Biography of Vikram Sarabhai For UPSC

The pioneer of Space research in India and a notable physicist, Vikram Sarabhai, has made remarkable contributions to the astronomical and nuclear fields of India. Known as the “Father of the Indian Space Program", his contributions have created a profuse reverence in Indians for science and scientific fraternity.

His life was a rare combination of a genuine passion for science and sustained interest in other fields like dance, theatre, and music. His potential was unmatched by any scientific brain the country has ever seen. He ran the Atomic Energy Commission (AEC) and Indian Space Research Organisation (ISRO) as the premier scientific institutions of India.

This topic has a high chance of being asked from the Science & Technology Notes for the UPSC Exam.

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Early Life

- He hailed from the prominent Sarabhai family of industrialists who were part of Indian Independence. His parents were Ambalal Sarabhai and Sarladevi Sarabhai. His family had an enlightened outlook and refined attitude towards culture and education. Their warm demeanor and progressive mindset made their home a living space for many prominent people, including political leaders, freedom fighters, and social workers. It included Mahatma Gandhi, Rabindranath Tagore, J. Krishnamoorthy, Motilal Nehru, Jawaharlal Nehru, Maulana Azad, Sarojini Naidu, Srinivasa Sastri, and C.F Andrews.

- They lead a simple life without much luxury and pomp. His parents wanted their children to be productive, honest, and lead a well-anchored life. Vikram received his elementary education from the Montessori system. The Sarabhai family followed Jainism and were ritualistic. They enthusiastically participated in the freedom movement and were a part of the Dandi march led by Mahatma Gandhi.

- The foundations of his intellectual career were laid in Retreat school. After completing his Matriculation, he joined Gujarat College, the first college in the state started by the British. Vikram was fond of Sanskrit poetry, particularly the works of Kalidasa, including Meghadootam and Vikramorvasiyam. He pursued his higher education at Cambridge University with a letter of recommendation from Rabindranath Tagore. After completing his undergraduate courses in Physics and Chemistry, he returned to India and joined the Indian Institute of Science (IISC). At IISc, he researched Cosmic rays and had serious interactions with C.V.Raman, the first Nobel

laureate from India. He also met another stalwart from Cambridge, the founder of India's Atomic Energy Programme, Homi.J.Bhabha.

- In August 1942, he married Mrinalini Swaminathan, sister of Captain Lakshmi Sehgal of Subhash Chandra Bose's Indian National Army.

- In 1943, Vikram studied Cosmic rays at high altitudes in Kashmir and shifted his topic of research to "time variations of cosmic rays".In 1945, after the end of the Second World War, he returned to Cambridge and completed his Ph.D. Degree.

- Vikram always believed that India has the potential to build anything, tackle any problems, or solve anything through technology and science. To tailor the needs of society, he advocated the replacement of obsolete technologies with new ones. He prompted people to acquire necessary skills from foreign lands and apply that knowledge within the country.

Early Organisational activities

- Things were not easy in the early years of the Indian Space Program. In an age of unsophisticated enthusiasm for technology, Sarabhai, with his scientific eminence and disarming personality, strived his best for upgrading the scientific temper of the country. He tried different combinations of skills, new institutional arrangements, and aspects to deal with problems he was interested in.

- He planned to create a nuclear centre for agriculture, with the competence of both agricultural scientists and nuclear scientists, along with the resources and assistance of the Indian Council of Agricultural Research.

- He also started a joint venture between All India Radio and ESCES (Experimental Satellite Communication Earth Station) to promote television as an instrument of mass communication and increase the production of food. These novel institutional structures challenged the traditional models of problem-solving in India.

Swastik Mill

- He opted to solve industry-related problems scientifically. In the oil seeds market, he calculated the market prices of ground nuts and seeds and graphically plotted them to obtain a statistical analysis. The application of research methodology to analyse the data and marketing activities garnered fruitful results and contributed towards making a strong organisation.

- He applied human relations techniques and solved the problems between the employees and management.

Sarabhai chemicals

- Despite the presence of top names in the pharmaceutical industry, like Ranbaxy, Cipla, Cadila, Glaxo, and Pfizer, Vikram launched professionally managed Sarabhai chemicals. He collaborated with J.R Geigy, the manufacturer of the whitening agent,' Tinopol', which produced huge profits in the market. Sarabhai chemicals collaborated with a German company and started manufacturing Vitamin C.

Indian Institute of Management Ahmedabad

- Vikram believed that the lack of efficient managers, lacking proper management skills was responsible for the downfall of many public and private industries in India.in 1956, He started Ahmedabad Management Association (AMA) along with Kasturbhai Lalbhai to conduct research and impart training to employees of organisations. This later transformed into the Indian Institute of Management (IIM) in 1962.

- He managed to elevate the institution to the next level through collaboration with the prestigious Cambridge University. Vikram set up this premier management institute amidst the challenges from Ford Foundation, which was along the same path. He handed over the position of director of IIM-A to Ravi Mathai as he got preoccupied with space research and later assumed Homi.J.Bhabha's Atomic Energy Commission (AEC).

International Geophysical Year

- Starting in 1957, the International geophysical year was awaited by the scientific communities with possibilities for the usage of satellites for scientific research. This paved the way for a global multi-centric approach to studying the atmosphere and oceans to explore space more effectively. By then, Vikram has become a part of the International fraternity, along with scientists like Bruno Rossi, James Van Allen, etc.

"Father of Space Program of India"

- The birth of the Space Age of India started with two stalwarts coming together to use science and technology as a tool for national development. Post-Independence, Jawaharlal Nehru, who had a firm conviction that Science and Technology could solve many social and economic problems, supported both of them to pursue their respective path in science.

- He emphasised the importance of the space program through his quote," *There are some who question the relevance of space activities in a developing nation. To us, there is no ambiguity of purpose. We do not have the fantasy of competing with economically advanced nations in the exploration of the moon or the planets or manned space flight*. "

Physical Research Laboratory

- Vikram Sarabhai founded PRL on November 11, 1947, as a National Research Institute for Space and Allied sciences. Aided by the Department of Space and Allied Sciences, the Government of India, it conducts several research programs in Astronomy and Astrophysics, Atmospheric Sciences and Aeronomy, Earth Sciences, Solar System studies, and Theoretical Physics.

- Located in Ahmedabad, it is also involved in the PLANEX Planet research and exploration program. It even gives awards, including Hari Om Ashram Prerit Vikram Sarabhai Research Award and PRL award to scientists who have exceptional contributions to the field of science and technology.

Indian National Satellite System (INSAT)

- At the Bombay National Electronics Conference in 1970, Vikram Sarabhai announced plans to launch an Indian National Satellite. It was a series of multipurpose geostationary satellites launched by ISRO to boost telecommunication, meteorology, and broadcasting.

- Sarabhai's INSAT was something similar to a direct-broadcast satellite with the purpose of educating villages through television. It was commissioned in 1983 as a joint venture of the Department of Space, Department of Telecommunications, India Meteorological Department, and All India Radio and Doordarshan. Eventually, it became the largest domestic satellite communication system in the Asia-Pacific region.

INCOSPAR (Indian National Committee for Space Research)

- The International Council for Science created a committee on space research known as COSPAR in 1958. This was in response to the launch of Sputnik - 1 by Russia. Homi J Bhabha was entrusted with a responsibility by the Indian government to facilitate research for the Department of Atomic Research (DAE). Bhabha created an Indian counterpart of COSPAR, known as INCOSPAR, with Vikram Sarabhai as the Chairman.

- Vikram organised a six-day seminar in Space Science at the Physical Research Laboratory (PRL) in Ahmedabad.

- By the early 1960s, close ties with the Soviet Union facilitated Space Research in India through the Indian Space Research Organisation (ISRO). This collaboration also allowed the expansion of nuclear power in India even after the Nuclear explosion in Pokhran, Rajasthan.

- Following the death of Homi Bhabha in 1966, Vikaran assumed the position as the Chairman of the Atomic Energy Commission and secretary of the Department of Atomic Energy (DAE).In the 1960s, they established four important institutions. They were:

1. Space Science and Technology Centre (SSTC)
2. Experimental Satellite Communication Earth Station (ESCES, 1967)
3. Sriharikota base (Sriharikota High Altitude Range,SHAR, now renamed as Satish Dhawan Space Centre(SDSC)
4. Indian Satellite System Project (ISSP).

- Vikram Sarabhai modernised ISRO to its present form in 1969. Following that, it managed all the space activities of the country. The Physical Research Laboratory (PRL), the brainchild of Vikram, conducted basic research in myriad fields, including aeronomy, cosmic rays, interplanetary space, and solar activity. TIFR was the cradle of India's Atomic Energy Program.

- A sounding rocket programme was launched with the collaboration of NASA (America), CNES (France), and Hydrometeorological Services (USSR). Bhabha Atomic Research Centre (BSRC), earlier known as DAE, was entrusted with the local manufacturing of rockets.

- The Space Science and Technology Centre (SSTC) was established with the task of developing sounding rockets of superior performance and a modest satellite launcher and aerospace engineering.

Learn more about the background of the Indian National Committee for Space Research here:

Indian Space research Organisation (ISRO)

- Indian Space Research Organisation was established in 1969 by Vikram Sarabhai and continued with its vision of developing new launch vehicles. After the successful development of the Sounding rocket programme in the 1960s, Satellite Launch Vehicle-3 (SLV - 3) and Augmented Satellite Launch Vehicle (ASLV) was launched.ISRO also developed Polar Satellite Launch Vehicle (PSLV) and Geosynchronous Satellite Launch Vehicle (GSLV).

- The headquarters of ISRO is in Antariksh Bhavan, Bangalore, and it was brought under the Department of Space in 1972.

Satellite Launch Vehicle (SLV)

- SLV was a four-stage solid fuel light launcher. It was expected to carry a payload of 40 kg and reach a height of 500m. Launched in 1979, SLV was the dream of Vikram Sarabhai. After its final launch in 1983, it was decommissioned. However, this paved the way for more refined versions in the years that followed.

Augmented Satellite Launch Vehicle (ASLV)

- ASLV was a five-stage solid propellant with the capability of holding a 150 kg satellite. Intending to place payloads in Geostationary Transfer Orbits, ISRO developed ASLV by the end of the 1980s. The first launch test in 1987 was followed by 3 others in 1988, 1992, and 1994. Two of them were successful. However, it was decommissioned later.

Polar Satellite Launch Vehicle (PSLV)

- With the advent of PSLV, India was able to launch its Indian Remote Sensing satellite into sun-synchronous orbits. Until then, only Russia had the technology for the same.PSLV can also launch small satellites into Geostationary Transfer Orbit (GTO). It has successfully launched almost 30 satellites over these years.

Geosynchronous Satellite Launch Vehicle (GSLV)

- GSLV was introduced by India to launch its Indian National Satellite Systems (INSAT) into Geostationary Transfer Orbit. The primary aim behind these was to make India less dependent on foreign rockets. It serves as ISRO's heaviest rocket launch vehicle with a capacity of putting a total payload of up to 5 tons into low earth orbit.

Aspirants can go through the List of Space Centres and Indian Space Agencies from the linked article.

- After assuming charge as the Chairman of the Atomic Energy Commission, he proposed a model of the Agro-Industrial Complex to boost the energy program in India. This plan was augmented by MS Swaminathan, the father of the Green Revolution in India.

- He also participated in the 14th general conference of the International Atomic Energy Agency in Vienna. He played an important role in the development of indigenous nuclear technology for defense. Some of the projects initiated by him include the Fast Test Reactor in Kalpakkam and Variable Energy Cyclotron project in Calcutta.

Read the article on Satellite Launch Vehicle Program and get a better understanding of the Polar Satellite Launch Vehicle (PSLV) and Geosynchronous Satellite Launch Vehicle (GSLV)

Democratic Outlook

- His democratic outlook in companies was highly appreciated. He believed that each employee of his company should get a chance to speak on the prevailing issues, challenges, and competencies. He delegated tasks to every employee and ensured a democratic outlook in every sphere of the organization. He sent his delegates to foreign lands to visit markets, textile mills, and laboratories to acquire new skills and the latest technologies.

Later Years

- He passed away due to cardiac arrest at the very young age of 52 on 30 December 1971.

- He was awarded the second-highest civilian honour of the country, Padma Vibhushan in 1972, and the third-highest civilian honour of the country, Padma Bhushan in 1966.

Important Institutions founded by Sarabhai

- PRL - Physical Research Laboratory in Ahmedabad
- IIM - Indian Institute of Management, Ahmedabad
- CSS - Community Science Centre, Ahmedabad
- Darpan Academy for Performing Arts, Ahmedabad (along with his wife)
- VSSC - Vikram Sarabhai Space Centre in Thiruvananthapuram
- Space Applications Centre in Ahmedabad
- FBTR - Faster Breeder Test Reactor in Kalpakkam
- Variable Energy Cyclotron Project in Calcutta
- ECIL - Electronics Corporation of India Limited in Hyderabad
- UCIL - Uranium Corporation of India Limited in Jaduguda, Bihar

Legacy

- ISRO named the lander of its second mission to the moon, CHANDRAYAAN as ‘Vikram’ in memory of Vikram Sarabhai.

- Vikram Sarabhai Space Centre, the lead centre of the Indian Space Research Organisation, is named after Vikram Sarabhai.

- The Indian Astronomical Union named a lunar crater after Sarabhai “Sarabhai Crater”.

- Vikram A Sarabhai community centre in Gujarat is named after him.

- ISRO has announced an award known as Vikram Sarabhai Journalism Award in Space Technology and Research on its 100th anniversary.

- Vikas, a liquid fuelled rocket engine by ISRO is named after him.

Frequently Asked Questions about Vikram Sarabhai

Is Vikram Sarabhai the founder of ISRO?

After Russia launched the Sputnik satellite, Sarabhai felt the need to have a space agency for India. The National Committee for Space Research was established by the Indian Government(INCOSPAR) on his recommendations, which was later renamed ISRO.

What are the achievements of Vikram Sarabhai in Space Research?

Vikram Sarabhai was a visionary and an outstanding scientist who worked for the development of the nation through the application of modern technology. He was instrumental in setting up the Indian National Committee on Space Research.

Which is the largest centre of ISRO?

Vikram Sarabhai Space Centre (VSSC) located in Trivandrum, is the lead centre of the Indian Space Research Organisation, which manages the design and development of launch vehicle technology.

Where did Vikram Sarabhai begin his research on cosmic rays?

Vikram Sarabhai started his experiments on cosmic rays at the Physical Research Laboratory (PIL) in Ahmedabad in 1947 at the age of 23.

Why is Vikram Sarabhai known as the “father of the Indian Space Programme?

Vikram Sarabhai is known as the “father of the Indian Space Programme” as he pioneered space research in India and his sustained efforts in the field have helped India achieve a place on the International map in space research.

When did Vikram Sarbhai become the chairman of the Atomic Energy Commission of India?

Vikram Sarabhai became the Chairman of the Atomic Energy Commission of India in 1966, following the death of Homi J Bhabha.