ABSTRACT
By 2025, chronic water scarcity will affect as many as three billion people in 52 countries. It is a pressing issue that demands the committed attention of governments of water-scarce nations and of regional and international institutions. In spite of numerous calls for decisive and collective action, however, water scarcity is worsening on a global scale. Demand for water is growing along with populations and economies, while sources of water are being rapidly degraded and depleted. Inequalities in the distribution of water supplies also are increasing, exacerbated by poor water management. In consequence, human welfare, ecological health and economic potential suffer. Under certain conditions, water scarcity threatens national security. This report examines the role of water scarcity in shared river basins in triggering, intensifying and generating regional instability and other security problems.

Three case studies have been selected to illustrate how various factors interact with water scarcity to threaten national and regional security. In the Jordan River Basin conflict has resulted from water scarcity combined with certain catalytic conditions. A lack of cooperation sustained by historical tensions could prove to be detrimental to regional and even global welfare. In the Nile River Basin, water scarcity exists, but conditions have not yet brought it to the level of conflict present in the Jordan River Valley. The nine countries in this basin, however, have been stalemated by political inertia, although there have been some recent indications of a growing interest in pursuing cooperative solutions to water problems. The Mekong River best exemplifies the potential for both conflict and cooperation in a shared river basin. Water-sharing mechanisms exist; the question is whether they can diffuse the tensions posed by water scarcity.

The importance of this issue is hard to understate. Water is a vital resource upon which all organisms directly depend. River basins have been referred to as "cradles of human civilization," sustaining productive, prosperous societies throughout human history. As these vital areas have been stressed by pollution and growing human demands, the world has witnessed growing competition and conflict over their water. So serious is the problem that the United Nations Commission on Sustainable Development has initiated a global freshwater assessment; it is currently underway and a report will be submitted to the U.N. General Assembly later in 1997.
INTRODUCTION
Water is essential for human and ecological health. It is vital for nutrition, food production, sanitation, and economic production. It is used for recreation, power generation and transportation, and embodies symbolic and cultural value. Water is a vital component of ecosystems, contributing to climate control and the hydrologic cycle. These processes profoundly affect the characteristics of the natural world of which human beings are a part.
As a natural resource, water has unique characteristics. From a global perspective, it is renewable and abundant; in regional settings, however, it is often finite, poorly distributed, and subject to the control of one nation or group. It is difficult to redistribute economically and has no substitutes. River flows in particular are uneven over time and poorly matched to human needs.

Reliable access to water supplies has long been a human concern because deprivation can cause illness, death and economic hardship. Yet given that water covers over 70 percent of the Earth's surface, scarcity might appear to be a low priority issue. The ostensible abundance of water is misleading. Fresh water comprises only 2.5 percent of the Earth's total water supply. Of this, 79 percent is locked in ice caps and glaciers. Groundwater comprises 20 percent; this leaves only one percent as easily accessible. Thus, only 0.000008 percent of the Earth's water is readily accessible for basic human use.

Historically, human welfare and progress have been closely associated with access to this small fraction of the world's total supply of water. Today, changes in the factors that determine water scarcity and in the manner in which scarcity is being handled ensure that the familiar problem of reliable access persists. Addressing this problem requires new approaches to managing water-scarce situations so that threats to international security are minimized. As world population skyrockets and increasing numbers pursue material wealth, high quality accessible water is likely to be the subject of competition and conflict. Unfortunately, simple solutions may not be adequate to address contemporary water scarcity conditions. Water scarcity problems are complex, subject to competing interests, and often entrenched along sensitive ethnic, religious, or social class divisions. They exacerbate interclass or interstate tensions where they exist, and create new tensions where previously there were none.

Water disputes are currently proliferating in several arenas, from oceans to lakes to rivers basins. Degradation of oceans and lakes has severely damaged marine ecosystems, eliminating or diminishing numerous fish species and igniting hostilities between countries vying for the declining fish stocks. The shrinking of the Aral Sea in central Asia has attracted worldwide attention for having depleted, diverted, and poisoned the maritime ecosystem, but it is only one example of water depletion due to human diversion and
contamination. The relationship between water scarcity and regional security, however, is most transparent in the cases of rivers shared by multiple countries. Nearly 40 percent of the world's population rely on shared river basins; this percentage jumps to 50 in northeast Africa and the Middle East. Rivers flow across political boundaries, usually giving upstream countries a distinct advantage over downstream neighbors. As rising demands strain river water supplies, international friction intensifies.

ANALYTICAL MODEL
In discussing the causes of water scarcity and how it may become a security issue, it is necessary to elaborate upon what is meant by "scarcity" and "security." Quantitative definitions of scarcity range from less than five to seven liters per person per day (the amount required to sustain a human being) to less than 2740 liters per person per day (based on the average amount required to sustain a Western standard of living). A number of specialists describe a state as "waterstressed" if renewable runoff per person is less than 1,700 cubic meters annually, and "water-scarce" if renewable runoff is below 1,000 cubic meters per person annually. But given the diversity of agricultural and industrial practices and expectations throughout the world, it is not especially useful to assign a specific value to water scarcity. We argue that water scarcity exists when demand (which varies considerably) exceeds supply. It is resolved by establishing a balance between supply and demand.

We define a security threat as a threat to the values in the defense of which a country will use violence. These values include sovereignty, territory, public health, economic prosperity, and cultural identity. Situations that potentially or actually threaten such values are considered threats to security. It is important to note, however, that while security problems have the potential to lead to violence, they may also act as a stimulus for cooperation.

Variables that Cause Water Scarcity:
There are three categories of variables that cause water scarcity: increased demand, decreased supply, and impeded access to available supplies. (Homer-Dixon, 1994)

Increased demand generally results from population growth, economic growth, and/or poor water resource management. 95 million people are added to the planet each year, increasing the demand for water; throughout the world economic growth is a top priority; and all too often poor water management adds inefficiency to the other pressures for more water. Per capita use today is almost 50 percent higher than it was in 1950, and in most of the world it continues to rise Dimension of Need: An Atlas of Food and Agriculture, p. 43).

Decreased supply is caused by the pollution, diversion, and depletion of water. Pollution
degrades water quality, often so much that it is unsafe to drink, use for hygiene and sanitation, or use for fishing, agricultural and even at times industrial purposes. Water pollution can decrease the amount of employable water by means of domestic waste, industry, and agricultural runoff. This is particularly true in developed countries; in Poland, for example, the share of river water of drinking quality has dropped from 32 percent to five percent during the last two decades, and around three quarters of Poland's river water is now too contaminated for even industrial use (Postel, p. 21, 1992).

Diversion occurs in river systems when an upstream water user alters the flow such that downstream users receive a diminished volume of water. Depletion occurs when ground water and aquifers are recharged and purified through percolation of precipitation through layers of soil and rock; because the hydrological cycle takes a long time to complete, based on a human time frame, severe depletion of groundwater means not only a diminished supply, but also an unclean supply. Severe depletion can also permanently abate natural water storage capacity, further jeopardizing the amount of water available for human use.

Unequal access to available supplies causes the unfortunate conditions of water scarcity only for certain portions of the population, regardless of the aggregate availability of water. This is the case in many places, and the inequality can be due to natural irregularities in precipitation, seasonal river flows, or human activities.

If the access problem is due to natural causes, catching and storing water when it is available is a critical factor in determining how much human suffering and damage will result from scarcity. If the problem is human-induced, access to water supplies is usually tied to political and economic power. In this situation the poor and marginalized subsidize the water use of those who have access to power. Thus, unequal access frequently creates water scarcity even in places where overall water scarcity may not exist.

Variables that Affect the Stability of Institutional Structures
The consequences of water scarcity can be severe. Populations can be displaced, as people migrate in search of water and new livelihood, or even as a result of attempts to remedy the scarcity situation, such as the construction of dams, the flooding of reservoirs, and the diversion of rivers from their natural river beds. As water scarcity causes water to be more highly valued, water prices increase and controlling water supplies becomes increasingly lucrative and may exacerbate existing forms of competition based on ethnic or other social divisions. As a fundamental component of the natural resource base which supports agricultural and industrial activities, production and growth are likely to be threatened. Finally, institutions are weakened as the various burdens placed on them increases; in the most severe cases they may fail or resort to violence.

The Link to Security:
Water scarcity poses a clear threat to internal or domestic security by contributing to health problems, civil strife, economic crises and institutional failures. Water scarcity may expand into the international realm, however, if certain conditions exist. The extent to which a river is shared by more than one country, disparate relative strengths of the countries sharing the water source, and the lack of equitable water sharing agreements among all water users can catalyze a situation of water scarcity into one of regional insecurity. Moreover, water scarcity may amplify conventional international security problems related to militarization, weak institutions and ethnic and other sources of hostility and tension. Conceivably, the forces that prevent countries from resorting to violence to protect their interests and core values may be overwhelmed.

CASE STUDY SUMMARY: THE JORDAN RIVER BASIN
Readers interested in complete versions of these case studies should contact the editors of the Environmental Change and Security Project Report.

Water in the Jordan River Basin is a limited resource whose scarcity has been a contributing factor to conflict between states in the past. The Jordan River Basin states are Israel, Jordan, Lebanon, Syria and the Occupied Territories. The upper Jordan is fed by three major springs: the Hasbani in Lebanon, the Banias in Syria, and the Dan in Israel. The major tributary of the Jordan, the Yarmuk River, originates in Syria and Jordan and constitutes part of the border between these countries and the Golan Heights before flowing into the Jordan River. The quality of Jordan River water is good up to the point where it enters the Sea of Galilee but by the time it arrives into the Dead Sea, the water has become too salty to use (Gleick, 1995, p. 9).

The surface and hydrological formations in the Middle East are nonhomogeneous discontinuous, meaning some sections of the region are dependent upon others for water supply (Ghezawi, 1994, p. 3). Those nations geographically situated upriver are gradually diverting more water from shared water resources in the Jordan River Basin for themselves, decreasing the available water for downstream users, while region-wide demands are swelling. Therefore, the control and allocation of water has evolved into an issue of high politics with global consequences and it has been explicitly made a part of the ongoing bilateral and multilateral peace negotiations (Gleick, 1995, p. 99).

Complicating the problem of water scarcity, the Jordan River is historically and culturally important to the region and the world, as some of the most ancient civilizations of the earth formed and grew around the river basin. Judaism, Christianity, and Islam consider the Jordan holy and it plays a role in national ideological objectives, such as settling border areas and population distribution, fanning ancient rivalries and disputes.

Since the establishment of Israel in 1948, interstate disputes over the Jordan River and its
related ground water basins have played a role in ensuing violence in the area. In the 1960s, for example, the Arab League attempted to divert the waters of the Jordan River into Jordan, preventing the waters from entering Israel. Water-related tensions between Israel, Jordan and Syria contributed to the atmosphere which led to the 1967 war.

Problems continue over the control of water resources in the region and have begun to deteriorate at an even more rapid pace, due to the almost complete exploitation of local resources. Palestinians on the West Bank and Gaza Strip compete with Israelis for dwindling groundwater supplies. Much of the water supplying northern and central Israel comes from aquifers that originate on the West Bank and drain westward towards the Mediterranean Sea (Brown, 1993, p. 130). Overpumping of the aquifer underlying the Gaza Strip has caused sea water to intrude and partially contaminate this source. As extraction from ground and surface water continues to increase, so do problems associated with low water levels, decreased quality, overflowing waste, and contamination from pesticides and fertilizers. Negotiations over water rights between Palestinians and Israelis were postponed in 1995, along with the issues of Jerusalem and Jewish settlements, indicating how important the subject of water is to the region and the diametrically opposed positions held by each side (Gleick, 1995, p. 8).

Though it may seem as such, this is not only an Arab-Israeli phenomenon. Tensions also exist between Syria and Jordan over the construction and operation of a number of Syrian dams on the Yarmuk River, which would allow Syria to regulate the Yarmuk's flow, which feeds the Jordan (Gleick, 1995, p. 11). If Syria acts aggressively to combat its own water shortages, violent conflict between the two states is possible.

Estimates suggest that fresh water deficits are increasing rapidly in the region and that if current water policies continue unchanged, the nations of the Jordan River Basin may begin to "experience acute and progressively worsening perennial water shortages and quality degradation analogous to the areas running out of renewable sources of fresh water within the next decade" (Naff, 1993, p. 116). Rapid population growth in the region, caused by elevated birth rates, reduced infant mortality rates, improved access to health care, and increased rates of immigration will place even greater burdens on all of the nations that utilize the water supply of the Jordan River Basin. Along with this population explosion, increased rates of urbanization and the growing demands of the agriculture and industrial sectors of these economies are placing further pressure on existing water reserves.

The United States, as the main mediator in Arab-Israeli negotiations, has an interest in assisting the parties to manage regional water scarcity obstacles because any factor which could derail the progress of the peace process would hinder the prospects of a lasting peace accord and perhaps damage U.S. prestige worldwide. Miriam Lowi, a professor at the
College of New Jersey, argues that solving problems of water scarcity in the Jordan Basin are "specific to the task and cannot be viewed as an avenue towards political settlement" (Lowi, 1993, p. 204). But unless the issues involving water scarcity, especially those between Israelis and Palestinians, are rectified in some manner, which will only occur in the foreseeable future with the assistance of the United States, the chances of resolving political problems in the region will be restricted. This is in part because of the high priority given to Palestinian problems in the negotiations and in part because the dilemma of water in the West Bank is integral to the difficulties of the Jordan River Basin as a whole (Gleick, 1995, p. 101).

While unilateral steps will assist in improving water management, cooperative efforts will be the ones which bring lasting success to the Jordan River Valley Basin. As the former Agriculture Minister of Israel, Meir Ben-Meir, said, "If the people of the region are not clever enough to discuss a mutual solution to the problem of water scarcity, war is unavoidable" (Brown, 1993, p. 128).

CASE STUDY SUMMARY: THE NILE RIVER BASIN

It is not unreasonable to assume that the world's longest river would offer the inhabitants of its banks an abundant and unlimited water resource. For millennia this has been the case in the Nile River basin. In the past several decades, however, this basin has suffered from enormous pressure from increased demand and reduction in supply. Not only does this pose a direct threat to the health of the humans and wildlife who depend on it for water, but it also poses the indirect threat of strained relations among the nine nations of varied levels of development that lie on the river's banks. This is no esoteric, whimsical notion; in 1989 Boutros Boutros-Ghali (then Egypt's Minister of State for Foreign Affairs) addressed the U.S. Congress and maintained that "The next war in our region will be over the waters of the Nile, not politics" (Gleick, 1994, p. 14).

Although the Nile passes through a multiplicity of nations (Rwanda, Burundi, Tanzania, Zaire, Kenya, Uganda, Ethiopia, Sudan, and Egypt), only two of these cooperate in its management: Egypt and Sudan, a result of the 1959 Nile Waters Agreement which allotted each a certain amount of water per year. The Nile has two sources. The Blue Nile originates in the Ethiopian highlands and meets the White Nile (the headwaters of which is Lake Victoria in Tanzania) at Khartoum, Sudan. The White Nile has actually demonstrated an increase in flows over the past sixty years, and thus the immediate problem is limited to Egypt, Sudan, and Ethiopia. The difficulty lies in the fact that, the 1959 Agreement notwithstanding, these nations, which demonstrate a wide range of development levels, have historically relied on a local approach to water allocation as opposed to a concerted, basin-wide approach. The local approach, however, does not take into consideration the other users of the waters, as witnessed in the case of Egypt's construction of the Aswan
High Dam in the late 1950s. This type of approach caused no serious difficulties until this century, but recent developments that increase demand and reduce supply have deemed this an unsustainable method of allocating resources.

One of these recent developments is population growth; Egypt's population is growing by another million every nine months. Despite famine and civil wars in Sudan and Ethiopia, their populations have grown steadily since 1960. This growth has increased and will continue to increase water demand for human and livestock consumption and for industrial and agricultural activities. Since there is a finite amount of water, this poses a serious problem.

In addition to the demand pressure caused from population growth, economic growth (or in the case of Sudan and Ethiopia, the desire for economic growth) presents another strain, as industry usually requires extensive amounts of water. Thus, the problem is two-fold; for Egypt, which is relatively industrialized, a decrease in flow due to elevated upstream consumption establishes constraints on economic options. Countries such as Sudan that strive for economic strength will vastly increase their consumption of water as electric power generation and manufacturing materialize. Another ominous strain is Egypt's intent to reclaim desert land for agriculture in order to reduce its dependence on imports for food; this would substantially increase its demand for water supplies. Taking into consideration the projected growth in population and its current per capita water use, Egypt's total water demand in twenty years will exceed its allotted share by almost 60 percent (Postel, 1992, p. 188).

To make matters worse, the actual supply is being reduced. Water is of no use to a thirsty person if it is polluted; degradation, as much as if the water simply disappeared, therefore decreases the available supply. In Egypt, for example, 117 factories dump their wastewater directly into the Nile (Postel, 1996, p. 143). Egypt is the last in line for the Nile and thus currently suffers from only self-inflicted injury. However, as the upstream countries nurture their interest in economic growth, they may be tempted to subsidize industrial water use, which would render degradation of the upstream waters (and thus further degradation of Egyptian water) inevitable.

In addition, a potential usurper of supply is global warming. It is almost impossible to predict exactly where changes resulting from this development will take place, but it is certain that where less rainfall is the outcome, periods of shortages may result if they are at or near water supply limits. With the inevitable increase in potential and actual evaporation that would result from higher surface air temperatures, the best guess for greenhouse-induced change in Nile flows would be a reduction in Blue Nile flows and constant or slightly increased White Nile flows (Howell and Allan, 1994, p. 159). Thus the current situation would only be aggravated.
As our general model suggests, each of these factors that are bringing about scarcity are affecting and will continue to affect security in the Nile basin. The decreasing supply of Nile waters in conjunction with an unlimited demand poses several types of security issues: those on the human, individual scale; the security of the ecosystem itself; and the security of nations. Clearly, the first two security issues are the most immediate and tangible. Along with the obvious consequences (dehydration, disease, and hunger) that result from water scarcity, unemployment and other factors that negatively affect the economy could threaten the security of the lives of Nile basin inhabitants. Also, although ostensibly not of much immediate interest to the countries involved, water scarcity in the Nile basin and unnatural attempts to alleviate it could have serious detrimental ramifications on the ecosystems and consequentially on the inhabitants of the region, as intact ecosystems play a vital role as water purification systems.

The indirect threat of international insecurity is, however, the most sweeping. If current circumstances persist, Egypt and Sudan will experience a severe deficit in water resources by the year 2010. The seven "lesser" countries have expressed a desire to increase their use of the river water source. Such an occurrence, especially by Ethiopia, could reduce water available to the downstream nations and significantly increase tensions. Mutual fear proliferates; although the Ethiopians understandably fear that Egypt could resort to violence, Egypt has little control over the water-related actions of the eight upstream governments. It may not have been an exaggeration when Boutros-Ghali declared that "The national security of Egypt is in the hands of the eight other African countries in the Nile basin" (Postel, 1996, p. 73). Despite the existence of several cooperative opportunities, policy-makers can expect the risk of conflict among the countries to grow. Egypt, though more developed in almost every aspect, is extremely vulnerable to water withdrawal by upstream countries and will be vigilant and apprehensive as she warily watches the growing spurs of her neighbors.

Several possibilities exist to mitigate scarcity and therefore the threats posed to the security of the Nile countries and their inhabitants. They fall under three principal approaches: increasing the supply of water (through purification and other projects and by controlling pollution); decreasing the pressures of demand for water by reducing population and eradicating wasteful use domestically and agriculturally; and formulating cooperative water management agreements. There is widespread support for emphasizing cooperation and reducing demand and contamination rather than searching for new supplies in this basin. Since most of the solutions dealing with demand and cooperation are similar for all river basins, they will be discussed in the "Policy Recommendations" section of this report. States depending on the Nile River basin, plagued with political inertia, need to be particularly concerned with sitting at the table and conducting cooperative, basin-wide negotiation; only after doing this can discussion of an overhaul of policy and of new projects begin. There currently exists a stalemate as Egypt refuses to renegotiate its 1959
Agreement allocation and as Ethiopia refuses to sit at the table as long as it is excluded from new allocation agreements. A useful actor could be the international community in the form of aid and technological assistance to Ethiopia to give it an edge. All things considered, it is essential that these countries realize that one's gain does not necessitate another's loss; otherwise, this malignant suspicion will protract the lack of coordination that in the long run just may well prove to be disastrous as water scarcity and its consequent security troubles continue to be exacerbated.

CASE STUDY SUMMARY: THE MEKONG RIVER BASIN

The Mekong River basin is a water scarce region where increasing competition for water threatens South East Asian security. The Greater Mekong Sub-region covers 2.3 million square kilometers, is home to 325 million people, and is Asia's southwest growth region. 52 million people, mostly small-scale farmers and fishermen, are directly sustained by the river. At 4800 kilometers in length, the Mekong is the world's twelfth longest river, flowing through the Yunnan Province of China, Myanmar, Laos, northeastern Thailand, Cambodia, and southern Vietnam. The Mekong provides the natural resource base for agriculture, fishing, transportation, economic development, and ecological systems maintenance. As a freshwater ecosystem, virtually every human action is eventually reflected in the functions of the Mekong River (Abramovitz, 1996, p. 10).

Potential for development along the Mekong is great but the river's turbulent annual flood-drought cycle renders harnessing its waters for human purposes expensive and problematic. The diverse interests and needs of the countries in the Mekong Basin have the potential to create and exacerbate existing intraregional tensions. Conflicts of interest are developing over use of the river. Mekong development is thus an opportunity for conflict as well as for cooperation. The diverse needs and interests in river development represented by riparian nations, the political relationships among the Mekong countries, and the ability of the Mekong to meet the current and projected demands for its services are all uncertain.

What is certain is that the Mekong is being used unsustainably. It cannot supply the water demanded by human users and the ecological functions it provides. Declining productivity in fisheries, the intrusion of salt water into previously fresh surface water and groundwater, the recession of fertile coastal deltas due to the reduced ability of lower water volumes to flush sediment into the sea, and the declining diversity of wildlife species all indicate that water resources are overexploited and stressed in the Mekong River basin. The region displays many of the characteristics that indicate or lead to water scarcity.

Population growth rates in the Mekong basin are high. In the lower Mekong countries, the annual growth rate averages 2.29 percent (Environmental Almanac, 1994). This means that the regional population increases by 2,550,870 people per year in the lower Mekong
The rate of economic growth in the lower Mekong countries is also high. In 1995, GDP grew at an average rate of 8.18 percent. Average growth in the industrial sector in the lower Mekong countries averaged 11.75 percent (Asian Development Outlook 1996 and 1997). With the economic expansion of the economies of the lower Mekong countries, water pollution increases and higher per capita consumption rates contribute to water scarcity through increased demand. In addition, rates of access to safe water supplies in the lower Mekong region, excluding Cambodia, range from 47 to 67 percent in urban areas and 25 to 85 percent in rural areas. Including China and Myanmar, these figures range from 47 to 87 percent in urban areas and remain unchanged in rural areas (Environmental Almanac, 1994). Segments of populations in both urban and rural areas of the Mekong basin are water scarce due to lack of access to existing supplies.

Water scarcity and its adverse impact on the people, economies and ecology of the Mekong River basin have the potential to generate or exacerbate an international security issue. This possibility amplifies existing political and ethnic tensions and weakens institutions that mitigate the negative impacts of water scarcity on social, political, and economic systems. Of vital concern today are proposed dam, reservoir, and irrigation development projects which threaten the per capita share of safe drinking water. Lack of access to safe water is destabilizing through its weakening of the productivity of the labor force through mortality and morbidity. Centuries old political and ethnic tensions in the Mekong basin may be exacerbated by increased competition for scarce water and by increasing inequality in distribution and access of water. The inevitable population displacements that will result from the projected infrastructure projects will further exacerbate these tensions as thousands of people are simultaneously evicted from their homes. Institutional weakening may plague governments, NGOs, regional and international development organizations, disaster relief agencies, and even the Mekong Committee.

From the perspective of water scarcity, the Mekong River basin is a danger zone. Mekong River development is imminent. Countries in the region are approaching an important decision point. In order to prevent an international security issue over water scarcity in the Mekong River basin, policies to govern Mekong development must be formulated that promote efficient technology, especially for agricultural and industrial uses, to enable efficient use of water; protect ecological and human health; and strengthen existing water regimes.

Decisive, proactive action is necessary in order to prevent water scarcity from developing into an international security issue. Policies focused on the causes of water scarcity and causes of insecurity will prevent instability and violence in the region and enable the
region to reap tangible and long-term benefits. Prevention is effective and cost-effective relative to retroactive, crisis-driven reactions. Preventive policies grounded in human and ecological needs reflect the vision and leadership demanded for future regional and international peace and prosperity.

POLICY RECOMMENDATIONS
Given the importance of the particular context in which water scarcity becomes a threat to international security, this report recommends that policies consider the particular physical, geopolitical, and cultural conditions of each case. Thus, this report emphasizes a case-by-case approach in policy-formation. Policy recommendations fall under five umbrella categories: promoting education, improving living conditions, protecting human and ecological health, allocating sufficient resources to address water scarcity, and building international water regimes.

Education
First and foremost, education should encourage the use of more efficient technology and improved resource management suited to the particular conditions of each case. Determining and implementing efficiency standards can be achieved through information-sharing and technology transfers. Policy-makers should support technology transfers as well as the research and development of new technologies. Focus should be on agricultural improvements, as the sheer volume of agriculture's share of water render this area one in which the most benefits can be reaped per technological innovation.

Improvement in Living Conditions
Improving living conditions in the affected areas must be a policy goal. It can be achieved in part by preventing the human suffering that results from population displacement and the marginalization of poor people. Because living standards rise with increasing incomes in the long run, sustainable economic development must be encouraged. Wasteful, short-term economic gains should be regarded as future threats to human well-being and thus discontinued.

Human and Environmental Health
Policy must protect human and ecological health. Inadequate drinking water supplies and poor sanitation facilities can have devastating impacts on mortality, morbidity, and the economy. A healthy population contributes to the productivity of a country, which strengthens societal institutions and promotes stability. Robust institutions are more effective in withstanding stresses when they occur. Ecological health, aside from its inherent importance, must be maintained since it forms the natural resource base upon which human and economic well-being depend.

Allocation of Sufficient Resources
Policy-makers, both local and international, must commit the resources necessary to collectively correct this urgent state of affairs. Informal promises will only exacerbate the problem as the causes of water scarcity worsen.

Creation of Effective International Water Regimes
Basin-wide water regimes must be designed so that all stakeholders have the opportunity and are given an incentive to contribute to effective water allocation agreements. All stakeholders should be obliged to participate and comply with agreements.

The problem of water scarcity will be resolved; the question is how? By acting collectively and decisively, humans relying on shared water basins can ensure their continued well-being and development. By acting unilaterally and indecisively, the probability of a military solution increases.

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