

The New Mexican Agricultural Model An Analysis from a Boserupian Perspective¹

Nuevo modelo de agricultura en México Un análisis desde la perspectiva boserupiana

ABSTRACT

The enforcement of market policies is the cause of the transformation of the Mexican agricultural sector. The new model changed both the production structure and the demographic patterns of the country's rural population. There has been a shift from a system that protected traditional producers from foreign investment flows and international trade to a new one of economic integration based on competitive markets. Traditional Malthusian theory has been used to analyze the social and environmental consequences of economic transformation in agriculture. This paper, however, analyses the transformation of the Mexican rural sector from a different perspective. It seeks to clarify the relationship between demographic processes and agricultural production developments in traditional Mexican rural areas with the help of the main Boserupian thesis: "Agricultural development is caused by population trends rather than the other way around" (Boserup, 1965, p. 4).

Keywords: Agriculture, population, free trade, migration.

RESUMEN

La aplicación de políticas de mercado es la causa de la transformación del sector agrícola en México. El nuevo modelo cambió tanto la estructura de producción como los patrones demográficos de la población rural del país. Ha habido un cambio de un sistema que protegía a los productores tradicionales de los flujos de inversión extranjera y del comercio internacional, a un nuevo sistema de integración económica basado en mercados competitivos. Para conocer los impactos de los cambios en la producción agrícola en la sociedad y el medio ambiente se utiliza la teoría malthusiana. El objetivo de este artículo consiste en aportar una visión alternativa al estudio de la problemática descrita con la ayuda de la teoría Boserupiana que parte de la idea de que "El desarrollo agrícola es causado más por tendencias poblacionales que por cualquier otro factor" (Boserup, 1965, p. 4).

Palabras clave: agricultura, población, libre comercio, migración.

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INTRODUCTION

Ester Boserup's main contribution to the understanding of the agricultural sector's modernization process is the idea of "an extraordinary capacity of nature to respond to the changes of demographic dynamics" (Mathieu, 2010). According to Boserup, the traditional analysis of agricultural development has a limited scope because it doesn't take under consideration that new fields and intensive cultivation are not the only ways to raise agricultural output. Evidence shows that traditional agriculture does not use permanent fields. Furthermore, soil fertility in this context, depends heavily on agricultural methods. This alternative interpretation of the relationship between demographic processes and agricultural production allows the use of a new analytical perspective.

By transforming the conventional theories of land use patterns, technology and productive systems, the Boserupian perspective allows for an alternative interpretation of social and economic developments taking place in modern, globalized agriculture. One example of these developments is the permanence of traditional corn agriculture in the developing world within the context of a heavily monopolized agricultural market. Regarding land use patterns, Boserup's flexible interpretation of productive land opens up the possibility of understanding the impact of migrant labor in the industrialized world on third world economies and other related factors of regional integration such as illegal crops business.

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Boserupian labor intensification and technological development theories are also powerful tools for understanding the latest developments in modern agriculture. It allows us to understand the existing tendencies of indigenous strategic resource dispossession through virtual water exports and other mechanisms of environmental appropriation.

The boserupian theory might be helpful to elaborate diverse interpretations about the adaptation to climate change effects and the degradation of environmental conditions of the communities living in rural areas. The understanding of the complex mechanism (social, organizational and technological) in which local producers rely for survival will be critical for the development of risk management policies and other areas of environmental governance related to global climate change.

BOSERUP'S CONTRIBUTION TO THE UNDERSTANDING OF AGRICULTURAL CHANGE

The main Boserupian idea that challenged conventional approaches on agricultural change was the critic of classic Malthusian theories about the limits of demographic growth related to the capacity of food production. Boserup stated that increases of population or land cause the development of technologies and productive strategies.

The author argued that with time this process transformed the physical and social landscapes of traditional communities, the labor markets, land tenure and social structures.

The implications of these arguments are evident:

- a) If technologic and productive strategies occur as a result of demographic stress, agricultural productive development could be explained as a process of "induced innovation". This endogeneity of technological change could explain developments of investment trends and technological shift in agriculture, specifically in traditional rural communities.
- b) Traditional field workers respond to consumption rather than to market demand. By doing so, they tend to minimize risk to local needs and not to maximize income patterns because this could damage land allocation, labor, technology and capital. Traditional farmers develop new technologies or productive strategies only with socio-economic pressure.
- c) The key factor of change and development are social structures. They are endogenous to technological development and land pressures and allow at the process of "induced intensification". This process might be related with a whole set of factors such as women participation in social production, environmental degradation, social structure, land tenure, family structure, employment, ethnicity and migration trends.

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THE EVOLUTION OF THE MEXICAN AGRICULTURAL MODEL

The New Mexican Agricultural Model is a result of the implementation of a series of public policy programs aimed at dismantling the mechanisms of governmental intervention and establishing new schemes of production based

on global trade and investment flows; in other words, it is a more “free-market” approach. The origins of the new scheme date from the administration of President Miguel de la Madrid Hurtado (1982-1988) and the new policies were consistent with the dominant economic paradigm shift in world history. This era marked the beginning of the end of the “welfare state” and the beginning of market-based policies in the management of many national economies.

The transition to the new model has been especially important for the Mexican agricultural sector given the characteristics and the role played by the rural sector in the country’s history. This is particularly true in the context of the socio-political and economic pact that emerged from the Mexican Revolution of 1910. As a result of the Revolution, Mexican peasants achieved a series of concessions that were embodied in the Constitution of 1917. This accomplishment is not surprising if we consider that the rural population in Mexico during the revolutionary years comprised 71% of the population (Pacheco, 2010, p. 401).

6 During its history, the agricultural economic model that emerged from the revolutionary pact had 3 basic stages. The first was the “agro-indigenous” stage. It was characterized by the implementation of the Agrarian Reform Act and the dismantling of traditional *latifundios*.² There was a land distribution policy among the peasants and the protection of communal property through the restoration of *ejidos*.³ According to Warman (2001), between 1911 and 1992, the total land re-distributed reached more than 100 million hectares (more than half of Mexico’s national territory).

In the 1940s, the model evolved to an “industrial” second stage in which agriculture was subordinated to the goals of industrialization through economic modernization strategies⁴ and the Green Revolution.⁵ The strategic objective of this stage was to take advantage of low prices imposed on agricultural products in order to subsidize urban workers’ food and raw materials for industry (Hale, 1996).

² *Latifundio*: A type of socio-economic land ownership form characterized by properties of great dimensions, derived from de pre-revolutionary haciendas.

³ *Ejidos*: A communal form of land ownership that is derived from indigenous production traditions.

⁴ Economic modernization: In the industrialization stage, modernization strategies gave great impetus to the development of market relations in the countryside.

⁵ The Green Revolution: Governmental policies centered on the hybridization of crops to increase yields together with additional inputs such as water, fertilizer and pesticides.

During this period, the urban population grew and subsidized industrialization could no longer drive development. Subsequently, the industrial stage began to show its limitations in the 1960s. Domestic agricultural production began to be insufficient to meet the needs of the model (Rello & Saavedra, 2007). The supply of basic products began to decline in response to artificially low government-imposed price limits. In response to this situation, the agricultural model entered its third “populist” stage. This stage was characterized by massive government intervention. Here, powerful federal and state institutions were created along with massive government subsidies for *extensionismo*⁶ programs.

The *Populismo* (Populist) strategy was unable to solve Mexican agriculture’s structural problems because it couldn’t create dynamic production systems; it strengthened the extreme concentration of political and economic power in rural areas and caused the overexploitation of natural resources. Governmental corruption and inappropriate development policies led to the 1982 international debt crisis and there was a subsequent decline in government support of the Mexican agricultural sector. The crisis of the third stage marked the end of the Revolutionary Era in Mexican agriculture. The model had reached its historical limits and was forced to adapt to economic market mechanisms.

A new market model was developed and consolidated with the North American Free Trade Agreement of 1994. Under the new policy, state and federal programs promoted market mechanisms through the cancellation of federal subsidies and the end of structural support to marginalized sectors.

The key factor of the modernization of the agricultural sector was the land reform promoted by the government. The new regulations enabled peasants to change the legal status of *ejidos* land allowing the incorporation of former communal productive territories to the land market. Recent research demonstrates that the reform had little impact in the agricultural production due to difficulties on the specificity of Mexican agricultural governance but few argue that the “modernization” of Mexican agriculture as a whole has had a great impact on the country’s economic and social structure and on the environmental health (Castañeda & Pfitze, 2013).

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⁶ *Extensionismo*: A governmental policy focused on agronomy training and extension services in rural communities.

a) Economic implications

The main result of agricultural trade liberalization was the productive restructuring of the sector. The new model has created a dual society. On the one hand, it benefited a group of agro-industrial producers who currently grow high-value goods. On the other hand, the process created a difficult economic environment for millions of traditional small farmers that can only produce low value traditional agricultural products.

Trade and investment flows gave a boost to non-traditional agricultural products (fruits and vegetables) at the expense of corn production. Given the economic, technological, and environmental imbalances, Mexican corn producers were unable to compete with their main trading partner, the United States (Calva, 1991). This has led to a situation where highly-capitalized farmers have become the leading exporters of commercial products. Since 1999, Mexico has achieved tenth place as a global exporter of specific crops. They have obtained leading positions in the export of high-profit goods such as asparagus, pumpkins, onions, mangos, beans, watermelons and papayas. During recent years, 9% of the acreage devoted to fruits and vegetables produced 37% of the crop production value in Mexico. Consequently, Mexico's international food trade almost tripled, reaching \$19.9 billion from 1990 to 2002. Correspondingly, imports of grains and seed oils reached \$1.1 billion in 2000 (Rosenzweig, 2002, p. 46). Furthermore, by 2003, only 3.7% of the total harvested area in the country was occupied by non-traditional products contributing with almost 50% of the total export revenues in the agricultural sector (Macías, 2003, p. 45).

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b) Social implications

The social impact of such a strategy has been significant. In the year 2000, 8.6 million farmers suffered the consequences of the New Mexican Agricultural Model; in 2004, rural communities represented 61% of the population living in extreme poverty in Mexico. Most rural farmers in extreme poverty were concentrated in the southern regions of the country. They focused on the production of basic grains on rain-fed land and were scattered over a large number of small farms, with low capitalization and low productivity (Menocal & Pickering, 2006).

The demographic impact of the structural shocks to the Mexican country side has been relevant. Relative to urban population centers rural populations have declined. However, Mexico's rural population keeps growing in absolute terms. Each year, the rural population grows by 143 000 people on average (Hernández, 2004). According to Pacheco (2010, p. 401), only 23.5% of the total population lived in rural communities in 2005 and its share has been permanently declining.

Due to the continuing decline in living conditions and the deteriorating environmental situation in rural Mexico, Mexican farmers have been forced to emigrate out of their communities to other regions inside the country and to the United States. Recent developments in the Mexican migration to the US trends show a tendency to diversification. The share of Mexican workers occupied in agriculture is still predominant but the service and construction activities among immigrants have increased as a result of the development of economic structure in the US (Conapo, 2012, p. 15).

Migration and its consequences became a central factor in the development of the North American hemisphere. The labor contribution of rural Mexican migrants to the success of the US agricultural system is significant; it's impossible to understand the high profitability of US agriculture without considering the role of migrant Mexican labor (Corona, 1994; Sandoval, 2012). According to the American NGO Student Action with Farmworkers (SAF), 75 percent of agricultural workers in the US were born in Mexico. Migration trends are very significant and increasing. According to the National Council of Population (Conapo, 2008), Mexican immigrants to the US reached 4% of the total American population in 2008. This means that there were approximately 33 million immigrants of Mexican origin, or 30 percent of the total immigrant population in the US (11.9 born in Mexico and 21.2 Mexican Americans). Since 1980, Mexicans have been the largest minority living in the United States. Despite the recent diversification of the social origin of the immigrants, evidence shows that most of them have a rural origin (Conapo, 2008, p. 27). Immigration to the US represents nearly 10% of the total population of Mexico.

The US labor market became the only possible employment source to support millions of families who depended on remittances from family members working in the US. Almost 80% of remittances are used to cover the necessary expenses of local families. This could well be interpreted as an indirect subsidy to rural corn production, although the state of existing research does not

allow us to draw definitive conclusions. One important indicator of the role of remittances in Mexican agriculture is the regional destination of the economic flows. In reviewing the information provided by the Secretary of Agriculture, it is clear that the states receiving the bulk of remittances are also the most important corn producers. In 2004, the states of Jalisco, Mexico, Guanajuato, Michoacán and Chiapas produced 56.5% of the total corn production and received 42.7% of the remittances from the US (SIAP, 2012).

However, the phenomenon of remittances may have other explanations. As noted by Jorge Fernandez, the drug trade has become a sophisticated supply chain and service network that links the laundering and circulation of money between countries in the hemisphere.

These products need ... a relatively long chemical process, requiring precursors, chemical transformations that occur in laboratories of large companies whose raw materials are produced in one place, are transferred to another, only to be transferred to a third country and from there be exported to the final consumer market. The money, at least in part, takes the reverse route, the transformation of billions of dollars in small bills placed in respected bank accounts... is perhaps more complex than the drug itself (Fernandez, 2004, p. 35).

10 The sudden increase in remittances from the US and Canada could possibly be explained by the Mexican illicit drug-business. According to Resa (2001),⁷ communities with more drug activity are also the regions where remittance flows have had a greater concentration (except in the border with the US). The daily practice of cultivation of prohibited crops related to drug trafficking has a clear economic rationale. According to Quadri (2011), a farmer may receive up to \$20 000 USD annually per hectare of cannabis harvested in plots with soil in poor condition. In contrast, the land would produce only \$300 USD in revenue if planted with corn. In a comprehensive study, The Mexican Institute for Competitiveness reports that profits of Mexican drug cartels related to cannabis sells to the US reach 2 billion dollars, 15 % of Mexican agricultural GDP (Hope & Clark, 2012).

⁷The drug trade reached 300 billion dollars during 2003.

c) Environmental degradation

Environmental degradation has become a major obstacle to agricultural development. It is widely accepted that free trade policies have placed the Mexican countryside under great environmental stress. According to reports, between 1970 and 1986 (the beginning of the Modernization Era), the deforestation rate reached 160 000 hectares per year, and by the year 2021 the ratio of per capita forest area will be 0.3, lower than the world average (Velazquez *et. al.*, 2006). As stated by a report by the Latin American Faculty of Social Sciences (in Spanish FLACSO), Mexico is at the limits of its agricultural potential due to the expansion of the agricultural frontier. As a result, the countryside has suffered high levels of desertification, reaching 69% of the territory (Rello & Saavedra, 2007, p. 116). Recent studies show that the *ejido* transformation is one of the main causes of deforestation process (Bonilla *et. al.*, 2012).

On the other hand, as result of the irrigation policy 53% of irrigated land is located in arid and semi-arid regions (Tortajada, Guerrero & Sandoval, 2004). Farms located in irrigation districts mainly produce export crops with high water consumption rates, obtained from underground sources. Consequently, the increase of commercial crops and the related export of virtual water for the North American market have caused serious stress on the available water supply in most of the country's productive basins (Semarnat, 2011).

In addition, local producers face other challenges associated with the trade liberalization process such as the strong presence of yellow corn in the Mexican market. This crop is heavily subsidized in the US and it is used as industrial raw material or forage. In Mexico, yellow corn competes with native species of white corn for human consumption. Although importers of this grain state that the yellow grain does not compete with the white one, it is a fact that these varieties can substitute each other and affect the productive market and the use of corn-growing land.

In addition to yellow corn's influence, Mexico's traditional corn sector has been affected by the problem of contamination from various environmentally aggressive agro-chemical inputs, as methyl bromide and DDT (Seefóo, 2003) and the uncontrolled introduction of transgenic species of white and yellow corn. The invasion of genetically modified corn, documented by the Council for Environmental Cooperation (CEC) of the North American Free Trade Agreement in 2004, was recognized as a "dangerous process" in the

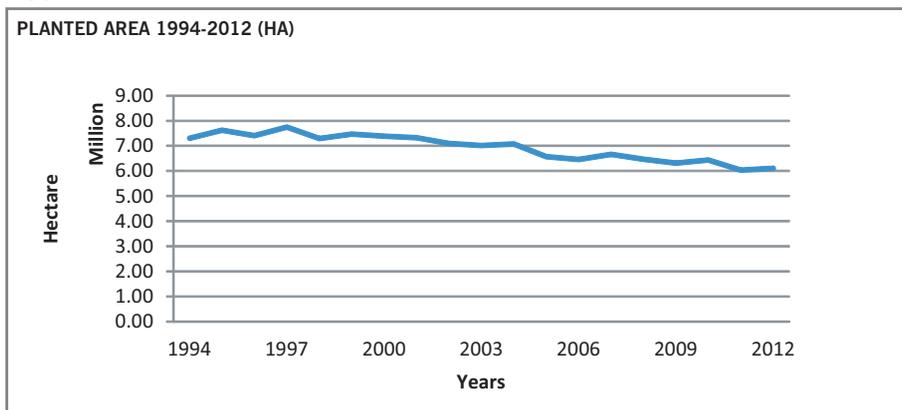
context of the Biodiversity Law of 2003. According to critics like Silvia Ribeiro, this piece of legislation protects the participation of the main producers of GMO in Mexican agriculture. The CEC warns about the danger for the existing biodiversity of gene contamination of native species of corn. In 2004, researchers found that 25% to 30% corn imports to Mexico were genetically manipulated (CCA, 2004).

In the near future, we can expect additional pressures related to international developments. With the unexpected increase in corn prices caused by the demand for bio-fuel, we can expect an increasing pressure on forest land from both the modern and the traditional farming sectors. In addition, it is important to note that the country's water reserves are located in the regions with a strong rural presence. This might suggest that the future location of water-intensive agricultural farms in areas now dominated by small farmers.

In this difficult context, the evidence indicates that overall agricultural productivity has improved in traditional, rain-fed corn fields. As shown in Figures 1, 2 and 3, despite the adverse economic policy aimed at eliminating "backward" productive systems, harvested areas in poor traditional communities show an important drop while the value of production and yield per hectare have grown. This phenomenon, analyzed by authors like David Barkin (2003) represents the core of the "New Rurality" theory. This theory explains the struggle for survival of millions of Mexican small farmers who must confront the impact of the agricultural market's economic liberalization.

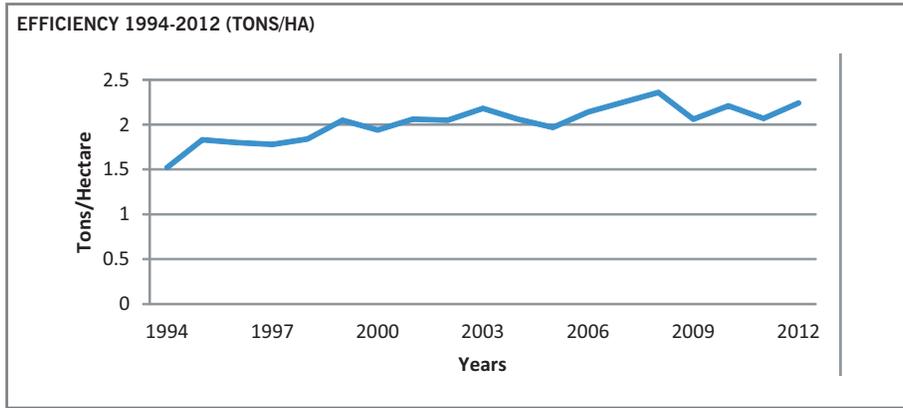
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FIGURA 1



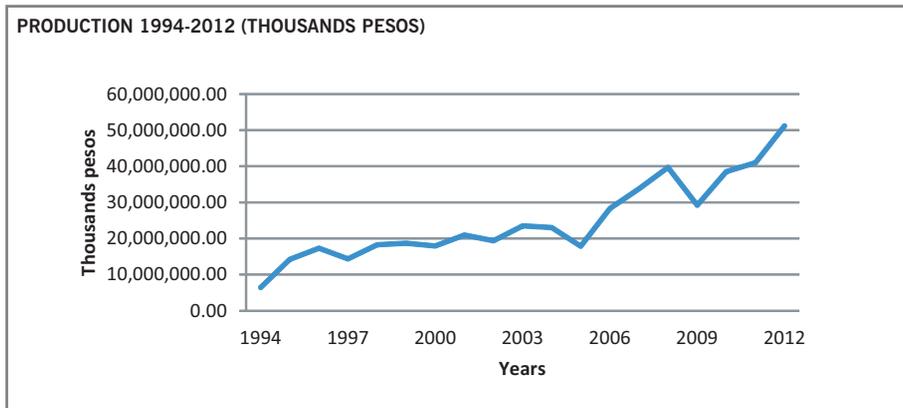
Source: SIAP.

FIGURA 2



Source: SIAP.

FIGURA 3



Source: SIAP.

Barkin states that:

Millions of peasants continue to cultivate traditional corn...While they are aware that this activity cannot compete in the open competitive market, they continue to produce increasing amounts of grain for consumption. It is their only response to maintain their lifestyle that also involves ensuring quality of their food and the ecosystems in which they live and produce (Barkin, 2003, p. 42).

For rain-fed traditional farms, trade and investment liberalization policies have become a threat to the existence of small farmers and indigenous communities. The response from farmers has been the conversion of their production processes. Traditional producers have reacted wisely to the threat of extinction, understanding that their survival depends on the defense of local resources and adaptation to new conditions. The result has been new organizational forms of corn production by traditional small farmers and the more intensive use of community resources. This allows them to maintain in the production of native corn types for consumption and to supply local markets. Consequently, evidence shows that in recent years, the value of production of corn has increased. This contradictory tendency can only be explained by internal socioeconomic processes related to the logic of the rural communities and not by market mechanisms and governmental support programs such as Procampo.⁸

A BOSERUPIAN INTERPRETATION

We find the Boserupian theories a useful framework for analyzing the transformation of Mexican agriculture. They allow us to understand the ongoing relationship between demographic change and productive trends in the context of hemispheric economic integration (which includes a wide range of processes such as migration patterns, production intensification and environmental degradation).

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Due to existing asymmetries between countries such as Mexico and the US, the hemispheric integration model has encouraged massive migration flows of millions of agricultural workers to the North for decades. Boserup (1965) studies regarding rural processes in traditional communities help to understand the Mexican experience, bringing to our attention the relationships between international trade, demographic change, migration flows, drug trafficking, remittance flows and the intensification of production in traditional farms have become elements of great importance.

The modernization of Mexican agriculture cannot be explained solely by addressing the success of the capitalized sector linked to trans-national corporations, international trade and investment. To have a complete picture of

⁸ Procampo: Is a governmental agricultural subsidy program established in 1993. The main objective of Procampo is to complement the income of agricultural producers and farmers.

this transformation, it is necessary to include the traditional rural communities, which have developed resistance strategies by using remittances as a source of financing seasonal corn production in the analysis. Consequently, in order to have a better understanding of the social and environmental impact of the transformation of the Mexican agricultural model, it is necessary to take into account the strong influence of a drug economy designed to meet the demand for narcotics in the United States as well as the drug war currently being carried out by both the Mexican and US governments.

Contrary to what policy makers expected (and conventional Malthusian theory suggests), trade liberalization has not meant the disappearance of traditional rural farmers in Mexico or their “conversion into agribusiness-men.” Actual evidence shows that the intensification processes are conducted in the most backward communities, allowing marginal farmers to continue the production of white corn for their own consumption and selling small surpluses for the local market. As a result, the Mexican agricultural sector has become a dual socio-productive entity, with a strong modern agro-industrial export sector and a traditional marginal sector. Rural communities have managed to use the existing institutional and economic situation as a resistance strategy for the preservation of both their basic food supply and the maintenance of rural population levels. Despite the adverse context and the demise of *ejido* land tenure (Barnes, 2008), traditional corn producers, *campesinos* and indigenous people living in *ejidos* or communal land, have learned to take advantage of the formal governmental programs (financial and technical support) and of the informal mechanisms (migration and remittances) and preserve the Mexican “corn culture”.

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Finally, from an environmental perspective, it is useful to approach the problem as a trans-boundary phenomenon as proposed by Lambin (2003) in order to understand the actual impact of Mexican agricultural transformation on land use patterns. We need to incorporate those factors that cause the transformation into the conceptualization of spatial relocation of productive land, i.e. the participation of the Mexican labor force in US modern agriculture in order to preserve Mexican traditional corn production.

In Mexico, the elements that explain the growth of the agricultural frontier, deforestation rates and the intensification of water resource exploitation are linked to the hemispheric integration process and NAFTA as well as external-source capital through remittance flows. This process is closely related to the intensification of modern agriculture, the increase of water intensive ex-

port crop production and cattle farms, the cannabis economy and the abandonment of productive land due to ongoing migration to the North.

CONCLUDING REMARKS

The market model and “economic rationality” can’t explain current developments related to agricultural change and the new rurality. As Bourdieu (2003) states, the market structures are social constructions and economic actors react to them not as victims, but as stakeholders pursuing their concrete economic goals.

Boserupian theory allows the analysis of agricultural change in the context of world economic integration and heavily monopolized markets because it offers a methodological apparatus that allows incorporating the participation of stakeholders in their reactions to markets flows and their social implications.

To consider that traditional rural communities do not find limits to their productive capabilities due to demographic patterns but, on the contrary, to see the demographic pressures as engines for technological induced development and intensification of production not only liberates rural development theories of its traditional morbid spirit (related to Malthusian influence), but opens a whole set of possibilities for the analysis of socio economic factors that do not find a coherent place under traditional interpretations.

16 The ongoing resistance of traditional Mexican rural workers to international pressures, trade flows and investments patterns can be explained with the help of Boserupian theories because it explains the relation of processes that remain relatively disregarded under traditional economic analysis. That is the case of environmental degradation, international migration and the inflows of remittances from the US and the role of narco business, all heavily related with the process of North American economic integration. In particular, Boserupian theory allows exploring the main question that remains open after 20 years of the North American Free Trade Agreement: The theoretical grounds that explain the permanence and development of traditional rural production despite the heavy pressures of monopolies, international trade and investment in agriculture.

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