Inferno Unleashed: Dan Brown's Uncomfortable Solution to Overpopulation

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Abstract

Dan Brown's *Inferno* (2013) explores a controversial issue that is often forgotten in national policies and international debates despite its relevance for the world's future: overpopulation. The effects of overpopulation in our environment can be seen in desertification, loss of diversity, or fresh water scarcity, and despite this, overpopulation remains a forgotten issue because of the difficulties of dealing with it at a large scale. Using Thomas Malthus's theories on the growth of population, in *Inferno* Dan Brown proposes an uncomfortable situation that entails the creation of a virus. While in the film version the virus is never released and the heroes defeat the villains, the novel offers a different and more complex finale which forces readers to reflect on the possible ways of dealing with the problem of overpopulation. The aim of this article is to analyze some of the consequences of overpopulation regarding the environment, and to explore how the two versions of *Inferno* portray this topic.

Keywords: overpopulation, plague, Malthus, Dan Brown, *Inferno*, ecological collapse.

Resumen

Inferno (2013) de Dan Brown explora un tema importante que a menudo se obvia en las políticas nacionales y en los debates internacionales, a pesar de lo relevante que es para el futuro del mundo: la sobrepoblación. Los efectos de la sobrepoblación en nuestro entorno pueden percibirse en la desertificación, la pérdida de diversidad o la escasez de agua. A pesar de ello, la sobrepoblación continúa siendo un problema olvidado debido a las dificultades que entraña abordar el problema a gran escala. Usando las teorías de Thomas Malthus sobre el crecimiento de la población, en *Inferno* Dan Brown propone una situación incómoda que conlleva la creación de un virus. Mientras que en la versión cinematográfica nunca se libera el virus, y los héroes vencen a los villanos; la novela ofrece un final diferente y más complejo que hace reflexionar al lector sobre las posibles maneras de lidiar con el problema de la sobrepoblación. El objetivo de este artículo es analizar algunas de las consecuencias de la sobrepoblación en lo que al medio ambiente se refiere, y explorar cómo las dos versiones de *Inferno* representan el tema.

Palabras clave: sobrepoblación, peste, Malthus, Dan Brown, *Inferno,* colapso ecológico.

Overpopulation has become an uncomfortable issue barely dealt with in public debate, and when it is linked to environmental degradation, discussion is

likely to arise. In "Taking the heat out of the population and climate debate," Campbell-Lendrum and Lusti-Narasimhan point out how close these two issues are but how difficult it is to address them since "discussing them together has often generated more heat than light" (807). Following Thomas Malthus's argument that "[the] power of population is so superior to the power in the earth to produce subsistence for man" (44), organizations such as the World Health Organization have analyzed how overpopulation affects the environment: "Although the major driver of greenhouse gas emissions remains the consumption patterns of richer populations, human population is also a fundamental determinant of this trend"; but they have also acknowledged the outrage that dealing with these issues in developing countries arouses. If we consider that developed and/or rich countries are those who have damaged the environment the most, then they should be the ones taking the first step towards proposing solutions to climate change, for example by reducing carbon emissions. However, their fear of losing their dominant positions in industrialization in favor of developing countries prevents them from doing so. Similarly, some people think that since population growth is fastest in developing countries, "this should be the starting point to reduce climate change"; but

> developing countries point out that per capita emissions of children born in poor countries are, and are likely to remain, much lower than those in richer countries, and claim that they are being stigmatized for "profligate reproductive behaviour" as a negotiating position over greenhouse gas commitments. (Campbell-Lendrum and Lusti-Narasimhan 807)

Whether we support one viewpoint or the other, it is necessary to realize the lack of action regarding overpopulation, environmental degradation, and how both are connected. The need for policies regarding these issues is also highlighted by Bryant, Carver, Butler and Anage in "Climate change and family planning: least-developed countries define the agenda". In this article, the authors comment on how the close relationship between climate change and demography is commonly omitted: "Despite widespread general debate on climate change, the relevance of demographic trends remains a comparatively unexplored issue, especially at the policy-making level" (852). Although the article focuses on the situation of least-developed countries, especially in Asia and in Africa, some of the environmental consequences of population growth in these countries can be extrapolated to the global situation. For example, they present a chart which includes the "Ten most cited issues identified as linked to population growth" and most of them have to do with environmental degradation: "Soil degradation/erosion, Fresh water scarcity, Migration, Deforestation, Inadequate farm land per capita, Loss of biodiversity, Disease and health system constraints, Loss of natural habitat, Diminishing fish stocks, and Desertification" (854). These issues affect not only developing countries, but have global implications, and that is why climate change and overpopulation should be discussed together and not separately. Besides, since climate change is a

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current debate topic with serious implications, overpopulation should be back on the agenda, as well.

The aim of this article is to explore the interconnections between ecology and overpopulation using Dan Brown's novel *Inferno* (2013) and its film adaptation with the same title, released in 2016. Both the novel and the film echo Malthus's theories on the unsustainability of population growth regarding the world's resources, but the main focus of this article is on how the ending of the novel differs from the one of the film and the implications of that change. In general, the film industry has been quite reluctant to deal with the issue of overpopulation and its consequences for the environment; when it has done so, it has been mostly in a comic or satirical vein. A recent example of this is Mathew Vaughn's *Kingsman: The Secret Service*, in which the supervillain Valentine, played by Samuel L. Jackson, wants to end most of humanity by creating a device that promotes violent behavior. In his plan, only those who are powerful and wealthy deserve to survive, whether they agree with his ideas or not. According to his point of view, humanity is a virus that is slowly killing the planet, so most of the human population needs to be eradicated: "Humankind is the only virus cursed to live with the horrifying knowledge of its host's fragile mortality." The analogy between the human population on Earth and a virus within a living organism is emphasized in the following lines, stated by one of Valentine's supporters:

> When you get a virus [...] you get a fever. That's the human body raising its core temperature to kill the virus. Planet Earth works the same way. Global warming is the fever. Mankind is the virus. We're making our planet sick. A cull is our only hope. If we don't reduce our population ourselves [...] there is only one of two ways this can go. The host kills the virus, or the virus kills the host. Either way [...], [the] result is the same. The virus dies. So Valentine's gonna take care of the population problem himself. (n.p.)

In *Kingsman*, the seriousness of Valentine's arguments against overpopulation is undercut by his severe lisp and by the fact that, despite his role as a promoter of mass murder, he cannot stand the sight of blood. However, if we consider the rationale behind his murderous plan, and set aside the way in which he plans to carry it out, his point of view—though controversial—makes ecological sense. Global warming is seen here as the Earth's response against overpopulation and not as an indirect consequence of it, thus Earth is seen as a living organism that is able to regulate itself, as proposed in James Lovelock's hypothesis of Gaia. Lovelock's hypothesis, supported by biologist Lynn Margulis, states that all life is interconnected, that "that the mean global temperature, the composition of reactive gases in the atmosphere, and the salinity and alkalinity of the oceans are not only influenced but regulated, at a planetary level, by the flora, fauna, and microorganisms" (Sagan and Margulis 353); thus, this theory conceives the Earth as "a self-regulating system, analogous to a living organism" (Garrard 173). However, this metaphor has proved quite controversial. Some ecophilosophers have argued that by envisioning the planet as a living organism with its own "self-regulating

mechanisms," it is suggested that the Earth is able to endure exploitation and other damaging human behaviors (Kheel 251). Patrick D. Murphy also criticizes Lovelock's notion of the Earth taking care of environmental problems such as pollution, since this would seem to entail that there is no need for environmentally-friendly attitudes (24). In *Kingsman* Valentine describes the Earth as an organism dealing with a virus infection, and this portrayal has some similarities with the Gaia hypothesis, the planet is seen as a fighting entity willing to end the disease regardless of the consequences. That is why the villain Valentine decides to take action and "help" the planet by eradicating the problem.

In Dan Brown's *Inferno,* we can also read about an alternative solution to overpopulation. *Inferno* is Brown's penultimate novel, and the fourth in the Robert Langdon series which started in 2000 with *Angels and Demons.* He became world-famous and a bestselling author with the second novel of the series, *The Da Vinci Code* (2003), which was turned into a film with the same title in 2006. Of this series of five novels, three have already been adapted for the screen, with Tom Hanks as the protagonist. The last novel, *Origin*, was published in October 2017. In all of these works, Brown mixes historical intrigue, secret organizations and religious themes, creating a thrilling atmosphere by fast-paced plots whose events take place over a short time-span. Dan Brown's *Inferno* starts with the suicide of scientist Bertrand Zobrist in Florence, although the reader only learns much later who he is and what he has done. As mentioned, the protagonist of the story is Robert Langdon, a Professor of Religious Iconology and Symbology at Harvard University. At the beginning of the novel, Langdon wakes up wounded in what seems to be a hospital in Florence, but after an attempt on his life, he quickly has to make an escape with the help of doctor Sienna Brooks. Little by little, and with constant references to Dante's life and works—with his portrayal of hell—as well as to Malthus's ideas on population, Langdon and Brooks discover that they must save the world from a plague created by Bertrand Zobrist. The story frequently switches between simultaneously unfolding events and is interspersed with flashbacks to Bertrand Zobrist's life. Each chapter has a distinctive focalizer, challenging the reader to figure out how the different strands of the narrative are related to each other—a highly effective technique for generating suspense which Brown employs in most of his work. In *Inferno*, different chapters focus on Robert and Brooks's escape across Florence and Venice, while other chapters allow readers to explore Zobrist's mind and the reason why he has created his plague. Using Malthus's ideas on the exponential growth of population, he explains his pessimistic view through a very clear and practical analogy:

> If I were to take this piece of paper and tear it in two… […] And then if I were to place the two halves on top of each other… […]. If the original sheet of paper is a mere one-tenth of a millimeter thick, and I were to repeat this process…say, **fifty** times… do you know how tall this stack would be? […] Our stack of paper, after only fifty doublings, now reaches almost all the way…to the sun. […] My point is that the history of human population growth is even more dramatic. The earth's population,

> like our stack of paper, had very meager beginnings… but alarming potential. (153-154; emphasis in original)

After the analogy, he uses real data to illustrate the growth of population, especially in the last two centuries.

> It took the earth's population thousands of years—from the early dawn of man all the way to the early 1800s—to reach **one** billion people. Then, astoundingly, it took only about a hundred years to double the population to **two** billion in the 1920s. After that, it took a mere fifty years for the population to double again to **four** billion in the 1970s. As you can imagine, we're well on track to reach eight billion very soon. Just today, the human race added another quarter-million people to planet Earth. A quarter **million**. And this happens every day—rain or shine. Currently, every year, we're adding the equivalent of the entire country of Germany. (154; emphasis in original)

With these words Zobrist echoes Thomas Malthus's predictions in *An Essay on the Principle of Population* (1798) in which he detailed the exponential growth of population, at a time when the number of people in the world was much lower than it is today. Zobrist also details the different consequences that Malthus pointed out in his essay using the same terms:

> Famine seems to be the last, the most dreadful resource of nature. The power of population is so superior to the power in the earth to produce subsistence for man, that premature death must in some shape or other visit the human race. The vices of mankind are active and able ministers of depopulation. They are the precursors in the great army of destruction; and often finish the dreadful work themselves. But should they fail in this war of extermination, sickly seasons, epidemics, pestilence, and plague, advance in terrific array, and sweep off their thousands and ten thousands. Should success be still incomplete, gigantic inevitable famine stalks in the rear, and with one mighty blow levels the population with the food of the world." (44)

When Malthus exposes the fatal results of overpopulation, he talks about famine, vices and diseases. These are also among the negative effects of population that Zobrist mentions. Malthus comments that the rate of population growth is not sustainable because the Earth's resources are insufficient, and he points out that the vices of humanity usually exacerbate the problem through violence and wars. In the same vein, Zobrist remarks that "Under the stress of overpopulation, those who have never considered stealing will become thieves to feed their families. Those who have never considered killing will kill to provide for their young" (157). Thus, Zobrist follows Malthus's argumentation, explaining how life in an overcrowded world will allow mankind's vices to flourish and the most violent behaviors to proliferate.

Again, following Malthus, Zobrist highlights that throughout history, plagues and epidemics have served to keep overpopulation in check. The scientist also mentions that according to Machiavelli, plagues are "the world's natural way of self-purging" and Dr. Sinskey, the WHO director in the novel, acknowledges this fact adding that the WHO is "well aware of the direct correlation between population density and the likelihood of wide-scale epidemics," and because of this the WHO thinks it "can prevent future pandemics" (158). Zobrist reacts to this with

frustration because he believes that controlling epidemics is a bad idea, given that epidemic "naturally" control population numbers (158). Similarly, he criticizes the WHO policies regarding overpopulation in developing countries. Developing countries have become the most problematic ones regarding overpopulation and they are one of the concerns of the WHO in the novel, as exposed in Dr. Sinskey's words when she talks with Zobrist: "Whoever you are, you know damned well the WHO takes overpopulation **very** seriously. Recently we spent millions of dollars sending doctors into Africa to deliver free condoms and educate people about birth control" (155; emphasis in original). Zobrist rejects Dr. Sinskey's defense, alleging that the Catholic church is effectively undercutting the WHO's efforts: "And an even bigger army of Catholic missionaries marched in on your heels and told the Africans that if they used the condoms, they'd all go to hell" (155).

The last element mentioned in Malthus's quote regarding nature's ways of dealing with overpopulation is famine. As discussed above, population growth in developing countries leads to a host of environmental problems: soil degradation, deforestation, lack of farm land, diminishing fish stocks and desertification (Bryant et al.). All these issues have a direct impact on the availability of food, and are they are an important part of the general condition of environmental degradation our world suffers nowadays. As Zobrist puts it: "Animal species are going extinct at a precipitously accelerated rate. The demand for dwindling natural resources is skyrocketing. Clean water is harder and harder to come by. By any biological gauge, our species has exceeded our sustainable numbers" (155). Later in the novel he repeats his concern for the ravages caused to the Earth by humans and overpopulation: "'Over the last fifty years [...] our sins against Mother Nature have grown exponentially'" (212). He continues talking about the results of population growth on a planet with limited resources, especially when those resources are only available to a small percentage of the population if we consider global numbers. In fact, he talks about overpopulation as a disease that is destroying the Earth, with "ozone depletion, lack of water, and pollution" as its symptoms.

Both in the novel and in the film, we see Langdon and Brooks travelling across Florence and Venice in order to guess where Zobrist has hidden his plague. In their journey, they are pursued by a group of armed men that belong to the WHO, but Langdon only learns that he has been running away from his own allies when it is too late. While they are in Venice, Brooks shows her true face, and we learn that she has in fact been a secret accomplice of Zobrist's all along. Even though she does not know everything about Zobrist's plan, her suspicious behavior after leaving Langdon behind makes her a second villain in the story. In the film, the chase ends in an underground cistern near Hagia Sophia in Istanbul, where Langdon and his helpers from the WHO save the world and frustrate Zobrist's plans by killing Brooks and her accomplices and retrieving the bag in which the plague is contained before it can dissolve in the water. However, the book has a much more complex ending which is elided in the film. In the novel, when the WHO and Robert Langdon arrive

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at the underground cistern in Istanbul where the Solublon bag with the plague was supposed to be, they discover that there is no bag, only a string and "a tiny plastic clasp, from which hung a few tatters of Solublon plastic" (653). That discovery makes them think they have failed and that humanity is doomed: "He pictured the submerged bag dissolving and breaking apart… its deadly contents spreading out into the water… and bubbling up to the surface of the lagoon" (653). While the WHO members try to assess the situation and the consequences, Langdon starts chasing Brooks across Istanbul until she surprisingly surrenders.

Once they are face to face, Langdon accuses Brooks of having released Zobrist's plague by breaking the Solublon bag. She appears confused by this charge and responds: "Robert, I went to the cistern to **stop** Bertrand's virus… to **steal** it and make it disappear forever… so nobody could ever study it, including Dr. Sinskey and the WHO" (678; emphasis in original). Langdon is surprised by this answer, especially when she tells him that Zobrist spread the virus before the date he had told Brooks he would be doing it. The plague has already been released for a week, so that the whole world would be infected. Langdon and the WHO wonder how it is possible that no plague has been announced if the virus has already been out for a week, but then Brooks tells the protagonist that "Bertrand didn't create a plague […]. He created something far more dangerous" (680). Robert cannot understand what can be more dangerous than a lethal plague, but Brooks tells him that Bertrand created a "viral vector": "It's a virus intentionally designed to install genetic information into the cell it's attacking" (689). When he asks her what Zobrist's virus does to human beings, she says after a silence: "The virus has the ability to render the human body… infertile" (689). Langdon objects that if the virus spreads and all humans become infertile, then the whole species would go extinct. Brooks explains that Zobrist did not want humanity to become extinct, but only to reduce its numbers so Zobrist

> "… created a **randomly** activated virus. Even though Inferno is now endemic in all human DNA and will be passed by all of us from this generation forward, it will 'activate' only in a certain percentage of people […]. When Bertrand did the math on infertility, he was exhilarated to discover that the plague's death rate of **one in three** seemed to be the precise ratio required to start winnowing the human population at a manageable rate." (690-91; emphasis in original)

Therefore, the final and most significant twist in the novel is that the lethal plague Langdon and the WHO were desperate to find had already been spreading for a week and was not, in fact, lethal at all. The dangerous element in Zobrist's plagues is not the virus as such but its ability to modify DNA, a technology which does not exist nowadays but that could be very dangerous in the wrong hands.

Brooks redeems herself by telling the WHO director, Dr. Sinskey, that she was not aware of all the details in Zobrist's plan. In fact, she wanted to stop the virus from being released, but when she arrived at the underground cavern, she discovered she had been lied to. In the end, she tells Sinskey everything she knows and demonstrates her willingness to cooperate. When Brooks comments that

something may be done to modify Zobrist's invention, both Brooks and Langdon are surprised by Dr. Sinskey's response when she states that perhaps Zobrist's virus should be left untouched, since it will actually put an end to overpopulation. In this manner, the novel keeps the reader's attention engaged until the very end, so it is very significant that in the film version, this whole section of the plot has been removed.

The film thus simplifies the plot of the novel and also the characters: it depicts both Zobrist and Brooks as evil terrorists, whereas Langdon and the WHO are the heroes of the film. This is particularly clear from the fight scene in the underground cavern in which the virus is miraculously contained and Brooks and her accomplices die. While the film mostly stays close to the plot of the novel, the most interesting and controversial issue in the latter is completely removed. The character of Brooks illustrates this process of simplification since in the film version, she is portrayed as a very intelligent woman who lies to Langdon and whose aim is to destroy the world. At the end, she dies as a terrorist without being able to explain herself and without repenting. However, the Brooks of the novel is a complex, conflicted character. In her conversations with Langdon, she shows herself to be motivated by the same Malthusian fears that also drive Zobrist:

> Robert, speaking from a purely scientific standpoint—all logic, no heart—I can tell you without a doubt that without some kind of drastic change, the end of our species is coming. And it's coming fast. It won't be fire, brimstone, apocalypse, or nuclear war… it will be total collapse due to the number of people on the planet. The mathematics is indisputable. (330)

Therefore, despite Brook's sympathies for Zobrist's viewpoints regarding overpopulation throughout the novel, the moment when she turns her back on Langdon comes as a surprise. In the novel, however, we later learn that her apparent betrayal was motivated by her wanting to not only stop the vector virus, but also to keep it out of the hands of the WHO or any other organization which might abuse the new technology.

When a novel is adapted to film, details invariably are lost. It is significant, however, that in the case of *Inferno*, some of the most interesting aspects of the plot are left out. Even setting aside the simplification of the character of Brooks, the endings of the film and the novel regarding the virus could not have been more different. In the film, the virus is compared to the plague and described as lethal, so the protagonists assume it would have killed most of the world's population. The defeat of Brooks and Zobrist is presented as a straightforward triumph over evil. The ending of the film leaves the world as it was at the beginning, the status quo ante is restored. In the novel, however, we discover that the virus had already begun to spread before the events in the plot started to take place. Even though at some points of the story, Brooks seems to be a villain, the reader learns of her regrets and of the personal motivations that lead her to act in the way she did. Also, the WHO director surprises the reader by admitting that Zobrist's virus will indeed end overpopulation and suggesting that it should be allowed to run its course. At the end

of the novel the world has changed, and the reader is left with the question of how serious a problem overpopulation is and what kinds of methods should be adopted to tackle it. Ironically, he ends up being the savior he said he was when he talked to Dr. Sinskey, and it is precisely through their dialogues and through those between Langdon and Brooks that readers are encouraged to reflect on how serious overpopulation is and how difficult it is to find a solution. During one of these conversations, Brooks asks Langdon a very uncomfortable question:

> "Zobrist asked the following: If you could throw a switch and randomly kill half the population on earth, would you do it?"
>
> "Of course not."
>
> "Okay. But what if you were told that if you **didn't** throw that switch right now, the human race would be extinct in the next hundred years?" She paused. "Would you throw it then? Even if it meant you might murder friends, family, and possibly even yourself?"
>
> "Sienna, I can't possibly—"
>
> "It's a hypothetical question," she said. "Would you kill half the population today in order to save our species from extinction?" (Brown 338-39; emphasis in original)

When Brooks quotes Zobrist's question at the beginning of this passage, it is directed at the reader as much as it is at Langdon. Even though she acknowledges it is a hypothetical situation, she insists on the logic of the lesser of two evils to illustrate Zobrist's thinking. Langdon never gets to answer this unsettling question: before he has time to do so, they reach their destination. It must be kept in mind that when this conversation takes place, neither Brooks nor Langdon know the scientist's actual plan: they think that Zobrist wants to kill half of the world's population, rather than make a third of it infertile. As mentioned before, at the end of the novel Dr. Sinskey faces a different kind of question that is no less unsettling because of its consequences. When she is asked about how the WHO is going to deal with Zobrist's virus, she says that the best option is to leave the virus alone since creating an anti-virus might be even more dangerous. Besides, the virus will end the problem of overpopulation, so even though she does not support Zobrist, she acknowledges that the fears which motivated him are well-founded.

In *Inferno*, Dan Brown discusses some perspectives on overpopulation and even hypothesizes about a possible solution to the problem. Although in the novel the author just focuses on Malthus's idea, Zobrist seems to echo as well some of the Neomalthusian ideas stated by authors like Garrett Hardin. In "The Tragedy of the Commons" Hardin comments that the "population problem" is within "the class of 'no technical solution problems'" (1243). According to Hardin, no change in technology can prevent the ravages of overpopulation in our habitat and in our very social system: "it is clear that we will greatly increase human misery if we do not, during the immediate future, assume that the world available to the terrestrial human population is finite" (1243). Therefore, through Zobrist Brown exposes Malthusian and Neomalthusian concerns without presenting alternative solutions to the population problem. In fact, Dr. Sinskey's implicit consent for Zobrist's plague once it has spread places Zobrist in the role of savior, the role he had given himself

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while most of the people saw him as a terrorist. Throughout the novel the narrator seems to empathize with Zobrist by highlighting his conversation with Dr. Sinskey, in which the fictional director of the WHO is not able to scientifically refute Zobrist's arguments. Sienna Brooks, who is presented as an exceptionally gifted doctor, also acknowledges the seriousness of the population problem as presented by Zobrist and with her speeches tries to convince Langdon—as well as the reader—of how important it is to take some kind of measure. However, Brown does not present any alternative solution to overpopulation, and when Dr. Sinskey learns about the real effects of Zobrist's virus, she is even pleased to not try to stop it or alter its effects. Through his virus Zobrist implements some of the measures Hardin exposes in "The Tragedy of the Commons", and so the plague he creates controls the population problem from the beginning: conception. At the end of the article above mentioned, Hardin states:

> Freedom to breed will bring ruin to all [...]. The only way we can preserve and nurture other and more precious freedoms is by relinquishing the freedom to breed, and that very soon. 'Freedom is the recognition of necessity—and it is the role of education to reveal to all the necessity of abandoning the freedom to breed. (1248)

The difference between Hardin's proposal and what Zobrist does is that Hardin conceived the problem of population as something to be dealt with through conscience and education, he referred to it as a "not technical solution problem". However, Zobrist carries out what Hardin outlines but using technology and scientific advances. In his article "Global overpopulation would 'withstand war, disasters and disease,'" Mark Tran comments on a report on overpopulation published by the National Academy of Sciences highlighting that "effective family planning and reproduction education worldwide have great potential to constrain the size of the human population and alleviate pressure on resource availability over the longer term", but that no results would be perceived in the short term (n.p). This report also comments that countries in Africa and South Asia will be the ones who suffer most from the consequences of overpopulation. But it is worth noting that that the report is not entirely pessimistic: "Rather than reducing the number of people, cutting the consumption of natural resources and enhanced recycling would have a better chance of achieving effective sustainability gains in the next 85 years" (n.p.). New policies and technologies which reduce the consumption of natural resources, the authors suggest, might go a long way to prevent overpopulation from damaging our ecological systems.

Regarding the development of new technologies to help to address overpopulation, or at least to reduce its environmental effects, some scientists propose a different model to that offered by Malthus. For example, biologist Erle C. Lewis argues that Malthus's theory fails to consider the effects of humans and their technology on the world that surrounds them: "The conditions that sustain humanity are not natural and never have been. Since prehistory, human populations have used technologies and engineered ecosystems to sustain populations well beyond the capabilities of unaltered "natural" ecosystems" (n.p.). He bases his point

of view on the ideas of the Danish economist Ester Boserup, whom he describes as the "antidote to the demographer and economist Thomas Malthus" (n.p.). According to Boserup, nature is flexible and full of untapped potential (Mathieu). From such a perspective, "the only limits to creating a planet that future generations will be proud of are our imaginations and our social systems" (Ellis n.p.). Therefore, the possibility of a solution to the population problem depends on both technological advances and our own awareness towards such issues as overpopulation and its effects on the environment. Whether we implement some sort of global birth control, improve our technological systems, or develop new technologies, overpopulation is an issue that will not go away. The consequences of our numbers on Earth can be seen in many of the environmental problems we face today, so we need to consider overpopulation alongside ecology in order to look for possible solutions. The question we may ask ourselves as humans is the same Brooks asks Langdon: Are we willing to sacrifice half the population to save the world? We may not be talking about sacrificing our very lives, but we may need to sacrifice our *way of life* in order to create a sustainable society.

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