

# Linking Population, Women, and Biodiversity

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Travel north by boat from the island city of Lamu on Kenya's coast toward the Kiunga National Marine Reserve and a scene of intense beauty unfolds. Stands of slender mangroves form leafy barrier islands in the Indian Ocean, vibrant swaths of green in the blue-gray waters. Pelicans and terns nest on beaches exposed by retreating tides. Just south of the Somali border, the Lamu Archipelago, with the Kiunga Reserve at its top, is part of a rich marine ecosystem that stretches thousands of kilometers along the East African coast from Somalia to Mozambique. Coral reefs and sea grasses provide homes for many species of fish and crustaceans, and Olive Ridley, Hawksbill, and Green turtles lay their eggs on Kiunga's beaches. The dugong—a rarely seen sea cow, cousin to the manatee—forages among the sea grass in these waters. A few small villages, with homes constructed of mangrove and palm, also hug the coastline, quiet but for the sounds of children playing and donkeys braying and drinking at the water's edge.<sup>1</sup>

But spend some time in the Kiunga

Reserve and the picture becomes more complicated. Brightly colored plastic bags and human flotsam mar many of the village beaches, including large numbers of plastic sandals carried on Indian Ocean currents from as far away as Malaysia. These are visible clues that this remote corner of Kenya, like so many places throughout the world, is subject to the forces of demographic and environmental change, even if the evidence of such changes is not always immediately apparent. Although the human population of the Lamu Archipelago is small—about 75,000—it is growing by some 2.2 percent a year. All along the East African coast, population continues to grow 5–6 percent a year, a result of relatively large family size and significant migration to coastal cities where job opportunities are more abundant. The growth rate is well above that for Kenya (about 1.9 percent) and for the world overall (now just above 1.2 percent a year).<sup>2</sup>

Nearly all of the 14,000 people living within the boundaries of the Kiunga Reserve or just outside them rely heavily on its nat-

ural resources. Salaried job options for men are few, and for women, they are practically non-existent. Just beyond the verdant coastal mangroves, large numbers of trees have been reduced to stumps—slashed and burned to make way for agriculture or cut for sale in coastal cities. Their loss contributes to soil erosion and to silt being deposited in the ocean waters, and will make it harder in future years for women to find wood for cooking and heating.<sup>3</sup>

Kiunga is just one illustration of the ways in which people are transforming Earth's natural systems. In and around this reserve, as in many parts of the developing world, local residents and migrants are intensifying their use of resources in a bid to meet their needs. In other parts of the world, including industrialized regions, migration—by choice, not desperation—in tandem with poor land use planning and overconsumption risks destroying ecosystems or so degrading them that they can no longer provide the services people depend on for daily life.

In Kiunga's waters, the fish, crustaceans, ocean-dwelling coral, and turtles are showing signs of stress as people pushed by poverty apply new fishing methods to increase their catch. Much of Kenya's coastal waters south of Kiunga have been "fished out," meaning that each year seasonal migrants—fishers seeking to engage in the only livelihood many of them know—enter the reserve, intensifying the pressures on sea life.<sup>4</sup>

As with the ecosystem, pressures on the human inhabitants of Kiunga are also increasing. Poverty is deepening and privations like a lack of electricity or running water remain unaddressed. Access to health services or education beyond primary school is limited, especially for women and girls. Like mothers in many rural regions of the developing world, most mothers in Kiunga say they hope their children will leave the reserve and make a

better life for themselves somewhere less remote and less poor, where choices are more plentiful.<sup>5</sup>

An ocean away, in Florida, a sub-tropical marshland known as the Everglades that is a riot of biodiversity also makes the population-environment link clear. Here 25 species of orchid, 300 species of birds, and thousands of plants and trees from oaks to mangroves share habitat with panthers, crocodiles, and alligators. But as in the Kiunga Reserve—and at a larger scale and with greater speed—the need to accommodate a rising human population is transforming natural systems and squeezing other species into ever-smaller spaces. For more than a hundred years, the Everglades wetlands were drained, diverting water to agriculture or providing a dry plain on which to build homes, businesses, and highways. Roads, housing developments, golf courses, and a university have all been built in prime habitat for the highly endangered Florida panther, whose population hovers at about 60.<sup>6</sup>

**In Florida, the Everglades is a riot of biodiversity that makes the population-environment link clear.**

But even with a \$7.8-billion Everglades restoration plan in place in the southeast, new development in the southwest of the state is taking off, often following the pattern of sprawl seen in other parts of the United States. As the human population grows, and with it demands for resources, threats to the unique ecosystems in the Everglades are gathering strength. Population is rising fast as a result not of high fertility but of migration into the area from other parts of the country and the world. Between 1990 and 2000, Florida's population grew by nearly a quarter;

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in two counties at the edge of the western Everglades, the annual growth rate hovers at or just above 5 percent.<sup>7</sup>

World population is now estimated to be over 6.2 billion and growing by 77 million a year, equivalent to the combined 2001 populations of Mozambique, Paraguay, Poland, Portugal, and Singapore. The rate of growth is slowing, however. Globally, women now have about half as many children as their mothers did (an average of just under three children each). But this trend is not guaranteed. Between 1998 and 2000, the United Nations had to revise its medium population projection (the one most likely to occur) for 2050 up by more than 400 million people. Fertility rates are not falling as fast as previously projected in 16 poor countries or in a handful of countries with large base populations, including Bangladesh, Nigeria, and the two most populous countries in the world—China and India, both of which are home to more than a billion people. (See Figure 3–1.) The United Nations now suggests that by 2050 about 9.3 billion people will be alive—50 percent more than today. The United Nations will soon issue new projections. While these may include slight changes in overall population estimates, they will still show that substantial population growth is expected over the next half-century, especially in the world's poorest countries.<sup>8</sup>

The interplay among population growth, gender roles, and biodiversity loss is complex and can be addressed from several different entry points. But at the core we know that gender inequity tends to exacerbate population growth, and that population increases tend to put pressure on the natural environment, including biological resources. Through a series of global agreements hammered out over the past decade, governments around the world have acknowledged the need to include population realities in sus-

tainable development planning and vice versa. These agreements have also noted the central role that increasing women's status and achieving gender equity—balancing relations between women and men—play both in lowering fertility and in ensuring the sound management of natural resources. Indeed, women's roles in the sustainable use and conservation of natural resources and the need for women to participate fully in policymaking and program delivery are among the principles guiding the Convention on Biological Diversity that was signed in 1992. And *Agenda 21*, the plan of action agreed to that year at the Rio Earth Summit, includes a whole chapter on women and natural resources.<sup>9</sup>

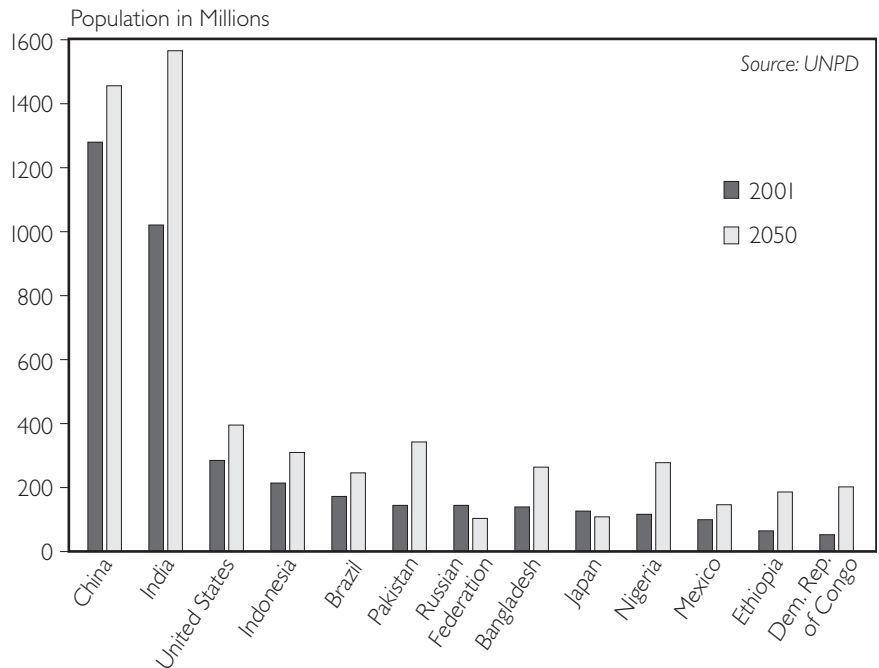
Even though the importance of gender in shaping the use of biological resources is acknowledged in these international agreements, women's roles have often been neglected in the global discussion about biodiversity. The links between biodiversity and gender are especially strong in rural areas of the developing world, where women often experience the immediate effects of environmental degradation. Unfortunately, they also usually have limited control over access to resources and decisions on how they are used. According to the *2002 Human Development Report*, while progress has been made on closing gender gaps in recent years, there is no country in the world where women have obtained equal political and economic power or human development with men—making gender equity a considerable goal for the industrial world as well as for countries in the fast-growing developing regions as they wrestle with how to best protect biodiversity and meet human needs.<sup>10</sup>

Despite the decade-long existence of goals and even, in some cases, strategies for integration of population, biodiversity conservation, and gender, most efforts remain

in the early stages. Still, throughout the 1990s, increasing numbers of conservation and development professionals, government agencies, and people in decisionmaking or educational arenas have begun to see and to act on the connections between population, biodiversity, and gender. This work, in the shape of a number of small initiatives under way in a range of biologically rich areas of the world, provides fertile ground for nurturing larger-scale, more robust actions. And it comes none too soon, for as Nobel prize-winning economist Amartya Sen points out, “The population problem is integrally linked with justice for women in particular....Advancing gender equity, through reversing the various social and economic handicaps that make women voiceless and powerless, may also be one of the best ways of saving the environment, working against global warming and countering the dangers of overcrowding and other adversities associated with population pressure. The voice of women is critically important for the world’s future—not just for women’s future.”<sup>11</sup>

### Exploring the Linkages

From the mountains of southwest China to the Eastern Himalayas, from the forests of central Africa to Eastern Europe’s Danube



**Figure 3–1. World’s Most Populous Countries, 2001 and 2050**

River basin, species, habitats, and ecosystems in a number of biologically rich areas are under stress as a result of human activities. Biologists and conservation practitioners now accept that changes in human population dynamics—including growth, migration, and density—and in patterns of resource consumption are among the root causes of biodiversity loss. Combined with social and economic realities like integration of global markets and the creation of new wealth alongside persistent poverty, demographic and resource use trends demonstrate the vast power humans have to reshape the natural world. They also make clear the need for new policies and programmatic approaches—sustainable over the long term—that protect biodiversity for ourselves and other species, that advance human development, and that redress long-standing inequities between women and men.<sup>12</sup>

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Each new person who joins the planet, even someone at the very low end of the consumption scale, ratchets up the net demands on Earth's natural systems. And each new person born in an industrial country has a disproportionate effect on those demands. The toll is becoming increasingly visible as the biotic communities on which life depends exhibit symptoms of decline, the most obvious being the retreat of plants and animals from parts of Earth both large and small. (See Box 3-1.)<sup>13</sup>

As in the Everglades and the Kiunga Reserve, the losses tell us just how the disruption of delicate and biologically diverse ecosystems—whether in tropical jungles or

the suburbs of major cities—can affect human and nonhuman lives. Commercial cutting of India's forests has undermined traditional systems of village forest management and has caused shortages in fuelwood and building materials for millions of rural villagers. And when overfishing caused the collapse of cod stocks off Canada's coast in the early 1990s, it threw 30,000 people out of work and decimated the economies of 700 communities in Newfoundland.<sup>14</sup>

More people are using more resources, and with more intensity, than ever before. But numbers alone do not capture the impact of the interactions between human populations and biodiversity. The size and weight of the

**BOX 3-1. THE VALUE OF BIODIVERSITY**

Biological diversity, or biodiversity, is the total number of genes, species, and ecosystems in a region and the variability between them. Biodiversity makes life itself possible. Not only do plants and animals provide actual and potential sources for human medicines and food, biodiversity has additional benefits that reach far beyond straightforward economic evaluations of utility. Scientists have shown that rich and diverse ecosystems improve water quality, reduce flooding, and absorb and clean wastes. They are also more resistant to environmental shocks and quicker to recover than regions depleted of genetic and species diversity. A group of scientists recently estimated the value of the services provided to humanity by the world's ecosystems—the pollination provided by insects, for example, and the water-cleaning capacity of healthy soils—as up to \$61 trillion, which is twice the size of the world economy.

But around the world, plants and animals and the ecosystems that are their homes are being degraded or disappearing, largely as a result of human actions. Over the past 100 years, 20–50 percent of Earth's original forest

cover has been lost. The U.N. Food and Agriculture Organization (FAO) estimates that during the 1990s, about 146,000 square kilometers of natural forest were lost each year. The vast majority of this was in tropical forests, with losses running at about 142,000 square kilometers a year (an area just about equal to the size of Nepal). The Central American dry tropical forests have practically disappeared. And in many countries, half or more of the mangroves (costal forests) have been cleared. Such losses are particularly damaging since forests contain about half the Earth's total biodiversity and have the highest species diversity of any ecosystem. Wetlands have also shrunk by 50 percent, and in some places only 10 percent of grasslands remain. Species loss is also increasing. About 24 percent of mammals (1,137 species) and 12 percent of birds (1,192 species) worldwide are currently under threat of extinction, and many species—the exact number is not known—have already disappeared.

SOURCE: See endnote 13.

“ecological footprint” each person plants on Earth is determined by the ways people use resources, which affects the quantities they use. The difference between the footprints of individuals can be vast. For instance, a vegetarian who uses a bike as a major mode of transportation has a much smaller impact than someone who eats meat and drives a gas-guzzling sport utility vehicle.

Similarly, the differences in average footprints across regions can also be huge, and the combined footprints of people in a given region determine the prospects for saving or permanently losing the biological diversity found there. The ecological footprint of an average person in a high-income country is about six times bigger than that of someone in a low-income country—comparable to wearing either a size 7 shoe or an outsized 42. The one fifth of the world who live in the highest-income countries drive 87 percent of world’s vehicles and release 53 percent of the world’s carbon emissions.<sup>15</sup>

Although family size has declined in most wealthy nations, the U.S. population is growing at the fastest rate of any industrial country. Between 1990 and 2000, the U.S. population increased by 32.7 million people (13.1 percent), the largest number in any 10-year period in U.S. history. At about 280 million people, the United States is now the third most populous nation in the world and its population is expected to reach nearly 400 million by 2050. And fertility rates in the United States are at their highest level in 30 years, at about 2.1 children per woman. A recent study suggests that if every person alive today consumed at the rate of an average person in the United States, three more planets would be required to fulfill these demands. “Because we live so large,” writes environmentalist Bill McKibben in a recent book on the need for Americans to consider having only one child, “North Americans

(and Europeans and Asians of the quickly growing industrial powers) will largely determine what shape the world is in fifty years from now.”<sup>16</sup>

While consumers in the wealthiest countries can and do have vast power to reshape the natural world through their use of resources and products, population growth rates themselves remain highest in the poorest, least-developed countries. Here, biodiversity is often high and environmental degradation already widespread. These are the same places where women’s status—a key determinant of population growth rates—is low and where governments are least equipped to provide health care, education, and job opportunities for the vast numbers of people added to the population each year or to moderate the direct demands placed on resources.<sup>17</sup>

Poor populations in many biodiversity-rich regions—largely rural areas where good health facilities, schools, and basic infrastructure are frequently absent—often have no other options but to exploit their local environment to meet subsistence needs. In these settings, rapid growth in human numbers can lead to collisions between traditional practices that were ecologically viable when population size was small but that are becoming increasingly less so for species and ecosystems as population grows and demands rise. The trade in bushmeat in Central Africa, for instance, has accelerated to such a degree that the future of forest-dwelling animals, including primates, is in jeopardy. (See Box 3–2.)<sup>18</sup>

As a way of focusing conservation efforts, British ecologist Norman Myers and Washington-based environmental group Conservation International (CI) defined 25 biodiversity “hotspots” around the world—places that are extremely rich in different plant and animal species and are also threatened significantly by human activity. These

**BOX 3-2. THE BUSHMEAT TRADE: POPULATION, BIODIVERSITY, AND WOMEN IN THE CONGO BASIN**

Gorillas, chimpanzees, forest buffalo, elephants, and a huge variety of other animal and plant life inhabit the forests of Central Africa's Congo Basin, designated as one of only three remaining major tropical wilderness areas in the world. But rising demand for bushmeat (the meat of wild animals, including elephant, gorilla, chimpanzee, monitor lizard, and forest antelopes), the main source of protein for a rapidly growing and urbanizing population, is contributing to loss of species at a breakneck pace. As much as 1 million tons of bushmeat—the equivalent of 4 million cattle—are sold in Central Africa each year. Urban areas are centers of demand, and logging operations expanding into the region's forests provide not only new markets (the logging camp workers), but also new means of transport on logging trucks and along logging roads. If current rates of hunting continue, the commercial bushmeat trade will decimate, if not eliminate, some endangered species such as great apes, forest elephants, and other fauna from the Congo Basin in coming decades. Conservationists increasingly warn of "empty forest syndrome," where tree cover survives but forest species are almost wholly absent.

Ecological and socioeconomic conditions

combine to make bushmeat an attractive option. The prevalence of the tsetse fly and sleeping sickness generally precludes cattle raising, and declining global prices for cash crops like coffee and cocoa leave rural families with few ways to earn an income. In addition, poverty and hunger are widespread: a recent FAO study classified half of all people living in Central Africa as "undernourished." Hunters can earn up to \$1,100 a year from bushmeat alone—well beyond average household incomes. Despite the fact that most of this hunting is illegal, it continues due to persistent demand and lax enforcement of anti-hunting laws. Poor women, relying on resources at hand to provide a livelihood, play important roles in the trade, processing, and marketing of the meat. About 24 million people live in the Congo Basin and population growth rates are among the highest in the world. Moreover, less than a fifth of girls in the Democratic Republic of the Congo attend secondary school, and almost half the women over the age of 15 are illiterate.

—Arunima Dhar

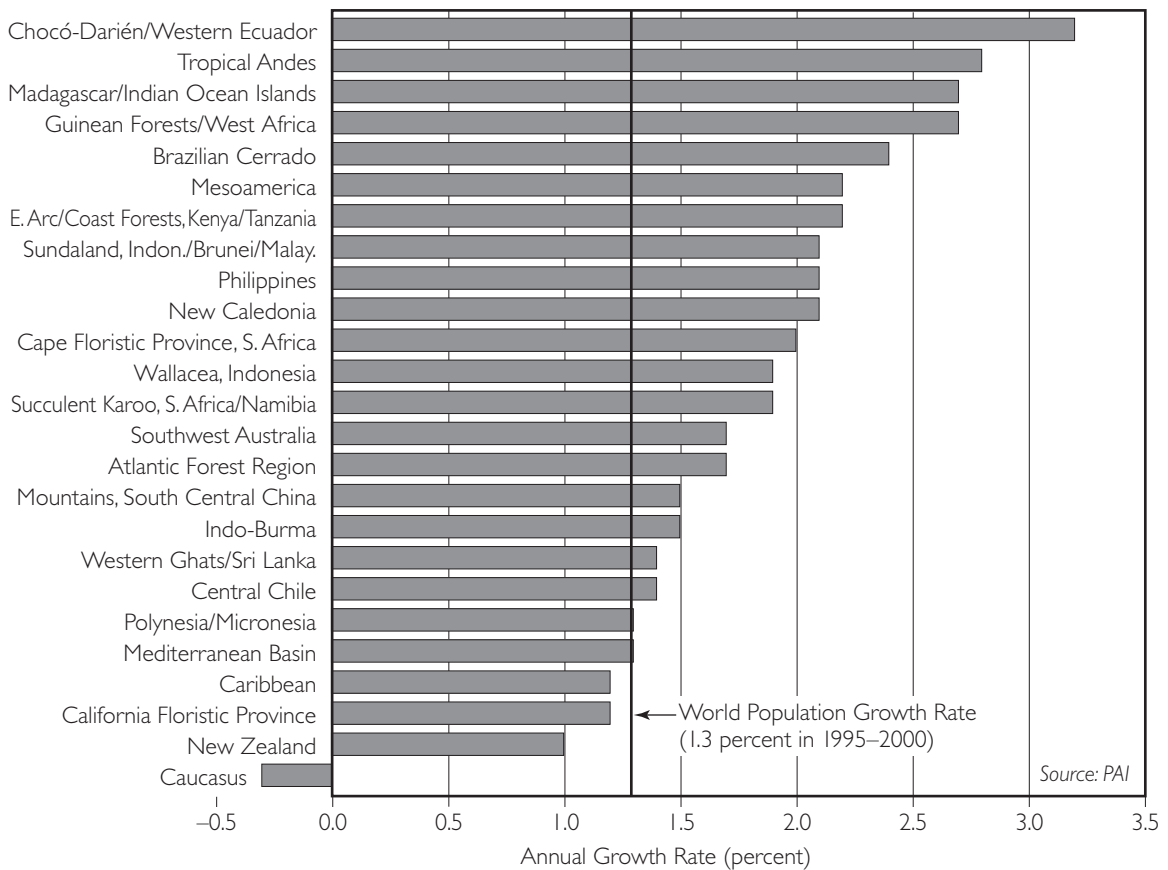
SOURCE: See endnote 18.

hotspots, found in both the industrial and the developing world, contain just over half of all land-dwelling plant and animal species. Together, hotspots once covered nearly 12 percent of Earth's land surface; now, the undisturbed original cover in these hotspots is just 1.4 percent of the world's total land surface area. A study by CI and Washington-based Population Action International found that in 1995 about 1.1 billion people—nearly one fifth of the world—lived inside hotspot boundaries. In all but one of the hotspots, the human population is growing, due to a com-

ination of high fertility and migration. On average, populations in the hotspots are increasing by about 1.8 percent a year, nearly 50 percent above the current global average. (See Figure 3-2.) Many hotspots also have high population densities, generally linked to significant losses of biodiversity. (See Figure 3-3.)<sup>19</sup>

Why are population growth rates in hotspots and many other biodiversity-rich areas often high? Researchers point to several reasons: local populations often live in extreme poverty, and since the areas are





**Figure 3–2. Population Growth in 25 Biodiversity Hotspots, 1995–2000**

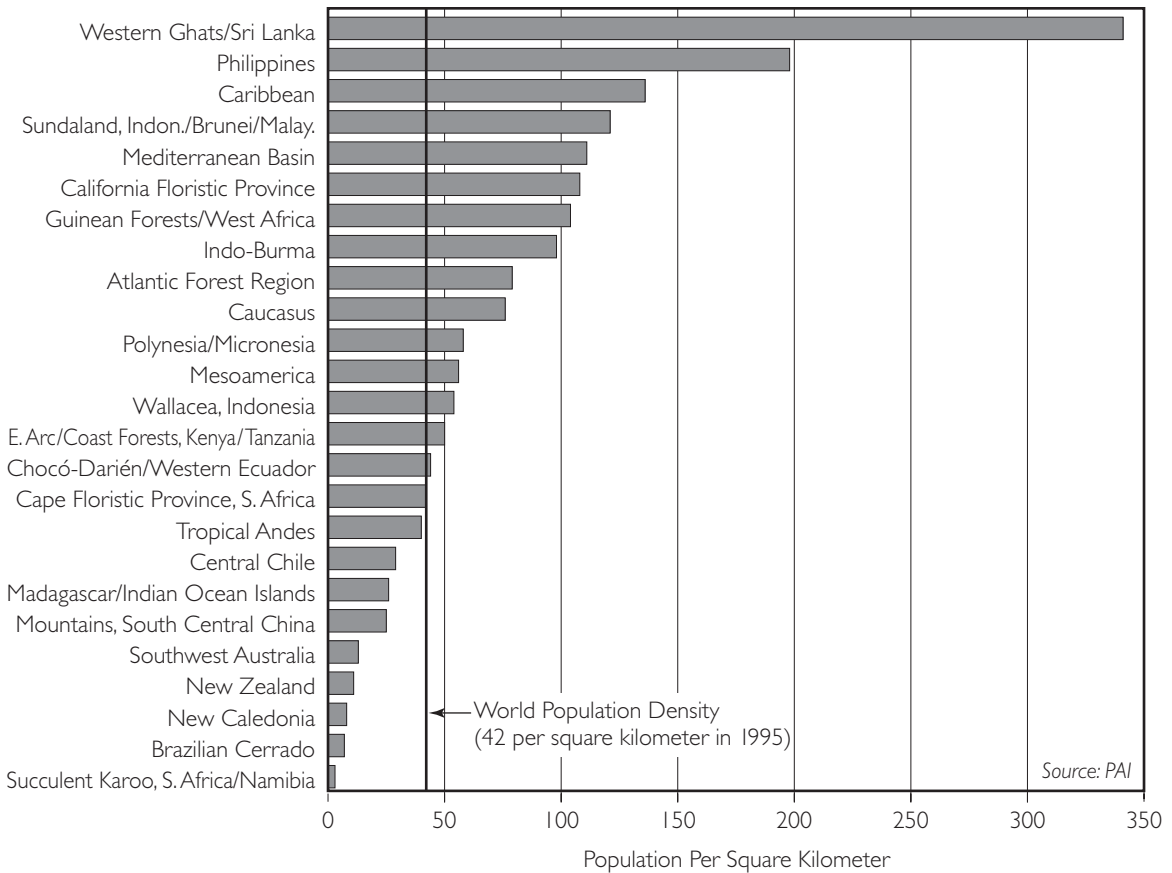
remote, health services, schools, and job opportunities for women are all scarce, contributing to higher fertility. Migration into the often fragile ecological zones that hotspots occupy may be the last resort for those who lack other options—landownership or livelihoods elsewhere—or the result of government agricultural or forest policies, rapid urbanization, or civil conflicts. In addition, in countries where a majority of the population is rural, rural-to-rural migration is still common.<sup>20</sup>

Of course, population growth is only one aspect—albeit a crucial one—of the full range

of population dynamics that needs to be explored when trying to understand the impacts of human numbers on biodiversity. In many regions, migration, increasing population densities, and consumption patterns are the most immediate pressures. Studies of the links between population density and biodiversity loss have not been extensive, but research suggests that as the number of people in an area increases, lower levels of biodiversity result. As habitats are reduced, animals and plants may be crowded increasingly into the spaces where human activity is less extensive.<sup>21</sup>



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**Figure 3-3. Population Densities in 25 Biodiversity Hotspots, 1995**

In Madagascar, about 30 percent of the people now live in cities, and the pace of migration to urban centers and larger towns is increasing. This migratory pattern, combined with rapid increases in human numbers, is leading both directly and indirectly to increased deforestation. Over 90 percent of Madagascar's urban population in the southwest of the country still relies on wood or charcoal for energy, using up the equivalent of about 10,000 hectares of forest a year. If the urban population in this island nation continues to grow at its current rate of 5–6 percent a year, and if no alternatives become

available, it is estimated that 42,500 hectares of forest will be needed annually by 2010 to meet urban demands for fuelwood and charcoal alone. Even more forest will be lost as rural dwellers also seek to meet their daily needs for fuel for heating and cooking.<sup>22</sup>

This pattern of migration in southwest Madagascar is mirrored throughout the developing world. Each day, about 160,000 people move from rural to urban areas, often as a result of poverty, landlessness, or degraded rural environments that are losing their productive capacity. In 1950, 30 percent of people lived in urban areas; by 2000, that

number had risen to 47 percent; by 2007, urban dwellers will make up half of the world's human population, although it will be at least two more decades before a majority of people in developing regions live in urban areas. Population growth from migration is fastest in smaller cities, where infrastructure to absorb the new arrivals is often lacking, leading to helter-skelter patterns of development, slums, pollution, and disease. It is often men who move to the cities in search of paid labor, leaving women behind to provide for children by farming or taking on a job themselves, often in the informal sector, to make ends meet. In some rural areas, gender ratios are highly skewed, with many more women present than men. In rural areas of the world's least developed countries, nearly a quarter of households are headed by women. This often reinforces women's dependence on the natural resources they have access to, and at times increases their burden of labor.<sup>23</sup>

Cities, too, consume vast amounts of resources, even if these are out of residents' sight. Urban dwellers rely heavily on watersheds, fuel sources, and waste processing. In addition, rapid growth of urban populations often limits cities' abilities to develop infrastructure adequate to demand, and it outstrips available supplies of clean water, electricity, and systems for treating or clearing wastes. And when cities sprawl, through planning or the lack of it, they can consume considerable amounts of open land or forests, often home to a diverse array of species.<sup>24</sup>

Unfortunately, the massive movement into cities does not mean there is going to be more space in rural regions for ecosystem and species recovery in the near future. Rural populations themselves grew from 2 billion in 1960 to 3.2 billion in 2000. Between now and 2030, some regions of the world will see their rural populations grow, including

south-central Asia and all of Africa except the southern region, although the net increase in the rural population of the less developed regions will be less than 200 million.<sup>25</sup>

As trading borders have opened, with greater integration of markets and with pressure for poor countries to export raw materials, ecosystems and species have felt the effects. The world's farmers, for example, a majority of whom are women, are shifting from cultivating a variety of crops for sale in local markets or to be consumed within households to growing one crop that is in demand from world commodity markets. Along with many of these "mono crops" comes pressure on producers to maximize yields in the short term, often at the expense of plants and animals and overall ecosystem health.<sup>26</sup>

Once exposed to the world trading system, producers in poor countries have to adapt to the volatility of markets that may threaten their livelihoods. As markets respond to shifting tastes, and as increasing numbers of people enter these markets as producers, biodiversity can often get trampled. This exchange of resources is not solely on a North-South axis. Somalia's acacia forests—or what remains of them in this heavily desertified country—are being chopped down, converted to charcoal, and exported to rapidly growing neighboring countries on the Arabian peninsula to fuel cooking stoves.<sup>27</sup>

At the same time, market forces are creating new middle classes around the world whose preferences are more closely aligned with consumers in industrial nations. As they consume more and more when their incomes rise, pressures on resources are likely to increase exponentially. With mass media making its way into the most remote regions, the lifestyle of the industrial world is being relayed to more and more people. People

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see how others in the world's wealthiest countries live—and they want to live that way too. Practicality and equity mean that such aspirations cannot go unheeded.

Fortunately, conservation groups are beginning to recognize that if biodiversity decline is to be reversed successfully, programs that previously focused on small areas of land or water in or near national parks or reserves will have to operate at much larger scales. At the same time, these groups are beginning to include in their planning and programming the socioeconomic realities that affect biodiversity, including population dynamics, relationships between women and men, and the often-distinct ways men and women use and control resources. Lorena Aguilar, senior gender advisor at IUCN–The World Conservation Union, sees gender equity as the “unavoidable current” determining the impact of conservation policies and programs, and therefore as deserving more focused attention than it has received to date. Still, even as awareness increases, very few women currently hold key decisionmaking positions in the global conservation community.<sup>28</sup>

## Why Gender Matters

At least since the 1994 International Conference on Population and Development, held in Cairo, the global community has recognized that greater equality between men and women is an essential component of advancing social and economic development and slowing population growth. Where women are free to determine when and whether they will have children, fertility rates fall. Research also shows that the more education a woman receives, the fewer children she has and the healthier and better educated those children are. Other studies suggest that if women have the right and ability to man-

age childbearing, they can manage other areas of their lives more effectively too, including available resources. And a recent World Bank report found that the lack of gender equality stymies the ability of developing-country governments to promote economic growth and reduce poverty.<sup>29</sup>

Throughout the developing world, in particular, gender plays a strong role in how resources are used, controlled, and developed and in how people respond to environmental challenges. These connections are particularly strong in rural areas, where people depend directly on resources on a daily basis, but there is evidence that they persist in urban settings and in wealthy nations as well. For the most part, though, men still decide how the world's natural resources are used through, for example, mining, livestock grazing, logging, and land tenure. By some estimates, women around the world hold title to less than 2 percent of the land that is owned.<sup>30</sup>

In much of the developing world, millions of people's lives are structured by their relationship with natural resources. In particular, though, it is women who rely heavily on trees, grasses, and water for livestock production, fuelwood, fibers for clothing and mats, roofing materials, basket making, and a variety of plants for medicines—whether to earn income or to meet household needs. Because of their direct dependence on resources, when ecosystems become degraded through human activity, women are often the first to feel the effects. They are often the first line of adaptation as well. It is they who most frequently are responsible for making up for declining capacity in the environment, by, for example, walking farther to get fuelwood as hillsides become denuded. They venture farther from home to reach clean water as soil erosion decreases water retention, and to find new

sources of food as customary supplies are overharvested. They must also make existing resources go further and often are the first to initiate efforts to reverse degradation—for instance, raising seedlings, planting trees, or practicing soil conservation.<sup>31</sup>

For example, deforestation in the Sudan has quadrupled the amount of time women spend gathering wood for cooking, and the energy used to tote water from rivers and other water sources accounts for one third of a woman's daily calorie intake, according to the World Health Organization. Throughout rural parts of the developing world, a common sight as days begin is women and young girls venturing out, alone or in small groups, to gather fuelwood or water, and later—sometimes much later—returning laden with bundles or heavy plastic water canisters on their heads.<sup>32</sup>

In addition to their responsibilities within households to ensure daily supplies of fuel, water, and food, women are also responsible for many agricultural tasks, including raising small livestock and generating income from the sale of food. According to FAO, women constitute 51 percent of the world's agricultural labor force. In Southeast Asia, they provide up to 90 percent of the labor for rice cultivation, while in Africa 90 percent of the wood and water gathering is done by women. In Africa and Asia, women work on average 13 more hours per week than men, and in many regions women spend up to 5 hours a day collecting fuelwood and water and up to 4 hours preparing food. This work is unpaid and does not appear in any national accounts of productive labor.<sup>33</sup>

Too often, however, governments and development agencies still see women solely as “housewives,” with men defined as “workers” (income earners)—categories that reinforce false distinctions. Researchers looking into the threats to biodiversity from gold

mining and the collection of Brazil nuts in the Bahuaja Sonene, a protected reserve in Peru, did not consider the meaning of the terms “housewife” and “miner” as applied to women and men. But the director of a local nongovernmental organization (NGO) did, and discovered that women also moved with men into the forest to collect nuts and then worked to dry, peel, and often sell them. Many contracts for collecting the nuts are in women's names. Women also join men in setting up gold mining camps in the forest and, in addition to cooking and managing the temporary household, often sell the gold that men dig up and process. Without this understanding of both women's and men's roles in the mining and nut trades, any campaigns of public education or promotion of alternative, less environmentally destructive livelihoods are unlikely to include women and therefore less likely to be effective.<sup>34</sup>

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Women without independent resources are more vulnerable to poverty. In the developing world, women's ability to stay on the land is often tied to the presence of a father or husband and is often reduced if the man dies or a couple divorces. In addition to the natural resources on the land, owning property can provide an important safety net for women as collateral to gain credit to improve land stewardship. It can also be used as an asset to be sold or mortgaged during a time of crisis, including drought, war, or ecosystem decline. In addition, financial security allows women to make long-term investments in resources—planting trees, for instance, building terraces to halt erosion, or investing in effi-

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cient irrigation.<sup>35</sup>

But low levels of literacy and education among women—still widespread in poor countries—can constrain productivity and limit women’s ability to manage land effectively. And despite women’s multiple and strong ties to natural resources, agricultural extension workers, development practitioners, and even conservation field-workers (still mostly men) have too often ignored the ways that gender shapes resource use and the prospects for sustainability and biodiversity protection. But this situation is beginning to change, with increasing numbers of conservation field workers being exposed, slowly, to information about gender dynamics and resource use, and including women in efforts to protect biodiversity and secure livelihoods from natural resources. As they do so, they are learning to provide training when women are not busy with child care or other responsibilities and to be sensitive to the different spheres that women and men inhabit. Without such training, opportunities are lost to make resource use more equitable and efficient both within communities and at higher levels, where district or national planning takes place.<sup>36</sup>

**Many women have acted to protect natural resources by mobilizing their communities against environmental and health hazards.**

In certain settings there is evidence of greater on-the-ground recognition of the inequalities between men and women and how these affect resource use. For example, in a network of locally managed conservancies in Namibia, men serve as game guards. But the conservancies have made a commitment to gender equity, so women have been hired to monitor use of non-wildlife resources as well as to provide a conduit for bringing

women’s input to conservation decision-makers. Parallel with this, the number of women on local conservancy committees has continued to rise, with some previously all-male committees amending their charters to include women. Program managers report that communities have, over time, embraced these moves toward gender equity and see the value in having diverse perspectives channeled into decisions about resource use and conservation.<sup>37</sup>

“Since rights to natural resources are so heavily biased against women,” reasons Agnes Quisumbing of the International Food Policy Research Institute, “equalizing these rights will lead to more efficient and equitable resource use.” When government officials or community leaders fail to recognize the different ways that women use natural resources—growing vegetables for family consumption in the spaces between male-managed cash crops, for example—the resources are easily destroyed. To protect fragile mangroves in El Salvador, for instance, community officials placed restrictions on fishing and collecting fuelwood. The community’s women, who depended on both the wood and the fish from the estuaries to feed their families, were not consulted—but they were most affected by the ban because performing their role as caretakers became a criminal act. Such a lack of fairness and common sense is no longer tolerable in view of the increasing stresses on croplands and other resources imposed by rising populations.<sup>38</sup>

But women are not only victims of environmental degradation; they are activists as well, and many have acted to protect natural resources by mobilizing their communities against environmental and health hazards. (See Box 3–3 for one example of this.) Women in India, for instance, are resisting large-scale agricultural methods that require

**BOX 3-3. WOMEN, TREES, AND EMPOWERMENT: KENYA'S GREEN BELT MOVEMENT**

"It is ironic that the poor people who depend on the environment are also partly responsible for its destruction. That's why I insist that the living conditions of the poor must be improved if we really want to save our environment," says Wangari Maathai, founder of the Green Belt Movement. Established in Kenya on Earth Day in 1977, the Green Belt Movement has created a nationwide network of 6,000 village nurseries that have worked to avert desertification by encouraging tree planting and soil and water conservation in rural communities. In 1999, it was estimated that Green Belt's 50,000 women members had planted more than 20 million trees, and that while some had been harvested, millions more were still standing.

The network encourages zero-grazing (keeping livestock penned to control manure) and organic farming as a means of improving soil fertility and food production. It also encourages farmers to plant native crop vari-

eties, like millet, groundnuts, and sweet potatoes that are adapted to local conditions and can weather drought and other shocks that threaten food supplies. Many of these crops had been put aside in favor of coffee, tea, and flowers for export. Because members of the group sell seedlings from their nurseries, they gain not only a source of firewood but also a source of independent income. Green Belt also works to build women's self-confidence and create the conditions for greater gender equality in households and the public sphere. "Implicit in the action of planting trees," says Maathai, "is a civic education, a strategy to empower people and to give them a sense of taking their destiny into their own hands, removing their fear...[so women] can control the direction of their own lives."

—Arunima Dhar

SOURCE: See endnote 39.

heavy inputs of chemicals by promoting sustainable agriculture in rural communities. In the Ogoni region of Nigeria, women have come together to fight the toll that oil exploration and refining—fires, oil waste dumping, and pipe explosions—have taken on the health of their families and the environment. Their demands have included protection of women environmental activists and compensation for health damages from the oil industry. In a region of Louisiana known as Cancer Alley, African-American women are educating one another and their communities about the connections linking industry, environment, and human health.<sup>39</sup>

In order to raise awareness of the links between gender and biodiversity and the actions that can address them, a few conser-

vation organizations are now providing gender training to headquarters and field-based staff, as well as to government extension workers and local community leaders. Others are promoting the use of gender analysis, a tool that helps illuminate the power dynamics that shape the control and use of resources and that eliminates blind spots. In 2001, a number of conservation organizations came together to form the Conservation and Gender Alliance, an informal group organized to look at the role of gender in conservation and to share experiences and tools that advance the inclusion of gender issues in the mainstream of conservation activities. Members include IUCN, The Nature Conservancy, Conservation International, and the World Wide Fund for Nature (WWF). And in

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the run-up to the 2002 World Summit on Sustainable Development, women from governments and the NGO community met to consider women's roles in the transition to sustainability. (See Box 3–4.)<sup>40</sup>

### Continuing Gaps, Integrated Approaches

In the 1950s and 1960s, a number of developing-country governments adopted national plans designed to reduce rapid rates of population growth that strained their abilities to provide enough health care, schools, and jobs for their citizens. Even more governments adopted population policies in the 1970s and 1980s. But few of these policies sought to link reducing population pressures with expanded

protections for biological resources or efforts to raise incomes within a framework of sustainability. This situation largely persists today: while the linkages between poverty, environmental degradation, and rapid population growth are noted in many policies, they are rarely elaborated. And few environment or population policies address issues of women's status and gender equality.<sup>41</sup>

Although government thinking has evolved away from numbers and toward improving lives, the conditions contributing to continued high fertility have not been dealt with adequately. Poverty remains a huge challenge, as does gender inequality, high rates of death for children under the age of five, and shortcomings in the systems for providing reproductive health care and edu-

#### BOX 3–4. WOMEN AND THE ENVIRONMENT

In most of the industrial world, the relationship between women and the environment is perhaps more subtle than elsewhere, partly because women tend to be more removed from the natural resources they depend on. Some advocates note, however, that women's roles as mothers and as the prime caregivers to children make them more likely to have a greater awareness of and interest in avoiding environmental hazards, such as pesticides in food and chemicals that can increase reproductive risks. Most women around the world, including in industrial nations, still do the majority of household shopping and cooking. This is why some environmental groups in these countries have targeted women for campaigns around issues of food safety. There are also some indications that women may be more receptive to efforts that encourage shifts in consumption practices. For example, a recent study in the United States showed that women tended to enroll in a green electricity program at a

higher rate than men.

In March 2002, women environment ministers and representatives from 19 industrial and developing countries, along with women NGO leaders, met in Helsinki to develop a common statement on the environment. The participants noted that "women bring a unique voice to the challenges and opportunities of sustainable development." They called for, in part, equal rights; access to and control of natural resources for women, including land tenure; policies that give women stronger voices in decisions about sustainable resource use; better consumer education, especially for women, on the environmental impacts of products; support for women's consumer initiatives, through recycling, product labeling, and promotion of organic foods; and development of "policies, legislation and strategies towards gender balance in environmental protection and in the distribution of its benefits."

SOURCE: See endnote 40.

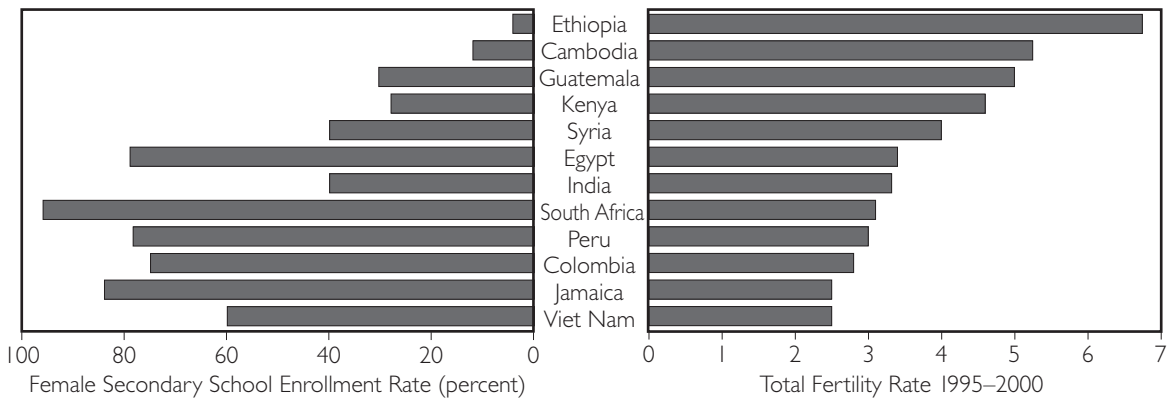


cation, particularly in rural areas. For instance, 60 percent of the 113 million children not in primary school around the world are girls. Yet numerous studies over the years have documented the impact that education has on the number of children a woman bears in her lifetime, particularly secondary schooling. (See Figure 3–4.) And women still account for two thirds of the people worldwide who cannot read. A 2002 study estimated that 549 million women in the world are illiterate. There is some good news, however. According to UNESCO, in all the world’s regions women are gaining access to literacy and education, and at a faster rate than men. (Although given how far women have lagged behind, this is perhaps not surprising.) The U.N. Development Programme (UNDP) found that 90 countries, home to 60 percent of the world’s people, are likely to meet global goals for ending gender inequalities in primary schooling by 2015.<sup>42</sup>

More women than ever are using modern methods of contraception today: 62 percent of those who are married or in a stable union globally (about 650 million women), including 60 percent of those in less developed

regions. But significant differences exist between regions. In Africa, only 25 percent of married women use contraception, while in Latin America and the Caribbean, 69 percent do, a rate very similar to the industrial-country average of 70 percent. Still, vast needs go unmet: overall, according to the United Nations Population Fund (UNFPA), 350 million women lack access to a range of contraceptive services, a number that can be expected to grow as populations increase. And an estimated 125 million women do not want to be pregnant but are not using any type of contraception. Millions more women would like to avoid pregnancy but are using the wrong type of birth control because they lack information about the best method for them.<sup>43</sup>

Overall, progress toward the goal agreed to at the Cairo Conference of universal access to reproductive health care—which includes family planning information and services, maternal and infant health care, and prevention and treatment of sexually transmitted diseases, among other services—by 2015 has been slow. Funds to realize this goal have fallen short. In 2000, the support that inter-



**Figure 3–4. Education Levels and Fertility Rates for Women and Girls in 12 Developing Countries, Late 1990s**

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national donors promised at the Cairo conference was running at about half the promised level. And although developing countries are contributing most of their agreed portion, significant differences exist between countries and regions.<sup>44</sup>

Some population researchers contend that the deficiencies in harnessing political will and sufficient budgets mean the declines in fertility witnessed over the past 35 years may well stall. “Many biodiversity-rich areas are among the last places on Earth for average fertility to fall from its historic high levels,” observes Robert Engelman of Population Action International, “probably because such places tend to be farthest from the reach of cities, services, and the electronic media. But these also are often the places where fertility is falling fastest,” he continues, “precisely because the modern world is just reaching them, and traditional ideas of childbearing and women’s roles are changing rapidly.” He notes that governments’ and NGOs’ inability or unwillingness to provide good-quality reproductive health services in remote areas often slows down this process altogether. And in the industrial world, national policies remain largely silent on the interaction of population trends with overconsumption of natural resources. Taken together, these realities suggest that collisions between human populations and biological resources in developing and industrial regions alike will only intensify.<sup>45</sup>

Still, since the Cairo conference and the global women’s conference in 1995 in Beijing, governments have acknowledged—at least rhetorically—that nations suffer when they neglect the needs and rights of women. Few leaders have made the needed additional leap in thinking, however, to see clearly and act on the links between growing population and resource consumption, gender inequality, and the loss of biodiversity. But at

the community level, programs that seek to address the commonalities among the three areas have been put in place, often as a result of the initiative of conservation and development agencies and the participation of local NGOs and communities—actors that are increasingly working in tandem. In some programs, governments themselves have been important partners. While a few of these programs began before the Cairo conference, most have been launched since 1994 and reflect its principles and objectives.

Some programs have health or population as their entry points. Others stem from concern about long-term threats to species or habitats. In some cases, conservation groups have taken the lead; in others, development organizations working on health or poverty alleviation have discovered that community needs are better served when reproductive health care is provided along with environmental inputs, or vice versa. But all are based on the premise that integrated service delivery leads to greater success in improving human health, expanding livelihood options, and protecting the environment. For several programs, gender equity and increases in the power that women have to make decisions—whether about their fertility or their use of resources—are important goals. Most of the current set of programs reach relatively small numbers of people, tens of thousands at the most, but in many can be found the seeds for a “scaling up” of the efforts’ reach and scope.<sup>46</sup>

In the state of Chiapas, Mexico, for instance, Conservation International has recently begun working with a family planning NGO, Mexfam, and the Mexican Social Security Institute to expand access to reproductive health care, including family planning, and to halt the clearing of forests in and around the Montes Azules Biosphere Reserve. Lying within the Mesoamerican biodiversity

hotspot, this reserve contains some of North America's last large tropical rainforest. CI provides natural resource management services—techniques for improving soil conservation and increasing crop yields, for example, and a forest fire prevention program—while its partners deliver health services. CI also provides information on small loans and income-generating opportunities to women who participate in the program's health or environmental activities, and is working to promote ecotourism in the region.<sup>47</sup>

In the mountainous provinces of central Ecuador, where most women want reproductive health services but cannot get them, fertility is high and soil erosion is widespread. World Neighbors, a development organization, has joined with a local NGO, the Center for Medical Guidance and Family Planning, to deliver reproductive health care and to promote improvements in local management of natural resources to more than 4,000 families. Among the services provided through five clinics in 60 rural provinces are family planning and maternal and child health care and training, along with inputs for sustainable agriculture, animal husbandry, and food security. Successful efforts have been made to expand women's participation in all program activities, despite high rates of female illiteracy and gender roles that limit women's say in community decisions.<sup>48</sup>

Three government departments in South Africa—Water Affairs and Forestry, Environmental Affairs and Tourism, and Agriculture—rolled out a Working for Water Programme in 1995 to meet two goals. The first was to remove alien trees and shrubs, brought to South Africa by successive waves of immigrants and colonizers, that compete with and crowd out indigenous plants and animals. The second was to create employment options for still-marginalized members of society, including women and young peo-

ple. The program employs about 20,000 people, 60 percent of them women, in 300 projects throughout South Africa. One area where Working for Water is active is the Cape Floral Kingdom in the southwest, a global biodiversity hotspot and home to 9,000 plant species. To address high rates of unwanted and unplanned pregnancies among staff, as well as the HIV/AIDS crisis gripping South Africa, Working for Water has incorporated an AIDS awareness training program and offers its workers reproductive health information and services, including condom distribution and management of sexually transmitted diseases.<sup>49</sup>

**Governments have acknowledged—at least rhetorically—that nations suffer when they neglect the needs and rights of women.**

In nearby Tanzania, responding to serious deforestation outside the borders of the Gombe National Park, in 1994 the Jane Goodall Institute established the Lake Tanganyika Catchment Reforestation and Education (TACARE) program. TACARE now works in 30 villages to address the combined pressures of high population growth, limited economic development, and ecosystem decline—specifically soil erosion and the effects of deforestation. Gombe itself now contains the only forested area left in the region. TACARE delivers conservation education in local schools and villages and has supported the creation of village forest reserves (for fuel and cooking wood) and tree nurseries, as well as the planting of nearly 750,000 new trees. With regional government health authorities, TACARE supports community-based health promoters and contraceptive distributors who are trained to deliver reproductive health care, preventive

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health services, and HIV/AIDS awareness. Central to TACARE's activities is developing the capacities of women for improved household and resource management. Training is provided to women in the cultivation of fruit and palm oil trees, savings and loans programs support women who launch environmentally friendly small businesses, a girls' scholarship program is in operation, and legal support is offered to make women's rights better known and to protect them.<sup>50</sup>

Yet another example of this integrated approach, and at a larger scale, is found in the Solomon Islands in the South Pacific, where marine biodiversity is rich. WWF has recently launched a public education and media initiative on the connections between population trends, resource use, and the health of land and sea ecosystems, including intact rainforest. Migration patterns combined with population growth (average fertility is above five children for each woman) are threatening communities' livelihoods, which largely consist of subsistence farming and fishing. A central goal of the campaign is to expand awareness and use of family planning services. Partners in this effort include provincial and national government agencies, health and family planning organizations, educational institutions, and community-based organizations, as well as women's groups. WWF-Solomon Islands has also adopted a gender equity policy to guide its internal operations and provide a potential model of best practices for other organizations working in the Solomons, which is still a highly patriarchal society.<sup>51</sup>

These initiatives, just a handful of those under way around the world, demonstrate that incorporating improved access to contraception and a broader range of other reproductive health services can increase women's participation in natural resource conservation, education, skills training, and small busi-

ness programs and vice versa. They also show that addressing health and livelihood needs—and gender realities—can be an important means of successfully protecting biodiversity. And they illustrate the roles that conservation and development organizations, government agencies, and communities have to play in addressing population and biodiversity challenges. As the connections between conservation, resource use, and population projects become clearer, the environmental community and environment ministers can become an important new constituency for reproductive health and women's rights.

As UNFPA executive director Thoraya Obaid has said: "Ten years after the adoption of *Agenda 21*, the primary challenge remains: to ensure that access to resources for human development is in balance with human numbers; to end extreme poverty; and to advance equality between men and women.... Many women in developing countries still lack access to resources, services and the opportunity to make real choices. They are trapped in poverty by illiteracy, poor health and unwanted high fertility. All of these contribute to environmental degradation and tighten the grip of poverty. If we are serious about sustainable development, we must break this vicious cycle."<sup>52</sup>

## Nurturing the Next Revolution

As the linkages among population, gender, and biodiversity become better known, there are more opportunities to take actions in holistic ways that work for people and nature. But time is critical. Collisions between population and biodiversity can be expected only to intensify as human numbers and resource use expand. If we do not address the bonds that tie population, gender, and biodiversity together through large-scale, more compre-

hensive, more equitable programs and policies, we will miss an opportunity that may not arise again. Species and habitats lost today as a result of rapid population growth and consumption will not be recreated anytime soon. Several principles can guide this effort. (See Box 3–5.)

First, policymakers need to target areas of high biodiversity. In areas particularly rich in animal and plant species and especially threatened, efforts should be made not just to protect biodiversity but also to improve women's lives and rights. Concrete steps should be taken by governments to expand the availability of reproductive health care and information in threatened landscapes or marine areas with high population growth. There is ample opportunity here for partnerships between government agencies and international, national, or regional health, development, or conservation NGOs. Conservation International, for instance, has integrated reproductive health activities into its conservation programs in four countries in biodiversity hotspot zones—Guatemala, Madagascar, Mexico, and the Philippines. When government reproductive health services are available, CI seeks to expand communities' access to them; when they are not, as is often the case, CI works with local NGOs to establish services.<sup>53</sup>

It will also be important for governments and conservation and development groups to ensure that the impact of gender realities on resource use and control is understood and addressed. They should take steps to ensure that women fully participate in, and benefit from, programs to improve natural resource management or conserve biodiversity on an equal basis with men. In Nepal and Tanzania, among other places, women's membership in community resource management bodies is mandated by the government. Conservation practitioners note that not only has this

**BOX 3–5. PRINCIPLES FOR INTEGRATED PROGRAMS ON POPULATION, WOMEN, AND BIODIVERSITY**

- Target areas of high biodiversity for improvements in reproductive health, in education, and in women's rights to participate in natural resource management.
- Increase capacity of key actors to do cross-sectoral work.
- Encourage sustainable consumption patterns in all countries.
- Introduce policy changes that will encourage scaling up of successful local programs.

advanced gender equity and women's status in communities, it has also led to improvements in management of forests and other ecosystems.<sup>54</sup>

In addition, supporting improvements in girls' education—in enrollment levels and available facilities—can promote future conservation of biodiversity-rich areas and improve women's lives. Nearly 1.2 billion adolescents are now entering their reproductive years—the largest generation in history. The choices they make today will determine the population-biodiversity balance of the twenty-first century. The government of Bangladesh, with World Bank support, has just launched the second phase of a national effort to improve secondary school enrollment rates for girls in rural areas by providing stipends for tuition costs. Although not geared specifically for areas of high biodiversity, the effort is laudable for its ambition and concrete gains. Girls' enrollment levels doubled in areas where the program operated in its first phase, and rates of early marriage (strongly linked to early child-

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bearing and continued high rates of maternal death in Bangladesh) have begun to fall. About 1.5 million girls are expected to participate in this new phase, which also includes measures to improve the quality of schooling, at an astonishingly low cost—about \$20 a year for each girl.<sup>55</sup>

**At the community level, productive partnerships need to be nurtured among health and population organizations, community groups, and key stakeholders.**

The World Wildlife Fund in the United States is supporting a small number of primary and secondary school scholarships for girls, along with environmental education, in seven countries in priority biodiversity conservation regions: Bhutan, Colombia, Kenya, Madagascar, Nepal, the Philippines, and Tanzania. Scholarships are awarded in rural communities where girls rarely complete high school, where women's literacy levels lag well behind men's, where fertility rates remain high, and where women's roles in resource use and its protection are often ignored.<sup>56</sup>

In schools in the Kiunga Reserve in Kenya, it is not unusual for eighth-grade classes to have no girls in them. But in a sign of change, some lower grades have more girls than boys. This trend toward valuing girls' education is growing, partly as a result of local communities' efforts. At weekly *barazas* (community meetings), teachers report urging parents to send girls to school and keep them there. Nineteen year-old Fahima is a World Wildlife Fund scholarship recipient from Kiunga who attends a girls' boarding school in the city of Lamu. "If you are a girl who is educated, you will be a very important person in society. You can uplift yourself and your family," she says.<sup>57</sup>

Efforts in Kiunga to get more girls into

school have naturally been paired with efforts to get conservation education into schools as well. And girls, along with boy scholarship recipients, attend a week-long conservation camp. Here they get hands-on conservation experience—restoring coral, counting turtle eggs, tagging nesting turtles—as well as conservation education. They also learn to snorkel, with many seeing live coral for the first time, even though they have lived on the shore of the Indian Ocean all their lives. Girls and boys leave with a better understanding of the conservation challenges in Kiunga, and in many cases a greater commitment to taking action to reduce the pressures placed on marine resources. Swabra, a 16-year-old girl living in Kiunga, says, "In our area, people were eating turtles. Now I know the importance of conserving turtles. If we eat all of them there will be no species of turtles.... They will not be able to save them....I've educated the whole community by telling them it is not good to eat turtles."<sup>58</sup>

The second key principle is to increase the capacity of organizations large and small—from governments and the World Bank to international conservation and development agencies and local family planning clinics—to undertake cross-sectoral work on population, gender, and biodiversity, and to make this work part of the way they do business. A great deal of interest exists in better understanding and acting on these linkages, but uncertainty on how to move forward is slowing efforts on the ground. In many agencies, government and nongovernmental alike, it is rare to find expertise that crosses sectors. Even in large development agencies, with many experts on staff, managers and divisions in an area such as health may have limited contact with those working on biodiversity protection. Such divisions will need to be broken down through, for example, building awareness within environment



departments of the gender dimensions of natural resource management. Another potentially useful strategy, particularly for large international agencies or government ministries, is creation of policy and program working groups with representation from population, biodiversity, and gender or women's divisions. Such groups, called for in the Cairo agreement, could also usefully be created at more local levels, within government structures and across NGOs, as a means of joining efforts in separate sectors.<sup>59</sup>

Actions are also needed to improve the understanding and skills of NGOs, community-based organizations (like women's groups), and field-based line managers who oversee government- or donor-funded programs. Conservation and development organizations have important roles to play here in spurring capacity development by supporting or providing training, for example, in the areas of gender and population. Development of partnerships between NGOs and government agencies can also increase their ability to act on population, gender, and biodiversity linkages, from local to district to national levels.

At larger scales, strategic partnerships among these various agencies and groups may be most useful, though it may take some time to develop and sustain joint ventures among international development agencies that provide health or education services; conservation groups; research institutes that work on population and that have useful technical skills, such as mapping population and biodiversity variables; gender and development organizations with analysis or program expertise; institutes with proficiency in technical skills or demography analysis; and regional health or development NGOs. At the community or district level, productive partnerships need to be nurtured among health and population organizations; community

groups, including women's groups and associations; and key stakeholders in communities, such as teachers and elders. One place to create such partnerships is through the district development committees that are increasingly common local policymaking bodies in developing countries; their membership generally includes government as well as community representatives.

Building the steps for gender equity and environmental sustainability at many levels is also likely to create the grounding from which to launch future actions. Moreover, strong partners at national, regional, and local levels can facilitate more strategic thinking, action, and follow-up. They can also share tools and information or provide an entry point for further work. For example, IUCN is in the midst of a multiyear project with environmental ministries in the eight Mesoamerican countries to integrate gender equity into natural resource policies and the action plans to implement them. Four U.N. agencies—UNFPA, UNDP, UNESCO, and FAO—are planning to work with national governments and IUCN on a comprehensive program to manage and conserve biodiversity in the Sundarbans region of India and Bangladesh. The Sundarbans is the largest mangrove ecosystem in the world—home to the Bengal tiger and Ganges dolphin—but ecological degradation there is gathering speed as human activities expand. When launched in mid-2003, the program will support skills development for sustainable livelihoods for women and men, promote communities' participation in conservation activities, and improve the capacity of governments to provide reproductive health services.<sup>60</sup>

A third area for action is encouraging more sustainable consumption, given local and global impacts of current choices—and necessities—on biodiversity and equity. As personal action has been fairly limited to date,



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widespread change is unlikely to come without government and institutional policies—and without more public information and guidance on the effects of consumption choices. Many countries have already taken steps in the right direction. In Brazil, for example, ethanol produced from fermented sugarcane juice is used as a gasoline substitute to power 10 million cars with high-compression engines. This has reduced gasoline use by 50 percent and prevents nearly 10 million tons of carbon dioxide emissions a year. Another significant benefit has been the creation of more than 700,000 jobs at the processing plants used for ethanol production. Other countries could adopt similarly or even more ambitious fuel-saving measures if the political leadership existed.<sup>61</sup>

**Population growth is slowing and the status of women is improving—two hopeful trends in an otherwise rather dismal picture.**

Many private nonprofit groups, however, including those working for environmental protection and sustainability, are not waiting for governments to act. For instance, the U.S.-based Center for a New American Dream has launched a Web-based Turn the Tide campaign that asks North Americans to take nine actions—from skipping a car trip or a meal of beef once a week to replacing four standard light bulbs with energy-efficient compact fluorescents—that produce measurable impacts on global warming, water and energy conservation, and wildlife and forest habitat protection. It is worth noting that about two thirds of those who have signed up so far are women. And the Women's Environmental Network in the United Kingdom has a local foods program and other campaigns to encourage women

and, by extension, men and children to change the way they consume.<sup>62</sup>

In the developing world, it is also important to raise public awareness and provide alternatives that shift or reduce consumption of resources that may put biodiversity under pressure. Prime areas for further action include reducing the cutting of forests for wood and charcoal and the hunting of forest mammals or marine species for household consumption or sale. Also important is development of alternative livelihoods that are less resource-dependent, especially for women, and skills and entrepreneurship training to make this possible; needs for these remain vast and will only increase as populations grow. An area of considerable interest and action is expanding use of solar cookers and fuel-efficient stoves that require less wood. Of course, significant pressures on developing regions' biodiversity as well as on the livelihoods of the poor, who rely heavily on local environments, stem from the operations of extractive industries like logging, mining, and oil exploration and refining; their impacts will also need to be acknowledged and addressed within the consumption equation.

A final guiding principle is to use policy changes to transform current programs into national or regional-level initiatives, drawing on the lessons learned from smaller-scale efforts. Most on-the-ground programs addressing population, gender, and biodiversity operate in relatively small geographic areas and reach only a fraction of those who could benefit. Few are backed up by policies that call for coordination between ministries of health or natural resources, or that make women's participation or gender equity operational principles. Such policy innovation—as endorsed in the series of international agreements that stretches from Rio to Cairo to Beijing—is an important component of scaling up current efforts and increasing

their reach and impact. “Even if there is a lot of emphasis on population and gender at local levels, without attention to this at policy levels, we are wasting our time,” says Daniel Mavella, project manager for a national park program in Tanzania. “Policies are the frameworks that give us the room and the confidence [to work].”<sup>63</sup>

Policies could help spur big-picture thinking by policymakers on the population trends most forcefully affecting biodiversity and the means of dealing with the underlying conditions driving them—such as limited access to reproductive health care and education in rural areas, women’s low status, high levels of illiteracy, intense use of resources at subsistence level, and women’s low levels of landownership and poor access to agricultural extension services or credit. They can also ensure that integration of sectors, such as population or health, with environment happens on the ground, at the district and municipal levels, where operational decisions are often made. Policies can and should make gender equity and women’s full and equal participation bedrock principles. The Ministry of Population and Environment in Nepal, for instance, may well ease the way for integrated actions across sectors and, potentially, at larger scales. Its mandate is to coordinate government activities in the areas of population, reproductive health, and environment.<sup>64</sup>

Policy changes may also redirect money

streams so that they, too, cross sectors. A test case in coming years will be funds spent on population programs by the U.S. Agency for International Development. Due to recent changes in the legislation guiding U.S. spending, some of the population funds are to be used in areas where population growth “threatens biodiversity or endangered species.”<sup>65</sup>

There is no question that much remains to be done to reverse the ecological degradation that has been experienced around the world because of unsustainable population growth and consumption. But population growth is slowing and the status of women is improving—two hopeful trends in an otherwise rather dismal picture. And efforts are under way to protect areas rich in biodiversity across the world by recognizing the links between gender equity, population realities, and environmental protection. These efforts set an example for all nations to recognize that what is good for women—improved access to reproductive health care and family planning, increased access to education, greater economic opportunities and decisionmaking on natural resource use—is also good for biodiversity. Current actions need to be nurtured and accelerated if we are to have a real chance of creating a more secure, equitable, biologically rich world, both for ourselves and for the rest of nature.