

Forest Women, Health, and Childbearing¹

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INTRODUCTION

In recent years, there has been a certain reluctance in some development and conservation circles to acknowledge the significance of population issues. Individuals from the West are cognizant of their (our) own roles in consuming the world's resources and understandably consider it inappropriate to harangue others about population expansion when the West can't "get its own house in order."

Additionally, there is growing recognition that the increasing emphasis within, for instance, forest management, on "people's participation" often carries a hidden agenda, that the participation is instrumental in nature—for the purposes of the managers, funders, and project leaders, rather than for local people's purposes (see Rocheleau and Slocum 1995, Braidotti and others 1994, Turshen 1995; or Reardon 1995, for a thorough examination of these processes as they apply to women's reproductive rights). Sensitive to these issues, many people are fearful that addressing broader population issues in remote forested areas is unethical in light of the immediate, subsistence problems these people face.

And finally, forest managers typically feel uncomfortable dealing with the women who live in forests. There are the usual problems of outsider men (as most forest managers are) dealing with local women. And there is the added communication disincentive for forest managers of the personal nature of childbearing behavior. Others feel the topic is simply outside the realm of forestry or ecological expertise.

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

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 well-being (both real and perceived), and we endeavor to clarify the links between population issues and women who live in forests. These links pertain to women outside forests as well. We hope that such clarification will stimulate those involved in forest management (and other international development /conservation efforts) to look creatively for ways to work more effectively with local women to stabilize population in ways that can be considered "win-win:" win for the women and win for 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 persuasively 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 estimates that:

- < the earth's population will have grown from the current 6.2 billion to 9 billion by mid-century;
- < despite reductions in the rate of population growth, the current Total Fertility Rate in the Third World (ca. 3.7 children per woman) is almost double that needed for eventual zero population growth;
- < populations will be growing older, with perhaps as many as 20-25% in the over-60 range by mid-century;²
- < the quantitative scale, geographic scope, escalating pace, and functional interconnectedness of these changes in population are unparalleled in human history, providing us no precedents to guide us (Smail likens human population growth to a cancer); and
- < we actually have a narrow window (between now and 2050) if we want to stabilize our population in a conscious and, we may hope, a benign fashion—avoiding a Malthusian scenario.

From the environmental standpoint, Smail argues that:

- < the earth's resources are finite;
- < 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;
- < about 20% of the world's population has a “generally adequate” standard of living, and the remaining 80%, representing the fastest growing populations, are striving for higher standards of living (with the accompanying projected increase in consumption);
- < using the well known equation, Impact = Population X Consumption X Technology (obtained from Hardin 1999 and others),³ our total impact on Earth's already strained ecosystems could easily quadruple by 2050 ; and
- < there is significant potential for irreversible damage, including loss of wilderness and biodiversity, which are important on pragmatic, aesthetic and moral grounds.

Although one may quibble with one or another specific estimate in this scenario (and many do⁴), there is undoubtedly a great deal of truth to it---sufficient to suggest that we should marshal more of our resources and energies to try to come up with possible ways to address this problem in a humane and effective way.

Demographers and others who specialize in population issues tend to ignore forested areas because of the comparatively minimal global, demographic effect of these sparsely populated areas. The six countries in Central Africa, for instance, have population densities ranging from 4.3 to 29.3 persons/km²; with annual growth rates ranging from 2.1 to 2.8 (Centrale 1999). From

the standpoint of individual forests, the changes can be dramatic. In the Long Segar area of East Kalimantan, population density was estimated at 2-3 people per km² in the 1980s. By the 1990s, density had increased to around 60/km² (Colfer 1995), due primarily to government sponsored transmigration programs. Similarly in the forested central and southern provinces of Cameroon, a 1987 rural population density of 17.4 persons/km² had increased to 22.4 persons/km² by 1997 (Kemajou and Sunderlin 1999:9), due partly to dislocations caused by the economic crisis of the early 1990s. For this large, forested area, the annual rate of population increase was 0.72% between 1976 and 1987, changing to 4.10% 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%. From a more personal standpoint, one study of residents in the Colombian rainforest surveyed 93 women. Twenty had had more than 10 pregnancies, 6 had more than 10 living children, and 27 of the 93 were pregnant or lactating (Townsend and de Acosta 1987:253).

Foresters, ecologists, and other biological scientists often take the view that while the “population problem” is vitally important for forest maintenance, it is entirely outside their realm of expertise or capability to address. The current trend toward more participatory forest management represents a potentially very effective entry point for beginning to stabilize population levels in forests—if partnerships can be developed between forest managers and local women, both of whom have excellent reasons for wanting to limit population. The emphasis to date, on income generation alone, carries with it the possibility of greater population increases—particularly through in-migration, as improvements in local livelihoods draw in others from afar.

Here, we attempt to portray our perceptions of the relationships among forest women and population using causal loop diagramming (a technique from the field of system dynamics).⁵ Our purpose in pursuing this line of thinking further is to counter a common perception that, in our opinions, *oversimplifies* the relationship between forests and population, and fosters an overly passive approach among those concerned primarily with managing forests. We begin with a brief account of this common (Malthusian) view—one that effectively paralyzes foresters, biologists and ecologists when they think of human population issues—and we proceed to provide our view of these interactions, built on 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 well-being.

DIVERGENT, CHANGING PERCEPTIONS ABOUT POPULATION

In 1994, Emery Roe ((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 policymakers (or anyone else) to understand in its entirety, human beings make do with simpler stories that can help guide them in decisionmaking. That reality is too complex for us to deal with well or easily 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). We argue here that we all (including scientists) make use of

simplifying stories, or mental models. Importantly there has been a very pervasive, and inaccurate, story about population.

We have found—in many years working with agricultural scientists, ecologists and foresters—that the Malthusian view of population dynamics is common: 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, in many places, environmental degradation proceeds apace. Some observers have argued that this has resulted 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 of what is normal. Higher levels of pollution and noise, reduced populations and diversity of plants and animals, 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).

In our view, there is considerable uncertainty about the precise relationship between population and resources; but we find it hard to argue with the idea that continued population increase would at some point 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).

We argue against the inevitability of the observable, deteriorating process described above. 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 well being.

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, CIFOR investigated these relationships through interdisciplinary, international field teams in Austria, Brazil, Cameroon, Côte d’Ivoire, Gabon, Indonesia, and the United States (Prabhu and others 1996; Prabhu and others 1998; Colfer and Byron 2001). In that research, we began with the assumption that the maintenance or enhancement of environmental quality and human well being were essential to sustainable forest management. Our research yielded a generic set of principles, criteria and indicators of sustainable forest management, as well as a number of manuals for use in making assessments of 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. Inter-generational access to resources is secure;

2. Rights and responsibilities to manage equitably and cooperatively are clear; and
3. Health of people, cultures and forests is maintained.

The arguments in this chapter focus on the interactions among human well-being, 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 well being and health, as well as stabilizing or even reducing the population. Our discussion is also based on a vision of the most desirable future as one that includes improved human well being and the maintenance of significant amounts of healthy forest.

In recent years, there has also been a recognition of the importance of working *with* local people ("people's participation") rather than either trying to plan for them or assuming that socioeconomic forces proceed on their own regardless of the actions of individuals and groups. This change in perspective opens the door for approaches to management that integrate the interests of people living in forests with the interests of outsiders concerned about the forests—as we have tried to do in CIFOR's ACM program (see Colfer 2004 or Hartanto 2003, for a description). In the following pages, we share our perspective on some common elements of women's lives that have been shown to affect their childbearing behavior—which of course taken cumulatively has significant effects on the size of a given population, including sometimes increasing sufficiently to adversely affect forest health.⁶ Our expectation is that awareness of these links can provide some useful hints about where those of us concerned about both human and forest health might best put our resources 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 intervening births (childbearing) —our interest here—deaths, and migration (in and out). In some forest contexts, these other factors may be more important than childbearing in their effects on population size and growth.

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 their likelihood of bearing children on the other.⁷ And we link these issues to the concept of human well-being 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 well-being. We further argue that reduced fertility can improve the health of women and their families (a clear component of human well-being). Improved access to education and employment and increased public status are also typically seen as contributing to human well-being. Our argument fundamentally is that benefiting forest women can, under appropriate circumstances, also benefit the forests they inhabit—and, 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, as the macro-level

population component most directly linked to women's micro-level interests and decisionmaking.

In the following discussion, we use causal loop diagrams (CLDs) as a mechanism to portray our understanding of the interactions between women's lives and population.⁸ 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 key 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 (2000:139):

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* [italics and bold in original].”

A positive link is indicated by a “+” sign on the arrow; and a negative link; by a “-“ sign on the arrow.

Figure 1 (cf. Sterman 2000) diagrams the way biologists 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, very significant factors that affect human population 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 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. Our point here is that, unlike animals, humans can actively promote balancing effects on births (loop B2) under the right conditions, and that 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.⁹

[Figure 1: Simplified Biological View of Population Dynamics]

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, 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:

- availability of birth control,
- use of birth control,
- desire to bear children,
- typical number of children born per woman, and
- 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, such as that described by Momsen:¹⁰

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 1987:39) [*italics in original*].

The five issues listed above appear in each of the diagrams below.¹¹

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 1974:189). 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 will portray—grossly—ways in which these four topics can interact with the childbearing behavior 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 behavior. 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.

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 2). Repeated, particularly closely spaced pregnancies 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.

[Figure 2: Health and Childbearing]

Another, reinforcing, loop, “Child survival affects reproduction” links typical number of children born per woman, 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 her children, though not the time spent *per child* (see also the other factors affecting time used for reproductive activity, in Figures 3-6). 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, 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 more 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 (Sanderson and Dubrow 2000). Children serve useful functions 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 related to family health through care-giving and

through production of nutritious (or non-nutritious) meals (see, e.g., Pearson 1987, Repetto 1985, 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

Globally (with the Middle East a notable exception (Youssef 1978), increased education for women has been shown to result in lower fertility levels (Caldwell 1979; Caldwell 1986; Myers 1985). We show four interesting feedback loops pertaining to this issue in Figure 3:

[Figure 3: Education and Childbearing]

- 1) "Education affects birth control:": As women's educational level goes up, they are likely to have more access to birth control (Dissanayake 1996, United Nations Population Division 1995, Castro-Martín 1995). 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.¹² 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 reinforcing women's educational level.
- 2) "Education affects desire for children:": As women's educational level rises, 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 and others (forthcoming) recently conducted a comprehensive survey and found that "In 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 in order 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 level still further.
- 3) "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 availability of education going up, 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 use of their energies are

unavailable to them), which in turn results in an increase in the typical number of children born per woman.

- 4) “Education affects population policy:” Finally, women’s educational level strengthens both their desire for birth control and their ability effectively to demand the availability of birth control. The availability of birth control, in turn, widens women’s perceptions of what their life chances include, thereby strengthening their desire for education.

These relationships between education and fertility are affected by the postponement of marriage in order to pursue education, increasing knowledge about family planning, increased status due to education, and/or by 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 labor, affects their involvement in the reproductive sphere (cf. Sanday 1974). Muhuri and others (1994) found in a study of 33 countries that most women who worked for cash for a non-family enterprise had lower fertility. In three sub-Saharan African countries fertility was higher for non-working women, probably because they tended to be working in occupations that were not incompatible with childbearing.

As mentioned above, human beings have a finite amount 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 4) and Paid Work (Figure 5). We have separated subsistence and paid labor because of some additional complexity introduced by the latter in the relationships between production and reproduction.

In Figure 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.

[Figure 4: Subsistence Work and Childbearing]

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 5.

[Figure 5: Paid Work and Childbearing]

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 some cases where wage labor is an issue (cf. Barkat-e-Khuda and Hossain 1996). Where subsistence labor 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 labor and use of birth control (Figure 5), as compared to that linking subsistence labor and use of birth control (Figure 4). The availability of paid work adds a significant opportunity cost to childbearing, further reducing women’s interest in childbearing, as compared to subsistence labor, which is usually more compatible with childcare.

A third important loop, “Women can work for money,” is new in Figure 5. Here, women’s involvement in the labor 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 labor. 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 labor, which feeds back to an increase in the time used/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 decisionmaking 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/Autonomy

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

In Figure 6, we address what Sanday (1974) referred to as female power and authority in the public domain¹³ (women’s public status/autonomy) and also women’s private status/autonomy. 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.

[Figure 6: Public and Private Status/Autonomy and Childbearing]

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.¹⁴ Kin-based networks are the most direct way to obtain help with domestic duties. As the strength of the 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 influence 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.

If the importance of kin-based networks for women decreases, this will decrease the pressure to reproduce and actual 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 decrease their desire for more children and ultimately reduce the typical number of children born per woman.¹⁵

In sum, women with higher public status are likely, almost by definition, to have a larger voice in family decision-making, including in reproductive decision-making. Lower personal fertility levels may grant them access to opportunities that would not otherwise have been available (income generation, education), 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, in regard to women and population. Our particular interest here has been forested contexts, where important external stakeholders are concerned about population growth and where forest women themselves often have similar concerns relating to family size, from a more personal perspective. By including population elements (such as 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 one larger one, in an attempt also to convey the interconnectedness among issues like health, education, work, and status. But the resulting diagram would be very complex, and therefore unappealing and uninformative, except perhaps to truly devoted advocates of causal loop diagramming and population concerns. We assume most of our readers do not fall into this category.

We have also hoped to convey the dynamic and active aspect—represented by human agency—that can serve to balance the features that currently create depressing and hopeless scenarios in the minds of many of the biologically oriented. Women, their families, and their societies all represent a source of human creativity and potential cooperation in efforts to make people’s lives better and to protect their own habitats. Women’s potential roles, particularly, have been under-recognized and under-used—to their own and their environments’ loss.

SUMMARY AND CONCLUSIONS

In this chapter, we have portrayed some of the interconnections between women and their childbearing behavior—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 behavior, 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).

Similarly, these same population, environment, and human issues are legitimate and real concerns of individual rural women, as they work toward improving their lives and those of their children. In our work with forest communities in CIFOR’s ACM program, we have found consistent emphasis among rural peoples, including women, on issues pertaining to economic well-being and health.¹⁶ From the individual woman’s point of view, improved health, education and employment are already desired; they are recognized as part of improved human well-being. 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. It is important to stress here the importance of the process of finetuning 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 among 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.

Figures

Figure 1: Simple View of Population Dynamics

Figure 2: Health and Childbearing

Figure 3: Education and Childbearing

Figure 4: Subsistence Work and Childbearing

Figure 5: Paid Work and Childbearing

Figure 6: Status and Childbearing

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Endnotes

¹ The germ of the ideas presented in this paper are present in (Colfer 2001).

² 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 of population. Regardless, populations are aging.

³ 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 2002:28)

⁴ ...including the late economist Julius 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.

⁵ Both population studies and system dynamics have been lambasted dramatically by Braidotti and others (1994:143-147) 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. The effects on forest women and the forests they inhabit are difficult to disaggregate, in any event.

⁶ The influence of Germain (1975) will be clear in the analysis that follows. Caldwell (1979, 1986), Venkateswaran (1995), Youssef (1978)--as well as numerous gender sensitive ethnographies--also document many of the same links described in this chapter.

⁷ Westoff Westoff, C.F. and A. Bankole (1999). Mass media and reproductive behavior in Pakistan, India and Bangladesh. Demographic and Health Surveys Analytical Report. Calverton, Maryland, Macro International: 32., in talking about South Asian countries, says "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." We deal with most of these issues here.

⁸ Understanding of 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 in forested landscapes.

⁹ As with many interdisciplinary endeavors, there is a difference in terminology between biologists and demographers that 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 1, since we are attempting to show the biologists' point of view, we use biological terminology. But in subsequent mention of birth rates, we will be using the demographers' definition--as most of the literature about human population uses that definition.

¹⁰ Another, 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.

¹¹ 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, J. (1978). "A framework for analyzing the proximate determinants of fertility." Population and Development Review 4(1):105-132., and later works). These issues are obviously also important, but they are issues in which women can potentially have active, decisionmaking roles. This is not to under-estimate the significance of the various societal/contextual factors that influence women's decisionmaking (e.g., availability of contraception, societal norms, legal strictures). To bring about the potential positive changes in forests and human well-being implied by this analysis (to tap into the potential, positive feedback loops), forest women will need support and encouragement from natural resource managers--to enhance maternal and child health; educational, employment, and political opportunities; and women's status.

¹² 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.

¹³ We like the definitions of power and authority quoted in Sanday's article: She follows M. G. Smith (1960) who defines power as "the ability to act effectively on persons or things, to take or secure favorable 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 (reflected to some extent within this book, see Chapters 8 and 13)--but there do seem to be some important implications for population of women's direct involvement in one or both of these spheres.

¹⁴ Youssef provides an excellent summary of how this has operated among Muslim women (Youssef 1978).

¹⁵ 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 percent 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 nonmembers. Nonmembers who live in areas with strong economically oriented women's groups were more likely to use them than women in areas without these groups."

¹⁶ Based on our ACM 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 that emphasizes both human and environmental well-being equally.

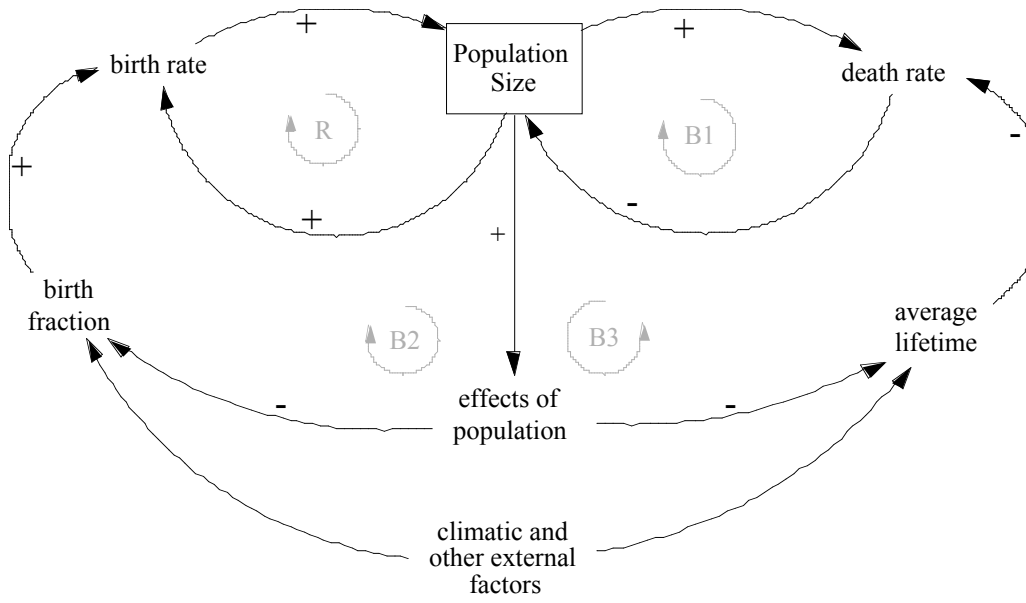


Figure 1: Simple View of Population Dynamics

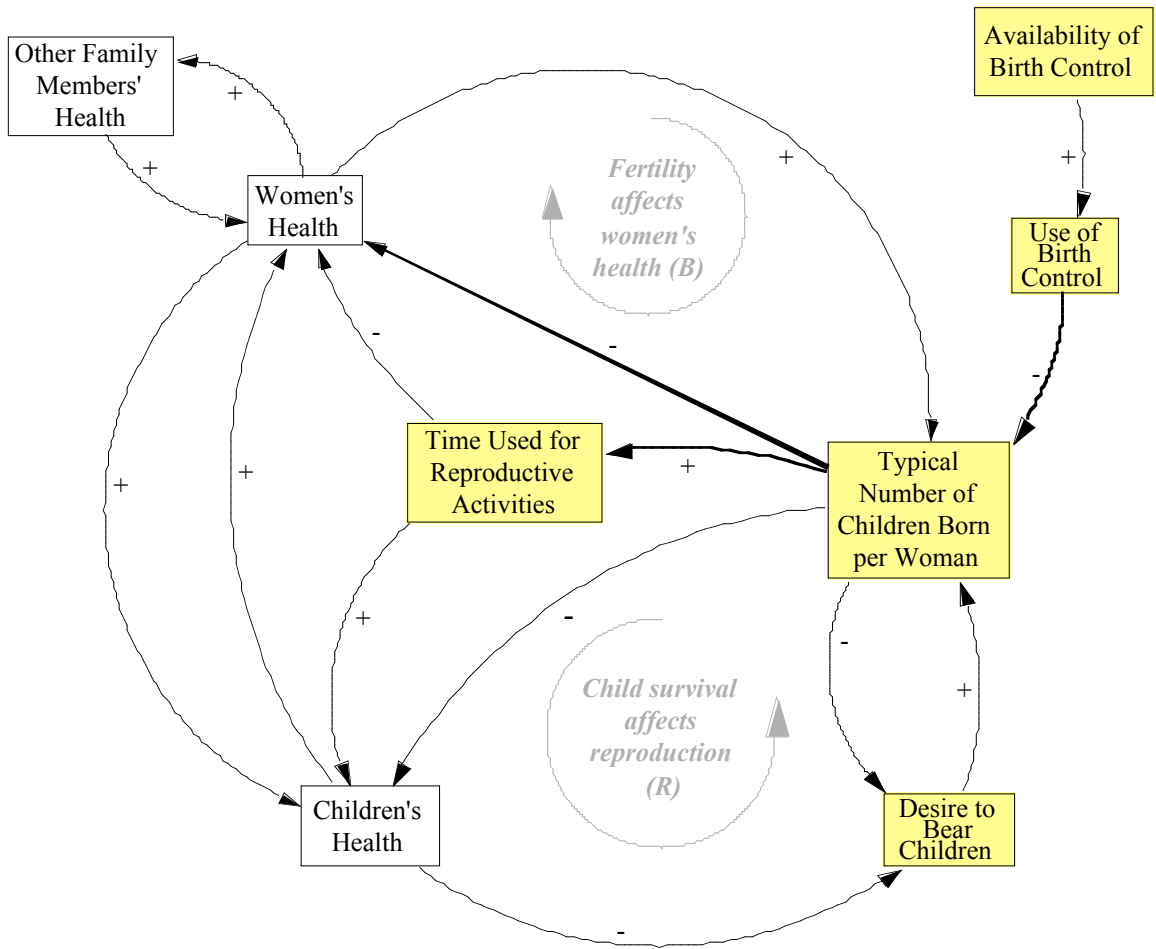


Figure 2: Health and Childbearing

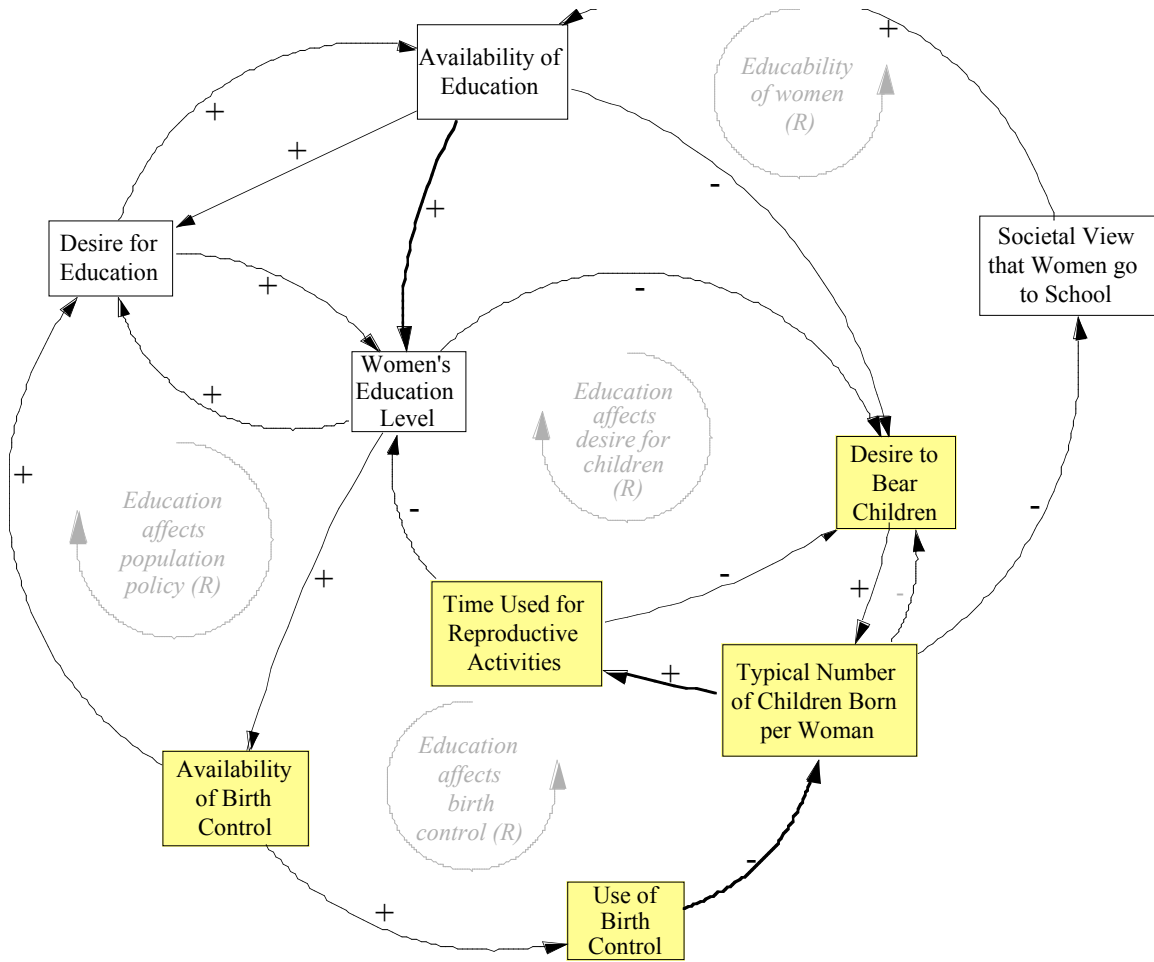


Figure 3: Education and Childbearing

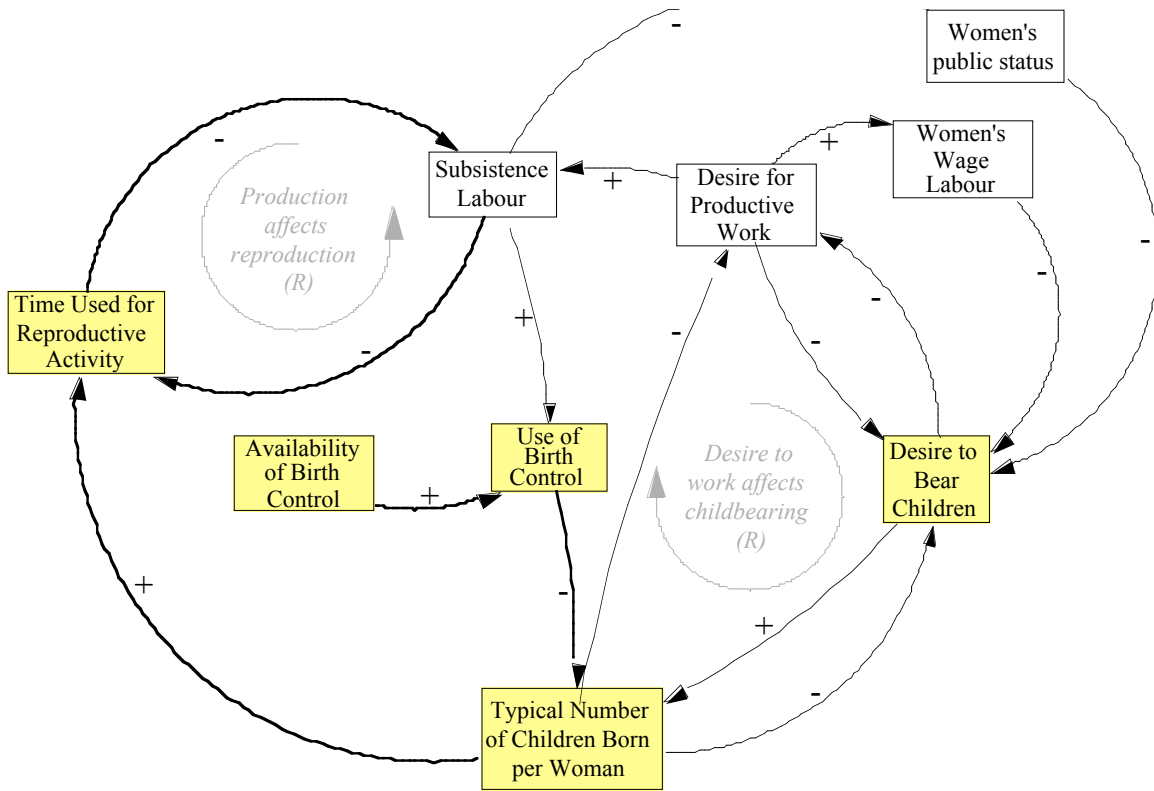


Figure 4: Subsistence Work and Childbearing

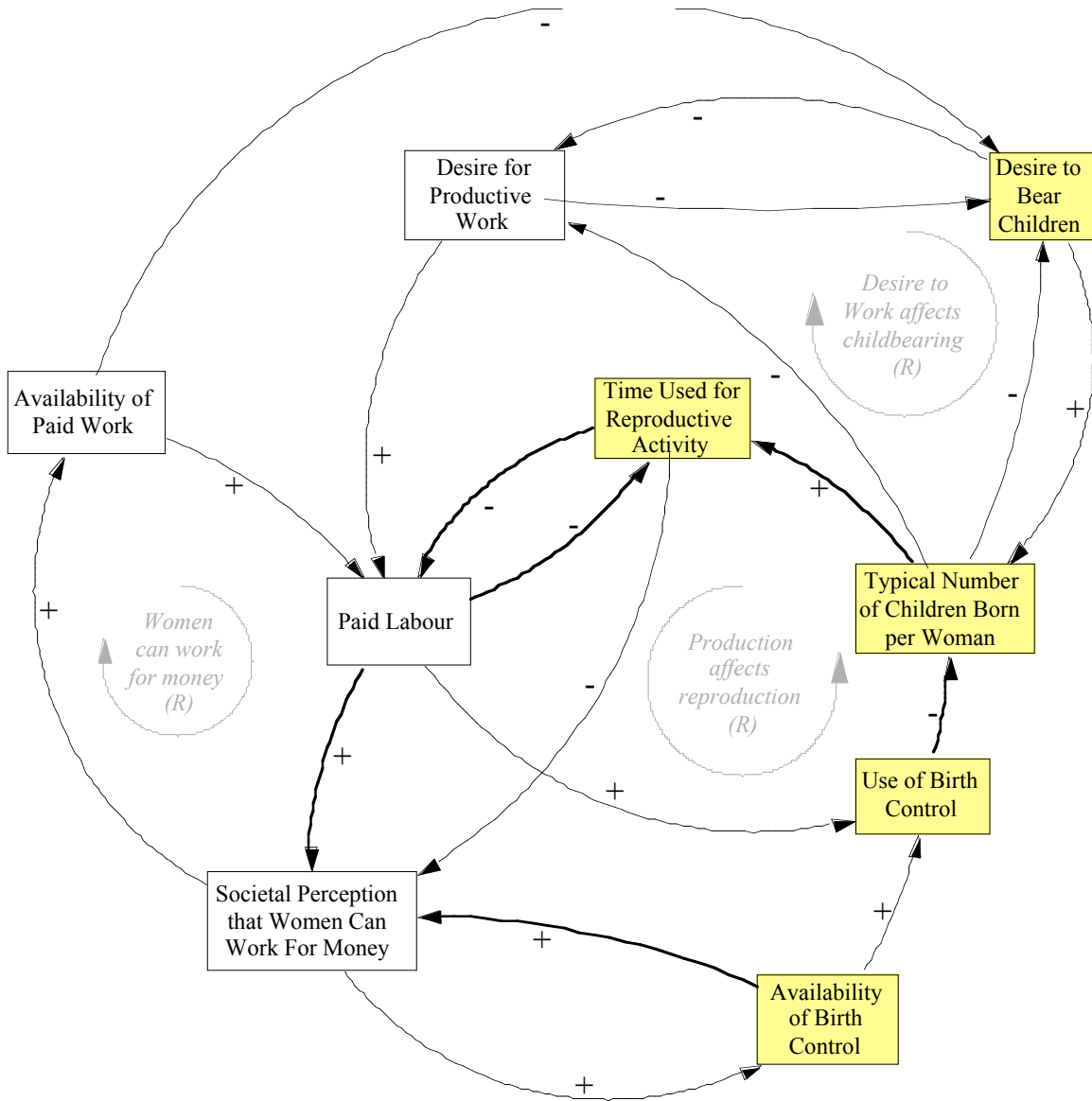


Figure 5: Paid Work and Childbearing

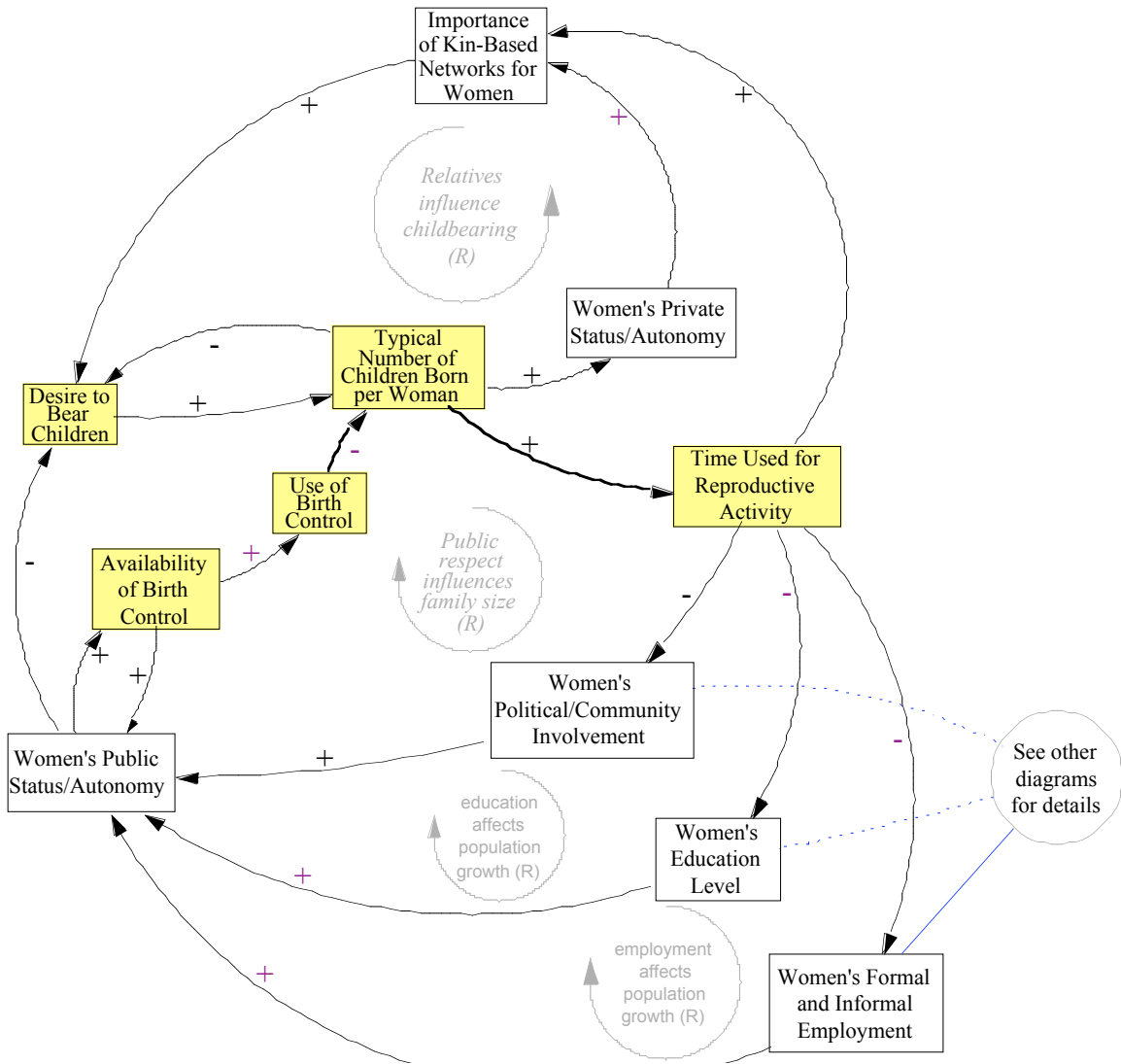


Figure 6: Status and Childbearing