Environmental Concerns and International Migration

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This article focuses on international migration occurring as a result of environmental changes and processes. It briefly reviews attempts to conceptualize environment-related migration and then considers the extent to which environmental factors have been and may be significant in initiating migration. Following is an examination of migration as an independent variable in the migration-environment relationship. Finally, ethical and policy dimensions are addressed.

Migration on a permanent or temporary basis has always been one of the most important survival strategies adopted by people in the face of natural or human-caused disasters. However, our knowledge of the complex two-way relationship involving environmental change as both a cause and consequence of migration remains limited. Moreover, how migration and environmental concerns interact and impinge upon economic development, social change, and conflict is little understood. In a context where global environmental stress and degradation have accelerated and unprecedented numbers of the world's population are seeing migration as an option, the need for research in this area is considerable. In recent years there has been an increase in the attention directed at the relationship between migration and the environment among both researchers and policymakers, especially in the lead up to, and aftermath of, the United Nations Conference on Environment and Development (UNCED) held in Rio de Janiero in 1992 (*e.g.*, Kibreab, 1994; Suhrke, 1992, 1994; Richmond, 1993; United Nations, 1994; The Population Institute, 1993; IOM, 1992). Chapter 5 of Agenda 21, which was adopted by UNCED, recognized the need to develop and disseminate knowledge of the links between changes in demographic processes like migration and achievement of sustainable development (United Nations, 1993).

Historically, the vast bulk of migration caused by environmental change has occurred within national boundaries, as have the environmental effects initiated by population movements. Nevertheless, the international dimensions of this relationship have been neglected until recently. Moreover, it is argued here that this dimension is of increasing scale and significance in concert with the accelerating pace of globalization processes. Accordingly, the present paper focuses upon international migration occurring as a result of environmental changes and processes and the implications of increasing levels of population movement between countries for the environment. We begin with a brief review of some attempts to conceptualize environment-related migration and then consider the extent to which environmental factors have been, and are likely to be, significant

in initiating international migration. This is attempted through a consideration of the environment as both a direct and a contributory factor in causing such migration, especially South-North international migration. Attention is then focused on migration as an independent variable in the migration-environment relationship, and the environmental consequences of international population movements are discussed. Finally, some of the ethical and policy dimensions of emerging international migration-environment trends and processes are addressed.

CONCEPTUALIZING THE RELATIONSHIP BETWEEN MIGRATION AND ENVIRONMENTAL CHANGES

The migration literature is replete with typologies which differentiate migrants and migrations according to the relative permanency of the move, the distance traversed, the nature of the boundaries crossed, the causes of the move, the characteristics of the movers, etc. One of the pervasive distinctions made between types of population movements is that between voluntary and forced migrations which dates back 60 years to Fairchild's (1925) migration classification. Perhaps the most frequently quoted typology of migration is that of Peterson (1958), in which one of the most fundamental divisions employed is the degree to which a move is "forced." However, the distinction between voluntary and involuntary migration is not as clear cut as it would appear at first glance. As Speare (1974:89) points out,

> In the strictest sense migration can be considered to be involuntary only when a person is physically transported from a country and has no opportunity to escape from those transporting him. Movement under threat, even the immediate threat to life, contains a voluntary element, as long as there is an option to escape to another part of the country, go into hiding or to remain and hope to avoid persecution.

On the other hand some scholars of migration argue that much of the population mobility which is conventionally seen as being voluntary occurs in situations which in fact the migrants have little or no choice. Amin (1974:100), for example, in his discussion of migration in Western Africa states that

> A comparative costs and benefits analysis, conducted at the individual level of the migrant, has no significance. In fact it only gives the appearance of objective rationality to a 'choice' (that of the migrant) which in reality does not exist because, in a given system, he (sic) has no alternatives.

Indeed the early typology developed by Peterson recognized this degree of overlap between voluntary and involuntary movement and distinguished an intermediate category. He differentiated between ". . . *impelled* migration when the migrants retain some power to decide whether or not to leave and *forced* migration when they do not have this power" (Peterson, 1958:261). These, in turn, are separated from free migration in which the will of the migrants is the decisive element initiating movement.

Population mobility is probably best viewed as being arranged along a continuum ranging from totally voluntary migration, in which the choice and will of the migrants is the overwhelmingly decisive element encouraging people to move, to totally forced migration, where the migrants are faced with death if they remain in their present place of residence (*see* Figure 1). The extremes in fact rarely occur, and most mobility is located along the continuum. The present paper is concerned with moves toward the forced end of this continuum.

There is also some diversity in the literature with respect to what particular types of involuntary migration can be identified. Much of this centers around the issue of defining the term refugee. While the term refugee migration in some cases is used as a synonym for involuntary migration, others apply it only to a very restricted subset of all such movements. The 1967 United Nations Protocol on Refugees considers a refugee as "every person who, owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality and is unable or, owing to such fear, is unwilling to avail himself of the protection of that country" (Keely, 1981:6). However, this has been modified and extended in practice by both the United Nations High Commission for Refugees (UNHCR) and individual Third World countries and regions. Nobel (1985:44), after an exhaustive discussion of contemporary refugee determination in Third World countries concludes that the common elements can be listed as follows:

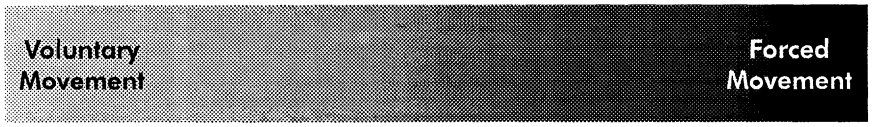
1) Cases of well-founded fear of being persecuted for any of the reasons mentioned in the Geneva Convention and/or the Statute for the Office of UNHCR.
2) Cases where lives, safety and freedom are threatened by events seriously disturbing public orders like external aggression, occupation, foreign domination, massive violations of human rights or generalized violence in the whole or part of the country of origin.

This definition, however, still only recognizes migrants who are forced to move because of political pressures or conflicts. Other commentators have adopted wider definitions of refugee and forced migrations. A good example of such a definition is that provided by Olson (1979:130).

> Refugees differ from other, spontaneous or sponsored migrants, largely in the circumstances of their movement out of one area to another, and the effects these have on them in the settlement and adjustment phases of their relocation. Refugees are forced to leave their homes because of a change in their environment which makes it impossible to continue life as they have known it. They are coerced by an external force to leave their homes and go elsewhere.

This definition stresses the involuntary, forced nature of the move, the 'uprooting' suddenness of most refugee moves and the externality to the mover of the force or forces impelling the move. It also implies a substantial degree of powerlessness among the movers in the decision to move and selection of

FIGURE 1. A Simple Continuum of International Migration



destination. There is no consideration in this definition of the distance the refugees move or whether or not they cross an international boundary, although Olson points out "these spatial factors do affect refugees' adjustment after flight." This definition is clearly more holistic and sees refugee moves as a subset of all population mobility rather than of international migration.

Olson's definition is also broader than that of the UNHCR with respect to the nature of the external force or forces, the threat or presence of which impels refugee movements. Again the UNHCR definition is somewhat restrictive in that it refers only to persecution, or fear of persecution, as initiating refugee movement. Keely (1981:6) points out that this excludes people fleeing the ravages of war, and who are usually considered refugees, although the broader definitions in wider use usually include such groups. More commonly, persons who are displaced by civil conflict or war are also categorized as refugees. Some writers, however, have extended the recognition of forces which create refugee movements even further and go beyond the conflicts created by human agents to include people displaced from their home areas by natural disasters. Olson (1979:130), for example, identifies the following five types of external compulsions that alone or in concert create refugees:

- physical dangers (*e.g.*, floods, volcanic eruptions, etc.);
- economic insufficiency (*e.g.*, drought, famine);
- religious persecution;
- ethnic persecution;
- ideological persecution.

More recently the term environmental refugee has gained wide usage (Hinnawi, 1985; Jacobsen, 1988) to refer to people who have been forced to leave their home area because of environmental disruption. Such refugees, however, are not officially recognized by national governments or international agencies, and hence the term environmental migrants would seem preferable. This includes migrants who are forced to flee their home areas by the onset of (or fear of) a natural calamity or disaster, would incorporate the first two categories of Olson's classification of external compulsions to migration listed above, and covers not only the migrations initiated by the sudden and violent onset of floods, earthquakes, volcanic eruptions, etc., but also the "silent violence" (Spitz, 1978) of drought, famine and the onset of severe food shortage associated with the gradual degradation of environments.

Refugees, as conventionally defined, are distinguished from environmental migrants by the fact that the overt force impelling migration is conflict or the

threat of conflict (Zolberg and Suhrke, 1984:2) – it has human rather than environmental origins. It must be stressed, however, that we are referring here to the immediate cause which triggers the forced migration, not necessarily the deeper underlying long-term determinants. For example, many natural disasters have their root causes in long- term political, social, economic or agricultural practices or policies. Nevertheless, in both types of forced movement, external pressures are paramount in initiating moves – without the sudden introduction of particular external forces the move would not have occurred. As Kunz (1973:130) points out,

> It is the reluctance to uproot oneself, and the absence of positive original motivations to settle elsewhere, which characterizes all refugee decisions and distinguishes the refugee from the voluntary migrants.

In fact, Kunz goes on to recognize two distinct "kinetic" types of refugee movement in which the chief distinction is the strength of the external forces impinging upon the potential refugee: 1) anticipatory refugee movements involve people moving before the deterioration of the military or political situation becomes overwhelming, preventing an orderly departure; and 2) acute refugee movements, where the emphasis is on unplanned flight en masse or in bursts of individual or group escapes in which the overwhelming objective is to reach a haven of safety. This differentiation is equally applicable to environmental migrants, and Richmond (1993) has divided environmentally induced migration into "proactive" and "reactive" movement on similar grounds.

Some have argued that it is best not to refer to migrants forced to move for environmental reasons as refugees, given the specific legal connotations of the term refugee (*e.g.*, Hugo and Chan, 1990). Nevertheless, as Richmond (1993:2) correctly points out, "the reality of external and internal migration induced mainly, or partly, by environmental factors cannot be denied." One major difference between migration induced by political and civil conflict and that caused by environmental factors is that it is rare that the latter affects an entire nation, so environmentally displaced persons can usually find refuge within their national boundaries. On the other hand, people fleeing persecution often are forced to flee from the entire jurisdiction of national governments. Another significant difference is that while political refugee movement is often an uncomplicated response to fear of persecution, environmental migration is often the result of a complex set of multiple pressures of which an environmental event is only the proximate cause.

Richmond (1993:11) argues persuasively that it is necessary to go beyond more descriptive typologies of environmentally induced migration and to understand the dynamic interaction of the multiple causal factors that can generate such movement. Whether or not environmentally induced migration occurs, the scale and composition of the movement and where it is directed will be shaped by many elements: predisposing conditions such as the nature

of the biophysical environment; structural constraints; facilitating factors; precipitating events; and feedback effects of the migration.

Richmond's model, a simplified version of which is presented in Figure 2, recognizes first of all that certain contexts are more susceptible to environmental disruptions likely to force outmigration than others. These, for example, would include: ecologically fragile ecosystems which, when subject to excessive cropping, forest removal or other human use impacts, become less productive; areas at high risk of natural disaster – earthquake zones, low lying areas subject to inundation, etc.; marginal agricultural or pastoral areas subject to frequent drought; and areas of poverty where the residents do not have the accumulated reserves to prevent, ameliorate, or cope with the onset of a natural disaster.

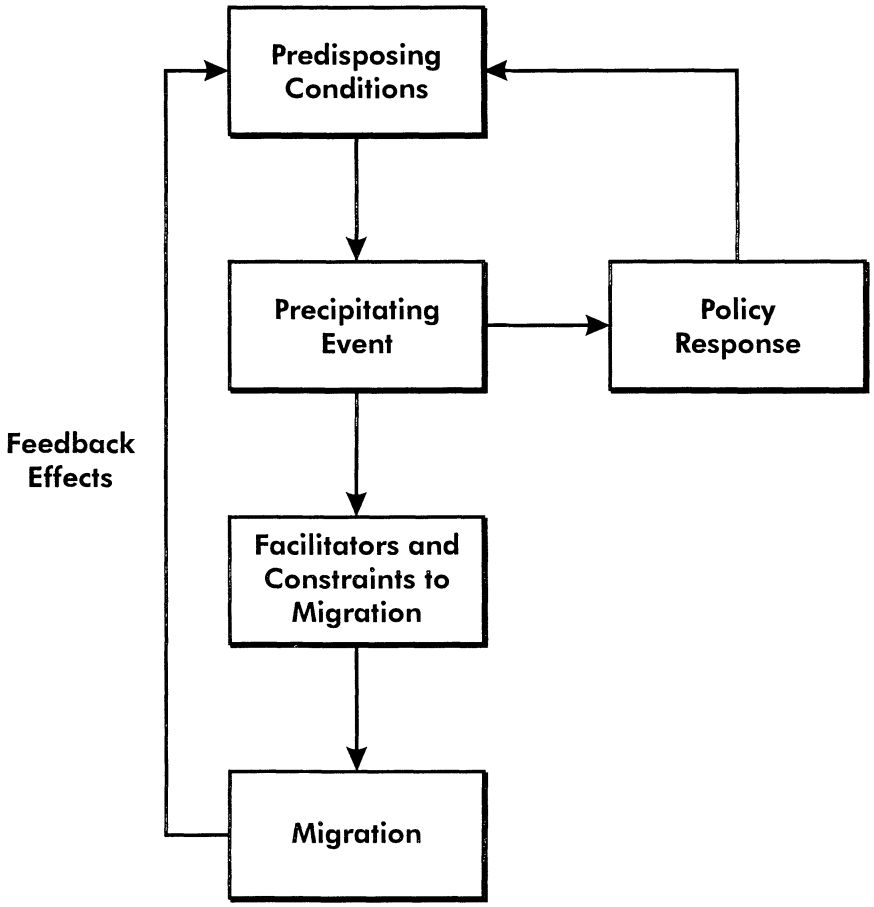
Hence the predisposing factors for environmental migration can be environmental but also are related to population pressure upon natural resources, the way in which the environment is being exploited by people, and the wealth of the occupants of the area. In general, these predisposing conditions are more likely to occur in less developed than in more developed countries.

Environmentally induced migration is likely to be precipitated by a particular environment-related event which effectively forces people to move. Table 1 is a list of factors identified by Richmond (1993) as being likely to precipitate reactive migration which has direct or indirect environmental implications. He stresses that these factors are not independent of one another. Whether or not an event-producing disruption to the environment actually produces migration, however, is partly influenced by the predisposing conditions mentioned earlier. It also will be shaped by a range of constraints and facilitators to migration which exist in the area affected. These include the existence or lack of escape routes not only in the form of transport networks but also kinship and social networks which mean that some environmental migrants can move to an area where they have relatives and friends who can support them. The presence of such networks undoubtedly acts as a facilitator to such movement while their absence would constrain movement.

Richmond (1993) stresses the importance of feedback effects in consideration of environmentally induced migration. The migration itself may have positive effects on the origin area through reduction of pressure of population on the local environment and hence reduce the likelihood of the occurrence of an environmental disaster. Similarly, environmental policies introduced as a result of those disasters may influence migration. Hence, in Indonesia the erosion of uplands causing flooding and siltation in lowlands has resulted in a policy of sedentarization whereby people who have practiced a type of slash and burn, shifting cultivation in the upland areas have been resettled in sedentary agricultural communities in lowland areas. This has affected some 4 million people (Hugo, 1988).

Conceptualizing environmentally induced migration as a subset of forced migrations draws attention to the neglect of this type of movement by

FIGURE 2. A Simple Model of Environmentally Induced Migration



Source: Modified and simplified from ideas in Richmond (1993).

researchers and policymakers alike. Jacobsen (1988:6, 1989:30) summarizes the situation thus:

> Most governments do not recognize environmental decline as a legitimate cause of refugee movements, choosing to ignore the issue. Neither the U.S. State Department nor the UN High Commissioner for Refugees for example collects data on this problem. Yet the number of environmental refugees – estimated by the author to be at least 10 million – rivals that of officially recognized refugees and is sure to overtake this latter group in the decades to come.

While the last point may well be overstated, the thrust of these strong remarks must be accepted – researchers and policymakers have neglected the signifi-

TABLE 1
TYPOLOGY OF ENVIRONMENTALLY RELATED DISASTERS

Naturally Induced Disasters (NIDs)		
Hurricanes	Tornadoes	Whirlwinds
Earthquakes	Volcanic Eruptions	Avalanches
Floods (freshwater)	Floods (saltwater)	Hail and Snow Storms
Fires	Electric Storms	Lightning
Droughts	Famines	Plagues
Technologically Induced Disasters (TIDs)		
Chemical	Nuclear	Oil Spills
Pollution (air)	Pollution (water)	Pollution (soil)
Explosions	Building Collapse	Rail or Airplane Crash
Dams (floods, etc.)	Mining Accidents	Power Cuts
Factory Accidents	Soil Exhaustion	Urban Dereliction
Economically Induced Disasters (EIDs)		
Deforestation	Crop Failure	Fishery Exhaustion
Mineral Exhaustion	Species Extinction	Human Redundancy
Population Clearances	Relocation	Structural Adjustment
Politically Induced Disasters (PIDs)		
War (external)	War (internal)	Terrorism
Apartheid	Ethnic Cleansing	Holocaust
Exile	Persecution	Rights Violations
Totalitarianism	Anarchy	Extremism/Intolerance
Socially Induced Disasters (SIDs)		
Ecological Extremism	Animal Rights Activism	Green Crusaders
Fanaticism	Excommunication	Jihad
Class War	Shunning	Boycott

Source: Richmond (1993).

cance (both in numerical and human suffering terms) of environmentally forced migrations.

Obviously one of the major barriers to research in environmentally induced migration is the lack of available relevant data. This is understandable since collection of data is accorded low priority in societies experiencing environmental crises. As Dirks (1980) has pointed out:

> While the biology of starvation has been analyzed in considerable detail, there exists little systematic knowledge about social behavior. The imbalance has been attributed to certain stumbling blocks impeding field study: chaotic conditions, the priority of the relief missions, the repugnance of seeking data amidst human suffering.

As has been reviewed elsewhere (Hugo, 1984:12–14) a number of studies have employed innovative, imaginative and sensitive approaches to collect data in such crisis situations where conventional sources have been absent or severely deficient. Nevertheless, it is important that due consideration be given in areas susceptible to such movement to inclusion of relevant questions regarding environmentally

induced population mobility in censuses and other large-scale data collection initiatives. Too often the questions included reflect international recommendations and not the specific local conditions and needs of local people.

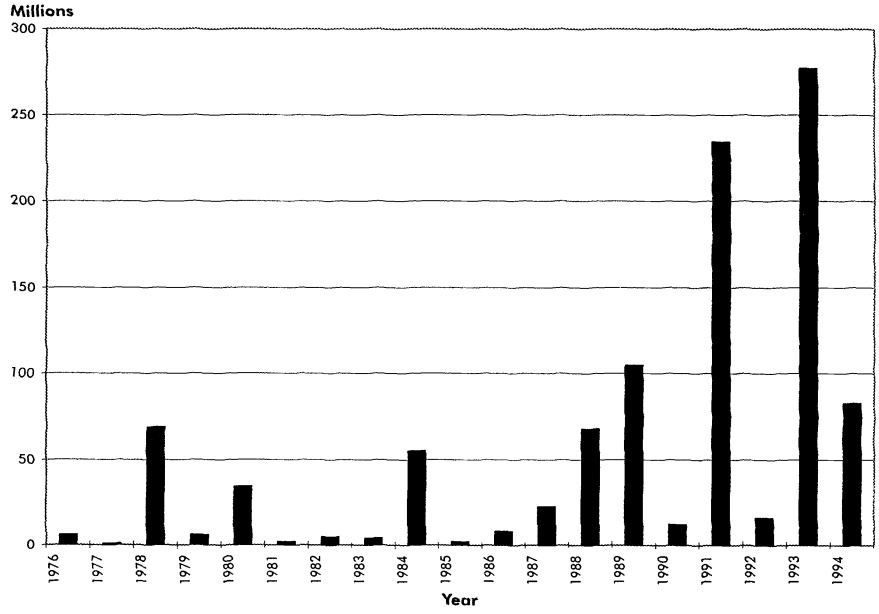
ENVIRONMENTAL FACTORS AS A CAUSE OF MIGRATION

The response of leaving an area on a permanent or temporary basis in the face of a life threatening environmental crisis is, of course, eminently rational and has been a most important survival strategy throughout human history. However, the situation in the mid-1990s with respect to such movements would appear to differ somewhat from the historical experience in a number of ways: the scale and pace of environmental change has increased substantially; differences between countries in ability to cope with these changes have increased; whereas in the past the migration destination options for environmental migrants have overwhelmingly been to move within their country of origin, international destinations are of increasing significance. These propositions will be expanded upon in this section.

Considering first the environmental forces impelling acute or reactive migration, a global survey of natural disasters for the period 1947 to 1980 found that the overall number of disasters is increasing over time and that a disproportionately large share of all lives lost (86%) in such disasters occurred in Asia (Shah, 1983). Since 1980 environmental pressures have continued to increase due to increased population growth leading to greater consumption of resources, pressure on agricultural land, pollution, etc., increased industrialization, and massive technological changes increasing the capacity of people to reshape environments. While it is true that global awareness of the need to adopt sustainable development policies and practices has also increased, there can be no doubt that the incidence of environmental disasters also has increased as have the associated population displacements.

To substantiate this contention we focus on the Asian region, which contains more than half of the world's population and is experiencing rapid economic and social change. The *United Nations Disaster Research Organization News* for the period 1976–1994 was scanned for reports of all major environmental catastrophes that occurred in Asia over the last two decades along with the volume of associated environmentally induced migration. While these data are far from comprehensive, they are indicative of the scale of the phenomenon of such population movement, although it must be reiterated that the vast bulk of the refugees were resettled or otherwise accommodated within their own nations. The data are summarized in Figure 3 and show that over the last two decades there has been a trend toward increasing numbers of people displaced by environmental disasters in Asia, although there is considerable variation from year to year in the numbers involved. Figure 4 shows the numbers of Asian environmental refugees by country. As would be expected, the largest

FIGURE 3. Asia: Population Displaced by Natural Disasters, 1976–1994



Source: Compiled from *UNDRO News*, 1976–1994.

nations of China and India (with 37.8% of the world's population) dominate, although the incidence in the much smaller nation of Bangladesh (1995 population of 119.2 million) is very substantial.

Nevertheless, some of the largest displacements of environmental refugees occurred in the largest countries in Asia. In 1976, China experienced its worst earthquake since 1556. Centered on Tangshan, some 730,000 people were rendered homeless (Breeze, 1980:103). In 1994, one-fifth of China's uplands were idled by floods and drought, creating a mass migration to urban areas (Kaye, 1994). The construction of China's Three Gorges Dam will displace 1.3 million people (Huus, 1994). In Bangladesh, frequent cyclones, floods and tidal surges have taken considerable toll of human life as well as causing massive population shifts.

> Whenever natural calamities like floods hit Bangladesh, people migrate from the countryside to urban areas. An unusual increase of beggars and people looking for work in cities and towns is part of the aftermath of drought and floods. This year, five successive floods submerged nearly 14 million acres, destroying the homes and hopes of over 30 million people. They claimed 900 lives, 85,000 head of cattle, and washed away half a million homes. (*Population: UNFPA Newsletter*, 10, II, November 1984:2)

In India alone it is reported (Kayastha and Yadara, 1985:79) that 15 million people are affected by natural disasters each year. This involves some 2.5 million being rendered homeless and 4 million having to migrate elsewhere to seek food and shelter.

It is apparent that environmentally induced migrations are especially marked in Africa. As Jacobsen (1988:11) has pointed out:

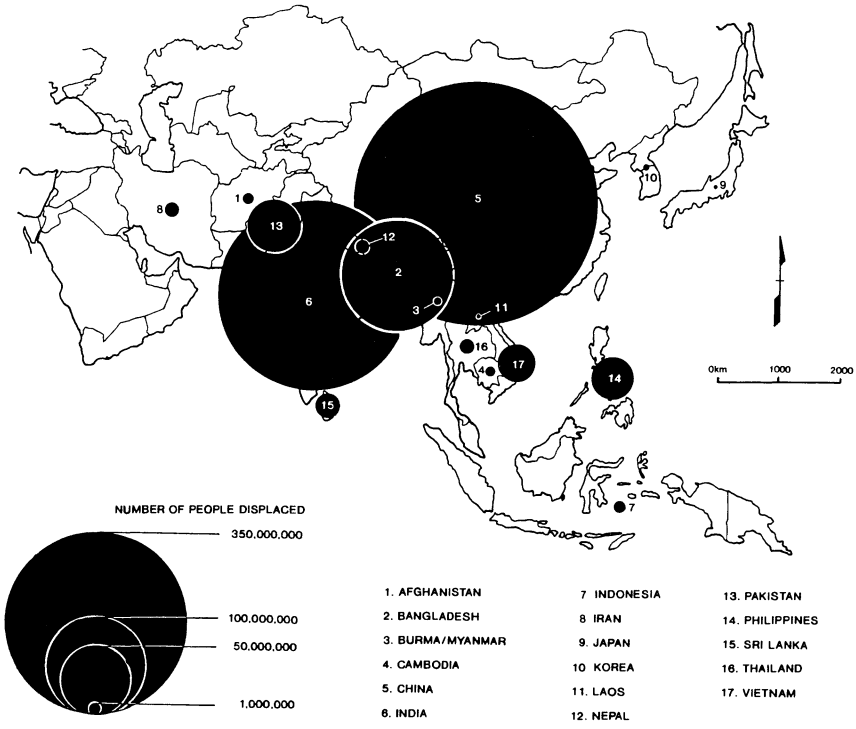
> Of all the continents, Africa, a land where poor soils and variable rainfall pose a harsh climate for agriculture, has spawned the most environmental refugees. Most came from the Sahel, a belt that spans several agro-ecological zones and stretches west to east across some nine countries from Mauritania and Senegal on into the Sudan. Desertification is accelerating in the Sahel, the world's largest area threatened by the wholesale loss of arable land.

The droughts of 1968–1973 and 1982–1984 led to millions of environmental refugees. In the first of these, there were a million environmental refugees in Burkina Faso alone. Table 2 shows the numbers displaced by the end of the second drought.

With reference to the simple model depicted in Figure 2, there are a number of developments in contemporary less developed countries (LDCs) which have exacerbated the predisposing conditions and increased the incidence of precipitating events for environmentally induced migration:

- Population growth has continued to increase pressure on agricultural land although significant fertility declines have occurred in Asia and Latin America and in limited parts of Africa. This has forced more people to settle in and cultivate marginal areas, making them more subject to flooding, erosion, desertification and other environmental degradation.
- Continuation of high incidence of poverty has meant that both individuals and nations have not the resources to initiate environmentally sustainable practices. For many there is a total preoccupation with survival.
- Concerted efforts to increase food production through the green revolution have seen some spectacular increases in output, but often at the expense of environmental concerns. Hence, clearing practices, heavy use of fertilizers, herbicides and pesticides have all often had undesirable environmental outcomes.
- Many LDCs have liberalized their economies to encourage foreign investment, especially in manufacturing, and multinational companies have taken advantage of cheap labor to establish factories. In many cases, environmental controls on such developments are less comprehensive than in more developed countries (MDCs), and certainly the policing of existing regulations is usually weaker so that environmental pollution from such activity can be considerable.
- In many LDCs the ability to enact legislation for environmental sustainability and to police existing legislation is restricted by limited infrastructure and corruption. Accordingly, it is difficult to control deforestation, air pollution, water pollution, land degradation, etc., in the face of increasing pressures on exploitation of the environment created by growing population, increasing involvement of foreign enterprises, etc.

FIGURE 4. **Asia: Number of Persons Displaced by Environmental Disasters, 1976–1994**



Source: Assembled from *UNDRO News*, 1976–1994.

TABLE 2
DISPLACED POPULATION IN SELECTED AFRICAN COUNTRIES, SEPTEMBER 1985

Country	People Displaced (*N*)	Share of Population (Percent)
Burkina Faso	222,000	3
Chad	500,000	11
Mali	200,000	3
Mauritania	190,000	12
Niger	1,000,000	16

Source: Jacobsen (1988:13).

- Climate change may become a significant factor in impelling environmental migration. The expansion of the hole in the ozone layer, global warming, and anticipated increases in sea levels would have significant population displacement implications. For example, a report by the U.S. National Academies of Sciences and Engineering and Institute of Medicine (1991:24) concludes that while understanding of complex global climatic systems is limited, some radical changes which will increase global temperatures must be considered plausible:
  - As high altitude tundra melts, CH_4 would be released, increasing greenhouse warming.
  - Increased freshwater runoff in high latitudes and reduced differentials in temperature between poles and equator could radically change ocean currents, leading to altered weather patterns.
  - There could be a significant melting of the West Antarctic Ice Sheet, resulting in a sea level several meters higher than it is today.

  The report concludes that, while migration is likely to be an important response to climate change, in the United States it is unlikely that climate-driven migration will be on a scale that cannot be managed.

However, it is not sufficient to consider the migration-environment relationship only in terms of migration induced as a response to the occurrence of particular environmental events. As Suhrke (1992:5) points out:

> From a broader development perspective, environmental degradation appears as a proximate cause of migration. The underlying causes are found in increasing population pressures on land and the patterns of resource use. Demography and political economy, in other words, are most salient causal factors. Yet these obviously interact in critical ways with specific environmental variables. Sometimes the result is stress of a kind that leads to massive outmigration. But to understand why, it is necessary to focus on the broader development process.

Similarly, Richmond (1993:8) argues

> . . . when environmental degradation leads to migration itis generally as a proximate cause linked to questions of economic growth, poverty, population pressure, and political conflict.

Bilsborrow (1991), in his case studies of Indonesia, Guatemala, and Sudan, depicts environmental degradation as one of a cluster of causes of outmigration. He suggests that environmental changes induced migration through their "social" effects by 1) reducing income; 2) increasing the risk of income reduction in the future; 3) making the environment less healthy.

The model outlined in Figure 2 emphasizes the fact that although a particular environmental event may be the trigger that actually initiates a substantial population displacement, it is the predisposing conditions which are often crucially important in determining one or more of the following: the nature and severity of the actual precipitating event, which is usually some form of environ-

mental disaster or disruption; whether or not migration results; the nature and scale of that migration. Hence in many cases, especially in LDCs, the deeper underlying causes of environmental migration are not environmental but related to political, economic, social and demographic processes. Thus policy interventions need to address the more fundamental causes of the movement rather than the triggering event which initiated the migration.

It would seem that environmental degradation is increasingly becoming a contributory cause of population mobility in LDCs. It is linked to the economic push being exerted by poverty, population pressure on resources, unemployment, underemployment, lack of access to services, etc. in rural areas of many LDCs. Migration is usually not simply a response to a single cause or event but to a constellation of often interlinked forces. As agriculture becomes more commercialized and mechanized in LCDs, declining demand for and displacement of labor is exerting considerable outmigration pressure, and this is being exacerbated by increasing environmental disruption.

ENVIRONMENTALLY INDUCED MIGRATION – INTERNAL VERSUS INTERNATIONAL

The bulk of migrants displaced by environmental disruption move within national boundaries, and international environmental migration has been very limited. However, there are a number of arguments which could be advanced to suggest that over the next decade environmental factors will become more significant in impelling international movements.

The first such argument would point to the increasing strength of environmental push factors in LDCs, especially the nonmetropolitan sectors of those countries. As was made clear at UNCED and in a number of comprehensive reviews (e.g., Suhrke, 1992, 1994; United Nations, 1994; Green, 1992), the signs of environmental stress are continuing to increase in LDCs. A few examples will suffice to make this point (Green, 1992:12–17). Each year . . .

- 17 million hectares of tropical forest vanish;
- a billion tons of topsoil are lost due to soil degradation which has seen 1.2 billion hectares of land losing much of their agricultural productivity since 1945;
- if water pollution continues at current rates, as much as one-fourth of the world's freshwater supply could be unsafe for human consumption by the end of the 1990s.

Air pollution, desertification and loss of biodiversity also are increasing their impacts in LDCs. Despite global action following UNCED, there are few signs of a reversal in trends of environmental degradation in LDCs.

Particular attention has been focused on global warming and its inevitable corollary – rising sea levels (Birdsall, 1992). While there is some debate, it is anticipated that sea levels may rise one meter by the year 2100, affecting

360,000 kilometers of coastline (Suhrke, 1992). Since almost two-thirds of the world's population lives within 100 kilometers of the coast and 30 of the world's 50 largest cities are located on the coast, the potential for population displacement from a significant rise in sea level is considerable. Indeed, some commentators have painted future scenarios of millions of people being forced to move by sea level changes (Gleick, 1989; Kaplan, 1994). Kritz (1990:110) has reviewed the impacts of climate change and migration and concludes:

> While historical and contemporary cases can be cited of climate exerting a major influence on migration, climate per se is seldom the root cause of migration but rather one more factor that exacerbates the already difficult conditions under which poor people attempt to cope with their changing environments.

It is apparent that while significant population displacement is a likely result of climate change, the effects have been exaggerated in the literature. As Suhrke (1993:11) points out:

> The social impact is indicated by estimates that over the next 60 years, 13–15 percent of Bangladesh's population would be displaced in a worst case scenario (Jacobsen, 1988:34). If the displacement occurs at a steady rate, the first 'installments' would be of the order of 200,000–300,000 persons annually. While a sizeable figure, it is less than one-quarter of the new arrivals who annually enter Bangladesh's labor market due to popular increase alone.

Moreover, in most such cases, it is within countries that the bulk of population displacement is likely to occur. This is not possible, however, in small low lying island nations such as the Maldives and especially in several of the island nations of the Pacific (Connell, 1987). The scope for internal population redistribution within such countries is limited, so there will be pressure for resettlement in another country. In many such nations there are strong existing social networks set up with destination countries along which displaced populations may travel (Moore and Smith, 1995).

There are other emerging developments in international migration which in the future may lead to environmentally displaced persons considering international as well as internal destinations. These relate predominantly to the forces identified in Figure 2 as facilitators – elements which, rather than cause movement, make that movement possible or channel it in a particular direction once the decision to move has been made. The sheer increase in the scale of international migration, especially South-North migration in the last decade, has meant that the social networks linking potential migrants in LDCs with family and friends in MDCs have proliferated exponentially. This has meant that the destination options for people in LDCs pushed out of their homes by environmental disruptions are increasingly including international destinations.

Another factor here and an often neglected element in the acceleration of population movement between nations over the last decade is the emergence and development of an international immigration industry. This is an increasingly large group of agents, recruiters, travel businesses, lawyers, etc., operating both within

and outside legal structures to facilitate international migration of one kind or another. As with the strengthening and spread of international social networks, the development of the immigration industry has acted as an important facilitator (Figure 2) of international migration.

Hence it could be argued strongly that environmental pressures will continue to increase in LDCs over the next decade and that such pressures will become increasingly important in pushing people out of rural areas in LDCs. Environmental factors will become a more significant cause of migration out of LDC rural areas, but mainly as a proximate and contributory factor among a range of pressures on people seeking to survive in such contexts, although the increasing incidence of sudden environmental disasters will also periodically produce significant displacements of population. It is likely too that while most environmentally induced migration will take place within nations, a greater proportion will occur between nations in line with globalization trends and proliferation of migration networks and increasing numbers of institutions, businesses and people facilitating international migration.

While the bulk of our attention here has focused upon environmental pressures and disciplines as a push factor initiating or contributing to migration, it should also be mentioned that environmental factors can be a pull factor in attracting population movements toward destinations perceived to have favorable environments (Svart, 1976). Such movement predominantly affects MDCs, and the bulk of it occurs within nations, as with the movement to the Sunbelt in the United States and from the southeast to northeastern Australia. However, such movement also occurs internationally, especially among retirees, as is the case with the flow of northern and western Europeans to some Mediterranean nations.

ENVIRONMENTAL IMPACTS OF INTERNATIONAL MIGRATION

In considering the role of international migration as an independent variable impacting upon the environment, a useful starting point is the equation developed by Ehrlich and Holdren (1971) and Ehrlich and Ehrlich (1990:58)

$$I = P \times A \times T$$

Where
I = Environmental Impact
P = Population Size and Growth
A = Affluence – per capita consumption of goods and services
T = Technology – quantity of resources consumed, environmental damage sustained and pollution generated during production and consumption per unit of goods and services.

While this formula has been subject to criticism (Bartiaux and van Ypersele, 1993; Hogan, 1992), it does emphasize the point that although population

growth is an important element shaping the extent of environmental impact, it is not the only one. Hence control of population growth does not offer a "quick fix" for environmental problems. Clearly, although reduced population growth can assist in reducing environmental pressure, there is no simple linear relationship between population density and growth and environmental degradation.

International migration plays a role in influencing population growth and size in the areas of origin and destination of migrants. Other things being equal (which of course they rarely are), emigration will reduce environmental pressures at the origin and increase them at the destination. However, it is unlikely that international migration can occur on such a scale to be any long-term solution to environmental pressure problems in LDCs except in relatively restricted localized areas (Keyfitz, 1991).

In the traditional immigration nations such as Canada, the United States and Australia, debates about immigration have generally raged around the issues of ethnic composition of the intake and the economic consequences of the immigration. However, there are some indications of the environmental effects of immigration becoming an increasingly important element in that debate. To take the case of Australia, in the 1980s there were a few commentators who argued that Australia should dramatically reduce immigration levels because of environmental concerns that an expanding population will have detrimental effects upon the native environment, flora and fauna and upon the capacity of the nation's resource base to accommodate that expansion (Birrell, Hill and Nevill, 1984; Day and Rowland, 1988). However, in more recent times, concern about the environmental consequences of immigration has seen this issue emerge as one of the dominant arguments against expanding immigration levels.

- The National Population Council (1992:109) report on Population issues and Australia's future stated, that "... the Committee has concluded that national ecological integrity would be best served by an active population policy which resulted in a reduced rate of population growth."
- A report by the House of Representatives Standing Committee for Long Term Strategies (Parliament of the Commonwealth of Australia, 1994:149) on Australia's population carrying capacity recommended that the nation develop a population policy which explicitly takes into account environmental costs of population growth.
- Environmental arguments against immigration are being increasingly addressed in the Australian literature on population and environment (Smith, 1991; Bierbaum, 1991; Boyden, Dovers and Shirlow, 1990; ABS, 1992; Clarke *et al.*, 1990; Fincher, 1991; Industries Assistance Commission, 1989).
- A symposium of the Australian Academy of Science (1994) emphasized the environmental limitations of Australia and the pressing need to

reduce population growth as part of the development of a policy of Ecologically Sustainable Development.

- In 1995, the Premier of New South Wales called for a moratorium on immigration to Sydney (the destination of more than half of the immigrants arriving in Australia) because of the environmental infrastructure and service delivery costs imposed (*The Australian*, May 24, 1995).

It is apparent, therefore, that in Australia the argument that immigrants exacerbate environmental pressures is gathering strength in the ongoing national debate about immigration levels. It is suggested that high levels of immigration:

- through enhancing population growth, increase consumption levels of scarce national resources (especially nonrenewable natural resources which have a limited finite supply such as oil) and increase overall levels of environmental degradation;
- through concentrating population distribution, in particular ecologically sensitive or fragile subareas within the nation, exacerbate environmental pressures and problems in those areas. Immigrant settlement in Australia is extremely concentrated in a few parts of the nation (Hugo, 1995).

Obviously there is a great deal of scapegoating of immigrants in such arguments. They ignore the reality of the environmental impact equation provided above which indicates that sheer population numbers are only one of the variables impinging upon the environment, along with per capita consumption levels and the way in which the people use the environment in which they live. Limitation of population growth or immigration levels is obviously of its own not a solution to such environmental problems. They cannot substitute for the development and adoption of policies and practices which reduce per capita consumption levels and which ensure that urban and rural environments are managed and exploited in ways that are compatible with ecological sustainability. On the other hand, it is crucial that environmental considerations be factored into the decisions made by the Australian government about immigration levels because population growth is one of the factors impinging upon the environment. It is clear that in the traditional immigration nations like Australia, the environmental consequences of immigration are coming under much greater scrutiny by government – and the community more generally – and that they will increasingly be a factor in shaping policy about the level of international migration gains for the nation.

Suhrke (1992:2) points out that the body of research on the impact of migration on the environment is considerably greater than that on the environment as a cause of migration. Again, however, the bulk of the evidence relates to internal migration, with little examination of the ecological and environmental consequences of international migration. There are many case studies where expanding land settlement into marginal and fragile ecosystems in LDCs have led to desertification, deforestation and other environmental degradation (Suhrke, 1993; Bilsborrow, 1991, 1992; Allen and Barnes, 1985; Bilsborrow, 1987; Bilsborrow

and DeLargy, 1991; Blaikie and Brookfield, 1987; Cruz, Zosa-Feranil and Goce, 1988; Georges and Bilsborrow, 1991; Hafner and Apichatvullop, 1990; Pichon and Bilsborrow, 1992). The expansion of agricultural settlement into hitherto untilled areas in some LDC contexts has led to severe environmental deterioration. This occurs both in government organized and sponsored land settlement programs and especially where the settlement occurs outside of government controls and involves squatters. In Indonesia, for example, the ecological impact of the government's Transmigration Program has been substantial (Secrett, 1986).

One type of international migration which has attracted attention because of its environmental impacts is refugee movement. The sudden unplanned influx of large numbers of people into a generally spatially restricted area, often already vulnerable to environmental degradation, can have devastating environmental impacts (Stevens, 1993). Ghimire (1994:561) has recently summarized the situation:

> Deforestation is one of many environmental problems facing refugees in developing countries. Others include the depletion and contamination of water, overcrowding, poor sanitation, soil erosion and pasture degradation. In some cases, forest coverage and other environmental problems existed prior to the arrival of refugees; in others the problems have been exacerbated by the refugees. Dwindling resource base has also led to increasing conflict with local populations and much hardship for refugees.

There are a number of studies which depict situations in Africa, and to a lesser extent Asia, where refugee settlement has resulted in environmental degradation (Ek and Karadawi, 1991; Simmance, 1987; Christensen and Scott, 1988; Utting, 1992; Aguayo *et al.*, 1987; Hugo, 1987).

While it is apparent that international migration can and does have negative environmental consequences, in some contexts there are considerable dangers that the migrants involved can become scapegoats for a general failure to adopt sustainable policies of land and other resource use in the destination areas. In Australia, a review (Clarke *et al.*, 1990) of literature concerned with immigration, population growth and the environment, concluded that Australians will be better off in general using resource management policies targeted to deal with specific resource and environmental concerns, rather than using immigration policies. This should not be taken to mean that population growth and immigration are not of relevance in discussion about Australia moving toward a sustainable development strategy but rather as Toyne (1990) has pointed out,

> It is vital the immigration debate is moved directly into the broader debate over ecological sustainability in Australia. No long-term resolution to the question of appropriate net immigration levels can be found until the broader questions are settled.

Toyne makes the important distinction between short-term and long-term considerations:

> A much more sophisticated approach to the question of population and sustainability is needed than has been evidenced in the debate to date. It must be acknowledged that in the short run over the next 20 years or so, environmental decline in Australia can only be

addressed through changing our lifestyles, consumption patterns and improving our waste disposal and minimization technologies. In the long term the number of people we wish to accommodate in Australia will play a significant role in determining the level of environmental impact and demand for scarce natural resources.

SOME ETHICAL AND POLICY IMPLICATIONS

The causes and effects of environmental deterioration in LDCs cannot be quarantined within the national boundaries of individual nations. It is clear that much contemporary environmental degradation in LDCs has its real roots in historical processes such as colonial exploitation which produced different modes of agricultural and pastoral activity to meet the needs of the colonial power and different patterns of population growth and distribution from those which prevailed in precolonial times. Similarly, international inequalities in power, access to resources, unequal terms of trade, etc. have all been influential in shaping patterns of land use and settlement in LDCs, as have the interventions of international companies and agencies. Moreover, the consequences of deforestation, pollution, etc. are not confined to single nations. The rapid depletion of rainforests in a few countries like Brazil and Indonesia, for example, has climate change and loss of biodiversity implications which are global. The clear message, not only from the 1992 UNCED but from as far back as the 1972 Stockholm Conference on the Human Environment and the 1987 publication of the World Commission on Environment and Development report, *Our Common Future*, is that achieving ecologically sustainable development demands action at the global level as well as the national and individual levels. Successfully tackling many of the environmental problems of LDCs and MDCs will require a global approach, and central to this is the pressing need to eradicate poverty so that people can have access to the resources to live sustainably. This will demand several redistributions from MDCs to LDCs through changes in international power, trade and aid relationships. In short, the environmental pressures which are increasingly the cause and consequence of population movements in LDCs should not be seen as exclusively the problems of the individual countries involved since those pressures have been caused partly by forces outside of the country and they have consequences which extend beyond the borders of those countries.

Migration is a logical and common immediate response to environmental degradation and disaster, but it is rarely a medium or long-term solution to environmental problems. This will only be attained via lower levels of population growth through substantial and sustained fertility decline and adopting ecologically sustainable ways of using the environment. Both of these goals are only going to be achieved through overcoming poverty and powerlessness among the people living in regions subject to environmental disaster and degradation. Only through improving employment opportunities for men and

women, health, education, human rights and enhancing the status and roles of women within such societies can long-term sustainability be achieved. Just as international processes have contributed to the creation of environmental problems in LDCs, long-term solutions will only be possible with significant involvement of the international community.

Environmental pressures are undoubtedly an increasing element initiating outmigration from many rural areas in LDCs. However, environmental factors are more significant as contributory and proximate causes of such migration, although "environmental refugee" migration is significant. The bulk of such movement is intranational, but just as other forms of migration in LDCs are increasingly involving crossing international borders, it is likely that a larger proportion of environmentally displaced persons will move to other countries. However, such migration cannot be generally seen as a solution to environmental problems in LDCs because:

- The vast scale of such movement is such that the sheer logistics of moving and establishing such refugees in other nations is many times larger than any previous global migration (Keyfitz, 1991).
- It does not represent a real and lasting solution to environmental problems, which can only come through eradicating poverty, reducing fertility, and adopting environmentally sustainable practices.

International relocation may provide an enduring solution only in very specific circumstances such as in small island nations influenced by a significant rise in sea levels or in small regions devastated by an environmental disaster.

The fact remains, however, that there are significant displacements of population occurring in LDCs as a result of environmental disasters or deterioration. Most of this displacement occurs within the boundaries of nations and there is certainly no indication of a lessening of the numbers of environmental migrants in LDCs. Hence it is imperative that the international community look to short-term measures as well as the longer-term solutions discussed above. As was indicated earlier, the people involved are certainly not covered by international refugee protocols, and there is a pressing need for this group of forced migrants to be systematically incorporated into an expanded international regime to assist people who are uprooted involuntarily from their home areas (Rogers and Copeland, 1993:132).

CONCLUSION

The growing appreciation of the global implications of environmental problems is occurring at a time of a rapidly changing context in which international exchanges of population, goods, capital and information are accelerating at an unprecedented rate. Our understanding of the nature and significance of the complex linkages between migration and environmental change remains very limited (IOM, 1992). It is clear, however, that the international dimensions

of the migration-environment relationship are assuming increasing significance. This presents a considerable challenge to both policymakers and researchers. Rogers and Copeland (1993:135), in examining emerging policy issues related to forced migrations associated with political conflict, conclude:

> The 1990s is a time of uncertainty, change and opportunity. While the challenges that confronted the international community with respect to forced migration were more predictable during the Cold War, certain opportunities for prevention activities and for the creation of solutions which present themselves today were not available even a few years ago. Our paper expresses the hope that governments – working with a UN system that is itself undergoing changes, and with regional bodies and NGOs – will find the political will and the necessary resources to realize the considerable opportunities for dealing creatively with the new and old challenges posed by forced migration due to war and persecution.

It is the contention here that the world is facing a comparable situation with respect to forced migration due to environmental disruption and there is a need for international involvement. This should be both in the short term in dealing with environmental migrants displaced by the sudden onset of disasters, but more importantly in the longer term in working to eradicate poverty, reduce population growth and encourage the adoption of sustainable ways of using the environment which, if successful, will obviate the need for such migration.

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