

ISA's 53rd Annual Convention
San Diego, USA, 1-4 April 2012

Power, Principles and Participation in the Global Information Age

MA26: Monday 8:15 AM - 10:00 AM

Panel: Climate Change, Environmental Migration, Sustainable Energy and Security Theory

Global Environmental Change and Environmental-Induced Migration¹

© Úrsula Oswald Spring

Research Professor, Centro Regional de Investigaciones Multidisciplinarias at National Autonomous University of Mexico (CRIM – UNAM)
Prof. Dr. Ursula Oswald Spring, Av. Universidad s/n Circuito 2, Colonia Chamilpa, Cuernavaca, Mor., C.P. 62210, México, uoswald@gmail.com

Abstract: This paper analyses linkages and feedbacks between global environmental change (GEC) and the neoliberal socioeconomic development model and its local impact on peasants in Morelos (Mexico), leaving them in precarious socio-environmental conditions. Environmentally-induced migration has become a coping strategy for communities, families or individuals facing long severe droughts. Nevertheless, the people staying at home, basically women, suffer greater social vulnerability and stress who care for their extended family and often pay the illegal crossing of their husband. Methodologically, the paper assesses how the complex linkages between GEC and its micro level effects and global push factors may be empirically explained and how both pressures may simultaneously be interconnected with its feedbacks, without confusing the levels of analysis. For Mexico, the militarization of the US-Mexican border and the war against drugs have created high public insecurity with more than 60,000 killed people, transforming a human, gender and environmental security problem into a military and policy security issue. Migration increasingly was linked with international arms, drug, human, children and organ trafficking, money laundering and extortion, where the migrant is often killed or gets involved with organized crime. In both cases the family left behind loses the emotional and financial support. Thus, a human, gender and environmental (a HUGE) security perspective for analyzing climate-induced migration permits fundamental changes in scientific world views and political mindsets, in order to shift the focus away from the effects (migration as an adaptation and survival strategy) and towards the anthropogenic environmental as well as socio-economic causes, triggers, multipliers, and intensifiers that have forced affected people to be on the move.

Keywords: global environmental change, socioeconomic development, peasants, Morelos, environmentally-induced migration, coping strategy, droughts, micro level effects, global

¹ This paper is based on a research project financed by DGAPA-PAPIIT-UNAM, IN304709 and by the Red Temática del Agua (RETAC) from the National Council on Science and Technology (CONACyT) on environmental-induced migration and gender vulnerability. The conceptual and empirical results will be published by Oswald Spring *et al.* (2013). Some ideas of this research are published in Ú. Oswald Spring "Environmentally-Forced Migration in Rural Areas: Security Risks and Threats in Mexico", in: Scheffran *et al.*, 2012: *Climate Change, human security and violent conflicts, Challenges for societal stability*, Springer-Verlag, Berlin: 315-350.

push factors, militarization, border, policy, human, gender, environmental security: a HUGE security

1. Introduction

Climate-induced migration is not a new phenomenon, but the changing sociopolitical conditions are posing between Mexico and the USA security risks for both countries, especially for the longest border between a highly industrialized and a developing country. After the signing of NAFTA in 1994, the industries in the USA have transferred increasingly their labor-intensive industry to the border region in Mexico, where during the last two decades the population increased by more than 10 million inhabitants. New services, cities, intensive migration, the *maquila* industry, and industrial and domestic waste have created multiple environmental challenges in this fragile arid region. On the other hand, the Mexican government relied increasingly on the imports of initially cheap and subsidized but nowadays quite expensive basic grains. As a result the authorities abandoned an agricultural policy to sustain and support poor small peasants, especially in drylands, depending on rain-fed agriculture increasingly affected by droughts due to climate change. This neoliberal policy has posed severe human, environmental, water, soil, food, and health security risks, but initially it did not pose any national or international military security threats neither for the countries of origin (Mexico, Central America) nor for the receiving countries (Mexico, USA, Canada).

The paper addresses the following research questions:

- What are the possible linkages and feedbacks between the factors of global environmental change along with the neo-liberal model of socio-economic development of massive food imports, climate change and their impacts on the local level for Mexican peasant families losing their livelihood?
- How does environmental-induced migration become a coping strategy for communities, families, or individuals facing GEC and who suffer a higher degree of social vulnerability and stress due to the outcomes of this migration?

The paper starts first with a conceptual definition of environmental-induced migration, then points to the neoliberal agricultural policy after the establishment of NAFTA between Mexico, the USA and Canada and as a result the increasing imports of basic food and the loss of a rural policy in Mexico. The impacts of these developments on the rain-fed regions in Mexico are catastrophic. One outcome is related to the environmental-induced migration as a coping and survival strategy (Oswald Spring, 1991, 2009) to overcome the loss of income and the environmental deterioration in abandoned poor rural areas. Finally, the paper explores both vulnerabilities: the environmental and the social ones and examines the different effects and risks among the migrants and those left behind. From a gender analysis this paper focuses especially on women left behind in the rural areas who become heads of households to care for their children and elders, not only of their own family but also of those of their husband

2. Conceptualization of environmental-induced migration

The *International Organization on Migration* (IOM, 2007) defines *environmentally forced migrants* as “persons or groups of persons who, for compelling reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their country or abroad” (IOM, MC/INF/288, 2007: 2).

This definition indicates that both climate and cultural or sociopolitical factors are too complex to be reduced to a simple cause-and-effect or a push-pull relationship. In this sense environment-induced and climate-induced migration is a complex phenomenon related to slow-ongoing or fast extreme climate events that are triggered by socio-economic developments, political struggles, survival strategies, family pressure and personal interests. After an extreme weather or climate event (e.g. a hurricane or a drought) the affected people lose part of their livelihood. First they try to recover by developing survival strategies (Oswald Spring, 1991, 2009) and by creating resilience processes, often initially supported by disaster funds. However, recurrent flash floods and droughts destroy their belongings several times and when the highly vulnerable and affected people can no longer recover they decide to leave, even if that means abandoning their land, their other belongings, and especially their community networks and social relations (Renaud *et al.*, 2007) including their cultural identity and immaterial patrimony (Arizpe, 2011). Frequently, a part of the family – the elderly, women, and children – stay behind, trying to survive in very difficult situations, whereas in extreme cases the whole community or family flees, either temporarily or permanently, and moves either within their country or abroad. EIM can be a rural-rural to better land; rural-urban to megalopolis or medium size cities, or international. In the case of Mexico, borders are crossed by people without legal documents by land and the demand of cheap labor in the USA and better salaries and conditions of life have created a complex industry of illegal human traffickers and new threats for life and patrimony².

The movement of people related to changes in the environment is not a new phenomenon. Throughout history human groups have migrated in response to climate variation, limited resources or to abrupt weather changes in their surroundings, often seasonally, but also permanently. This phenomenon has been responsible for important population movements in the past³ and it is also one cause of the destruction of highly developed civilizations (Mayan, Egyptian, Chinese cultures, etc.).

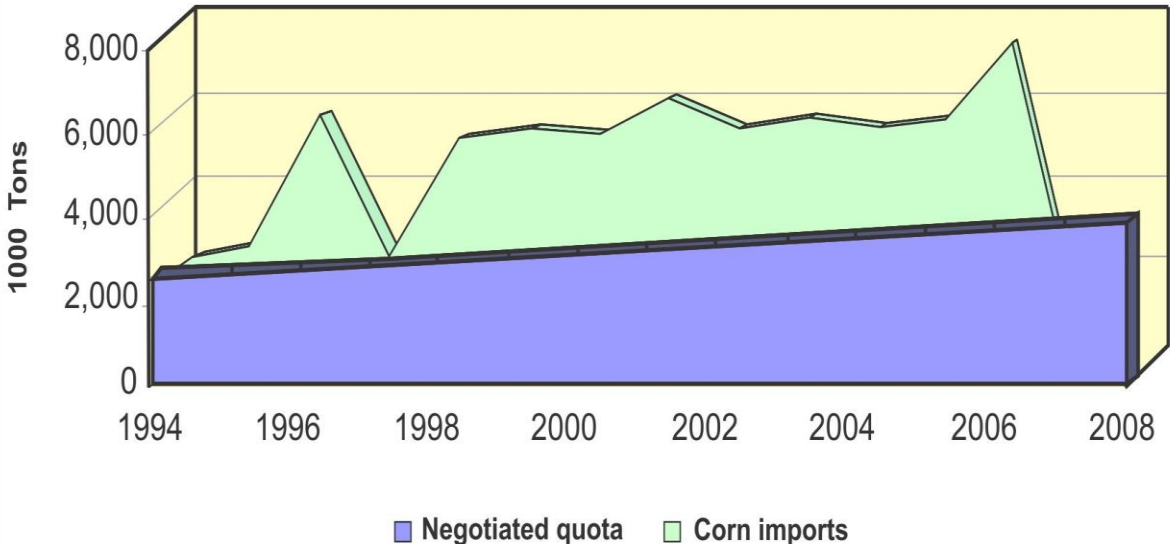
² Amnesty International (2011, 2012) reported that after the declaration of the drug by war President Calderón in 2007, dozens of thousands of Central-American but also Mexican migrants and travellers have disappeared during their trip in Mexico, kidnapped and extorted by the organized crime, and several collective graves were found.

³ Chinese cave researchers recorded the waning of Asian monsoons together with a temporary weakening of the sun (Science, 6 May 2005: 787) that helped to bring down the Tang dynasty in 907 C.E. (Science, 7 Nov. 2008: 837 – 8). Zhang et al. (2008) established consistent data based on the ECHO-G *climate model simulation* (SOM) that includes volcanic and solar events for the last millennium. They also linked Chinese cave records for a period of 1,810 years (with $\delta^{18}O$) and weak monsoon periods with the fall of the late Tang, the Five Dynasties, the Yuan, and the Ming cultures, and the rise of strong monsoons with the consolidation of the Song, the Ming, and the Qing civilizations. During the almost 2,000 years of their analysis they also noted the fall of the Mayan civilization, the advance of Alpine glaciers in Europe, and major population movements. In Meso-America (Mexico and Central America) more than a hundred reasons were given to explain the downfall of the Mayan civilization (*National Geographic*, August 2007). Mexican archaeologists, environmentalists, and geologists referred to a severe drought at the same time as in China (900 C.E; Science, 18 May 2001: 1293). The data suggest that a combination of slash-and-burn agriculture and intensive drainage of the wetlands induced local drought, altered the micro-climate, increased the temperature, and therefore affected food production for a densely populated region, where the traditional methods of food production could not sustain the growing population any longer. Food scarcity, heat waves, and hunger weakened the immune system and fostered diseases and epidemics among the population. Simultaneously, peasant revolts, conflicts among rulers, destruction of harvests, and warfare increased food scarcity in the overpopulated region and triggered the collapse of the Mayan civilization (Blümel, 2008; Webster, 2002; Demerest/Rice/Rice, 2004; Arz/Haug/Tiedeman, 2005).

3. Neoliberal rural policy in Mexico

Neoliberal policies were first imposed through the IMF’s Structural Adjustment Program after the Mexican economic crisis in 1986 and these have since been fiercely defended by the governments belonging both to the PRI (Partido de la Revolución Institucional) and the right-wing PAN (Partido de Acción Nacional) party. During the last 17 years food imports, including the basic food staple maize have substantially increased. Graph 1 indicates that these imports were always higher than the agreed quota and that during the first 14 years of NAFTA Mexico lost US\$ 27 billion in taxes that were not charged on the excess of the quota of imported corn. The quota agreement that should protect and enhance the adaptation of poor peasants to these free market conditions ended in 2008. As the allowed import surcharge was not collected by the Mexican government, there were no financial resources available for the adaptation of the affected farmers to be able to compete with the highly subsidized foreign competitors, primarily in the USA.

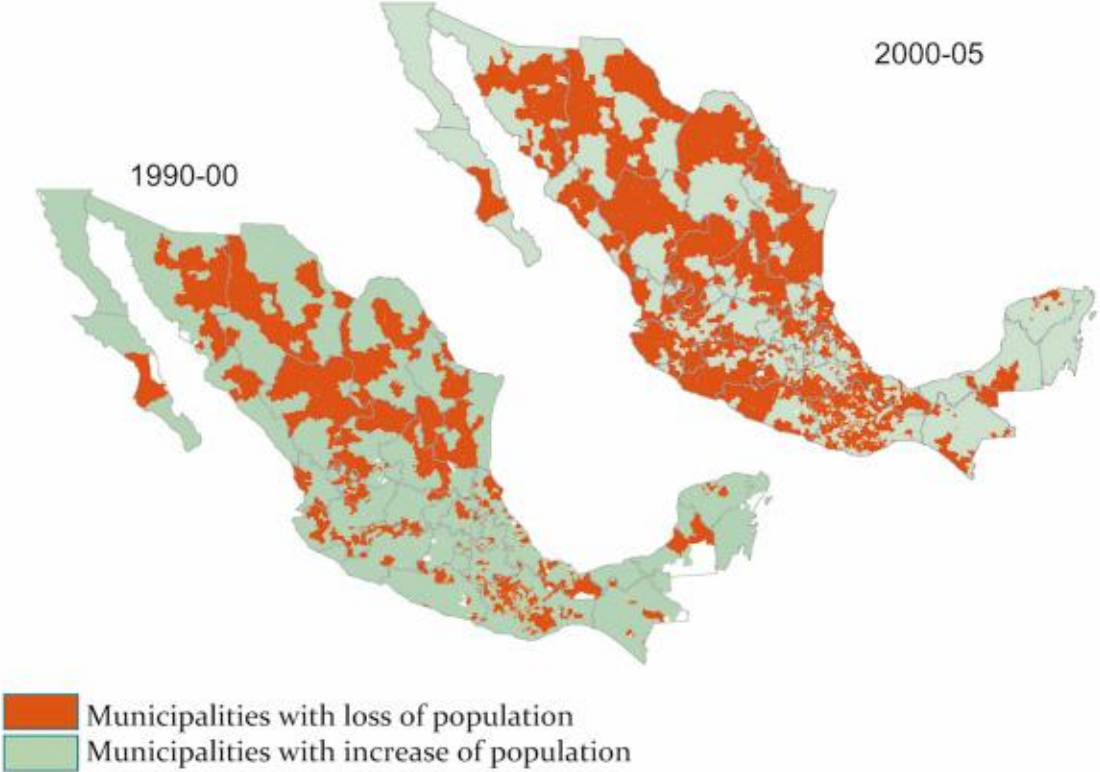
Graph 1: NAFTA: Imports of corn and quota delimitation with a supposed 13% price increase for imported white corn. **Source:** SIAP, 2008: 83.



In numeric terms, during the last decade 2000-2010, Mexico paid for food imports US\$ 150 billion dollars, and during 2011 these imports were US\$ 24.728 billion, what resulted in a deficit in the balance of agricultural products amounting to US\$4.328 billion (INEGI, 2012).

The results in the rural area have been catastrophic and the poverty rate, hunger and rural migration have dramatically increased, including the emigration to the USA (graph 2). From 2000 to 2005 the image of the drylands in Mexico has changed the physiognomy and only Baja California, the big cities and the south-east show a population increase, while in most rural municipalities the population declined. This migration is not only due to neoliberal policy, but is also related climate change processes. Precisely in 2012, the worst drought of the past 72 years is affecting the northern and central parts of Mexico (until March 2012, 389 municipalities) and is further reducing the productive capacity of people and livelihood, especially those without access to irrigation.

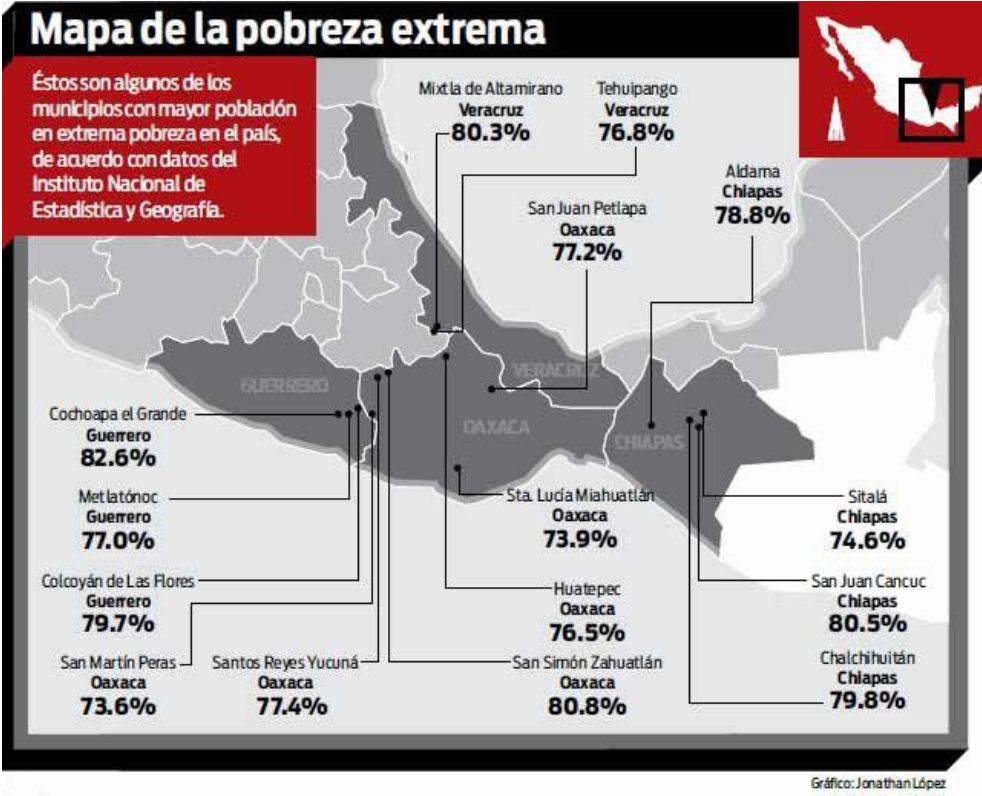
Graph 2: Internal migration in Mexico. **Source:** Developed by F. Lozano, based on INEGI, 1990, 2000, 2005, 2010.



One outcome has been hunger that has affected more than 11 percent of the population, often indigenous and small children whose future is irreversibly affected due to brain damages caused by chronic malnutrition. During the two PAN governments of Presidents Fox and Calderon, from 2001 to 2010, 85,343 people died due to hunger (Fuentes, 2012, based on data from INEGI, 2012), and during the same period this number was higher than the number of the officially killed 49,804 people due to the drug war (Procuraduría General de la República and Mexican Congress, 2009-2011).

Especially affected by hunger and extreme poverty are people living in the traditional states (see graph 3) in the south. The increase in food prices from 2008 hindered these people to buy their necessary food. 12 million Mexicans in 339 municipalities are now considered indigents. From 2003 to 2008, the Latin American governments had an average of 5% of GDP growth and were able thanks to reduce their debts by 15 percent, achieving a surplus of 0.4 percent in their budget. Together with an increase in public spending and a real improvement in salaries during the same period they were able to reduce the rate of poverty and extreme poverty by 3.8 percent per year (CEPAL, 2012). Only Mexico and Honduras increased their number of poor and extremely poor people. Furthermore in Mexico from 2000 to 2011, inflation, low salaries and a lack of jobs have reduced the purchase power with regard to the six basic food staples by 24.4 percent. In 2012, 52 million or 46.2 percent of Mexicans are considered poor with a rate of increase from 2008 by 3.2 percent per year or 12 million more in 5 years (Coneval, 2012). The change in Latin America is related to the economic model, where public and private investments are oriented to economic growth, job creation, education, the improvement of salaries of the people together with anti-cyclic governmental policy during the crisis, while the neoliberal Mexican model and practice has concentrated wealth in a few hands at the cost of the majority of the people, health and food.

Graph 3: Map of extreme poverty in Mexico, 2012. **Source:** Jonathan López, based on data from CONEVAL, 2012.

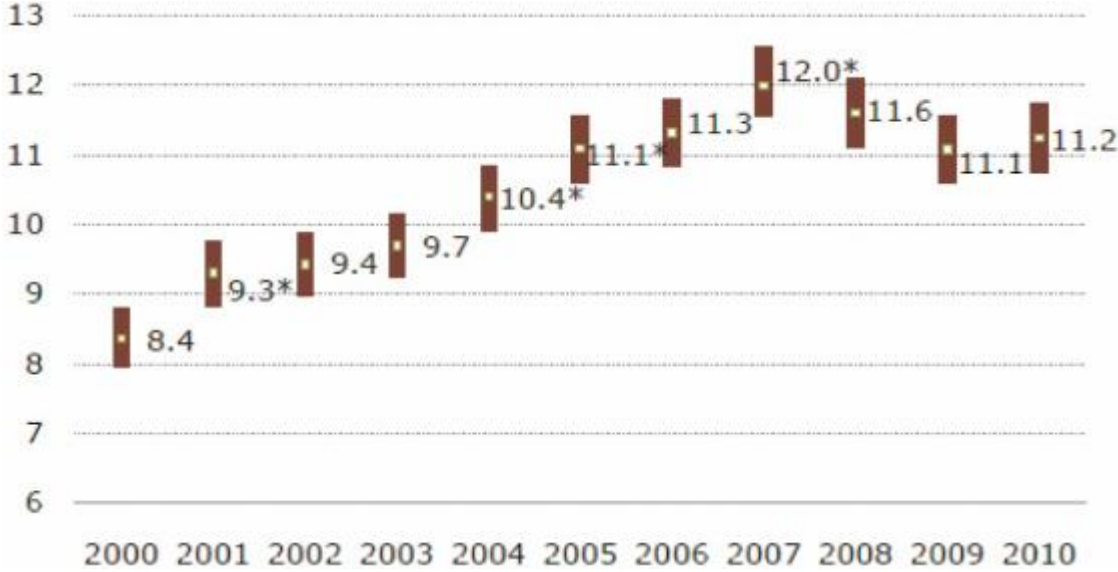


After decades of neoliberalism and poverty, Mexicans are confronted with a survival dilemma (Brauch, 2008), where the traditional survival strategies (Oswald Spring, 1991, 2009) are failing during the first decade of the 21st century. Thus, a growing number of people have decided to migrate to the USA, and they have been attracted by better life conditions and higher income.

4. Migration especially from the drylands to the USA

Until 2007 the number of unauthorized Mexican immigrants has increased constantly (graph 4). But due to the economic crises since 2008, the higher costs for crossing without documents and difficult labor conditions reduced the possibility to realize the American dream. Unauthorized immigrants were exposed to all kinds of threats and prosecutions. During the economic crisis the unauthorized Hispanic population has been especially affected by a 12.6 percent unemployment rate (US Bureau of Labor Statistics, 2010), the highest unemployment rate among all ethnic groups and races. The majority of these migrants were Mexicans. In 2007 they represented seven million immigrants and in 2010 the number dropped to 6.5 million, while between 12.67 (Passel/Cohn, 2011a) and 18.5 million (Lozano/Rivera, 2009) Mexicans live legally in the USA or belong to the second generation born in the USA. The reduction of the number of unauthorized immigrants is probably directly related to a lower immigration rate of Mexicans not only due to the high unemployment rate in the USA, but also due to public insecurity, violence and the high crime rate in the border region, such as the increasing difficulty of crossing the border (Passel/Cohn, 2010, 2010a, 2011, 2011a; Passel/Taylor, 2010; López/Livingston/Kochhar, 2009). Also the cost for a human trafficker (coyote) able to facilitate the entrance to the USA has almost doubled in the last three years (field research).

Graph 4: Estimated unauthorized immigration of Mexican population into the USA. **Source:** Passel/Cohn, 2010: 1.



Furthermore, the harsher control with sophisticated technological equipment installed by the US Border Patrol such as drones and infrared observation systems and the fence built between both countries have increasingly forced migrants to cross through the most dangerous parts of the Arizona desert, what has resulted in many deaths, especially of children, ill people or elders. The estimation is that 90 percent of the people who try to cross the border in El Paso, Yuma or San Diego are captured. But also within the USA the Obama government has prosecuted migrants and increased the number of deported people. Thus, most migrants are obliged to rely on transnational organized crime (often linked to trafficking of drugs, arms, humans, and human organs). Precisely, the presence of the organized crime, drug gangs and human traffickers has transformed the border between Mexico and the USA into one of the most violent regions in the world, with repercussions for both countries due to prostitution, HIV-AIDS (Klot/DeLargy, 2007), public insecurity, organized crime, money laundering, arms trade, drug consumption, violence, and human and drug trafficking.

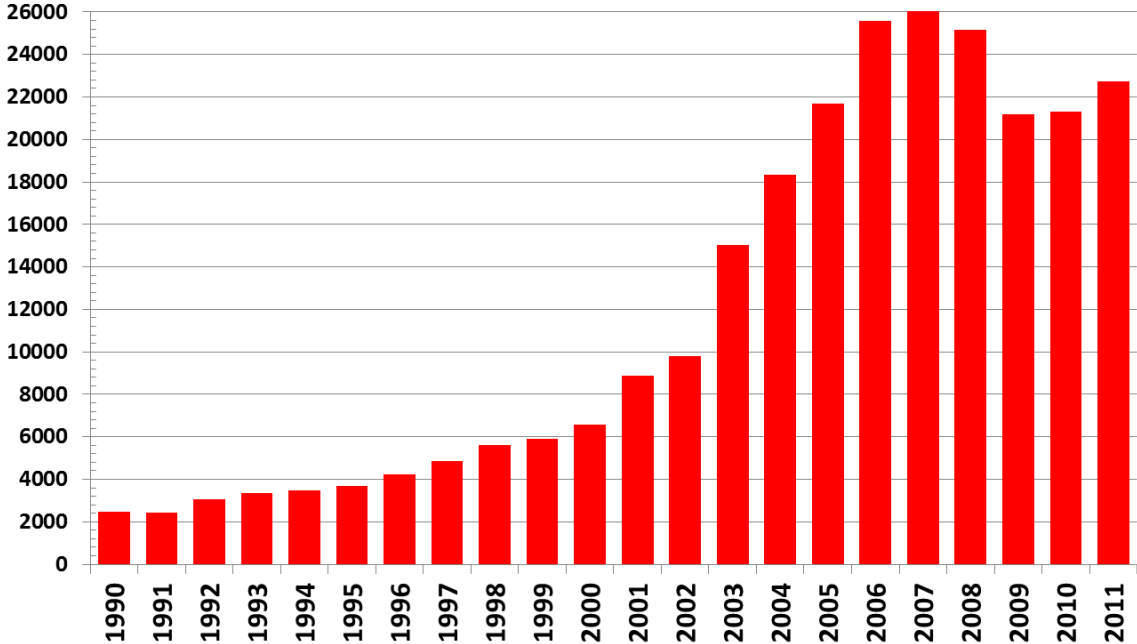
In synthesis, in 2011 about 50.5 million Hispanics or Latinos in the United States made up 16.3 percent of the population (American Community Survey, 2010). Eight million are estimated to be illegal or unauthorized immigrants, representing 3.7 percent of the US population, 5.2 percent of its labor force, and 28 percent of its foreign born population (Passel/Cohn, 2011: 9). Unauthorized immigrants are exposed to all kinds of threats and prosecutions. In the economic crisis that started in 2008 they have been especially threatened by a 12.6 percent unemployment rate in the USA (US Bureau of Labor Statistics, 2010). The reduction of the number of ‘unauthorized’ immigrants is probably directly related to a lower immigration rate of Mexicans due to the high unemployment rate in the USA, the crime rate, and the increasing difficulty of crossing the border (Passel/Cohn, 2010, 2010a, 2011, 2011a; Passel/Taylor, 2010; López/Livingston/Kochhar, 2009). Beside this traditional military security component, related to the organized crime and their illegal activities, nevertheless the human security threat is far more important for these unauthorized migrants.

5. Social and gender vulnerability in Mexico

Not only the migrants are exposed to all kind of threats, but also their families left behind, especially the wife in charge of their children and elders. They are confronted with a double

vulnerability: on the one hand they have to deal with environmental threats and vulnerabilities and on the other due to their precarious social and economic situation, or their high social vulnerability. A final goal of many migrants is to send remittances to their family members in Mexico. Remittances are crucial for poor people and especially rural regions, with lack of governmental support for mitigating crises and environmental threats. These have substantially increased up to 2008, and despite the global financial crisis they still represent the second largest source of foreign income in Mexico, just behind the income from oil exports; they are higher than direct foreign investments (graph 5). In 2000 they amounted to US\$ 7.24 billion , but in 2008 they rose to US\$ 25.145 billion and in 2009 – due to the global financial and economic crisis and the high unemployment rates – they dropped by 15 per cent to US\$ 21.181 billion but in 2011 they increased 6.8% compared with 2010 to US\$ 22.311 billion (Bank of Mexico, 2012).

Graph 5: Remittances to Mexico. **Source:** Elaborated by the author, based on data from Bank of Mexico, 1990-2012.



With regard to their environmental vulnerability, major environmental problems in Mexico are related to climate change that have resulted in stronger and more frequent hurricanes, intensive rainfalls, flash floods, and longer and more severe droughts, and the deteriorating quality of soils (soil erosion, loss of soil fertility, desertification, and pollution of soils with agrochemicals) and its salinization (overexploitation of aquifers), due to intensive agriculture and livestock practices. In addition, the loss of biodiversity, mainly linked to deforestation and change in land use, together with the pollution of water are key environmental problems. In the drylands the higher temperature, higher variability and reduction in precipitation, longer midsummer (inter-aestival) droughts, and insufficient availability of water and its pollution are key factors for climate-induced threats and environmental security risks. In Mexico, scarcity and degradation of natural resources are creating multiple stresses on the availability and quality of environmental services.

Desertification and land degradation in more than 58 percent of the country are crucial push factors for emigration. Based on our own field research which relied on focus group discussions and survey in Morelos, Sonora, Chihuahua, and Guerrero, we found that the key drivers of cross-national and internal rural-urban migration have been the loss of soil fertility,

a lack of water, and the decline in crop yields. Similar results were obtained by research teams from INIFAP (Sánchez et al. 2012). Most municipalities in drylands have lost people due to drought, loss of soil fertility, and inadequate soil management and agricultural practices (see graph 2). Therefore environmental and social vulnerability are interrelated and create negative feedbacks. Polluted and scarce water and soil resources have further created local conflicts on the access to communal grassland for private livestock. In addition, the lack of transparent property rights often generates overgrazing of the common land reserves, since local landlords often do not respect the communal agreements for protecting the natural recovery of the tropical drylands (Oswald Spring *et al.*, 2013).

To reduce socio-environmental vulnerabilities, social networks are crucial for those people who lack governmental support and live in precarious socioeconomic conditions. During extreme hydrometeorological events, disasters, or droughts, the community networks often disintegrate, and people must find ways to face these new threats on their own. These critical situations are especially difficult for women and children. During evacuation and migration they are often the victims of human traffickers, driven into prostitution, being kidnapped, or have their belongings stolen. With regard to migration to a town or to the USA, it is existing social networks that usually define the place to migrate to; they finance the illegal crossing or pay for the release of a kidnapped. But family networks also support children who emigrate to other family members living in the USA in the hope of a better education or health care. If a migrant in the USA becomes ill or dies, the family supports the repatriation and buries the migrant in his home town. These social networks among migrants in the USA have been termed *transnational communities* (Castillo/Cruz/Santibáñez, 2009).

Insecure land and water rights have also generated conflicts and produced “complex emergencies” (Oswald/Brauch, 2009) within communities and regions, where physical insecurity, violence, environmental threats and social vulnerability are producing highly stressful life conditions. These factors, combined with public insecurity and organized crime, suggest that a significant proportion of the people living in villages are fleeing from physical and structural violence. However, the women who stay behind as *de facto* household heads have to survive in perilous conditions exposing often their life. They must work in the fields, care for their children, pay the debts for the migration of their husbands and other family members, and support the extended family at home, relying partly on remittances or on paid labor when these are insufficient. Often their social vulnerability increases and their psycho-physical stress are sometimes expressed as illness and depression, but on the other hand this experience can also empower these women (Flores/Wagner, 2011; Serrano Oswald, 2010, Flores, 2001). Remittances from family members working in the USA or Canada have often improved the livelihood, housing, clothing, and nutrition of the family left behind in the villages and these transfers by the migrants have also opened new opportunities for jobs and micro-businesses (Each-For, 2009), transforming migration into a successful adaptation process.

This complex crisis combination may experience further security risks due to aggravated climate change conditions. As indicated above, a combination of climate and socio-economic factors has created large urban slums in Mexico City and in other urban centers. These factors, together with a persistent socio-economic crisis since the 1980s, insufficient job offers, and youth without any perspective for the future, lack of an economic stimulus for small businesses, poor educational standards, and limited social programs have all contributed to a steady increase in the massive emigration to the USA. For both internal and international migration it is impossible to separate these environmental triggers from the socio-economic motivations of the migrants. Therefore, environmentally-induced migration is a complex,

multi-causal, and interactive phenomenon, often with negative outcomes that may destroy both family and community networks, and increase the social vulnerability of women.

6. Some conclusive comments

A fundamental and necessary change in both scientific thinking and political action is also relevant for the analysis of climate-induced migrants. The human, gender and environmental security approach (Oswald Spring, 2009) offers a change in the focus of the referent object, while the necessary new paradigm of sustainability requires a fundamental shift in the means of addressing both climate-induced phenomena from national and homeland security perspectives. A new mindset is needed away from fences, walls, sensors, and other observation techniques, not to mention prisons and deportations, and towards strategies of sustainable rural development, in order to address the very causes and triggers of why poor rural people have been forced to leave their rural livelihoods.

Thus, a human, gender and environmental (a HUGE) security perspective for analyzing climate-induced migration permits fundamental changes in scientific world views and political mindsets, in order to shift the focus away from the effects (migration as an adaptation and survival strategy) and towards the anthropogenic environmental as well as socio-economic causes, triggers, multipliers, and intensifiers that have forced affected people to be on the move. This theme has been addressed in a second paper for this Convention.⁴

References

- AFI [Agencia Federal de Investigación], 2008, 2009: “Combate a la delincuencia,” (Mexico, D.F.: Procuraduría General de Justicia-AFI); at: <http://www.pgr.gob.mx/Combate%20a%20la%20Delincuencia/Agencia%20Federal%20de%20Investigacion/Agencia%20Federal%20de%20Investigacion.asp>.
- American Community Survey, 2010: Census 2010 (Washington, D.C.: U.S. Census Bureau).
- Arizpe Lourdes (ed. 2011). *Patrimonio Cultural Cívico. La Memoria Política como Capital Social*, LXI Cámara de Diputados, M.Á. Porrúa, UNAM, Mexico, D.F.
- Arz, Helge; Haug, Gerald; Tiedemann, Ralph, 2007: “Meeressedimente als Klimaarchiv: Klimaveränderungen von Jahrmillionen bis Jahren“, in: *Geographische Rundschau* 59,4 (Braunschweig: Westermann).
- Bank of Mexico, 1990-2012. Statistics at: <http://www.bancode mexico.gob.mx>.
- Blümel, Wolf Dieter, 2009: “Natural Climatic Variations in the Holocene: Past Impacts on Cultural History, Human Welfare and Crisis”, in: Brauch *et al.* (Eds.), 2009: *Facing Global Environmental Change: Environmental, Human, Energy, Food, Health and Water Security Concepts*. (Berlin: Springer-Verlag): 103 – 118.

⁴ Oswald Spring (2001, 2008, 2009a) developed the concept of a human, gender and environmental (HUGE) security concept as scientific approach and as a political project. The bibliographies are at SpringerLink: <<http://www.springer.com/series/8090?detailsPage=titles>>. See also the joint paper by Brauch and Oswald Spring on: “PEISOR Model: Climate Change from A Human, Gender and Environmental (HUGE) Security Perspective”, where many references on this theme can be obtained.

- Brauch and Oswald Spring, 2012: “PEISOR Model: Climate Change from A Human, Gender and Environmental (HUGE) Security Perspective”, ISA, San Diego, SD54: Sunday, 1 April 2012, 4:00 PM - 5:45 PM.
- Brauch, Hans Günter, 2008: “Conceptual Quartet: Security and its Linkages with peace, Development and Environment”, in: Hans Günter Brauch *et al.* (eds.): *Globalization and Environmental Challenges: Reconceptualizing Security in the 21st Century*. Hexagon Series on Human and Environmental Security and Peace, (Berlin: Springer-Verlag): 65-98.
- Castillo, Manuel Ángel; Cruz, Rodolfo; Santibáñez, Jorge (Eds.), 2009: *Nuevas tendencias y nuevos desafíos de la migración internacional. Memorias del Seminario Permanente sobre Migración Internacional. Volumen III* (Mexico: El Colef, El Colmex, SOMEDE y Sin Fronteras).
- Fuentes, Mario Luis, 2012: “Más de 85 mil muertos por hambre en la primera década de este siglo” (México, D.F.: Centro de Estudios e Investigación en Desarrollo y Asistencia Social), en:
http://www.rimisp.org/proyectos/noticias_proy.php?id_proyecto=262&id_=1508.
- CEPAL, 2012: *Perspectivas Económicas para América Latina* (Santiago de Chile: CEPAL).
- CONEVAL, 2012: *El Informe de Evaluación de la Política de Desarrollo Social 2011* (México, D.F.: CONEVAL).
- Demerest, Arthur; Rice, Prudence; Rice, Don (Eds.), 2004: *The Terminal Classic in the Maya Lowlands* (Boulder: University Press of Colorado).
- Each-For, 2009: *Environmental Change and Forced Migration Scenarios* (Oxford: Each-For).
- Flores Palacios, Fátima and Wolfgang Wagner, 2010: “Conceptualization of Social Representations in Relation to the Risk of HIV-AIDS in Local Communities”, in: Brauch, Hans Günter *et al.* (eds.), *Coping with Global Environmental Change, Disasters and Security Threats, Challenges, Vulnerabilities and Risks* (Berlin: Springer): 1081-1090.
- Flores Palacios, Fátima, 2001: *Psicología social y género. El sexo como objeto de representación social* (México, D.F.: UNAM/McGrawHill).
- INEGI, 1990: *XI Censo General de Población y Vivienda, 1990*, INEGI, Aguascalientes.
- INEGI, 1995: *II Conteo General de Población y Vivienda, 1995*, INEGI, Aguascalientes.
- INEGI, 2000: *XII Censo General de Población y Vivienda, 2000*, INEGI, Aguascalientes.
- INEGI, 2005: *II Conteo General de Población y Vivienda, 2005*, INEGI, Aguascalientes.
- INEGI, 2011: *XIII Censo General de Población y Vivienda, 2010*, INEGI, Aguascalientes.
- INEGI, 2012: Statistical data on: <http://www.inegi.gob.mx>.

IOM [International Organization on Migration], IOM MC/INF/288, 2007: *Discussion Note: Migration and the Environment*, IOM2, Geneva, at: <http://www.iom.int/jahia/webdav/site/myjahiasite/shared/shared/mainsite/microsites/IDM/workshops/evolving_global_economy_2728112007/MC_INF_288_EN.pdf>.

Jonathan López, 2012: map elaborated on the data bank, published by CONEVAL, 2012.

Klot, Jeniffer and Pam DeLargy, 2007: “Sexual violence and HIV/AIDS transmission”, in: Couldrey, Marion, Tim Morris (eds.): *Forced Migration Review*, No. 27: *Sexual violence: weapon of war, impediment of peace* (Oxford: Refugee Studies Centre), January: 23-24; at: <http://www.fmreview.org/FMR_pdfs/FMR27/full.pdf>.

López, Mark Hugo; Livingston, Gretchen; Kochhar, Rakesh, 2009: *Hispanics and the Economic Downturn: Housing Woes and Remittance Cuts*. Report (Washington, D.C.: Pew Hispanic Center, 8 January).

Lozano, Fernando and Rivera, Liliana 2009: *Encuentros disciplinarios y debates metodológicos. La práctica de la investigación sobre migraciones y movilidades* (Cuernavaca: CRIM-UNAM).

Mexican Congress [Congreso de la Unión] (2009-2011). “Resumen de actividades en el Congreso de la Unión [Summary of the Activities in the Congress]” (Mexico, D.F.: Congress of the Union).

National Geographic, August 2007 /Washington: National Geographic Society).

Oswald *et al.*, 2013: *Migración-ambiental y vulnerabilidad de género* (Cuernavaca: CRIM-UNAM).

Oswald Spring Ú., 2012: “Environmentally-Forced Migration in Rural Areas: Security Risks and Threats in Mexico”, in: Scheffran *et al.* (eds.), *Climate Change, human security and violent conflicts, Challenges for societal stability*, Springer-Verlag, Berlin: 315-350.

Oswald Spring, Úrsula y Hans Günter Brauch, 2009: *Securitizar la tierra. Aterrizar la seguridad* (Bonn: UNCCD).

Oswald Spring, Úrsula, 1991: *Estrategias de Supervivencia en la Ciudad de México* (Cuernavaca: CRIM-UNAM).

Oswald Spring, Úrsula, 2001: *Estudios para la Paz desde una Perspectiva Global* (Mexico: Miguel Ángel Porrúa y CRIM-UNAM).

Oswald Spring, Úrsula, 2008: *Gender and Disasters. Human, Gender and Environmental Security: A HUGE Challenge*, Source, no 8 (Bonn: UNU-EHS).

Oswald Spring, Úrsula, 2009: “Food as a New Human and Livelihood Security Challenge, in: Hans Günter Brauch *et al.* (eds.): *Facing Global Environmental Change*:

- Environmental, Human, Energy, Food, Health and Water Security Concepts* (Berlin: Springer-Verlag): 473-502.
- Oswald Spring, Úrsula, 2009a: “A HUGE Gender Security Approach: Towards Human, Gender and Environmental Security”, in: Hans Günter Brauch, et al. (eds.): *Facing Global Environmental Change: Environmental, Human, Energy, Food, Health and Water Security Concepts* (Berlin: Springer-Verlag): 1165-1190.
- Passel, Jeffrey S.; Cohn, D’Vera, 2010: *Unauthorized Immigrant Population: National and State Trends* (Washington, D.C.: Pew Hispanic Center).
- Passel, Jeffrey S.; Cohn, D’Vera, 2010a: *A Portrait of Unauthorized Immigrants in the United States* (Washington, D.C.: Pew Hispanic Center).
- Passel, Jeffrey S.; Cohn, D’Vera, 2011: *U.S. Unauthorized Immigration Flows Are Down Sharply Since Mid-Decade* (Washington, D.C.: Pew Hispanic Center).
- Passel, Jeffrey S.; Cohn, D’Vera, 2011a: *Mexican Immigrants: How Many Come? How Many Leave?* (Washington, D.C.: Pew Hispanic Center).
- Passel, Jeffrey S.; Taylor, Paul, 2010: *Unauthorized Immigrants and their US-born Children*, in: <<http://pewhispanic.org/files/reports/125.pdf>>.
- Procuraduría General de la República, 2012: Statistical data on: <http://www.pgr.gob.mx>; see also AFI
- Renaud, Fabrice; Bogardi, Janos J.; Dun, Olivia; Warner, Koko, 2007: *Control, Adapt or Flee. How to Face Environmental Migration?* Intersection 5/2007 (Bonn: UNU-EHS).
- Sánchez Cohen, Ignacio; Oswald Spring, Úrsula, Díaz, Gabriel, 2011: “Forced Migration by Climate Change in Mexico. Some Functional Relationships”, *Journal for International Migration* (in press).
- Science, 18 May 2001: 1293; in: www.ciencemag.org.
- Science, 2008: 7 Nov., vol. 332: 837 –838; in: www.ciencemag.org.
- Science, 6 May 2005: 787; in: www.ciencemag.org.
- Serrano Oswald, Serena Eréndira, 2010: *La Construcción Social y Cultural de la Maternidad en San Martín Tilcajete*, PhD Thesis (Mexico, Institute of Anthropology- UNAM).
- SIAP [Servicio de Información Agroalimentaria y Pesquera] 2008: *Situación actual y perspectiva del maíz en México: 1996-2012*, Servicio de Información Agroalimentaria y Pesquera (SIAP), Mexico, D.F.
- U.S. Bureau of Labor Statistics, Division of Labor Force Statistics, 2010: “Labor Force Statistics from the Current Population Survey”, in: <http://www.bls.gov/cps/>.

Webster, David, 2002: *The Fall of the Ancient Maya* (New York: Thames and Hudson).

Zang, Pingzhong; Cheng, Hai; Edwards, R. Lawrence; Chen, Fahu; Wang, Yongjin; Yang, Xunlin; Liu, Jian; Tan, Ming; Wang, Xianfeng; Li, Jinghua; An, Chunlei; Dai, Zhibo; Zhou, Jing; Zhang, Dezhong; Jia, Jihong; Jin, Liya; Johnson, Kathleen R., 2008: “A Test of Climate, Sun, and Culture Relationships from an 1810-Year Chinese Cave Record”, in: *Science*, vol. 332 (7 November): 940 – 942.