

# Environmental impacts of divorce

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Edited by Paul R. Ehrlich, Stanford University, Stanford, CA, and approved October 30, 2007 (received for review August 2, 2007)

Divorce is increasingly common around the world. Its causes, dynamics, and socioeconomic impacts have been widely studied, but little research has addressed its environmental impacts. We found that average household size (number of people in a household) in divorced households (households with divorced heads) was 27–41% smaller than married households (households with married heads) in 12 countries across the world around the year 2000 (between 1998 and 2002). If divorced households had combined to have the same average household size as married households, there could have been 7.4 million fewer households in these countries. Meanwhile, the number of rooms per person in divorced households was 33–95% greater than in married households. In the United States (U.S.) in 2005, divorced households spent 46% and 56% more on electricity and water per person than married households. Divorced households in the U.S. could have saved more than 38 million rooms, 73 billion kilowatt-hours of electricity, and 627 billion gallons of water in 2005 alone if their resource-use efficiency had been comparable to married households. Furthermore, U.S. households that experienced divorce used 42–61% more resources per person than before their dissolution. Remarriage of divorced household heads increased household size and reduced resource use to levels similar to those of married households. The results suggest that mitigating the impacts of resource-inefficient lifestyles such as divorce helps to achieve global environmental sustainability and saves money for households.

energy | household | land | sustainability | water

Numerous studies have used aggregate variables, such as population size and population growth rate, to understand human impacts on the environment (1–5). Although those studies have generated important insights, there is an increasing recognition that aggregate variables alone are insufficient. For example, it is important to investigate the effects of household dynamics on the environment (6–10), because households are basic socioeconomic units and share resources (e.g., energy, land, and water) among occupants. Globally, the number of households has been growing much faster than population size (7). Even with a reduced population size or a declining global population growth rate (11), the number of households is still rising substantially because of factors such as divorce (7).

Divorce has become an increasingly common phenomenon around the world (12) (Fig. 1). In the United States (U.S.), for instance, the proportion of divorced households (households with divorced heads) among all households increased from 5% in 1970 to 15% in 2000 (an increase from 3.4 million to 15.6 million divorced households) (Fig. 1), whereas the proportion of married households (households with married heads) decreased from 69% in 1970 to 53% in 2000. Even in China, where divorce was traditionally uncommon, divorce rates have recently surged [1.6, 1.7, and 1.9 million couples cut their ties in 2004, 2005, and 2006, respectively ([www.china.org.cn/english/features/cw/211746.htm](http://www.china.org.cn/english/features/cw/211746.htm)) (13)].

Although numerous studies have been undertaken to assess the dynamics, causes, and socioeconomic impacts of divorce (14–17), little is known about the environmental impacts of divorce. From the perspective of household dynamics (7), we hypothesize that divorce affects the environment by increasing the number of households and reducing household size (number

of people in a household). Divorce usually causes a former spouse to move out and form a new household, thus increasing the use of materials and land for housing. Because divorce usually splits households into smaller units, it contributes to the global trend toward smaller household sizes and reduces the efficiency of resource use per person (18). Specifically, we hypothesize that increasing incidences of divorce have led to an increasing number of households and that the average household size and efficiency of resource use per person are lower in divorced households than in married households.

## Results

**Smaller Household Size in Divorced Households than in Married Households.** Divorced households had smaller household sizes than married households. In 12 countries around the year 2000 (from 1998 to 2002), there were 1.1–1.8 fewer people in an average divorced household than in an average married household (Fig. 2A). In terms of percent differences, average household sizes were 27–41% smaller in divorced households than in married households. The differences between divorced and married households also varied between more developed countries (MDCs) and less developed countries (LDCs). On average, a divorced household had 1.3 and 1.5 fewer people than a married household in the four MDCs (Greece, Romania, Spain, and the U.S.) and eight LDCs, respectively. Both divorced and married households in LDCs were larger than their counterparts in MDCs (Fig. 2A).

From 1970 to 2001, household sizes in divorced households remained 36–50% smaller than those in married households (Fig. 2B). The differences between average sizes of married and divorced households ranged from 1.2 to 2.1 people. Although the average household sizes generally decreased over time in both married and divorced households (Fig. 2B), married households shrank faster than divorced households.

**Divorce Led to More Households.** If divorced households in the 12 study countries around 2000 had combined to have the same average household size as that of married households, there could have been 7.4 million fewer households (Table 1). Divorced households accounted for 0.9–14.8% of all households in each country, whereas extra households due to divorce constituted 0.3–5.7% (Table 1). The numbers of extra households varied greatly among countries, ranging from 13,000 in Costa Rica to 6.1 million in the U.S. The four MDCs contributed ≈87% of the total extra households, and the U.S. alone dominated the contribution (82%).

The number of extra households due to divorce increased 3.3- to 7.9-fold during the period 1970–2001 in the three countries analyzed in Fig. 3. The U.S. experienced the largest absolute

Author contributions: E.Y. and J.L. designed research, performed research, analyzed data, and wrote the paper.

The authors declare no conflict of interest.

This article is a PNAS Direct Submission.

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