional mean regression estimators, such as Ordinary Least Squares. This technique is subject to criticism because of the often heroic assumptions underlying the approach. One is the assumption of homoskedasticity in the distribution of the error terms. If the sample is not completely homogenous, this approach, by forcing the parameters to be the same across the entire distribution of individuals, may be too restrictive and may hide important information.

The method applied in this paper is quantile regression. The idea is that one can choose any quantile and thus obtain many different parameter estimates on the same variable. In this manner the entire conditional distribution can be explored. By testing whether coefficients for a given variable across different quantiles are significantly different, one implicitly also tests for conditional heteroskedasticity across the wage distribution. This is particular interesting for developing countries where wage disparities are large and returns to, for example, human capital may vary across the distribution.

The method has many other virtues apart from being robust to heteroskedasticity. When the error term is non-normal, for instance, quantile regression estimators may be more efficient than least square estimators. Furthermore, since quantile regression minimizes a weighted sum of absolute deviations, the estimated coefficient vector is not sensitive to outlier observations on the dependent variable.¹⁰¹

¹⁰¹ That is, if $y_i - x_i' \hat{\beta}_\theta > 0$, then y_i can be increased toward $+\infty$, or if $y_i - x_i' \hat{\beta}_\theta < 0$, y_i can be decreased toward $-\infty$, without altering the solution $\hat{\beta}_\theta$. In other words, it is not the magnitude of the dependent variable that matters but on which side of the estimated hyperplane the observation is. This is most easily seen by considering the first-order-condition, which can be shown to be given as (see Buchinsky 1998)

$$\frac{1}{n} \sum_{i=1}^n (\theta - \frac{1}{2} + \frac{1}{2} \text{sgn}(y_i - x_i' \hat{\beta}_\theta)) x_i = 0.$$

The main advantage of quantile regressions is the semi-parametric nature of the approach, which relaxes the restrictions on the parameters to be fixed across the entire distribution. Intuitively, quantile regression estimates convey information on wage differentials arising from non-observable characteristics among individuals otherwise observationally equivalent. In other words, by using quantile regressions, we can determine if individuals that rank in different positions in the conditional distribution (i.e., individuals that have higher or lower wages than predicted by observable characteristics) receive different premiums to education, tenure, or to other relevant observable variables.

Formally the method, first developed by Koenker and Basset (1978), can be formulated as¹⁰²

$$y_i = x_i' \beta_\theta + u_{\theta i} = \text{Quant}_\theta(y_i | x_i) = x_i' \beta_\theta \quad (2)$$

where $\text{Quant}_\theta(y_i | x_i)$ denotes the θ^{th} conditional quantile of y given x , and i denotes an index over all individuals, $i = 1, \dots, n$.

In general, the θ^{th} sample quantile ($0 < \theta < 1$) of y solves

$$\min_{\beta} = \frac{1}{n} \left\{ \sum_{i: y_i \geq x_i' \beta} \theta |y_i - x_i' \beta| + \sum_{i: y_i < x_i' \beta} (1 - \theta) |y_i - x_i' \beta| \right\} \quad (3)$$

Buchinsky (1998) examines various estimators for the asymptotic covariance matrix and concludes that the *design matrix bootstrap* performs the best. In this paper, the standard errors are obtained by bootstrapping, using 200 repetitions. This is in line with the literature.

B. Main results

We compare workers located at different points in the wage distribution to analyze this issue. The wage determination model is based on the ENE survey from 2003 (2nd quarter) using quantile regression (see above for details on the quantile method). Wages are compared across workers grouped by gender, education, experience, labor status, and location¹⁰³. Results for rural areas with more than 15,000 inhabitants are presented in Table 3.F.1. We analyze for each quantile how the above variables explain the wage at the quantile, and also whether the impact of individual characteristics on wages is homogeneous across the wage distribution. Findings indicate that wages are by no means determined in the same way for high and low paid workers.

This can be seen both as a strength and weakness of the method. To the extent that a given outlier represents a feature of “the true” distribution of the population, one would prefer the estimator to be sensitive to such an outlier – at least to a certain degree.

¹⁰² See Buchinsky (1998).

¹⁰³ Wages are modeled using log monthly wages as the dependent variable. The general wage model contains explanatory variables in levels and allows for non-linearities in the data. For example, the log wage equation is found to be non-linear in education and experience, indicating that returns to education and experience are not constant but decreasing over the life cycle. The model contains dummy variables that take the value of one if, for example, a worker holds a job in the formal sector, and zero otherwise. A positive dummy variable in this example reveals that there is a wage premium in formal employment related to informal employment. We use standard quantiles, namely the 10th, 25th, 50th, 75th, and 90th quantiles.

For example, female workers are paid much less than males working in the high end of the wage distribution relative to their peers in the low end of the distribution, and returns to lower levels of education are far smaller in the upper income quantiles than in the lower ones.

All coefficients of the explanatory variables included have the expected signs and are statistically significantly different from zero for all quantiles. In the following pages we discuss the results obtained for each of the explanatory variables: (1) education, (2) experience, (3) labor market association, (4) occupation and employment sector, (5) gender, and (6) disperse rural area and regional location.

Table 3.F.1. Wage Determination in Rural Mexico (Quantile Regression), 2003

Log monthly labor income	Quantile									
	0.1		0.25		0.5		0.75		0.9	
	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE
<i>Worker Characteristics</i>										
Age	0.054	0.004	0.049	0.002	0.043	0.002	0.038	0.001	0.038	0.002
Age Square	-0.001	0	-0.001	0	-0.001	0	0	0	0	0
Married woman w/o children	-0.271	0.049	-0.289	0.065	-0.261	0.025	-0.288	0.038	-0.248	0.04
Married woman with children	-0.443	0.026	-0.371	0.019	-0.321	0.013	-0.329	0.013	-0.336	0.016
Single woman w/o children	-0.317	0.03	-0.303	0.016	-0.33	0.009	-0.351	0.011	-0.33	0.013
Single woman with children	-0.255	0.031	-0.252	0.022	-0.28	0.016	-0.327	0.014	-0.35	0.017
<i>Labor Status</i>										
Employer	0.218	0.061	0.388	0.027	0.507	0.024	0.593	0.031	0.71	0.035
Self-employed	-1.516	0.052	-1.163	0.028	-0.623	0.014	-0.278	0.016	-0.118	0.026
Informal Salaried	-0.116	0.036	-0.12	0.017	-0.133	0.012	-0.173	0.013	-0.255	0.027
Formal Salaried	0.418	0.027	0.235	0.017	0.139	0.015	0.079	0.017	0.012	0.032
Contract	-0.901	0.066	-0.439	0.039	-0.16	0.022	-0.071	0.023	-0.024	0.036
<i>Education</i>										
Primary Complete+	0.258	0.016	0.245	0.016	0.202	0.011	0.175	0.011	0.173	0.013
Lower Secondary Complete+	0.42	0.023	0.367	0.016	0.296	0.013	0.269	0.011	0.264	0.015
Upper Secondary Complete+	0.523	0.03	0.495	0.018	0.456	0.02	0.456	0.02	0.51	0.024
University Complete	0.956	0.036	0.98	0.021	0.986	0.022	0.988	0.019	1.03	0.03
Technical Education	0.633	0.03	0.579	0.022	0.537	0.022	0.536	0.024	0.624	0.033
<i>Region³</i>										
Norte +	0.376	0.035	0.376	0.019	0.376	0.019	0.253	0.012	0.274	0.026
Capital+	0.363	0.046	0.325	0.022	0.325	0.022	0.187	0.014	0.152	0.025
Golfo +	-0.105	0.034	-0.086	0.023	-0.086	0.023	-0.088	0.015	-0.081	0.013
Pacifico+	0.372	0.038	0.343	0.022	0.343	0.022	0.198	0.014	0.186	0.012
Sur+	0.101	0.028	-0.022	0.023	-0.022	0.023	-0.038	0.013	-0.039	0.015
Centro-Norte+	0.215	0.037	0.202	0.025	0.202	0.025	0.104	0.012	0.093	0.014
Locality < 2,500 inhabitants+	-0.156	0.016	-0.192	0.011	-0.192	0.011	-0.141	0.009	-0.123	0.012
Constant	5.616	0.088	6.218	0.063	6.218	0.063	7.213	0.034	7.491	0.052

¹ Rural area defined as localities with less than 15,000 inhabitants.

Source: Calculations based on ENE 2003, 2nd quarter. Note: figures in italics are statistically significant at 10 percent only.

Education

Human capital has long proven to be important in enhancing economic growth.¹⁰⁴ A more educated workforce is likely to increase productivity by virtue of being more flexible and innovative, and to facilitate the adoption and use of new technologies. Knowledge about wage differentials or gaps due to education serves at least three different purposes. First, wage differentials reveal the magnitude of the incentives that workers have to acquire education, and hence the incentives for educational demand by individuals. Second, information of the impact of education on wages makes it possible to assess whether it is worth investing in this area with preference to others. Third, wage differentials disclose how the labor market translates educational inequalities into wage inequalities –a useful information to reduce inequality.

¹⁰⁴ See, for example, Barro (1991) and Mankiw, Romer, and Weil (1992).

Furthermore, the relation between education and wage levels links education to labor productivity and thus points to the magnitude of the contribution of education to economic growth. It is of interest, therefore, to estimate the association between different levels of education and experience and money wages¹⁰⁵.

Results in Table 3.F.1 confirm the findings of many other studies, namely that education plays an important role in the wage determination process. Better-educated individuals earn higher wages than their less-educated peers.

Wages vary according to education levels.¹⁰⁶ In this analysis, we compare workers who have not completed any level of education (the reference group) with workers who have completed primary school, lower secondary school, higher secondary school, tertiary education, and some form of technical education.¹⁰⁷ In 2003, the association with the wage level of primary, lower secondary, upper secondary, tertiary, and technical education relative to no or incomplete primary education was positive at all quantiles, controlling for other individual characteristics. Having completed primary education contributes to better wages, and the premium increases rapidly with the level of education attainment. Compared to the wages of non-educated workers and those with incomplete primary, median wages of workers with complete primary, lower secondary, upper secondary and tertiary education were respectively 22, 34, 58, and 168 percent higher¹⁰⁸. Workers with complete technical education received a 71 percent higher return compared to peers with no complete education. Better-educated individuals in rural Mexico earn therefore dramatically higher wages than their less-educated counterparts.

Returns across the wage distribution are fairly constant for workers with complete upper secondary and tertiary education, i.e. workers in the low end of the income distribution are not being paid comparatively less than their peers in the high end. This would seem to indicate that: (1) there is no wide heterogeneity in the quality of education in rural areas across the wage distribution, and (2) the capacity of workers to convert their educational capital into higher earnings through labor market networks is similar for poorer and richer workers. Hence, poor people with education seem to benefit from good labor market connections to the same degree as richer people.

Workers with complete primary and lower secondary education face decreasing returns across the wage distribution, i.e. those at the low end are paid proportionally more than those at

¹⁰⁵An issue to be flagged is the possible endogeneity of education in the regression. There is vast evidence of a positive correlation between earnings and education but it is difficult to decide whether the higher earnings observed for better educated employees are caused by their higher level of education, or whether employees with more earning capacity have chosen to acquire more education. Also to be flagged is that wage levels are not only related directly to education as stated in the wage equation but also indirectly through the relation between education and labor status –a choice variable. Education may affect the choice of labor status (e.g. being an employer) and in turn affect the level of wage derived by an employer. The importance of education is hence likely to be underestimated in our wage equation.

¹⁰⁶ Unmeasured ability and measurement error problems have been dealt with in the literature applying data on twins, see for example Card (1998) and Arias, Hollack, and Sosa (1999).

¹⁰⁷ According to the so-called “sheepskin effect” there are wage premiums for completing the final year of elementary school, high school, or university. It has been argued that credentials such as a school diploma or university degree are more important than years of schooling *per se*. This is one of the reasons for not having a continuous education variable in the regression.

¹⁰⁸ The percentage return is calculated as $(\exp(\text{coefficient estimate}) - 1) * 100$. All figures presented in the following paragraphs are percentage premiums thus calculated from the marginal coefficients in Table 3.5.

the high end, indicating that workers with the same level of education are not compensated equally. The poor (10th quantile) receive a wage premium when completing primary education of 29 percent, while the rich (90th quantile) receive only 19 percent. In the case of lower secondary schooling, workers in the low end (10th quantile) obtain a premium of 52 percent, while workers in the top end (90th quantile), obtain only 30 percent. One possible explanation is that social networks that facilitate labor market connections operate better among the poorer than the richer segments of the rural labor force. Another is that these levels of schooling are more relevant for employers hiring workers at the low than at the high end of the wage distribution.

Experience

There are several reasons for including experience in the analysis. One is that experience, together with education, provides flexibility in adapting to changes in technology or other economic changes. Experience and years of schooling are widely used in analyses of wage determination (see Mincer 1974, and Levy and Murnane 1992). The proxy used here is general experience gauged by the age of the worker. We use two variables, age and age squared, to take into account possible non-linearities.

We investigate two questions: (1) is experience important to explain wages? and (2) are returns to experience homogeneous across the population? According to the results presented in Table 3.5 the answer is yes to the first question and no to the second one. The experience (age) coefficient is significantly different from zero and positive for all five quantiles, controlling for other individual characteristics. The impact of experience on wages is positive and increases until workers reach 49 years of age. Thereafter, the returns fall in all quantiles. One explanation may be that older workers adapt less easily than younger ones to new technologies or they are simply less productive because of their age. Returns to experience tend to fall as we move up the wage distribution, but the variation is not large.

Labor market association

Workers in the informal sector obtain a significantly lower pay after controlling for other variables. The negative impact of informality increases across the wage distribution; a worker in the 10th quantile has an 11 percent wage discount because of informality, whereas a worker in the 75th quantile has a discount of 16 percent. The informal sector generally provides lower quality jobs than the formal one. Since higher quality jobs may require more skills, the informal sector variable may be capturing skill differences not signaled by other variables included in the regression. The wage gap may also be due to lower productivity in the informal sector relative to the formal one not captured by education and experience.

Labor status

The labor status of workers is included as another determinant of wages, taking “other workers” as the reference group. Coefficients for all occupational groups included are statistically significant at the 99 or 95 percent level (except contract workers and formal salaried workers at the 90th quantile). Looking at the median of the distribution, employers obtain the highest return: 66 percent. For the 90th quantile, the premium gap is even larger: 103 percent. The self-employed, informal salaried and contract workers are systematically worse off than “other workers”, particularly the self-employed. It is interesting that in the case of self-employed and contract workers the negative gap decreases sharply as we move up the wage distribution. Thus, richer self-employed and contract workers are not as penalized with respect to “other workers” as poorer ones. The opposite is the case with informal salaried workers.

Gender

Discrimination takes place when otherwise identical persons are treated differently by virtue of personal characteristics such as ethnicity or gender. Estimating economic discrimination is difficult. Worker productivity is seldom observed directly, so other variables must be used to proxy for the relevant productivity characteristics. The crucial problem is to assess (1) whether relevant omitted characteristics differ according to ethnicity or gender, and (2) whether included characteristics directly capture productivity differences or are instead proxies for ethnicity or gender. The following section reports findings on gender differences. In chapter 7 we report results from Ramírez and García (2004) and de Janvry and Sadoulet (2001) related to ethnic discrimination. The analysis includes four gender variables: married women with and without children, and single women with and without children. The reference group is male workers.

Regression results show large inequalities between men and women. Female wages are significantly different from male wages at all quantiles. Results also suggest that the gender gap is homogeneous across quantiles for women without children (married and single), but heterogeneous across quantiles for women with children (married and single). Married women with children experience the largest wage gap at the low end of the distribution; they obtain 36 percent lower wages than their male peers in the 10th quantile, with the gap narrowing along the distribution to reach 28 percent at the 90th quantile.

The gender gap may be explained to some degree by choice of jobs by women. Women are more likely to select more flexible jobs. They may choose, for example, part time jobs or jobs with lower working hours than men¹⁰⁹. A second factor may be gender differences in unmeasured skills. Education levels are taken into account in the regressions, but the skill level of some women may be lower than that of men for some jobs, and they may also be under-capitalized in terms of actual job experience. Direct discrimination may hence be less strong than it appears from the results in Table 3.5.

Disperse Areas and Regional Effects

Data in Table 3.5 refers to rural areas defined as settlements of less than 15,000 residents. We have included in the regression a dummy variable for settlements of less than 2,500 residents to see if dwellers of disperse rural areas experience significant differences in wages compared to those in semi-urban settlements. We have also included dummies for the various geographical regions, taking as reference the *Centro* region.

Regression results show that workers in disperse rural areas are paid significantly less than workers in semi-urban rural areas, after controlling for other factors. The semi-urban – disperse rural wage gap is significantly different from zero for all quantiles and varies across the wage distribution. It increases from the 10th to the 50th quantile and declines from the 50th to the 90th, controlling for other covariates. The semi-urban premium is 12 percent for the median worker. One possible explanation for this gap is that prices, for example that of urban land, are higher in semi-urban areas, and hence the higher wage is a compensation for this —a reflection of the fact that semi-urban workers have a labor supply curve above that of disperse rural workers. Another possible explanation is that work opportunities, i.e. labor demand, are higher in semi-urban areas, pushing up wages.

¹⁰⁹ On average Mexican female workers work 24 percent fewer hours than their male peers. See annex Table 3.B.1

All regions with the exception of the *Golfo* and *Sur* enjoy a wage premium with respect to the *Centro*, and this is consistent across the whole distribution (except for the *Sur*). The *Norte*, *Capital* and *Pacífico* regions have the highest premiums. Workers in the *Sur* have an advantage over their peers in the *Centro* (but not over those in other regions) in the bottom part of the distribution, which they soon lose as we move up to higher quantiles.

ANNEX 3.G. - TABLE 3.G.1. INCOME SHARES BY SOURCE AND CONSUMPTION QUINTILE IN RURAL MEXICO 1992, LOCALITIES OF LESS THAN 2,500 RESIDENTS

	Agriculture Income Sources					Non-agricultural Income Sources							Total Non-Agriculture Income (%)		
	Crop Farming (%)	Other Farming ^a (%)	Food Self-Consumption (%)	Wage Labor in Crops (%)	Wage Labor in Others ^a (%)	Total Agriculture Income (%)	Low-return ^b non-farm wage income (%)	High-return ^b non-farm wage income (%)	Non-farm Entrep. Income (%)	Remittances (%)	Other private transfers (%)	Direct Public Transfers (%)		Other Income Sources ^c (%)	In-kind Payment and Imputed Rent (%)
<i>Total</i>	17.9	11.9	8.7	10.2	2.1	50.8	15.5	4.9	8.1	2.7	4.1	0.2	1	12.6	49.2
<i>Rural per capita consumption quintile</i>															
Bottom	17.4	12.7	16.4	20.5	2.8	69.8	10.2	1.1	3.2	0.6	3	0.5	0.2	11.5	30.2
2nd	19.8	12.4	14.9	15.4	2.2	64.8	10.1	1.5	5.1	1.5	4.1	0.1	0.6	12.2	35.2
3rd	17.4	10.5	10.8	12.4	2.5	53.5	21.6	2.2	5.1	1.4	3.1	0.3	0.3	12.4	46.5
4th	19.8	11.3	6.9	10.6	2.1	50.7	15.6	4.1	9.5	1.9	5.9	0.2	0.4	11.7	49.3
5th	16.8	12.4	6.3	6.5	1.8	43.8	15.7	7.5	9.8	4.2	3.7	0.2	1.7	13.5	56.2
<i>Poor/non poor (food poverty line)</i>															
Non-poor	18.9	12.5	7.2	8.9	1.9	49.4	15.7	5.6	8.8	3	4.2	0.2	1.1	12	50.6
Poor	13.2	8.8	16.1	16.6	3	57.7	14.6	1.3	4.8	1.3	3.9	0.4	0.4	15.5	42.3
<i>Poor/non poor (assets poverty line)</i>															
Non-poor	21.5	14.2	6	6.6	1.6	49.9	13.7	6.7	9.2	3.2	4.1	0.2	1.3	11.8	50.1
Poor	12.5	8.4	12.8	15.7	2.9	52.3	18.3	2.1	6.5	2.1	4.1	0.3	0.4	13.9	47.7

Source: ENIGH 2002

^a Includes livestock, forestry and fisheries

^b Low and high return non-farm activities are identified on the basis of average monthly per capita earnings associated with primary employment in different sectors. Sectors where average monthly earnings are below the assets poverty line of \$ 494.77 per month are identified as low return activities. Low return activities comprise: food and beverages, textiles, clothing and leather, wood products, printing, ceramics, machinery, other manufacturing, construction, hotels, communications, financial services, entertainment, personal services.

^c Includes leasing and business societies

ANNEX 3.G. - TABLE 3.G.2. INCOME SHARES BY SOURCE AND CONSUMPTION QUINTILE IN RURAL MEXICO 1992, LOCALITIES OF LESS THAN 15,000 RESIDENTS

	Agriculture Income Sources					Non-agricultural Income Sources					In-kind Payment & imputed rent (%)	Total Non-Agriculture Income (%)			
	Crop Farming (%)	Other Farming ^a (%)	Food Self-Consumption (%)	Wage Labor in Crops (%)	Wage Labor in Others ^a (%)	Total Agriculture Income (%)	Low-return ^b non-farm wage income (%)	High-return ^b non-farm wage income (%)	Non-farm Enterprise Income (%)	Remittances (%)			Other private transfers (%)	Direct Public Transfers (%)	Other Income Sources ^c (%)
<i>Total</i>	12.8	16.4	6	6.9	1.8	43.9	15	10.9	9.5	2.3	4.2	0.1	1.4	12.7	56.1
<i>Rural per capita consumption quintile</i>															
Bottom	16.6	11.6	14.5	19.5	2.5	64.7	11.3	2.9	3.4	1.1	3.2	0.3	0.5	12.5	35.3
2nd	15	11.8	10.9	10.6	2.9	51.3	15.4	4.2	9.7	2.4	5.5	0.2	0.2	11.3	48.7
3rd	14	13.5	6.9	8.6	3.3	46.3	18.1	7	10.5	1.2	4.5	0.3	0.7	11.4	53.7
4th	13.6	9.8	4.2	7.2	2	36.8	21.1	13.4	7.1	2	4.8	0.3	0.5	14.2	63.2
5th	11.2	21.8	4.2	3.6	1	41.8	11.8	13.6	10.9	3	3.7	0	2.3	12.9	58.2
<i>Poor/non poor (food poverty line)</i>															
Non-poor	13	17.4	4.9	5.7	1.7	42.6	15.1	11.9	9.8	2.5	4.2	0.1	1.5	12.3	57.4
Poor	11.9	8.6	14.7	15.8	2.9	53.8	14.3	2.8	6.7	1.1	4.5	0.3	0.4	16.1	46.2
<i>Poor/non poor (assets poverty line)</i>															
Non-poor	13.8	20.7	4	4	1.1	43.6	13.2	13.1	9.9	2.5	4	0.1	1.7	11.9	56.4
Poor	10.8	6.9	10.3	13.1	3.5	44.6	18.8	6.2	8.6	2	4.6	0.3	0.5	14.5	55.4

Source: ENIGH 2002

^a Includes livestock, forestry and fisheries

^b Low and high return non-farm activities are identified on the basis of average monthly per capita earnings associated with primary employment in different sectors. Sectors where average monthly earnings

are below the assets poverty line of \$ 494.77 per month are identified as low return activities. Low return activities comprise: food and beverages, textiles, clothing and leather, wood products, printing,

ceramics, machinery, other manufacturing, construction, hotels, communications, financial services, entertainment, personal services.

^c Includes leasing and business societies

ANNEX 3.G. - TABLE 3.G.3. INCOME SHARES BY SOURCE AND REGION IN RURAL MEXICO 1992, LOCALITIES OF LESS THAN 2,500 RESIDENTS

	Agriculture Income Sources					Non-agricultural Income Sources					Total Non-Agriculture Income (%)				
	Crop Farming ^a (%)	Other Farming ^a (%)	Food Self-Consumption (%)	Wage Labor in Crops (%)	Wage Labor in Others ^a (%)	Total Agriculture Income (%)	Low-return non-farm wage income (%)	High-return ^b non-farm wage income (%)	Non-farm Entrep. Income (%)	Remittances (%)		Other private transfers (%)	Direct Public Transfers (%)	Other Income Sources ^c (%)	In-kind Payment & Imputed Rent (%)
<i>Total</i>	17.9	11.9	8.7	10.2	2.1	50.8	15.5	4.9	8.1	2.7	4.1	0.2	1.0	12.6	49.2
<i>Region^g</i>															
Norte	21.1	14.4	4.3	16.6	2.8	59.2	8.5	7.5	3.3	1.3	4.4	0.0	1.6	14.1	40.8
Capital	8.1	9.4	8.0	7.8	0.9	34.1	28.0	7.5	6.8	2.2	7.8	0.2	0.0	13.2	65.9
Golfo	20.0	9.5	7.8	6.4	4.4	48.1	20.2	6.3	6.7	0.0	3.9	0.4	0.7	13.7	51.9
Pacifico	11.0	8.7	7.1	11.6	1.8	40.3	15.9	7.1	10.7	1.9	4.0	0.0	3.1	16.9	59.7
Sur	21.2	18.1	15.4	10.3	1.6	66.6	6.5	1.5	9.1	4.5	2.4	0.4	0.5	8.6	33.4
Centro-Norte	22.2	10.9	7.2	6.6	1.0	47.8	19.4	3.2	6.9	6.0	5.0	0.1	0.4	11.2	52.2
Centro	9.9	6.5	6.9	15.1	0.6	38.9	21.4	4.2	15.2	1.7	4.3	0.2	0.3	13.9	61.1

Source: ENIGH 2002

^a Includes livestock, forestry and fisheries

^b Low and high return non-farm activities are identified on the basis of average monthly per capita earnings associated with primary employment in different sectors.

Sectors where average monthly earnings

are below the assets poverty line of \$ 494.77 per month are identified as low return activities. Low return activities comprise: food and beverages, textiles, clothing and leather, wood products, printing,

ceramics, machinery, other manufacturing, construction, hotels, communications, financial services, entertainment, personal services.

^c Includes leasing and business societies

^g The regions correspond to the following states: Norte: Baja California, Coahuila, Chihuahua, Nuevo León, Sonora, Tamaulipas; Capital: Distrito Federal, México; Golfo: Campeche, Quintana Roo, Tabasco, Veracruz, Yucatán; Pacifico: BC Sur, Colima, Jalisco, Nayarit, Sinaloa; Sur: Chiapas, Guerrero, Michoacan, Oaxaca; Centro-Norte: Aguascalientes, Durango, Guanajuato, Querétaro, San Luis Potosí, Zacatecas; Centro: Hidalgo, Morelos, Puebla, Tlaxcala

ANNEX 3.G. - TABLE 3.G.4. INCOME SHARES BY SOURCE AND REGION IN RURAL MEXICO 1992, LOCALITIES OF LESS THAN 15,000 RESIDENTS

	Agriculture Income Sources						Non-agricultural Income Sources						Total Non-Agriculture Income (%)	
	Crop Farming (%)	Other Farming ^a (%)	Food Self-Consumption (%)	Wage Labor in Crops (%)	Wage Labor in Others ^a (%)	Total Agriculture Income (%)	Low-return ^b non-farm wage income (%)	High-return ^b non-farm wage income (%)	Non-farm Entrepreneurial Income (%)	Remittances (%)	Other private transfers (%)	Direct Public Transfers (%)		Other Income Sources ^c (%)
<i>Total</i>	12.8	16.4	6.0	6.9	1.8	43.9	15.0	10.9	9.5	2.3	4.2	0.1	1.4	12.7
<i>Region^g</i>														
Norte	17.4	8.2	3.0	11.5	2.5	42.6	11.7	11.1	9.5	2.2	5.8	0.0	1.9	15.2
Capital	3.7	6.7	3.7	4.9	0.7	19.8	30.8	22.3	4.4	0.9	5.3	0.2	0.0	16.2
Golfo	13.9	11.1	5.9	4.2	3.3	38.3	14.7	15.8	11.4	0.0	6.2	0.4	0.6	12.6
Pacifico	11.1	10.8	4.4	7.3	1.3	34.8	18.0	11.7	10.5	1.2	3.7	0.0	5.5	14.5
Sur Centro-Norte	11.8	36.2	9.1	5.7	2.0	64.7	7.4	5.1	8.6	3.1	1.8	0.2	0.2	9.0
Centro	18.9	9.1	6.4	5.9	1.0	41.4	17.8	8.7	8.6	6.1	5.0	0.1	0.8	11.5
Centro	10.8	9.6	6.0	10.2	1.2	37.8	18.2	9.3	12.7	2.8	3.6	0.1	0.5	14.9

Source: ENIGH 2002

^a Includes livestock, forestry and fisheries

^b Low and high return non-farm activities are identified on the basis of average monthly per capita earnings associated with primary employment in different sectors. Sectors where average monthly earnings are below the assets poverty line of \$ 494.77 per month are identified as low return activities. Low return activities comprise: food and beverages, textiles, clothing and leather, wood products, printing,

ceramics, machinery, other manufacturing, construction, hotels, communications, financial services, entertainment, personal services.

^c Includes leasing and business societies

^g The regions correspond to the following states: Norte: Baja California, Coahuila, Chihuahua, Nuevo León, Sonora, Tamaulipas; Capital: Distrito Federal, México; Golfo: Campeche, Quintana Roo, Tabasco, Veracruz, Yucatán; Pacífico: BC Sur, Colima, Jalisco, Nayarit, Sinaloa; Sur: Chiapas, Guerrero, Michoacan, Oaxaca; Centro-Norte: Aguascalientes, Durango, Guanajuato, Querétaro, San Luis Potosí, Zacatecas; Centro: Hidalgo, Morelos, Puebla, Tlaxcala

ANNEX 3.G. - TABLE 3.G.5. INCOME SHARES BY SOURCE AND CONSUMPTION QUINTILE IN RURAL MEXICO 2002, LOCALITIES OF LESS THAN 2,500 RESIDENTS

	Agriculture Income Sources					Non-agricultural Income Sources							Total Non-Agriculture Income (%)				
	Crop Farming (%)	Other Farming ^a (%)	Food Self-consumption (%)	Wage Labor in Crops (%)	Wage Labor in Others ^a (%)	Total Agriculture Income (%)	Low-return ^b non-farm wage income (%)	High-return ^b non-farm wage income (%)	Non-farm Entrep. Income (%)	Remittances (%)	Other private transfers (%)	PRO-GRESA (%)		PRO-CAMP O (%)	Direct Public Transfers (%)	Other Income Sources ^c (%)	In-kind Payment & Imputed Rent (%)
TOTAL	5.1	4.4	3.1	8	3.3	23.8	12.3	23.8	5.7	5.9	4.4	3.2	2.8	0.2	5.4	12.4	76.2
<i>Rural per capita consumption quintile</i>																	
Bottom	9.2	3.2	6.1	20.7	7.4	46.6	11.5	2.8	4.3	1.7	5.1	1.2	4.7	0.3	0.3	10.6	53.4
2nd	7	3.1	4.7	18.1	4.1	37.1	14.4	8.3	6	4.5	5	8.5	3.6	0.7	1.9	10	62.9
3rd	7.3	3.1	3.6	15	5.5	34.6	16.8	11.1	7.6	4.7	4.7	5.7	2.9	0.4	1.4	10.1	65.4
4th	4.8	5.2	2.8	9.7	5.6	28	19	14.1	6.7	8	4.7	3.1	2.5	0.2	4.3	9.2	72
5th	3.8	4.8	2.4	2.4	1.4	14.8	8.6	35.4	5	6.2	4	0.6	2.5	0.1	8	14.7	85.2
<i>Poor/non poor (food poverty line)</i>																	
Non-poor	4.6	4.6	2.6	6.6	3	21.4	12.2	27	5.5	6.2	4.2	1.7	2.6	0.2	6	12.8	78.6
Poor	7.9	3	5.9	16.5	5.4	38.7	12.8	4.4	6.8	3.8	5.5	11.9	3.8	0.4	1.7	10.2	61.3
<i>Poor/non poor (assets poverty line)</i>																	
Non-poor	4.3	5.2	2.3	3.8	2.4	17.9	10.1	32.1	5.2	6	4	0.7	2.5	0.1	7.7	13.7	82.1
Poor	6.4	3	4.5	15	4.9	33.8	16	9.9	6.6	5.8	5.2	7.4	3.3	0.4	1.6	10.1	66.2

Source: ENIGH 2002

^a Includes livestock, forestry and fisheries

^b Low and high return non-farm activities are identified on the basis of average monthly per capita earnings associated with primary employment in different sectors. Sectors where average monthly earnings

are below the assets poverty line of \$ 494.77 per month are identified as low return activities. Low return activities comprise:

food and beverages, textiles, clothing and leather, wood products, printing,

ceramics, machinery, other manufacturing, construction, hotels, communications, financial services, entertainment, personal services.

^c Includes leasing and business societies

ANNEX 3.G. - TABLE 3.G.6. INCOME SHARES BY SOURCE AND CONSUMPTION QUINTILE IN RURAL MEXICO 2002, LOCALITIES OF LESS THAN 15,000 RESIDENTS

	Agriculture Income Sources					Non-agricultural Income Sources										Total Non-Agriculture Income (%)	
	Crop Farming (%)	Other Farming ^a (%)	Food Self-Consumption (%)	Wage Labor in Crops (%)	Wage Labor in Others ^a (%)	Total Agriculture Income (%)	Low-return ^b non-farm wage income (%)	High-return ^b non-farm wage income (%)	Non-farm Entrep. Income (%)	Remittances (%)	Other private transfers (%)	PRO-GRISA (%)	PRO-CAMPO (%)	Other Public Transfers (%)	Other Income Sources ^c (%)		In-kind Payment & Imputed Rent (%)
TOTAL	3.6	2.9	2.5	5.8	2.4	17.1	12.5	27.5	8.6	4.4	6.1	2.2	1.8	1.1	7.2	11.6	82.9
<i>Rural per capita consumption quintile</i>																	
Bottom	9.3	2.9	5.5	20.2	6.1	44	10.9	5.7	5.6	2.1	5.6	11	3.9	0.3	0.4	10.6	56
2nd	6.6	2.4	3.5	15.3	4.5	32.3	18.9	11.5	6.5	4.5	5.3	6.4	2.6	0.6	1.7	9.7	67.7
3rd	3.9	2.5	2.5	10.2	3.1	22.3	19	15.4	15.5	4.5	4.5	3.6	2	0.3	2.9	9.9	77.7
4th	4	3.9	2.3	5.4	3.9	19.4	18.4	22.5	10.4	5.8	5.2	2	1.4	0.3	4.1	10.5	80.6
5th	2.2	2.7	2	1.4	0.9	9.1	7.6	37.8	6.8	4.2	7	0.2	1.4	1.7	11.2	12.9	90.9
<i>Poor/non poor (food poverty line)</i>																	
Non-poor	3.1	2.9	2.1	4.6	2.1	14.9	12.3	30	8.6	4.6	6.1	1.2	1.6	1.2	7.8	11.7	85.1
Poor	7.6	2.6	5.4	15.7	4.7	36.1	13.5	5.8	8.2	3.4	5.7	10.9	3.3	0.4	2.1	10.6	63.9
<i>Poor/non poor (assets poverty line)</i>																	
Non-poor	2.8	3.1	2	2.4	1.7	11.9	9.8	33.8	8.9	4.3	6.4	0.4	1.4	1.4	9.4	12.1	88.1
Poor	5.3	2.4	3.6	13	4	28.2	18.1	13.9	7.9	4.6	5.4	6.1	2.5	0.4	2.4	10.5	71.8

Source: ENIGH 2002

^a Includes livestock, forestry and fisheries

^b Low and high return non-farm activities are identified on the basis of average monthly per capita earnings associated with primary employment in different sectors. Sectors where average monthly earnings

are below the assets poverty line of \$ 494.77 per month are identified as low return activities. Low return activities comprise: food and beverages, textiles, clothing and leather, wood products, printing,

ceramics, machinery, other manufacturing, construction, hotels, communications, financial services, entertainment, personal services.

^c Includes leasing and business societies

ANNEX 3.G. - TABLE 3.G.7. INCOME SHARES BY SOURCE AND REGION IN RURAL MEXICO 2002, LOCALITIES OF LESS THAN 2,500 RESIDENTS

	Agriculture Income Sources					Non-agricultural Income Sources											
	Crop Farming (%)	Other Farming ^a (%)	Food Self-Consumption (%)	Wage Labor in Crops (%)	Wage Labor in Others ^a (%)	Total Agriculture Income (%)	Low-return ^b non-farm wage income (%)	High-return ^b non-farm wage income (%)	Non-farm Income (%)	Remittances (%)	Other private transfers (%)	PRO-GRESA (%)	PRO-CAMPO (%)	Other Public Transfers (%)	Other Income Sources ^c (%)	In-kind Payment & Imputed Rent (%)	Total Non-Agriculture Income (%)
TOTAL	5.1	4.4	3.1	8	3.3	23.8	12.3	23.8	5.7	5.9	4.4	3.2	2.8	0.2	5.4	12.4	76.2
<i>Región</i>																	
Norte	2	3.5	1.8	5.1	7.1	19.5	15.1	20.1	5.8	3.8	4.7	1.3	8.3	0.2	10.5	10.6	80.5
Capital	1.5	1.4	2.2	5.1	0.8	11	35.9	22.4	5	1.5	4.1	3.1	1.8	0.1	4.8	10.3	89
Golfo	3.1	1.6	1.8	10.9	4.8	22.2	12.5	21.1	6.6	1.2	5.3	5.4	1.2	0.1	4.1	20.4	77.8
Pacífico	3.4	2.7	1.3	3.7	1.3	12.4	3.1	51	2.2	1.6	3.1	0.8	0.9	0.3	7	17.6	87.6
Sur	9.2	9.1	6.5	11	5.4	41.2	8	8.1	8.5	10.6	5	5.2	3	0.2	1.8	8.5	58.8
Centro-Norte	7.4	4.7	2.5	8.5	2.2	25.4	13.4	18	6.9	13.4	4.1	2.6	3.8	0.3	4.7	7.5	74.6
Centro	4.7	4.4	4.8	12.4	1	27.3	22.4	11.9	5	3.8	5.4	5	1.2	0.4	7.4	10.3	72.7

Source: ENIGH 2002

^a Includes livestock, forestry and fisheries

^b Low and high return non-farm activities are identified on the basis of average monthly per capita earnings associated with primary employment in different sectors. Sectors where average monthly earnings are below the assets poverty line of \$ 494.77 per month are identified as low return activities. Low return activities comprise: food and beverages, textiles, clothing and leather, wood products, printing, ceramics, machinery, other manufacturing, construction, hotels, communications, financial services, entertainment, personal services.

^c Includes leasing and business societies

^d The regions correspond to the following states: Norte: Baja California, Coahuila, Chihuahua, Nuevo León, Sonora, Tamaulipas; Capital: Distrito Federal, México; Golfo: Campeche, Quintana Roo, Tabasco, Veracruz, Yucatán; Pacífico: BC Sur, Colima, Jalisco, Nayarit, Sinaloa; Sur: Chiapas, Guerrero, Michoacán, Oaxaca; Centro-Norte: Aguascalientes, Durango, Guanajuato, Querétaro, San Luis Potosí, Zacatecas; Centro: Hidalgo, Morelos, Puebla, Tlaxcala

ANNEX 3.G. - Table 3.G.8. Income Shares by Source and Region in Rural Mexico 2002, Localities of Less than 15,000 Residents

Region	Agriculture Income Sources					Non-agricultural Income Sources											
	Crop Farming (%)	Other Farming ^a (%)	Food Self-Consumption (%)	Wage Labor in Crops (%)	Wage Labor in Others ^a (%)	Total Agriculture Income (%)	Low-return ^b non-farm wage income (%)	High-return ^b non-farm wage income (%)	Non-farm Entrep. Income (%)	Remittances (%)	Other private transfers (%)	PRO-GRESA (%)	PRO-CAMPO (%)	Other Public Transfers (%)	Other Income Sources ^c (%)	In-kind Payment & Imputed Rent (%)	Total Non-Agriculture Income (%)
TOTAL	3.6	2.9	2.5	5.8	2.4	17.1	12.5	27.5	8.6	4.4	6.1	2.2	1.8	1.1	7.2	11.6	82.9
Norte	1.4	2.2	2	4.1	5.4	15.2	13.8	26.3	8.5	3.7	5.8	1.1	5.4	1.2	8.6	10.5	84.8
Capital	0.8	0.6	1.3	2.2	0.8	5.7	22.2	36.3	8.5	0.9	4.1	1.2	0.7	0.1	9	11.3	94.3
Golfo	3.5	1.3	1.5	7.6	4.1	18	15.8	28.1	6.4	1	5.7	3.5	0.7	0.1	4.1	16.6	82
Pacífico	2.6	2.1	1.4	2.9	1.1	10.1	6.9	46.5	2.5	2	3.9	0.7	0.7	0.3	10.7	15.6	89.9
Sur	5.9	5.7	4.5	7.1	3	26.1	6.1	13.3	16.8	6.7	9.5	3.4	1.8	3.7	3.7	8.9	73.9
Centro-Norte	5.7	3.9	2.5	6.8	2.2	21.1	12.1	20.4	7.9	11.7	5.4	2.1	3.1	0.3	7.7	8.2	78.9
Centro	3	2.3	3.1	9.1	0.5	18.1	19	24.8	6.2	3.1	6.6	3.3	0.7	0.4	8.1	10	81.9

Source: ENIGH 2002

^a Includes livestock, forestry and fisheries

^b Low and high return non-farm activities are identified on the basis of average monthly per capita earnings associated with primary employment in different sectors. Sectors where average monthly earnings are below the assets poverty line of \$ 494.77 per month are identified as low return activities. Low return activities comprise: food and beverages, textiles, clothing and leather, wood products, printing, ceramics, machinery, other manufacturing, construction, hotels, communications, financial services, entertainment, personal services.

^c Includes leasing and business societies

^d The regions correspond to the following states: Norte: Baja California, Coahuila, Chihuahua, Nuevo León, Sonora, Tamaulipas; Capital: Distrito Federal, México; Golfo: Campeche, Quintana Roo, Tabasco, Veracruz, Yucatán; Pacífico: BC Sur, Colima, Jalisco, Nayarit, Sinaloa; Sur: Chiapas, Guerrero, Michoacán, Oaxaca; Centro-Norte: Aguascalientes, Durango, Guanajuato, Querétaro, San Luis Potosí, Zacatecas; Centro: Hidalgo, Morelos, Puebla, Tlaxcala

ANNEX 3.H. CORRELATES OF RURAL NON-FARM EMPLOYMENT

Several studies have tried to explain the participation of households in RNF activities using different data bases. We present an exercise carried out on the basis of the ENE 2003, 2nd quarter survey, using a Probit model to determine the probability of individual involvement in non-farm activities as primary occupation, conditional on a range of personal, household and geographical characteristics. The specification of the model draws on findings from previous sections, which suggest that the choice of primary occupation is affected by geographical location, education, gender, age, and labor status. We use a wide definition of rural in the regression, and include a dummy to check the impact of a more restrictive definition. Results are shown in Table 3.H.1.

Rather than reporting parameter estimates, which are difficult to interpret, Table 3.H.1 presents the marginal effects associated with each explanatory variable, which measure the effect of a percentage change in the explanatory variable on the probability of involvement in non-farm activities, taking all other variables at their means.¹¹⁰

The table presents three Probit regressions linking the probability of having primary employment in non-agricultural wage-labor occupations to a range of explanatory variables. The dependent variable takes the value of 1 if the person is primarily employed in non-agricultural wage labor and zero otherwise. Included in the analyses are household size, age, age squared, gender, labor status, schooling variables, residence in settlements with less than 2,500 people, and regional dummies. The first model comprises all non-farm activities in rural Mexico. The second and third models have the same specification of regressors but split workers in the non-agricultural labor force into two groups: those with low-return jobs and those with high-return jobs. As in the previous section, we examine in turn regression results for the different variables, comparing them with results from other studies.

Gender

Considering all non-farm employment together, women have considerable higher probability than men to participate in RNF activities, controlling for all other variables¹¹¹. This result holds for married and single women, with and without children, with marginal effects that are not very different among these groups of women. This is consistent with the results obtained by Araujo (2003: 1st essay) for Mexican rural poor communities using the 1997 ENCASEH data base, but differs from results for other countries, for example for Northeast Brazil, where women are less likely to be represented in the RNF sector (see Ferreira and Lanjouw 2001). In the *ejido* sector, married and old women were found to be less likely to participate in RNF activities, with proximity to urban centers increasing the probability of women participation in these activities, particularly that of younger women (de Janvry and Sadoulet, 2001).

The picture becomes more complex when we consider high and low return activities, because women are significantly more likely than men to participate in low return occupations but significantly less likely to participate in high return ones, and this does not change with marital status or having or not children.

¹¹⁰ For dummy variables, the marginal effect is the change in the dependent variable associated with a move from a value of zero to a value of one of the dummy, holding all other variables constant at mean values.

¹¹¹ The reference variable for gender comparisons is single male.

Table 3.H.1. Probability of Being Employed in the Non-agricultural Sector, Rural Mexico 2002¹

Dependent Variable	Non-Agricultural Employment				Low-Productivity ² Non-Agricultural Employment				High-Productivity Non-Agricultural Employment			
	dF/dx	SE	P> z		DF/dx	SE	P> z		dF/dx	SE	P> z	
<i>Worker Characteristics</i>												
Age	0.002	**	0.001	0.03	-0.008	***	0.001	0	0.012	***	0.001	0
Age Square	0	***	0	0	0	***	0	0	0	***	0	0
Married woman w/o children+	0.275	***	0.006	0	0.498	***	0.019	0	-0.141	***	0.014	0
Married woman with children+	0.314	***	0.004	0	0.511	***	0.006	0	-0.154	***	0.005	0
Single woman w/o children+	0.281	***	0.004	0	0.487	***	0.008	0	-0.161	***	0.005	0
Single woman with children+	0.287	***	0.004	0	0.534	***	0.008	0	-0.161	***	0.005	0
<i>Labor Status</i>												
Employer+	0.056	***	0.016	0.001	0.405	***	0.018	0	-0.151	***	0.007	0
Self-employed+	-0.146	***	0.013	0	0.405	***	0.014	0	-0.326	***	0.006	0
Informal Salaried+	-0.056	***	0.012	0	0.319	***	0.014	0	-0.198	***	0.006	0
Formal Salaried+	0.181	***	0.01	0	0.263	***	0.015	0	-0.071	***	0.008	0
Contract+	0.093	***	0.013	0	0.328	***	0.017	0	-0.1	***	0.009	0
Family Worker+	-0.464	***	0.013	0	0.216	***	0.016	0	-0.322	***	0.003	0
Other												
<i>Education</i>												
No education												
Primary Complete+	0.114	***	0.006	0	0.06	***	0.007	0	0.082	***	0.006	0
Lower Secondary Complete+	0.196	***	0.006	0	0.09	***	0.008	0	0.144	***	0.008	0
Upper Secondary Complete+	0.228	***	0.007	0	0.071	***	0.012	0	0.223	***	0.013	0
University Complete+	0.278	***	0.005	0	-0.214	***	0.007	0	0.537	***	0.012	0
Technical Education+	0.238	***	0.008	0	-0.093	***	0.011	0	0.367	***	0.014	0
<i>Region</i>												
Norte +	0.019	**	0.009	0.042	0.031	***	0.009	0.001	0.002		0.008	0.769
Capital+	0.175	***	0.009	0	0.061	***	0.012	0	0.091	***	0.012	0
Golfo +	0.015	*	0.008	0.056	0.027	***	0.008	0	-0.021	***	0.007	0.003
Pacifico+	-0.027	***	0.009	0.002	0.019	**	0.008	0.025	-0.023	***	0.007	0.002
Sur+	-0.019	**	0.009	0.03	-0.026	***	0.008	0.001	-0.009		0.008	0.265
Centro-Norte+	0.033	***	0.008	0	0.014	*	0.008	0.074	0.022	***	0.008	0.002
Locality < 2,500 inhabitants+	-0.237	***	0.005	0	-0.152	***	0.005	0	-0.088	***	0.005	0
obs. P	0.629				0.332				0.297			
Pred. P (at x-bar)	0.707				0.302				0.229			
Number of observations =	46501				46501				46501			
Log Likelihood=	-20843.1				-23166.4				-20634.5			
LR chi2(24)=	19671.5				12766.4				15278.6			
Prob>chi2=	0				0				0			
Pseudo R2=	0.321				0.216				0.27			

Source: ENE 2003, 2nd quarter

¹ Rural area defined as localities with less than 15,000 inhabitants

² The worker is employed in a low-productivity non-agricultural job if her monthly labor income is below the average non-agricultural labor income.

³ The worker is employed in a low-productivity agricultural job if her monthly labor income is below the average agricultural labor income.

Age

The probability of employment in non-agricultural jobs rises with age, after controlling for other characteristics, although the marginal effect is small. The association is somewhat larger for high return occupations and is negative for low return ones. No evidence was found of the association declining at a certain age. This finding contrasts with that for the Brazilian Northeast obtained by Ferreira and Lanjouw (2001), also with the results obtained for the *ejido* sector by Winters, Davis and Corral (2002) and de Janvry and Sadoulet (2001), and with the results for the rural poor communities covered in the ENCASEH survey, examined by Araujo (2003: 1st essay). All these studies found that young individuals, particularly young men, tend to participate more than older ones in RNF activities. It is not clear why this difference in results, but it may be due to the wider coverage of the ENE survey, and the wide definition of rural used in our regressions.

Education

The effect of education is strong, and the results are consistent with findings from other studies, like those of Yúnez-Naude and Taylor (2000), Ferreira and Lanjouw (2001), Winters, Davis, and Corral (2002), de Janvry and Sadoulet (2001), Araujo (2003: 1st essay), and Taylor, Yúnez-Naude and Cerón (2004). Table 3.H.1 shows that the probability of involvement in the non-farm sector is positively and significantly related to education levels. Relative to the non educated, workers with education are generally more likely to find employment in the non-agricultural sector. As education levels rise, so does the probability of being employed in the non-agricultural sector both in low return and high return occupations. The exception is university and technical education, which, not surprisingly, diminish the probability of engagement in low return RNF activities. It should be acknowledged that the exogeneity of education in these models can be questioned, so more research is needed to understand employment possibilities in RNF sectors.

We did not combine in our regressions gender and education variables, but it has been done in other studies with interesting results. Thus, Winters, Davis and Corral (2002) find from income regression equations for the *ejido* sector that increasing levels of education translate into higher income for rural women at higher levels of education only, probably because at lower levels of education low paid work in domestic help is the only or the most frequent opportunity available to women.

Location

Location influences the probability of participation in the RNF sector. Workers living in localities smaller than 2,500 inhabitants are less likely to be employed in RNF occupations than those living in localities under 15,000 residents. The regression model for low-productive non-agricultural occupations reveals that workers in small localities are even less likely to be employed in this sector.

Other studies confirm the importance of location. Araujo (2003: 2nd essay) finds that proximity to urban centers increases the probability of participation in manufacturing activities, irrespectively of education, ethnicity, wage levels or initial employment. Participation in services is less related to proximity to urban centers and more to the characteristics of the area.

Region

Relative to those living in the Centro, which is taken as reference, workers in the *Norte*, *Capital*, *Golfo*, and *Centro-Norte* regions are more likely to be employed in RNF activities. Instead, workers in the *Pacífico* and *Sur* are less likely to participate in the RNF economy than their peers in the *Centro*. De Janvry and Sadoulet (2001) found also important differences between regions, with dwellers in *ejidos* located in the *Sur* having fewer opportunities to work in RNF activities.

Other Variables

Other variables not included in our regressions because of lack of data in the ENE survey may also be important determinants of labor market participation, and have been included in other studies. One of them is **access to land**. Finan, Sadoulet and de Janvry (2002) find that young educated men from land scarce households in Mexico are more likely to participate in off-farm non-agricultural employment. Araujo (2003: 1st essay) also found that access to irrigated land has a negative impact on RNF employment.

Araujo (2003: 1st essay) measures the role of **social networks** on labor market behavior in rural Mexico. She finds that neighbors' participation in off-farm non-agricultural employment has a significant impact on the individual choice of occupation, even after controlling for the availability of opportunities. The role of employment choices by neighbors is more important for groups that are less likely to participate in non-agricultural rural employment such as women, indigenous people, the elder, and land-owners. This finding suggests an important role for networks and referrals in the job-search process of rural households, specially since it appears that social networks have an equalizing effect, compensating more to those who are less endowed and therefore less likely to participate in off-farm non-agricultural employment.

Ethnicity is another important variable. Yúnez-Naude and Taylor (2001) found from a sample of 391 household in eight rural locations in four states of Mexico that indigenous workers are less likely than non-indigenous ones to participate in RNF activities, and more likely to participate in staple and cash crop production, wage employment and national migration. A similar conclusion was reached by de Janvry and Sadoulet (2001) for young indigenous workers in the *ejido* sector at low levels of education, although the difference was not significant at high levels of education. Araujo (2003: 1st essay) also found that indigenous workers tend to participate less in RNF activities.

Infrastructure and connectedness have also been found to be important to promote RNF participation by Winters, Davis and Corral (2002) and Araujo (2003: 2nd and 3rd essays). Araujo finds that interventions in roads and secondary education are effective in reducing poverty through non-farm rural employment in rural municipalities.

ANNEX 3.I. THE TERRITORIAL APPROACH TO RURAL DEVELOPMENT¹¹²

The notion of Rural Territorial Development (RTD) is parallel to that of local economic development, with the difference that the latter concept is traditionally used more for urban areas and urban-industrial activities while the former is more rural, although RTD advocates insist in the links between rural and urban activities and the role in rural development of intermediate and rural towns. RTD should be seen as an approach and a method to promote rural development with relevant policy implications rather than as a theory about development.

The main tenets of the RTD approach can be summarized as follows: (1) a view of rural development that consists of a combination of productive transformation and institutional change; (2) a widened concept of the rural space to include small rural towns and the links with intermediate cities; (3) a multisectoral approach to economic development covering different economic sectors and including farm and non-farm activities; (4) a recognition of the differences among rural territories and the need to tailor productive investments and other interventions to their diverse characteristics and needs; (5) a concept of the territory that presupposes some territorial identity and the possibility of building a collective project of local actors for the development of the territory; (6) participatory planning as a means of economic coordination and prioritization of investments in the territory; (7) conscious involvement of different local actors (public, private and civil society) in the economic coordination process, and alliances between these actors; (8) emphasis on territorial competitiveness and on maximum economic use of territorial assets; (9) search of economic synergies and clustering of activities around development axes to achieve critical economic masses; (10) construction of an institutional architecture to facilitate economic coordination processes; and (11) a medium- and long-term development horizon¹¹³. The intellectual background from economic theory and the social and political sciences of the RTD concept is summarized in box below.

The central purpose of RTD is to facilitate endogenous growth processes, centered on the capacity of local agents to promote territorial development on the basis of existing resources. Elements favorable to this are the presence of valuable —and marketable— territorial assets (natural resources, landscapes, culture and traditions, accumulated local knowledge and know-how in certain areas, etc.), strong institutional development and social capital, and the potential to generate growth process around territorial economic linkages. Return migrations have also been identified as a factor favoring local growth processes.

A crucial question is that of the extent to which public policies can generate this type of growth dynamics. Each territory that has gone through a successful endogenous growth process has done it in a different way, based on factors that in some sense are always unique. The process may have been triggered by the presence of strong leadership from a local agent, or the finding of a good market niche for a local product, or the transformation of what may have been an economic obstacle, like a mountainous environment, into an economic opportunity, e.g. for tourist development, or the introduction of new economic activities by returning migrants, or in many other ways. Policy action cannot replace these triggers, and in this sense it cannot “pick winners”, but it can help create favorable conditions so that development arises whenever the triggering factors appear, and can stimulate local actors to search for those triggers. This will normally be done via the supply of public goods like infrastructure, education, training, research, extension, etc., and also by creating a favorable institutional framework, acting to overcome market failures (e.g. in the financial market), and providing targeted assistance when required.

¹¹² This annex is based on material in World Bank (2004c).

¹¹³ These tenets are very similar although not identical to the TRD criteria proposed by Schejtman and Berdegué (2003).

Intellectual Background of the Territorial Approach to Rural Development

From the perspective of economic theory three influences can be traced in the RTD notion. The first is the classical theory of location and territorial specialization of von Thunen, Weber, Christaller, Isard and others, and the recent revival of economic geography partly under the authority of Paul Krugman. The second influence is that of the theorists of territorial competitiveness, with their view of competition as a systemic phenomenon going beyond single markets, their insistence on economies external to the firm but internal to the territory, and their theory of “knowledge environments”. Relevant here is the literature on industrial districts initiated by Alfred Marshall, which has flourished around the Italian experience (e.g. Bagnasco, Trigilia, Putnam), the contribution of Michael Porter on territorial competitiveness and clustering, and the discussions on “knowledge environments” following the Silicon Valley experience.

The third strand is the theory of economic coordination originated in the work of the classical development economists. Rosenstein Rodan’s famous paper on the industrialization of Eastern and Southern-Eastern European countries is the piece most frequently quoted, but the exposition of Tibor Scitovsky in his “Two Concepts of External Economies” is theoretically more compact. The theory has revived with the flourishing of information economics and game theory, with notable contributions from Karla Hoff, Joseph Stiglitz and others. The crucial idea is that economic agents do not just take information from the price system but also interact outside that system. For investment decisions, in particular, the use of non-price information on the investment plans of different actors will normally lead to superior equilibria than if only price information were used. Economic coordination refers to the exchange of information and resulting agreements by different economic agents to carry out complementary actions that are mutually beneficial. Participatory planning, for instance, is an instrument for doing this.

From the perspective of the social and political sciences, we can identify another three strands of influence. The first are the discussions on decentralization, the developmental role of local governments, and the alliances and synergies between different levels of government. The second influence is that of the theorists of the role of public and private actors in the development process, with the emphasis on the role of collective action and the “third actor” (for instance by Elinor Ostrom), and on the potential for public-private synergies in the development process (for instance by Judith Tandler and Peter Evans). The third strand of influence is that of the theorists of participation and empowerment like Robert Chambers and John Friedmann, and of the theory and experience of community-driven development.

The concept of territory is not an easy one. Various issues are relevant, like its size, the criteria for its delimitation, and its ideological dimension, i.e. the way in which it is present in the imagination of its actors.

Most of the tenets of RTD presented above apply to territories of different sizes, from small micro-basins or municipal areas to entire sub-regions, basins or provinces. The approach can hence be used at different levels in the rural space. Economic coordination and the clustering of activities to achieve critical economic masses would normally require, however, a certain size, which cannot be too small. This is why RTD requires strong meso-level economic coordination institutions that would normally go beyond a single municipality or micro-basin. The district level singled out in the *Ley de Desarrollo Rural Sustentable* may be such level.

The demarcation of territories is a complex issue. There are in principle three ways in which this can be done: (1) in a top-down technocratic way, using *ex-ante* technical criteria of homogeneity, complementarity, water basins, market basins, and the like; (2) in an administrative way, using existing administrative boundaries (*municipios, distritos, provincias*); and (3) in a bottom-up way, letting local actors define their own territories, as in the European Leader experience.

The relevance of the ideological dimension of territories is larger than generally acknowledged. Local populations and institutional actors usually identify themselves with a territory. That identification is important for people’s identity and is hence an element of human development in the Sen’s sense of development as freedom to be who you can be. But territorial identity is also an economic asset, inasmuch as it is a source of social capital, a condition that facilitates economic coordination, and itself a marketable asset if territorial

products can be favorably differentiated in the market. RTD is about using identity for the construction of a development project of the territory that can catch the imagination of local actors and produce outcomes in which they can recognize themselves. This is at the core of the “development with identity” concept, which can be particularly relevant for indigenous areas (see World Bank, 2004d).

Key to RTD are territorial planning and the investment decision process. As indicated before, territorial planning is an instrument of economic coordination, and should be carried out with a strategic perspective and in a way that involves all relevant local actors in the decision making process. It is a means to identify local potentials and constraints, and to locally “pick winners” in the sense of identifying the strategic axes considered promissory by local actors around which they propose to cluster investments. It is also a way of organizing the local demand for development assistance. Participatory territorial planning is a system of compromises among the interests of local actors arrived at in confrontation between spontaneously perceived opportunities and needs, and technical, market and cost criteria. Cost sharing in the investments by the beneficiaries, an ex-ante budgetary restriction, and effective decision-making capacity of the participatory planning body, are essential elements to give economic meaning to the entire exercise and arrive at trade-offs between alternative investment options. This type of planning is hence the opposite of the simple collection and listing of local spontaneous investment requests that is common in many community-driven development programs.

The final element of RTD to be mentioned is that of the new institutional architecture. We can include here the creation and/or strengthening of meso-level economic coordination entities, the strengthening of local civil society organizations, and the strengthening of public-private synergies. Among the economic coordination entities we should include territorial institutions, and sector coordination entities like activity-based producer organizations and value chain organizations. Within civil society organizations we have to include membership and service organizations, and in the strengthening of public-private synergies we should include central government programs and local government actors.

ANNEX 4.A. - Table 4.A.1. Public Federal Expenditure in Rural Development: Productive and Land Programs, 1995-2004 in Mexico, Current Million MxP

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
<i>All Productive Expenditures and Land Programs</i>	17,572.00	23,848.80	25,572.60	21,749.60	26,287.40	28,813.00	29,733.00	33,230.50	53,820.20	72,622.60
PROCAMPO	5,864.00	6,800.00	7,533.00	8,491.70	9,372.20	10,378.80	11,004.60	11,850.50	14,191.30	14,409.60
OTROS PROGRAMAS DE APOYO DIRECTO	0	0	0	0	0	0	0	0	1,500.00	2,680.60
APOYOS A LA COMERCIALIZACIÓN	738	642	2,163.00	1,991.00	1,698.80	3,049.90	5,314.20	4,340.10	5,405.60	3,275.10
OTROS APOYOS A LA COMERCIALIZACIÓN	0	0	0	0	0	0	0	0	0	3,320.10
ALIANZA PARA EL CAMPO	0	1,156.50	1,875.00	2,010.00	2,497.30	2,655.90	4,046.40	6,438.40	3,237.80	5,831.50
OTROS APOYOS DE ALIANZA	0	0	0	0	0	0	0	0	0	3,578.80
OTROS PROGRAMAS PRODUCTIVOS	0	0	0	0	3,748.60	0	0	0	1,930.00	2,414.10
PROCEDE	892	902.7	768.8	806.4	1,153.00	1,186.40	674.3	701.2	562.2	373.4
SAGARPA, ASERCA, CEA, INIFAP NIVEL NORMATIVO	1,593.40	2,635.80	2,984.90	2,403.00	3,036.80	7,055.80	3,836.50	4,147.20	9,056.00	4,373.30
BANRURAL Y AGROASEMEX	1,360.40	1,685.50	1,361.60	1,665.00	1,793.30	513.8	441.4	2,484.80	907.4	1,349.00
INTERMEDIARIOS FINANCIEROS AGROPECUARIOS	0	0	0	0	0	0	0	376.6	10,310.30	2,007.20
SECTOR AGRARIO	1,359.00	2,916.00	1,764.30	1,497.80	1,270.60	1,557.10	1,673.90	2,069.60	2,694.40	2,704.90
PROBECAT	523.7	856.6	n.d	n.d	1,231.20	497.6	1,316.80	0	0	0
INVESTIGACIÓN	0	0	0	0	0	0	0	0	0	3,089.00
PROGRAMAS DE DESARROLLO REGIONAL SUSTENTABLE	0	0	0	0	304.1	27.7	68	459.4	16.1	50
GASTO OPERATIVO PAR ACTIVIDADES DE DES. SUST.	0	0	0	0	0	0	0	0	0	16,970.00
PRO. INT. Y REC. PROD. EN ZONAS SEQUÍA REC. (PIASRE)	0	0	0	0	0	0	0	0	612.1	683
CONASUPO	5,241.50	6,112.50	6,723.40	2,656.00	0	0	0	0	0	0
CONAZA	n.d.	141.2	120.9	101.6	48.8	93.1	154.6	161.2	94	125
DESARROLLO FORESTAL	n.d.	n.d.	277.7	127.1	128.3	124.9	155.8	181.4	237.2	400
PROGRAMAS DE DESARROLLO RURAL	0	0	0	0	0	1,666.70	1,032.70	n.d.	3,012.50	2,240.00
PROGRAMA MICROFINANCIAMIENTO MUJERES RURALES	0	0	0	0	0	0	0	0	0	100
DESARROLLO DE LOS PUEBLOS INDIGENAS	0	0	0	0	0	0	0	0	0	16.9
ACUACULTURA RURAL	0	0	0	0	4.4	5.3	13.8	20.1	20	200
ACTIVIDADES PESQUERAS	n.d.	2,373.00								
PROGRAMAS TURISTICOS	0	0	0	0	0	0	0	0	16.4	75

Source: Prepared for the study by Oscar Diaz Santos with information from the *Secretaría de Hacienda y Crédito Público*

ANNEX 4.A. - Table 4.A.2. Public Federal Expenditure in Rural Development: Social and Labor Aspects, 1995-2004, Mexico, Current Million MxP

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
<i>All Social and Labor Programs</i>	29,042.80	34,890.50	34,914.30	37,492.40	36,524.20	42,564.60	59,341.50	65,131.40	47,863.50	46,272.80
PROGRAMA DE EMPLEO TEMPORAL (PET)	0	1,663.70	1,750.50	n.d.	3,401.10	3,669.30	3,752.80	2,867.40	1,800.30	2,780.00
APOYO AL EMPLEO	0	0	0	0	0	0	0	0	1,073.40	0
INI	652	789.4	883	949.5	n.d.	738.6	1,453.00	1,393.90	569.6	800.1
APOYOS PROD. EN ZONAS MARGI. (RAMOS 20 Y 26)	0	0	0	1,876.20	2,268.30	1,730.20	1,860.80	n.d.	2,135.00	n.d.
MUJERES CAMPESINAS	0	0	34.2	69.1	87.1	0	0	n.d.	27.1	50
JORNALEROS AGRÍCOLAS	0	52	62.5	63.2	n.d.	n.d.	n.d.	n.d.	140	150
FONDO INFRAESTRUC. SOCIAL MUNICIPAL (FISM)	0	773.6	n.d.	258.7	n.d.	2,353.50	n.d.	n.d.	n.d.	0
PROGRAMA OPORTUNIDADES	0	0	0	0	0	0	0	0	840	900
PROGRAMA AGUA POTABLE Y SAN. ZONAS MARG.	545.7	874.7	475.8	1,030.10	713.1	739.1	861.2	768.8	72	144
RAMO 26: PROGRAMAS REGIONALES	9,058.20	8,974.70	11,077.70	11,077.90	4,047.60	82.3	24.9	n.d.	863.1	3,191.50
DESARROLLO LOCAL	0	0	0	0	0	0	0	0	405	0
MICORREGIONES	0	0	0	0	0	0	0	0	0	510
RAMO 33: APORTE FEDERAL/	12,946.30	11,884.90	12,093.80	11,831.60	14,215.80	14,972.60	19,063.50	21,783.90	6,212.50	n.d.
FOOD PROGRAMS	3,497.00	5,600.40	3,912.50	4,238.50	n.d.	2,410.70	4,917.60	5,346.50	2,887.60	4,092.10
CAPACIDADES	0	0	0	0	0	0	0	0	10,892.00	9,593.40
ACCIONES COMPENSATORIAS	2,343.60	2,969.30	3,206.40	3,119.60	3,360.40	4,016.90	12,557.90	17,003.80	0	0
PROGRESA-OPORTUNIDADES	0	265.7	n.d.	1,276.00	6,671.70	9,635.00	12,393.80	13,393.40	16,551.80	16,585.70
EDUCACION AGROPECUARIO RAMO 11		1,042.10	1,417.90	1,702.00	1,759.10	2,216.40	2,456.00	2,573.70	3,394.10	3,741.00
CAPACITACIÓN										3,735.00

Source: Prepared for the study by Oscar Diaz Santos with information from the *Secretaría de Hacienda y Crédito Público*. 2004 is Programmed Expenditure

ANNEX 4.A. - Table 4.A.3. Public Federal Expenditure in Rural Development: Basic and Productive Infrastructure, 1995-2004, Mexico, Current Million MxP

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
<i>All Infrastructure</i>	3,104.00	4,508.40	4,516.80	4,686.90	4,840.60	5,051.00	4,042.50	4,067.80	10,104.10	7,804.90
INFRAESTRUCTURA HIDROAGRICOLA	2,166.30	3,225.10	3,153.40	2,468.70	2,576.80	2,518.50	2,266.00	2,106.00	3,668.50	3,520.00
INFRAESTRUCTURA PRODUCTIVA	n.d.	4,733.30	nd.							
TELEFONIA Y CAMINOS RURALES	392	372.1	856.7	1,188.10	1,550.70	1,337.90	915.3	1,193.00	1,092.30	1,767.90
ADQUISICIÓN DE DERECHOS DE USO DE AGUA	545.7	874.7	475.8	1,030.10	713.1	739.1	861.2	768.8	72	144
RESTAURACIÓN DE SUELOS Y AGUA									460	
INFRAESTRUCT. HIDROAGRIC. ZONAS MARGI.	n.d.	36.5	30.9	n.d.	n.d.	455.5	0	n.d.	78	2,373.00

Source: Prepared for the study by Oscar Diaz Santos with information from the *Secretaría de Hacienda y Crédito Público*. 2004 is Programmed Expenditure

ANNEX 4.A. - Table 4.A.4. Public Federal Expenditure in Rural Development: Environmental Programs, 1995-2004, Mexico, Current Million MxP

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
<i>All Environmental Programs</i>	1,347.00	2,053.50	883.9	222.3	1,137.60	517	358.3	3,817.40	4,904.80	3,604.40
FORESTAL	1,250.20	1,371.70			645.6	110	145.8	1,492.40	942.3	2,252.00
SEMARNAT NIVEL CENTRAL		424	603.5	34.7	142.1	171.5	0	2,325.00	3,415.60	654
IMTA	96.8	133.8	173.6	158.5	180.4	35.1	11.3		199	211.3
PROGRAMA NACIONAL DE REFORESTACIÓN		124	106.8	29.1	169.5	200.4	201.2		347.9	487.1

Source: Prepared for the study by Oscar Diaz Santos with information from the *Secretaría de Hacienda y Crédito Público*. 2004 is Programmed Expenditure

ANNEX 4.A. - Table 4.A.5. Public Federal Expenditure in Rural Development: All Programs, 1995-2004, Mexico, Current Million MxP

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
All Federal Public Investment	51,065.80	65,301.20	65,887.60	64,151.20	68,789.80	76,947.60	93,475.30	106,247.10	116,692.60	130,304.70
Productive Aspects	17,572.00	23,848.80	25,572.60	21,749.60	26,287.40	28,815.00	29,733.00	33,230.50	53,820.20	72,622.60
Social and Labor Aspects	29,042.80	34,890.50	34,914.30	37,492.40	36,524.20	42,564.60	59,341.50	65,131.40	47,863.50	46,272.80
Infrastructure	3,104.00	4,508.40	4,516.80	4,686.90	4,840.60	5,051.00	4,042.50	4,067.80	10,104.10	7,804.90
Environment	1,347.00	2,053.50	883.9	222.3	1,137.60	517	358.3	3,817.40	4,904.80	3,604.40

Source: Prepared for the study by Oscar Diaz Santos with information from the *Secretaría de Hacienda y Crédito Público*. 2004 is Programmed Expenditure

ANNEX 4.A. - Table 4.A.6 Public Federal Expenditure in Rural Development: All Programs, 1995-2004, Mexico, Million MxP at Constant 1993 Prices

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
All Federal Public Investment	35,363.38	33,652.35	28,148.70	23,641.20	21,744.20	22,454.92	25,370.33	27,358.22	28,899.17	31,186.62
Productive Aspects	20,112.32	17,980.48	14,916.19	13,816.82	11,545.18	12,305.77	16,106.00	16,830.74	11,886.44	11,074.75
Social and Labor Aspects	2,149.54	2,323.36	1,929.68	1,727.23	1,530.10	1,458.20	1,097.18	1,051.17	2,497.46	1,867.99
Infrastructure	932.81	1,058.25	377.62	81.92	359.59	149.26	97.25	986.46	1,212.34	862.66
Environment	12,168.72	12,290.25	10,925.20	8,015.23	8,309.36	8,541.70	8,069.90	8,489.85	13,302.92	17,381.21

Source: Prepared for the study by Oscar Diaz Santos with information from the *Secretaría de Hacienda y Crédito Público*. 2004 is Programmed Expenditure.

ANNEX 4.B. SMALL FARM EFFICIENCY ANALYSIS

Using ENHRUM data, we have carried out an exercise to determine the economic efficiency of small farmers. We do this in various steps. The first step consists in fitting a production function to 666 crop farms using a stochastic frontier analysis method. The econometric basis of the method is explained in Appendix 1 of this Annex. The core of the method is to separate in two the residuals of the production function regression equation. The first residual is the ordinary stochastic one with zero mean and constant variance, which accounts for non included variables and measurement errors. The second is an efficiency residual which results from differences in efficiency among farmers. The method allows to tests if farmers are efficient, which farmers deviate from the efficiency frontier, and to what extent. The second step consists of regressing the efficiency residual against a set of explanatory variables to see if they help explaining inefficiency.

A Cobb-Douglas production function was chosen¹¹⁴. The dependent variable is the gross value of crop output of farms (**q**), and the explanatory variables are: variable capital (**kvar**), which includes seed, fertilizer and chemicals, fixed capital (**kfix**), which includes the value of machinery and draft animal services, labor (**labor**), which includes all labor used during the entire production process, and land (**sland**), which enters in the equation in a standardized form.

Land standardization is necessary because measuring land in crude hectares implies that very different qualities of land (irrigated and not irrigated, with and without good access, steep and flat, etc.) all count equally. It is appropriate to give different weights to different types of land. The standardization process carried out is explained in the Appendix 2 to this Annex. It basically consisted in estimating the implicit or hedonic prices of relevant land characteristics included in the survey by regressing these characteristics on the value of land declared by the farmer¹¹⁵. Using the coefficients of the regression equation we estimate the value per hectare of land for each farm¹¹⁶. Comparing this value with the average value per hectare of all farms declared by farmers, we obtain a weight for the land of the particular farm.

We used a logarithmic specification of the Cobb-Douglas function as follows:

$$\ln q_i = b_0 + b_1 \ln kvar_i + b_2 \ln kfix_i + b_3 \ln labor_i + b_4 \ln sland + e_i$$

We first run the regression for all 666 farmers in the sample. All explanatory variables turned out to be significant at 95 percent level. The values of the coefficients, which indicate the elasticity of crop output to each of the factors in the production function, are shown in Table 4.B.1¹¹⁷.

The first thing to be noticed is that variable capital is the main element explaining output, with a big difference to the others factors, followed by land. A one percent increase in variable capital increases output by 0.43 percent. Labor has little weight, signaling the probable presence of surplus labor in many farms. The sum of elasticities is 0.913, i.e. less than one, which would indicate the presence of diseconomies of scale. The confidence intervals of the coefficients are

¹¹⁴ A translog specification was also tried but did not perform as well.

¹¹⁵ Regression results are presented in Appendix 2. Irrigation, accessibility, and regional location are the characteristics that influence most land values. Location in the *Centro* region increased much the probability of higher land value, and the opposite was the case for location in the *Sur-Sureste*.

¹¹⁶ In the regression equation we included this estimated value, not the number of standardized hectares.

¹¹⁷ Complete results with relevant tests are given in annex Table 4.B.7.

sufficiently large, however, not to reject the null hypotheses that the sum of the coefficients is one. Hence, there is no statistical evidence of diseconomies of scale, but there is little likelihood of economies of scale for the entire sample¹¹⁸.

**Table 4.B.1 Value of Elasticities in the Production Function
Regression Equation for all ENHRUM Sample of Crop Farms**

Parameter	Variable	Coefficient	S.E.	P>z
b ₁	Variable capital	0.43	0.035	0
b ₂	Fixed Capital	0.159	0.035	0
b ₃	labor	0.093	0.381	0.02
b ₄	sland	0.232	0.03	0
b ₀	constant	3.259	0.367	0

Source: calculated from ENHRUM.

The values of the elasticities of the productive factors are influenced by imperfections in factor markets. This seem to be particularly the case with variable capital whose high elasticity seems to be the result of the underutilization of fertilizer and chemicals due to the lack of access of small farmers to seasonal credit (see chapter 5 on this). Lack of credit to buy inputs prevents farmers from using them optimally, i.e. up to the point when the marginal contribution to production equals the cost to the farmer.

The test for inefficiency rejects the null hypothesis that there is no inefficiency. When we group the inefficiency residuals by categories of farms we can see which types of farms are less efficient. We show this in Table 4.B.2, where the average inefficiency of each category of farms is measured as the distance to the efficiency frontier. Thus, an average residual of 0.94 means that that category of farmers would need to increase output, with existing inputs, by 94 percent to reach the efficiency frontier.

¹¹⁸ Notice that economies of scale in this context do not refer to increased farm size, which is the common meaning in usual parlance, but to the simultaneous increase of ALL factors in the production equation, which is the technical meaning.

**Table 4.B.2. Distribution of the
Inefficiency Error Term by Category of Farms**

Variables	No. of farms	Average Inefficiency	S.D.
<i>Sur-Sureste</i> Region	211	0.94	0.3809
<i>Centro</i> Region	233	1.03	0.398
<i>Centro-Occidente</i> Region	122	0.78	0.2391
<i>Noroeste</i> Region	36	0.69	0.4104
<i>Noreste</i> Regions	64	0.73	0.4012
Maize and Beans farmers	456	0.98	0.3845
Coffee Farmers	43	0.65	0.2273
Vegetable Farmers	33	0.69	0.2467
Perennial Crops Farmers	79	0.75	0.3419
Oilseeds and Other Grain Far.	55	0.86	0.4288
Farmers with natural shocks	295	1.05	0.4481
Farmers without natural shocks	371	0.8	0.2862
All Farmers	666	0.91	0.387

Source: calculated from ENHRUM.

An important result is that maize and beans farmers, farmers in the *Sur-Sureste* and *Centro* regions, and farmers that experienced natural shocks are the least efficient. Producers of coffee, other perennial crops and vegetables, and producers in the *Noreste* and *Noroeste* are the most efficient. At the national level an effort would be required to increase production by 91 percent with existing factors to reach efficiency, i.e. production would almost need to double. One surprising result is the large number of farmers that suffered from natural disasters¹¹⁹. We discuss this more in chapter 7 but we must notice here that this is a frequently overlooked element with important repercussions on efficiency.

Next we partitioned the sample and repeated separately the stochastic production function exercise for maize and beans farmers, farmers that experienced shocks, and farmers that did not experience shocks. We also carried out regression exercises for these categories of farmers to try to explain the factors causing inefficiency¹²⁰.

¹¹⁹ This was defined as farmers who reported having suffered from rains, hurricanes, droughts, frosts or pests and diseases, and whose output was less than 50 percent that of a good year.

¹²⁰ We only carried out a separate analysis for these categories of farmers because sample sizes were too small for the others.

**Table 4.B.3 Production Function Elasticities
for Different Crop Farmers in the ENHRUM Sample**

Variables	Elasticities			
	All Farms	Maize and Beans	With Shocks	Without Shocks
Kvar	0.43	0.443	0.399	0.391
Kfix	0.159	0.265	0.273	0.183
Labor	0.093	0.107	0.276	0.207
Sland	0.232	0.132	0.171	0.249
Sum Elasticities	914	0.947	1.119	1.03
Constant	3.259	3.669	2.658	2.226

Source: calculated from ENHRUM. All coefficients are significant at 95% level.

There are substantial changes in the elasticities of production factors for different types of producers, although variable capital remains always the highest. The comparison is shown in Table 4.B.3. For maize and beans producers the importance of fixed capital is higher than for the entire sample of farmers, while that of labor remains low. This indicates that more use of animal power and/or tractor services for these producers would have a large effect on output. Contrarily, reducing the amount of labor put in these crops would not have a large impact on output. Land elasticity in maize and beans production is surprising low, less than half of that for all farms and for farms without natural shocks. Increasing output in maize and beans production depends hence more on improved technology embodied in variable and fixed capital than on increasing the area. This is good news for small peasant farmers who are the main producers of maize and beans, for it means that they could boost output in their small farms if they had access to better technology. Under present conditions, however, shifting land from maize and beans to other crops would raise total output.

The sum of elasticities grows when we partition the sample, which suggests that for some categories of farmers economies of scales are more of a possibility than for farmers in general. In the case of farmers who experienced natural shocks, labor is much more relevant than for all farmers in general, and there is no clear explanation for this. Instead, for farmers who did not experience shocks, the importance of land is the highest. This group of farmers represents “normal”, i.e. natural shocks free, farming conditions¹²¹, and their elasticity coefficients are illustrative of this situation. Hence, under “normal” conditions land is more relevant than under “abnormal” ones. The presence of a large proportion of maize and beans farmers in the sample, nearly 70 percent, decreases the elasticity of land since, as we have seen, the elasticity of land is low for these farmers. In farms, therefore, producing other crops under “normal” conditions land must be much more important. An interesting result for the “farmers without shocks” sub-sample is that the inefficiency test failed to reject the hypothesis of no inefficiency. This does not necessarily mean that these producers are all efficient, but points to the strong link between “normality” in production conditions and farming efficiency.

Our econometric analysis to explain in more detail the causes of inefficiency gave modest results (Tables 4.B.7 to 4.B.14). Many of the explanatory variables included, like gender, age, education, existence of services in the community (measured by a services index), land tenure, farm size, and government transfers, were not statistically significant, although the sign of the

¹²¹ But we can see in Table 4.11 that this “normal” condition is not so normal: 295 out of 666 farmers, 44 percent, experienced natural shocks.

coefficients was generally the expected one. The reason seems to be that these variables influence more the choice of technology, i.e. the combination of inputs in the production function, than the efficiency of production given a combination of inputs, which is what we investigate by regressing the efficiency residuals on these variables. More econometric work remains hence to be done, trying to include these variables directly in the production function.

Table 4.B.4 Frequency of Dummy Variables

VARIABLES DUMMY	FRECUENCIA	PORCENTAJE
Sexo del jefe del hogar (mujer)	60	9
Jefe de familia habla alguna lengua indígena	225	33.8
Existencia de problemas con el cultivo	295	44.3
Existencia de organizaciones agrícolas	124	18.6
Tipo de tenencia de la tierra (privada)	235	35.3
Tipo de tenencia de la tierra (ejidal y comunal)	400	60.1
Tipo de tenencia de la tierra (mixta)	31	4.7
Si el hogar recibe transferencias de gobierno	482	72.4
Pequeño, menos de 5 ha cultivadas	411	61.7
Grande, con 5 ha o más cultivadas	255	38.3

Source: Enhrum, 2003.

Table 4.B.5 Crop Specialization

CULTIVO	FRECUENCIA	PORCENTAJE	PORCENTAJE
Maíz y frijol	456	68.5	68.5
Oleaginosas y otros granos	55	8.3	76.7
Café	43	6.5	83.2
Hortalizas	33	5	88.1
Perennes	79	11.9	100

Source: Enhrum, 2003.

Table 4.B.6. Summary Statistics of Variables

VARIABLE	OBS.	MEDIA	DESVIACIÓN	MIN	MAX
q (\$)	666	29,639.60	141,276.80	45	2,550,000.00
kvar (\$)	666	5,024.70	32,033.10	10	564,500.00
kfij (horas-tractor)	666	41.4	81.6	0.1	920
mo (jornales)	666	114.9	157.3	1	1,559.00
sup (ha naturales)	666	4.9	7.7	0	78.50
supest (\$, valor estandarizado)	666	209,030.80	813,229.80	185	12,800,000.00
restfinan (\$, términos netos)	666	597.7	3,523.70	-1,875.00	69,265.30
restfinanor (proporción del vbp agrícola, q)	666	3.3	33.8	-5.9	642.00
edad (años)	666	51.5	15	18	94.00
educ (años de escolaridad)	666	3.8	3.3	0	19.00
dispmo (proporción)	666	0.7	0.3	0	1.00
indserv (proporción de servicios en comunidad)	666	0.2	0.1	0	0.80

Source: Enhrum, 2003.

Table 4.B.7 Stochastic Production Function, All Farms

Stoc. Frontier normal/half-normal model		Number of obs	666		
		Wald chi2(4)	686.67		
Log likelihood	-1102.2665	Prob > chi2	0		
lq	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]
lkvar	0.4304	0.03544	12.14	0.000	0.36094 0.49986
lkfij	0.15869	0.03534	4.49	0.000	0.08942 0.22796
lmo	0.09303	0.03809	2.44	0.015	0.01838 0.16769
lsupersta	0.23155	0.03024	7.66	0.000	0.17227 0.29082
_cons	3.259	0.36657	8.89	0.000	2.54054 3.97745
/lnsig2v	0.13042	0.16018	0.81	0.416	-0.18353 0.44437
/lnsig2u	0.25885	0.3909	0.66	0.508	-0.5073 1.025
sigma_v	1.06738	0.08549			0.91232 1.2488
sigma_u	1.13818	0.22246			0.77596 1.66946
sigma2	2.43475	0.3565			1.73602 3.13348
lambda	1.06633	0.30044			0.47747 1.65518

Likelihood-ratio test of sigma_u=0: chibar2(01) = 3.13 Prob>=chibar2 = 0.039

Table 4.B.8 Efficiency Determinants, All Farms

Regression with robust standard errors		Number of obs	666			
		F(23, 599)	15.47			
		Prob > F	0			
		R-squared	0.3577			
		Root MSE	0.31515			
inefic	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]	
olegra	0.0267	0.0554	0.48	0.630	-0.0821	0.1356
caf	-0.3722	0.0422	-8.82	0.000	-0.4551	-0.2893
hort	-0.2166	0.0462	-4.69	0.000	-0.3073	-0.1258
peren	-0.1506	0.0375	-4.02	0.000	-0.2242	-0.0771
proble	0.1833	0.0267	6.87	0.000	0.1309	0.2357
restfinanor	0.0032	0.0006	5.66	0.000	0.0021	0.0044
indserv	0.1693	0.117	1.45	0.148	-0.0604	0.3989
organi	0.0703	0.0377	1.87	0.062	-0.0037	0.1443
dispmo	-0.014	0.0453	-0.31	0.757	-0.103	0.0749
proguber	0.0108	0.0284	0.38	0.703	-0.0449	0.0665
mixta	-0.0144	0.0646	-0.22	0.824	-0.1413	0.1125
priv	-0.0096	0.0268	-0.36	0.720	-0.0622	0.043
gran	-0.029	0.0286	-1.01	0.311	-0.0852	0.0272
sexo	0.0645	0.047	1.37	0.170	-0.027	0.1568
lengua	0.0005	0.0298	0.02	0.987	-0.0581	0.0591
educ	-0.0009	0.0043	-0.22	0.828	-0.0094	0.0075
edad	0.0009	0.001	0.93	0.355	-0.001	0.0028
r1	-0.1082	0.0356	-3.04	0.002	-0.178	-0.0383
r3	-0.2663	0.0343	-7.76	0.000	-0.3337	-0.1989
r4	-0.3338	0.0688	-4.85	0.000	-0.469	-0.1987
r5	-0.3281	0.0571	-5.74	0.000	-0.4403	-0.2159
cons	0.9156	0.0889	10.3	0.000	0.741	1.0902

Table 4.B.9 Stochastic Production Function, Maize and Bean Producers

Stoc. Frontier normal/half-normal model		Number of obs	435			
		Wald chi2(4)	555.76			
Log likelihood		-644.4	Prob > chi2	0.000		
lq	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
lkvar	0.4427	0.0396	11.18	0.000	0.3651	0.5204
lkfij	0.2647	0.0396	6.69	0.000	0.1871	0.3422
lmo	0.1074	0.0478	2.25	0.025	0.0137	0.2011
lsupersta	0.1321	0.0323	4.09	0.000	0.0688	0.1953
_cons	3.6686	0.3893	9.42	0.000	2.9056	4.4315
/lnsig2v	-0.6157	0.1957	-3.15	0.002	-0.9993	-0.232
/lnsig2u	0.5398	0.2047	2.64	0.008	0.1386	0.941
sigma_v	0.735	0.0719			0.6067	0.8905
sigma_u	1.3098	0.134			1.0718	1.6008
sigma2	2.2559	0.2793			1.7086	2.8033
lambda	1.782	0.1945			1.4008	2.1631

Table 4.B.10 Efficiency Determinants, Maize and Beans Producers

Regression with robust standard errors		Number of ob	435			
		F (17,393)	10.3			
		Prob > F	0.000			
		R-squared	0.268			
		Root MSE	0.526			
inefmafri	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
indserv	0.157	0.200	0.790	0.432	-0.236	0.550
organi	0.122	0.071	1.730	0.085	-0.017	0.261
dispmo	-0.179	0.098	-1.830	0.068	-0.370	0.013
proguber	0.007	0.062	0.120	0.905	-0.114	0.129
mixta	-0.050	0.135	-0.370	0.711	-0.314	0.215
priv	-0.058	0.057	-1.030	0.305	-0.170	0.053
gran	-0.041	0.061	-0.670	0.500	-0.160	0.078
sexo	0.142	0.101	1.410	0.160	-0.056	0.340
lengua	-0.044	0.058	-0.760	0.449	-0.158	0.070
educ	-0.007	0.010	-0.720	0.474	-0.027	0.013
edad	0.000	0.002	0.070	0.947	-0.004	0.004
r1	-0.100	0.069	-1.450	0.147	-0.235	0.035
r3	-0.386	0.073	-5.270	0.000	-0.530	-0.242
r4	-0.658	0.103	-6.400	0.000	-0.860	-0.456
r5	-0.252	0.142	-1.770	0.077	-0.532	0.027
_cons	1.151	0.186	6.180	0.000	0.785	1.518

**Table 4.B.11 Stochastic Production Function,
Producers who Experienced Shocks**

Stoc. Frontier normal/half-normal model		Number of obs	278			
		Wald chi2(4)	322.750			
Log likelihood		446.91	Prob > chi2	0.000		
lq	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
lkvar	0.399	0.056	7.150	0.000	0.290	0.509
lkfij	0.273	0.055	5.000	0.000	0.166	0.380
lmo	0.276	0.068	4.060	0.000	0.143	0.409
lsupersta	0.172	0.044	3.870	0.000	0.085	0.259
_cons	2.658	0.544	4.890	0.000	1.592	3.723
/lnsig2v	-0.175	0.233	0.750	0.453	-0.631	0.281
/lnsig2u	0.563	0.336	1.670	0.094	-0.096	1.221
sigma_v	0.916	0.107			0.729	1.151
sigma_u	1.325	0.223			0.953	1.842
sigma2	2.595	0.448			1.716	3.473
lambda	1.446	0.315			0.829	2.063

**Table 4.B.12 Efficiency Determinants,
Producers who Experienced Shocks**

Stoc. Frontier normal/half-normal model						
				Number of ob		278
				F (16,264)		7.620
				Prob > F		0.000
				R-squared		0.292
				Root MSE		0.479
inefconp	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
olegra	0.188	0.152	1.230	0.219	-0.112	0.487
caf	-0.604	0.090	-6.740	0.000	-0.780	-0.428
hort	-0.167	0.108	-1.550	0.121	-0.379	0.045
peren	-0.039	0.115	-0.340	0.732	-0.265	0.187
restfinanor	0.004	0.001	5.920	0.000	0.003	0.005
indserv	0.208	0.293	0.710	0.478	-0.368	0.784
organi	0.045	0.092	0.490	0.624	-0.136	0.226
dispmo	-0.144	0.099	-1.450	0.147	-0.340	0.051
proguber	0.021	0.070	0.300	0.765	-0.116	0.158
mixta	0.046	0.120	0.380	0.702	-0.190	0.282
priv	-0.011	0.074	-0.150	0.882	-0.157	0.135
gran	0.018	0.066	0.280	0.783	-0.112	0.149
sexo	0.068	0.109	0.620	0.537	-0.148	0.283
lengua	0.045	0.071	0.630	0.530	-0.095	0.184
educ	0.000	0.011	0.010	0.992	-0.021	0.022
edad	0.002	0.003	0.900	0.371	-0.003	0.007
r1	-0.018	0.080	-0.230	0.819	-0.176	0.139
r3	-0.348	0.074	-4.680	0.000	-0.495	-0.202
r4	-0.444	0.116	-3.840	0.000	-0.672	-0.216
r5	-0.290	0.151	-1.930	0.055	-0.587	0.006

**Table 4.B.13 Stochastic Production Function,
Producers who did not Experience Shocks**

Stoc. Frontier normal/half-normal model	Number of ob	346				
	Wald chi2(4)	484.030				
	Log likelihood	-526.305				
	Prob > chi2	0.000				
lq	Coef.	Std. Err.	z	P>z	[95% Conf. Interval]	
lkvar	0.391	0.043	9.070	0.000	0.306	0.475
lkfij	0.183	0.043	4.250	0.000	0.099	0.268
lmo	0.207	0.057	3.600	0.000	0.094	0.319
lmo	0.207	0.057	3.600	0.000	0.094	0.319
lsupersta	0.249	0.035	7.020	0.000	0.179	0.318
_cons	2.226	0.915	2.430	0.015	0.434	4.019
/lnsig2v	0.204	0.077	2.660	0.008	0.054	0.355
/lnsig2u	-8.228	125.030	-0.070	0.948	-253.282	236.826
sigma_v	1.108	0.042			1.027	1.194
sigma_u	0.016	1.022			0.000	2.670E+51
sigma2	1.227	0.096			1.039	1.414
lambda	0.015	1.028			-2.000	2.029

**Table 4.B.14 Efficiency Determinants,
Producers who did not Experience Shocks**

				Number of obs	346	
				F(16, 325)	11.81	
				Prob > F	0.00000	
				R-squared	0.38370	
				Root MSE	0.00007	
inefsinprob	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]	
olegra	-0.00001	0.00002	-0.25000	0.80600	-0.00004	0.00003
caf	-0.00010	0.00001	-7.08000	0.00000	-0.00013	-0.00007
hort	-0.00007	0.00002	-3.83000	0.00000	-0.00010	-0.00003
peren	-0.00007	0.00001	-5.29000	0.00000	-0.00010	-0.00004
restfinanor	0.00000	0.00000	0.31000	0.75800	-0.00001	0.00001
indserv	-0.00002	0.00002	-0.79000	0.43200	-0.00007	0.00003
organi	0.00003	0.00001	2.27000	0.02400	0.00000	0.00005
dispmo	0.00002	0.00002	1.39000	0.16600	-0.00001	0.00006
proguber	0.00000	0.00001	0.42000	0.67300	-0.00002	0.00002
mixta	-0.00001	0.00003	-0.42000	0.67600	-0.00007	0.00005
priv	-0.00001	0.00001	-0.59000	0.55700	-0.00002	0.00001
gran	-0.00001	0.00001	-1.27000	0.20700	-0.00003	0.00001
sexo	0.00001	0.00001	0.97000	0.33300	-0.00001	0.00004
lengua	-0.00001	0.00001	-0.69000	0.49000	-0.00003	0.00001
educ	0.00000	0.00000	-0.26000	0.79800	0.00000	0.00000
edad	0.00000	0.00000	-0.05000	0.95600	0.00000	0.00000
r1	-0.00001	0.00001	-1.24000	0.21500	-0.00004	0.00001
r3	-0.00006	0.00001	-4.99000	0.00000	-0.00009	-0.00004
r4	-0.00014	0.00002	-7.27000	0.00000	-0.00017	-0.00010
r5	-0.00011	0.00002	-4.56000	0.00000	-0.00015	-0.00006
_cons	0.01308	0.00003	483.30000	0.00000	0.01303	0.01314

APPENDIX 1 : THE STOCHASTIC FRONTIER METHOD

El enfoque econométrico utilizado está basado en la construcción de la frontera de producción y la medida de ineficiencia respecto a ésta, es decir, aísla los efectos de la perturbación aleatoria estándar de los correspondientes a la ineficiencia. Posteriormente, a partir de las estimaciones de la ineficiencia para cada productor, se trata de encontrar sus determinantes.

La frontera de producción estocástica se determina por la estructura de la tecnología de producción y por un componente que contiene las desviaciones observadas de la función de producción, cuyas fuentes pueden ser de dos tipos: 1) efectos específicos del productor que pueden ser de cualquier signo y 2) la ineficiencia productiva. Esto es:

$$\ln Y_i = B_0 + \beta B_n \ln X_{ni} + v_i - u_i$$

$$\ln Y_i = B_0 + \beta B_n \ln X_{ni} + e_i$$

donde el vector de insumos X pertenece a R^+ ; el vector de producto Y pertenece a R^+ ; B es el vector de parámetros de tecnología a estimar; $i=1, \dots, I$ es el índice de los productores. En este modelo de error compuesto, v_i es el término de perturbación aleatoria simétrico, idéntico e independientemente distribuido (iid) como $N(0, \sigma_v^2)$ que captura los efectos de la perturbación estocástica, y u_i es el componente no negativo atribuible a la ineficiencia técnica, distribuido independientemente de v_i .

Dado que $u_i \geq 0$, $e_i = v_i - u_i$ es asimétrico. Bajo el supuesto de que v_i y u_i se distribuyen independientemente de X_i , la estimación por MCO proporciona estimadores consistentes de B_n , a excepción del intercepto B_0 , debido a que $E(e_i) = -E(u_i) \leq 0$. Sin embargo, bajo los siguientes supuestos de la distribución de u_i y v_i el Método de Máxima Verosimilitud es más eficaz.

- i) v_i se \sim iid $N(0, \sigma_v^2)$
- ii) u_i se \sim iid $N^+(0, \sigma_u^2)$ como una media normal no negativa
- iii) v_i y u_i se distribuyen independientemente una de otra y de los regresores X_n .

Dado que $e_i = v_i - u_i$, la función de densidad conjunta de u_i y e_i es

$$f(u, e) = \frac{1}{2\pi\sigma_u\sigma_v} \cdot \exp\left\{-\frac{u^2}{2\sigma_u^2} - \frac{v^2}{2\sigma_v^2}\right\}$$

y la función de densidad marginal de e_i resultante de integrar u_i sobre $f(u, e)$ es

$$f(e) = \int_0^{\infty} f(u, e) du = \frac{1}{\sqrt{2\pi}\sigma} \cdot [1 - \Phi\left(\frac{e\lambda}{\sigma}\right)] \cdot \exp\left\{-\frac{e^2}{2\sigma^2}\right\} = \frac{2}{\sigma} \cdot \phi\left(\frac{e}{\sigma}\right) \cdot \Phi\left(-\frac{e\lambda}{\sigma}\right) \quad *$$

Donde $\lambda = (\sigma_v^2 + \sigma_u^2)^{1/2}$, $\sigma = (\sigma_u/\sigma_v)$, y $\phi(\cdot)$ y $\Phi(\cdot)$ es la distribución normal acumulativa y la función de densidad normal, respectivamente.

Utilizando *, la función de máxima verosimilitud para una muestra de I productores es:

$$\ln L = cte - I \ln \sigma + \sum_i \ln \Phi\left(-\frac{e_i \lambda}{\sigma}\right) - \frac{1}{2\sigma^2} \sum_i e_i^2$$

La maximización de esta función proporciona estimadores consistentes de máxima verosimilitud de todos los parámetros cuando $I \rightarrow \infty$. El siguiente paso consiste en obtener las estimaciones de eficiencia técnica para cada productor u hogar bajo la siguiente idea. Dado que $e_i = v_i - u_i$, entonces:

si $e_i > 0$, u_i no es suficientemente grande (dado que $E(v_i) = 0$), lo cual implica que el productor es relativamente eficiente,

en el caso contrario (cuando $e_i < 0$), el productor es relativamente ineficiente.

Para extraer la información de u_i a partir de e_i , Jondrow, Novell, Materov y Schmidt (1982) especificaron una forma funcional de la ineficiencia a partir de la distribución condicional de u_i dado e_i . Así, si u_i se distribuye $N^+(0, \sigma_u^2)$ entonces

$$f(u|e) = \frac{f(u,e)}{f(e)} = \frac{1}{\sqrt{2\pi\sigma^*}} \cdot \exp\left\{-\frac{(u-\mu^*)^2}{2\sigma^{2*}}\right\} / \left[1 - \Phi\left(-\frac{\mu^*}{\sigma^*}\right)\right]$$

Donde $\sigma^* = -e\sigma_u^2/\sigma^2$ y $\sigma^{2*} = \sigma_u^2\sigma_v^2/\sigma^2$. Dado que $f(u|e)$ se distribuye como $N^+(\sigma, \sigma^{2*})$, la media y la moda pueden servir como un estimador puntual para estimar la ineficiencia técnica u_i de cada productor:

$$E(u_i | e_i) = \mu^*_i + \sigma^* \left[\frac{\phi(-\mu^*_i / \sigma^*)}{1 - \Phi(-\mu^*_i / \sigma^*)} \right] = \sigma^* \left[\frac{\phi(e_i \lambda / \sigma)}{1 - \Phi(e_i \lambda / \sigma)} - \left(\frac{e_i \lambda}{\sigma} \right) \right]$$

$$M(u_i | e_i) = \begin{cases} -e_i \left(\frac{\sigma_u^2}{\sigma^2} \right) & \text{si } e_i \leq 0 \\ 0 & \text{en otro caso} \end{cases}$$

A partir de las estimaciones de la ineficiencia técnica u_i , se obtiene un estimador puntual para la eficiencia técnica:

$$ET = \exp\{-\hat{u}_i\} \quad \text{donde } \hat{u}_i, \text{ es } M(u_i|e_i) \text{ o } E(u_i|e_i)$$

Cabe mencionar que Battese y Coelli (1988) propusieron un estimador puntual alternativo para la eficiencia técnica:

$$ET = E(\exp\{-u_i\} | e_i) = \left[\frac{1 - \Phi(\sigma^* - \mu^*_i / \sigma^*)}{1 - \Phi(-\mu^*_i / \sigma^*)} \right] \cdot \exp\left\{-\mu^*_i + \frac{1}{2}\sigma^{2*}\right\}$$

Sin embargo, en estudios de corte transversal, independientemente del tipo de estimador utilizado, las estimaciones de la eficiencia técnica son inconsistentes (no son de mínima varianza) debido a que la variación asociada con la distribución de $(u_i|e_i)$ es independiente de i .

APPENDIX 2: LAND STANDARDIZATION METHOD

El ejercicio de estandarización de la tierra tiene como objetivo evaluar las tierras de cultivo de las cinco regiones bajo un mismo patrón de valor. Esta homogeneización del valor de la tierra se realizó mediante el cálculo de sus valores hedónicos, con base en las diversas características que reporta la encuesta. Dado que el valor estandarizado no es directamente observable, a partir de la información sobre el valor declarado de las parcelas y sus características de humedad, inclinación, cercanía a la comunidad, acceso en auto, región y número de veces que se puede sembrar al año se construyeron las variables necesarias para estimar la especificación que se describe enseguida.

$$\log v_{th_i}^{122} = b_0 + b_1 \text{hum}_i + b_2 \text{mi}_i + b_3 \text{mmi}_i + b_4 \text{acca}_i + b_5 \text{t1}_i + b_6 \text{t2}_i + b_7 \text{t3yt4}_i + b_8 \text{tpp}_i + b_9 \text{r1}_i + b_{10} \text{r3}_i + b_{11} \text{r4}_i + b_{12} \text{r5}_i + b_{13} \text{uso2}_i + \epsilon_i$$

$\log v_{th_i}$ es logaritmo del valor en pesos de la tierra por hectárea;

hum_i es una variable *dummy*, caracteriza la humedad de la tierra, asigna 1 en el caso de riego y 0 si es de temporal;

mi_i es una variable *dummy*, denota la inclinación del suelo, asigna 1 si es inclinado y 0 en otro caso;

mmi_i es una variable *dummy*, denota la inclinación del suelo, , asigna 1 si es muy inclinada y 0 en otro caso;

acca_i es una variable *dummy*, asigna 1 si la parcela tiene acceso en auto y 0 en otro caso;

t1_i es una variable *dummy* que asigna 1 si a la parcela se llega a pie de 0 a 10 minutos desde el centro de la comunidad y 0 en otro caso;

t2_i es una variable *dummy* que asigna 1 si la parcela se encuentra entre 11 y 30 minutos a pie desde el centro de la comunidad y 0 en otro caso;

t3yt4_i es una variable *dummy* que asigna valor de 1 si la parcela se encuentra de 31 a 120 minutos a pie desde el centro de la comunidad y 0 en otro caso;

t5_i es una variable *dummy* que asigna valor de 1 si la parcela se encuentra a más de 120 minutos a pie desde el centro de la comunidad y 0 en otro caso

tpp_i es una variable *dummy*, asigna 1 si el tipo de tenencia de la tierra es privado y 0 en otro caso;

$\text{r1}_i, \text{r2}_i, \text{r3}_i, \text{r4}_i, \text{r5}_i$ son variables *dummy* que denotan a que región pertenece la parcela;

Us2_i es una variable *dummy* que asigna 1 si la parcela se puede sembrar al menos dos veces al año y 0 en otro caso.

Una vez que se calculan los valores hedónicos estimados de las tierras por hectárea se procede a sacar el ponderador para la estandarización de la siguiente manera.

Primero, se calcula el valor declarado promedio de las tierras para toda la muestra; segundo, se estima el valor de las tierras para toda la muestra a partir de los coeficientes de la regresión; y tercero, se dividen los valores estimados (del paso 2) entre el valor promedio de la muestra (paso 1) para cada parcela i .

Finalmente este ponderador se multiplica por el valor declarado, con lo cual la nueva variable del valor estandarizado de la tierra tendrá una varianza menor, mejorando la estimación.

¹²² En este modelo, el subíndice i se refiere a las diferentes parcelas que podría poseer cada hogar.

Cuadro B1. Regresión Lineal Simple para el Cálculo de Valores Hedónicos de la Tierra de los Hogares Productores

Source	SS	df	MS	No. of obs	958	
				F(13, 944)	36.33	
Model	658.46	13.00	50.65	Prob > F	0.00	
Residual	1316.17	944.00	1.39	R-squared	0.33	
Total	1974.63	957.00	2.06	Adj R-squared	0.32	

logyth	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
hum	0.883	0.109	8.080	0.000	0.669	1.097
mi	-0.243	0.086	-2.840	0.005	-0.411	-0.075
mmi	-0.547	0.201	-2.720	0.007	-0.941	-0.153
acca	0.266	0.115	2.310	0.021	0.040	0.492
t1	0.914	0.271	3.370	0.001	0.383	1.446
t2	0.663	0.262	2.530	0.012	0.149	1.177
t3yt4	0.463	0.262	1.770	0.078	-0.051	0.977
tpp	0.205	0.085	2.420	0.016	0.039	0.372
r1	-1.097	0.108	-10.190	0.000	-1.309	-0.886
r3	-0.848	0.115	-7.340	0.000	-1.074	-0.621
r4	-1.142	0.158	-7.240	0.000	-1.451	-0.832
r5	-1.945	0.133	-14.630	0.000	-2.206	-1.684
uso2	0.203	0.094	2.150	0.032	0.018	0.388
_cons	9.230	0.287	32.170	0.000	8.667	9.793

List of Variables

Etapa I	
<i>lq</i>	logaritmo del valor bruto de la producción agrícola de los hogares
<i>lkvar</i>	logaritmo del gasto en pesos en semilla, fertilizante y plaguicida
<i>lkfij</i>	logaritmo de la utilización de maquinaria en la actividad en términos de horas-tractor
<i>lmo</i>	logaritmo del número de jornales empleados durante las tres etapas del proceso productivo
<i>lsupest</i>	logaritmo del valor en pesos del gasto en semilla, fertilizante y plaguicida
Etapa II	
<i>sexo</i>	dummy que captura los hogares donde el jefe es mujer
<i>lengua</i>	variable dummy que capta los hogares donde el jefe habla una lengua o dialecto además del castellano
<i>edad</i>	la edad del jefe del hogar
<i>educ</i>	el nivel educativo del jefe, años de escolaridad
<i>dispmo</i>	proporción de la disponibilidad de mano de obra familiar
<i>restfinan</i>	restricción financiera, capta el acceso a financiamiento de otras fuentes distintas a las del presupuesto familiar, en términos netos
<i>restfinanor</i>	variables restfinan como porcentaje del valor bruto de la producción agrícola (q)
<i>proguber</i>	dummy que capta el acceso de los hogares agrícolas a transferencias del gobierno
<i>proble</i>	dummy que captura si la producción agrícola del hogar experimentó algún tipo de siniestro y la cosecha fue menor al 50% de lo esperado en año normal
<i>mafri</i>	dummy de especialización de la producción agrícola en el cultivo de maíz y frijol
<i>olegra</i>	dummy de especialización de la producción agrícola en el cultivo de otros granos y oleaginosas
<i>caf</i>	dummy de especialización de la producción agrícola en el cultivo de café
<i>hort</i>	dummy de especialización de la producción agrícola en el cultivo de hortalizas
<i>peren</i>	dummy de especialización de la producción agrícola en cultivos perennes cuyos ciclos son mayores a un año
<i>gran</i>	dummy de hogar con 5 ha cultivadas o más
<i>peq</i>	dummy de hogar con menos de 5 ha cultivadas
<i>indserv</i>	proporción que refleja la dotación de servicios en la comunidad a la que pertenece el hogar de un total de nueve tipos
<i>organi</i>	dummy que captura la existencia de organizaciones de tipo agrícola, ejidal o campesina dentro de las comunidades
<i>ejicom</i>	Tipo de tenencia de la tierra ejidal y comunal
<i>priv</i>	Tipo de tenencia de la tierra privada
<i>mixta</i>	Tipo de tenencia de la tierra mixta, es decir, privada y ejidal o comunal
<i>r1</i>	región 1, Sur-sureste
<i>r2</i>	región 2, Centro
<i>r3</i>	región 3, Centro-occidente
<i>r4</i>	región 4, Noroeste
<i>r5</i>	región 5, Noreste

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