G | M | F The German Marshall Fund of the United States
STRENGTHENING TRANSATLANTIC COOPERATION

Climate Change and Migration

Study Team on Climate-Induced Migration

June 2010

Summary: This paper reviews the likely effects of climate change on agricultural development and the resulting implications for internal and international migration. The agricultural sector employed about 1.4 billion of the world's 3.4 billion workers in 2008. Even without climate change, coming years are likely to witness continuing large-scale migration out of the agricultural sector, particularly in developing countries where farm incomes are significantly lower than non-farm incomes. Climate change, specifically global warming, is likely to accelerate this pace of migration.

Several economic models project that global warming will have more effects on the distribution of farm production than global farm output, with new areas becoming viable for farming as a result of higher temperatures. However, far more people are likely to be displaced by global warming than those likely to find jobs in these new farming areas.

Existing policy addressing the challenges already faced by agricultural workers as they seek alternative economic opportunities is limited. The likely impact of climate change on the agricultural sector, more displacement, underscores the urgent need for policymakers and the international community to commit greater attention and resources towards developing a package of innovative policies to provide workers with alternative opportunities within the agricultural sector or to ease their out-migration from the sector.

1744 R Street NW
Washington, DC 20009
T 1 202 745 3950
F 1 202 265 1662
E info@gmfus.org

Climate Change, Agricultural Development, and Migration

by Philip Martin

The agricultural sector employed about 1.4 billion of the world's 3.4 billion workers in 2008. The sector also comprises the largest reservoir of workers in any economic sector looking for higher wages and more opportunity. Out-migration from the agricultural sector, particularly in developing countries, has been an ongoing phenomenon in recent years and is likely to continue into the future. Climate change, specifically global warming, is likely to compound the challenges faced by agricultural workers in finding sustainable livelihoods. This paper discusses some of the challenges faced by these workers and also the role of governments and the international community in addressing these challenges.

In the following section, the paper reviews existing patterns of migration, focusing on the substantial out-migration from the agricultural sector in developing countries. Section 3 discusses the ways in which climate change is likely to affect agriculture especially in these same developing countries, and accelerate the current pace of out-migration of agricultural workers. Section 4 considers various existing policy options intended to deal with rural-urban migration. It also makes further suggestions towards developing a comprehensive package of policies aimed at addressing the challenges of agricultural workers as they adapt to the changing fortunes of the agricultural sector in coming years.

Existing patterns of migration in the agricultural sector

While median farm incomes in developed countries are higher than median non-farm incomes,[1] in developing countries, farm incomes are generally lower than the average incomes of non-farm households. While developed countries regularly subsidize their farmers,[2] developing country governments often tax farmers, usually by creating or allowing monopolies to sell farmers the seeds, fertilizers and other inputs they need at high prices. Alternatively, governments sometimes buy the commodities farmers produce at prices lower than the world price. Low farm incomes and few prospects for upward mobility in agriculture encourage workers, particularly youth, to leave rural areas and to move to towns and cities within the same country which offer better economic

[1] For example, a median $52,500 for farm households in 2007, versus a median $50,250 for all U.S. households (www.ers.usda.gov/Briefing/WellBeing/farmhouseincome.htm#distribution).
[2] The EU paid $150 billion in farm subsidies in 2008, followed by $42 billion paid in Japan and $23 billion in the United States; subsidies were more than half of farm revenue in Norway, Korea and Switzerland.

opportunities, establishing a pattern of internal rural-urban migration.

While such domestic rural-urban migration accounts for much of the migration in the agricultural sector, there are also cases of agricultural migration beyond national borders to fill jobs in developed countries. Moving workers rather than farm commodities over borders helps to increase the value of farmland in richer countries, and helps to retain other jobs at the higher end of the value chain, such as farm-related packing and transportation jobs, in these countries. Remittances from such work to the home countries of migrant workers can also offset healthcare and education costs for workers' children in developing countries, and it may further ease out-migration from the agricultural sector in developing countries by helping youth to find non-farm opportunities.

Perhaps the best known case of international migration from the agricultural sector is Mexico-United States migration, which has its roots in U.S. government approved recruitment of rural Mexicans to fill U.S. farm jobs between 1942 and 1964. Similar patterns may be observed in Europe, Japan, Korea, Australia and New Zealand, where labor-intensive agricultural production is sustained through the import of agricultural labor from developing countries. The production of strawberries in southern Spain, which employs 50,000 to 60,000 workers, mostly migrants from North Africa, Eastern Europe, and Latin America (Plewa, 2009), is a case in point. Additionally, there are also several middle-income developing countries that admit or tolerate migrants from lower-wage countries to help produce farm commodities for export. Thailand for example, has more than a million workers from neighboring countries employed in agriculture and fisheries.

Such patterns of migration within the agricultural sector, both domestic rural-urban migration and international migration, are likely to be exacerbated by global warming.

Global warming, agriculture and patterns of migration

There are three major ways in which global warming could affect agriculture and migration patterns. First, global warming is likely to generate more severe storms such as hurricanes that destroy housing, erode land and encourage migration, at least until recovery. Second, there may be more competition for land and water, especially in arid areas with rapidly growing populations, such as sub-Saharan Africa. Rising temperatures are associated with more water available for irrigation, but also increased variability in precipitation, so that drier areas may experience more severe droughts and wetter areas more floods. Competition for land and water can lead to conflict and migration, as when herders come into conflict with crop farmers.

Third, gradually rising temperatures are likely to shift areas of viable and optimal food production, making agriculture less productive in densely populated areas in developing countries and more productive in sparsely populated areas of industrial countries. Indeed, several economic models project that global warming will have more effects on the distribution of farm production rather than on global farm output (Darwin et al., 1995; World Bank, 2008: 16-17). The areas in which agricultural productivity is expected to decrease because of climate change include sub-Saharan Africa, South Asia, and parts of South America, while agricultural productivity may increase in currently colder areas such as Canada and Russia (Darwin et al., 1995; World Bank, 2008: 16-17).

Agriculture and migration will also be affected by other trends, including a rapidly rising demand for meat in middle-income developing countries that can accelerate deforestation as land is cleared for pasture. Deforestation may accelerate climate change; increase demand for biofuels that can push up food prices and encourage cutting down forests for new farmland; and create a rising demand for seafood that encourages production of fish, shrimp, and other seafood in coastal areas, sometimes in ways that permit increased storm-related damage in coastal areas. Deforestation to make land available for crops and livestock and to produce biofuels could accelerate global warming. Deforestation in developing countries already contributes one-quarter of greenhouse gas emissions, and half of this deforestation occurs to expand agriculture (World Bank, 2008: 17). Biofuels promise to reduce the use of fossil fuels, but so far they are not economically viable without subsidies and may have negative side effects, from rising food prices to more deforestation to create land on which to produce crops to turn into ethanol.

These three links between global warming and the agricultural sector suggest two plausible patterns of migration. First, we might expect acceleration in the pace of rural-urban migration within countries. We might also expect out-migration of agricultural workers from areas which are likely to become less viable for farming with climate change, and greater in-migration of workers to areas that are likely to become more viable for farming as a result of climate change.

However, the fact that agricultural areas likely to be adversely affected by climate change are relatively densely populated areas in developing countries, while those benefitting from global warming are sparsely populated locations in developed countries, with less social infrastructure to accommodate newly arrived international migrants, means that there is likely to be far more out-migration from adversely affected areas than in-migration to areas that become more productive. For example, the out-migration from low-lying areas of Bangladesh or arid areas of Africa is likely to be far greater than in-migration to northern Canada or Russia. Moreover, new farming operations there are not likely to be labor intensive, as with additional grain production in northern Canada or Russia.

The net effect of climate-induced changes in the agricultural sector is likely to be more migration out of the agricultural sector into non-farm opportunities. Climate change is expected to make agriculture less viable for already poorer-than-average rural residents in many developing countries, which should increase the pace of domestic rural-urban migration and to a lesser extent, international migration into agricultural and urban sectors in other countries. While this increased migration will likely follow well-established migration networks, which may make it hard to isolate statistically the extra migration due to climate change (World Bank, 2009: 110),[3] this should not deter policymakers from acknowledging the impact of climate change on migration patterns in the sector, and to move towards developing effective policies to address these trends.

Policy options for agricultural migration

Out-migration from the agricultural sector related to global warming is likely to benefit from many of the same policy options applied to out-migration from the agricultural sector in general. The policies proposed by many governments generally fall into one of two categories: (1) attempts to provide incentives for agricultural workers to remain in the sector, and (2) to ease the transition of out-migration from the agricultural sector, by helping workers to integrate effectively into their new environments. Policy options in both categories are limited and require further and urgent consideration.

One key policy aimed towards helping migrants integrate in urban areas is to remove barriers to government services. The United Nations Development Programme (UNDP) estimated that one-third of developing countries presently restrict the access of internal migrants to public services away from the place in which they are registered to live. China, India, and other developing countries have been urged to abolish or revamp systems that often limit the public services available to internal migrants.[4]

As for policies aimed towards retention of workers in the agricultural sector, the World Bank (2008: 2) is currently leading the major effort to transform the agricultural sector into a tool for development. Some 75 percent of the poor in developing countries are in rural areas.[5] Three major changes are recommended: (1) Increased investments in agricultural R&D, including research on how to produce food and fiber in the face of climate change; (2) Land reform and creation of opportunities for non-farm supplemental incomes in rural areas; and (3) Provide incentives for farmers and other rural residents to manage limited supplies of

[3] WDR 2010 on climate change and development includes a box on page 110 on migration that emphasizes that "climate change is likely to add incrementally to existing migration patterns rather than generating entirely new flows of people."

[4] The Chinese government regulates internal mobility with a hukou or household registration system that limits access to public housing, education, medical and other benefits to the place where a person is registered. The OECD's Economic Survey of China in February 2010 recommended that the hukou system be phased out and that the Chinese government develops national pension and health insurance systems to promote internal mobility. Under the hukou system, some coastal areas with mostly migrant workers, who do not participate in pension systems where they work, must levy high taxes on employers to provide benefits to their elderly residents eligible for services. Meanwhile, rural areas with few workers must also levy high taxes on their few employers and workers in order to provide pension benefits to their growing elderly populations.

[5] For example, agriculture employs 40 percent of the world's workers and 70 percent of the world's 5 to 14-year-old workers, according to Pigott.

land, water and other natural resources in environmentally sustainable ways.

While many of these options are well-intentioned, the road to implementing them is likely to be a rough one. For example, creating non-farm job opportunities in rural areas is not likely to be an easy task. In the case of the manufacturing sector, another sector which has seen considerable changes with the advent of economic development and free trade agreements, attempts to create new opportunities for workers have not been without their challenges. The U.S. experience demonstrates that ex-factory workers, even when provided with opportunities for retraining and education, rarely find new jobs that offer similar wages and benefits, prompting many factory workers and their unions to oppose freer trade despite Trade Adjustment Assistance for those who lose their job as a result of freer trade (Rosen, 2008).

Farm employment falls "naturally" with economic development, and higher non-farm wages act as a magnet to "pull" labor out of agriculture. Creating non-farm jobs in rural areas could minimize migration, but non-farm industries offering higher wages often need subsidies to induce them to locate in areas that may have higher transportation costs and lack workers with needed skills. It is often easier to call for value-added processing of the farm commodities produced in rural areas than to develop viable processing facilities. For example, many of the African countries complaining that U.S. cotton subsidies increase cotton production and reduce the global price of cotton ship their own raw cotton abroad to be turned into cloth, and import the cloth needed to produce garments.

Mass migrations due to climate changes will be much easier to identify but perhaps harder to deal with effectively. For example, storms that cover land with salt water or wash away top soil can displace large numbers of people quickly, as with Cyclone Aila in southwestern Bangladesh in May 2009. The initial policy response is temporary support until the agricultural system can be repaired and those who were displaced can return and resume farming; in the case of Aila, the government expected waters to recede, and they did not, which made it impossible for farmers to plant.

Similarly, flooding that covers low-lying land can result in displacement to temporary shelters followed by a return to farming. What is not clear is when or whether a mass movement as a result of a climate-related event will or should lead to permanent resettlement.

Conclusions

The agricultural sector comprises the largest reservoir of workers looking for higher wages and more opportunity. Global warming is likely to exacerbate the challenges faced by agricultural workers. While it may be difficult to isolate climate change from other factors encouraging people in rural areas to move to urban areas, there can be little doubt that climate changes will add to out-migration. It is also clear that existing policy is inadequate to address the current flow of migrants from the agricultural sector, much less an increased movement as a result of climate change. The likely effects of global warming underscore the urgency of developing effective and comprehensive policy to address the challenges faced by agricultural workers. A concerted effort on the part of home and host governments, and the international community, and a commitment of resources towards developing feasible and innovative options and incentives to make both the rural sector attractive or to assist migrants in making the transition out of the agricultural sector will be critical in the next years.

Philip Martin is a Professor and Chair of the Comparative Immigration and Integration Program at the University of California at Davis.

The University of California-Davis Migration Dialogue provides timely, factual and non-partisan information and analysis of international migration issues.

PHOTO CREDIT: Floods in Ifo refugee camp, Dadaab,Kenya, UNHCR: B. Bannon, December 2006.

References

Darwin, Roy, Marinos Tsigas, Jan Lewandrowski, and Anton Raneses (1995) World Agriculture and Climate Change: Economic Adaptations. Natural Resources and Environment Division, Economic Research Service, U.S. Department of Agriculture. Agricultural Economic Report No. 703.

Intergovernmental Panel on Climate Change (2007) Synthesis Report. www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm

Martin, Philip (2009) *Importing Poverty? Immigration and the Changing Face of Rural America*. Yale University Press.

Mendelsohn, Robert and Ariel Dinar (2009) *Climate Change and Agriculture: An Economic Analysis of Global Impacts, Adaptation and Distributional Effects*, Edward Elgar, www.e-elgar.co.uk/Bookentry_Main.lasso?id=12990

NASA (2009) Global Climate Change: NASA's Eyes on the Earth, http://climate.nasa.gov/keyIndicators/

OECD (2010) Economic Survey of China. February, www.oecd.org/document/43/0,3343,en_2649_34111_44477419_1_1_1_37443,00.html

Pigott, Marilyn (2003) Decent Work in Agriculture. ILO ACTRAV, Geneva. September, www.ilo.org/public/english/dialogue/actrav/new/agsymp03/index.htm

Plewa, Piotr (2009) Administration of Seasonal Foreign Worker Admissions to Huelva's Strawberry Agriculture, available at: http://migration.ucdavis.edu/cf/

Rosen, Howard (2008) Strengthening Trade Adjustment Assistance. Peterson Institute for International Economics Policy Brief 08-2. www.piie.com/publications/interstitial.cfm?ResearchID=878

Rural Migration News (2009) Climate Change and Ag; AB 32. Volume 15 Number 3. July, http://migration.ucdavis.edu/rmn/comments.php?id=1474_0_5_0

UNDP (United Nations Development Programme) (2009) Overcoming barriers: Human mobility and development, http://hdr.undp.org/en/reports/global/hdr2009/

World Bank (2008) Agriculture for Development, www.worldbank.org/wdr2008

World Bank (2009) Development and Climate Change, http://go.worldbank.org/ZXULQ9SCC0

Study team members

Susan Martin, Institute for the Study of International Migration, School of Foreign Service, Georgetown University, Washington, DC (Co-Chair)

Koko Warner, Institute for Environment and Human Security, United Nations University, Bonn, Germany (Co-Chair)

Jared Banks and Suzanne Sheldon, Bureau for Population, Refugees and Migration, U.S. Department of State, Washington, DC

Regina Bauerochse Barbosa, Economy and Employment Department, Sector Project Migration and Development, German Technical Cooperation (GTZ), Eschborn, Germany

Alexander Carius, Moira Feil, and Dennis Tänzler, Adelphi Research, Berlin, Germany

Joel Charny, Refugees International, Washington, DC

Dimitria Clayton, Ministry for Intergenerational Affairs, Family, Women and Integration, State of North Rhine-Westphalia, Düsseldorf, Germany

Sarah Collinson, Overseas Development Institute, London, United Kingdom

Peter Croll, Ruth Vollmer, Andrea Warnecke, Bonn International Center for Conversion, Bonn, Germany

Frank Laczko, International Organization for Migration, Geneva, Switzerland

Agustin Escobar Latapi, Centro de Investigaciones y Estudios Superiores en Antropología Social (CIESAS), Guadalajara, Mexico

Michelle Leighton, Center for Law and Global Justice, University of San Francisco, San Francisco, California and Munich Re Foundation-UNU Chair in Social Vulnerability

Philip Martin, University of California, Migration Dialogue, Davis, California

Heather McGray, World Resources Institute, Washington, DC

Lorenz Petersen, Climate Change Taskforce, German Technical Cooperation (GTZ), Eschborn, Germany

Aly Tandian, Groupe d'Etudes et de Recherches sur les Migrations (GERMS), Gaston Berger University, Senegal

Agnieszka Weinar, Directorate-General Justice, Freedom and Security, European Commission, Brussels, Belgium

Astrid Ziebarth, German Marshall Fund of the United States, Berlin, Germany.

List of papers

Developing Adequate Humanitarian Responses
by Sarah Collinson

Migration, the Environment and Climate Change: Assessing the Evidence
by Frank Laczko

Climate Change and Migration: Key Issues for Legal Protection of Migrants and Displaced Persons
by Michelle Leighton

Climate Change, Agricultural Development, and Migration
by Philip Martin

Climate Change and International Migration
by Susan F. Martin

Climate Change, Migration and Adaptation
by Susan F. Martin

Climate Change, Migration and Conflict: Receiving Communities under Pressure?
by Andrea Warnecke, Dennis Tänzler and Ruth Vollmer

Assessing Institutional and Governance Needs Related to Environmental Change and Human Migration
by Koko Warner

Transatlantic Study Teams

The GMF Immigration and Integration Program's Transatlantic Study Teams link the transatlantic debate on international migration flows with its consequences for sending and receiving regions. Through compiling existing data, policy analysis, and dialogue with policymakers, selected study teams gather facts, convene leading opinion leaders on both sides of the Atlantic, promote open dialogue, and help to advance the policy debate. Study teams are chosen by a competitive selection process, based on the overall quality of their proposal, its policy relevance, institutional strength, sustainability, and potential for synergies. The Transatlantic Study Team 2009/2010 is investigating the impact of climate change on migration patterns. Environmental deterioration, including natural disasters, rising sea level, and drought problems in agricultural production, could cause millions of people to leave their homes in the coming decades. Led by Dr. Susan F. Martin, Georgetown University, and Dr. Koko Warner, UN University, the team consists of scholars, policymakers and practitioners from the migration and environmental communities.

The German Marshall Fund of the United States (GMF) is a non-partisan American public policy and grantmaking institution dedicated to promoting better understanding and cooperation between North America and Europe on transatlantic and global issues. GMF does this by supporting individuals and institutions working in the transatlantic sphere, by convening leaders and members of the policy and business communities, by contributing research and analysis on transatlantic topics, and by providing exchange opportunities to foster renewed commitment to the transatlantic relationship. In addition, GMF supports a number of initiatives to strengthen democracies. Founded in 1972 through a gift from Germany as a permanent memorial to Marshall Plan assistance, GMF maintains a strong presence on both sides of the Atlantic. In addition to its headquarters in Washington, DC, GMF has seven offices in Europe: Berlin, Bratislava, Paris, Brussels, Belgrade, Ankara, and Bucharest.

The Institute for the Study of International Migration is based in the School of Foreign Service at Georgetown University. Staffed by leading experts on immigration and refugee policy, the Institute draws upon the resources of Georgetown University faculty working on international migration and related issues on the main campus and in the law center. It conducts research and convenes workshops and conferences on immigration and refugee law and policies. In addition, the Institute seeks to stimulate more objective and well-documented migration research by convening research symposia and publishing an academic journal that provides an opportunity for the sharing of research in progress as well as finished projects.

The UN University established by the UN General Assembly in 1973, is an international community of scholars engaged in research, advanced training and the dissemination of knowledge related to pressing global problems. Activities focus mainly on peace and conflict resolution, sustainable development and the use of science and technology to advance human welfare. The University's Institute for Environment and Human Security addresses risks and vulnerabilities that are the consequence of complex environmental hazards, including climate change, which may affect sustainable development. It aims to improve the in-depth understanding of the cause effect relationships to find possible ways to reduce risks and vulnerabilities. The Institute is conceived to support policy and decision makers with authoritative research and information.