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Remote Sensing and Mass Migration Policy Development

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Mass migration is a global problem that affects displaced persons, their countries of origin, and the nations that voluntarily or involuntarily receive them. The 2010 US National Security Strategy recognized the domestic and international perils that refugees and the underlying causes for their dislocation represent and acknowledged that future conflicts caused by scarce resources, environmental disasters, or refugees were possible.[1]

In his congressional testimony regarding the 2010 Threat Assessment, Director of National Intelligence Dennis Blair expressed concern about the prospect of mass migration from Cuba or Haiti to the United States. He also warned that population movements caused by climate change could have a negative impact in India, China, Southeast Asia, and Europe within 20 years, resulting in broad national security consequences for the United States.[2] The National Reconnaissance Office (NRO) stands as one of the first lines of defense against these potential catastrophes. It develops, acquires, and operates US satellite systems that conduct space reconnaissance by collecting the imagery intelligence, signals intelligence, and measurement and signature intelligence required by its customers, including those in both Department of Defense (DOD) and non-DOD US government agencies.[3] NRO thus fulfills critical requirements necessary for the formulation of national strategy.

Its national sensor systems provide the means to gather information beyond that required for military operations.[4]

The 2000 congressionally-chartered National Commission for the Review of the National Reconnaissance Office recommended the NRO "focus on innovation" to preclude intelligence failures that "have a direct influence on strategic choices facing the nation."[5] The NRO should therefore initiate procedures to identify and measure triggers for mass human migration and proactively participate in interagency forums developing policy pertaining to such events. The NRO may thus promote the attainment of US national security objectives by guiding the development of policy regarding mass migration, thereby enhancing its critical role in supporting the success of the National Security Strategy. An examination of the causes of mass migration and its effects, using the examples of water resources, agricultural conditions, disease, and climate change, demonstrates how remotely measurable factors may foreshadow large-scale human migration and shows that the NRO should use its findings to inform policy to prevent or mitigate such movements.

Causes of Internal and International Migration

People may freely choose to move from place to place, or they may relocate in response to duress. Voluntary migrations take place because people become dissatisfied with their present location. Push factors inducing these migrations motivate citizens to abandon their customary residences for another locale. Such influences might include:

- armed conflicts
- natural disasters
- discrimination based on religion, politics, or ethnicity
- inability to earn a living wage
- depletion of natural resources
- war
- climate change
- famine
- population pressure on arable land
- disease
- pollution
- human rights abuses, or
- economic considerations.

Voluntary migration may also occur as a result of pull factors providing people with positive reasons to relocate, including seeking a place with a more favorable religious or political climate, a lack of racial discrimination, improved job or educational opportunities, or a more agreeable physical environment. They might also look for a region possessing cultural or linguistic ties with the state from which they intended to emigrate.[6] Involuntary migrations occur when populations are coerced to relocate, and like voluntary relocations, they may comprise internal and international population movements.

Globalization has contributed to mass migration. International finance and trade promote the mobility of people, ideas, and technology among and within states. While it has led to prosperity in many regions, globalization has resulted in a concentration of wealth in the North[7] while the developing nations of the South[8] remain poor. The political, economic, and social interrelationships that have come into being as a result of globalization have also affected the worldwide system where the movement of migrants takes place.

Sarah Collinson, a fellow at the United Kingdom's Overseas Development Institute, contended that a number of states have recently collaborated to limit and place restrictions on cross border movements. The North became less willing to accept immigrants or asylum-seekers, perceived as ignoring legal entry policies, undermining national identify, or taking jobs from local workers.[9] Sociologist Susanne Schmeidl contended that state interest could prevent United Nations (UN) member nations from taking action to prevent mass migrations as they did during the 1994 Rwanda genocide. She further maintained that the concepts of "safe zones"[10] and the "right to remain"[11] could serve as means of preventing refugees from entering asylum states.[12]

A shift of industrial production to the South caused migration from rural areas to cities and in some cases led to the abandonment of traditional agriculture. Those unable to find jobs in urban areas forsook their homelands and sought employment in other countries, forming a

base on which a continued flow of migrants built. Such a loss of residents brought changes to the country of emigration, often including an exodus of educated or professional citizens that left the home country with a larger percentage of unskilled workers. In the country of immigration, new ideas transmitted by migrants precipitated political, cultural, and social changes.[13]

Some nations have chosen to adopt policies fomenting mass migration to achieve a strategic effect: "coercion predicated on the international creation, manipulation, and exploitation of migration and refugee crises."[14] Prof. Kelly M. Greenhill argued that since the adoption of the UN's 1951 *Convention Relating to the Status of Refugees*, coerced migration has been initiated on at least 56 occasions and possibly on another eight; in more than half of those cases, the state precipitating those population movements obtained its strategic goal.[15] She maintained that the asymmetric strategy threatens civilian populations with "demographic bombs" that could disrupt their nation's economic and social fabric.[16] Among the 64 instances cited, the United States alone or in conjunction with other nations or international institutions was targeted 23 times.

For example, on three occasions Cuban president Fidel Castro used the threat of mass Cuban immigration into the United States to gain his strategic objective of controlling the flow of Cuban refugees to the United States: the opening of the port of Camarioca in September

1965, the 1980 Mariel boatlift, and Castro's August 1994 decision to suspend arrests of those who attempted to flee to the United States by boat. The Mariel boatlift, which resulted in over 100,000 Cubans entering America, ended only after the United States agreed to discuss immigration in conjunction with other issues regarding Cuba. In the other two cases, the United States and Cuba reached new accords on immigration regulations.[17]

Effects of Mass Migration on Societies

Mass migrations have a profound impact on both the people in transit and the host population. In examining such migrations brought about by environmental change, one should consider how the availability of natural resources affects mobility decisions, the agricultural considerations entailed in large-scale population shifts, and the frictions that arise between people prior to and as a result of mass relocations.

The UN Population Fund's *State of the World Population 2010* reported that more than 40 million people were currently displaced either internally or living as refugees in other countries, with internally displaced persons outnumbering refugees. John Holmes, UN under-secretary-general for humanitarian affairs and emergency relief coordinator, described them as "'disoriented, traumatized, confused, fearful, disempowered, dependent, helpless.'"[18]

For example, more than 2.6 million persons were displaced within Iraq and another 1.9 million had fled to other countries. A sense of

community was lacking among Iraqis who had fled to Jordan, Iraqi children were sometimes bullied in the schools, and sexual and gender-based violence existed within refugee communities. Since Jordan had not signed the UN's 1951 *Convention and Protocol Relating to the Status of Refugees*, refugees there were "guests" who were not permitted to hold jobs, a state of affairs that placed them in precarious financial circumstances. Of the estimated half million Iraqi refugees in Jordan, only 30,000 had registered with the UN Human Rights Commission (UNHRC), and approximately 12,000 of that number were receiving financial aid. Many Iraqi refugees with the wherewithal moved on to other countries, leaving an increasingly poor refugee population remaining in Jordan. Women and girls were particularly at risk due to their susceptibility to exploitation and violence, a fact that adversely affected the health and well-being of children dependent upon them.[19]

Displaced persons within Iraq were vulnerable to being targeted because of their religious beliefs, identification with political parties or tribes, and cooperation with US or Iraqi forces. Those who had no family or friends to move in with were relegated to public facilities or to camps operated by the Iraqi Red Crescent Society or the Ministry of Displacement and Migration. They experienced shortages of the basic necessities of life and placed a huge burden on the communities in which they were sheltered. Iraqi refugees faced the prospect of remaining in a status similar to Palestinian refugees who have been marginalized for

years. They were subject to social isolation, and many Iraqi refugee children were not attending school.[20]

In early 2009 internally displaced persons in Afghanistan numbered approximately 231,000, another 278,000 former refugees had returned home, and about 3 million Afghan refugees remained in other countries.[21] The UN High Commissioner for Refugees estimated that more than five million refugees had returned to Afghanistan since 2002, taxing the country's resources and intensifying the need for basic necessities like food, water, shelter, transportation, and a means of earning a living. Many of the returnees owned no property in their native country. Children were at risk of being forced into child labor, human trafficking, smuggling, and marriage at an early age. Reintegration into Afghan society remained difficult for those who may have spent years in Pakistan or Iran and returned in a condition of abject poverty.[22] These problems were exacerbated by continuing hostilities in Afghanistan.

As of 1 January 2008, Afghanistan and Iraq were the two top countries of origin for refugees, together being the source of 43 percent of the total number from the top 10 countries.[23] The difficulties encountered by refugees and displaced persons from these two nations were typical of those experienced by their counterparts around the world. States targeted by mass migrants, therefore, faced a variety of social and political problems, not the least of which was a commitment for

resources of an unknown magnitude necessary to provide for the migrants' basic human needs for an indeterminate amount of time.

In the post-9/11 world, states were also concerned that terrorists might seek to enter their borders along with refugees. As of December 2008, 147 countries had signed either the UN's 1951 *Refugee Convention* or its 1967 *Protocol*, which mandated that refugees not be returned to regions where threats to their lives or freedom existed. The UN therefore proposed three solutions for refugees: voluntary repatriation, local integration, and resettlement. Those unwilling to return to their country of origin, however, found few nations willing to accept them.[24]

International Migrants and Internally Displaced Persons

The UN has defined an international migrant as "any person who changes his or her country of usual residence" voluntarily or involuntarily.[25] A 1992 UN report identified internally displaced individuals as "'persons who have been forced to flee their homes suddenly or unexpectedly in large numbers, as a result of armed conflict, internal strife, systematic violations of human rights or natural or man-made disasters, and who are within the territory of their own country.'"[26]

The Inter-Parliamentary Union (IPU) cited "economic hardship; social, religious and ethnic instability; rapid population growth; political repression; the threat or use of force; environmental disasters; and threat of starvation, and internal migration" as direct and indirect causes of the mass migration of humans.[27] Maintaining that it was often difficult to

determine whether a particular person's reasons for migration were voluntary or involuntary, the IPU acknowledged the profound "social, economic, administrative, political and national costs" of mass migrations for both the losing and gaining nations.[28] Year after year, the number of involuntarily displaced persons continues to rise. By the end of 2004, the total population of concern as calculated by the UNHCR reached 19.2 million. That number included 9.2 million refugees, with the remainder being comprised of asylum seekers, returned refugees, internally displaced persons (IDP), returned IDPs, stateless persons, and various other persons of concern. IDPs alone totaled in excess of 5.4 million.[29] By the end of 2009, the worldwide total had reached 36.5 million, with 15.6 million of that number being IDPs.[30]

In order to minimize the negative consequences of large-scale migrations, the United States should develop an effective early warning system to prevent or mitigate mass population movements. The first step in accomplishing this is to identify the factors that provoke such migrations. In 1989 Lance Clark of the Refugee Policy Group developed a model for early warning of forced migration, identifying its underlying causes, the immediate provocation for movement, intervening factors that increased or decreased the likelihood of compulsory relocation, and the stimulus that initiated the actual migration. Writing in 1995, Susanne Schmeidl introduced a quantitative element to Clark's model. She maintained that the root causes of forced migrations were

circumstances existing over long periods of time, such as religious differences, border disputes, ecological problems, or poor governance. She held that proximate causes for migration exacerbate preexisting factors, such as when government is unwilling or unable to address longstanding, divisive problems.[31] She examined factors facilitating or complicating forced migration, including:

- Coping strategies that might preclude international migration
- Perceived or actual obstacles to international flight
- Presumed reception in target country
- Cultural precedents for decision making
- Seasonal considerations such as weather or agriculture.[32]

She agreed with other scholars' conclusion that early warning should be accomplished by collecting data that indicated a forced migration might occur, analyzing it, building scenarios, determining possible responses, and transmitting the information to decision makers.[33]

Remotely Measurable Predictors of Mass Migration

Many indicators that mass migration is imminent or that it has begun are remotely measurable. Imagery obtained from satellites and manned and unmanned aerial reconnaissance systems provides evidence of large-scale human movement by noting changes in historical patterns of population distribution. It is also particularly useful in determining changes in environmental factors—especially those driven by climate change—that provide the impetus for mass migration. In the early 1980s,

scientists realized that only remote sensing by satellites could provide overall measurement of gross primary production (GPP) and net primary production (NPP) on a global scale.[34] Researchers recommended making GPP and NPP data about conditions within the biosphere available in a manner similar to the provision of weather reports. That information would provide the basis for determining the extent to which an area could support human life and in predicting desertification, deforestation, and the effects of wildfires, pollution, and climate change. The discovery of deterioration in an ecosystem could indicate the need for changes in land management policies. Prof. Steven W. Running and others concluded that strategic planners could use long-term trends in NPP to measure regional declines in productive capability. For example, they noted that desertification in sub-Saharan Africa, long presumed to be due to overgrazing, in fact corresponded to precipitation levels. They concluded that only large scale remote sensing could measure changes in vegetation on a regional level and pointed to the value of remotely observing and predicting the runoff of water, which is rapidly becoming the most limited natural resource. Running and his research team emphasized the utility of NPP data in land management, the formulation of environmental policy, and tracking changes in the biosphere.[35] Earth observation by satellites can detect potential threats to human security that may spark mass migration such as stressed water resources, adverse agricultural conditions, disease, and climate change.

Water Resources

As the world's population swells and the global mean surface temperature increases,[36] the supply of clean, safe water continues to diminish. When temperatures rise, less water is stored in glaciers and snow packs, which currently comprise 68.6 percent of the earth's total supply of fresh water and supply water for one-sixth of the world's population.[37] Bloomberg reported in 2006 that "the lack of usable water worldwide has made it more valuable than oil," since its World Water Index of 11 utilities had returned 35 percent per year since 2003 while oil and gas stocks yielded only 29 percent.[38] The American College of Environmental Lawyers reported in January 2010 that the Bloomberg World Water Index had continued to produce larger returns each year than either gas and oil stocks or the Standard & Poor's Index.[39] Bloomberg also noted that the UN had predicted that by 2050, water deficits would affect in excess of 2 billion people in 48 nations. It further observed that China, which is home to 20 percent of the world's population, has access to only 7 percent of its fresh water supply and forecast that between 1995 and 2025, global use of fresh water for drinking, agriculture and industry could increase by 22 percent.[40]

Scientists use satellites to measure the amount of water in the Amazon River floodplain, enabling them to predict droughts and floods that may result from global climate change.[41] A European Space Agency (ESA) project has helped Zambia manage its water shortages. Its

multispectral medium resolution imaging spectrometer (MERIS) sensor on Envisat mapped existing water resources and vegetation in the Kafue River Basin and identified potential dam sites. A Science Daily press release noted that "IWAREMA [Integrated Water Resource Management for Zambia] was one of the projects initiated under ESA's TIGER initiative, launched in 2002 employing space technology to assist African countries to overcome water-related problems and to bridge Africa's water information gap using satellite data. To date, more than 100 African water basin authorities, universities and other organizations have become involved in TIGER projects across the continent."[42]

The Horn of Africa, an arid to semi-arid region, is subject to frequent droughts. Shortages of rainfall cause recurrent crop failures, which precipitate the starvation that promotes mass migration. Geostationary weather satellites collect data that may be used with geographical information systems (GIS) to monitor current conditions, identify seasonal trends, and predict rainfall, providing the ability to plan for and mitigate future drought events. In 1975 the UN Economic Commission for Africa chartered the Regional Centre for Mapping of Resources for Development, which cooperates with the National Aeronautics and Space Administration (NASA) to initiate SERVIR, a satellite-based disaster early warning system for Africa that makes disaster information available over the Internet. Data from Meteosat second generation, a geostationary weather satellite, and SPOT, which

provides data on vegetation, are available throughout Africa on free receiving stations provided by the European Union.[43] Used together these systems can predict upcoming water crises in time to allow the initiation of policies and programs designed to ameliorate the effects of shrinking water resources.

Agricultural Conditions

The 1992 Earth Summit in Rio de Janeiro identified desertification as a significant environmental and social challenge for the future. The relentless progress of desertification adversely affects the world's poorest people. Formerly arable land continues to decline in productivity due to loss of ground cover, erosion, and deterioration in soil quality. Areas subject to desertification comprise 40 percent of the global land surface and support more than one billion people. The ESA sponsors DesertWatch, a satellite-based information service, to identify regions at risk for desertification in Greece, Italy, Portugal, and Turkey, which together contain 30 million hectares of drylands that are home to 16.5 million people. Desertification can be mitigated or reversed if high-risk areas can be identified in time. "Satellite images can highlight relevant land use change along with increased surface reflectivity, temperature, dryness, and dustiness. Infrared sensors can detect vegetation stress due to environmental shifts."[44] Once the at risk areas have been identified, measures to restore degraded lands and reduce the incidence of human-

caused droughts such as those taught at the Africa Centre for Holistic Management in Zimbabwe may be initiated.[45]

Commercially available satellite or aerial remote sensing technology can provide a wealth of information for agricultural applications. Satellite Imaging Corporation, for example, provides "satellite imagery data at different spatial, spectral and temporal resolutions for agriculture and crop assessment, crop health, change detection, environmental analysis, irrigated landscape mapping, yield determination, and soils analysis."[46] The images it delivers "can show variations in organic matter and drainage patterns. Soils higher in organic matter can be differentiated from lighter sandier soil that has a lower organic matter content."[47] Satellites can monitor crop growth throughout the season, identifying problem areas such as weed infestations and assessing the effectiveness of watering.[48] The widespread employment of such technology could optimize agricultural production, allay the effects of climates change, and reduce the risk of mass migration due to food shortages.

Disease

Remote sensing has broad applications in monitoring the spread of disease, providing early warning of health emergencies, and allowing for the application of preventative measures. For example, in 2008 malaria, a preventable disease, infected 247 million people, killing nearly 1 million. It is caused by parasites transmitted to people by the bite of an

infected *Anopheles* mosquito. About half of the world's population is in danger of contracting malaria, with most cases occurring in sub-Saharan Africa and fewer in Asia, Latin America, the Middle East, and some parts of Europe.[49] Remote sensing may be used to determine concentrations of *Anopheles* mosquitoes in areas with a particular type of land cover. The National Oceanic and Atmospheric Administration and Meteosat weather satellites have provided valuable data in correlating rainfall and the amount of green vegetation with the density of the mosquito population. Landsat has been used to determine the connection between vegetation characteristics and malaria transmission, and Landsat 1, 2, and SPOT provided data on flora, water plants, and land cover that are linked to the breeding environment for *Anopheles*. These studies merged "landscape ecology, vector biology, and human epidemiology, linking large-scale maps to individual risk in local human populations."[50] A 2005 study conducted in Thailand used Landsat5 thematic mapper to classify eight land cover types that corresponded with the mosquito life cycle. The researchers were able to build a statistical model that predicted *Anopheles* mosquito densities on varied land covers, allowing for targeting of mosquito eradication efforts.[51]

Remote sensing has been used extensively to provide early warning of disease. Cholera outbreaks in Bangladesh have been predicted by detecting coastal algae blooms containing *Vibrio cholerae*, which serves as a food source for zooplankton that are later consumed in drinking

water.[52] Forecasts using GPP data may be used to identify areas where infected mice might transmit hantavirus. Since the mouse population is directly correlated with the productivity of desert plants, satellite monitoring of the seasonal changes in vegetation can forewarn health officers of the spread of the mice into new areas.[53] Remote sensing has further enabled tracking of climate conditions that are favorable to disease outbreaks and to predict occurrence of diseases in new areas due to climate change in time to initiate public health actions to assuage their impact.[54]

Scientists contend that the consequences of climate change on human health will be largely negative. It has already affected the transmission and geographic distribution of diseases such as malaria, dengue, diseases transmitted by ticks, cholera, and other diarrheal diseases. The proliferation of these diseases is exacerbated by human and animal migrations.[55] Disease and health issues are numbered among the push factors for human migration. Data gathered by satellites and input into geographic information systems introduces a spatial perspective on disease and comprises a valuable tool for analysis in public health and epidemiology that can used to improve public health, thus diminishing the impetus for mass migration due to disease.[56]

Climate Change

The 2010 National Security Strategy mandates a focus on building international relationships to combat the threat of climate change and

warns that it can threaten the security of regions.[57] London-based nongovernmental organization International Alert identified four primary risks associated with climate change: “political instability, economic weakness, food insecurity, and large-scale migration.”[58] It concluded that impoverished countries, which often suffer from poor governance, would find it difficult to cope with climate change and that climate change would likely contribute to a rise in armed conflict. If food supplies were to become scarce, mass migrations would likely ensue, heightening the possibility of violent clashes with governments that fear large influxes of foreigners and attempt to forestall them with provocative policies. Migrants moving into areas that are only marginally productive would be most likely to be perceived as a liability to a struggling nation.[59]

International Alert has predicted that global migration as a result of climate change could affect 200 million people by 2050. Climate change may displace coastal populations living at or near sea level. Melting glaciers may affect the water supply for millions, droughts or floods may ensue, and desertification may take place. Diseases may spread, and growing seasons, crop yields, and agricultural zone characteristics may change. To cope with these problems, policies that address ways of adjusting to a new environment must be put in place.[60]

As climate change takes place, increasingly more precise predictions of climate variations are required. The recent increase in satellite data made available for use in computer modeling has improved

forecasts, but the addition of more categories would increase their accuracy. For example, climate forecasts could be enhanced by increased data on soil moisture over large regions measured by satellite-based instruments. The ESA initiated its Soil Moisture and Ocean Salinity mission in November 2009, and NASA plans to begin the Soil Moisture Active and Passive mission in 2014. The US National Research Council has call for proposed increased cooperation between US government agencies and universities to improve forecast quality and the creation of pubic archives to facilitate the review of past predictions for accuracy.[61]

Policy Recommendations

Despite its focus on designing and operating US reconnaissance satellites, given the profound effects that result from mass migrations, the NRO should take prompt action to identify the precursors of push factors. This may be accomplished by improving targeting, processing, exploitation, and dissemination of data related to mass migrations; establishing mechanisms to enable the provision of advance warning of impending disasters; and participating in the development of response plans, in coordination with social scientists who can assist in integrating remotely collected data with information acquired by conventional means.[62] Satellite operating doctrine should be reexamined in regard to allocation considerations. Increased access should be provided to archived data to facilitate tracking change over time. During the Clinton administration, for example, the Central Intelligence Agency allowed

civilian scientists to review archived materials to identify environmental problems, and the Medea Group, chartered by the National Intelligence Council in 1992, studied past satellite imagery to detect diseases in trees, track deforestation, and assess the condition of fisheries.[63] Finally, the NRO should foster an internal climate that promotes innovation in the use of existing systems, the development of new ones, and their creative employment.

The United States should continue cooperation with the UN's early warning initiatives and technologies designed to monitor and identify dangers to the earth, water, and air. Sharing data from international scientific monitoring systems and enhancing training and communication networks can assist in reducing the incidence of mass migration in the event of a natural disaster.[64] At the same time, continued research into probable migration patterns will allow planners to identify the migrant populations and their likely destinations, enabling early intervention to identify potential problems and deconflict the process.[65] The collection of information including specific indicators of impending large population movement; analysis of information by attaching meaning to the indicators, placing them into context, and recognizing crisis development; formulation of best and worst-case scenarios; creation of response options; and the communication of the result to decision makers are key steps in the process of effective early warning.[66]

In her study of coercive migrations, Greenhill put forward three policy options for preventing their occurrence. First, she suggested that policymakers study historical examples of such behavior in order to avoid the pitfalls other negotiators encountered. Second, she proposed that states vulnerable to such coercion institute a farsighted public policy, sponsor education and research, and offer liberal economic aid before the threatened migration begins to limit or prevent an influx of refugees. Finally, Greenhill recommended targeted states undertake actions within the threatening state to alter internal conditions or to bring about regime change.[67] These measures are suitable for employment as preventives for impending mass migrations identified by analysis of data produced by remote sensing. By looking for early warning of factors that predispose populations to relocate in partnership with social scientists, the NRO may initiate timely policy discussions to identify the steps the United States should take to prevent internal or international population displacements.

Conclusion

In a new and evolving threat climate, assessing the impact of mass human migration and identifying where the next crisis will occur has assumed a new importance. Stress on water resources, degrading agricultural conditions, disease, and climate change are but four of the factors that initiate the mass population movements that adversely affect not only the migrants themselves but a globalized world. All nations are

justifiably concerned about mass migration and its attendant concerns related to human smuggling and trafficking, terrorism, the costs of asylum, and the burdens refugees might impose on society. Like the four examples discussed above, many changes that presage mass migration are detectable by earth observation, which provides the data necessary to identify problem areas and plan to diminish impending humanitarian crises. The implementation of sound policies formulated in anticipation of the relocation of large numbers of people will help mitigate its effects. The 2008 National Defense Strategy calls for the United States to assist at risk nations "to defend and govern themselves" by "addressing root causes of turmoil . . . [to] help states stabilize threatened areas."[68] Proactive planning to employ US assets across the broad spectrum of capabilities will answer this call and promote the achievement of US national security objectives. The NRO should therefore broaden its knowledge base concerning the events that drive and proceed from mass migrations to ensure that national assets are used optimally to inform strategic decision making.

Notes

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1. Barack Obama, *National Security Strategy* (Washington, DC: The White House, May 2010), 33–34, 55, http://www.whitehouse.gov/sites/default/files/rss_viewer/national_security_strategy.pdf.

2. Dennis C. Blair, director of national intelligence, "Annual Threat Assessment of the U.S. Intelligence Community for the House Permanent Select Committee on Intelligence," 3 February 2010, 33–34, 39–40, http://www.dni.gov/testimonies/20100203_testimony.pdf.

3. "Report of the National Commission for the Review of the National Reconnaissance Office: NRO at the Crossroads," 1 November 2000, 21, http://www.loyola.edu/departments/academics/political-science/strategic-intelligence/intel/nro-comm-2000.pdf.

4. Thomas G. Behling and Kenneth McGruther, "Satellite Reconnaissance of the Future," *Joint Forces Quarterly*, Spring 1998, 28, reprinted in Roy F. Houchin, comp., *National Reconnaissance Office (NRO): An Independent Space Force* (Maxwell AFB, AL: Air University, AY 2011), 364.

5. "Report of the National Commission," 4.

6. Edward G. Stockwell and H. Theodore Groat, *World Population: An Introduction to Demography* (New York: Franklin Watts, 1984), 291–92.

7. Western Europe and North America.

8. Weak and poor states including a large portion of sub-Saharan Africa.

9. Sarah Collinson, "Globalisation and the Dynamics of International Migration: Implications for the Refugee Regime," May 1999,

2, 4, 12, and 15,

http://repository.forcedmigration.org/show_metadata.jsp?pid=fmo:2457.

10. Safe zones are areas designated to protect refugees within their own homelands rather than necessitating their seeking refuge in other nations. This concept was promoted by the UNHCR as countries became increasingly reluctant to accept refugees. Such safe zones may be agreed upon or enforced by military action, such as the United States, French, and British establishment of a safe zone in Northern Iraq during Operation Provide Comfort.

11. Temporary protection in a host country entailing the right to remain until it is safe to return to one's homeland.

12. Susanne Schmeidl, "The Early Warning of Forced Migration: State or Human Security?" in *Refugees and Forced Displacement: International Security, Human Vulnerability, and the State*, eds. Edward Newman and Joann van Selm (Tokyo: UN University Press, 2003), 144–45. Schmeidl reported that Lt Gen Roméo Dallaire, who served as the UN force commander in Rwanda in 1993 and 1994, warned the UN Department of Peacekeeping Operations that mass killings of Tutsis were about to take place and suggested measures to prevent the murders, but the UN did not intervene.

13. Alexander Betts, et al., *The State of the World's Refugees 2006: Human Displacement in the New Millennium*, Nada Merheb, et al., eds.

(Oxford: Oxford University Press, 2006), 12–13, http://www.unhcr.org/4a4dc1a89.html.

14. Kelly M. Greenhill, *Weapons of Mass Migration: Forced Displacement, Coercion, and Foreign Policy*, Cornell Studies in Security Affairs, Robert J. Art, Robert Jervis, and Stephen M. Walt, eds. (Ithaca, NY: Cornell University Press, 2010), 2.

15. Ibid.

16. Ibid., 2–3.

17. Ibid., 75–130.

18. Barbara Crossette, *State of World Population 2010—From Conflict and Crisis to Renewal: Generations of Change* (N. p.: UNFPA, 2010), 63, http://www.unfpa.org/public/home/sitemap/swp2010#reports.

19. Ibid., 63–69.

20. Rhoda Margesson, Andorra Bruno, and Jeremy M. Sharp, "Iraqi Refugees and Internally Displaced Persons: A Deepening Humanitarian Crisis?" Congressional Research Service (CRS), 13 February 2010, 1–7, http://www.fas.org/sgp/crs/mideast/RL33936.pdf.

21. Curt Tarnoff, "Afghanistan: U.S. Foreign Assistance," CRS, 12 August 2010, 9, www.fas.org/sgp/crs/row/R40699.pdf.

22. UN High Commissioner for Refugees (UNHCR), "2010 UNHCR Country Operations Profile—Afghanistan," http://www.unhcr.org/cgi-bin/texis/vtx/page?page=49e486eb6.

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25. UN, Department of Economic and Social Affairs, Statistics Division, “Recommendations on Statistics of International Migration: Revision 1,” 17, http://unstats.un.org/unsd/publication/SeriesM/SeriesM_58rev1E.pdf.

26. Roberta Cohen and Francis M. Deng, *Masses in Flight: The Global Crisis of Internal Displacement* (Washington, DC: Brookings Institution Press, 1998), 16.

27. Inter-Parliamentary Union, “The International Mass Migration of People: Its Demographic, Religious, Ethnic and Economic Causes; Its Effects on Source and Receiving Countries; Its Implications Internationally; and the Rights of Migrants and Refugees,” 12 September 1992, http://www.ipu.org/conf-e/88spl.htm. The Inter-Parliamentary Union is an international organization of parliaments established in 1889 to promote global parliamentary exchange of ideas, peace, and cooperation among peoples. As of 2010, 155 members and nine associate members comprised the Inter-Parliamentary Union.

28. Ibid.

29. Betts, *The State of the World’s Refugees 2006,* 212.

30. UNHCR, “UNHCR Statistical Yearbook 2009, Country Data Sheets,” October 2010, http://www.unhcr.org/4ce5327f9.html.

31. Schmeidl, "The Early Warning of Forced Migration," 133–138.

32. Ibid., 139.

33. Ibid., 140.

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