



What are some examples of global change?



Active Listening Questions:

- What are some of the categories of global change listed by Dr. Vitousek?

WHAT: What is global change? Global change describes major alterations to Earth, such as warming of the Earth's climate. Climate change, however, is not the only possible form of a global change: other examples can extend to biodiversity loss, changes in the water cycle or nutrient cycles, alterations of landscapes, and more. In this clip from the 1994 presentation "Biological Invasion Overview," Peter Vitousek offers a list of the different categories *he* uses when considering global change. He points out that some of the changes are more certain than others and some have been directly related to human actions.



WHO: Dr. Peter Vitousek is an ecologist and professor at Stanford University, where he has been faculty since 1984. He has a PhD in biology and focuses primarily on nitrogen and phosphorus enrichment in

soils and the impact of invasive species. He is a Senior Fellow of the Woods Institute for the Environment. Dr. Vitousek began college as a Political Science Major but was inspired to change the focus of his studies after reading a Charles Elton book about ecology for an English class.

"MY VIEW OF THE OVERALL GLOBAL CHANGE ISSUES IS THAT THERE ARE A SET OF GLOBAL CHANGES OF WHICH WE'RE CERTAIN THAT ARE CAUSED DIRECTLY BY HUMAN ACTIVITY..."

GLOSSARY TERM: BIOLOGICAL INVASION

When a species move into an area where it was not formerly present and establishes successful colonies, sometimes displacing native species in the process.



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TAKING THE REINS

DISCUSSION QUESTIONS:

Discuss with a friend or record your thoughts in a journal.

- Are there any alterations that Dr. Vitousek lists which you think do not belong in the category of global change? Why or why not?
- Are there any alterations (human caused or natural) that Dr. Vitousek does NOT list which you believe qualify as a global change?

CLIP ACTIVITY: Shaping Influence

Complete this activity in your science journal or discuss with a friend.

1. Take a look at Dr. Vitousek's diagram.
2. Select one of the arrows showing a relationship between a human activity and an example of global change.
3. Make a list of ways that humans could change their behavior to either increase their impact (make the arrow thicker) or diminish their impact (make the arrow thinner).

Biological Invasion as a Global Change

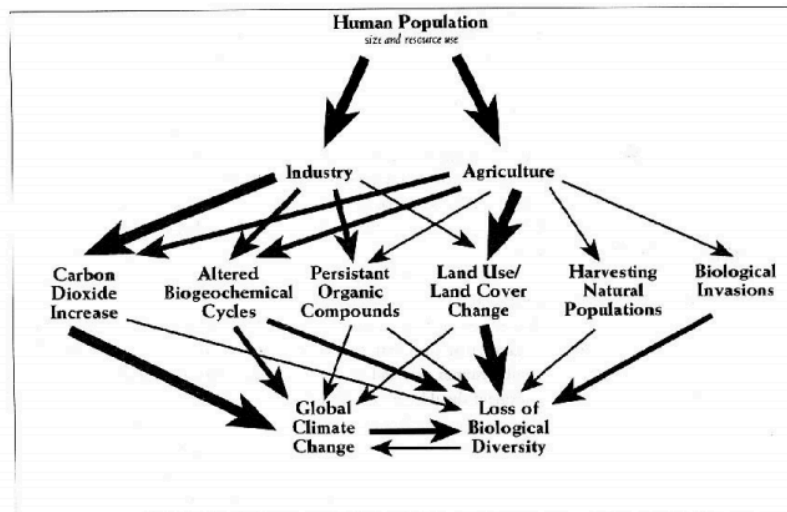


Figure 2.1. Components of global environmental change. Growth in the size of and resource use by the human population is expressed through growing industrial and agricultural activities. These have caused a set of relatively well-documented global environmental changes (well-documented both in the sense that they are occurring, and in that they are human-caused), including increasing concentrations of carbon dioxide in the atmosphere, the production and distribution of novel and persistent compounds such as chlorofluorocarbons (with their attendant effects on stratospheric ozone), and PCBs, global-scale alteration of the biogeochemical cycles of nitrogen, sulfur, and other elements, changes in land use and land cover, the removal of top predators from most terrestrial and many marine ecosystems, and biological invasions by exotic species. These components of change interact, also they will drive changes in global climate and losses of biological diversity. After Vitousek (1994).

FURTHER READING:

Vitousek, Peter. "Biological Invasion as a Global Change." Biological Invasion as a Global Change. Ed. Susan Joy Hassol. *Elements of Change Series*. Aspen Global Change Institute p.66-67.