Biological robustness is a property of biological systems. It allows a biological system to maintain its structure and functions despite external and internal perturbations. The external environment is changing constantly. The stability of internal environment of biological systems is beneficial to its survival. Ecological fragility is an inherent property of an ecosystem that is sensitive to and self-recovering from external disturbances at specific spatial and temporal scales. Thus, sensitivity is an integral part of fragility, and fragility is the result of the superposition of sensitivity and self-resilience.

The study of scientific robustness is the ability of a system or group, or even an individual to resist or overcome adverse conditions. Contemporary as the life sciences, the object of study of this complexity science, naturally must be from the macroscopic Earth's biosphere, to human-centered biological robustness research, the content mainly contains genetic robustness and environmental robustness of the basic science of complexity research. Based on classical and cytogenetic knowledge, crop scientists in the field of agronomy may search through thousands of plants in the field year after year by visual observation, and find the excellent individual plants with large spikes and large seeds (thousand grain weight/group genetics), which can be used as experimental cross breeding material for the selection of good varieties in the traditional sense of agronomy. In essence, this is the screening process of good C3 plant varieties for photosynthesis of field crops at the visual level, for example, the so-called "South Yuan and North Li" in China - the high-yielding hybrid rice of academician Yuan Longping in Hunan Province in the south and the high-quality high-yielding wheat of academician Li Zensheng in the north are based on the reasonable combination of screening C3 plant With the help of physicochemical technology, we have selected excellent varieties with good genetic robustness and environmental robustness. It has made a great contribution to the food security production in China.

At the beginning of reform and opening up, China's fishery production was mainly based on fishing, but with the increasing demand for aquatic products, the fishery resources were depleted, and people started to switch from fishing to aquaculture, and aquaculture gradually emerged and developed rapidly. The aquaculture industry has experienced five industrial waves of algae, shrimp, fish, shellfish and ginseng, and the total output of aquatic products in the country reached 64,615,200 tons in 2014, of which 18,126,500 tons were mariculture, accounting for 28.06% of the national aquatic products output. Marine aquaculture species are fish, shellfish, crustaceans (shrimp, crab), algae and so on. Mariculture area accounts for 27.49% of the total area of aquaculture in the country. With the continuous development of mariculture, the islands around some coastal cities in China, such as Changshan Islands in Dalian, Liaoning Province, Miaodao Islands in Yantai, Shandong Province, and Nanao Island in Shantou, Guangdong Province, have become key areas for the development of mariculture. To a certain extent, mariculture has solved the huge pressure on marine resources caused by the shortage of resources, and the expansion of farming scale, the increase of farming quantity and the enrichment of farming species have increased the economic income, but at the same time, it has increased the fragility of island ecosystems. Among the pressures on island ecosystems are: (1) pollution from aquaculture (self-pollution from aquaculture, pharmaceutical pollution, and bottom sediment enrichment pollution); (2) changes in hydrodynamic characteristics; (3) destruction of natural wetlands; (4) changes in island shorelines; (5) genetic pollution and changes in biological communities; and (6) effects of mariculture on island land.

Fragility is the extent to which a species is affected by climate change, and includes three major elements: exposure, sensitivity and adaptive capacity. Exposure is the external factors caused by climate change, such as temperature, rainfall, extreme weather, etc.; sensitivity is influenced by species' own factors, such as interspecific relationships and tolerance, etc.; adaptive capacity is the ability of species to reduce the impact of climate change through their own adjustments, such as the ability to migrate or spread to suitable habitats, plasticity response and evolutionary response, etc. We review the recent approaches to wildlife fragility assessment in the context of climate change, compare the differences in the indicators selected by each assessment method, summarize the treatment of uncertain indicators encountered in the fragility assessment, and the application of fragility assessment results in the adaptation of wildlife to climate change. By summarizing wildlife fragility assessment methods, we aim to provide a reference method for assessing the fragility of wildlife resources in China in the context of climate change.