

Sustainability and Food Security

Agriculture is not a wholly benign actor on the environment, as it causes accelerated soil erosion by water and wind, through cultivation, and often introduces nitrates and other chemicals into water supplies through the application of chemical fertilizers and pesticides. The concept of "sustainable agriculture" endeavors to reduce chemical inputs and energy use in farming systems, in order to minimize environmental damage and to ensure longer-term productivity. Most agricultural assessments of global environmental change made to date have not focused explicitly on sustainability issues, and have neglected the considerable impacts of shifting agricultural zones, alterations in commercial fertilizer and pesticide use, and changes in the demand for water resources.

Climate change can impact agricultural sustainability in two interrelated ways: first, by diminishing the long-term ability of agroecosystems to provide food and fiber for the world's population; and second, by inducing shifts in agricultural regions that may encroach upon natural habitats, at the expense of floral and faunal diversity. Global warming may encourage the expansion of agricultural activities into regions now occupied by natural ecosystems such as forests, particularly at mid- and high-latitudes. Forced encroachments of this sort may thwart the processes of natural selection of climatically-adapted native crops and other species.

While the overall, global impact of climate change on agricultural production may be small, regional vulnerabilities to food deficits may increase, due to problems of distributing and marketing food to specific regions and groups of people. For subsistence farmers, and more so for people who now face a shortage of food, lower yields may result not only in measurable economic losses, but also in malnutrition and even famine.