6

Forest Women, Health and Childbearing[1]

Carol J. Pierce Colfer, Richard G. Dudley and Robert Gardner

In recent years, there has been a certain reluctance in some development and conservation circles to acknowledge the significance of population issues. Westerners are cognizant of their own roles in consuming the world's resources and understandably consider it inappropriate to warn others about population expansion. Additionally, there is growing recognition that, for instance, in forest management, public participation is often used for the purposes of the managers, donors and project leaders, rather than for local people's purposes (for a thorough examination of these processes as they apply to women's reproductive rights, see Braidotti et al, 1994; Reardon, 1995; Rocheleau and Slocum, 1995; Turshen, 1995). And finally, forest managers – usually men, and usually outsiders – typically feel uncomfortable dealing with the women who live in forests. Childbearing behaviour, they believe, is too personal, and outside the realm of forestry or ecological expertise. For all these reasons, many people are fearful of addressing broader population issues in remote forested areas and may even consider it unethical.

In this chapter, we begin by making the case, using arguments from Smail (2002a; 2002b), that the population situation is critical. Although population densities in forests are relatively low, the importance of keeping them low – for maintaining forest-based ways of life and biodiversity, as well as for aesthetic and moral reasons – is obvious to forest managers.

We next argue that, in fact, lower fertility among women who live in forests will effectively address many of these women's own concerns and enhance their own wellbeing (both 'real' and perceived), and we endeavour to show some of the links among population, health issues and women who live in forests. These links pertain to women outside forests as well. We hope that such clarification will stimulate others to look for creative ways to work more effectively with local forest women to stabilize population and improve local health in ways that will help both the people and the environment.

THE 'POPULATION PROBLEM'

Smail (2002a; 2002b), following many others, has made a convincing argument that we ignore the current rate of population increase at our own (and our environment's) peril. Indeed, he argues that we need to be reducing our numbers, not just slowing the increase. He bases his thinking on five demographic observations and five observations pertaining to the Earth's carrying capacity, which we summarize here.

With regard to demography, Smail makes the following estimates:

1 The Earth's population will have grown from the current 6.2 billion to 9 billion by mid-century.
2 Despite reductions in the rate of population growth, the current total fertility rate in the developing world (3.7 children per woman) is almost double that needed for eventual zero population growth.
3 Populations will be growing older, with perhaps as many as 20 to 25 per cent in the over-60 category by mid-century. Smail attributes this to falling death rates. However, although falling mortality is an element in this process, demographers have shown that falling fertility is a more important cause. Regardless, populations are ageing.
4 The quantitative scale, geographic scope, escalating pace and functional interconnectedness of these changes in population are unparalleled in human history, providing us with no precedents to guide us (Smail likens human population growth to a cancer).
5 We have a narrow window – between now and 2050 – to stabilize our population in a conscious and, we may hope, benign fashion, avoiding a Malthusian scenario.

From the environmental standpoint, Smail makes these arguments:

1 The Earth's resources are finite.
2 The Earth's true (optimal) carrying capacity – with people in long-term, adaptive balance with their environment, resource base and each other – may have already been exceeded by a factor of two.
3 About 20 per cent of the world's population has a 'generally adequate' standard of living, and the remaining 80 per cent, representing the fastest-growing populations, are striving for higher standards of living (with the accompanying projected increase in consumption).
4 Using the equation 'impact = population × consumption × technology' (obtained from Hardin, 1999, and others), our total impact on the Earth's already strained ecosystems could easily quadruple by 2050. To quote from Smail:

> *The total impact of human numbers on the global environment is often described as the product of three basic multipliers: (1) population size; (2) per capita energy and resource consumption (level of affluence); and (3) technological efficiency in the production, utilization and conservation of such energy and resources.* (Smail, 2002b, p28)

5 There is significant potential for irreversible damage, including loss of wilderness and biodiversity, which is important on pragmatic, aesthetic and moral grounds.

Although one may quibble with one or another specific estimate in this scenario (and many do, among them the late economist Julian Simon, who won a wager with Paul Ehrlich, author of *The Population Bomb*, over whether resource costs would rise within a certain number of years), we believe there is a great deal of truth to it; sufficient to suggest

that we should marshal more of our resources and energies to address this problem in a humane and effective way.

Demographers and others who specialize in population issues, like those specializing in health more generally, tend to ignore forested areas because of the comparatively minimal global, demographic effect of these sparsely populated areas. The six countries in generally well-forested Central Africa, for instance, have population densities ranging from 1.6 to 3.1 per cent (Population Reference Bureau, 2007). From the standpoint of individual forests, the changes can be dramatic. In the Long Segar area of East Kalimantan, population density was estimated at two to three people per km^2 in the 1980s. By the 1990s, density had increased to around 60 per km^2 (Colfer, 1995), primarily because of government-sponsored transmigration programmes. Similarly, in the forested central and southern provinces of Cameroon, a 1987 rural population density of 17.4 persons per km^2 had increased to 22.4 persons per km^2 by 1997 (Kemajou and Sunderlin, 1999, p9), partly because of dislocations caused by the economic crisis of the early 1990s. For this large, forested area, the annual rate of population increase was 0.72 per cent between 1976 and 1987, changing to 4.10 per cent for the period 1987–1997. Leach (1994) reports rates of increase between 1963 and 1985 in the Gola forest region in Sierra Leone as ranging between 2.2 and 2.9 per cent. One study of residents in the Colombian rainforest surveyed 93 women: 20 had had more than 10 pregnancies, 6 had more than 10 living children, and 27 were pregnant or lactating (Townsend and de Acosta, 1987, p253).

The 'population problem' is vitally important for forest maintenance, and both forest managers and local women have excellent reasons for limiting population. The current trend toward more participatory forest management presents an entry point for beginning to stabilize population levels if partnerships can be developed between foresters and local women. The current public participation emphasis – on income generation alone – carries with it the possibility of greater population increases, particularly through in-migration, as improvements in local livelihoods may draw in others from afar.

Here, we attempt to portray our perceptions of the relationships among forest women, population and health using causal loop diagramming (a technique from the field of system dynamics). Both population studies and system dynamics have been lambasted dramatically by Braidotti et al (1994, pp143–147) who see system dynamics approaches to population studies as simplistic, dangerous and prone to use in justifying draconian measures to ensure fertility reduction by individual women. We acknowledge the simplistic aspect of all models, but argue that such simplification is useful, probably even necessary, in clarifying complex interrelationships. We explicitly renounce any attempts to force individual women. Instead we are seeking to understand the dynamic links among factors that can – by means of individual choices – benefit both women and forests.

Our purpose is to counter a common perception that may over-simplify the relationships among forests, population and health and foster a passive approach among forest managers. This common (Malthusian) view effectively paralyses foresters, biologists and ecologists when they think of human population issues. We then provide our view of the interactions, built on an extensive literature review and long-term field experience. Our interpretation provides a constructive approach and optimistic view for dealing with population reduction, environmental improvement and human wellbeing.

RETHINKING MALTHUS

In 1994, Emery Roe (1994) introduced the idea of a policy narrative. A policy narrative is a kind of simplified 'story' about how the world works. Because reality is too complex for policy-makers (or anyone else) to understand in its entirety, human beings make do with simpler stories that can help guide them in decision-making. That reality is too complex for us is an idea that resonates within the field of system dynamics as well (Forrester, 1971; Sterman, 2000). System dynamics allows our mental models of the world around us to be explicitly, and where possible quantitatively, mapped out for constructive discussion and analysis (cf. Sterman, 2000). All of us (including scientists) make use of simplifying stories, or mental models, and one example is a very pervasive but inaccurate story about population.

In the Malthusian view of population dynamics, population will increase exponentially while resources will not, resulting inevitably in disastrous consequences for humanity. From an environmentalist's perspective, there is an added poignancy to this story, with its air of inevitability. As population increases, environmental degradation proceeds apace and results in what system dynamicists call 'eroding goals'. As the decades pass and a continual process of environmental degradation is underway, people gradually become accustomed to lower standards. Higher levels of pollution and noise, reduced plant and animal populations and diversity, more urban sprawl and social conflict become 'normal'; people forget (or are never exposed to) the higher environmental standards that were once the norm (cf. Terborgh, 1999).

Despite the considerable uncertainty about the precise relationship between population and resources, we agree that continued population increase would eventually reach a point that the Earth's resources could not sustain, regardless of likely improvements in technology. We also think that reducing population would have beneficial effects (such as simplification of governance, improved natural habitats, reduced levels of violent conflict, a greater possibility of more equitable distribution of resources: generally, improved health for people and their environments).

But we disagree about the inevitability of Malthus's view. There are important elements in the population–environment interface that can turn this trend around. Many of those who are concerned with managing forests have characterized the 'population problem' as someone else's concern, albeit one with a huge effect on the forests they care about. But such compartmentalization ignores the interconnectedness of people's lives and the reality of human agency (the ability to act). Women (and men) make decisions about their fertility that cumulatively affect their environment, which in turn can affect their own wellbeing.

Over the past decade, there has been an increasing awareness of the interconnections between people living in and around forests and the conditions of the forests themselves. Between 1994 and 1998, the Center for International Forestry Research (CIFOR) investigated these relationships through interdisciplinary, international field teams in Austria, Brazil, Cameroon, Côte d'Ivoire, Gabon, Indonesia and the USA (Prabhu et al, 1996; 1998; Colfer and Byron, 2001). In that research, we began with the assumption that the maintenance or enhancement of environmental quality and human wellbeing was

essential to sustainable forest management. Our research yielded a generic set of principles, criteria and indicators of sustainable forest management, as well as manuals for assessing the sustainability of particular forests and forest communities (CIFOR, 1999). In the human sphere, we concluded with three main necessities for sustainable forest management:

1 intergenerational access to resources is secure;
2 rights and responsibilities to manage equitably and cooperatively are clear; and
3 the health of people, cultures and forests is maintained.

This chapter focuses on the interactions among human wellbeing, population, and forest and human health, with special reference to women's real and potential roles. The actions and preferences of women, if supported over time, can contribute significantly to bringing about their own improved wellbeing and health, as well as stabilizing or even reducing the population. Our discussion is also based on a vision of the future that includes improved human wellbeing and the maintenance of significant amounts of healthy forest.

Recognition of the importance of collaborating with local people, rather than trying to plan for them, opens the door to management approaches that integrate the interests of people living in forests with the interests of outsiders concerned about the forests, as we tried to do in CIFOR's Adaptive Collaborative Management Program (see Hartanto et al, 2003; Kusumanto et al, 2005; Colfer, 2005a; 2005b; Guijt, 2007). In the following pages, we share our perspective on some common elements of women's lives that have been shown to affect their childbearing behaviour and, in turn, population growth and forest health. The influence of Germain (1975) will be clear in the analysis that follows. Youssef (1978), Caldwell (1979; 1986), and Venkateswaran (1995) – as well as numerous gender-sensitive ethnographies – also document many of the same links described in this chapter, as does Colfer's extensive ethnographic experience. Our expectation is that awareness of these links can guide our resource allocation and attention. It is of course important to bear in mind that a given population size results from the previous population and the combined effects of births, deaths and migration (in and out). In some forest contexts, these other factors have more important effects on population size and growth than childbearing alone.

It is time to pay greater attention specifically to the factors that affect women's propensity to bear children. We argue that there is often an inverse relationship between women's health, level of education, amount and type of work, and public status on the one hand, and women's likelihood of bearing children on the other. Westoff and Bankole (1999), in talking about South Asian countries, say:

> *Theories are abundant to explain the spread of contraception and the decline of fertility in the developing world. The changes have been attributed to factors that include increases in income and in education, the improvement in the status of women, the decline of infant and child mortality, and the erosion of religious and traditional authority. All are plausible explanations, and all no doubt have some validity.* (p32)

We deal with most of these issues here, and we link them to the concept of human wellbeing that has been widely linked to sustainable forest management in general. We argue, as others have done before, that truly sustainable forest management is dependent on some level of human wellbeing. We further argue that reduced fertility can improve the health of women and their families, as called for in the Millennium Development Goals. Improved access to education and employment and increased public status are also typically seen as contributing to human wellbeing. Our fundamental argument is that benefiting forest women can also benefit the forests they inhabit. Given women's reproductive specialization, this is true to a greater degree than would be the case for men.

WOMEN, POPULATION AND CAUSAL LOOPS

Human population increase derives from natural increase (the balance of births over deaths in an area) and net in-migration. In this chapter, we focus on natural increase, the macro-level population component most directly linked to women's micro-level interests and decision-making.

In the following discussion, we use causal loop diagrams as a mechanism to portray our understanding of the interactions between women's lives and population. Understanding these interactions is important for those who strive to protect forested environments while working with local communities. Such understanding is even more important for those concerned about population growth, equity and human health in forested landscapes. Causal loop diagrams were invented to help system dynamicists develop and portray the conceptual foundations for their mathematical models of systems. Our own diagrams seek to illustrate the points of our argument; a quantified model is beyond the scope of this chapter.

Causal loop diagrams are simplifications of reality – as will become clear as we examine the diagrams – but they are useful to point out important causal feedback relationships affecting a problem or issue. They allow us to indicate our views of the direction of causality and the relative strength of the causal connection (by the width of the connecting arrow). Clearly, since this discussion is at a global scale, we can expect important variation in local conditions, but we have tried to represent fairly general processes seen and documented in many parts of the world. We want to stress that all models are partial and subject to revision.

A critical feature of causal loop diagrams is their capacity to help us look at feedback (see Richardson, 1991 for a thorough exposition on the background and importance of feedback thinking). Feedback loops can be either reinforcing (as in a vicious circle) or balancing (as in thermostats). Such loops are important when we are thinking about how and why populations grow, decline or stabilize.

In the diagrams to follow, there are two kinds of links between diagram components: positive and negative. In Sterman's words (2000, p39),

> *A positive link means that if the cause* increases*, the effect* increases *above what it would otherwise have been, and if the cause* decreases*, the effect* decreases *below what it would otherwise have been. … A negative link means that if the cause* increases*, the effect* decreases *below what it would otherwise have been,*

> *and if the cause* decreases*, the effect* increases *above what it would otherwise have been.* [Emphasis in the original]

A positive link is indicated by a plus sign on the arrow, and a negative link by a minus sign on the arrow.

Figure 6.1 (cf. Sterman, 2000) illustrates the way biologists tend to view population. Although many biologists would select other ways to portray their views, most would understand it and could apply it to the animal world. We will argue here that human population includes many other significant factors that affect growth or decline. The argument is not that biologists have a simplistic view of population, but rather that they focus on the equally complex biological aspects of population growth and decline and do not tend to think about those aspects that are peculiar to human beings (as discussed below).

Biologists tend to see the population problem in terms of a disruption of natural factors controlling population size. In Figure 6.1, biologists would emphasize the reinforcing effect of the birth-rate loop on population growth (R) and the balancing effect of the death-rate loop (B1). They would also focus on the many feedback effects of population size that can limit births and reduce average lifetime (balancing loops B2 and B3). They might also focus on external factors, such as climatic conditions. Unlike other kinds of animals, however, humans can actively promote balancing effects on births (loop B2) under the right conditions, and many of these conditions are intimately tied to local conditions. Demographers and anthropologists focus much more attention on the bundle of factors subsumed by biologists under 'other external factors', as we discuss below.

As with many interdisciplinary endeavours, differences in terminology between biologists and demographers can lead to serious misunderstandings. Where demographers consider a birth rate to be births per population, assumed (unless otherwise stated) to be an annual measure, biologists call this a fractional birth rate or a birth fraction, reserving 'birth' rate for the number of births per year. In Figure 6.1, since we are attempting to show

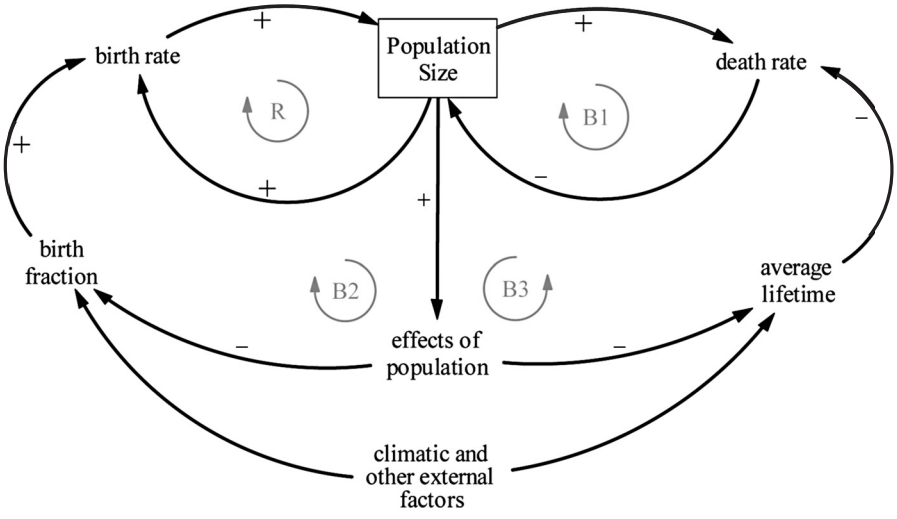

Figure 6.1 *Simplified biological view of population dynamics*

the biologists' point of view, we use biological terminology. But in subsequent mention of birth rates, we will be using the demographers' definition, because most of the literature about human population uses that definition.

The R encircled by an arrow refers to a reinforcing loop, and the B encircled by an arrow represents a balancing loop. Again, an example of a reinforcing loop is a vicious circle; a balancing loop is a self-regulating, homeostatic device.

A final point on causal loop diagrams: the links between these various components in the diagrams may involve time lags. As one component changes, time may pass before the effect is felt or seen in the related components. The inherent complexity of the interactions shown in the diagrams is exacerbated, from the standpoint of human understanding and action, by these time lags, which preclude easy identification of cause and effect.

Births, and by extension, human population, derive directly from the cumulative childbearing activity of women (plus mortality and migration). We have identified five issues that we feel are closely related to decisions about childbearing:

1 availability of birth control;
2 use of birth control;
3 desire to bear children;
4 typical number of children born per woman; and
5 time used for reproductive activity.

Because we are focusing here on factors affecting typical individual forest women's perceptions and decisions – with the idea that these are subject to change – we have not used two other common and closely related demographic concepts: total fertility rate and desired family size. These tend to be cross-sectional and aggregate, whereas we are emphasizing the longitudinal and individual aspects. By reproductive activity, we refer to domestic work as described by Momsen:

> *Goods and services must be produced for human use; human life and society must be* reproduced *to continue in existence. … Children must be cared for and taught. … But there is more to* social *reproduction than this: food, water, warmth, clothing, shelter, hygiene and care for the sick must be provided as well as personal support and comfort.* (Momsen, 1987, p39) [Emphasis in original]

An equally legitimate and more demographic definition of reproductive activity would be 'all activities that women/people with (or planning to have) children do that those without children do not do'. In this chapter, though, we are using Momsen's broader, more anthropological definition.

Demographers focus on still more proximate causes of population growth, like age at marriage, onset of sexual activity, rates of abortion and contraceptive use, length of breastfeeding (cf. Bongaarts, 1978, and later works). These issues are obviously also important, but they are issues in which women can potentially have active, decision-making

roles. This is not to underestimate the significance of the various societal and contextual factors that influence women's decision-making (e.g., availability of contraception, societal norms, legal strictures). To bring about the potential positive changes in forests and human wellbeing implied by this analysis (to tap into the potential positive feedback loops), forest women will need support and encouragement from natural resource managers and health professionals to enhance maternal and child health; educational, employment and political opportunities; and women's status.

The five issues listed above appear in each of the diagrams below. Additionally, each individual woman has a finite amount of time and energy to use each day, and today most women have some role in decisions about how they allocate that time and energy (cf. Sanday, 1974, p189). The other topics that we discuss (health, education, work and status) all pertain to these women's decisions (or potential decisions) about how to allocate their time and energy.

In the subsequent discussion we focus on these four broad topics that we see as closely related to the population issues outlined above, one by one. The diagrams characterize ways in which these four topics can interact with the childbearing behaviour of women. Our intent is to portray dynamically or longitudinally some of the interactions among factors that individual women take into account as they think about their own reproductive behaviour. Space does not permit discussion of every loop in the diagrams. We hope that readers will consider these hypothesized relationships and communicate critiques and additional insights to us.[2]

Health

Links between health and childbearing are illustrated in one straightforward balancing or negative feedback loop, 'Fertility affects women's health', which links women's health and the typical number of children born per woman (Figure 6.2). Repeated pregnancies, particularly if closely spaced, have adverse effects on women's own health and, by extension, on the health of those they care for. Continued ill-health can affect women's childbearing capacity as well.

A reinforcing loop, 'Child survival affects reproduction', links a typical number of children born per woman, the desire to bear children and children's health. It is important to remember that we are talking in dynamic, longitudinal terms. As the typical number of children born per woman goes up, so does the time used for reproductive activity; as that time goes up, so does the total time spent on care of children, though not the time spent *per child* (see also the other factors affecting time used for reproductive activity, in Figures 6.3 to 6.6). The negative link between typical number of children born per woman and children's health captures the undesired impacts of large numbers of children on child health. A woman who is exhausted from repeated pregnancies and the care of many children cannot provide as much care to her family as can a woman with fewer children, potentially leading in a vicious cycle to increased child mortality and general morbidity within the family. When the survival rate of existing children is low, the desire to bear more children goes up, increasing women's childbearing (Pritchard and Sanderson, 2002). Children serve useful functions

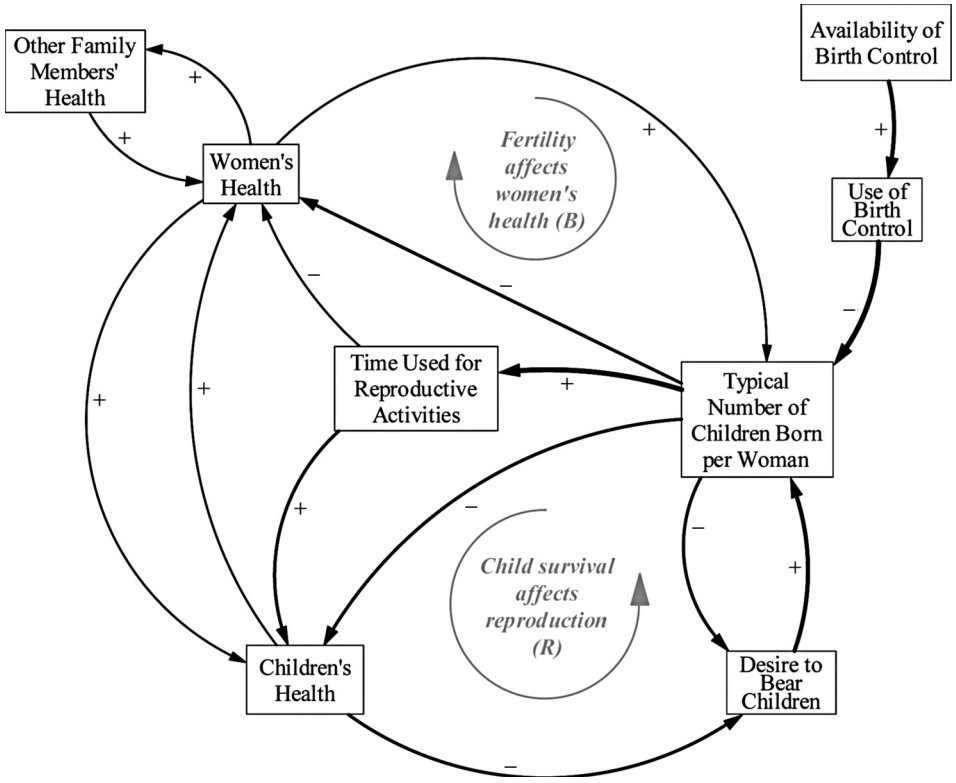

Figure 6.2 *Health and childbearing*

in many parts of the world: as insurance and companionship in old age, as workers on the farm, as helpers around the house and with other children (Barkat-e-Khuda and Hossain, 1996). On the other hand, when children's health status improves, the same links mentioned above can result in a lowering of the typical number of children born per woman.

The links between people's health and the birth rate have been long recognized (Myers, 1985). In most cultures, women play important roles in family health through caregiving and the provision of nutritious (or non-nutritious) meals (e.g., Repetto, 1985; Pearson, 1987; Shiva, 1989; Venkateswaran, 1995; and multitudinous ethnographies). Strengthening women's abilities to enhance their own and their families' health can also be instrumental in lowering birth rates.

Education

With the Middle East a notable exception (Youssef, 1978), increased education for women has been shown to result in lower fertility levels (Caldwell, 1979; 1986; Myers, 1985). We show four interesting feedback loops pertaining to this issue in Figure 6.3.

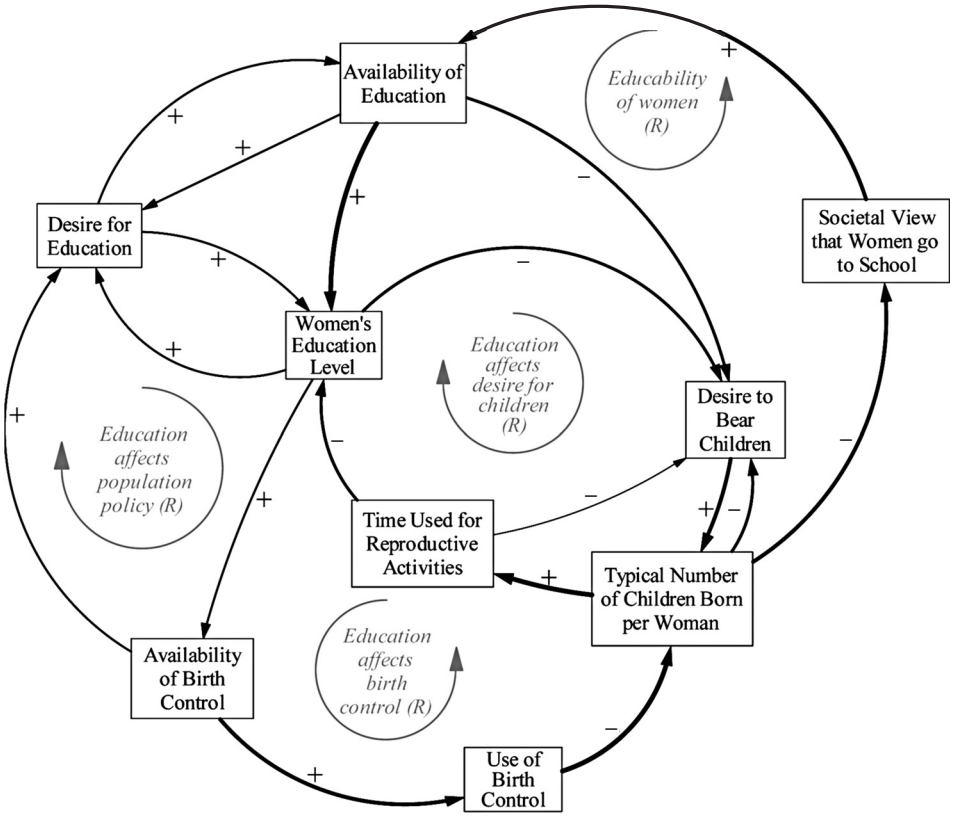

Figure 6.3 *Education and childbearing*

Education affects birth control

As women's educational levels go up, they are likely to have more access to birth control (Castro-Martín, 1995; United Nations Population Division, 1995; Dissanayake, 1996). This may happen for several reasons. The educational process makes more information available to women and may expose them to increased understanding about population-related issues, like their own and their children's health, further educational opportunities, and global issues like over-population. It may also make increased income available, making contraception more affordable. More highly educated women may marry more highly educated men, who may be more open to contraceptive use. Educated men may also be more open to smaller family sizes, which may affect desired family size. Women's educational level can directly affect the use of birth control, and use of birth control is strongly affected by the desire to bear children. Many similar links not shown here will be obvious in any given locale. With contraception, fertility can be postponed or controlled, and schooling becomes a viable possibility. This increases women's desire for education, which in turn increases the likely availability of education, thereby raising women's educational level.

Education affects desire for children

As women's educational levels rise, their desire for children typically decreases. The result is that the typical number of children born per woman also goes down (Barkat-e-Khuda and Hossain, 1996). Zlidar et al (2003) recently conducted a comprehensive survey and found that '[i]n nearly every surveyed country, the more years of school that women have completed, the lower their fertility'. This global trend derives from such factors as the postponement of childbearing to attend school, the greater likelihood that educated women know about and approve of birth control, and the opportunities for employment and involvement in public affairs available to educated women. As the number of children goes down, access to education becomes easier (both through societal recognition that women go to school, and because women have more time to do so). This availability of education, in turn, increases women's education levels still further.

Educability of women

If the typical number of children born per woman goes down, society's perceptions about the appropriateness of education for women goes up, leading to the increased availability of education, decreasing women's desire to bear children, and reducing the typical number of children born. If, on the other hand, the typical number of children born per woman goes up, society's view that education is appropriate for women goes down, bringing the availability of education to women down with it. This increases women's desire to bear children (since other options for their time and energy are unavailable to them), which in turn results in an increase in the typical number of children born per woman.

Education affects population policy

Finally, women's educational levels strengthen both their desire for birth control and their ability to demand the availability of birth control. The availability of birth control, in turn, widens women's perceptions of what their opportunities include, thereby strengthening their desire for education.

These relationships between education and fertility are affected by the postponement of marriage to pursue education, increased knowledge about family planning, increased status due to education, and/or increased interest in and qualifications for employment outside the home. An educated woman with fewer children to care for (and thus fewer demands on her own children for help in childcare) may also allow her daughters to gain an education, which further reinforces the cycle of lower fertility and increased educational levels for women.

Work

Women's involvement in productive work, whether paid or subsistence labour, affects their involvement in the reproductive sphere (cf. Sanday, 1974). Muhuri et al (1994), for instance, found in a study of 33 countries that most women who worked for cash for a non-family enterprise had lower fertility.

Because human beings have finite amounts of time and energy, the effort women expend in the reproductive sphere is not available for them to expend in the productive sphere (and vice versa). Here we divide productive work into two types: subsistence work (Figure 6.4) and paid work (Figure 6.5). We have separated subsistence and paid labour because of some additional complexity introduced by the latter in the relationships between production and reproduction.

In Figure 6.4, there are two interesting loops, both reinforcing. The first loop, 'Production affects reproduction', simply reflects the fact that involvement in reproductive activity limits the time used for subsistence production, and vice versa.

The second loop, 'Desire to work affects childbearing', shows how the desire to work negatively influences the desire to have children, which in turn would reduce the typical number of children born per woman. That in turn would reinforce women's desire to work, since they have the time and energy to do so. Conversely, if the desire to work goes down, the desire to have children typically goes up, which increases the number of children born per woman and decreases further the woman's desire to work, as she has no time.

There are three important reinforcing loops in Figure 6.5. First, we see again the reinforcing loops, 'Production affects reproduction' and 'Desire to work affects childbearing'. Although many connections remain the same, their strength is increased in cases where wage labour is an issue (cf. Barkat-e-Khuda and Hossain, 1996). Where subsistence labour is the norm, for instance, modern birth control is less likely to be available; we have highlighted this difference by thickening the line between wage labour

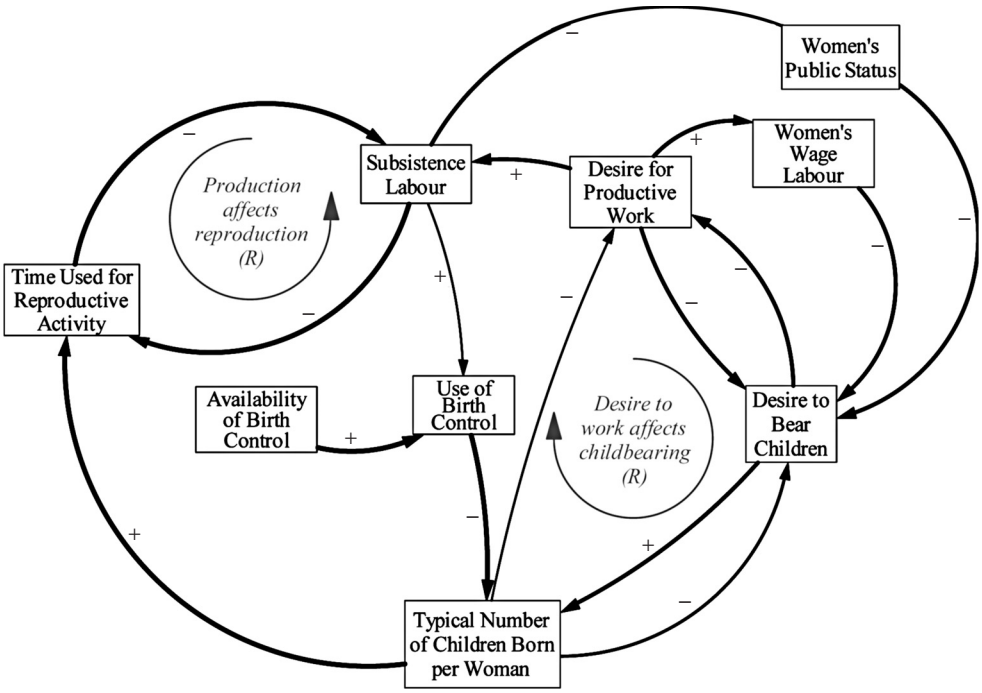

Figure 6.4 *Subsistence work and childbearing*

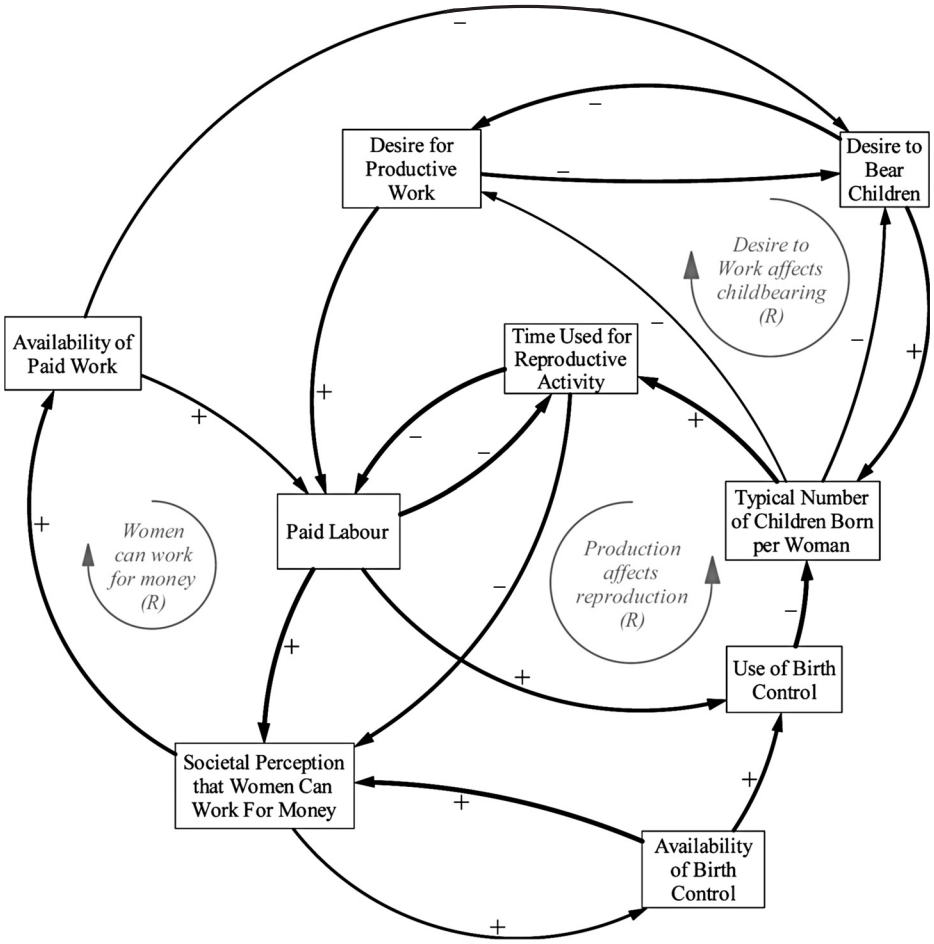

Figure 6.5 *Paid work and childbearing*

and use of birth control (Figure 6.5), compared with that linking subsistence labour and use of birth control (Figure 6.4). The availability of paid work adds a significant opportunity cost to childbearing, further reducing women's interest in childbearing compared with subsistence labour, which is usually more compatible with childcare.

A third important loop, 'Women can work for money', is new in Figure 6.5. Here, women's involvement in the labour market increases the societal perception that women should be able to work for wages. This perception in turn increases the availability of work to women, which in turn increases their involvement in wage labour. But there is an added dimension of relevance for fertility: if the time used for reproductive activity goes up because fertility goes up, the societal perception that women can work for money goes down, causing a reduction in paid labour, which feeds back to an increase in the time used or available for reproductive activity.

In general, direct contributions to family welfare – through production or earnings – increase a woman's value to the family, and in many cases give her a greater voice in decision-making about reproduction, along with a greater motivation to reduce her number of

pregnancies. Such productive involvement also strengthens women's autonomy and provides insurance in case of abandonment or the ill-health of other productive family members.

Public and private status and autonomy

Status can include everything from the chivalrous idea of placing women 'on a pedestal', to pragmatic power, to formal authority (cf. Dubisch, 1971; Rogers, 1978; Youssef, 1978; Colfer, 1985). There is evidence that in areas where women's status rises, fertility rates decline (Mason, 1987; 1997; cf. Riley, 2003, who sees this important issue as more complex than is often recognized).

In Figure 6.6, we address what Sanday (1974) referred to as female power and authority in the public domain (women's public status and autonomy), and also women's private status and autonomy. Sanday follows Smith (1960), who defines power as 'the ability to act effectively on

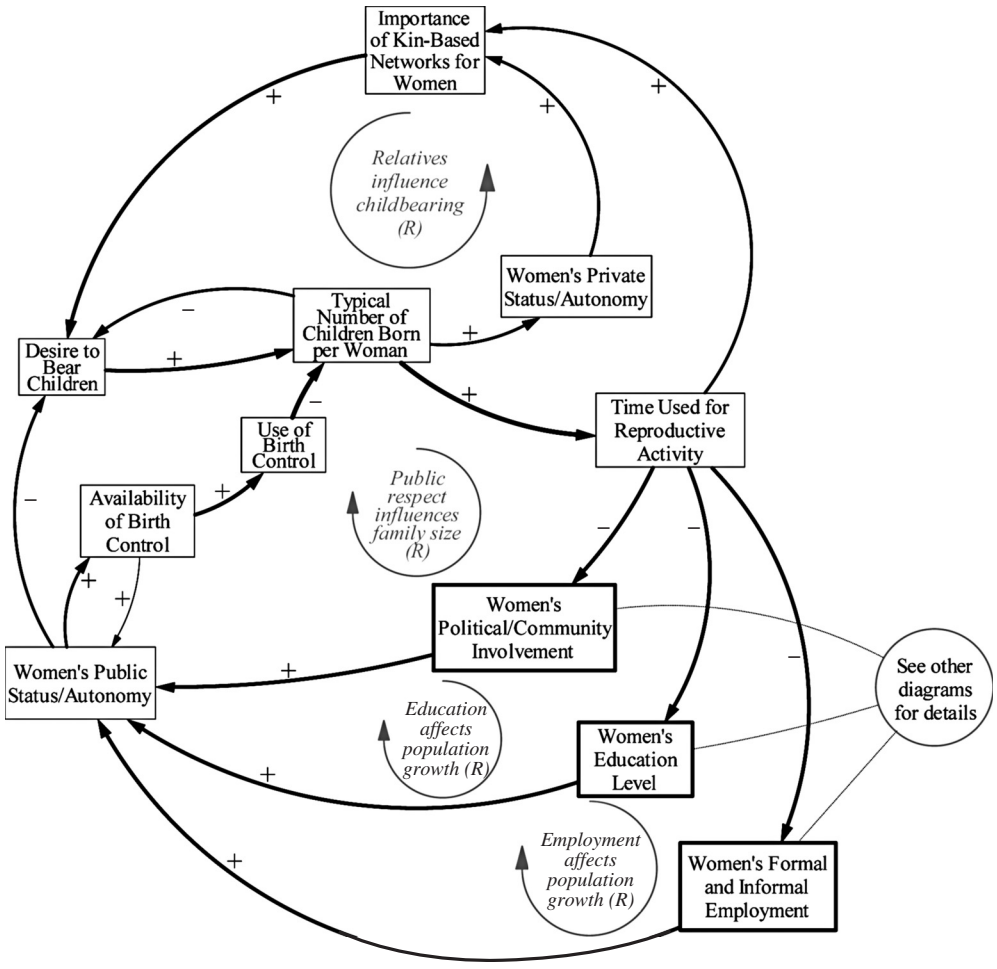

Figure 6.6 *Public and private status/autonomy and childbearing*

persons or things, to take or secure favourable decisions which are not of right allocated to the individuals or their roles', and authority as 'the right to make a particular decision and to command obedience'. There is an ongoing debate within anthropology about the appropriateness of dividing the world into public and domestic spheres, but there do seem to be some important implications for population regarding women's direct involvement in one or both of these spheres. As many have argued, in real life these two domains overlap and intersect, but in a model such as this, it is convenient to separate them, since the factors affecting these two kinds of status differ significantly in their implications for population growth.

In the first loop, 'Relatives influence childbearing', which pertains to women's status in the private sphere, the typical number of children born per woman increases the time used for reproductive activity. This increases the importance of kin-based networks for women. Youssef (1978) provides an excellent summary of how this has operated among Muslim women. Kin-based networks are the most direct way to obtain help with domestic duties. As the strength of kin-based networks increases, so does the typical number of children born per woman, through 'Desire to bear children'. The propensity in many cultures for mothers-in-law and husbands to encourage young brides to reproduce is well documented. In such situations, the typical number of children born per woman commonly increases, as ultimately women's main avenue to power and authority is through their children.

A decrease in the importance of kin-based networks for women will lessen the pressure to reproduce and lower fertility. This in turn reduces the time used for reproductive activity and leads to increased female activity in the political, community, educational and productive spheres. These increases result in increased status and autonomy for women in the public sphere ('Public respect influences family size'), which decreases their desire for more children and ultimately reduces the typical number of children born per woman.

Wipper (1995) reports a study by Charles Hammerslough (1991):

> *In one study of voluntary associations and the use of contraceptives in rural Kenya, group members were found to be 33 per cent more likely to be current contraceptive users (controlling for age, education and urban-rural residence), were more likely to have discussed family planning with their husbands, and to know more about methods and sources of supply than non-members. … Non-members who live in areas with strong economically-oriented women's groups were more likely to use them than women in areas without these groups.*

In sum, women with higher public status are likely, almost by definition, to have a louder voice in family decision-making, including in reproductive decision-making. Lower personal fertility levels may grant them access to otherwise-unavailable educational and income-generating opportunities, which may in turn reinforce decisions to limit the number of children they bear.

BRINGING IT ALL TOGETHER

We have tried to portray some recurring patterns relating to cause and effect with regard to women, population and health. Our particular interest here has been forested contexts,

where external stakeholders are concerned about population growth and health and where forest women themselves often have similar concerns relating to family size and wellbeing, from a more personal perspective. By including population elements (such as the desire to bear children, or typical number of children born per woman) in each of the diagrams, we hoped to demonstrate the kinds of links and feedback loops that affect both women and population size. One could combine these diagrams into a larger diagram to convey the interconnectedness of all the issues (health, education, work and status), but the complexity of the resulting diagram would make it comprehensible only to devoted advocates of causal loop diagramming and population concerns.

We have also hoped to convey the dynamic and active aspect – represented by human agency – that can counteract the depressing and hopeless scenarios of global population growth. Women, their families and their societies all represent a source of human creativity and potential cooperation in efforts to improve people's lives and protect their own habitats. Women's potential roles, particularly, have been under-recognized and underused, to their own and their environment's loss.

SUMMARY AND CONCLUSIONS

In this chapter, we have portrayed some of the interconnections between women and their childbearing behaviour, admittedly on a broad scale and ignoring many issues of importance in particular contexts. We began with the view that the Earth's population trajectory is a worrying concern, even in relatively sparsely populated forested areas. We then argued that women's childbearing behaviour, taken cumulatively, is important in determining the direction of future population growth or reduction; and that population growth is a legitimate concern for environmental scientists (as well as those more directly concerned about human populations themselves).

These same population, environment and human issues are legitimate and real concerns for individual rural women as they work towards improving their lives and those of their children. In our work with forest communities in CIFOR's Adaptive Collaborative Management Program, we have found consistent emphasis among rural peoples, including women, on issues pertaining to economic wellbeing and health. Based on our experience to date, we have developed a hypothesis for planned future work: *improving the capabilities of women to manage their environment, health and fertility – through improving their social capital (links to each other and other stakeholders) and their ability to adapt more quickly to external and internal changes – will result in improvements to rural health, livelihoods and the environment.* Essentially, this approach requires a continuing focus on the women themselves, beginning with their important roles in health and reproductive matters. In this way, we expect to build their confidence and trust, and strengthen their links both within communities and with outsiders. We anticipate that then building on their existing uses and knowledge of the forest will be easier. We expect to retain our dual focus, which prizes human and environmental wellbeing equally. From the individual woman's point of view, improved health, education and employment are already desired; they are recognized as part of improved human wellbeing. Strengthening women's access to these benefits will be widely appreciated, as will be (with varying lag times) the ability to control their fertility.

These interconnections, taken in conjunction with the growing awareness of the necessary involvement of local communities in forest and other natural resource management, suggest that we need not passively await a Malthusian catastrophe or a macro-economically determined 'demographic transition'. Instead, by working with forest women to strengthen their access to education and employment, improve their health and that of their children, and raise their general status within their communities, we can have a positive effect on the women, their families and the forests that provide their sustenance and habitat. We conclude by stressing the importance of fine-tuning these ideas in particular contexts, in cooperation with local people. Although the patterns and relationships identified in this chapter are common, the strength of connections between issues varies widely, as does the acceptability of particular strategies. Fundamentally, though, outside help with health, education, employment and status can serve as a powerful motivating force for forest women to cooperate in efforts to protect the environment and stabilize population growth, for themselves, for their children and for the world at large.

NOTES

1 The ideas presented in this paper originated in Colfer (2001), and an earlier version of the chapter was presented at the Second Worldwide Symposium on Gender and Forestry, August 2004, Mweka, Tanzania.

2 Write to Carol Colfer at c.colfer@cgiar.org.

REFERENCES

Barkat-e-Khuda and Hossain, M. (1996) 'Fertility decline in Bangladesh: An investigation of the major factors', Extension Project (Rural) Working Paper No. 111, International Centre for Diarrhoeal Disease Research, Bangladesh

Bongaarts, J. (1978) 'A framework for analyzing the proximate determinants of fertility', *Population and Development Review* 4(1): 105–132

Braidotti, R., Charkiewicz, E., Hausler, S. and Wieringa, S. (1994) *Women, the Environment, and Sustainable Development: Towards a Theoretical Synthesis*, Zed Books/INSTRAW, London

Caldwell, J.C. (1979) 'Education as a factor in mortality decline: An examination of Nigerian data', *Population Studies* 33(3): 395–412

Caldwell, J.C. (1986) 'Routes to low mortality in poor countries', *Population and Development Review* 12(2): 171–220

Castro-Martín, T. (1995) 'Women's education and fertility: Results from 26 demographic and health surveys', *Studies in Family Planning* 26(4): 187–202

CIFOR (Center for International Forestry Research) (1999) *CIFOR C&I Toolbox,* R. Prabhu (ed), 9 volumes, CIFOR, Bogor, Indonesia

Colfer, C.J.P. (1985) 'Female status and action in two Dayak communities', in M. Goodman (ed) *Women in Asia and the Pacific: Toward an East–West Dialogue*, University of Hawaii Press, Honolulu, HI, pp183–211

Colfer, C.J.P. (1995) 'Social aspects of the C&I test in East Kalimantan, March 1995', CIFOR, Bogor, Indonesia

Colfer, C.J.P. (2001) 'Are women important in sustainable forest?', in G. Lidestay (ed) *Proceedings, Women and Forestry: How Can Gender Research Contribute to a More Sustainable Forest Management*, Swedish University of Agricultural Sciences, Department of Silviculture, Report No. 47, pp48–56

Colfer, C.J.P. (2005a) *The Complex Forest: Communities, Uncertainty, and Adaptive Collaborative Management*, Resources for the Future, Washington, DC/CIFOR, Bogor, Indonesia

Colfer, C.J.P. (ed) (2005b) *The Equitable Forest: Diversity, Community and Natural Resources*, Resources for the Future, Washington, DC/CIFOR, Bogor, Indonesia

Colfer, C.J.P. and Byron, Y. (2001) *People Managing Forests: The Links between Human Well-being and Sustainability*, Resources for the Future, Washington, DC/CIFOR, Bogor, Indonesia

Dissanayake, L. (1996) 'Relative impact of "starting, spacing and stopping fertility behaviour" in Sri Lanka', *The Journal of Family Welfare* 42(3): 1–7

Dubisch, J. (1971) 'Dowry and the domestic power of women in a Greek island village', paper presented at the 70th Annual Meeting of the American Anthropological Association, November, New York, NY

Forrester, J.W. (1971) 'Counterintuitive behavior of social systems', *Technology Review* 73(3): 52–68

Germain, A. (1975) 'Status and roles of women as factors in fertility behaviour: A policy analysis', *Studies in Family Planning* 6(7): 192–200

Guijt, I. (2007) *Negotiated Learning: Collaborative Monitoring for Forest Resource Management*, Resources for the Future, Washington, DC/CIFOR, Bogor, Indonesia

Hammerslough, R. (1991) 'Women's groups and contraceptive use in rural Kenya', in T. Locoh and V. Hertrich (eds) *The Onset of the Fertility Transition in Subsaharan Africa*, Derouaux-Ordina, Liège, pp267–287

Hardin, G. (1999) *The Ostrich Factor: Our Population Myopia,* Oxford University Press, New York, NY

Hartanto, H., Lorenzo, C., Valmores, C., Arda-Minas, L. and Burton, E.M. (2003) *Adaptive Collaborative Management: Enhancing Community Forestry in the Philippines*, CIFOR, Bogor, Indonesia

Kemajou, J.P.W. and Sunderlin, W.D. (1999) 'L'impact de la crise économique sur les populations, les migrations et le couvert forestier du Sud-Cameroun', CIFOR Occasional Paper 25, CIFOR, Bogor, Indonesia, p29

Kusumanto, T., Yuliani, L., Macoun, P., Indriatmoko, Y. and Adnan, H. (2005) *Learning to Adapt: Managing Forests Together in Indonesia*, CIFOR, Bogor, Indonesia

Leach, M. (1994) *Rainforest Relations: Gender and Resource Use among the Mende of Gola, Sierra Leone*, Smithsonian Institution Press, Washington, DC

Mason, K.O. (1987) 'The impact of women's social position on fertility in developing countries', *Sociological Forum* 2(4): 718–745

Mason, K.O. (1997) 'Gender and demographic change: What do we know?', in G.W.E.A. Jones (ed) *The Continuing Demographic Transition*, Clarendon Press, Oxford, pp158–182

Momsen, J.H. (1987) 'Introduction', in J.H. Momsen and J. Townsend (eds) *Geography of Gender in the Third World*, State University of New York Press, Albany, NY, pp15–26

Muhuri, P.K., Blanc, A.K. and Rutstein, S.O. (1994) *Socioeconomic Differentials in Fertility*, Demographic and Health Surveys Comparative Studies, Macro International, Calverton, MD, p79

Myers, N. (1985) 'The global possible: What can be gained?', in R. Repetto (ed) *The Global Possible: Resources, Development and the New Century*, Yale University Press, New Haven, CT, pp477–490

Pearson, M. (1987) 'Old wives or young midwives? Women as caretakers of health: The case of Nepal', in J.H. Momsen and J. Townsend (eds) *Geography of Gender in the Third World*, State University of New York Press, Albany, pp116–130

Population Reference Bureau (2007) '2007 world population data sheet', available from www.prb.org/pdf07/07WPDS_Eng.pdf, accessed 30 December 2007

Prabhu, R., Colfer, C.J.P., Venkateswarlu, P., Tan, L.C., Soekmadi, R. and Wollenberg, E. (1996) *Testing Criteria and Indicators for the Sustainable Management of Forests: Phase 1*, CIFOR, Bogor, Indonesia

Prabhu, R., Maynard, W., Eba'a Atyi, R., Colfer, C.J.P., Shepherd, G., Venkateswarlu, P. and Tiayon, F. (1998) *Testing and Developing Criteria and Indicators for Sustainable Forest Management in Cameroon: The Kribi Test, Final Report,* CIFOR, Bogor, Indonesia

Pritchard, L. and Sanderson, S. (2002) 'The dynamics of political discourse in seeking sustainability', in L.H. Gunderson and C.S. Holling (eds) *Panarchy: Understanding Transformations in Human and Natural Systems*, Island Press, Washington, DC, pp147–172

Reardon, G. (1995) *Power and Process: A Report from the Women Linking for Change Conference, Thailand, 1994*, Oxfam Publications, Oxford, UK

Repetto, R. (1985) 'Population, resource pressures, and poverty', in R. Repetto (ed) *The Global Possible: Resources, Development and the New Century*, Yale University Press, New Haven, CT, pp131–169

Richardson, G.P. (1991) *Feedback Thought in Social Science and Systems Theory*, University of Pennsylvania Press, Philadelphia, PA

Riley, N.E. (2003) 'The demography of gender', in D. Poston and M. Micklin (eds) *Handbook of Population*, Kleuwer Academic/Plenum Publishers, Dordrecht, Netherlands, pp109–142

Rocheleau, D. and Slocum, R. (1995). 'Participation in context: Key questions', in R. Slocum, L. Wichhart, D. Rocheleau and B. Thomas-Slayter (eds) *Power, Process and Participation: Tools for Change*, Intermediate Technology Development Group Publishing, London, pp17–30

Roe, E. (1994) *Narrative Policy Analysis: Theory and Practice*, Duke University, Durham, NC

Rogers, S.C. (1978) 'Woman's place: A critical review of anthropological theory', *Comparative Studies in Society and History* 20(1): 123–162

Sanday, P. (1974) 'Female status in the public domain', in M.Z. Rosaldo and L. Lamphere (eds) *Woman, Culture and Society*, Stanford University Press, Stanford, CA, pp189–206

Shiva, V. (1989) *Staying Alive: Women, Ecology and Development*, Zed Books, London

Smail, J.K. (2002a) 'Confronting a surfeit of people: Reducing global human numbers to sustainable levels', *Environment, Development and Sustainability* 4: 21–50

Smail, J.K. (2002b) 'Remembering Malthus: A preliminary argument for a significant reduction in global human numbers', *American Journal of Physical Anthropology* 118: 292–297

Smith, M.G. (1960) *Government in Zazzau 1800–1950*, Oxford University Press for the International African Institute, London/New York/Toronto

Sterman, J.D. (2000) *Business Dynamics: Systems Thinking and Modeling for a Complex World*, McGraw-Hill, Boston, MA

Terborgh, J. (1999) *Requiem for Nature*, Island Press, Washington, DC

Townsend, J. and de Acosta, S.W. (1987) 'Gender roles in colonization of rainforest: A Colombian case study', in J.H. Momsen and J. Townsend (eds) *Geography of Gender,* State University of New York Press, Albany, NY, pp240–257

Turshen, M. (1995) 'African women and health issues', in M.J. Hay and S. Stichter (eds) *African Women South of the Sahara*, Longman Publishing, New York, NY, pp239–249

United Nations Population Division (1995) 'Women's education and fertility behaviour: Recent evidence from the demographic and health surveys', UNPD, New York, p113

Venkateswaran, S. (1995) *Environment, Development and the Gender Gap*, Sage Publications, New Delhi, India

Westoff, C.F. and Bankole, A. (1999) 'Mass media and reproductive behavior in Pakistan, India and Bangladesh', Demographic and Health Surveys Analytical Report, Macro International, Calverton, MD, p32

Wipper, A. (1995) 'Women's voluntary associations', in M.J. Hay and S. Stichter (eds) *African Women South of the Sahara*, Longman, New York, NY, pp164–186

Youssef, N. (1978) 'The status and fertility patterns of Muslim women', in L. Beck and N. Keddie (eds) *Women in the Muslim World*, Harvard University Press, Cambridge, MA

Zlidar, V.M., Gardner, R., Rutstein, S.O., Moris, L., Goldberg, H. and Johnson, K. (2003) 'New survey findings: The reproductive revolution continues', Population Reports, Population Information Program, The Johns Hopkins Bloomberg School of Public Health, Baltimore, MD