

## GLOBAL WARMING AND HUMAN MIGRATION

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**Keywords:** Global warming, environment, migration, early warning, strategic environmental planning, carrying capacity, desertification, urbanization

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### Summary

Migration is as old as humankind. It has always been and still is a very important coping mechanism for people to adapt to changed living circumstances. This can be a short-term regular occurrence, as part of a specific natural resource-based livelihood (e.g. pastoralism, seasonal movement of fishing communities) as well as a longer-term or even permanent phenomenon (e.g. shifting cultivation, conflict victims).

Global warming, if accepted as existing and of a progressive nature, would have a significant impact on the living environment of large populations. There is growing evidence that some of the more extreme climatic occurrences of the last 30 years, such as the cyclones in the Caribbean and the drought/flood cycles in Africa, have their roots in global warming. Sea-level rise, in particular, would have a huge and lasting effect on many highly populated regions in the world.

When climatic changes create unstable communities, people react by leaving their home areas in search of alternative livelihoods. When people decide to move, they become environmentally displaced persons. Some would simply call them “environmental refugees.” This terminology is, however, contested by those organizations that have governmental or intergovernmental mandates to assist refugees, such as the United Nations High Commissioner for Refugees (UNHCR).

The circumstances under which people leave their homes and migrate usually do little to explain the structural or root causes. There is a clear link between the number of

environmentally displaced persons and the level of poverty in their home areas. Environmental pressures are often exacerbated by issues such as economic marginalization, insecurity, social upheaval, and political mismanagement. Global warming as an underlying factor for migration should therefore always be seen in the light of these aggravating socioeconomic factors.

When pushed by long-term environmental upheavals caused by global warming, people may move in different ways (i.e. as individuals, families, small groups, large groups, or massive crowds). They may try to find refuge within the region of origin, or move much further away. Their move may remain within the home country (i.e. internally displaced people) or they may cross international borders (i.e. international migrants or, if recognized, refugees). Besides the push factors (deteriorating environment at home), pull factors may also play a role. Some pull factors are economic opportunities, family, clan, or nationality reunion, and organized resettlement schemes.

The cost to society of environmentally induced displacements—especially if they are massive—can be huge, in both financial and human terms, because of the resultant social, political, and economic tensions. A refuge tactic seldom provides real solution but can often create new problems in the hosting areas, whether urban or rural. Prevention of out-migration seems in many cases the best approach. Efforts should be undertaken to apply existing and technological potential to prevent environmentally induced displacement. This includes adequate risk assessment, vulnerability analysis, and countermeasures in the fields of infrastructure planning and project implementation, hazard monitoring, and structural strengthening of crucial infrastructure.

The carrying capacities of those areas that receive or “host” environmentally induced migrants are sometimes exceeded by the influx of new displaced persons, which can cause pressure on the local natural resource base, leading in turn to possible environmental deterioration and damage. It should be noted that there is evidence of a lower adverse impact on the local environment in the case of so-called “spontaneously settled” displaced persons than where people are settled in concentrated and highly populated situations.

## **1. Introduction**

At the remote three-border mountain region of Uweinat (partly situated in Libya, Sudan, and Egypt), 3500-year-old rock engravings and paintings were found that represented a diversified pastoralist society. Because of climatic changes resulting in prolonged drought and desertification, these people had to take refuge away from the rich pastures in the plains into the still green mountains. When these areas also dried out and degraded, the people migrated to the Nile and to an area called Zolat, in northwest Sudan (see map, Appendix 1).

The images of livestock keeping found both in Zolat and Uweinat were of such a similarity (see rock engraving images, Appendix 2) and their datings of such a clear chronological sequence that archeologists concluded that the erstwhile lush pastures had pushed the Uweinat people into a southeastern (to Zolat) and western (to the Nile) migration. Climate change was here clearly a cause for permanent out-migration. As

there are other such examples in ancient history, it could be concluded that in human history climate change has always been associated with migration.

The earth and its resources are under enormous pressure, and with a fast growing and unequally distributed world population—six billion in 1999—the strain is sharply increasing. Global warming is one important factor to contribute to environmental pressure. Stable and life-sustaining relationships between societies and their environmental and economic support systems are breaking down in many places. Huge numbers of people are struggling to survive in environmentally degraded areas and many of these see only one way out of their misery: leave home and seek better places to live with greater chances of survival. However, such a “refuge tactic” seldom provides real solutions; on the contrary, it often creates new problems in the hosting areas, whether urban or rural.

Some well-known examples of situations where environment and population displacement were intrinsically related are:

- The dust bowl in North America: a rapid desertification process mainly caused by exploitative agriculture systems
- The drying out of Lake Aral: caused by water diversion for large-scale irrigation schemes and perhaps climate change
- The Chernobyl nuclear accident: a human-made ecological disaster
- The Sahel drought and famine: a recurrent drought and desertification situation that, in relation to population growth, has transformed a huge arid zone into an extremely vulnerable region from which people seek refuge in southern, environmentally less depleted areas and countries (climate change is thought to be one aggravating factor)
- The Rwanda conflict: a human drama that has its roots in ethnic conflict as well as in environmental degradation of the scarce natural resources in an overpopulated region
- Rural exodus in many countries, worldwide, in both industrialized and non-industrialized countries: a long-term environmentally induced process, often linked to decreasing economic security and climate change
- The structural insecurity in the Horn of Africa: a complex emergency with at its roots desertification, drought, conflict over land, war, and economic and political instability

In all these cases, environmental problems are to varying degrees the cause or the result of population displacements. Climate change often plays an inducing and aggravating role.

Global warming is not a limited, local problem, but concerns huge areas. Although rural population densities in affected regions may not always be high, such vast areas can nonetheless become large migrant-producing hinterlands for accessible cities. The numbers of people thus affected can be such that for many towns and cities global warming impacts may be the most significant cause of rapid urbanization.

In many cases, people uprooted for environmental reasons will look for alternative livelihoods elsewhere while at the same time remaining oriented towards both their areas of origin and their traditional way of living (off the land). Over-population and uncertain access to land and other natural resources will usually provide them, however, with little opportunity to reestablish themselves in other rural areas. Towns and cities therefore often become their last-resort solution.

Global warming is, then, a considerable rural–urban push factor. Such migration is furthermore strongly reinforced by pull factors from the towns and cities. Urban “realities” seen from rural areas may attract many, although the true situation—especially for those who arrive with little more than hunger and hope—may soon prove its incapacity to provide the hoped-for brighter future.

While these problems are occurring more frequently and on a larger scale, awareness of their extent and depth is also increasing. Studies are being initiated, meetings held, and a growing number of field-level projects undertaken (even if to date these address, in the main, damage already incurred).

There is a need for progress in two important areas. Firstly, *ad hoc* approaches—projects addressing only part of the problem—should give way to more strategic program planning and implementation. Secondly, preventive measures require much more attention as, particularly in cases of environmental degradation, early intervention has a significant cost-effective impact.

Practical guidelines will need to be developed to enable the agencies and governments concerned to act more effectively when they implement measures to prevent, mitigate, and rehabilitate environmental damage.

## **2. The Problem and the State of the Art**

The huge weight of human numbers places enormous demands on the earth’s resources. World population and resource consumption are rising across most of the globe, but patterns of population growth are far from even, and levels of consumption by no means mirror the distribution of people worldwide. Added to this, as an exacerbating factor, is global warming. Insecurity over available natural resources is often the result; this creates unstable communities who are ready to leave their home areas in search of alternative livelihoods. When people actually decide to move, they become environmentally displaced persons.

People should be encouraged to stay in their home areas. One important aspect that needs attention is the concept of carrying capacity (i.e. the number of individuals able to be sustained by a given area without severe damage to the eco-system).

Human intervention can decrease an eco-system’s carrying capacity, or stretch it by technological advances. There are cases where the carrying capacity is exceeded to such an extent that the degradation process becomes irreversible. Rehabilitation of the eco-system then proves an extremely difficult and expensive, or even impossible, affair. Since, next to climate, the human factor is of paramount importance, practical ways of

improving prevention, mitigation, and rehabilitation of environmental degradation need to be developed, with the aim of slowing down the process of environmentally induced population displacements.

The number of environmentally displaced persons worldwide in 1995 is estimated at 25 million. When environmental problems already predicted, such as flooding as a result of rising sea levels, drought and desertification, deforestation, chronic water shortages, soil degradation, and rapid urban development of megacities, are taken into account, the total number of environmentally displaced persons may well reach 200 million by the year 2010 (Myers and Kent, 1995). Improvements to current assessment mechanisms are needed to enable more accurate estimates of numbers of environmentally displaced persons, as well as to provide the basis for more efficient monitoring and evaluation systems.

There is a clear link between the number of environmentally displaced persons and the poverty level of their home areas. The relation between environmental and other—human-made—problems depends on issues such as economic marginalization, insecurity, social upheaval, and political mismanagement. It is preferable for socioeconomic and ecological reasons to improve people's conditions in their home area rather than confront the problems of forced migration.

What needs more study are the deeper causes of mass population displacements, and the forms they take. The situational or circumstantial reasons for people leaving their homes do not very often indicate much about the structural or underlying causes.

Situational causes include drought, pestilence, disruption of food production activities, the collapse of government health services, etc. These circumstances can rapidly lead to disaster.

Structural causes include climate change and global warming, long-term processes and trends that exist within a society and in its relations with external communities, the world economy, and environmental degradation. These processes are political, social, economic, and environmental in nature and are usually inter-linked. They lead, over a long period, to major changes in situational conditions and so increase the risk of disasters, with the subsequent possibility of displacement.

An example of a study designed to understand the root causes of environmental degradation and mass migration is the 1991 World Conservation Union (IUCN) study on the Horn of Africa, *Fighting for Survival*, which examines how a shrinking resource base breeds insecurity, insecurity spreads conflict, and conflict causes environmental degradation, thus establishing a pattern that has resulted in the deaths of millions of people and the displacement of many more. The study concludes that: "Governments must be encouraged to understand that diversity is the central pillar of sustainable development" and "The problem now facing environmental strategists and development planners operating in the Horn is not only to reach a consensus on what is out of balance and why, but also to put in motion the process of achieving environmentally sustainable development policies that embrace diversity, and then put these policies into practice."

People who are migrating for environmental reasons fall outside the categories protected by instruments of international refugee law, both in terms of the text and intent of the drafters, and in terms of much current practice. International recognition of environmentally displaced persons as a vulnerable group in need of particular assistance may now be seen as desirable.

It is only recently that researchers have begun to address the question of environmentally induced population displacements. The results of both field studies and global research are increasingly available. Studies, results of which may be of direct use to agencies and governments, need to be connected to the implementation of agencies' and governments' programs in this field. Examples of field projects specifically addressing the problems of environmentally induced population displacements need to be documented. The experiences of such programs may help in developing measures for prevention, mitigation, and rehabilitation. Results of meetings, workshops, and conferences that contributed to the development of the present understanding of, and responses to, this problem will need to be compiled and widely disseminated.

### 3. Preventive Action

The livelihoods of households and communities in environmentally sensitive rural areas depend on sustained agricultural production capacity, income generation, and access to natural resources. The degree of sustainability depends on prevailing socio economic and ecological factors. Global warming leading to long-term environmental degradation or sudden environmental disruption will decrease people's capacity to cope with their situation. A decision to leave home in search of better living conditions should be considered the consequence of extreme vulnerability, the tip of the iceberg of multiple survival difficulties. It is of great importance for anyone looking for solutions to this problem to realize that migration is inevitably the result of a decision taken *in extremis*. Many people are obliged to resort to a survival strategy to face the mounting problems of resource degradation and possible displacement. Coping techniques applied in rural Africa (Ethiopia, 1993/94) show that people go to considerable lengths to reduce their vulnerability, and thus avoid migration.

Survival options	Percentage
Hire out labour	40.5
Borrow grain	38.3
Borrow cash	25.8
Sell livestock	20.6
Sell other property	0.6
Relief aid	24.8
Sales of trees	1.9
Selling local beer	0.9
Petty trade	2.3
Handicraft	1.5
Begging	0.9
Migration	1.5
Assistance from relatives	1.5

Other	11.0
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N.B.: Households could have chosen more than one survival option.

Source: R. Apthorpe, H. Ketel, M. Salih, and A. Wood, *What Relief for the Horn?* (The Hague: Institute of Social Studies Advisory Service, 1994), Vol. II, pp. 120–279.

Table 1. Percentage distribution of households' survival strategies to fill the food deficit gap

Coping strategies depend on the level of vulnerability of, and the insecurity pressures on, the family. By the time the extreme decision of migration is taken, percentage choice of survival strategies will show a pattern different from the one seen in Table 1. Selling other property (including family jewels), assistance from relatives, begging, relief aid, and—finally—migration will then show increased percentages.

The deteriorating welfare situation of societies and communities moving towards the moment of migration need to be clearly understood if early recovery is to be maintained as a possibility. Population displacement may still be averted if, during this period, appropriate action is taken. Early warning systems allowing global surveillance of areas prone to environmentally induced population displacements need to be developed. Furthermore research systems are required to establish, for each situation, its specific root causes. With a better understanding of what causes displacement, earlier and more efficient measures can be applied to minimize emigrant flow, and where possible help people overcome their difficulties at an early stage, enabling them thereby to remain in their home areas.

Disaster preparedness as an essential tool in preventing disruption of the developmental process is of great importance to all populations living in resource-marginal areas. Given that, as a result of environmental degradation, food shortages are very often the main threat and the most likely cause of famine and displacements, two levels of preparedness may be distinguished:

- The first, based on food security, takes the short-term view of how in marginal areas the inevitable food deficits may escalate into emergency and famine. Early warning systems linked to this food balance exist nowadays in many countries, often supported by international agencies such as the Food and Agriculture Organization (FAO) of the United Nations, and sub-regional organizations. These systems monitor closely food supply situations and include rainfall projections and patterns, crop assessments, and other indicators that provide early warning of the timing and scale of impending food deficits.
- The second, the environment-oriented, takes a longer-term view of root causes. If the natural resource base of marginal areas can be reinforced, people's vulnerability to environmentally induced disaster, and subsequent displacement, will be lessened. This requires a comprehensive environmental rehabilitation approach linked to agriculture and livestock keeping, for these sectors provide the bulk of food required.
- The Tigray region of northern Ethiopia has a long history of food shortages, periodic famines, and migration. The region is prone to desertification and the

high vulnerability to drought is exacerbated by years of war and insecurity and accelerating environmental degradation. The local agency Relief Society of Tigray (REST) has shifted its policy away from food aid to a new approach of community-based improvement projects. A key element of the current policy is the participation of the community in environmental rehabilitation programs to improve the quality of the land, agricultural practices, and increase food production.

The activities that are part of an integrated agricultural development program are:

- Catchment terracing
- Reforestation
- Water development
- Livestock development
- Seed banks
- Provision of extension services
- Rural access roads

The objectives of this program, aiming at the prevention of environmentally induced population displacements, are to:

- Reverse the environmental degradation that has prevailed in Tigray for decades, and by so doing promote an ecological balance that will facilitate sustainable agricultural production
- Increase agricultural production, both crop and livestock, by developing local institutions that provide services to farmers and preserve the genetic resources of the region
- Introduce low-cost and low-input appropriate technologies to the area in order to increase agricultural production and attain food security

There is a need for an inventory of those types of practical measures that may avoid people becoming environmentally induced displaced persons. Effective prevention may be best achieved with the help of natural resource projects and sustainable development programs that allow marginalized people to improve their livelihoods without compromising future resource needs. Examples are needed for various environmental disruptions, such as desertification, deforestation, flooding, soil degradation, pollution, and over-exploitation of energy sources.

For example, in the Sahel region, where desertification problems are widespread and scientifically linked to both anthropogenic and climate change, the introduction of soil and water conservation measures—such as anti-erosion dykes and water-basin irrigation—can be of decisive importance to local communities engaged in a stay-or-go debate. Some other techniques used in arid zones facing water shortages and desertification problems are traditional water harvesting, small-scale irrigation, organic farming (often traditional), and dune fixation.

Deforestation as a cause for displacement may be prevented by forestry programs. Participation plays a key element in social forestry, which is the type of afforestation

that has proved to have the greatest impact in providing people with sustainable forest resources. Agro-forestry techniques can usefully combine the two resource-rich livelihoods of farming and tree planting.

Soil degradation can be avoided by a whole set of soil conservation and farming techniques, for example, mechanical measures (contour banks, drainage canals, terraces), agricultural measures (plowing and cultivating on the contour, contour strips, vegetative barriers, mulching, fallow, green manuring, plowing in of crop residues and animal manure, use of compost, crop rotation, mixed cropping, strip cropping, etc.), agro-forestry measures (wind breaks, shade trees). These measures, however widely studied and known, are unfortunately still much too rarely put into practice. Development and relief agencies are increasingly paying attention to these issues by introducing practical environmental guidelines for their field operations.

Pollution is growing in importance as a factor in uprooting people, especially in and around the larger urban centers. As energy is, after water and food, one of people's most basic needs and at the same time, especially in the tropics, commonly derived from wood resources, the degradation and over-exploitation of the natural resource base can have a devastating effect on the local environment. Many African countries suffer from a growing biomass energy (for cooking) deficit. One way of avoiding this problem is by reducing energy use through the introduction of energy-saving devices. Establishing fuel-wood plantations and the search for and introduction of alternative energies are other ways of avoiding future energy shortages. If wood is to come from natural forests, and future shortage is to be avoided, the wood of these forests needs to be sustainably harvested. This can be done, however the increasing demands of fast-growing populations requires great technical, social, and institutional will.

One disturbing discussion that can be heard now and then is about whether development efforts in so-called super marginal areas (northern Sahel, deserts) or flooding- and cyclone-prone areas (small islands) should be stopped. The reason given is that "these people will have no chance in the longer run anyway, because they live in permanently resource-deficient or disaster situations." As there already exists an out-migration, seasonal or one-way, the feeling is "Why bother to try to stem the flow?" and "Better to invest in the hosting areas where an environmental disaster may still be avoided." Such talk is all the more disturbing because it neglects two important realities:

- Firstly, there are people involved, and as long as there remain communities who dearly carve a living from declining resources or in climatically volatile areas, so long should there be an attempt to help them make it work. In any case, the technological developments are there today to cope with many types of climatic extremes (for examples, trickle irrigation schemes in the Negev desert, building of dykes and polders in The Netherlands).
- Secondly, it would seem much wiser to invest in letting people stay at home than to have to face the problems related to the settlement of displaced persons and over-population in the hosting areas. Sociopolitical (including ethnic) and economic tensions are often the result of such in-migration.

Other measures to be considered concern the responsibilities of governments of countries facing large-scale environmental problems, and those of international aid agencies. An important mechanism is national strategic environmental planning adopted through strategies such as:

- National environmental action plans (NEAPs)
- National conservation strategies (NCSs)
- Plans to combat desertification (PCDs)
- Tropical forestry action plans (TFAPs)

These environmental planning tools can be extremely useful in natural resource management activities for prevention, mitigation, and rehabilitation. The role of environmental strategies is to make an inventory of existing natural resources, analyze the reasons for their possible degradation, identify the priorities and bottlenecks for their management, and formulate a strategy for their sustainable use. It is important that development programs take cognizance of, and work together with, the environmental strategies and plans existing on national or regional level, or in certain sectors (e.g. wetlands, forestry, mountains). This will be of benefit to both plans and programs.

One recent positive development is that donor agencies have introduced environmental checklists for screening project proposals. This should, in the long-term, result in environmentally friendlier development programs. Donor agencies are thereby helping to move away from non-committed natural resource exploitation aiming at “development,” to committed wise use of natural resources aiming at “sustainable development.” Especially in environmentally threatened areas, where people risk migration in search of alternative resources, this promising change in donor policy may have considerable impact.

#### **4. Mitigation**

Once environmentally displaced persons are on the move and regions with marginal natural resources have started to show clear population decline, *ad hoc* measures, even efficiently implemented ones, are usually incapable of stemming the exodus. Mitigation needs to be undertaken in the home areas, all along the migration routes, and in the hosting areas. This should be part of an overall strategy that not only aims at reducing the environmental impacts of the migration itself, but also at encouraging a return flow by ensuring improved conditions in the home areas.

In cases where environmentally displaced persons cross international borders, for example, host governments will have great difficulty stopping an influx just by closing their frontiers. There is plenty of proof worldwide that such a measure alone is not capable of “solving” the problem. Displaced persons will continue to find ways of crossing, host areas will continue to cope with sharply increased populations, and home areas will go on having to find solutions for the problems of environmental degradation. Interrelated mitigating measures should, through a strategic approach, become mutually reinforcing.

For example, in several countries where there have been considerable moves from rural areas to the cities due to environmental degradation in the home areas, initiatives are being taken to help people return to their land. This “return-to-the-land” approach is two-pronged in that it establishes work with people in the poorer neighborhoods of the cities and, through project activities, establishes close contacts with the home villages. The aim is also two-pronged: (i) to avoid family members joining urban dwellers who arrived earlier and (ii) to promote the return of the urban dwellers to their villages and assist them in living off the land anew.

The essential point here is that there should be a permanent exchange of information between the home and host areas of environmentally induced displaced people. This exchange should be based on positive action to link the situations in both areas and restore the natural resource base in the home area. Closer monitoring of the entire migration process will permit an understanding of quantitative and qualitative aspects of environmentally caused displacements and possibilities for return.

## 5. Rehabilitation

Adequate support is seldom available for rehabilitation measures in environmentally degraded or disrupted areas. This may be because of the high expenditure and complex technical inputs needed to restore the damaged natural resource base. Especially is this so if it concerns slow-onset environmental impacts—often irreversible—resulting from global warming. Special programs need to be developed to address rehabilitation effectively, even if they require extra fund-raising efforts.

Some of the broader environmental disasters seem to be of an irreversible nature. Humans are demonstrably capable of going so far in exploitation of natural resources that, having left the key behind, we shut ourselves forever out of our own house. Three examples are Chernobyl, Lake Aral, and rainforest degradation. Another irreversible environmental problem is that with climate change it is believed that coastal areas populated with some 162 million people (Bangladesh 26 million, Egypt 12 million, China 73 million, India 20 million, elsewhere 31 million) will be threatened with rising sea levels and flooding (Myers and Kent, 1995). Fortunately, in other cases, such as the North American dust bowl, rehabilitation has been shown to be possible but only after many years of considerable effort and financial input.

One difficult problem specific to environmental rehabilitation in home areas is that the original population has been reduced by out-migration. This process, which the French call *la désertification rurale*, leaves a limited human resource capacity—both in quantity and in quality—to do the rehabilitation work needed.

## 6. Policy Guidelines and Roles of Different Actors

To address the field of environmentally induced population displacements more effectively, the following actions are needed:

1. Appropriate policy development within governments and agencies
2. A move away from reactive interventions to proactive strategies and action plans

3. The development of a worldwide monitoring capacity that would look closely at the relation between global warming and environmentally sensitive areas
4. The establishment of a platform where information on important issues can be exchanged between governments and agencies

The International Organization of Migration (IOM), in a 1995 paper from its Division of Research and Forum Activities, called for “intensified international cooperation to prevent disruptive environmental migration.”

In his study *Environmental Exodus. An Emergent Crisis in the Global Arena*, Dr. Norman Myers proposes a number of policy responses. He feels that “there is much scope for preventive responses, especially those that aim to reduce people’s motivation to migrate by ensuring an acceptable livelihood in their established homelands.” The specific options he then recommends are:

1. An expanded approach (he argues in favor of “an official standing accorded to environmental refugees.” As explained earlier, within official refugee agencies there is no support for this idea.)
2. Addressing root causes (“to widen and deepen our understanding of the whole problem”)
3. Promoting sustainable development (“in big-picture terms, it provides a sound way to pre-empt the environmental refugee issue in its full scope over the long run”)
4. Foreign aid (“to relieve poverty among the communities most likely to generate environmental refugees”)
5. Foreign debt (he is in favor of “debt-for-environment swaps”)
6. Specific initiatives for developing countries (“were developing countries to reallocate half of their military outlays, they could supply sufficient health care to save at least 10 million lives per year, and it is the people threatened with death who are often the ones most driven to migrate”)
7. Policies with multiplier effects (“expanded tree-planting campaigns” and “a sharply increased effort to tackle population growth generates handsome payoffs”)
8. Enhanced management of the problem (“the principal policy response here is to mobilize an extended effort to handle an adverse situation that is already strongly established”)

These recommendations are useful as general policy options, but there is a need for more specific guidelines, permitting agencies and governments to adjust existing or develop new action-oriented policy in this field.

Governments of countries most concerned with global-warming related migration need assistance from international agencies, both to develop their in-house capacity in dealing more effectively with the situation and to get relevant information on cross-border related issues and successful practice elsewhere.

In ecological zones sensitive to environmental degradation (e.g. arid and semi-arid zones, coastal areas, rain forests, wetlands), but also in many overpopulated areas

(Rwanda, Burundi, Northern Ethiopia, Pakistan, Indonesia, Bangladesh), special programs and conventions may be extremely helpful in organizing a more strategic approach.

An example of such a program is the Indonesian government resettlement program that moved Javanese to low-density islands. Although this program has certainly also had negative impacts on the hosting areas (political opposition in Irian Jaya), it has prevented an uncontrolled displacement of people, with all the major problems inherent in it.

Another example of a strategic approach is the Convention on Desertification, which aims at reining in the partly human-induced, partly climatic processes of turning vast areas of pasture and arable land into degraded arid zones.

In order to guide the actions of governments and agencies, there is a need for guidelines explaining how to deal with environmentally induced population displacements. Existing policies may need adapting to cope with and indeed palliate such massive human and environmental disasters.

Some policy considerations—including preventive, mitigating, and rehabilitative actions—are:

- The mandates of organizations, the roles of governments, and their respective capacities and limitations in this field of intervention
- Identification of areas prone to environmental exodus
- Sustainable development approaches as preventive measures
- The underlying causes of population displacement
- The circumstantial reasons why people decide to move
- The implications of population reduction for the home areas, and possible rehabilitation measures
- Impact of environmentally displaced persons on the migratory route, and appropriate mitigating measures
- Potential impact on hosting areas, early warning, early mitigating measures and long-term planning

The policy consideration of sustainable development approaches as preventive measures was, of course, tackled at the 1992 United Nations Conference on Environment and Development (UNCED) Conference in Rio de Janeiro. However, there seems to be reason enough to remain vigilant in this field as, with time, UNCED's conclusions and recommendations—encapsulated in *Agenda 21*—are slowly ebbing away into oblivion. Environmental policies, guidelines, checklists, and impact assessments are exactly the sort of tools agencies and governments should apply to their development and relief operations if environmentally induced population displacements are to be reduced. The principles of sustainability in development programs and other activities (emergency relief, rehabilitation, and even nature conservation programs) no longer need study, but should be put into practice.

Because of the strong linkage between population growth and environmental degradation, it is clear that a strategic population policy needs to accompany all other measures. Such a policy could consist of one, or both, of two main elements—family planning and resettlement. Family planning, however widely promoted nowadays, still shows but limited results in effective population growth reduction. Resettlement programs as an organized—and therefore controlled—process of migration are also of importance, although they meet with many social and practical problems.

Evidence of serious problems of organized resettlement can be found in experiences with resettlement programs during the Ujamaa period in Tanzania, and the Derg regime in Ethiopia. More successful schemes could be mentioned: the resettlement of Javanese to other Indonesian islands, and immigration into The Netherlands' polders.

Problems related to the migration route of environmentally induced population displacements, and strategy choices, will also need to be addressed. Those international agencies best placed to monitor and intervene in this intermediate phase between uprooting and new settlement need to be identified.

Instead of creating a new field of environmentally induced population displacement (or more commonly “environmental exodus”), it would seem to be much more logical to improve on existing migration and refugee policies developed over many years. To achieve such policy improvement and integration, each agency will need to look at the general principles and desirable practices involved in addressing environmentally induced population migrations, and incorporate these into their own agency-specific program policy. Information on general principles and desirable practices should be developed through international meetings and made available to agencies and concerned governments.

Each actor—government, humanitarian agency, development organization, environmental agency, donor, nongovernmental organization (NGO), specialized institute, local community, displaced persons community—has a specific role to play. An indication follows of how the various actors could be oriented to play their role most effectively:

- Displaced persons: full participation in any problem analysis and attempts at solutions
- Host communities: active involvement
- Local, specialized institutes: field studies, surveys, geographic information systems, environmental impact studies, monitoring
- Local and international NGOs: depending on their expertise, community-based work and environmental mitigation and rehabilitation work
- Governments: more attention to the problem, especially the home countries and reinforcement of operational and coordination capacity
- Donors: more sensitivity to the problem, and support for concrete actions, with emphasis on prevention
- International development organizations: full adoption of sustainability in their programs, as prescribed in UNCED's *Agenda 21*

- Humanitarian relief organizations: inclusion of environmental principles in emergency relief work
- Environmental organizations: conservation and rehabilitation programs and technical advice to all actors
- United Nations and other international organizations: putting the issue of environmentally induced population displacements on the agenda and promoting worldwide solutions

It should be clear that positive interaction between the various actors is a *sine qua non* for successful solutions.

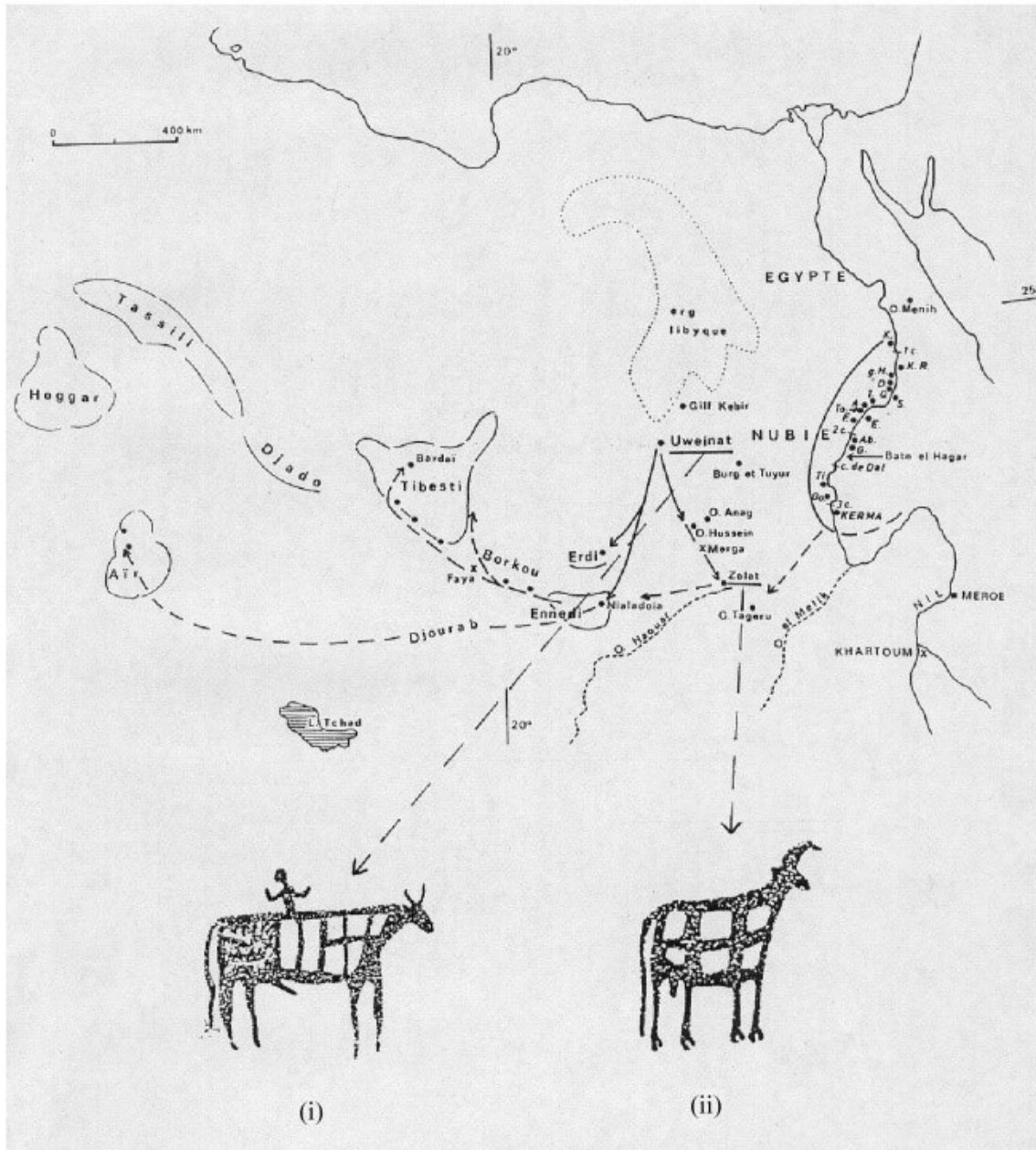
## **7. Conclusion**

The certainty of global warming and its potential effects on human society are still very much under discussion. However, there are environmental problems that scientists of today claim derive from climatic tendencies that point to global warming. Desertification, flooding, deforestation, and pollution are some of the impacts that could directly or indirectly be attributed to global warming.

These environmental upheavals have an impact on the stability of populations. Depending on other aggravating factors, such as socioeconomic and political conditions, people may decide to leave their homes in search of better conditions. Such population movements could be considered environmentally induced migration. Internationally, there is still little organized knowledge about the causes and effects of such migration. Relevant international agencies such as IOM, UNHCR, United Nations Development Programme (UNDP), IUCN, and Worldwide Fund for Nature (WWF) and governments of either home or host areas are in need of developing new policy for prevention, mitigation, and rehabilitation programs.

As human migration caused by global warming might well be one of the major development problems of the third millennium, it seems of utmost importance for governments and international humanitarian, development, and environmental agencies to pay weighty attention to the issues at stake.

## Appendix



Rock engravings: (i) Ox - discovered in Uweinat by Rhotert, 1952  
(ii) Ox - discovered in Zolat by Rhotert, 1952

Appendix 1. Map: Environmentally induced migration of pastoralist society from Uweinat to Zolat (2000 to 1500 BCE)  
(Source: Paul Huard and Léone Allard-Huard)

Appendix 2. Rock engravings: (i) Ox, discovered in Uweinat by Rhotert, 1952; (ii) Ox, discovered in Zolat by Rhotert, 1952  
(Source: Paul Huard and Léone Allard-Huard)

## Acknowledgments

The results of the International Symposium on Environmentally Induced Population Displacements and Environmental Impacts resulting from Mass Migrations, Geneva 1996, have been particularly useful for the orientation of this article. The symposium was organized by UNHCR, IOM, and the Refugee Policy Group.

## Glossary

<b>Carrying capacity:</b>	The number of individuals able to be sustained by a given area without severe damage to the ecosystem.
<b>IDP:</b>	Internally displaced person.
<b>IOM:</b>	International Organization for Migration.
<b>IUCN:</b>	The World Conservation Union (formerly the International Union for the Conservation of Nature and Natural Resources, the initials of which have been retained despite the name change).
<b>NCS:</b>	National conservation strategy.
<b>NEAP:</b>	National environmental action plan.
<b>NGO:</b>	Nongovernmental organization.
<b>PCD:</b>	Plan to combat desertification.
<b>Pull factor:</b>	Here, a pull factor is promising urban or settlement prospects that attract people away from their rural home areas to become city dwellers or organized settlers.
<b>Push factor:</b>	Here, a push factor is a degrading environmental situation, often leading to serious socioeconomic and political problems, that impels people to leave their home in search of better living conditions elsewhere.
<b>REST:</b>	Relief Society of Tigray.
<b>TFAP:</b>	Tropical forestry action plan.
<b>UNCED:</b>	United Nations Conference on the Environment and Development.
<b>UNHCR:</b>	United Nations High Commissioner for Refugees.

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### **Biographical Sketch**

**Hermen Ketel** has since 1974 been active in the fields of environment, sustainable development, and humanitarian relief. He has worked as an advisor to farmers in developing countries, managed field projects, and developed national and regional programs, and has been involved in several studies related to environmental issues, such as desertification, insecurity and environment, urbanization and migration, national environmental planning, and environmental education and awareness-raising. He has organized and facilitated several national and international seminars and symposia on the environment. Since 1992, Mr. Ketel has worked as an independent consultant for United Nations agencies (UNHCR, UNDP, IOM, UNOPS, UN-CCD), environmental organizations (IUCN, Green Cross), and international nongovernmental organizations (International Federation of Red Cross Societies, CARE, OXFAM, Lutheran World Federation, ACT-International). Much of his work is done in Sub-Saharan Africa, through assignments aimed at strategic program planning, reviews, field studies, and environmental assessments. He has been involved in an advisory role in environmental policy development with several international agencies, including the UNHCR.

### **To cite this chapter**

**Hermen J. Ketel**, (2004), GLOBAL WARMING AND HUMAN MIGRATION, in *Climate Change, Human Systems and Policy*, [Ed. Antoaneta Yotova], in *Encyclopedia of Life Support Systems (EOLSS)*, Developed under the Auspices of the UNESCO, Eolss Publishers, Oxford ,UK, [<http://www.eolss.net>]