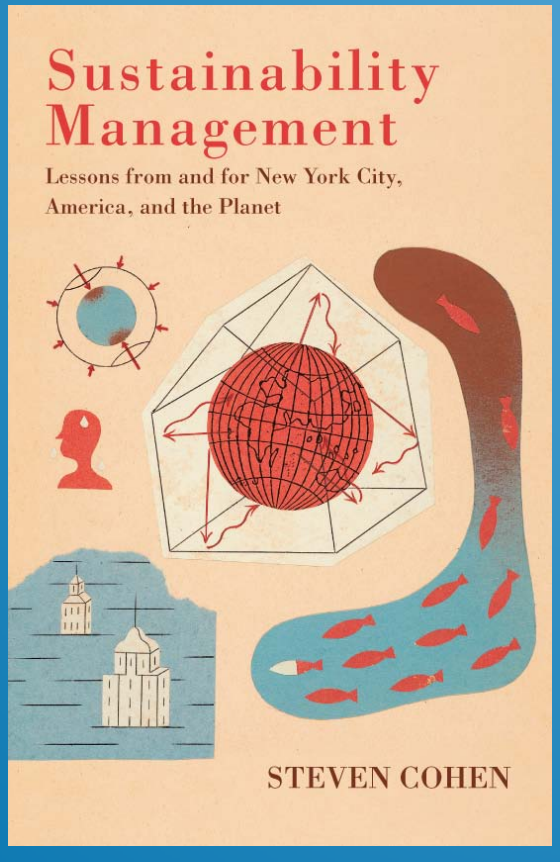
SUSTAINABILITY MANAGEMENT: Lessons from and for New York City, America, and the Planet



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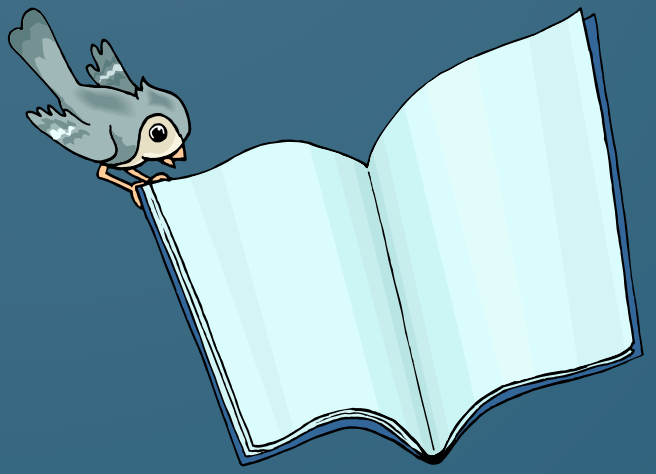
Today We Will Discuss:

1. The Goals of "Sustainability Management"
2. What is the Definition of Sustainability Management?
3. Is it Feasible? Can We Manage Our Way to Sustainability?
4. What are the Prerequisites of Sustainability?
5. What are the Technical, Managerial, and Political Challenges of Sustainability?
6. What are the Fundamental Issues of Sustainability?
7. Sustainable Manufacturing and Businesses
8. Renewable Energy
9. Sustainable Water
10. Sustainable Food Supply
11. Sustainable Cities
12. A Sustainable Planet
13. Conclusions



1. The Goals of "Sustainability Management"

- The goals of this book are:
  - To use everything we know about organizations to make the implementation of environmental protection policy more efficient and effective.
  - To eliminate the misconception that there must be a trade-off between environmental protection and economic growth.

- To answer the question: can we grow our world economy, open up opportunity to the poorest of the poor, and manage to keep the planet intact?

1. The Goals of "Sustainability Management" (Cont.)

- The idea behind this book is to survey the concept of sustainability as it is thought of in a number of arenas, including sustainable manufacturing, energy, water, food supply, cities and the planet.
- For each of these issues I consider the key:
  - technological challenges,
  - financial, organizational and management challenges,
  - and the role of government and public policy.

2. What is the Definition of Sustainability Management?

- What is Sustainability?
  - From the 1987 Commission on Environment and Development, or the Brundtland Commission:

"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

- Sustainability management is the use of organizational management practices to result in sustainable development.
  - Economic production and consumption that minimizes environmental impact and maximizes resource conservation and reuse.

2. What is the Definition of Sustainability Management?(Cont.)

- Characteristics of Sustainability Management:
  - Thinking in the long-term instead of focusing on weekly, quarterly or daily reports.
  - Effective management is sustainability management because physical constraints and the environment are increasing inputs to organizational decision making.
  - Lower resource demand means lower production costs.
    - Maximizing sustainability is maximizing revenue.

3. Is It Feasible? Can We Manage Our Way to Sustainability?

- Is there enough capacity to produce the food, energy, water, air and biological necessities required to sustain human life while maintaining a healthy planet?
- Managing the planet is beyond our current capacity.
  - But the goal of the field of sustainability management is to develop the ability to do so.
- We need sufficient:
  - Natural resources,
  - Technology,
  - Management, and
  - Organizational capacity.

4. What are the Prerequisites of Sustainability?

- We have the potential to begin a sustainable, green economic era if we meet the following prerequisites:

- Peace: we must reduce the destructive elements of competition between nations and people.

- Population and Poverty: ending poverty would end population growth and reduce the environmental stress caused by overpopulation.

4. What are the Prerequisites of Sustainability? (Cont.)

- Energy: develop a renewable, non-fossil fuel-based energy economy in order to reduce damage to the ecosphere.

- Ecological Footprint: learn how to reduce the damage we do to our environment.
  - Most of the world's population now lives in cities. This might help us preserve surrounding natural environments.

5. What are the Technical, Managerial, and Political Challenges of Sustainability?

- We need new technologies for:
  - Water: an increasingly rare resource that must be distributed, processed and used efficiently.
  - Waste: we must learn to clean sewage and other waste, treating it as a reusable commodity instead of as a residue.
  - Food: must be mass-produced; however, we must retain the capacity for re-growth and regeneration.
  - Energy: solar energy or clean nuclear energy.

5. What are the Technical, Managerial, and Political Challenges of Sustainability? (Cont.)

- **The implementation of new technology:**
  - Specific measurements of the planet's conditions will help us identify problems and the success or failure of new solution-seeking technology.
    - Current earth observation measures are insufficient.
  - Public policy will be needed to ensure that sustainability technologies are put into use throughout the world.
    - New technologies take time to adopt; incentives are needed to accelerate adoption.

5. What are the Technical, Managerial, and Political Challenges of Sustainability? (Cont.)

- Funding is necessary for the development of new technologies. But where will it come from?
- There are many examples of successful government funded technologies that built private businesses:
  - Internet
  - Cell phones
  - Laptop computers

5. What are the Technical, Managerial, and Political Challenges of Sustainability? (Cont.)

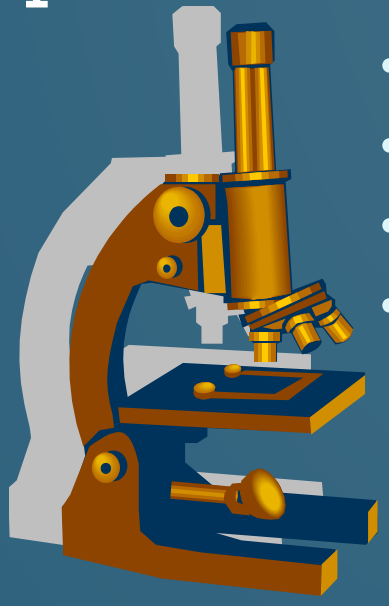
- Adopting new technologies into human organizations will be a challenge.
  - Many services and goods are built on non-sustainable technologies.
  - Standard operating procedures are persistent and slow to change.

5. What are the Technical, Managerial, and Political Challenges of Sustainability? (Cont.)

- Requirements of sustainability management in companies:
  - Incentives to change behavior
  - Resources to pay for incentives
  - New thinking about resource use and waste
    - Integrating sustainability into strategy
    - Understanding integrated systems
    - Collaborative innovation with stakeholders
    - Valuing the long-term
    - Measurement and reporting

5. What are the Technical, Managerial, and Political Challenges of Sustainability? (Cont.)

- Policy is often made with short-term goals in mind. Sustainability requires long-term thinking.
- Comparing scientific methods to the policy process:



- Science tests hypotheses to answer questions.
- Policy tries to make a problem less bad.
- It is rarely a linear problem-solving process.
- The problems assigned to public policy are more complex and involve more variables than scientific problems.

5. What are the Technical, Managerial, and Political Challenges of Sustainability? (Cont.)

- There is a lot we do not know about solving sustainability issues – we must adopt an aggressive trial and error strategy.
  - Politics often punishes uncertainty and makes it difficult to confess errors.

- Measuring results and taking corrective action when mistakes are made is crucial.
  - Though difficult to "spin"

6. What are the Fundamental Issues of Sustainability?

- We will next examine how best to tackle fundamental sustainability issues:
  - Sustainable Manufacturing and Services Businesses
  - Renewable Energy
  - Sustainable Water
  - Sustainable Food Supply
  - Sustainable Cities
  - A Sustainable Planet

7. Sustainable Manufacturing and Services Businesses

- Sustainable businesses try to reduce costs by producing goods and services with minimum resources and waste.
- Eliminates the preconceived trade-off between environment and growth.

7. Sustainable Manufacturing and Services Businesses (Cont.)

- Challenges to Sustainable Businesses include:
  - Much of the technological base required for reuse of resources and products or waste reduction has not been developed. Some of the technology is not fully proven, making companies hesitant to invest.
  - Just as safety was integrated into products, reusability and reduced resource consumption must become design specifications.
  - Newness sells: A piece of equipment made of recycled parts might be seen as lower quality.

7. Sustainable Manufacturing and Services Businesses (Cont.)

- Additional challenges include:
  - Business culture is organized around short-term revenues, expenses, and profits, at the expense of long-term sustainability.
  - Many businesses think of wasted resources simply as "the cost of doing business." These organizations will require complete business culture transformations to become sustainable.
- Government has an important role to play:
  - Structure incentives via tax code and disincentives via regulation
  - Act as a consumer of goods and services produced sustainably
  - Fund research and development

8. Renewable Energy

- The U.S. energy system is characterized by large-scale, capital intensive, centralized facilities – some are nuclear and hydro, but most are coal and other fossil fuels.
- These fossil fuels will continue to get more difficult and more expensive to extract.
- Although they may be more costly in the short and middle term, the long-term costs of renewable energy and energy efficiency are lower than those of fossil fuels.

8. Renewable Energy (Cont.)

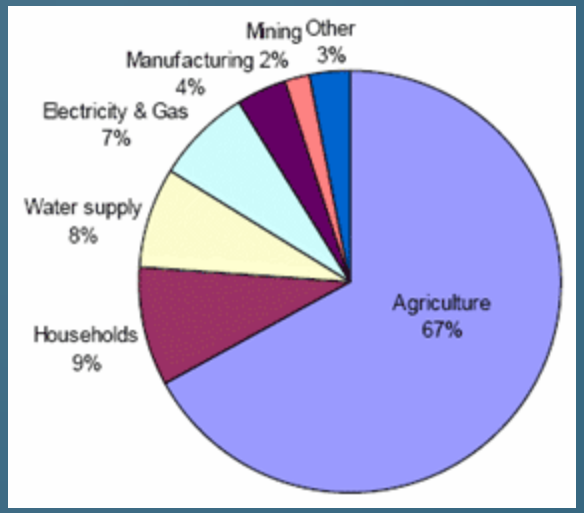
- Issues facing development of renewable energy sources include:
  - Fossil fuel prices are relatively low; they do not include the price of the environmental damage that they generate.
  - The renewable energy industry is still not fully understood or tested, so investor confidence has been slow to develop.

8. Renewable Energy (Cont.)

- Potential solutions include Energy Service Companies (ESCos):
  - ESCos develop, install, and arrange financing for projects designed to improve energy efficiency for businesses over a period of 7 to 21 years.
  - A project's cost is repaid through the dollar savings it generates.
  - ESCos are particularly useful for small businesses without sufficient investment capital.
- Government also has a role to play:
  - Set energy efficiency standards
  - Tax fossil fuels to make their prices reflect the damage they do to the environment and humanity. This will make the renewables market more competitive.

9. Sustainable Water

- Is there enough water?
  - Worldwide, about 70% of the freshwater we use goes to farming, 20% is used by industry and only 10% is used in households
  - The UN projects that two-thirds of the world's population will experience water stress by 2025.
  - Nearly 1 billion people do not have access to drinkable water and over 2.5 billion people do not have access to improved sanitation.



9. Sustainable Water (Cont.)

- Columbia Professor Upmanu Lall and his colleagues divided the water issue into three components:
  - The issue of access to water due to the absence of infrastructure to store, treat, and deliver it
  - The problem of damaged or polluted water
  - The issue of water scarcity resulting from supply and demand imbalances in some geographical settings.

9. Sustainable Water (Cont.)

LIFESTRAW: is a mobile personal filtration system containing filters that make water teaming with typhoid-, cholera- and diarrhea-causing microorganisms drinkable.

- With enough capital and energy, the world's supply of fresh water could be expanded dramatically, but this could be very expensive.
- The filtration of water for re-use and desalinization are technologies that could vastly increase the supply of potable water, but these methods remain unperfected.
- Increasing water productivity would help us work toward a sustainable water supply.
  - Agricultural practices are very wasteful
  - Only 30-40% of water used reaches target plant
  - In part because government subsidies do not take local conditions like water availability into account.

10. Sustainable Food Supply

- While industrial farming feeds a large number of people, it has negative environmental impacts:
  - Industrial farms rely on unsustainable resources that will become depleted: fossil fuels, fresh water, and arable land.

- The planet is capable of growing sufficient food for its ~7 billion people.
  - We must figure out a way to make industrial agriculture more sustainable.
  - Through ecological management, we can start building a sustainable worldwide agriculture system.

10. Sustainable Food Supply (Cont.)

- Large-scale production provides protection from the boom and bust cycle characteristic of family farming.
- The challenge of financing sustainable food is: how can farms make a profit, despite low food prices and difficulty paying back yearly investments, without using environmentally harmful methods?

10. Sustainable Food Supply (Cont.)

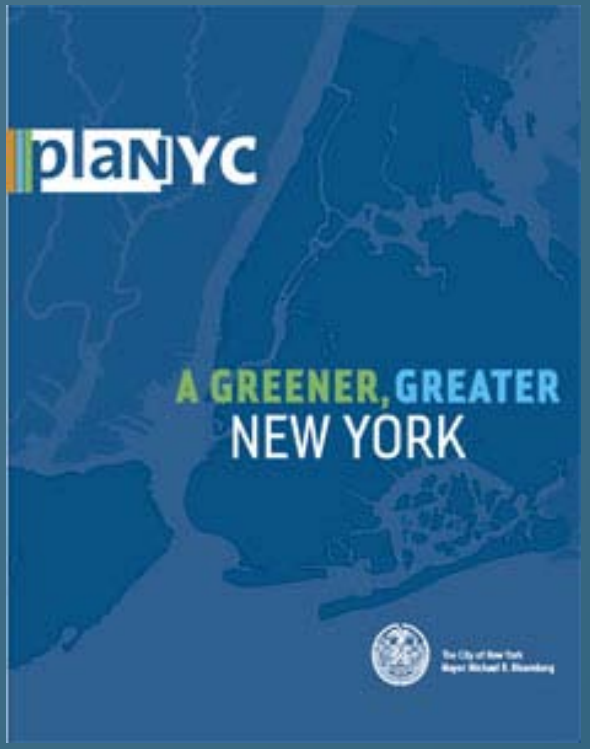
- In order to make agriculture more sustainable, government should play a key role in:
  - Developing energy efficiency standards
  - Developing water use standards
  - Funding basic research and development of agricultural science, engineering, and management
- Government should develop a set of agricultural rules and regulations to manage food markets sustainably.
  - Subsidies need to be reorganized

11. Sustainable Cities

- In addition to the difficulties of implementing sustainable water, energy, food, and business practices, cities are faced with the challenge of sustainable waste management.
- We are getting better at recycling and reusing materials.
- Cities that find ways to reduce the amount of waste that is dumped will face much fewer challenges in the long run.

11. Sustainable Cities (Cont.)

- Some sources of air pollution are local: factories, power plants, and motor vehicles.
- In some places, most air pollution is carried by air currents from distant communities.
  - A city must rely on national and even international policy to ensure high-quality air.
- Still, local land-use policies can improve urban air quality.
- Mass transit, green roofs, tree planting, and parkland reduce pollution. A marketable auto without an internal combustion engine must be designed to further reduce emissions.



11. Sustainable Cities (Cont.)

- Electric car-charging stations, smart grids, sources of renewable energy, energy-efficiency retrofits, and modern water systems require capital.
- The long-term problem is that Americans are undertaxed and do not save enough of what they earn.
- Government must work with the private sector to come up with the massive investments and innovations required.
- Sustainable organizations need to make more money than organizations that don't pay attention to sustainability so that the private sector will take sustainability seriously.

12. A Sustainable Planet

- We need to develop sufficient understanding of earth's system's processes in order to manage them.
  - Creation of an earth observation system.
  - Remote sensing, satellite images, advanced communication, and computational technologies reduce the costs of earth observation.
- We also need to develop renewable energy technology, preserve biodiversity, manage global warming, and treat waste to enable its re-use.
- We need to stop the use weapons of mass destruction, which cause grave environmental damage.

12. A Sustainable Planet (Cont.)

- Our economy can be managed to minimize impacts on water and air quality.
  - The past half-century or so of intense population and economic growth have been matched by dramatic advances in the technology of pollution control.
  - The historic link between economic growth (GDP) and pollution growth was decoupled in the 1980s.
- Resources now spent on management practices that are not sustainable will shift to those that are.
  - Private market forces have already begun these processes, but government must provide further incentives.

12. A Sustainable Planet (Cont.)

- We need leadership by people trained in the field of sustainability management.
  - Most organizational leaders are either lawyers or MBAs; they have no training in the physical dimension of sustainability.
- We need stronger international agreements with respect to environmental standards and investments in the future.
- The idea that an unregulated market can achieve sustainability is absurd.

13. Conclusions

- Can we manage this complexity, or will the modern economy destroy the planet?
  - Local governments have the capacity to deal with local sources of pollution.
  - Developing countries follow the developed world's model and rely on new technologies to try to minimize waste.
  - We possess an increased understanding of technologies and how they affect the world.
  - Someday we will develop technologies that will allow us to exist without natural resources.

13. Conclusions

- What are the key technical, financial, organization, and political challenges we face?
  - The key technological challenge is energy.
  - The key financial challenge is funding the capital cost of the transition to green infrastructure.
  - To develop organizational capacity, sustainability management must replace general management.
  - Short-term, tangible impacts have more political strength while problems like climate change are less politically successful.

13. Conclusion

- What are the odds of success?
  - Current data show that we are headed toward an environmental catastrophe.
  - But the human species is resilient.
    - The issue of environmental sustainability has gained currency over the past fifty years.
    - We will learn from setbacks and even catastrophes and develop the expertise needed to sustain the planet and lift people out of poverty.
    - The younger generations will carry the load of sustainability.