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हाल ही में राष्ट्रपति द्वारा अनुच्छेद 143 के तहत सुप्रीम कोर्ट की पाँच-न्यायाधीशीय पीठ से परामर्श माँगा गया है। मामला तमिलनाडु राज्यपाल द्वारा 2020 से लंबित रखे गए राज्य विधेयकों से जुड़ा है, जिसके चलते सर्वोच्च न्यायालय ने 8 अप्रैल 2024 को "माने गए अनुमोदन (deemed assent)" का प्रावधान लागू किया। यह घटनाक्रम राज्यपाल की भूमिका, न्यायपालिका की सीमाएँ और शक्तियों के पृथक्करण (Separation of Powers) पर गहन बहस को जन्म देता है।

'T.N. Governor's actions forced SC to step in'

No intention of pronouncing a judgment on the T.N. Governor case, Bench clarifies

Governor had reasons to keep Bills pending, Attorney General R. Venkataramani argues

A Reference Bench need not get into the facts of the T.N. case, says Solicitor-General Mehta

Krishnadas Rajagopal
NEW DELHI

A Presidential Reference Bench of five judges, headed by Chief Justice of India B.R. Gavai, observed on Tuesday that the Supreme Court's move to grant deemed assent to 10 crucial Tamil Nadu State Bills may have been a way to resolve an "egregious situation" created by the State's Governor, who had sat on the Bills since 2020.

The Reference Bench clarified that it does not intend to "pronounce a judgment on the T.N. Governor case judgment" or overrule it, making the subtle point that it could voice an opinion about a "binding" SC verdict, not supplant it.

The Bench found the facts of the Tamil Nadu case "glaring". Justice Surya Kant asked Attorney General R. Venkataramani, "Were the Bills pending since 2020?"

The A-G replied that there were reasons the Governor had kept the Bills pending. He was well within his powers under Article 200 to withhold assent to State Bills, and was not bound by the Council of Ministers' advice, he said.

Mr. Venkataramani asserted that the Constitution envisaged the President and Governors using their discretion to withhold assent if they found that the Bills sent to them for assent had suspect constitutionality. He said he did not want to get into the facts of the T.N. case.

"Is it because the facts are so glaring that you do not want to get into them?" Chief Justice Gavai asked.

> It seems such an egregious situation came into existence in the Tamil Nadu case, that the Supreme Court was compelled to handle the situation and resolve the issue. The conclusion was not meant to act as a precedent
>
> JUSTICE P.S. NARASIMHA

Justice P.S. Narasimha said the facts of the T.N. case did not consist of any "pudding" and were stark in themselves.

Solicitor General Tushar Mehta, appearing for the Union government, seconded Mr. Venkataramani's submission that a Reference Bench need not get into the facts of the T.N. case, but merely answer the questions raised by the President.

Role of Bench

The role of the Reference Bench was to maintain the balance envisioned by the Constitution, Mr. Mehta submitted.

Mr. Venkataramani said the T.N. judgment was like someone saying, "I will myself take a pen and paper and rewrite the Constitution." It had squarely encroached upon the legislative domain, he said.

But Justice Kant persisted, asking what a Constitutional court was expected to do if the facts were as obvious as those found in the T.N. case.

"It seems such an egregious situation came into existence in the Tamil Nadu case, that the Supreme Court was compelled to handle the situation and resolve the issue. The conclusion was not meant to act as a precedent," Justice Narasimha said, referring to the circumstances which had led to the April 8 judgment.

The debate came on the first day of hearing the Presidential Reference, which has questioned the top court's power to impose three-month deadlines on the President and Governors to deal with State Bills which come to them for assent.

Imposing time limits

The Reference was issued by the President under Article 143 of the Constitution a month after a two-judge Bench of the SC, in an April 8 judgment in the T.N. Governor case, plugged a Constitutional silence by fixing specific time limits for Governors and the President to assent, withhold approval, or reserve State Bills for further consideration under Articles 200 and 201.

The Division Bench, headed by Justice J.B. Pardiwala, had also invoked Article 142 to grant 'deemed assent' to the T.N. Bills. It had held that laws which remain pending with the President and Governor beyond the specified three-month deadline would be deemed to be approved.

On Tuesday, Mr. Venkataramani argued the court could not have used its extraordinary powers under Article 142 to supplant substantive law in the T.N. case.

The top law officer submitted that the Constitution did not impose any time limits on the President and Governors while dealing with State Bills, and contended that the SC's power under Article 142 cannot exceed the power of the Constitution.

Mr. Venkataramani urged the judiciary not to violate the basic structure of the Constitution and take over executive and legislative functions.

मुख्य मुद्दे

1. राज्यपाल की संवैधानिक भूमिका (अनु. 200, 201):

- राज्यपाल किसी विधेयक को स्वीकृति दे सकते हैं, रोक सकते हैं या राष्ट्रपति के विचार हेतु सुरक्षित रख सकते हैं।
- संविधान ने समय-सीमा का उल्लेख नहीं किया है, जिससे राजनीतिक और प्रशासनिक गतिरोध उत्पन्न होता है।

न्यायपालिका का हस्तक्षेप:

- सुप्रीम कोर्ट ने अप्रैल 2024 में आदेश दिया कि तीन माह में निर्णय न लेने पर विधेयक "स्वीकृत माना जाएगा"।
- अनुच्छेद 142 का प्रयोग कर "पूर्ण न्याय" सुनिश्चित करने का प्रयास किया गया।

राष्ट्रपति का संदर्भ (अनु. 143):

- राष्ट्रपति ने यह स्पष्ट करने हेतु प्रश्न उठाए कि क्या न्यायालय समय-सीमा निर्धारित कर सकता है और क्या यह कार्यपालिका के विवेकाधिकार में हस्तक्षेप है।

विचार-विमर्श में तर्क

- **एटॉर्नी जनरल व केंद्र सरकार का पक्ष:**
  - राज्यपाल मंत्रिपरिषद की सलाह से हमेशा बाध्य नहीं हैं।
  - यदि विधेयक की संवैधानिकता संदिग्ध हो तो रोकना राज्यपाल का अधिकार है।
  - अनुच्छेद 142 का प्रयोग संविधान के मूल प्रावधानों से ऊपर नहीं हो सकता।

  सुप्रीम कोर्ट की टिप्पणियाँ:
  - तमिलनाडु का मामला "अत्यंत असाधारण" परिस्थितियों का था, जहाँ वर्षों तक विधेयक लंबित रखे गए।
  - न्यायालय को विधायी कार्य बाधित न हो, इसलिए हस्तक्षेप करना पड़ा।
  - यह निर्णय सामान्य नज़ीर (precedent) नहीं बल्कि विशेष परिस्थितियों का समाधान था।

संवैधानिक पहलू

- अनुच्छेद 200-201 → राज्यपाल/राष्ट्रपति की शक्तियाँ।
- अनुच्छेद 142 → न्यायालय की विशेष शक्तियाँ।
- अनुच्छेद 143 → राष्ट्रपति का परामर्श अधिकार।
- मूल संरचना सिद्धांत → शक्तियों का पृथक्करण एवं संघीय संतुलन।

निष्कर्ष

तमिलनाडु प्रकरण यह दर्शाता है कि संविधान की चुप्पी (silence) कभी-कभी राजनीतिक गतिरोध और संस्थागत टकराव का कारण बन सकती है। "माने गए अनुमोदन" ने तात्कालिक समस्या तो सुलझाई, परन्तु इससे न्यायिक अतिक्रमण का प्रश्न भी उठा। दीर्घकालिक समाधान के लिए आवश्यक है कि संसद या संविधान संशोधन द्वारा राज्यपाल/राष्ट्रपति के निर्णय हेतु समय-सीमा स्पष्ट रूप से तय की जाए। इससे न केवल संघीय ढांचे की मजबूती होगी, बल्कि लोकतांत्रिक जवाबदेही भी सुनिश्चित होगी।

UPSC Prelims Practice Question

Ques: भारतीय संविधान के किन अनुच्छेदों के तहत राज्यपाल राज्य विधेयकों पर स्वीकृति (Assent) देते हैं?

(A) अनुच्छेद 153 और 154

(B) अनुच्छेद 200 और 201

(C) अनुच्छेद 356 और 357

(D) अनुच्छेद 72 और 74

Ans : B)

UPSC Mains Practice Question

Ques: "न्यायिक सक्रियता (Judicial Activism) संवैधानिक सुधार का विकल्प नहीं हो सकती।" इस कथन की आलोचनात्मक समीक्षा कीजिए, विशेषकर उस संदर्भ में जब सर्वोच्च न्यायालय ने राज्य विधेयकों को 'माना हुआ अनुमोदन' प्रदान किया। **(250 Words)**

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आधुनिक भौतिकी की सबसे बड़ी पहेलियों में से एक है कि क्वांटम यांत्रिकी (सूक्ष्म जगत का सिद्धांत) और आइंस्टीन का सामान्य आपेक्षिकता सिद्धांत (गुरुत्वाकर्षण व समय-स्थान का सिद्धांत) आपस में कैसे मेल खाते हैं। दोनों ही अपने-अपने क्षेत्र में अत्यंत सफल हैं, लेकिन अभी तक एकीकृत रूपरेखा नहीं बन पाई है। हाल ही में PRX Quantum (जुलाई 2025) में प्रकाशित एक अध्ययन ने एंटैंगल्ड एटॉमिक क्लॉक्स (उलझी हुई परमाणु घड़ियों) का प्रयोग कर इस संगम को परखने का अभिनव तरीका सुझाया है।

मुख्य बिंदु व विश्लेषण

1. समस्या की जड़

- क्वांटम सिद्धांत बलों को कणों के रूप में व्याख्यायित करता है, जबकि सामान्य आपेक्षिकता गुरुत्व को समय-स्थान की वक्रता मानती है।
- अब तक प्रयोगशालाओं में गुरुत्व की वक्रता पर क्वांटम प्रणालियों का प्रत्यक्ष परीक्षण नहीं हुआ है।

नया प्रस्तावित प्रयोग

- तीन यिट्रिबियम परमाणु घड़ियों को अलग-अलग ऊँचाई पर स्थापित कर आपस में एंटैंगल किया जाएगा।
- इनकी समय-माप में सूक्ष्म अंतर समय-स्थान की वक्रता का प्रत्यक्ष संकेत देगा।
- इसमें क्वांटम एंटैंगलमेंट का विशेष रूप W-State प्रयोग होगा, जो अपेक्षाकृत स्थायी और मजबूत है।

वैज्ञानिक महत्व

- यह पहला अवसर होगा जब प्रयोगशाला में क्वांटम प्रणालियों द्वारा समय-स्थान की वक्रता परखा जाएगा।
- इससे यह परखा जा सकेगा कि क्वांटम यांत्रिकी के मूल सिद्धांत (unitarity, linearity, Born rule) गुरुत्वीय प्रभाव में भी लागू होते हैं या नहीं।
- किसी भी विचलन से नए भौतिकी सिद्धांतों के संकेत मिल सकते हैं।

चुनौतियाँ

- एंटैंगल्ड स्टेट की नाजुकता बड़ी बाधा है।

Entangled clocks may reveal where quantum physics and gravity meet

The new experimental design allows scientists to probe the interface between quantum theory and general relativity, a frontier that has so far been largely theoretical. It also illustrates that not all fundamental questions about the universe need ever-larger machines to look for the answers

Vasudevan Mukunth

One of the deepest puzzles in modern science is how quantum mechanics and general relativity – the two great pillars of 20th-century physics – fit together. Quantum mechanics governs the microscopic world of atoms and subatomic particles. General relativity describes gravity and the structure of spacetime. Both theories are stunningly successful in their domains, but they don't yet combine into a single unified framework. A central difficulty lies in testing where the two theories might meet. While quantum experiments often take place in controlled laboratories, the effects of spacetime curvature are usually faint and detectable only on astronomical scales.

A new study by Jacob Covey, Igor Pikovski, and Johannes Borregaard, all from universities in the U.S., has proposed a new way to probe this intersection. By using a distributed network of atomic clocks, they outline an experiment that could directly reveal how quantum systems behave in curved spacetime. Their approach uses advances in atomic physics, quantum networking, and precision timekeeping to make a once-outlandish idea a real experimental possibility.

"The interplay between quantum theory and gravity is one of the most challenging problems in physics today, but also fascinating," Igor Pikovski, one of the co-authors and assistant professor in the School of Engineering and Science at the Stevens Institute of Technology in the U.S., said in a statement.

The study was published in *PRX Quantum* in July. A complementary theoretical work co-authored by Borregaard and Pikovski appeared in *Physical Review Research* in May.

Sensing the curve

For more than a century, physicists have dreamed of bridging quantum mechanics and gravity. Efforts generally fall into two categories. One is the search for a full theory of quantum gravity, where gravity itself is quantised like the other forces of nature. For example, the electromagnetic force is quantised as photons, the particles of light. The goal in this category is to develop a theory that can explain the universe's gravitational features using hypothetical particles called gravitons.

The other category has a more modest goal: exploring how ordinary quantum systems behave in a spacetime already curved by gravity. This approach does not require speculative new theories but still asks foundational questions. For example, do basic quantum principles like unitarity, linearity, and the Born rule still hold?

Thus far, most laboratory experiments have only used quantum mechanics with the assumption that gravity is a simple force that pulls objects towards a heavier mass. For example, neutron bouncing experiments and atom interferometers have shown phase shifts induced by the earth's gravitational potential, but they haven't probed deeper effects due to relativity.

One such effect is the curvature of spacetime. That is, according to the general theory of relativity, a massive object will curve spacetime around itself. When a lighter body passes through this region of spacetime, it will naturally be deflected along the curved path. The apparent force responsible for the deflection is said to be gravity. This is why, for example, the moon is said to be in orbit around the earth: it's simply moving along the spacetime curved by the earth's mass.

A tell-tale feature of curvature is that time doesn't just flow differently at two points: it changes nonlinearly across space. For example, the difference between the time measured by two clocks 1 km and 2 km away from the earth's surface is not exactly the same as the difference between the time measured by two clocks 3 km and 4 km away. This disparity is a direct sign that the spacetime that the clocks inhabit is curved.

Measuring this in an experiment will require the setup to compare data from at least three locations simultaneously.

The overarching goal is to (i) set up a purely quantum system, then (ii) look for the effects of curved spacetime in the properties of the system. If scientists spot any effects, they will demonstrate an intersection of (post-Newtonian) gravity and quantum physics.

In the new study, the authors have proposed building a network of three entangled atomic clocks, separated by kilometer scale elevation differences, that act together as one "distributed clock." By doing so, they say they can directly test how curved spacetime influences quantum interference patterns in the clock.

If this experimental setup is successful, it could be the first laboratory probe of spacetime curvature using quantum systems – a major leap forward.

The researchers designed a protocol based on cutting-edge quantum networking and atomic clock technologies. At its heart is a state of entanglement called the W state.

A resilient friendship

In quantum physics, particles like electrons or photons can be linked in such a way that what happens to one instantly affects the others. This strange connection is called entanglement. It's one of the most important resources for quantum technologies like quantum computers and quantum communication.

The W state is a particular example of entanglement involving three or more particles. Imagine you have three quantum bits (qubits). The W state looks something like the following: One qubit is in the state 1 (excited) and the others are in 0 (not excited). But you do not know which one is the 1. Instead, all three possibilities – first is 1 *or* second is 1 *or* third is 1 – are combined together in a balanced quantum superposition. In other words, exactly one of the three qubits is 1 but in a perfectly shared way across all three.

The W state has a very robust kind of entanglement. Even if you lose one of the particles, the others are still entangled with each other. This is different from another famous entangled state, the GHZ state, which completely loses its entanglement if you remove a particle.

Think of three friends sharing a secret. In a GHZ state, if one friend leaves, the secret is lost. In a W state, even if one friend leaves, the two remaining friends still share part of the secret. That's why physicists like the W state: it's more resilient.

A ytterbium lattice atomic clock. For representational purposes only. AFP

> The interplay between quantum theory and gravity is one of the most challenging problems in physics today, but also fascinating
>
> IGOR PIKOVSKI
> ASSISTANT PROFESSOR IN THE SCHOOL OF ENGINEERING AND SCIENCE AT THE STEVENS INSTITUTE OF TECHNOLOGY

The quantum symphony

The new protocol proposes to use ytterbium atoms as the qubits. Some property of the atoms changes back and forth in periodic fashion, like a clock ticking. Each atom will experience time differently because of its position in the earth's gravity. After evolving for some time, the three states are recombined and measured. If the atoms' W state has been affected by curved spacetime, scientists should expect to measure 'shifts' in the property's value corresponding to the time-dilation between the three pairs of atoms. That is, these shifts will carry the imprint of the curvature itself.

According to the researchers' analysis, this proposed setup could in principle resolve small shifts in the atoms' frequency. For example, when the atoms are separated by 1 km through earth's gravitational field and individual ytterbium atoms are able to hold their quantum state for around 50 seconds (called the coherence time), the frequency shifts could be of the order of 0.02 Hz. This shift would be easy to measure. And while the coherence time is very high, it's within reach of modern technologies – if only just.

"Implementing the scheme proposed by Covey and his colleagues is currently at the limit of what is experimentally possible," Djordje Minic, a professor of physics at Virginia Tech in the U.S. and who was not affiliated with the study, wrote in a commentary in *APS Physics*. "The main difficulty is the inevitable fragility of the required collective, entangled state."

That said, the implications of such an experiment are far-reaching. First, it would mark a major step in experimentally probing the interface between quantum theory and general relativity, a frontier that has so far been largely theoretical. Direct evidence that quantum coherence and interference persist in curved spacetime would strengthen confidence in the universality of quantum mechanics.

Second, the experiment can be modified to test unitarity, linearity, and the Born rule under the influence of curved spacetime, which would address some of the most fundamental open questions in physics. If quantum mechanics were a symphony, linearity means all possible notes can be played at once, unitarity ensures the music never loses its rhythm or energy, and the Born rule means that when you finally listen, you hear one clear melody rather than a cacophony.

If scientists observe any deviations, it could be a sign of new physics beyond standard quantum theory. Even a null result – that everything behaves as expected – would provide valuable confirmation that no hidden breakdowns occur at this scale.

These three facets "are central to the structure, evolution, and measurement of quantum states," Minic wrote. "The main novelty of the team's approach is that it combines several advances made in the past decade on neutral atoms and trapped ions to achieve a new, unique quantum probe of curved spacetime."

Room to be clever

"We assume that quantum theory holds everywhere – but we really don't know if this is true," Pikovski said. "It might be that gravity changes how quantum mechanics works. In fact, some theories suggest such modifications, and quantum technology will be able to test that."

Third, the methodology opens doors for further exploration. By refining entangled atomic networks, scientists could probe more extreme gravitational environments, perhaps even onboard satellites, where larger separations and nearly-zero-noise environs are possible. Such systems could one day serve as sensitive detectors for exotic entities like dark matter and gravitational waves.

For students and young researchers, the new study also illustrates that some of the most fundamental questions about the universe can be addressed not by building ever-larger machines but also by cleverly combining precision tools scientists already have. The dream of uniting quantum mechanics and relativity may still be distant but experiments like this one could bring it tangibly closer.

In this visual metaphor, the pillow is like spacetime and the heavy ball could be the earth or the sun. The mass bends spacetime around itself. When another body traverses this area, it follows a curved path. IMAGE CREATED USING CHATGPT 5

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- क्वांटम नेटवर्किंग व टाइमकीपिंग की अत्याधुनिक तकनीक आवश्यक होगी।
- वर्तमान में यह प्रयोग विज्ञान की सीमाओं को छू रहा है।

वृहद् निहितार्थ

- भौतिकी हेतु: क्वांटम यांत्रिकी व सामान्य आपेक्षिकता का संगम समझने की दिशा में ठोस कदम।
- प्रौद्योगिकी हेतु: भविष्य में डार्क मैटर, गुरुत्वीय तरंगें व अन्य समय-स्थान असामान्यताओं का पता लगाने में सहायक।
- विज्ञान नीति हेतु: यह दर्शाता है कि बड़े-बड़े कोलाइडर बनाने के बजाय भी, सटीक व नवोन्मेषी प्रयोग ब्रह्माण्ड के मूल प्रश्नों को हल कर सकते हैं।

निष्कर्ष

एंटैंगल्ड एटॉमिक क्लॉक्स द्वारा समय-स्थान की वक्रता की जाँच का यह प्रस्ताव आधुनिक विज्ञान में परिवर्तनकारी कदम हो सकता है। सफल होने पर यह मानवता को क्वांटम सिद्धांत और आपेक्षिकता के बीच पुल बनाने की दिशा में एक नया रास्ता दिखाएगा। भले ही कोई नया परिणाम न निकले, पर यह पुष्टि करेगा कि क्वांटम यांत्रिकी सार्वभौमिक है।

UPSC Prelims Practice Question

Ques: निम्नलिखित में से कौन-सा कथन "एंटैंगल्ड एटॉमिक क्लॉक्स" (Entangled Atomic Clocks) से सही रूप से सम्बंधित है?

1. इनका उपयोग गुरुत्वाकर्षण द्वारा उत्पन्न समय-स्थान की वक्रता को परखने के लिए किया जा सकता है।
2. इनमें प्रयुक्त "W-State" एंटैंगलमेंट अपेक्षाकृत अधिक स्थायी होता है।
3. यह प्रयोग केवल खगोलीय पैमाने पर ही किया जा सकता है।

सही विकल्प चुनिए:

(A) केवल 1 और 2
(B) केवल 2 और 3
(C) केवल 1 और 3
(D) 1, 2 और 3

Ans: A)

UPSC Mains Practice Question

Ques: क्वांटम यांत्रिकी और सामान्य आपेक्षिकता के बीच समन्वय विज्ञान की सबसे बड़ी चुनौतियों में से एक है। हाल ही में प्रस्तावित "एंटैंगल्ड एटॉमिक क्लॉक्स" प्रयोग के संदर्भ में इस चुनौती पर चर्चा कीजिए। **(150 Words)**

Page : 08 : GS 3 : Agriculture

भारत के "हरित क्रांति के जनक" कहे जाने वाले डॉ. एम.एस. स्वामीनाथन ने 1960 के दशक में भारत को भीषण खाद्य संकट और अमेरिकी गेहूँ पर निर्भरता से निकालकर आत्मनिर्भर बनाया। उनकी वैज्ञानिक दृष्टि, अंतरराष्ट्रीय सहयोग और राजनीतिक नेतृत्व के साथ समन्वय ने भारत को "ship-to-mouth" राष्ट्र से खाद्य अधिशेष देश में बदल दिया। आज जब भारत विकसित भारत@2047 का सपना देख रहा है, स्वामीनाथन का जीवन विज्ञान, नेतृत्व और संस्थागत सुधार के समन्वय का प्रेरक उदाहरण है।

A tribute to M.S. Swaminathan, 'the man who fed India'

Montek Singh Ahluwalia

is Distinguished Fellow, Centre for Social and Economic Progress

The Viksit Bharat aspiration, which has gained considerable momentum, will require a significant development of scientific capability, and some of this, especially in the new digital economy, will have to be *aatmanirbhar*. There is much to learn in this context from the most successful experiment in *atmanirbharata* in the past, which was the achievement of food self-sufficiency in the 1960s. M.S. Swaminathan was the man who did it and he was a living hero to all of us. This is the centenary year of his birth and it has seen the publication of a new biography, *M.S. Swaminathan: the Man who Fed India*, by Priyambada Jayakumar.

Ms. Jayakumar had the benefit of detailed discussions with him on both the personal and professional side of his life and she has produced a book which is a great read. However, in this article, I will focus on some lessons from his experience which have relevance for the future.

The planting of a seed of an idea

Scientific advancement was at the core of the Green Revolution and the book brings out that such advances are not achieved by dedicated scientists working in isolation in a lab. They involve collaboration with other scientists and a cross-fertilisation of ideas. It was known that wheat productivity could be increased through application of fertilizers and other inputs, but the problem was that the higher weight of grains caused the plant to bend and lodge if the stalk was not strong enough. Swaminathan was trying to use radiation to develop a genetic mutation that would have a stronger stalk, but this approach was not getting anywhere.

In 1958, a Japanese scientist visiting Delhi told Swaminathan that a dwarf wheat variety developed in Japan, and which had a shorter, stronger stalk, could hold the higher weight of grain without bending. Swaminathan found that the new variety had been taken to the United States where a seed breeder was working on it. The breeder told Swaminathan that they were developing a winter variety, which would not be suitable for India, but Norman Borlaug in Mexico was developing a different variety that might work. As it happened, Swaminathan had met Borlaug earlier at a seminar in the U.S. He was able to persuade him to send a small quantity of his Mexican seeds to India. These seeds did well and Swaminathan wanted to invite Borlaug to come to India to discuss ways of adapting these varieties to Indian conditions.

The proposal to invite Borlaug was promptly approved by the Director of the Indian Agricultural Research Institute (IARI) in 1960 but it took more than two years to get the bureaucratic approvals needed to send the invitation and Borlaug arrived only by March 1963.

Swaminathan often quoted Pandit Nehru's phrase, "everything can wait but not agriculture", but the bureaucracy was clearly unaware of it. It is interesting to speculate on what would have been the benefits if the Green Revolution had come two years earlier. The important lesson is that for science to flourish, our scientists must be much better connected to relevant scientists abroad and become familiar with cutting-edge work in their field. This means they should travel more freely to attend conferences abroad and build personal contacts, all of which means bureaucratic control must be drastically reduced.

There is much to learn from one of India's most successful experiments — the achievement of food self-sufficiency in the 1960s and the scientist who made it possible

The next step was to subject the seeds to trials on the fields of actual farmers. Swaminathan could not get the Ministry to fund the effort. Fortunately, Lal Bahadur Shastri, who became Prime Minister in 1964, wanted to give higher priority to agriculture and for this purpose appointed C. Subramaniam as Minister of Agriculture. This made a critical difference. Subramaniam called about 20 agricultural scientists for a meeting to hear their views on how to increase food production. When Swaminathan was asked to speak, he frankly told the Minister that he had identified the new seeds that would solve the problem, but the Ministry was unable to fund the necessary trials. Subramaniam promptly called for the file and ensured that the funds were provided. It is a pity that we have no record of what the other scientists said in the meeting, and in particular whether the more senior scientists (Swaminathan was then only 39) had a different view.

The politician needs to listen to the scientist

This yields the second important lesson. In dealing with complex technical issues, the political leadership must hear the scientists/technical people involved directly instead of relying on the generalist bureaucracy to convey their views. Swaminathan greatly admired Pandit Nehru's commitment to science, but the book brings out that he soon realised that this "had few takers even in his own government, ministries and the bureaucracy". On page 48 the author puts it bluntly: "Most ministers barely supported, understood, or believed in research and development.... this was also true of the Agriculture Minister in 1958.. (who) would order scientists like Swaminathan to go into the field and 'sort out the problems' without really understanding the ground realities."

One of the reasons China has done so well on the economic and technical front is that Ministers are usually technically qualified people, often engineers with a track record of successful management. Subramaniam exemplified that type of political leader: he was a physics graduate and had a good knowledge of science. If we want to achieve Viksit Bharat, and explore new and increasingly complex areas of science, we will need many more such Ministers in the years ahead, not only at the Centre but also in the States.

The field trials were a great success and the next step was to roll out the Green Revolution across the country. This required importing 18,000 tonnes of seed – the largest seed shipment in history – costing ₹5 crore in foreign exchange. There were objections from many fronts. The Finance Ministry was not happy releasing that much foreign exchange. The Planning Commission opposed the proposal on the grounds that it did not believe that the new seeds would do better than what we already had. The Left also opposed the move because the seeds were developed under a grant from a U.S. institution (the Rockefeller Foundation).

Shastri was understandably concerned about these conflicting views. Fortunately, Swaminathan persuaded him to visit the IARI to see for himself how the new wheat was doing. Shastri was convinced and the import of new seeds was duly approved. Tragically, Shastri passed away in January 1966 but Indira Gandhi, who took over as the next Prime Minister, also gave Swaminathan full backing.

The lesson is that when dealing with new and untried ideas, there will always be conflicting opinions even among so-called experts. It is important that all the different points of view are appropriately aired and considered. However, this process may not always result in a consensus. In such a situation, a decision has to be taken at the highest level. Once taken, the thing to do is to back the effort fully. But it must also be subjected to truly independent monitoring, with course corrections.

In the case of the Green Revolution, the results were amply evident within a few years. We reaped a bounteous wheat harvest in 1968 and we were able to start phasing out PL 480 imports. Over time, new problems arose. The excessive dependence on water and also fertilizer use led to environmental problems. Swaminathan himself, having left the government by then, warned about the corrections needed to make the Green Revolution environmentally sustainable. It is a pity that we are yet to implement these corrections.

The issues India needs to look at

Looking ahead, we know that climate change will have a severely negative effect on agricultural productivity. Once again, science will be critical and much will depend upon the performance of our research institutions. India was ahead of China in agricultural research in the late 1960s, but today, China has eight agricultural research institutions in the world's top 10 and India does not have any in the top 200. One reason is inadequate funding: we spend only 0.43% of our agricultural GDP on research and development, whereas the percentage in China is twice our level. But there is also the issue of the quality. Do our agricultural research institutions have the institutional autonomy and governance structure that they need to recruit and promote meritorious scientists? And can we ensure that our top agricultural scientists have the kind of access to political decision makers that Swaminathan had?

Filling these gaps is the best way of really honouring M.S. Swaminathan. And the lessons are relevant for other areas of scientific development also.

स्वामीनाथन के अनुभव से मिले प्रमुख पाठ

1. **विज्ञान में सहयोग और वैश्विक सम्पर्क**
    - गेहूँ की उच्च उत्पादकता वाली किस्में स्वामीनाथन ने नॉर्मन बोरलॉग के सहयोग से भारत लाईं।
    - **पाठ:** भारतीय वैज्ञानिकों को वैश्विक स्तर पर जुड़ने की अधिक स्वतंत्रता और नौकरशाही नियंत्रण में कमी की आवश्यकता है।

वैज्ञानिक परामर्श को राजनीतिक समर्थन

- लाल बहादुर शास्त्री और कृषि मंत्री सी. सुब्रमण्यम ने वैज्ञानिक सुझावों को प्रत्यक्ष सुना और समर्थन दिया।
- **पाठ:** जटिल तकनीकी मुद्दों में नेताओं को सीधे वैज्ञानिकों से संवाद करना चाहिए, न कि केवल सामान्य प्रशासनिक सलाह पर निर्भर रहना।

विवादों के बीच निर्णायक नेतृत्व

- वित्त मंत्रालय, योजना आयोग और वामपंथी आलोचना के बावजूद बड़े पैमाने पर बीज आयात का निर्णय लिया गया।
- **पाठ:** नीतिगत निर्णयों में जोखिम उठाने का साहस और दृढ़ता परिवर्तनकारी परिणाम ला सकता है।

उत्पादकता और स्थिरता का संतुलन

- हरित क्रांति ने खाद्य संकट तो सुलझाया परंतु जल दोहन और उर्वरक पर निर्भरता जैसी पर्यावरणीय समस्याएँ पैदा कीं।
- **पाठ:** वैज्ञानिक प्रगति को दीर्घकालिक स्थिरता के साथ जोड़ा जाना चाहिए।

कृषि अनुसंधान को मज़बूत बनाना

- आज भारत कृषि अनुसंधान में चीन से पीछे है।
- **पाठ:** अनुसंधान एवं विकास (R&D) में निवेश, स्वायत्तता और नीति-निर्माताओं से वैज्ञानिकों का जुड़ाव अनिवार्य है।

भविष्य के लिए प्रासंगिकता

- जलवायु परिवर्तन फसल उत्पादन पर गंभीर प्रभाव डालेगा।
- खाद्य एवं पोषण सुरक्षा भारत की सामाजिक स्थिरता का आधार है।
- आत्मनिर्भर भारत की दिशा में विज्ञान-नीति तालमेल से ही स्थायी समाधान मिल सकता है।

निष्कर्ष

डॉ. एम.एस. स्वामीनाथन की विरासत केवल हरित क्रांति तक सीमित नहीं है, बल्कि यह दिखाती है कि जब विज्ञान को दूरदर्शी राजनीतिक नेतृत्व का साथ मिलता है, तो राष्ट्र की नियति बदल सकती है। उन्हें सच्ची श्रद्धांजलि यही होगी कि भारत नई "सतत् हरित क्रांति" (Evergreen Revolution) की ओर बढ़े और आने वाले दशकों में खाद्य सुरक्षा, जलवायु अनुकूलता और स्थिर कृषि को सुनिश्चित करे।

UPSC Prelims Practice Question

Ques: भारत में हरित क्रांति के संदर्भ में निम्नलिखित कथनों पर विचार कीजिए:

1. डॉ. एम.एस. स्वामीनाथन को भारत में हरित क्रांति का जनक कहा जाता है।
2. भारत में हरित क्रांति का आरंभ मुख्यतः गेहूँ और धान पर केंद्रित था।
3. इसके परिणामस्वरूप 1963 में ही भारत ने पी.एल.-480 के अंतर्गत खाद्यान्न आयात पूरी तरह समाप्त कर दिया।

उपरोक्त में से कौन-सा/से कथन सही है/हैं?

(a) केवल 1 और 2
(b) केवल 2 और 3
(c) केवल 1 और 3
(d) 1, 2 और 3

Ans : a)

UPSC Mains Practice Question

Ques : हरित क्रांति ने भारत को खाद्यान्न आत्मनिर्भर बनाया परंतु इसके साथ ही दीर्घकालिक पर्यावरणीय समस्याएँ भी उत्पन्न हुईं। जलवायु परिवर्तन की पृष्ठभूमि में भारत की भावी कृषि नीतियों के लिए इससे प्राप्त सबक का आलोचनात्मक परीक्षण कीजिए। **(150 Words)**

Page 09 : GS 2 : Social Justice

2018 में पोषण अभियान (POSHAN Abhiyaan) की शुरुआत के साथ सरकार ने बच्चों में स्टंटिंग को प्रति वर्ष कम-से-कम 2 प्रतिशत अंक घटाने का लक्ष्य रखा था। "मिशन 25 बाय 2022" के अंतर्गत 2022 तक स्टंटिंग को 25% तक लाने का लक्ष्य था। परंतु पोषण ट्रैकर (जून 2025) के अनुसार आज भी 37% पाँच वर्ष से कम आयु के बच्चे स्टंटिंग से पीड़ित हैं — 2016 (38.4%) की तुलना में केवल 1% की गिरावट। यह स्थिति गहरे संरचनात्मक कारणों की ओर संकेत करती है।

The complex web of factors behind India's persistent stunting crisis

A host of factors including teenage pregnancies, poor maternal and child nutrition, and lack of sanitation perpetuates stunting

DATA POINT

Devyanshi Bihani

In 2018, when POSHAN Abhiyaan was launched, the government had set a target to reduce stunting among children in India by at least 2% points each year. A stunted child is too short for his or her age as a result of chronic or recurrent malnutrition.

In 2016, 38.4% of children under five were stunted in India. As per this plan, the share should have fallen to 26.4% by 2022. During the launch, however, the government had set an even more ambitious target – to bring stunting down to 25% by 2022 – a goal it called 'Mission 25 by 2022'. Seven years after the launch, Poshan Tracker data for June 2025 showed that 37% of children under five in India were stunted – barely 1% point lower than in 2016 **(Chart 1)**.

"The fact that the needle has barely moved points to deeper systemic issues," says Dr. Vandana Prasad, a community paediatrician and former member of the National Commission for Protection of Child Rights. She calls persistent stunting "the tip of the iceberg of deprivation".

Research shows that stunting is linked to a host of factors – from teenage pregnancies and poor diets of both the mother and the child to anaemia during pregnancy and inadequate breastfeeding in the early years **(Table 3)**. Evidence also points to associations with caesarean deliveries (C-section), children living in unsanitary conditions, and drinking unsafe water. Data further shows a strong link between stunting and the mother's level of education.

"Stunting is often visible right at the time of birth. Nearly half of India's stunted children are already small when they are born," says Dr. Prasad, underscoring how deeply it is tied to maternal health.

Teen mothers are more likely to give birth to babies who struggle to grow. Experts say this is because a woman's body is not ready for pregnancy at such a young age. Adolescent mothers are also less likely to be able to adequately care for their child after birth. Despite legal restrictions, child marriages have not been eradicated in India. Consequently, as of 2019-21, close to 7% of women aged 15-19 had begun childbearing in India.

Education plays a key role in breaking the cycle of stunting. Data from 2019-21 shows that nearly 46% of children born to mothers with no schooling were stunted, compared to only 26% of children whose mothers had 12 or more years of schooling. Mothers with higher levels of education are far more likely to access antenatal care, follow better nutrition practices, and delay early pregnancies, all of which improve child health outcomes.

C-sections have increased in India from 9% in 2005-06 to over 22% in 2021. While C-sections are not a direct cause of stunting, they can disrupt early breastfeeding practices. Babies delivered surgically often miss out on immediate breastfeeding, especially the first milk or colostrum, which contains all the nutrients an infant needs. "C-sections can directly affect the woman's ability to initiate breastfeeding, because she herself is sick or may be isolated from the baby, who has been taken away to the SNCU (special newborn care units) or NICU (neonatal intensive care unit)," says Dr. Prasad.

While India has a strong tradition of breastfeeding, only 64% of babies under the age of six months are exclusively breastfed. Here, class divides play a serious role. "A teacher in a government school may get six months' maternity leave to breastfeed. But a domestic worker is back to work within two weeks. How will she feed her child every two hours as required," Dr. Prasad asks.

The quality of diet for both the mother and child is another key factor linked to stunting. Carbohydrate-heavy meals dominate most Indian households, especially among the poor. "In some Adivasi communities I have worked in, people eat mounds of rice because that is all they have access to. People eat dal once a week or even once a month," says Dr. Prasad.

Only around 11% of Indian children under two years met the standard for a minimum acceptable diet in India, as of 2019-21. The minimum acceptable diet measures the share of children aged 6-23 months who receive both adequate dietary diversity and meal frequency (or, for non-breastfed children, at least two milk feeds along with diverse and frequent meals). While some States have introduced eggs in Anganwadi meals, access to protein and micronutrient-rich foods is limited.

Anaemia among mothers, closely tied to women's nutrition, is another reason for stunting among children. In 2019-21, in India, nearly 57% of women aged 15-49 and 67% of children under the age of five were anaemic.

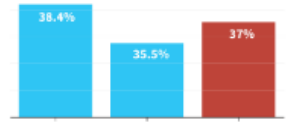
Sanitation deepens the disadvantage. Children exposed to open defecation and unsafe water are far more vulnerable to infections that sap their nutrition and stunt their growth. Open defecation, in particular, contaminates groundwater, which enters drinking supplies. This disrupts gut health by damaging the balance of good bacteria needed to absorb food. According to 2019-21 data, 19% of Indian households still practiced open defecation. Dr. Prasad explains, "There is a vicious cycle between infection and malnutrition. A malnourished child falls sick more often. When sick, the child eats less and absorbs less, which pushes the child further into malnourishment."

The consequences stretch far beyond height. "Stunting has a correlation with poverty, less education, less employability, and weaker cognitive skills," she says. "It locks families into an intergenerational cycle of deprivation."

Short-changed

The data for the charts were sourced from the National Family Health Survey and the POSHAN tracker for June 2025

Chart 1
The share of children aged below five years who were stunted in India across years



Scan the QR code to listen to Dr. Vandana Prasad's full interview

Chart 2: State-wise share of children aged below five years who were stunted as of June 2025. Data were analysed only for larger States

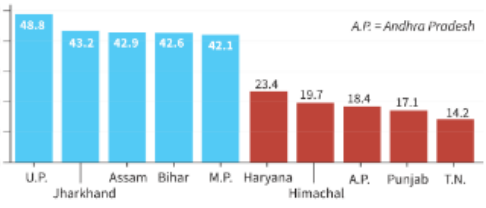


Table 3: Factors linked to stunting and their prevalence according to NFHS 5 (2019-21). Figures are in % and are average figures for India

Factors linked to stunting	NFHS 5 (2019-21) in %
Teenage pregnancy (women aged 15-19 who have begun childbearing)	6.8
Anaemia in children aged 6 to 59 months	67.1
Anaemia in mothers aged 15-49 years	57
Caesarean deliveries	22
Exclusive breastfeeding (for first 6 months)	64
Children (6-23 months) with a minimum acceptable diet	11
Share of households with no toilet facility	19

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स्टंटिंग के प्रमुख कारण

1. **मातृ स्वास्थ्य और किशोरावस्था में गर्भधारण**
    - लगभग आधे बच्चे जन्म के समय ही छोटे होते हैं।
    - 15–19 आयु वर्ग की लगभग 7% महिलाएँ पहले ही माँ बन चुकी हैं।

मातृ शिक्षा का स्तर

- बिना पढ़ी-लिखी माताओं के बच्चों में स्टंटिंग 46% जबकि 12+ वर्ष पढ़ी माताओं के बच्चों में केवल 26%।
- शिक्षा से बेहतर पोषण व्यवहार, प्रसव पूर्व देखभाल और विलंबित विवाह संभव।

शिशु एवं बाल आहार संबंधी व्यवहार (IYCF)

- सिजेरियन डिलीवरी (2005: 9% → 2021: 22%) से स्तनपान की शुरुआत बाधित।
- केवल 64% शिशु (6 माह तक) ही पूर्ण स्तनपान पाते हैं।
- असंगठित क्षेत्र की महिलाओं को मातृत्व अवकाश का लाभ न मिलने से समस्या और बढ़ती है।

आहार की गुणवत्ता एवं सूक्ष्म पोषण की कमी

- गरीब परिवारों में कार्बोहाइड्रेट प्रधान भोजन, प्रोटीन व माइक्रोन्यूट्रिएंट्स की कमी।
- केवल 11% दो वर्ष से कम आयु के बच्चों को न्यूनतम स्वीकार्य आहार मिलता है।
- एनीमिया: 15–49 वर्ष की 57% महिलाएँ और पाँच वर्ष से कम 67% बच्चे।

स्वच्छता और पर्यावरण

- 19% परिवार आज भी खुले में शौच करते हैं।
- दूषित जल और संक्रमण → पोषण अवशोषण में बाधा → बीमारी और कुपोषण का दुष्चक्र।

परिणाम

- संज्ञानात्मक विकास में कमी → शिक्षा व कौशल पर असर।
- उत्पादकता और रोजगार क्षमता घटती है।
- स्वास्थ्य प्रणाली पर दीर्घकालिक बोझ।

आगे की राह

1. पोषण अभियान 2.0 को मज़बूत करना – अंडे, दाल, सूक्ष्म पोषक तत्वों की आपूर्ति।
2. किशोरावस्था में गर्भधारण रोकना – बाल विवाह पर सख्ती, किशोर स्वास्थ्य कार्यक्रम।

3. महिला शिक्षा व सशक्तिकरण को नीति का आधार बनाना।
4. मातृ स्वास्थ्य और एनीमिया नियंत्रण – प्रसव पूर्व देखभाल, आयरन-फोलिक एसिड सप्लीमेंट।
5. शिशु आहार सहायता – मातृत्व लाभ का विस्तार, अनावश्यक C-section पर रोक, स्तनपान समर्थन।
6. स्वच्छ जल और स्वच्छता (WASH) पर सतत निवेश।

निष्कर्ष

भारत का स्टंटिंग संकट केवल पोषण की कमी नहीं बल्कि मातृ स्वास्थ्य, सामाजिक असमानता और स्वच्छता की चुनौतियों से जुड़ा बहुआयामी संकट है। समाधान के लिए लाइफ-साइकिल दृष्टिकोण आवश्यक है — जिसमें बाल विवाह रोकना, महिलाओं की शिक्षा, गर्भावस्था पूर्व व प्रसव उपरांत पोषण, तथा स्वच्छता सुधार शामिल हों। जब तक इन मूल कारणों को संबोधित नहीं किया जाएगा, तब तक भारत का मानव संसाधन "कुपोषण के दुष्चक्र" में फंसा रहेगा।

UPSC Mains Practice Question

Ques: पोषण अभियान जैसी अनेक योजनाओं के बावजूद भारत में बाल स्टंटिंग की दर में केवल मामूली कमी आई है। इसके स्थायित्व के प्रमुख कारणों का परीक्षण कीजिए तथा आगे की राह सुझाइए। **(150 Words)**

Page 09 : GS 2 : International Relation

भारत और चीन वर्ष 2025 में कूटनीतिक संबंधों के 75 वर्ष पूरे कर रहे हैं। हाल ही की घटनाएँ — कैलाश मानसरोवर यात्रा का पुनः प्रारम्भ, दोनों देशों के रक्षा मंत्रियों की मुलाकात तथा चीनी विदेश मंत्री की भारत यात्रा — आपसी संबंधों में हल्की गर्माहट का संकेत देती हैं। फिर भी, संबंध अब भी रणनीतिक अस्पष्टता, सीमा विवाद और सतर्क कूटनीति से घिरे हैं। लेख में नालंदा परंपरा को पुनर्जीवित करने की आवश्यकता बताई गई है, जो ज्ञान व संस्कृति पर आधारित गहन संवाद का प्रतीक है।

Breaking down the Chinese wall

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As India and China commemorate 75 years of diplomatic engagement this year, strong signs of a diplomatic thaw have emerged. The meeting between Defence Minister Rajnath Singh and his Chinese counterpart, Admiral Dong Jun, on the sidelines of the Shanghai Cooperation Organisation Defence Ministers' meeting in January; resumption of the Kailash Manasarovar Yatra in June; and Chinese Foreign Minister Wang Yi's two-day visit to India this week all offer glimpses of warmth.

A meeting point for two worlds

Long before modern diplomacy took shape, and borders were established and redrawn, the relationship between India and China was nurtured by something more enduring: the shared pursuit of knowledge. As early as the first millennium CE, Chinese monks such as Faxian, Xuanzang, and Yijing journeyed across treacherous landscapes to reach Indian centres of learning. At the heart of this exchange stood Nalanda, where ideas flowed more freely than goods, and religious belief and secular inquiry coexisted in harmony. Nalanda was a meeting point of the two worlds, where cultural and intellectual connections flourished far beyond the concerns of modern statehood. In the quest to revive Nalanda today, there is more than nostalgia; there is hope to rebuild the kind of meaningful, respectful engagement that once defined our ties.

Nalanda, both as an institution and as a philosophy, has long embodied a commitment to peace, dialogue, and intellectual diplomacy. It's enduring spirit lives on in its motto – "*Aa no bhadra kratavo yantu viśvata* (let noble thoughts come to us from all directions)." This same spirit lives on in the idea of *Vasudhaiva Kutumbakam* (the world as one family). This way of thinking has, for centuries, held together the threads of exchange between India and China.

Just as Nalanda once created space for dialogue and learning between civilisations, perhaps today too, India can draw from that spirit to shape how it engages with China

Since the time of Xuanzang, scholars, teachers, and students from both nations have engaged in meaningful interaction, unimpeded by the boundaries that define the modern state. Today, the space for such academic and cultural exchange seems to be narrowed. Should contemporary political complexities necessarily limit the flow of ideas between two ancient civilisations? Stalling of trade, recurring military confrontations, and hundreds of academic or people-to-people connections awaiting bureaucratic clearance have created a kind of stillness, one that feels far removed from the natural flow of exchange that once defined our ties. Why must scholars on either side require permission to engage in dialogue, or students hesitate before considering an academic exchange with institutions of global standing across the border?

There is immense potential for mutual learning. India can look to China's initiatives in areas such as food security, local infrastructure development, or grassroots entrepreneurship. And China's academic and policy community may find value in studying India's democratic decentralisation, open civil society engagement, or digital public goods framework. These are not points of comparison, but possible pathways of collaborative learning.

In this light, one wonders: why does India's engagement with China remain so carefully limited? Why does strategic ambiguity continue to define a relationship rooted in shared intellectual history? How can we move from reactive diplomacy towards a more confident, future-facing framework that honours the depth of our civilisational ties, while meeting the complexities of the present? How do we deal with the emergence of 'the gatekeeper states,' limiting the range of possibilities?

The Nalanda way

Just as Nalanda once created space for dialogue and learning between civilisations, perhaps today too, we can draw from that spirit to shape how we engage with China. There will always be areas where our paths differ: on the border, in trade, or in the way we see the region around us. But Nalanda reminds us that disagreement does not have to mean disengagement. It is possible to hold firm where we must, and still stay open to conversations where they matter.

This approach also calls for some reflection on how we prepare ourselves. We don't need to change our principles, but we may need to adapt how we practice them. Investing in stronger academic and policy research on China, allowing smoother academic exchanges in areas such as environment, health, and culture, and building long-term people-to-people connections are quiet but important steps. Nalanda drew its strength from more than just being a beacon of knowledge.

At the heart of Nalanda's tradition were values that still feel close to us: curiosity, compassion, and the transformative power of knowledge. Scholars such as Śīlabhadra, who taught the Chinese monk Xuanzang, showed that learning could also be a form of diplomacy. Nalanda wasn't just India's; it was also a place of deep importance to generations of Chinese scholars who carried its teachings home and helped shape the intellectual and spiritual fabric of East Asia. Today, perhaps these principles matter even more. If India and China can draw from this shared legacy with genuine intention, they may find a way to engage with each other more thoughtfully. Curiosity without fear, dialogue without suspicion, and clarity without aggression could be the beginning of a steadier path built on understanding and mutual respect. We need to break down our Chinese wall to move beyond the paranoia that sustains our China policy.

सभ्यतागत जुड़ाव

- ऐतिहासिक आदान–प्रदान: प्राचीन काल में चीनी भिक्षु ह्वेनसांग, फाहियान, ई-चिंग ने नालंदा में अध्ययन कर ज्ञान-संपदा को चीन ले जाया।
- नालंदा का प्रतीकात्मक महत्व: यह "आ नो भद्राः क्रतवो यन्तु विश्वतः" की भावना का प्रतिनिधित्व करता है, जिसमें हर दिशा से श्रेष्ठ विचार ग्रहण करने का संदेश है।
- दार्शनिक आधार: भारत का "वसुधैव कुटुम्बकम्" और चीन का सामंजस्यपूर्ण सह-अस्तित्व (harmonious coexistence) दोनों देशों को जोड़ने वाले तत्व हैं।

समकालीन चुनौतियाँ

1. सीमा विवाद: गलवान (2020) जैसी घटनाएँ विश्वास की कमी उत्पन्न करती हैं।
2. व्यापार असंतुलन: 2024 में द्विपक्षीय व्यापार लगभग 136 अरब डॉलर का रहा, परन्तु भारत का व्यापार घाटा बहुत बड़ा है।
3. शैक्षणिक व जन-जन आदान–प्रदान में बाधाएँ: अकादमिक सहयोग व छात्रवृत्ति अक्सर नौकरशाही अड़चनों से बाधित।
4. भूराजनीतिक कारक: भारत का क्वाड व इंडो-पैसिफिक रणनीति और चीन की आक्रामकता आपसी विश्वास घटाती है।
5. धारणा का अंतर: भारत चीन को सुरक्षा खतरे के रूप में देखता है, जबकि चीन अक्सर भारत की चिंताओं को क्षेत्रीय संतुलन मानकर अनदेखा करता है।

सहयोग की संभावनाएँ

- आपसी सीख:
    - भारत चीन से: खाद्य सुरक्षा, ग्रामीण अवसंरचना, उद्यमिता।
    - चीन भारत से: लोकतांत्रिक विकेन्द्रीकरण, सिविल सोसायटी सहभागिता, डिजिटल पब्लिक गुड्स।

साझा क्षेत्र: पर्यावरण, स्वास्थ्य, प्रौद्योगिकी शासन, सांस्कृतिक धरोहर।

अकादमिक कूटनीति: भारत में चीन अध्ययन (China Studies) को मज़बूत करना, छात्र व शोधार्थी आदान-प्रदान को सरल बनाना।

नालंदा दृष्टिकोण

- असहमति ≠ असंपर्क: सीमा व व्यापार विवादों के बावजूद संवाद के रास्ते खुले रहने चाहिए।
- सॉफ्ट पावर एवं बौद्धिक कूटनीति: शिक्षा, संस्कृति और शोध में निवेश छोटे लेकिन प्रभावी कदम हो सकते हैं।
- मूल्य आधारित दृष्टि: जिज्ञासा (निर्भय होकर सीखना), संवाद (संदेह रहित), और स्पष्टता (बिना आक्रामकता) ही स्थायी संबंधों की नींव बन सकते हैं।

निष्कर्ष

भारत–चीन संबंध प्रतिस्पर्धा और सहयोग दोनों से निर्मित हैं। नालंदा की विरासत बताती है कि जहाँ राजनीति असफल होती है, वहाँ विचार और संवाद से पुल बनाए जा सकते हैं। भारत के लिए "चीनी दीवार" को तोड़ना तभी संभव है जब वह सिद्धांतों पर दृढ़ रहकर भी सांस्कृतिक व बौद्धिक स्तर पर खुलेपन का परिचय दे। यही संतुलित दृष्टिकोण आपसी अविश्वास को कम कर स्थायी सहयोग की राह खोल सकता है।

UPSC Mains Practice Question

Ques: भारत–चीन संबंध संघर्ष और सहयोग के बीच फँसे हुए प्रतीत होते हैं। इस परिप्रेक्ष्य में, सांस्कृतिक एवं बौद्धिक कूटनीति को स्थायी सहभागिता के ढाँचे के रूप में चर्चा कीजिए। **(150 Words)**

Page : 08 Editorial Analysis

Making India's climate taxonomy framework work

Shashank Pandey

is a lawyer and a former Research Fellow at the Vidhi Centre for Legal Policy

In May this year, the Ministry of Finance released India's draft Climate Finance Taxonomy for public consultation. As a foundational tool, the taxonomy aims to mobilise climate-aligned investments, prevent greenwashing, and clarify for investors which sectors, technologies and practices contribute to mitigation, adaptation, or transition. Importantly, the document calls itself a "living" framework, adaptable to India's evolving priorities and international obligations. However, its success as a credible governance tool will depend on how it operationalises this principle.

The review architecture

Herein is a proposed review mechanism that is structured for the taxonomy, drawing from the recent regulatory innovations under the Paris Agreement's Article 6.4 Mechanism. The Article 6.4 Supervisory Body has adopted a legal and editorial review system for climate market instruments. These principles offer a useful reference for India's taxonomy to ensure investor confidence, legal clarity, and domestic-international alignment.

The review system for the climate finance taxonomy should function on two complementary levels. First, there must be a periodic review mechanism that allows for timely course correction.

These reviews should be annual and triggered by implementation gaps, evolving international obligations, stakeholder feedback, or policy changes. To be effective, they must follow a structured and predictable process, with fixed timelines, clear documentation protocols, and mandatory public consultation.

Alongside this, a recurring review should be institutionalised every five years. This deeper, more comprehensive, process would reassess the taxonomy in light of emerging trends in carbon markets, shifts in global climate finance definitions, and lessons learned from sectoral transitions. A five-year cycle corresponds with India's updated Nationally Determined Contributions timeline and the global stocktake process under the United Nations Framework Convention on Climate Change. Together, these two levels of review would ensure that the taxonomy remains both responsive in the short term and resilient in the long term.

This is important as the taxonomy's rollout coincides with critical developments in India's climate finance ecosystem

The substantive aspect of the review

Two key aspects must form the basis of any meaningful review: legal coherence and substantive content clarity. The legal assessment should examine the taxonomy's alignment with India's laws: Energy Conservation Act, SEBI norms, Carbon Credit Trading Scheme, and international obligations. The review should ensure enforceability, remove redundancies, clarify overlaps and harmonise terms. In addition, the review must identify interdependencies between climate finance mandates and other economic or fiscal measures such as green bonds, blended finance schemes, or environmental risk disclosures, so that revisional inconsistencies are avoided.

The substantive editorial review must ensure that the taxonomy remains readable, coherent and technically precise. Definitions must reflect evolving market standards and be usable by both experts and non-experts.

Where quantitative thresholds exist, for instance, greenhouse gas emissions reduction targets or energy efficiency benchmarks, these must be updated with empirical data and stakeholder input.

These reviews should ensure the taxonomy remains accessible for micro, small and medium enterprises, the informal sector, and vulnerable communities, crucial for net-zero goals, but which face barriers. It should provide simplified entry points, staggered compliance timelines, and proportionate expectations, especially in agriculture and small manufacturing.

Institutionalising accountability

To support such a review structure, the Ministry of Finance should establish a standing unit within the Department of Economic Affairs or an expert committee composed of stakeholders from financial regulators, climate science institutions, legal experts and civil society. Public dashboards can be developed to receive inputs, document implementation experiences and publish review reports. These measures will ensure the taxonomy evolves predictably and transparently

Annual review summaries and five-year revision proposals must be made available to the public, ideally in a consolidated format, to improve investor confidence and ease of access. This will also enable better coordination with parallel instruments such as India's carbon market mechanisms, disclosure obligations and green bond frameworks.

The taxonomy's rollout coincides with critical developments in India's climate finance ecosystem. The Carbon Credit Trading Scheme is expected to be fully operationalised, green bonds are entering mainstream portfolios, including on the stock market, and the pressure to align public investment flows with long-term climate goals is rising. A weak or opaque taxonomy will undercut these efforts. A 'living document' is only as effective as the process that keeps it alive through active review, transparent revision, and structured engagement. It is hoped that such consideration will form a part of the final climate taxonomy framework.

GS. Paper 03 Indian Economy

UPSC Mains Practice Question: भारत की ड्राफ्ट क्लाइमेट फाइनेंस टैक्सोनॉमी को जलवायु-अनुकूल निवेशों के मार्गदर्शन और ग्रीनवॉशिंग पर रोक लगाने के लिए एक "लिविंग फ्रेमवर्क" कहा गया है। इसकी आवश्यकता, समीक्षा तंत्र तथा जवाबदेही के संस्थानीकरण से जुड़ी चुनौतियों का आलोचनात्मक परीक्षण कीजिए। इसकी प्रभावशीलता बढ़ाने के लिए उपाय सुझाइए। (150 words)

Context :

मई 2025 में, वित्त मंत्रालय ने ड्राफ्ट क्लाइमेट फाइनेंस टैक्सोनॉमी जारी की — यह एक ऐसा उपकरण है जिसका उद्देश्य जलवायु-अनुकूल निवेशों का मार्गदर्शन करना, ग्रीनवॉशिंग पर रोक लगाना और यह स्पष्ट करना है कि कौन से क्षेत्र, प्रौद्योगिकियाँ और प्रथाएँ शमन, अनुकूलन या संक्रमण का समर्थन करती हैं। खुद को "लिविंग फ्रेमवर्क" कहकर, यह अनुकूलनशीलता पर जोर देती है। हालाँकि, इसकी विश्वसनीयता इस बात पर निर्भर करेगी कि यह समीक्षा, सामंजस्य और जवाबदेही को कितनी प्रभावी ढंग से संस्थागत बनाती है।

क्यों ज़रूरी है क्लाइमेट टैक्सोनॉमी

- वैश्विक सामंजस्य: भारत को अंतरराष्ट्रीय जलवायु वित्त मानकों के अनुरूप बनाने में मदद करती है।
- निवेशकों की स्पष्टता: यह पहचानती है कि वास्तव में कौन-से निवेश "ग्रीन" की श्रेणी में आते हैं।
- ग्रीनवॉशिंग पर रोक: कंपनियों को परियोजनाओं को झूठा "जलवायु-अनुकूल" बताने से रोकती है।
- नीति एकीकरण: कार्बन क्रेडिट बाज़ार, सेबी मानदंड और ग्रीन बॉन्ड्स से जोड़ती है।
- नेट-ज़ीरो मार्ग: यह सुनिश्चित करती है कि एमएसएमई, कृषि और कमजोर क्षेत्र पीछे न छूटें।

समीक्षा संरचना

वार्षिक समीक्षा:

- क्रियान्वयन की कमियों को दूर करने और नई नीतियों के अनुरूप ढालने के लिए।
- इसमें सार्वजनिक परामर्श, स्पष्ट दस्तावेज़ीकरण और तय समयसीमा शामिल होनी चाहिए।

पाँच वर्षीय समीक्षा:

- गहन और संरचनात्मक पुनर्मूल्यांकन, जो आधारित हो:
    - भारत की अद्यतन एनडीसीs (राष्ट्रीय स्तर पर निर्धारित योगदान) पर।
    - यूएनएफसीसीसी के तहत वैश्विक स्टॉकटेक पर।
    - कार्बन बाज़ार में बदलाव और क्षेत्रीय संक्रमण से मिली सीखों पर।

प्रमुख ठोस पहलू

कानूनी सामंजस्य:

- ऊर्जा संरक्षण अधिनियम, सेबी विनियम, कार्बन क्रेडिट ट्रेडिंग योजना के साथ संरेखण।
- दोहराव और विसंगतियों को हटाना।
- वित्तीय उपायों (ग्रीन बॉन्ड्स, ब्लेंडेड फाइनेंस, ईएसजी डिस्क्लोज़र) के साथ एकीकरण।

सामग्री की स्पष्टता:

- एमएसएमई और असंगठित क्षेत्र के लिए सुलभ परिभाषाएँ और सरल अनुपालन।
- अनुभवजन्य आँकड़ों के आधार पर उत्सर्जन सीमा और ऊर्जा दक्षता मानकों को अद्यतन करना।
- विशेषज्ञ और गैर-विशेषज्ञ दोनों के लिए पठनीयता सुनिश्चित करना।

जवाबदेही का संस्थानीकरण

- विशेषज्ञ समिति: आर्थिक मामलों के विभाग में, जिसमें नियामक, जलवायु वैज्ञानिक, विधिक विशेषज्ञ और नागरिक समाज शामिल हों।
- सार्वजनिक डैशबोर्ड: इनपुट जुटाने, क्रियान्वयन अनुभव साझा करने और रिपोर्ट प्रकाशित करने के लिए।
- पारदर्शिता: वार्षिक सारांश और पाँच वर्षीय संशोधन सार्वजनिक होने चाहिए।
- निवेशक विश्वास: कार्बन बाज़ार, प्रकटीकरण मानदंड और ग्रीन बॉन्ड्स के साथ समन्वय।

महत्व

यह मेल खाता है:

- कार्बन क्रेडिट ट्रेडिंग योजना के कार्यान्वयन के साथ।
- शेयर बाज़ार में ग्रीन बॉन्ड्स के बढ़ते उपयोग के साथ।
- सार्वजनिक निवेश को दीर्घकालिक जलवायु लक्ष्यों के अनुरूप करने के लिए वैश्विक दबाव के साथ।

कमज़ोर या अपारदर्शी टैक्सोनॉमी निवेशकों के विश्वास और भारत की जलवायु विश्वसनीयता को कमजोर कर सकती है।

निष्कर्ष

भारत की क्लाइमेट टैक्सोनॉमी एक अग्रणी शासन उपकरण है, जो भारत को सतत वित्त के क्षेत्र में अग्रणी बना सकती है। हालाँकि, इसके "लिविंग फ्रेमवर्क" के वादे को तभी साकार किया जा सकता है जब समीक्षाएँ समय पर हों, भागीदारी व्यापक हो, और जवाबदेही संस्थागत हो। कानूनी स्पष्टता, सुलभता और पारदर्शिता सुनिश्चित करके यह टैक्सोनॉमी बड़े पैमाने पर जलवायु वित्त जुटा सकती है और ग्रीनवॉशिंग से बचाव कर सकती है — जो भारत की नेट-ज़ीरो यात्रा में एक अहम कदम है।