

1. Supercomputing can help India not only in proving its technological capacities but also in planning for growth. Explain uses of supercomputing in context of above statement. What are the recent initiatives of Government of India in the field of supercomputing?

Answer:

- A supercomputer is a computer with a high-level computational capacity compared to a general-purpose computer.
- In a world, where the might of a nation is more a function of its hold on technology, India has continuously endeavoured to work on cutting edge supercomputing

Agricultural planning

- A paradigm shift is occurring within the agricultural sciences, owing to the genomics-based data explosion and concurrent computational advances.
- In New Delhi, ASHOKA – short for Advanced Super-computing Hub for OMICS Knowledge in Agriculture – was established at the Centre for Agricultural Bioinformatics (CABin) as the first supercomputing hub for Indian agriculture
- Apart from this supercomputing can be used in precision farming, complex weather forecasting and crop management, drought prediction, documenting and protecting plant genomics

Environment and Biodiversity planning**Emission reduction:**

- GE used a supercomputer to reveal a new aspect of turbine behaviour that is already providing GE with a competitive advantage in fuel efficiency. Every 1% reduction in fuel consumption saves users of these products \$2 billion/year.
- Automotive and engine manufacturers are using high performance computing to develop next- generation engines that use less fuel. These fuel savings are estimated at more than \$1 billion per year.

Disaster management

- **Forecasting disasters:** Seismic simulations are used to generate advanced hazard maps and developed software that significantly advances this map-making ability. The potential saving is in billions of dollars in preventing property loss/damage, along with protecting lives
- Supercomputing can significantly improve tropical cyclone intensity prediction

Economic planning

- Decision support system to aid in the management of the national economy by analyzing trends and statistics. e. g Chilean project “cybersyn”
- By calculating shortest path method, transportation cost and delivery time can be drastically reduced (enhancing competitiveness)
- Monetary and fiscal policy formulation: The high computing and analytic power of Super computers can be used in evidence based policy formulation. e. g to keep

check inflation in economy, super computers can be fed with factors and indices to generate appropriate policy rates.

- The information would also be input into economic simulation software that the government could use to forecast the possible outcome of economic decisions.
- Sophisticated operations room would provide a space where managers could see relevant economic data, formulate responses to emergencies, and transmit advice and directives to enterprises and factories in alarm situations by using the telex network.
- Researchers are using simulations to decrease the materials scrapped during the continuous casting process. Decreasing the material scrapped due to defects such as cracks, even by a small percentage, results in a large net savings to steel manufacturers and customers

Energy security: The low-cost, post-processing system powered by supercomputing, reduces the need for observation wells and has demonstrated commercial success in oil and gas recovery, carbon capture and sequestration and geothermal energy

Government initiatives

- The government in 2015 approved launch of National Supercomputing Mission to connect national academic and R&D institutions with a grid of over 70 high-performance computing facilities.
- The NKN is another program of the government which connects academic institutions and R&D labs over a high speed network and develop by using these facilities applications of national relevance.
- The Mission also includes development of highly professional High Performance Computing (HPC) aware human resource for meeting challenges of development of these applications.

Given the complexity, volume and dimensions of developmental planning, India needs to harness the power of supercomputers to enhance quality, improve speed of its planning process. Along with the above mentioned steps, Government along with private sector should invest more in R&D infrastructure to give our young aspiring scientists to develop more powerful indigenous Super computers. At the same time more application workshops are conducted, involving different stake holders, so that the huge potential of Supercomputers can be fully realized.

PRACTICE QUESTIONS

Answer the following Questions

1. NAPCC, almost 10 years old and formulated with lofty objectives, has not served as the best answer to cope with the impacts of climate change. Critically discuss. (150 words)
2. Proliferation of nuclear weapons and the threat of their use are key concerns for global security nonetheless existing international arrangements seem to be ineffective. Comment. Also, identify the salient features of India's policy in this context and discuss whether India should join the NPT in the current form. (150 words)