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Dr. Albert Bartlett's "Laws of Sustainability"

Posted by Gail the Actuary on November 6, 2009 - 10:15am
Topic: Environment/Sustainability
Tags: albert bartlett, sustainability [list all tags]

At the Denver ASPO conference, I had the good fortune to meet Dr. Albert Bartlett. Afterward, Dr. Bartlett e-mailed me some material he had written over the years. The "Laws of Sustainability" were included in this material. They are part of Al Bartlett's contribution to the anthology The Future of Sustainability by Marco Keiner, published in 2006. The document by Dr. Bartlett from which these were excerpted can be found here.

LAWS OF SUSTAINABILITY

The Laws that follow are offered to define the term "sustainability." In some cases these statements are accompanied by corollaries that are identified by capital letters. They all apply for populations and rates of consumption of goods and resources of the sizes and scales found in the world in 2005, and may not be applicable for small numbers of people or to groups in primitive tribal situations.

These Laws are believed to hold rigorously.

The list is but a single compilation, and hence may be incomplete. Readers are invited to communicate with the author in regard to items that should or should not be in this list.

First Law: Population growth and / or growth in the rates of consumption of resources cannot be sustained.

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First Law: Population growth and / or growth in the rates of consumption of resources cannot be sustained.

A) A population growth rate less than or equal to zero and declining rates of consumption of resources are a necessary, but not a sufficient, condition for a sustainable society.

B) Unsustainability will be the certain result of any program of "development," that does not plan the achievement of zero (or a period of negative) growth of populations and of rates of consumption of resources. This is true even if the program is said to be "sustainable."

C) The research and regulation programs of governmental agencies that are charged with protecting the environment and promoting "sustainability" are, in the long run, irrelevant, unless these programs address vigorously and quantitatively the concept of carrying capacities and unless the programs study in depth the demographic causes and consequences of environmental problems.

D) Societies, or sectors of a society, that depend on population growth or growth in their rates of consumption of resources, are unsustainable.

E) Persons who advocate population growth and / or growth in the rates of consumption of resources are advocating unsustainability.

F) Persons who suggest that sustainability can be achieved without stopping population growth are misleading themselves and others.

G) Persons whose actions directly or indirectly cause increases in population or in the rates of consumption of resources are moving society away from sustainability.

H) The term "Sustainable Growth" is an oxymoron.

I) In terms of population sizes and rates of resource consumption, "The only smart growth is no growth." (Hammond, 1999)

Second Law: In a society with a growing population and / or growing rates of consumption of resources, the larger the population, and / or the larger the rates of consumption of resources, the more difficult it will be to transform the society to the condition of sustainability.

Third Law: The response time of populations to changes in the human fertility rate is the average length of a human life, or approximately 70 years. (Bartlett and Lytwak 1995) [This is called "population momentum."]

A) A nation can achieve zero population growth if:
a) the fertility rate is maintained at the replacement level for 70 years, and
b) there is no net migration during the 70 years.

During the 70 years the population continues to grow, but at declining rates until the growth finally stops after approximately 70 years.

B) If we want to make changes in the total fertility rates so as to stabilize the population by the mid - to late 21st century, we must make the necessary changes now.

C) The time horizon of political leaders is of the order of two to eight years.

D) It will be difficult to convince political leaders to act now to change course, when the full results of the change may not become apparent in the lifetimes of those leaders.

Fourth Law: The size of population that can be sustained (the carrying capacity) and the sustainable average standard of living of the population are inversely related to one another. (This must be true even though Cohen asserts that the numerical size of the carrying capacity of the Earth cannot be determined, (Cohen 1995))

A) The higher the standard of living one wishes to sustain, the more urgent it is to stop population growth.

B) Reductions in the rates of consumption of resources and reductions in the rates of production of pollution can shift the carrying capacity in the direction of sustaining a larger population.

Fifth Law: One cannot sustain a world in which some regions have high standards of living while others have low standards of living.

Sixth Law: All countries cannot simultaneously be net importers of carrying capacity.

A) World trade involves the exportation and importation of carrying capacity.

Seventh Law: A society that has to import people to do its daily work ("We can't find locals who will do the work,") is not sustainable.

Eighth Law: Sustainability requires that the size of the population be less than or equal to the carrying capacity of the ecosystem for the desired standard of living.

A) Sustainability requires an equilibrium between human society and dynamic but stable ecosystems.

B) Destruction of ecosystems tends to reduce the carrying capacity and / or the sustainable standard of living.

C) The rate of destruction of ecosystems increases as the rate of growth of the population increases.

D) Affluent countries, through world trade, destroy the ecosystems of less developed countries.

E) Population growth rates less than or equal to zero are necessary, but are not sufficient, conditions for halting the destruction of the environment. This is true locally and globally.

Ninth Law: (The lesson of "The Tragedy of the Commons") (Hardin 1968): The benefits of population growth and of growth in the rates of consumption of resources accrue to a few; the costs of population growth and growth in the rates of consumption of resources are borne by all of society.

A) Individuals who benefit from growth will continue to exert strong pressures supporting and encouraging both population growth and growth in rates of consumption of resources.

B) The individuals who promote growth are motivated by the recognition that growth is good for them. In order to gain public support for their goals, they must convince people that population growth and growth in the rates of consumption of resources, are also good for society. [This is the Charles Wilson argument: if it is good for General Motors, it is good for the United States.] (Yates 1983)

Tenth Law: Growth in the rate of consumption of a non-renewable resource, such as a fossil fuel, causes a dramatic decrease in the life-expectancy of the resource.

A) In a world of growing rates of consumption of resources, it is seriously misleading to state the life-expectancy of a non-renewable resource "at present rates of consumption," i.e., with no growth. More relevant than the life-expectancy of a resource is the expected date of the peak production of the resource, i.e. the peak of the Hubbert curve. (Hubbert 1972)

B) It is intellectually dishonest to advocate growth in the rate of consumption of non-renewable resources while, at the same time, reassuring people about how long the resources will last "at present rates of consumption." (zero growth)

Eleventh Law: The time of expiration of non-renewable resources can be postponed, possibly for a very long time, by:

i) technological improvements in the efficiency with which the resources are recovered and used

ii) using the resources in accord with a program of "Sustained Availability," (Bartlett 1986)

iii) recycling

iv) the use of substitute resources.

Twelfth Law: When large efforts are made to improve the efficiency with which resources are used, the resulting savings are easily and completely wiped out by the added resources that are consumed as a consequence of modest increases in population.

A) When the efficiency of resource use is increased, the consequence often is that the "saved" resources are not put aside for the use of future generations, but instead are used immediately to encourage and support larger populations.

B) Humans have an enormous compulsion to find an immediate use for all available resources.

Thirteenth Law: The benefits of large efforts to preserve the environment are easily canceled by the added demands on the environment that result from small increases in human population.

Fourteenth Law: (Second Law of Thermodynamics) When rates of pollution exceed the natural cleansing capacity of the environment, it is easier to pollute than it is to clean up the environment.

Fifteenth Law: (Eric Sevareid's Law); The chief cause of problems is solutions. (Sevareid 1970)

A) This law should be a central part of higher education, especially in engineering.

Sixteenth Law: Humans will always be dependent on agriculture. (This is the first of Malthus' two postulata.)

A) Supermarkets alone are not sufficient.

B) The central task in sustainable agriculture is to preserve agricultural land. The agricultural land must be protected from losses due to things such as:

i) Urbanization and development

ii) Erosion

iii) Poisoning by chemicals

Seventeenth Law: If, for whatever reason, humans fail to stop population growth and growth in the rates of consumption of resources, Nature will stop these growths.

A) By contemporary western standards, Nature's method of stopping growth is cruel and inhumane.

> B) Glimpses of Nature's method of dealing with populations that have exceeded the carrying capacity of their lands can be seen each night on the television news reports from places where large populations are experiencing starvation and misery.

Eighteenth Law: In local situations within the U.S., creating jobs increases the number of people locally who are out of work.

> A) Newly created jobs in a community temporarily lowers the unemployment rate (say from 5% to 4%), but then people move into the community to restore the unemployment rate to its earlier higher value (of 5%), but this is 5% of the larger population, so more individuals are out of work than before.

Nineteenth Law: Starving people don't care about sustainability.

> A) If sustainability is to be achieved, the necessary leadership and resources must be supplied by people who are not starving.

Twentieth Law: The addition of the word "sustainable" to our vocabulary, to our reports, programs, and papers, to the names of our academic institutes and research programs, and to our community initiatives, is not sufficient to ensure that our society becomes sustainable.

Twenty-First Law: Extinction is forever.

SO WHERE DO WE GO FROM HERE?

The challenge of making the transition to a sustainable society is enormous, in part because of a major global effort to keep people from recognizing the centrality of population growth to the enormous problems of the U.S. and the world.

• On the global scale, we need to support family planning throughout the world, and we should generally restrict our foreign aid to those countries that make continued demonstrated progress in reducing population growth rates and sizes.

• The immediate task is to restore numeracy to the population programs in the local, national and global agendas.

• On the national scale, we can work for the selection of leaders who will recognize that population growth is the major problem in the U.S. and who will initiate a national dialog on the problem. With a lot of work at the grassroots, our system of representative government will respond.

• On the local and national levels, we must focus serious attention and large fiscal resources on the development of renewable energy sources.

• On the local and national levels, we need to work to improve social justice and equity.

• On the community level in the U.S., we should work to make growth pay for itself.

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