According to a recent study, India's grain production is vulnerable to climate change, primarily because of the decline in yield of rice crop during extreme weather conditions.

- Researchers from Columbia University in the US studied the effects of climate on five major crops in India: finger millet, maize, pearl millet, sorghum, and rice.
  - These five grains are essential for meeting India's nutritional needs.
  - These crops make up the vast majority of grain production during the June-to-September monsoon season with rice contributing three-quarters of the supply for the season.
- It can be noted that recently, the United Nations' State of Food Security and Nutrition in the World report 2018 said that climate change is already having a negative effect on global agriculture and is driving up the number of hungry people around the world.
- The study, however, found that the yields from grains such as millet, sorghum, and maize are more resilient to extreme weather.
- On the other hand, yields from rice experiences larger declines during extreme weather conditions.
  
  By relying more and more on rice, India’s food supply is potentially vulnerable to the effects of varying climate.

- Therefore, expanding the area planted with alternative grains like finger millet, maize, pearl millet, sorghum can reduce variations in Indian grain production caused by extreme climate.
- The study shows that diversifying the crops that a country grows can be an effective way to adapt its food-production systems to the growing influence of climate change.
  
  It also offers benefits like improving nutrition, saving water, reducing energy demand and greenhouse gas emissions from agriculture.

- Of late, there has been growing awareness about these alternative grains, often clubbed as “Smart Food”. Few important developments are:
  - India celebrated 2018 as the national year of millets. Moreover, India's
proposal to observe an **International Year of Millets in 2023** has been approved by the Food and Agriculture Organisation (FAO).

- **ICRISAT** which conducts research on six highly nutritious drought-tolerant crops, recently discovered important factors for **heat and drought tolerance in chickpea**.