

Population and Natural Resource Limits in Global Change

Introduction

With the world's current population at 6 billion, and racing towards 9 billion in the year 2050, we have a great challenge before us to produce enough food for everyone, while still keeping the earth's resources in balance. The two films discussed in this study, "Seed" and "Asparagus", imagine worlds where complete government takeover of food production is in place to meet a population's needs. Both films express a dystopian view of our future, not only related to food production methods, but the high levels of societal control that is required to meet their goals of feeding the world.

Film Overview

The two films chosen for this analysis imagine worlds where the entire process of food production was controlled, and natural organic food is seen as a threat to society. "Seed" is a film set in a time where all food production is highly regulated. Organic seed is considered contraband and moved around in an underground market where there is a resistance to the controlled, genetically modified seed. In this film, the production of food has the highest priority, even above the rights of people and the bonds of family. The young boy has discovered that his father has been dealing in this contraband seed. He felt that his father was now a threat to him, as well as to society, so he reported him to the authorities.

"Asparagus" is a film set in a society that addresses efficient food production using very limited resources by growing food in completely controlled growing chamber. Water and nutrients are all tightly controlled and the main character tends the crops under strict direction of a computer. This is a time and place so far removed from natural food production that the main character had admitted that he "never thought of growing food outside the chamber." The computer used genetic markers to determine the future success of each individual plant. Certain genetic markers raised a red flag and required the "farmer" to enter the chamber and eliminate the offending plant. This is solely based on the predictive power that the knowledge of the genetic markers gives, even though the plant with those offending genetic markers might actually continue to grow to be a successful plant. The social impacts of this policy is disturbing as a standard first date is to compare the genetic makeup of the two young lovers, and through a computed predictive process, play out an expected outcome of their relationship. Ultimately, their friendship would be over before it begun, much like the life of the offending plant.

Population

The movie "Seed" explores a world where there has been "Food Riots". In this film, the loss of life in the Food Riots was so great and overreaching that much of the population was affected. This could easily be the way food shortages play out in the coming decades, if we do not solve our food shortage problem.

The global population has grown from 1.6 billion in the year 1900 to 6.1 billion in the year 2000. The population is expected to increase to 9 billion by the year 2050. In 1972, the think-tank known as the Club of Rome used computer modeling to predict possible outcomes of increasing populations and decreasing resources. Their published book "Limits to Growth" predicted a major crash in population due to the limit of food production. In 2009, Day and Hall published a study called "Revisiting the Limits to Growth" which evaluated the predictions published by the Club of Rome. The predictions compared to the actual data in 2008 for Population, birth rate, death rate, resources and pollution were surprisingly close. The Club of Rome predicts a crash in the near future where food and resources per capita drops off significantly, and after some time, the population rapidly drops off. That day has yet to come, and the challenge is upon us to meet the needs of the projected 9 billion people.

Natural Resource Limits

In the film "Asparagus", all food production is controlled in "growing chambers" which could be an interesting solution for the problem of limited fresh water and controlling nitrogen fertilizers from polluting the oceans.

Rockstrom et al, has created a model where there are nine planetary boundaries, 3 of which we have passed the limits. We have passed the limits of the Nitrogen cycle due to farming and fertilizing practices, biodiversity loss as the current extinction level is 100 times the background levels, and

climate change. Freshwater as a planetary boundary is in jeopardy. This is a limited resource that is critical to meeting the food production needs of our growing population. The disappearance of the Aral Sea to meet the crop irrigation needs of a country is a dramatic example of mismanagement of fresh water used for irrigation. Rockstrom states that we do not have the luxury of concentrating on one boundary over the others as they are all interconnected. If we surpass one limit, then the others are at risk.

Social Impacts

Principle 1 of the UN Rio Declaration, otherwise known as *Agenda 21*, states "*Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.*" This is going to be a difficult challenge to meet, as the definition of *harmony with nature* is subjective, and will evolve as the population moves towards the projected 9 billion.

Both filmmakers envision worlds where this Principle is compromised in one way or another. "Seed" shows a society that puts the "rule of law" above the rights of the individual. This is not a world where the people are *entitled to a healthy and productive life*. In the film "Seed", the father was executed on the spot after being turned in. "Asparagus" creates a world that is not allowed to evolve naturally. In this world, people are no longer in charge of their destiny, and this is a great loss in the overall human experience.

Both of the films predict a society that blindly follows direction. Most of the characters in the films act for the good of the society, not for their own benefit. Contrary to this, current business practices show that rights of the individual are more important than the good of the many. This is demonstrated by over-fishing stocks in the oceans, oil and gas drilling for profits valued above ecosystem health, or the Arizona senator that presented a bill to outlaw support of *Agenda 21* that

would “protect the citizens of Arizona of encroachment by international institutions”. These examples show that the future will not be as simple as setting rules and limits on what kind of food to grow and how to grow it. Over-reaching governments will be challenged every step of the way, as was demonstrated during the Boston Tea Party in the year 1773, so any success in our future will come not entirely from new regulation, but from a consensus of many individuals.

Future Projections

Raskin et al’s “Great Transition” presents three scenarios of future global change, *Conventional Worlds*, *Barbarization*, and *Great Transitions*. *Conventional Worlds* assumes that the current situation continues and evolves without a sharp discontinuity or fundamental transformation. *Barbarization* is the predicted future where the unmanaged problems put the entire world into crisis eventually falling into anarchy or tyranny. *Great Transitions* envisions major changes in the values and principles of society happening in a way that emphasizes the quality of life and human solidarity.

Each of these films imagines a different future scenario. “Seed”, set in a world after a major breakdown of society, displays the possible outcome of *Barbarization*. “Asparagus”, which shows a great leap forward in the use of technology, displays a possible outcome of *Great Transition*. Both filmmakers envision the future quite differently from each other, but both are plausible outcomes based on population and resource projections.

As the population continues to grow, and the limits of our natural resources are tested, we need a broad consensus of social and natural scientists to provide guidance to future decision making. The Millennium Ecosystem Assessment (MA) called for by the United Nations is a positive step forward to the *Great Transition* that is the desirable future for our earth. We can change the economic background, for example, externalities such as the depletion of ocean fish stocks must have a direct cost associated.

Summary

We have great challenges ahead of us, and the solutions are not laid out in a clear path. We must work together with global consensus, but we should avoid the loss of individual liberties. New ideas are emerging that can bring people and countries to agreement, the work of Elinor Ostrom being one example. Ultimately, the good ideas can be shared globally so that every community, city, state and country can benefit from the shared knowledge of how to solve the issues of food production, while maintaining the balance of the health of the environmental systems.

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