The Systems View of Life
II. Systemic Problems — Systemic Solutions
Ecological Sustainability

A sustainable human community is designed in such a manner that its ways of life, businesses, economy, physical structures, and technologies do not interfere with nature’s inherent ability to sustain life.
Ecological Literacy

Over billions of years, the Earth’s ecosystems have evolved certain principles of organization to sustain the web of life.

Ecological literacy is the knowledge of these principles of organization, or principles of ecology.

BedZED sustainable housing community, London, UK
Principles of Ecology

- One species’ waste is another species’ food.
- Matter cycles continually through the web of life.
- Solar energy drives the ecological cycles.
- Diversity assures resilience.
- Life did not take over the planet by combat, but by networking.

Diagram of ecological web: USDA
Sustainability and Community

Sustainability is not an individual property but a property of an entire web of relationships; it always involves a whole community.
Systemic Problems

The major problems of our time are systemic problems, which means that they are all interconnected and interdependent.
PLAN B 4.0
MOBILIZING TO SAVE CIVILIZATION

LESTER R. BROWN

“Great blueprint for combating climate change.” —Bryan Walsh, Time
Systemic Problems

- demographic pressure
- feedback
- poverty

- falling water tables
- wells going dry
- shrinking forests
- eroding soils
- grassland turning into desert

FAILING STATES
Qualitative Growth

Growth in nature is not linear and unlimited. While certain parts grow, others decline, releasing their components.

Qualitative growth is this balanced, multi-faceted growth that is well known to biologists and ecologists.
Qualitative Growth

Qualitative growth is growth that enhances the quality of life.

In living organisms, ecosystems, and societies, qualitative growth consists in an increase of complexity, sophistication, and maturity.
A New Science of Qualities

The qualities of a complex system are properties that none of the parts exhibit. Qualities arise from the processes and patterns of relationships among the parts.

Quantities can be measured; qualities need to be mapped.
Qualitative Indicators

What we need to assess the health of an economy are Qualitative indicators of poverty, health, equity, education, social inclusion, and the environment — none of which can be reduced to money-coefficients or aggregated into a simple number.
Good Growth and Bad Growth

Bad growth is growth of production processes and services which externalize social and environmental costs, are based on fossil fuels, involve toxic substances, deplete our natural resources, and degrade the Earth’s ecosystems.

Good growth is growth of more efficient production processes and services that involve renewable energies, zero emissions, continual recycling of natural resources, and restoration of the Earth’s ecosystems.
Development

in biology

a fundamental property of life

economic a multi-faceted unfolding

in economics

a measure of

GDP growth
Qualitative Growth
Systemic Solutions
Ecodesign
Systemic Solutions

Systemic solutions typically solve several problems at the same time.

E.g., shift from chemical, large-scale industrial agriculture to organic, community-oriented, sustainable farming would help solve 3 of our biggest problems:

- energy dependence,
- health crisis,
- climate change.
Agriculture and Climate Change

Today, carbon sequestration in soil and plants is the only known and proven strategy that can remove carbon from the atmosphere and, over time, reduce the atmospheric concentration of CO2.
Examples of Systemic Solutions

• Proposals to reshape economic globalization and restructure corporations;

• new forms of ownership that are not extractive but generative;

• systemic solutions to the interlinked problems of energy, food, poverty, and climate change;

• systemic design solutions, known as ecodesign, which embody the basic principles of ecology.
Ecodesign

Design is the shaping of flows of energy and matter for human purposes.

Ecological design is a process in which our human purposes are carefully meshed with the larger patterns and flows of the natural world.

Living machine, water filtration system
Ecodesign

Ecological design principles reflect the principles of organization that nature has evolved to sustain the web of life. This requires a fundamental shift in our attitude toward nature — from finding out what we can extract from nature, to what we can learn from her.
The Ecodesign Revolution

There has been a dramatic rise in ecologically oriented design practices and projects, e.g.

- worldwide renaissance in organic farming,
- organization of different industries into ecological clusters,
- shift to ‘service-and-flow’ economy,
- green architecture,
- hybrid-electric cars, hydrogen fuel cells, etc.
Characteristics of Ecodesign

Ecodesign technologies and projects incorporate the basic principles of ecology:

- small-scale projects with plenty of diversity,
- energy efficient,
- non-polluting,
- community-oriented,
- labor-intensive (plenty of jobs).
Thank you