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The Environmental Impacts of China's One Child Policy

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With a population of more than 1.3 billion people (Table 1), China is often at the forefront of global environmental discussions (“2016 World Population Data Sheet”). Past concerns over its growing population and consumption of resources prompted the government to implement a policy that placed stringent limitations on fertility and familial growth. Described in the research article titled “Environmental Stressors and Food Security in China” as “the single most important reduction of environmental stress to have occurred globally in the past generation,” the one child policy was a population control measure introduced by the Chinese government in 1979 (McBeath and Huang McBeath 70). The policy limited families to one child in an effort to slow rapid population growth and reduce high demands on the nation’s environment, economy, and society. Following the announcement in October 2015 that China’s Communist Party had decided to relax the decades-old policy and allow families to have two children, questions have emerged as to how this change will affect China’s environmental impact on a global scale. While some caution that the increase in the number of allowable births could result in a population explosion, others are optimistic that accepted modern societal practices will curb birth rates naturally.

In addition to consistently taking the number one spot as the world’s most populous country year after year, China has also been placed at the top of rankings that compare resource consumption among nations (Figures 1 and 2). A September 2015 article published by BBC News summarizes data from the U.S. Geological Survey and the International Cement Review and depicts in a graphic how China used 6.6 billion tons of cement between 2011 and 2013. This is more than the United States used in ten years between 1900 and 1999. The BBC article also cites statistics from the Food and Agriculture Organization of the United Nations, the U.S. Department of Agriculture, and Reuters that state in 2014, China slaughtered more than 735 million pigs for food. This far exceeds the 106.9 million pigs slaughtered for consumption in the U.S. that same year (“Cement and pig consumption reveal China’s huge changes”). China’s growing population has presented the country with myriad problems regarding resource consumption and has led to air and water pollution that endangers the health of many who reside in its cities (“China Slows Growth” 4). As discussed in “Environmental Stressors and Food Security in China,” China’s population, which the article states is set to reach 1.6 billion people by 2030, “puts immense pressure on the land,” and leads to a reduction in arable land and insufficient access to clean water (McBeath and Huang McBeath 52). The stress the population puts on arable land results in problems related to erosion, pollution of the land from overused

pesticides and fertilizers, deforestation from excessive logging, and degradation of natural pastoral land (McBeath and Huang McBeath 50, 55-56).

Further concerns related to resource allocation for a growing populace are highlighted in a 2006 study conducted by China's Ministry of Environmental Protection, formerly known as the State Environmental Protection Administration. In the study, titled "China Ecological Protection," SEPA reports that 60 percent of China's territory is deemed to be in a "fragile" state. It further states that 90 percent of "natural pasture land" faces "degradation and desertification" (McBeath and Huang McBeath 56). The uneven distribution of China's population throughout the country also complicates the environmental situation. Indeed, China houses 22 percent of the global population but only provides 7 percent of the world's arable land (McBeath and Huang McBeath 50). Furthermore, the authors of "Environmental Stressors and Food Security in China" note that the urban population was already greater than 500 million by the early twenty-first century. They say this resulted in the expansion of cities into the countryside, "consuming land once used for agricultural purposes" (McBeath and Huang McBeath 53). Thus, the one child policy was born in part out of these environmental concerns because "the nation did not have enough land or natural resources to support the growing population," as stated in "China's Population Policy at the Crossroads: Social Impacts and Prospects" (Jiang et al. 197).

A small, nuclear family was not always the norm, as authors Quanbao Jiang et al. explain. At first, they write, having several children was encouraged under Chairman Mao's leadership of the People's Republic of China. "Following the foundation of the PRC in 1949, the Chinese government's policy and propaganda encouraged families to have several children," they state in the article. Yet, when the first census was completed in 1954, it showed rapid growth in population (Jiang et al. 194). These findings led Ma Yinchu, a demographer and president of Peking University, to warn how "China's rapid population growth would jeopardize development if not checked" (McBeath and Huang McBeath 52). This view was championed by Mao's successor, Deng Xiaoping, who worried about the impact population growth would have on the implementation of economic reform policies (Jiang et al. 197). According to Jiang and his co-authors, China's new leader felt that population growth had to be controlled in order to bring about "China's economic development and improvement of living standards" (Jiang et al. 197).

Deng was not alone in viewing China's growing population as a concern that impacted an array of public policy topics. In the article "Science, Modernity, and the Making of China's One-Child Policy," author Susan Greenhalgh analyzes "textual and pictorial representations" that

supported a negative view of population growth. Greenhalgh's sources argue that a large population was "sabotaging economic development, ruining the environment and preventing China from achieving its rightful place in the world" (Greenhalgh 172-173). Mentioned in Greenhalgh's essay is a scientist named Song Jian, who warned of "scenarios of ecological devastation" brought on by population growth. He is quoted as saying: "As population increases, forests are chopped down ... To guarantee future generations adequate or good survival conditions, we cannot exceed our limit on taking natural resources ..." (Greenhalgh 174-175). Similarly, in an open letter from China's Central Committee in 1985, the link between population growth and environmental ruin is again explicitly stated. The letter reads: "Too fast a growth of population not only creates difficulties in education and employment but will overtax the energy, water, forest, and other natural resources, aggravate environmental pollution and make the production conditions and living environment downright bad and very hard to be improved" (Greenhalgh 184).

The evolution of China's one child policy occurred in three phases, as described in "China's Population Policy at the Crossroads." The authors of the article identify three time periods, distinguished by the extent to which the government addressed adherence to the policy. The first, ranging from 1970 to 1979, was a period "during which population control was not very strict" (Jiang et al. 195). This was followed by the next phase, from 1980 to 1999, when "a policy of strict population control was implemented" (Jiang et al. 195). The final stage, from 2000 and beyond, is characterized by the policy goal of maintaining a "low birth rate" (Jiang et al. 195). As China and its population control policy have changed throughout the years, ethical questions have been raised. The article "Environmental Stressors and Food Security in China" mentions the policy's role in forcing women to undergo abortions or sterilization procedures. Additionally, cultural preferences rooted in antiquated beliefs encourage a preference for male children over female children, which the article argues has "resulted in cases of female infanticide and under-reporting of births" (McBeath and Huang McBeath 70). Families who resisted the policy by having more than one child were often subjected to additional taxes and fees, as dictated by a new family planning law that took effect in 2002. The law required that families with more than one child pay "'social expenses of raising the child' — the amount of which is to be determined by local authorities" (Vermeer 124). Critics of the policy attribute long-term societal problems, such as an uneven sex ratio and a shortage of marriage partners for

millions of men, to the government's one-child-per-couple limit (McBeath and Huang McBeath 70).

Although the one child policy had been in place for decades, reports show that many loopholes existed. This leads the article "China Slows Growth" to conclude "the one-child ideal was never a reality nation-wide" ("China Slows Growth" 3). Additionally, as mentioned in a Vice News article from October 2015 — published days after the government announced the conversion to a two child policy — the former one child limit had undergone gradual changes. One alteration was the government's decision to allow couples to have two children if one of the parents was an only child (Smith). In the same article, Lucia Green-Weiskel of the Innovation Center for Energy and Transportation links China's relaxation of policy enforcement to the government's reconsideration of several national issues. "They're saying the demographic problem is more worrying than social unrest from industrial pollution and climate change," Green-Weiskel says in the interview with Vice (Smith). Yet there are differing opinions as to how much of an impact the new two child policy will have on China's environment. As a population-control method, the Chinese government has touted the one child policy as a success. According to China's Population and Family Planning Commission, 400 million additional births were prevented during the time the policy was in effect (Jiang et al. 1999). From an environmental standpoint, many believe the policy has preemptively decreased emissions, as evidenced by the government's claim that there has been a reduction in annual emissions by "as much as 1.8 billion tons of carbon dioxide and other gases" (Smith).

With the decision to now officially allow two children per family, some worry that China's ecological resources will be further strained and depleted. A quote from Zhang Weiqing, Minister of the State Population and Family Planning Commission, in 2008 expressed his concern about potential changes to the policy: "Given such a large population base, there would be major fluctuations in population growth if we abandoned the one-child rule now. It would cause serious problems and add extra pressure on social and economic development" (McBeath and Huang McBeath 70). Other demographic data show similar concerns. In a commentary published by CNN in October 2015, a graph of data from the Population Reference Bureau depicts outcomes of population growth in China from 2016 to 2050 under three scenarios: the addition of two children per woman each year beginning in 2016, a "gradual increase" to two children per woman, and the current population projection prior to the change in policy (Figure 3). The model shows that, with the "most likely scenario" — a gradual increase of two children

per woman — 23 million more births by 2050 are “likely” under the new policy (Ghitis). The environmental impact of more children per person has not been extensively studied in the context of the one child policy, but an academic article published by researchers at Oregon State University in 2008 sought to examine the “carbon legacy” of an individual based on his or her reproductive choices. In their conclusion, Paul A. Murtaugh and Michael G. Schlax explain that the average emissions added per child in China is approximately 1,384 tons of fossil carbon dioxide (Table 2). A secondary chart (Table 3) also included in the study uses a theoretical simulation based on United States data to show that reducing the number of children by one is the most impactful way to lessen one’s lifetime emissions of carbon dioxide (Murtaugh and Schlax 18).

On the other hand, some uphold a more optimistic view of the Chinese government’s decision. Green-Weiskel of the Innovation Center for Energy and Transportation argues in the Vice News article that improvements in the realm of manufacturing and power generation will have more of an impact than a decrease in population. “If you want to know where China can really tighten its belt in terms of greenhouse gas emissions, it is not individual consumption,” she says. In the article, Green-Weiskel also discusses how families’ individual choices to limit themselves to one child could prevent an unmanageable population boom. For this reason, she says, she doesn’t think “we’re going to see a situation where suddenly the population is growing exponentially” (Smith). Others share the belief that global trends in modern family demographics prove that relaxation of rules will not have a very large effect on China’s future population. Eduard Vermeer theorizes in his article, “Demographic Dimensions of China’s Development,” that the decision by one out of every five women to not have children would result in a total fertility rate of 1.6 — even if the other four women have an average of two children. This rate, he says, is “well below replacement” levels (Vermeer 137). In his article, Vermeer asserts that this is a result of the undesirable view many modern couples have toward starting and maintaining large families. “Relaxation of political controls over timing and spacing of births may have little impact,” he writes. He instead attributes lower fertility rates to trends in “social tendencies” that result in “later births” (Vermeer 137).

From its introduction in 1979 to its eradication in 2015, China’s one child policy has been a controversial topic for decades. Simultaneously viewed as an effective population control mechanism and as a draconian edict that unethically interferes with the private lives of citizens, the policy is rooted in the idea that individual sacrifice benefits the nation as a whole. Fueled by

concerns over the negative economic and environmental impacts of a skyrocketing population, the one child policy is often seen as a success by the Chinese government because it has prevented hundreds of millions of births, thus protecting against the complete depletion of the country's already-limited resources. Increased anxiety over skewed gender ratios and gradual relaxation of the rule in the past years eventually culminated in the government's decision to allow families to have two children, but this decision is once again entangled in competing interests. While human rights supporters rejoice in the victory, demographers and scientists worry that this will lead to an unsustainable population boom that will have adverse affects on the global environment. It remains to be seen how China's new era of social policy will coincide with the climatic changes the Earth is collectively experiencing every day.

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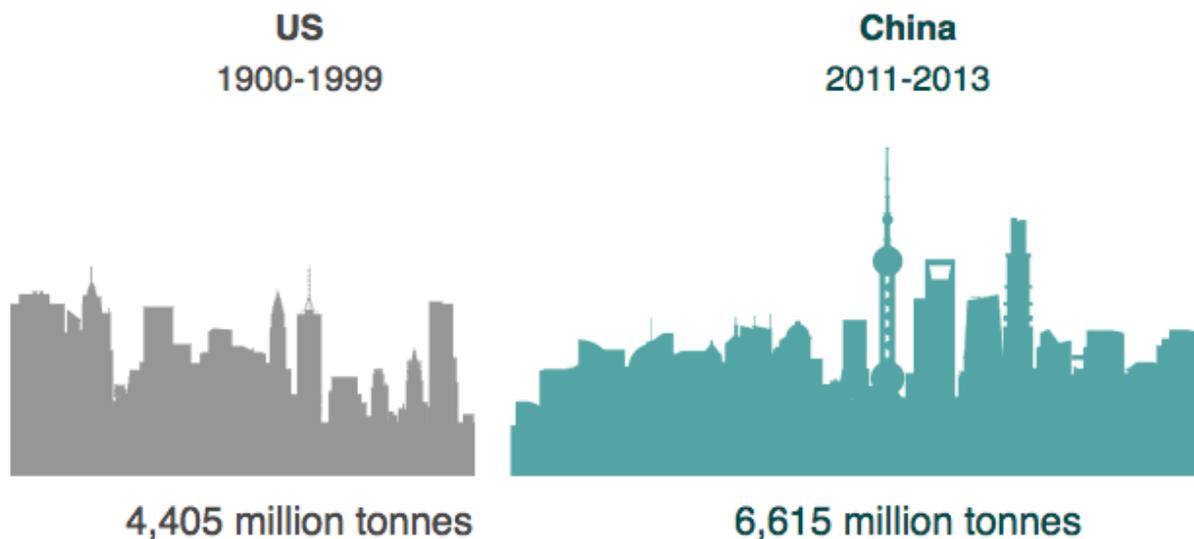
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Most Populous Countries

COUNTRY, 2016	POPULATION (MILLIONS)
China	1,378
India	1,329
United States	324
Indonesia	259
Brazil	206
Pakistan	203
Nigeria	187
Bangladesh	163
Russia	144
Mexico	129

Table 1: China tops the list of most populous countries in 2016 with 1.378 billion people, despite decades of government enforcement of a one-child-per-couple rule. (Source: Population Reference Bureau)

China used more cement in three years than the US did in a century



Source: USGS, International Cement Review

Figure 1: China’s growing urban population has resulted in the country using more cement between the years 2011-2013 than the United States used in 10 years between 1900-1999. (Source: BBC News, USGS, International Cement Review)

Pigs slaughtered for food

 = 20 million

2014

China 735,100,000



US 106,957,700

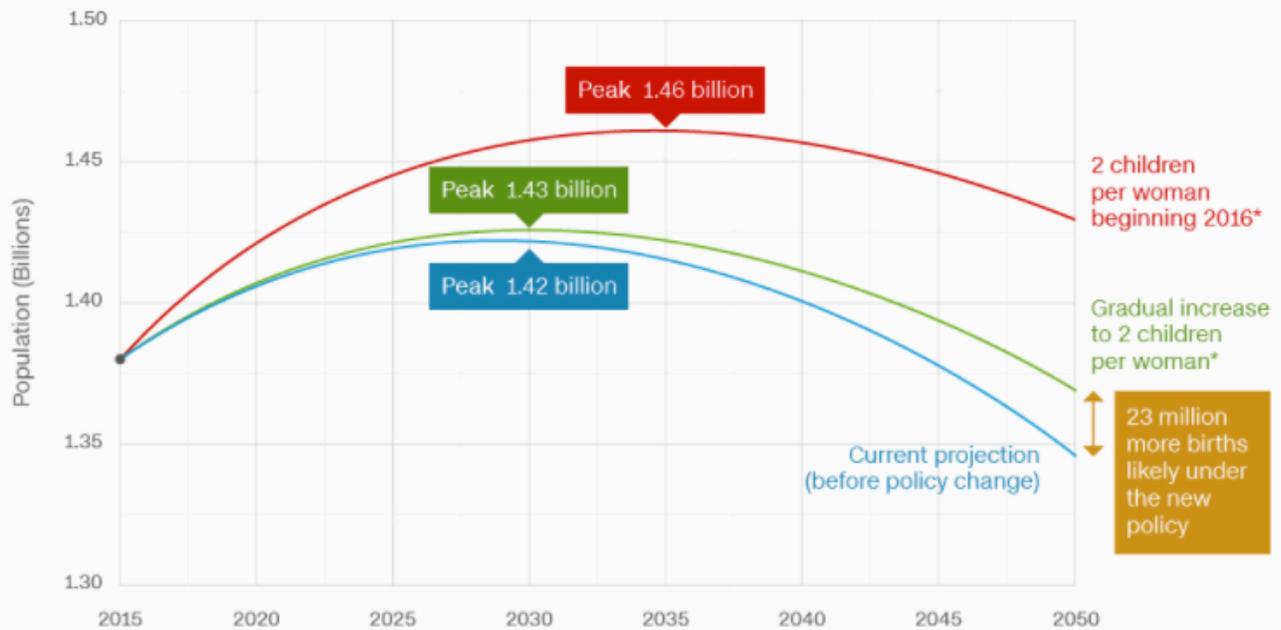


Source: FAO, USDA, Reuters

BBC

Figure 2: China's large population is mirrored in its resource consumption. In 2014 alone, China slaughtered a little under seven times the number of pigs killed in the United States that same year. (Source: BBC News, FAO, USDA, Reuters)

How will policy change affect China's population?



Source: Population Reference Bureau *This scenario is unlikely *Most likely scenario

Figure 3: In this graph, three scenarios are modeled from the implementation of the two child policy in 2016 through the year 2050. A gradual increase up to two children per woman in China is considered the most likely scenario. If this indeed is what occurs, it could add an estimated 23 million more births than what was expected under the one child policy by 2050. (Source: CNN, Population Reference Bureau)

Country (abbreviation)	Per capita emissions (t person ⁻¹ year ⁻¹)	Average emissions (t)	
		Ancestor's life	Added per child
China (C)	3.62	311 (183, 383)	1384 (228, 2023)
India (Ia)	1.05	70 (52, 85)	171 (87, 231)
United States (US)	20.18	1644 (883, 2030)	9441 (562, 12730)
Indonesia (Io)	1.29	110 (76, 135)	380 (143, 627)
Brazil (Br)	1.83	148 (97, 182)	721 (207, 1006)
Pakistan (P)	0.67	50 (42, 61)	205 (128, 273)
Bangladesh (Ba)	0.27	18 (18, 24)	56 (56, 94)
Russia (R)	11.70	883 (492, 1082)	2498 (295, 3497)
Nigeria (N)	0.75	41 (34, 51)	110 (73, 157)
Japan (J)	9.91	840 (453, 1047)	2026 (233, 2829)
Mexico (M)	3.67	291 (172, 360)	1241 (222, 1800)

Table 2: Researchers from Oregon State University analyzed the estimated emissions of fossil carbon dioxide in tons added to the atmosphere per each child born in 11 of the world's most populous countries. (Source: Paul A. Murtaugh and Michael G. Schlax, Oregon State University)

Action	CO ₂ saved (metric tons ^a)
Increase car's fuel economy from 20 to 30 mpg	148
Reduce miles driven from 231 to 155 per week	147
Replace single-glazed windows with energy-efficient windows	121
Replace ten 75-w incandescent bulbs with 25-w energy-efficient lights	36
Replace old refrigerator with energy-efficient model	19
Recycle newspaper, magazines, glass, plastic, aluminum, and steel cans	17
Reduce number of children by one	
Constant-emission scenario	9,441
Optimistic scenario	562
Pessimistic scenario	12,730

^a One metric ton equals 2205 pounds.

Table 3: In this table, the amount of carbon dioxide saved through various changes in domestic and transportation-related activities is compared to the amount saved by reducing the number of children per couple in the United States by one. (Source: Paul A. Murtaugh and Michael G. Schlax, U.S. Environmental Protection Agency)