

**Population as a Contributor
to Security Considerations**

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Paper number 0021

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1989

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It is the linkages between population growth, environmental degradation, resource depletion and conflict that led Robert McNamara to state in 1984 that short of thermonuclear war itself, population growth is the gravest issue the world faces over the decades immediately ahead. Despite the recent NAS report on population as a worldwide problem, which was assembled by a group of economists, the majority of population specialists who understand ecology and evolution do not share their sanguine views about the role of population growth in the future of less developed countries.

Population growth cannot be addressed without considering at the same time food supplies, water availability, energy requirements, social services, employment, etc., and above all, the capacity of ecosystems to absorb abuse. You all know that the fastest growing populations have low per capita income, decreasing per capita food production (especially in Africa), weakest social infrastructures, and the least stable governments. It is these stresses made by too many people making too many demands on the resource base and the government that foster situations in which conflict is likely.

Recent projections for Africa predict that by the year 2000 the proportion of Africans actually starving to death will rise from 7% today to 18%, 130 million out of 700 million. Within Africa, 14 countries which cover one third of the land area and one half of the population were able in 1975 to grow enough food to feed themselves. Even if these mostly subsistence level economies were upgraded with relatively weak technology to a level of commercial agriculture, most could not be self supporting by 2000. This food crunch alone is likely to generate international upheaval in Africa at an increasing rate.

A second major consequence of population expansions in subsistence farming economies is the destruction of natural resources, i.e. soil, grasslands and forests. The result is deforestation, soil erosion, and desertification and, in the long run, no access to even the poorest quality land. Consider the situation in the Himalayan foothills where wood fuel has become a very scarce commodity. Cattle dung is used as a fuel instead of fertilizer. This reduces crop yields by 15% and it is estimated that the worldwide total loss of food grain due to this factor is 20 million metric tons, equivalent to the total of all food aid shipped in 1985. Many food riots in India, Egypt, Ethiopia, and Sudan could have been averted with this much food. In India 39% of its previously productive land is now technically described as degraded.

We can see how these issues impinge on conflict and security by considering examples from Ethiopia, the Indian subcontinent, and Central America. One of the primary causes of the Ogaden war between Somalia and Ethiopia in the 1970's was a migration towards the Ogaden lowlands from degraded Ethiopian highlands where topsoil was being lost at 1 billion tons per year in 1970. There was also a large scale migration from Somalia. It has been estimated that the expenditure by superpowers on weapons during the Ogaden war was over 1 billion dollars. With an estimated 50 million a year, safeguards could have been taken to prevent the destruction of the agricultural lands (reforestation, etc). Even though Ethiopia's growth rate is one of the lowest in the third world, its population problem is an enormous one which threatens to affect Sudan and Somalia again.

Population growth accompanied by deforestation has had a dramatic effect on the Ganges River which now has massive floods followed by reduced flow. The clash over water interests in the Ganges between Bangladesh and India makes this a major flashpoint in the subcontinent. The river basin had 200 million in 1950, and will have 500 million in 2000. Resource availability in this area has always been a source of conflict. Similar disputes over the Indus waters have occurred between India and Pakistan. The 1956 war in the Middle East also involved diversion of the Jordan as a contributing factor.

Other water related conflicts are exacerbated by population growth. Of 200 major river systems in the world, 120 are shared by 200 more countries. Egypt's reliance on the Nile's floods is legendary, yet the headwaters of the Blue Nile in Ethiopia may be diverted by Ethiopia so that 1 1/2 million peasants can be resettled in the highlands (see above). And the White Nile in the Sudan is also a matter conflict.

Water availability is predicted to be one of the major flashpoints in the next 25 years.

In Central America we have the famous example of the Soccer War. El Salvador has the worst population problem of the region, with the highest fraction of landless rural population, and it is the most devastated environmentally. During the early 1960's, some 10% of its population moved to Honduras where the pressure on arable land was less and was a major cause of the War of 1969. Even if El Salvador were to practice U.S.-style agriculture and adopt broadscale conservation measures, FAO reports it could support at most 14 million people. Current projections have it stabilizing at 17 million.

One of the major sources of conflict in the next few decades is the rise in fundamentalism throughout the world. One of the great dangers of this movement is that it will set back any population programs that are in place. This has already happened in Egypt, where such government sponsored family planning programs have been cut back to appease Shiite extremists. And the effect of fundamentalism within the U.S. is to further curtail expenditures on these programs.

Actions Suggested: To meet the fertility control needs of women with unmet family planning needs - 15-40% of women in the developing countries would add approximately \$2 billion per year to what is currently spent on family planning aid. The result would be a reduction of the population projected for 2020 by hundreds of millions. I believe that in this phase of fertility control, two factors must be given more attention than they received in the past. First, we must forget the supply side view of the problem and tailor the programs to the people who use them. This entails that the programs be driven more by social science considerations than by medical science considerations. Second, the focus should be on elevating the status of women. This will itself be a source of conflict, but by providing opportunities for self development, women may realize a greater share in power distribution.

Two further issues deserve comment as they affect our ability to respond to crises. The first concerns how much flexibility humans have in finding consumable resources while maintaining the elements of sustainability. The first is biological and the second agricultural and ecological. Recent calculations by a group of physiological ecologists at Stanford have produced the estimate that humans and domestic animals consume directly 4% of the Net Primary Productivity of land and 2% of that of the sea. Net Primary Productivity (NPP) is the energy produced by photosynthesizing animals, green plants, algae, and many bacteria. If you include diversion into human-directed ecosystems, e.g. agricultural pests, conversion to pasture land clearing for agriculture, etc., the figure goes to 30%. Note that conversion to agriculture since 1950 is estimated to have reduced NPP of the earth by 13%. This is resulting in the massive deterioration of all of the earth's ecosystem services. As the population grows, these services will suffer more abuse, abuse that will eventually be reflected in mortality of humans.

Half of the world's caloric consumption is grain. The great droughts of 1988 are expected to cause 152 million tons of grain to be used up from carryover stocks (estimated

use, 1673 million tons; production, 1521 million tons). The stockpile will drop to 250 million tons - enough for 54 days, and 3 days less than the 1973 level that resulted in a doubling of the world's grain price.

Following the success of the green revolution, there has been a disturbing loss of momentum in grain production in China, India, and Mexico. These countries had remarkable increases in production prior to 1984, but we are now seeing at what cost: 1) The additional land was highly erodable, and 2) water tables were drawn down to supply irrigation. The USDA is taking 10% of U.S. cropland out of production (under the Food Security Act of 1985) because it is losing too much topsoil. One-fourth of all irrigation in the U.S. is from water table. This is unsustainable production, and if you remove this production, all surpluses would be gone. In the Soviet Union, since 1977, 1 million hectares/year of cropland has been abandoned due to erosion, a total shrinkage of 13%. As I mentioned above with respect to ecosystem services, there is not a lot of flexibility in the system. The most important consideration is that our marginal stockpiles are the consequence of abusing the ecosystem.

I have tried to focus on just a few of the potential areas of conflict that are likely to be profoundly affected by population growth. One could go on at length about the security problems posed by urbanization in less developed countries, the problems exacerbated by the rapid rise in the rural landless, and the fast growing gap between the number of jobs available and the number of unemployed in LDCs. Overall, the LDCs have unemployments of the order of 40%.

The stresses on the government services in LDCs will certainly produce national bankruptcies and have the potential to disrupt trading patterns, to limit access to vital commodities, and to alter political alignments. The worldwide population problem has all of these ramifications and should be viewed as a major factor, not just in internal affairs but in international relations.

A final word concerning arenas for international cooperation. It is clear that the unfolding environmental crises such as global warming and the problems of the ozone layer, which are exacerbated by the population/resource problem described above, can only be solved by an international cooperative effort of unprecedented magnitude. This is actually a rare opportunity for such a joint endeavor, and members of the scientific

community from east, west, and the developing world should be encouraged to move this to the political top drawer.

A further suggestion. Those investigators who are well trained in economics tend to have no understanding of ecological and/or environmental matters, and vice versa. We need to develop a cadre of people trained from the undergraduate level who see economics of development (in LDCs and in the industrialized countries) and ecology as part of the same subject. Interdisciplinary training at this early stage of education is vitally needed.

References

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