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Sergio O. Saldaña Zorrilla

Natural Disasters, Foreign Trade and Agriculture in Mexico

Public Policy for
Reducing Economic
Vulnerability

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Economic Vulnerability

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Sergio O. Saldaña-Zorrilla
Research Scholar
Risk, Policy and Vulnerability Program
International Institute for Applied Systems Analysis (IIASA)
Laxenburg, Austria

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Abstract

The increasing frequency and economic losses from natural disasters within the framework of decreasing agricultural prices and trade liberalization is becoming crucial in increasing poverty in the Mexican rural economy. During the past two decades, the governmental withdrawal from supporting the agricultural sector with investments in physical, financial and logistic instruments continues to stress agricultural livelihoods, as current private mechanisms have not replaced them effectively. It has contributed to making the agricultural sector particularly vulnerable to a number of hazards as it has weakened economic agents' response and impeded assets accumulation. This book identifies economic vulnerability to natural and economic hazards in order to assess public and private coping capacity, and provides a conceptual framework and economic theory that supports the overall approach and employed methodologies. It is based on quantitative and qualitative research methods, and makes use of econometric analysis and stakeholders' views aimed at finding feasible solutions. Further, this book offers a spatial model that can support policy-decision-making for the creation of differential investments in productive infrastructure, as well as financial instruments to reduce current vulnerability and poverty throughout the national territory.

During the past three decades, over 80% of total economic losses from weather-related disasters occurred in the agricultural sector. In the same period, mean weighted agricultural prices have decreased over 50% in real terms, and since 1996 a trade deficit has persisted in this sector. Currently, insufficient credit access, low coverage of crop insurance, as well as a near lack of investments to expand irrigation and further productive infrastructure, is sharpening the vulnerability of rural livelihoods. These facts explain why this sector produces only 4% of the GDP despite employing over 20% of the national workforce. These facts undermine farmers' expectations of future incomes within the community, stimulating rural-urban out migration, which usually cannot be absorbed by the urban economy in light of the modest industrial dynamism of recent years. This leads to enlargement of informal sectors in large cities and migratory flows to abroad, among others.

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Chapter 1

Introduction

Along with economic and institutional stressors, the occurrence of natural disasters is increasingly determining income and asset accumulation of a vulnerable population in Mexico. This book identifies and estimates the effect of natural hazards, along with some economic variables, on poverty, as well as assesses the impact of current public and private strategies aimed at reducing economic vulnerability. Most of the workforce living in poverty in rural areas relies on agricultural livelihoods and they are increasingly affected by weather-related disasters. Insufficient physical and financial instruments to hedge the agricultural sector both from weather- and market-related risks contribute to the weakening response of farmers, the negative consequences of which expand to other regions.

During the period 1980-2013, over 80% of total damages from weather-related events affected the agricultural sector in Mexico. Though the contribution of the agricultural sector is only around 3% of GDP, it is the livelihood of nearly 20% of the national population. Trade liberalization, in Mexico since the mid-1980s, has not only resulted in a negligible increase in production, but also contributed to an increase of uncertainty with regards to small farm incomes, with a rise in imports and depressed prices of agricultural products.

This book recognizes that natural disasters and trade liberalization are not the only factors contributing to poverty in this country; however, it aims to prove that they are becoming economically crucial in maintaining and increasing structural poverty with their disruptive effect on the asset accumulation process. As confirmed in this book's analysis, it drives small-scale farmers out of business, and increases out migration from rural areas. The purpose of this analysis is to examine how natural disasters and adverse economic conditions affect agricultural livelihoods and the implications of these stressors upon the poor in the agricultural sector, in order to come up with suggestions to reduce their vulnerability. Special emphasis is given to the effects of these hazards on migration patterns. In addition, this project analyzes selected policy options (e.g. government-supported insurance schemes) to reduce the vulnerability of farmers. To further this aim, this work makes use of descriptive and econometric analyses, as well as stakeholders' interviews.

During the past three decades, the rising amount of research work, particularly in the natural sciences, has contained warnings about the increasing pressure of natural hazards on human societies. So far, the economic sciences have given little attention to these studies. This book presents an integral analysis of both natural and economic hazards as determinants of poverty and labor mobility, embracing social and policy aspects. The methodology includes both quantitative and qualitative methods. A review of existing economic and policy literature is presented mainly in Chapters 2 and 4, which discuss evidence supporting this book's hypothesis and describe the process behind economic vulnerability in Mexico. Chapter 5 is based on a spatial econometrics analysis of data from the 2,443 municipalities of Mexico as well as on a survey of farmers and further stakeholders. Data was gathered from a number of sources, including national and international organizations, as well as those collected directly from households and policymakers during the survey and country consultations carried out in 2003, 2004, 2005 and 2014. This analysis quantitatively validates the hypotheses presented in this text.

The conceptual framework of this book, presented in **Chapter 2**, is based on the vast existing literature from both the natural and social sciences. It describes the basic mechanisms by which vulnerable societies tend to amplify the negative consequences of natural disasters, given their usual weak coping and adaptive capacity. Coping capacity, as discussed, is in turn conditioned not only by natural hazards and market imperfections, but also a result of the original endowment modified by the historic process of wealth distribution, giving shape to the current entitlement system. In addition, the inherent capacity of economic agents to adapt their structure and functioning in response to harmful events is closely conditioned by existing institutions. Given the prevailing high levels of poverty and vulnerability in Mexico, as discussed in **Chapter 2**, the current public intervention to strengthen coping and adaptive capacity of the exposed population is being exceeded

Considering the increasing tendency of frequent and severe natural disasters and the economic losses associated with them, together with the dropping agricultural prices presented in **Chapter 3**, this research warns of the most likely forthcoming increase in poverty if no effective strategy has been implemented to reduce vulnerability. As the urban economy has experienced a very modest growth during the last three decades, it is unable to absorb the additional workforce released from rural areas. It has led to the proliferation of slums and to a currently fast growing informal urban economy. As both the uncertain agricultural incomes and the precarious urban jobs do not fulfill the expectation of the vulnerable population, increasing emigration to the USA is the usual response, particularly in the case of farmers living in remote regions. This trend is further verified both by the stakeholders' survey and the spatial model.

Chapter 4 assesses current policy instruments for reducing agricultural vulnerability, identifying areas where public investments in productive infrastructure can greatly achieve progress in poverty reduction if combined with disaster mitigation works and expanding public-private insurance schemes. In addition, it analyzes possible improvements to policies and instruments for reducing economic losses, e.g., subsidized micro-insurance, and for reducing poverty and vulnerability in the

agricultural sector. In light of the current comparatively low implementation of ex-ante instruments, this chapter underlines the need for a more active promotion of existing disaster mitigation instruments (e.g. funds for mitigation works) from the federal authority along with more participative action from the community and municipal authorities to propose projects. This chapter's research is based to a large extent on a project the author carried out in 2003 for the World Bank and the Prevention Consortium (Saldaña-Zorrilla 2004), which was complemented by a consultation with policymakers in Mexico between 2004 and 2014, a policy assessment report prepared for the United Nations (Saldaña-Zorrilla 2007) and a stakeholders' assessment carried out in 2014.

The great human and geophysical diversity of Mexico is reflected in its existing plurality of economic practices and natural hazards exposure. **Chapter 5** applies spatial econometric analyses to assess the importance of natural disasters and depressed prices due to imports (or to simple low international prices), and analyzes their differential interaction with the diminishing income of vulnerable regions to stimulate out migration from municipalities highly exposed to natural hazards. During the past two decades, failure to implement effective mechanisms for reducing risk to climatic and market variability is impeding accumulating enough physical and human assets in, particularly, the agricultural sector. The negative effects of hazards in vulnerable regions have a spillover effect on neighboring regions. For that reason, direct public intervention is needed to allow asset accumulation. Derived from the migration model, one can observe that a segment more prone to emigrate is one that with greater reductions in real incomes and more frequently affected by disasters. It reveals the role of expectations of future incomes in the configuration of migratory flows.

The current role of the government, the private market (e.g., insurers), the farmers and other stakeholders in dealing with adverse outcomes from natural disasters and income uncertainty of small-scale farmers are still insufficiently interconnected, as verified by the views of the stakeholders presented in **Chapter 6**. This chapter identifies the problem of farmer vulnerability to natural disasters and trade liberalization, and examines the preferred policy responses from the point of view of stakeholders, including farmers, farmer cooperatives, crop insurers, and ministries and departments of local and national governments. A dramatic governmental withdrawal of the previous two decades from supporting the agricultural sector with facilities for production and commercialization continues putting stress on rural livelihoods as no effective compensatory mechanisms have been successfully implemented. This fieldwork identified a clear need for a more profit-oriented production and expansion of coverage of individual and collective financing instruments to face external shocks. The chapter is derived from research the author conducted between 2004 and 2005 as part of a project for the START-IIASA *Advanced Institute of Vulnerability to Global Environmental Change* (Saldaña-Zorrilla 2006) as well as on field work carried out in 2014 in order to elaborate the 10 years follow-up.

Chapter 7 integrates the results of all chapters to provide some wrapping-up remarks and presents a final discussion to guide future directions.

This book's analyses contribute to the current debate of the long-term economic impact of disasters, as well as offer an integral methodology combining natural and social sciences for further studies of country and community level vulnerability to climate change. The lessons derived from this analysis provide useful elements for the design and improvement of governmental policies concerning social and economic development as well. In addition, the desegregation of this analysis has the advantage of facilitating the design and evaluation of governmental projects at municipal, sub-national and national level, as well as provides conceptual-empirical elements for international cooperation in matters of disaster risk reduction, climate change adaptation, rural development and poverty reduction.

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Chapter 2

A conceptual framework of economic vulnerability

... Una historia que toma sentido a partir de la conciencia de marginalidad

LEOPOLDO ZEA, Filosofía de la historia americana

Abstract This introductory chapter is devoted to presenting the conceptual framework of economic vulnerability and its drivers, as well as analyzes the role of natural disasters in reducing assets accumulation and the derived regional development implications. It provides the background to understand the dynamic of economic vulnerability first in general and further concretely in Mexico. This chapter quotes a number of research works relevant to provide elements for a solid discussion on the original endowment in defining current social asymmetries, poverty and agricultural productivity in Mexico, coming up with an objective view of the problematic, and a grounded argumentation of this work's hypothesis.

Keywords Vulnerability • Resilience building • Coping capacity • Adaptive capacity • Hazard, stressor • Poverty • Rural development • Rural poverty • Migration • Exposure • Foreign trade • Assets • Entitlements

The chapter starts by providing a review of different concepts and approaches of vulnerability (Section 2.1) and economic vulnerability (Section 2.2) towards defining this work's concept of economic vulnerability. Further, we approach and briefly illustrate the structure of economic vulnerability and its functioning as a dynamic and cyclic process. One interpretation of the complex process of multiple interacting drivers of economic vulnerability is expounded in Section 2.3, emphasizing the role of assets, especially those of the poor in rural areas. This section also discusses poverty definitions, assesses briefly poverty in Mexico, and provides some elements towards explaining historic facts defining entitlements and some issues of economic policy behind poverty in Mexico and concretely in the countryside. The need for taking into account concepts and patterns of agricultural growth and rural-urban migration in a strategy to deal with economic vulnerability is presented in Section 2.4. External shocks tend to become amplified due to structural weakness and interacting stressors that are explicitly described within this chapter and summed