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**Vellore Institute of Technology**

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# TRACING THE HISTORY OF SCIENCE DIPLOMACY OF INDIA

In fulfilment of the requirements for the course of

**HUM1024 – India and Contemporary World**

A project report submitted to

**Faculty: Prof. Pooja Raghav**

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## ABSTRACT

Science Diplomacy refers to scientific collaborations among various nations to address common problems and to build constructive international partnerships/relations. It is a subcategory of “new diplomacy” and is an umbrella term for several formal or informal technical, research-based, academic, or engineering exchanges between various countries in the emerging field of global policymaking.

Even though we say it’s a part of “new diplomacy,” forms of science diplomacy have been observed quite far in history. The great voyages of exploration and colonization had brought in science-based diplomacy as a form of diplomacy of influence.

In this report, we elaborated, with the help of research papers and articles, the achievements and policies drafted by India with other countries since the beginning of science diplomacy to the present.

## BONAFIDE CERTIFICATE

Certified that this project report entitled “**TRACING THE HISTORY OF SCIENCE DIPLOMACY OF INDIA**” is a Bonafide work of RASHIKHA AGARWAL – 20BCE1342, PRIYANSH CHAUHAN – 20BCE1374, HARSHIT VERMA – 20BCE1698, A ABINAYA SRI – 20BRS1001 and ANANYA DIKSHIT – 20BRS1016 who carried out the Project work under my supervision and guidance for HUM1024 – INDIA AND CONTEMPORARY WORLD.

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## INTRODUCTION

The emergence of political blocs during the Industrial Era also saw the use of technology to influence less developed countries. By the time we had the Cold War, ideological bloc-based science diplomacy had already taken root in the form of space exploration and the development of fission and fusion reactors and weapons.

The term “Science Diplomacy” was coined near the end of the Cold War to describe the need for new strategic partnerships at the country level to promote issues of global concern, like biosafety. This involved the development of scientific relations between all countries around the globe irrespective of their rivalries or friendships with the participating countries. It encouraged countries to cooperate to the extent that it would avoid diplomatic failures and reduce the risk of conflict.

"Strategic relations between individuals, city-states, and countries have forever been connected here and there to Science and Technology." Polynesian islanders created complex navigational frameworks that permit them to lay out enormous organizations of island states. At the point when eight researchers were aggrieved by the Roman Emperor Justinian, they were invited to Persia for their logical commitments.

The Silk Road extending from Asia to Europe worked with the trading of products including innovations like a Chinese papermaking framework. In the American Revolution, authorities of contradicting powers permitted US and British researchers to move back and forth across battlefronts.

Since World War 2 and the utilization of the nuclear bomb, science tact has become increasingly more to the front of both public and global stages. Science and Technology assumed a basic part not just in the result of World War two however in the ensuing contest between the superpowers during the Cold War. Perceiving the unequivocal linkage between science and diplomacy permits us to decisively saddle the force of science to address worldwide difficulties.

India is one of the world's leading countries in the field of scientific research, ranked as one of the top five in the field of exploration. Our scientists and engineers have played a particularly important role in strengthening our country's diplomacy. Scientific cooperation can improve international relations. It uses international scientific language to unite countries, strengthen relations, and defuse tensions in political contexts.

Science and Technology policies implemented in India are as follows.

- **Scientific Policy Resolution of 1958**
  - It was the principal science policy that generally underscored on fundamental exploration in pretty much every area of science.
  - It additionally put emphasis on creating and making accessible the fundamental foundation for the improvement of scientific research.
- **The Technology Policy Statement of 1983**
  - The policy of 1983 was the second policy that generally centered around the accomplishment of innovative skill and self-reliance.
- **The Science and Technology Policy of 2003**
  - This policy brought the advantages of Science and Technology to the cutting edge and furthermore centered around the speculation expected for innovative work.
  - Further, it accompanies incorporated programs for the financial areas with the public innovative work framework to resolve the public issues and simultaneously make a public advancement framework.
- **Science Technology and Innovation Policy 2013**
  - By 2013, Science, Technology, and Innovation (STI) turned into the significant drivers of public turn of events.
  - This policy guarantees quicker, manageable, and comprehensive advancement of individuals
  - Further, the arrangement centers around the enormous segment profit and the colossal ability pool to characterize the job in accomplishing the public objectives.

## 20<sup>TH</sup> CENTURY

### *Nuclear Technology*



In 1946, Atomic Energy Research Committee was set up with the famous physicist Dr. Homi J. Bhabha as its chairperson. Then, the Indian Atomic Energy Commission (AEC) was formed up on 3 August 1948 under the late Department of Scientific Research under the direct charge of Prime Minister Jawaharlal Nehru. In 1954, the Department of Atomic Energy (DAE) was Established by a Presidential Order with the following mandate :

- Age of safe, monetarily cutthroat power from thermal power by taking advantage of the normal assets of uranium and thorium accessible in the country;
- Working of examination reactors and use of radioisotopes delivered in them for applications in medication, horticulture, and industry;
- Improvement of trend setting innovation in regions, for example, gas pedals, lasers, biotechnology, data innovation and materials including advancement of non-atomic and key materials like titanium;
- Empowering innovation moves and cooperation with industry in region of its solidarity, adding to the modern turn of events;
- Offering help to fundamental exploration in thermal power and related boondocks areas of science, and association with colleges and scholastic establishments to work on the nature of instruction and examination, and giving exploration awards to them;
- Empowering global collaboration in cutting edge areas of examination and in uber science activities to understand the advantages of best in class science and advancements, and
- Adding to public safety.

A resolution passed by the Government of India later replaced the commission by "Atomic Energy Commission of India" on 1 March 1954 under the Department of Atomic Energy with



Homi J. Bhabha as secretary and more financial and executive powers, headquartered in Mumbai, Maharashtra.

In May 1974, India conducted its first successful Nuclear test. "On the morning of May 18, 1974, a nuclear device was detonated in the Rajasthan desert near Pokhran, India." The test was named 'Smiling Buddha' because it was conducted on Buddha Purnima that year. "The Buddha has smiled," Dr Ramanna is learnt to have told then Prime Minister Indira Gandhi after the test.

Prime Minister told a press conference after the test, "There is nothing to get excited about. It is the result of normal research and study. We are committed to only peaceful use of atomic energy."

But international reaction was negative, and Canada cut off virtually all nuclear assistance. The United States also restricted such collaborations and successfully persuaded India not to carry out further nuclear tests at that time. India continued its research and development on nuclear weapons, mostly out of sight of the public. Pakistan, India's longtime rival, accelerated its nuclear program in response.



In 1998, Five Nuclear Test were conducted as a part of the series of Pokhran-II. These Tests were collectively called Operation Shakti-98. Vajpayee was reported to have given the order for the nuclear tests around 8-10 April. On 11 May, Pokhran dessert reverberated with shock waves of Second Round of India's nuclear explosions. It included detonation of three nuclear weapons. Two days later, another test was conducted in underground explosions with two more devices.

It affected India's economic sector heavily. In keeping with its preferred approach to foreign policy in recent decades, and in compliance with a 1994 anti-proliferation law, the United States and Japan imposed economic sanctions on India. China also criticized India's actions saying, "The Chinese government is seriously concerned about the nuclear tests

conducted by India,". China further rejected India's stated rationale of needing nuclear capabilities to counter a Chinese threat as "totally unreasonable".

### *Agriculture Technology*

In 1943, India experienced the world's most obviously terrible recorded food emergency; the Bengal Famine, which prompted the demise of around 4 million individuals in eastern India because of craving.

After Independence in 1947, the population grew at a much faster rate than food production. This called for immediate and drastic action to increase yield. The action came in the form of the '**Green Revolution.**'



In the year 1965, the public authority of India sent off the Green Revolution with the assistance of a geneticist, presently known as the father of the Green Revolution in India, M.S. Swaminathan. The development of this revolution was an incredible achievement and changed the country's status from a food-lacking economy to one of the world's driving horticultural countries. It began in 1967 and endured till 1978.

It was funded by the US and the Indian Government and the Ford and Rockefeller Foundation. The Green Revolution brought about an incredible expansion underway of food grains (particularly wheat and rice) because of the presentation into emerging nations of new, high-yielding assortment seeds, starting during mid-20th century.

Its main objectives were,

- Short term goal was to address the India's hunger during the second Five Year Plan.
- Long term goal included by and large agribusiness modernization in view of rustic turn of events, modern turn of events; framework, unrefined substance and so forth.
- To provide work to both agrarian and modern specialists.

- Producing more grounded plants which could endure outrageous environments and sicknesses.
- By spreading innovation to non-industrialized countries and setting up numerous organizations in major agrarian regions.

It brought about a grain result of 131 million tons in the year 1978-79 and laid out India as one of the world's greatest agrarian makers. "India became independent in food-grains and had adequate stock in the focal pool, even, on occasion, India was in a situation to trade food-grains. The Revolution achieved enormous scope ranch automation which encouraged interest for various sorts of machines like work vehicles, gatherers, harvesters, joins, diesel motors, electric engines, siphoning sets, and so forth.

### *Space Technology*

The DAE provided funding for space research throughout India. The Rangpur Observatory was set up in 1957 at Osmania University, Hyderabad.

Dr. Homi J. Bhabha and Dr. Vikram Sarabhai, saw a dream to use space technology for the development of India. So, with a vision to turn this dream into reality, the Indian National Committee for Space Research (INCOSPAR) was set up in 1962 by PM Nehru on the urging of Vikram Sarabhai. H.G.S. Murthy was appointed as the first Director of Thumba Equatorial Rocket Launching Station from where Sounding rockets were fired marking the start of upper atmospheric research in India.

Slowly and steadily, INCOSPAR grew and finally, because of consistent efforts made by distinct minds, it got converted to ISRO under the administration of Indira Gandhi on August 15, 1969. Later in 1972, a space commission and Department of Space (DOS) were set up to outline space innovation improvement in India explicitly and ISRO was brought under DOS, standardizing space research in India and producing Indian space program into its current structure.

ISRO built India's First Satellite 'Aryabhata' with joint collaboration as a part of Soviet Interkosmos program which was launched on 19 April 1975 through a Soviet rocket.



SLV-3 was sent off in 1979 conveyed a Rohini innovation payload yet couldn't infuse the satellite into its ideal orbit. It was trailed by a fruitful send off in 1980 conveying Rohini Series-I satellite making India the seventh country to arrive at Earth's circle after USSR, USA, France, United Kingdom, China, and Japan.

Appearance of PSLV in 1990s turned into a significant lift for Indian space program. India attempted to acquire upper-stage cryogenic motors from Russian Glavkosmos yet was impeded by United States from doing as such. A new agreement was signed with Russia for 7 KVD-1 cryogenic stages and 1 ground mock-up stage with no technology transfer, instead of 5 cryogenic stages along with the technology and design as per the earlier agreement.

ISRO was under US government sanctions between 6 May 1992 to 6 May 1994. After US refused to help India with Global Positioning System (GPS) during the Kargil war, ISRO was induced to develop its own satellite navigation system IRNSS which is now expanding further.

### *Computer Technology*

Mahalanobis founded the Indian Statistical Institute (ISI) in Calcutta in 1932 and introduced mechanical desk calculators for the first time. In 1943, he also set up the Indian Calculating Machine and Scientific Instrument Research Society to explore the fabrication of such devices locally.

India finally got its first indigenous analog computer (that could solve linear equations with 10 Variables and related problems) in 1953.



Tata Institute of Fundamental Research Automatic Calculator (TIFRAC) was the first computer developed in India, at the TIRF in Mumbai from 22 February 1960 was fully formally christened by PM Jawaharlal Nehru in 1962. TIFRAC made India the first country in Asia to have built such a machine it was a first-generation mainframe computer developed for Scientific Computations.

TIFRAC was a significant milestone in India's progress to make itself self-aligned in the field of electronics. This Technology was also helpful in other scientific fields such as Nuclear Technology, Space Technology and Information and Communication Technology.

Confronted with an innovation forswearing system that denied its academic local area admittance to supercomputers, India set up Center for Development of Advanced Computing (C-DAC) in March 1988 with the reasonable order to foster a native supercomputer to meet rapid computational requirements in tackling logical and other formative issues where quick calculating is a significant part.

Following a particular suggestion of the Science Advisory Council to the Prime Minister (SAC-PM) with that impact, C-DAC was laid out as a logical society of the then Department of Electronics.

India approached the American company Cray, which developed the world's first supercomputer, to buy supercomputers. Due to American policy, Cray sought permission from US government to sell its goods abroad. But the government refused. It believed that India would not use it for research, but for military purposes.

With researchers from everywhere the nation included working their socks off, within three years, C-DAC at long last finished its function admirably inside the proposed cutoff time. With parts that could be paid off the racks, in 1991, C-DAC carried out India's most memorable native supercomputer: PARAM 8000.



Needless to say, the world was shocked at this achievement. A US Newspapers published the news with headline, “Denied supercomputer, Angry India does it!” Soon, PARAM 8000 shocked everyone as it was benchmarked at 5 Glops, making the second fastest supercomputer in the world.



## 21<sup>ST</sup> CENTURY

*"Science knows no country, because knowledge belongs to humanity, and is the torch which illuminates the world. Science is the highest personification of the nation because that nation will remain the first which carries the furthest the works of thought and intelligence."* – Louis Pasteur

### *Nuclear Diplomacy*

1998 Operation Shakti impacted India's Nuclear Development even toward the beginning of 21st 100 years. Steadily, a couple of nations began to lift their authorizations towards India. In August 2000, Russia consented to supply 58 metric huge loads of LEU to India's Tarapur Nuclear power plant which then expanded to 60 tons by 2006. In March 2001, Canada lifted monetary approvals that were forced on India.

Toward the finish of 2001, Japan and US additionally lifted a limited quantity of financial assets and US began to continue military-to-military collaboration. In May 2005, India charged the Weapons of Mass Destruction and Their Delivery Systems Bill because of UN Security Council Resolution 1540.

That year both British and France altered their actions to its approach limitation on India and abbreviated its connection holes. India and Pakistan endorsed to settle on diminishing gamble of mishaps because of Nuclear Weapons.



India laid out four Nuclear units in Kudankulam in the participation with Russia after Indo-US atomic arrangement in 2008. India and Kazakhstan sign a Memorandum of Understanding (MoU) in 2009 under which Kazakhstan gets Indian-made atomic reactors and supplies India with 2,000 tons of uranium.

Same year, India sent off the INS Arihant, its most memorable atomic fueled submarine, which is fit for sending off atomic weapons. It likewise consented to an arrangement with European Union for coordinated effort research on combination energy.

Since India is outside the Nuclear Non-Proliferation Treaty because of its weapons Program, it was for quite a long time to a great extent barred from exchange atomic plant and materials, which hampered its advancement of common thermal power until 2009. Beginning around 2010, a principal contradiction between India's thoughtful responsibility regulation and global shows limits unfamiliar innovation arrangement.

India previously caught the new open doors through the marking of the update of figuring out (MoU) on serene atomic collaboration with upwards of 11 nations by 2011. In April 2015 the public authority gave on a fundamental level endorsement for new atomic plants at ten locales in nine states. Those for native PHWRs are Gorakhpur in Haryana's Fatehabad; Chutka and Bhimpur in Madhya Pradesh; Kaiga in Karnataka; and Mahi Banswara in Rajasthan.

A starter atomic participation arrangement was endorsed among India and Japan which lingered as a restricting component for some, innovation arrangement including GE Hitachi and Westinghouse in December 2015, and following six years of talks a full atomic collaboration understanding was endorsed in November 2016.

The Indian and US state run administrations have called for proceeded with commitment among Westinghouse and NPCIL towards concluding the authoritative courses of action for the six Kovvada units by June 2017.

### *Space Diplomacy*

ISRO sent off its most memorable lunar mission Chandrayaan I in 2008 and furthermore the Mars Orbiter Mission (MOM) or the Mangalyaan in 2014. It is India's first interplanetary mission, making ISRO the fourth space organization to arrive at Mars, after the Soviet space program, NASA, and the European Space Agency. With this, India turned into the first country to make progress in placing a satellite in the Mars circle in its lady endeavor and the fourth space organization and the principal space Asian office to do as such.

In August 2016, ISRO effectively directed the Scramjet (Supersonic Combustion Ramjet) motor test. India is the fourth country to exhibit the flight testing of a Scramjet Engine.

In 2017, ISRO made a world record by sending off 104 satellites in a solitary rocket. It sent off its heaviest rocket yet, the Geosynchronous Satellite Launch Vehicle-Mark III and put the GSAT 19 in circle.



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## *Health Diplomacy*

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Third party administrators were presented by the Insurance Regulatory and Development Authority (IRDA) in 2001, which went about as the connection between the clinics and the organizations and thus permitted the insurance agency to offer credit only offices on their items which doubled in 2003-04.

Beginning around 2009, India has committed no less than US\$100 million to two-sided wellbeing projects in almost 20 nations in south Asia, southeast Asia and Africa.

On March 27, 2014, the World Health Organization (WHO) pronounced India to be liberated from polio, which Bill Gates portrayed as "the best worldwide wellbeing accomplishment that I have seen". The conflict was pronounced as won as the last revealed instance of 'wild poliovirus' in India was in January 2011.

During 2020 - 2021, India has become popular in Vaccine Diplomacy all over the planet because of the creation and conveyance of COVID antibody to low-pay and agricultural nations.

## PRESENT

“Today’s news is Tomorrow’s history.” This quote by Judy Crome specifies the completeness our latest news brings while we are tracing the history of Science Diplomacy. Without adding what has happened recently in this year, we will not be able to complete our timeline of the Science Diplomacy history.

Recently, the outspread of COVID-19 virus has turned the table in the field of Science Diplomacy. The whole world was affected by the “Humanitarian Calamity” during the surge of Corona Virus illness and death in 2020 – 2021. As far as foreign policy, the COVID-19 fiasco expects India to fix its standing for philanthropic help, reexamine its ways to deal with China's rise, and overhaul its procedures for getting its public advantages in a more hazardous world.

### *India’s Vaccine Diplomacy*



India sent off the Vaccine Maitri (Vaccine Friendship) drive - a significant discretionary work to gift and supply made-in-India vaccinations to low-income and developing nations worldwide in January 2021. India is a not kidding competitor in that frame of mind to deliver COVID-19 immunizations as the world's third-biggest maker of drugs.

### *Glasgow Climate Pact – CoP26*

The United Kingdom hosted the 26th UN Climate Change Conference of the Parties (COP26) in Glasgow on 31 October – 12 November 2021. India has promised to cut its emissions to net zero by 2070 - missing a key goal of the COP26 summit for countries to commit to reach that target by 2050. This is quite a significant step for the world's third largest emitter, still getting more than 50% of the country's electricity from coal.

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### *India's Arctic Policy*

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Recently, the Ministry of Earth Science has unveiled India's Arctic Policy, titled 'India and the Arctic: building a partnership for sustainable development' in March 2022. India's Arctic policy titled 'India and the Arctic: building a partnership for sustainable development' lays down six pillars:

- Strengthening India's scientific research and cooperation
- Climate and environmental protection
- Economic and human development
- Transportation and connectivity
- Governance and international cooperation
- National capacity building in the Arctic region.

India's release of its year-long pending Arctic policy, entitled 'India and the Arctic: Building a Partnership for Sustainable Development', has drawn considerable global attention amid growing strategic engagements in the Arctic region in the wake of Russia's invasion of Ukraine.

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### *Virtual Network Centre on Quantum Computing*

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Delegates from India and Finland met in March 2022 and discussed possible areas of co-operation in quantum computing and a roadmap for the collaborative virtual Centre of Excellence (CoE) that has been planned to be set up.

The meeting was held a day after the signing of the Joint Declaration for setting up the Indo-Finnish Virtual Network Centre on Quantum Computing in the presence of the Union Minister of State (Independent Charge) Science & Technology; Minister of State (Independent Charge) Earth Sciences; MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Dr. Jitendra Singh and Visiting Finland Minister of Economic Affairs, Mr Mika Lintila.

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### *India – UK Joint Statement 2022*

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Rt Hon Boris Johnson MP paid an official visit to India at the invitation of Prime Minister of India, Shri Narendra Modi on 21-22 April 2022. The two leaders reaffirmed their desire to strengthen India-UK civil nuclear cooperation and welcomed the UK's renewed collaboration with Global Centre for Nuclear Energy Partnership (GCNEP) for jointly

promoting research and training on nuclear energy studies, radioactive applications, nuclear security and safety. They looked forward to the early conclusion of negotiations on a renewed and strengthened UK-India Nuclear Cooperation Agreement.



They also expressed the shared interest of the two countries in advancing nuclear disarmament and non-proliferation. They noted the productive discussions held at the Space consultations in 2021 to advance bilateral civilian cooperation including on space trade, commerce and international initiatives in the field of outer space including at the UN.



## ARTICLES

## Green Revolution: Creators Still Quite Hopeful on World Food

No Western technology has more intimately influenced the life of the Asian peasant than the science of plant breeding. Farmers from Turkey to the Philippines last year sowed 39 million acres of wheat and an equal area of rice with the high-yield strains developed in research institutes created by the Rockefeller and Ford foundations. The process of replacing traditional varieties of crops is a phenomenon only 10 years old and has engendered not just increased yields but the hope that some-

thing can be done to assist peasant agriculture out of its age-old rut of no-change conservatism.

Yet the green revolution, as it is known, has attracted a crescendo of criticism. Some consider the new seeds serve to make the rich farmers richer and the poor poorer, others that the green revolution is a myth, or only successful when there is an abundance of water and fertilizer. The jump in oil prices and worldwide shortages of fertilizer have not improved the immediate prospects for green revolution agriculture.

How do the creators of the green revolution feel about the process they have launched? Many have contributed but four people have particularly aided the genesis of the new varieties: J. George Harar, first director of the Rockefeller Foundation's agricultural research program in Mexico; Edwin J. Welhausen, the program's corn breeder and Harar's successor as director; Norman E. Borlaug, a forester who became the wheat breeder; and Robert F. Chandler, a soil scientist who, after work in Mexico, set up a similar institute in the Philippines which has done for rice what the Mexican program has done for wheat.

Interviewed recently both Harar and Chandler were zealous in rebutting the critics of the green revolution, their only regret being that the new seeds had not been more widely adopted. In Asia as a whole 35 percent of the rice area and 20 percent of the wheat area were planted with the high-yield varieties in the 1972-73 season.

For Harar, this is not enough: "I feel very frustrated. It's said that if you build a better mousetrap the world will beat a path to your doorstep. We

built a better mousetrap, but people didn't come."

Harar, now retired as president of the Rockefeller Foundation, blames the leadership of developing countries for buying "lighter planes instead of fertilizer." Some political leaders think the green revolution has accomplished its job, he complains. But so far it has only showed the way. It hasn't failed, as the critics allege, but it has not begun to reach its potential.

For Chandler, too, the major problem with the green revolution is why it hasn't been more widely adopted. Chandler retired in 1972 from the International Rice Research Institute (IRRI) that he had set up in the Philippines, but within a month of his retirement had arrived in Taiwan to create a second institute, the Asian Vegetable Research and Development Center. The center already has the world's



Robert F. Chandler, now head of the Asian Vegetable Research and Development Center, during his directorship (1960-1972) of the International Rice Research Institute. (Photo: Rockefeller Foundation)

emphasis first rather than on price for cereals, poultry, and other necessary economic incentives. The Nobel Peace Prize for his work with the new high-yield-



Norman E. Borlaug

ing wheat, describes India's wheat-breeding program as the best in the world. Much has been accomplished in Indian agriculture in recent years and future prospects are good, but achieving self-sufficiency in cereals, India's equivalent to the American battle on the moon, is not proving to be the satisfying achievement it appeared

one thing, it is economic and not nutritional self-sufficiency that has been achieved. Indian agriculture is now producing all the grain the marketplace will absorb at prevailing prices. The problem is that purchasing power among the great bulk of the population is not sufficient to provide nutritionally adequate diets. The new seeds and associated technologies will probably affect more people than any technological advance in history. But in India, as elsewhere, the benefits of these new technologies are not distributed evenly. Farmers with adequate, controlled water supplies are the principal beneficiaries. Five years ago, economic self-sufficiency in cereals appeared to be an end in itself. Against the backdrop of the problems emerging today, it appears only as one step in a long journey toward improvement in the living levels of India's people.

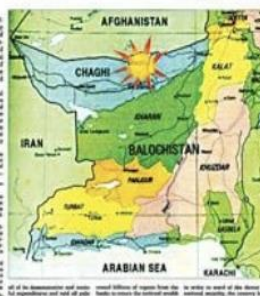
The latter of this remarkable achievement is dimmed by the signs of growing environmental stress: increased crowding and rising unemployment on the subcontinent. The relentless growth of population, now numbering 200 million in India and increasing by 14 million per year, is steadily denuding the continent of natural vegetation. Deforestation in Nepal, where the subcontinent's major rivers originate, is

By M. Hossain

ISLAMABAD, May 25 (Reuters) — Pakistan's Prime Minister Zulfikar Ali Bhutto announced today that his government would support the nuclear test of India.

The prime minister said in a radio address that Pakistan would support India's nuclear test because it was a "natural right" of a sovereign state.

The prime minister also said that Pakistan would support India's nuclear test because it was a "natural right" of a sovereign state.



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FOUNDED BY QUAID-E-AZAM MOHAMMAD ALI JINNAH

**DAWN**

No. 120, 1st Floor, Karachi, India 3, 1000 Pakistan, May 26, 1990 10 Pages Rs 100

ACCOUNT EVENED WITH INDIA, SAYS PM

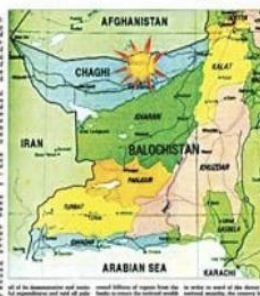
## Pakistan opts to go nuclear

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China regrets

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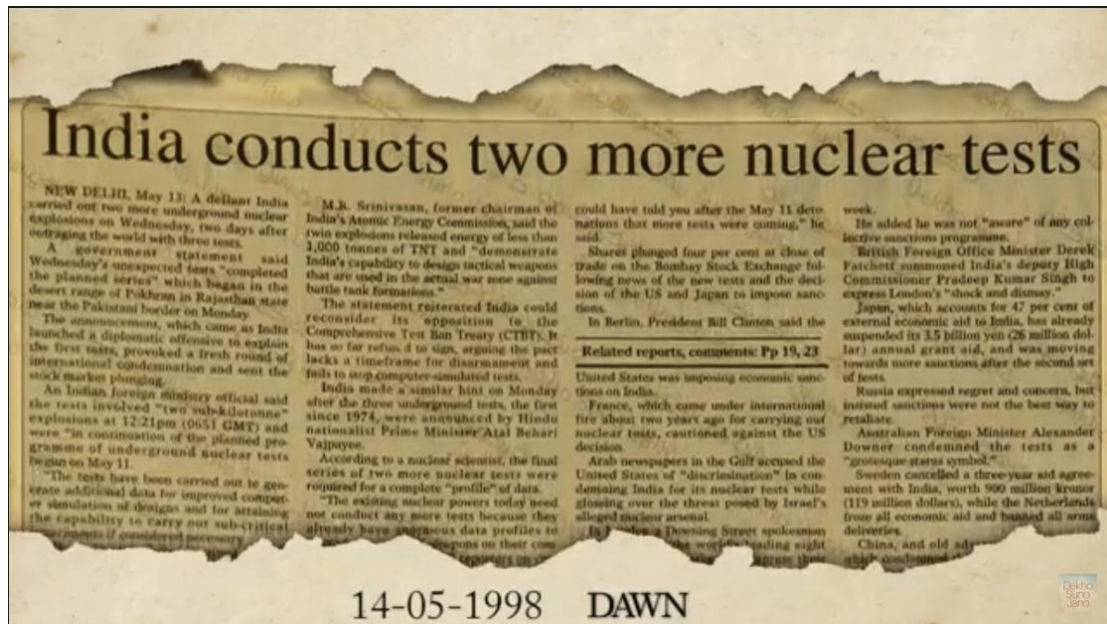
## Smiling Buddha: How India successfully conducted first nuclear test in Pokhran

It took a nearly two-year preparation for India to conduct the nuclear test in Pokhran. Indira Gandhi had authorised scientists at BARC to detonate an indigenously designed nuclear device in September, 1972.



Prime Minister Indira Gandhi visits





The Glasgow Climate Pact is a step forward, researchers say, but efforts to decarbonize are not enough to limit global temperature rises to 2°C.



**The Tribune**  
VOICE OF THE PEOPLE

BRITISH PM RACE ENDS, VOTING CLOSED WORLD  
APEX COURT PUTS ON HOLD SALE OF ESSAR STEEL TO ARCELORMITTAL BUSINESS  
6-MONTH JAIL, KOENA MITRA

## India leaps towards moon

**MISSION POSSIBLE LUNAR DATE IN 48 DAYS**

**ROCKET** GSLV-MkIII-M2 (M20) **LAUNCH TIME** 2.43 pm **PUT INTO ORBIT IN** 16.14 min **PAYLOAD** 13

**MISSION OBJECTIVE**

- Develop and demonstrate key technologies for soft- and hard-landing capability, including soft-landing and roving on lunar surface
- Expand knowledge about Moon through study of its topography, mineralogy, surface chemical composition, thermophysical characteristics and atmosphere
- Validate key technologies for soft-landing and roving on lunar surface

**2ND MOON MISSION**

Mission covers 12 years after ISRO's Chandrayaan-1 ended history by reaching 1,400 orbits around Moon and was operational for 313 days 18 August 26, 2009

**SUN NEXT**

ISRO plans to launch next mission, Aditya-L1, in 2020 to study Sun's corona, the solar layer extending to thousands of kilometres

**CHANDRAYAAN-2**

The 3,800kg Chandrayaan-2 will revolve around Earth for 23 days. It will undergo a series of manoeuvres before soft-landing on Moon's surface in 60 days. Three components: spacecraft, lander and rover

**ORBITER**

Will be placed into 100x100 km lunar orbit after 10 days, commencing lunar mapping and data relay. Can communicate with mission control, lander & rover

**LANDER 'VIKRAM'**

Will separate from orbiter and make soft-landing on the south pole of Moon on September 7. Can communicate with mission control, orbiter & rover

**ROVER 'PRAGUHA'**

Six-wheeled robotic vehicle will set out on its job of collecting information on lunar surface. Can travel up to 500 m, can communicate with lander

**27 kg weight, 150 W power, 1 lunar day life**

**14 earth days**

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**A FULLY INDIGENOUS MISSION**

ISRO's Chandrayaan-2 will further showcasing India's indigenous space technology, the quality research and innovation, ISRO's R&D, mission

**BACK WITH FLYING COLOURS**

ISRO today is a vibrant day for space science and technology in India. It has taken a leap with Chandrayaan-2 for the next big step, ISRO, on its way

THE TRIBUNE  
Tue, 21 July 2015  
https://tribune.in/chandrayaan-2/4103076



2013 MANGALYAAN

## Mars Attacked

A massive achievement was India's Mars Orbiter Mission with the spacecraft Mangalyaan. On November 5, 2013, the probe lifted off from the Satish Dhawan Space Centre aboard PSLV C-25. After spending about a month in orbit around the Earth, Mangalyaan began its journey on November 20. Almost a year later, it entered Mars' orbit on September 24, 2014, putting India in the small club of five countries which have successfully sent spacecraft to Mars. This was ground-breaking in terms of cost—at its 450 crore, (about \$73 million), it was the cheapest mission to Mars in history. This was achieved via low R&D costs, homegrown technology, and a significantly less complicated payload than NASA's Maven. Mangalyaan's arrival at Mars marked another milestone: it made India the first country to achieve success on the first attempt. Acknowledging ISRO's expertise, NASA signed an agreement with it to collaborate on a new Earth Observing Satellite called NSAR, and future missions to Mars.

### THEN

Imagining an inter-planetary mission as an expensive exploration

### NOW

Practising prudent budgetary norms enables the launch of ambitious space missions

## India Is Building a Top-Secret Nuclear City to Produce Thermonuclear Weapons, Experts Say

The weapons could upgrade India as a nuclear power — and deeply unsettle Pakistan and China.

By Adrian Levy



After the walls went up, behind them construction began on a vast runway intended for unmanned aerial reconnaissance vehicles, and drones.

DECEMBER 16, 2015, 8:49 PM

**CHALLAKERE, India** — When laborers began excavating pastureland in India's southern Karnataka state early in 2012, members of the nomadic Lambani tribe were startled. For centuries, the scarlet-robed herbalists and herders had freely crisscrossed the undulating meadows there, known as kavals, and this uprooting



Built by Indian Space Research Organisation, or Isro, and funded entirely by India, GSAT-9 boosts India's "neighbourhood first policy", helps it carve a unique place for itself in space diplomacy by "gifting" a satellite to its neighbours. Photo: PTI

3 min read . Updated: 05 May 2017, 11:39 PM IST

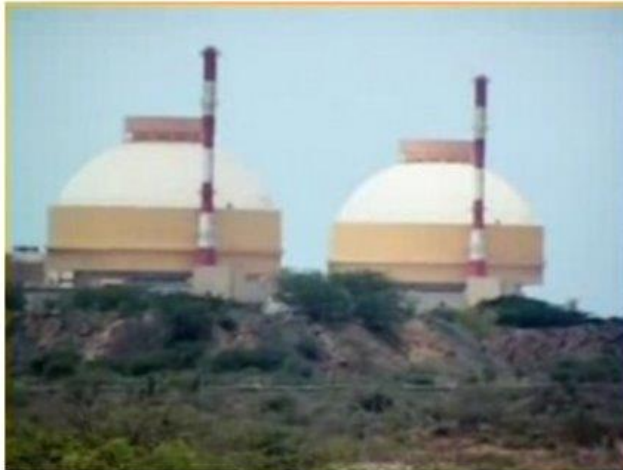
elizabeth roche

South Asia Satellite to help partner countries in effective communication, better governance, better banking and education in remote areas, more predictable weather forecasting and efficient resource mapping



**New Delhi:** India on Friday launched the first South Asia Satellite, built by the Indian Space Research Organisation (Isro) and funded entirely by India, that at once boosted its "neighbourhood first policy" as well as helped it carve a unique place for itself in space diplomacy by "gifting" a satellite to its neighbours.

The action follows Prime Minister Manmohan Singh's comments to *Science* magazine that suggested that US non-governmental organisations were behind the agitation, which has stalled work on the nuclear plant in power-starved Tamil Nadu. The first of the two 1000-MW reactors, being built with Russian help, was to have been decommissioned in December 2011, but work on the project has been suspended since August 2011 after the protests intensified.



Foreign-funded NGOs are under the scanner for backing the Kudankulam anti-nuclear protests: Reuters

Singh's comments had whipped up a controversy, with the leader of the protest movement SP Udayakumar challenging the Prime Minister to prove his charge - or resign. ([Watch the debate on CNN-IBN here.](#))

## Green Revolution architect MS Swaminathan felicitated for winning World Agriculture Prize

### OUR BUREAU

Chennai, November 12

"It will not be an exaggeration to place MS Swaminathan on par with Indian agriculture," said Union Agriculture Minister Radha Mohan Singh here on Monday. He was addressing a function to felicitate Prof M S Swaminathan for receiving the first World Agriculture Prize, in October, in New Delhi. The event was organised by Tamil Nadu Agriculture University, Coimbatore.

The Minister said Swaminathan, called the architect of India's green revolution, single-handedly turned around Indian agriculture from the food crisis that plagued the country between the 1960-80s.

"In a matter of two decades, our country, which was carrying begging bowl to other countries for food grains had become self-



Radha Mohan Singh, Union Minister for Agriculture (right) and MS Swaminathan, Founder, MSSRF, at a function to felicitate the geneticist for being awarded the First World Agriculture Prize, in Chennai, on Monday BIJOY GHOSH

sufficient and we must all be thankful to MS Swaminathan for this," Singh said.

Listing out various farmer-centric schemes implemented by the Centre, Singh acknowledged that initiatives such as e-NAM, Soil health cards, micro & drip irrigation and crop insurance are based on the recommendations submitted by Prof

Swaminathan when he was appointed chairman of the 'National Commission for farmers' by former Prime Minister Atal Bihari Vajpayee in 2004.

"In fact the change of name from Ministry of Agriculture to Ministry of Agriculture and Farmers' Welfare was one of the recommendations of Prof Swaminathan," Singh added. The Min-

ister also highlighted the contribution of the professor in building self-reliance in the area of pulses production by setting up 150 seed hubs across the country, resulting in record production of 22 million tonnes of pulses.

### Sharing the credit

In his acceptance speech, Swaminathan recalled the contributions of former agriculture ministers and green revolution heroes C Subramanian and Babu Jagjivan Ram, for ushering Indian agriculture towards surplus productivity.

"Market and Monsoon behaviour will be the two major challenges faced by the Indian farmers," Swaminathan said adding that the key focus should be management of these two forces.



THE PULSE | SECURITY | SOUTH ASIA

## The New Geometry of India's Foreign Policy

No doubt, India's foreign policy is at crossroads.

By **Monish Tourangbam**

March 14, 2022



India's foreign policy is undergoing a new test of choices and partners in the international system. Such a dilemma of autonomy and engagement is not new in the history of India's dealings with the world. However, the ongoing crisis in Ukraine, and the deep divisions it has created in the international community, stir up [new questions about India's foreign policy](#). Like a circle, is India's multi-alignment a recycled version of its Cold War era non-alignment? Like a square, are India's strategic orientations guided by the Quadrilateral Security Dialogue (Quad) partnership with the United States, Japan, and Australia in the Indo-Pacific? Do the new shifts in the European security order, following Russia's invasion of Ukraine, and [India's abstention at the United Nations](#), create new grounds for an augmented triangle of Russia, India, and China?



Indian Prime Minister Narendra Modi welcomes President of Russia Vladimir Putin for the 21st India-Russia Annual Summit, Dec. 7, 2021.

Credit: Flickr/ Indian Ministry of External Affairs

## View: India's science diplomacy could take centre stage in 2021

By Bharat Joshi, ET Bureau • Last Updated: Feb 09, 2021, 08:00 AM IST

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### Synopsis

To start with a safe prediction, India's remarkable success at managing the pandemic's impact on health and economy will continue, even as India gains recognition as the world's pharmacy.



Two time-honoured traditions this time of the year are an annual list of (ig)noble events of the past year, and predictions for the new. This article is a trifle late for the former, so we'll take a stab at the latter.

To start with a safe prediction, India's remarkable success at managing the [pandemic's](#) impact on health and economy will continue, even as India gains recognition as the world's [pharmacy](#).

Both, Medical and digital competencies have highlighted the role of the private sector in science diplomacy and economic diplomacy- two pillars that the government will likely leverage in execution of foreign policy. Its perhaps no coincidence that the MEA launched the economic diplomacy website last month.

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## Quantum Computing: India and Finland agree to set up virtual Centre of Excellence for technical cooperation

The CoE aims to a product and research-driven collaboration which can work towards supercomputing devices, sensors, communication technologies, space technologies, and many others.

T Radhakrishna • ETGovernment • Updated: April 21, 2022, 08:23 IST



Minister of State for Science & Technology Dr. Jitendra Singh and Under-Secretary of State, Ministry of Economic Affairs and Employment, Finland Petri Pelttonen at the event. (PIB photo)

A virtual centre of excellence (CoE) will be set up between India and Finland to enhance cooperation in quantum computing, a rapidly emerging technology that harnesses the laws of quantum mechanics to solve problems too complex for classical computers.

"The two countries are trying to get academic and industrial partners which can help

develop quantum science and technology for the betterment of humankind in particular and the planet in general. We are committed to global excellence in this field to achieve the best possible technologies in the shortest possible time," said Science and Technology Department Secretary S. Chandrasekhar at a round table meeting at DST headquarters in New Delhi on Wednesday.

## India's Nuclear Journey: Of Scientists, Spies and Statesmen

AUTHOR Ashok K. Singh

PUBLISHED 11 May 2021

BOOKMARK

On 26th December 2004, seven months after he had completed his term as Prime Minister, Atal Behari Vajpayee made a sensational disclosure. At a small gathering of writers in Gwalior, his hometown, he said that it was not he who should be given credit for the May 1998 nuclear tests at Pokhran. Credit for India's second round of nuclear tests should go to his predecessor, P V Narasimha Rao.

"Rao told me that the bomb was ready, I had to explode it," Vajpayee said.

Rao had died three days earlier, on 23rd December 2004. Vajpayee's decision to credit Rao for being the real architect of the bomb was a great tribute to the departed Congress leader, a fine act of bipartisanship in Indian politics - which is increasingly becoming rare.

### News

## Cabinet approves signing of India-UK MoU on Migration and Mobility Partnership

Our Bureau | New Delhi, May 5 | Updated On: May 05, 2021



### Also gives ex-post facto approval to MoU between India and UK on Global Innovation Partnership

The Union Cabinet has approved the signing of Memorandum of Understanding (MoU) on Migration and Mobility Partnership between India and the United Kingdom.

The MoU is aimed at liberalising issuance of visas promoting mobility of students, researchers and skilled professionals and strengthen cooperation on issues related to irregular migration and human trafficking between the two sides, an official release said.

## Amidst Russian War in Ukraine, India's New Arctic Policy Spotlights a Region in Turmoil

The announcement of India's Arctic Policy, against a background of conflict and climate change, is a potential game-changer in Arctic geopolitics.



Representative image of ships in the Arctic region. Photo: US Geological Survey/Flickr, Public Domain



K.M. Seethi



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0:00 / 18:51

ENVIRONMENT WORLD 24/MAR/2022

India's release of its year-long pending Arctic policy, entitled 'India and the Arctic: Building a Partnership for Sustainable Development', has drawn considerable global attention amid growing strategic engagements in the Arctic region in the wake of Russia's invasion of Ukraine. It has come at a time when the major powers in the Arctic Council have turned against its current chairperson, Russia, which has been charged with violating basic principles of international law in Ukraine, a country of strategic importance for Europe in terms of its connectivity with other neighbouring regions, including the Arctic.

More importantly, all the major member countries in the Arctic Council have expressed their displeasure over India's silence on the Russian invasion and its 'new quiet diplomacy' in the international fora. Added to their anguish is India's decision to import oil from Russia, which has been facing international sanctions for its attack on Ukraine. In this regard, India understands that Russia, which has faced sanctions on vital sectors such as energy, can be relied on for its own energy needs in the midst of the war, despite the escalating global oil price.

## India Today 41st anniversary: A look at science and technology from 1975-2016

From explorations in space, nuclear and defence technology to inventions that have improved everyday life, a few milestones in India's scientific and technological progress in four decades.



India Today Web Desk  
December 15, 2016  
ISSUE DATE: December 26, 2016 | UPDATED: December 18, 2016 10:45 IST





NATIONAL January 14, 2022 |

## First Super Computer: When America refused to give, India made its own super computer, read the full story

By Editorial

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**KEYSIGHT TECHNOLOGIES**

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India approached the American company Cray to buy the supercomputer, but the US government did not allow the company to be sold. Then Indian scientists started making their own supercomputer.

## The inside story of India's medical diplomacy | India Today Insight

*How the government got pharma firms to treble production of hydroxychloroquine for export and earn goodwill*

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Uday Mahurkar

New Delhi

June 22, 2020 UPDATED: June 23, 2020 08:27 IST



Preparations underway on the Indian naval ship, Kesari, which carried food and medical items, including HCQ, to five countries. (ANI Photo, May 10)



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04:04

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The Union chemicals and fertilizers ministry's empowered committee on essential medicines, consisting of key ministry officials, has been regularly meeting since the first week of April when Prime Minister Narendra Modi decided that production of hydroxychloroquine (HCQ), the anti-malarial drug in use against COVID-19, be stepped up to meet the rising global demand. Since HCQ exports from India were banned, the government began by partially lifting some of these restrictions to allow countries to get critical supplies of the drug in the fight against the

## CONCLUSION

India has come a long way from being a colonized country, to being a technological advanced country. The name of India comes in the top 10 technologically advanced country, and the most interesting part being it's still a developing country. We have developed the technology of India Stack, which is a set of open APIs and digital public goods that aim to unlock the economic primitives of identity, data, and payments at the population scale.

This technology is open to all nations, and countries like Japan have already signed MoUs to acquire them from India. They want this technology to establish a digital government platform for their country. In return India, will be given access to 5G, telecom security, submarine optical fiber cable, high altitude platform for broadband in unconnected areas, disaster management and public security.

Hence, we can say that India has a potential to become a developed country soon and the major factor contributing would be its rich history in Science Diplomacy.

## ANNEXURE

### *Literature Review*

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