Logistic Growth Encyclopedia Article

Logistic Growth

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Assuming the rate of immigration is the same as emigration, population size increases when births exceed deaths. As population size increases, population density increases, and the supply of limited available resources per organism decreases. There is thus less food and less space available for each individual. As food, water, and space decline, fewer births or more deaths may occur, and this imbalance continues until the number of births are equal to the number of deaths at a population size that can be sustained by the available resources. This equilibrium level is called the **carrying capacity** for that **environment**.

A temporary and rapid increase in population may be due to a period of optimum growth conditions including physical and biological factors. Such an increase may push a population beyond the environmental carrying capacity. This sudden burst will be followed by a decline, and the population will maintain a steady fluctuation around the carrying capacity. Other population controls, such as predators and weather extremes (**drought**, frost, and floods), keep populations below the carrying capacity. Some environmentalists believe that the human population has exceeded the earth's carrying capacity.

Logistic growth, then, refers to growth rates that are regulated by internal and external factors that establish an equilibrium with **environmental resources**. The sigmoid (idealized S-shaped) curve illustrates this logistic growth where environmental factors limit **population growth**. In this model, a low-density population begins to grow slowly, then goes through an exponential or geometric phase, and then levels off at the environmental carrying capacity.

See Also

Exponential Growth; Growth Limiting Factors; Sustainable Development; Zero Population Growth