



Tissue Culture Laboratory at the Asola Bhatti Wildlife Sanctuary

[Source: HT](#)

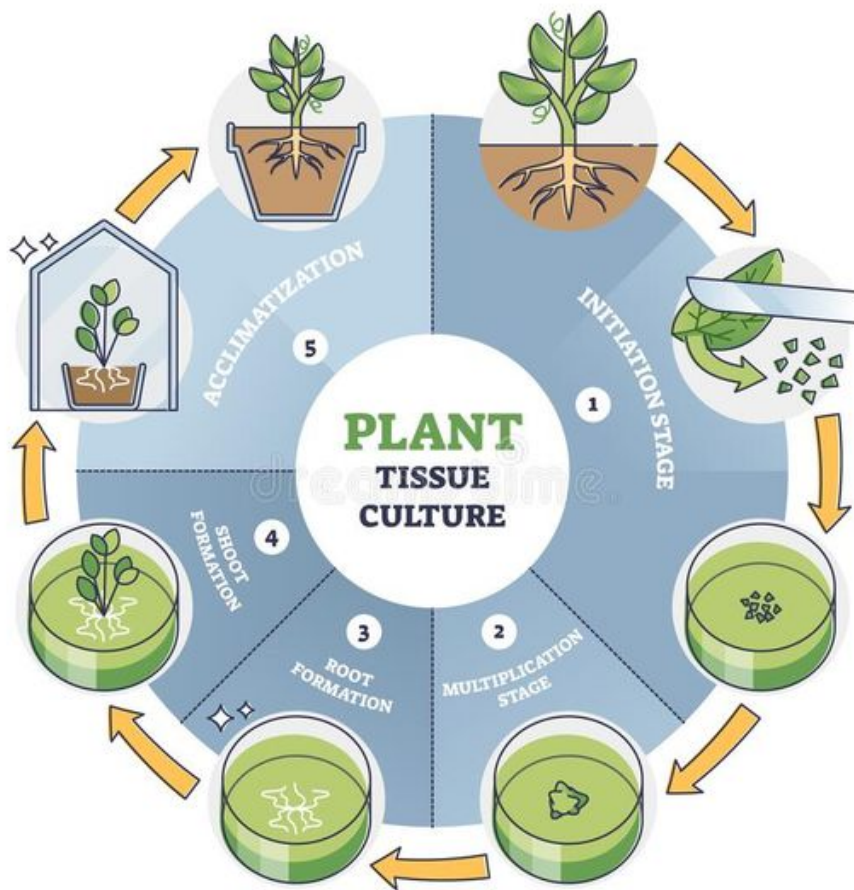
Why in News?

Recently, the Delhi forest department has initiated the establishment of a tissue culture laboratory at the Asola Bhatti Wildlife Sanctuary to conserve rare native trees.

- The primary goal of the laboratory is to grow **endangered native** Delhi trees in a controlled environment and regenerate saplings of species facing **regeneration challenges** due to [invasive species](#).

What are key Facts about the Tissue Culture Laboratory?

- **Tissue Culture Laboratory:**
 - The lab will be able to extract plant tissue from an in-vitro fully grown plant, generating **multiple trees** from the same tree.
 - The forest department will take assistance from botanists and scientists from the [Indian Council of Forestry Research and Education \(ICFRE\)](#) and the [Forest Research Institute \(FRI\)](#).
- **Other Similar Laboratories:**
 - The [National Facility for Plant Tissue Culture Repository \(NFPTCR\)](#) was established in Delhi at the [National Bureau of Plant Genetic Resources \(NBGR\)](#) in 1986.
 - They carry out tissue culture experiments and research on **five plant types** -- tubers, bulbs, spices, plantation crops, horticultural crops, and medicinal and aromatic plants.
- **Application:**
 - **The Aravalli Plan:**
 - The regeneration of ridge species like Kulu (ghost tree), palash, doodhi, and dhau is hindered by invasive species, resulting in **poor survival rates**, with large-scale multiplication achievable **only** through tissue culture, **particularly shoot culture**.
 - The lab will also be useful in culturing endangered [medicinal plants](#).
 - **Success Stories:**
 - Tissue culture has proven **highly effective** in agriculture, particularly with crops such as **bananas, apples, pomegranates, and jatropha**, offering **higher yields** compared to traditional farming methods.
- **Issues:**
 - Biodiversity experts have contended that cloning should be limited to "**extremely rare trees**" to avoid **genetic homogeneity** and vulnerability to specific **diseases**.
 - Cloning can result in **restricted genetic diversity**, with the trees being clones of a single tree or plant.
 - To avoid this, one should not restrict oneself to a single seed variety; instead, **use different parent seeds** or seed varieties to prevent having multiple cloned trees.
 - Experts believe that commonly found species like khair, dhak and desi babool in the Aravallis could waste public funds, despite **potential benefits for endangered or nearly extinct species**.



What is Tissue Culture?

- Tissue culture, also known as [micro-propagation](#), allows multiple plants to be produced from a parent plant using [in-vitro tissue](#), which is incubated under a controlled environment.
- **Types of Plant Tissue culture:**
 - **Callus Culture:** Involves **cultivating undifferentiated masses** of cells (callus) from explants.
 - **Cell Suspension Culture:** Cultures **individual cells** or small aggregates of cells in a liquid medium.
 - **Anther/Microspore Culture:** Used for **producing haploid plants** from pollen grains or anthers.
 - **Protoplast Culture:** Cultures **isolated plant cells** without cell walls.
- **Applications of Plant Tissue Culture:**
 - **Micropropagation:** Rapid **clonal propagation** of plants by culturing small pieces of plant tissue.
 - **Soma-clonal Variation:** Studying **genetic variation** among plant cells in culture.
 - **Transgenic Plants:** Introducing and expressing foreign genes (transgenes) in plant cells.
 - **Induction and Selection of Mutations:** Using mutagens to induce mutations for specific traits.

Animal Tissue Culture:

- Animal tissue culture is the **in vitro maintenance** and propagation of isolated cells, tissues, or organs **from animals in an appropriate artificial environment**.
- Cells used in animal tissue culture are usually obtained from **multicellular eukaryotes** and their established cell lines.
- This technique allows the study of **cell functions, mechanisms**, and applications.
- Animal cell culture has revolutionised research and **biotechnology**, providing insights into cell behaviour and applications across various fields.

Asola Wildlife Sanctuary

- [Asola-Bhatti Wildlife Sanctuary](#) is located at the end of an important wildlife corridor that starts from [Sariska National Park](#) in Alwar and passes through Mewat, Faridabad and Gurugram districts of Haryana.
- The region has a **semiarid climate** with notable diurnal temperature variations.
- The vegetation in the Wildlife Sanctuary is predominantly an **open canopied thorny scrub**. The native plants exhibit **xerophytic adaptations** such as thorny appendages, and wax-coated, succulent, and tomentose leaves.
- Major wildlife species include Peafowl, Common Woodshrike, Sirkeer Malkoha, Nilgai, Golden Jackals, Spotted deer, etc.

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UPSC Civil Services Examination, Previous Year Questions (PYQ)

Prelims

Q. With reference to the current trends in the cultivation of sugarcane in India, consider the following statements: (2020)

1. A substantial saving in seed material is made when 'bud chip settlings' are raised in a nurse, and transplanted in the main field.
2. When direct planting of setts is done, the germination percentage is better with single-budded setts as compared to setts with many buds.
3. If bad weather conditions prevail when setts are directly planted, single-budded setts have better survival as compared to large setts.
4. Sugarcane can be cultivated using settlings prepared from tissue culture.

Which of the statements given above is/are correct?

- (a) 1 and 2 only
- (b) 3 only
- (c) 1 and 4 only
- (d) 2, 3 and 4 only

Ans: (c)

Q. Consider the following statements: (2009)

1. Sweet orange plant is propagated by grafting technique.
2. Jasmine plant is propagated by layering technique.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

Ans: (c)

World Anti-Doping Report 2022

For Prelims: [World Anti-Doping Agency](#), [National Anti-Doping Agency](#), [Anti-Doping](#), [National Anti-Doping Act](#), [UNESCO](#).

For Mains: Ethical implications of doping in sports, Effectiveness of government policies related to Anti-Doping, India's anti-doping efforts

[Source: BS](#)

Why in News?

The [World Anti-Doping Agency \(WADA\) anti-doping report, 2022](#), released by the WADA reveals alarming statistics on **global doping violations**, emphasising the need for stringent measures to safeguard the integrity of sports.

What are the Key Findings of the Report?

▪ India Leads Globally in Doping Offences:

- India emerged with the highest percentage of doping offenders, accounting for 3.26% of tested athletes.
 - Out of 3,865 samples tested by India's [National Anti-Doping Agency \(NADA\)](#), 125 returned **Adverse Analytical Findings (AAFs)**, making India the only country with over 100 positive results and the highest among nations testing more than 2,000 samples.
 - An AAF is a report from a **WADA-accredited laboratory** that identifies the **presence of a prohibited substance and/or its metabolites or markers in a sample**.
- Despite being **11th in the number of samples tested**, India's doping violations surpassed major sporting nations like Russia, the USA, Italy, and France.

▪ Comparison with Other Nations:

- South Africa followed India with 2.09% of samples testing positive among nations collecting over 2,000 samples.
- **China tested the most samples (17,357), producing only 0.25% AAFs**, while the USA (84) and Russia (85) closely followed India in the number of positive results.

▪ Overall Increase in Testing and AAFs:

- WADA reported a 6.4% increase in the total number of samples analysed and reported into its **Anti-Doping Administration and Management System (ADAMS)** in 2022 compared to 2021, signalling a positive trend towards maintaining the integrity of sports.
 - The percentage of AAFs rose from 0.65% in 2021 to 0.77% in 2022.
- The director general of WADA, emphasised the importance of intelligence-led strategic testing plans along with values-based education, intelligence, investigations, and other strategies to combat doping effectively.

What are the Implications of These Findings for India?

- **Concerns Regarding Athletes:**
 - The prevalence of **doping among young athletes** raises serious concerns about their **physical and mental development**.
 - Doping poses significant health risks to athletes and undermines their long-term well-being.
 - It is imperative for **India to prioritise the health and safety of its athletes** by implementing measures to prevent doping and promote clean sports culture.
- **Reputation Damage:**
 - India's standing as the country with the highest percentage of doping offenders tarnishes its **reputation in the international sports community**.
 - The prevalence of doping could **erode trust in Indian athletes and cast doubts on their achievements**, impacting India's credibility in global sports.
- **Olympic 2024:**
 - A total of **142 Indian athletes were caught for doping-related activities** in the period between April 2022 and March 2023, data compiled by the NADA has revealed.
 - Doping violations may pose a significant risk of disqualification for Indian athletes in the coming [Olympics 2024](#), depriving them of the opportunity to compete and represent their country at the highest level of sporting competition.
 - The threat of disqualification highlights the need for India to address doping effectively and ensure clean participation in the Olympics.
- **Discrepancies in Testing Efforts:**
 - While the total number of samples tested increased from 1,794 in 2021 to 3,865 in 2022, it pales in **comparison to countries like China, which tested 17,357 samples (almost five times that of India) but produced just 33 positive results**.
 - Despite increased testing, the number of positive cases remains a concern, indicating the need for more comprehensive measures.
- **Regulatory Oversight:**
 - India's position at the top of the doping offenders list raises concerns and highlights systemic **issues within the country's anti-doping framework**.
 - There is a pressing need to strengthen regulatory frameworks and enhance monitoring mechanisms to curb doping effectively.
- **Economic Impact:**
 - The doping crisis could have economic repercussions, affecting **sponsorships, investments, and revenue streams** associated with Indian sports.
 - Upholding integrity in sports is essential to sustain and grow India's sports industry and economy.

What is Anti-Doping?

- **About:**
 - Doping is the **act of consuming artificial and often illegal substances to gain an advantage over others** in sporting competitions (For example: anabolic steroids, human growth hormones, stimulants and diuretics).
 - Doping products are often illegally produced, trafficked and distributed. As they are rarely approved for public use, their consumption is dangerous and poses a serious health risk to both professional and amateur sports people.
 - **Anti Doping** is opposing or **prohibiting illegal doping to improve athletic performance**.
- **India's Initiatives Related to Anti-Doping:**
 - **National Anti-Doping Agency (NADA):**
 - NADA was set up as a registered society under the Societies Registration Act of 1860 in 2005, with a mandate of creating dope-free sports in India.
 - NADA is responsible for planning, implementing, and coordinating India's anti-doping activities. It **adheres to the World Anti-Doping Agency (WADA) code and regulations**.
 - **The National Anti-Doping Act 2022:**
 - The [National Anti-Doping Act 2022](#) provides legal backing to NADA's. for regulating

anti-doping activities in sports and to give effect to the [United Nations Educational, Scientific and Cultural Organisation \(UNESCO\)](#) International Convention against doping in sport.

- The act aims to ensure the highest standards of integrity while participating and preparing for sports competitions, both domestically and internationally.
- **National Dope Testing Laboratories (NDTL):**
 - NDTL under the **Ministry of Youth Affairs and Sports**, is responsible for sample analysis and research work in the field of dope analysis.
 - The **NDTL is WADA-accredited**, this accreditation is a testament to the NDTL's commitment to quality and accuracy in its testing procedures.

World Anti-Doping Agency (WADA)

- Established in 1999 by the **International Olympic Committee (IOC)** to combat doping in sports globally. WADA's governance and funding are based on equal partnership between the Sport Movement and Governments of the world.
 - The **IOC is a not-for-profit independent international organisation** committed to building a better world through sport. Established in 1894, it is the supreme authority of the **Olympic Movement**, fostering collaboration among all parties involved in the Olympic family.
- Its mission is to promote and coordinate the fight against doping in sports internationally.
- **Headquarters: Montreal (Canada).**
- The **World Anti-Doping Code (Code)** is the core document produced by WADA that harmonises anti-doping policies, rules and regulations within sports organisations and among public authorities.
 - It is designed to harmonise anti-doping policies and ensure the standards are the same for all athletes.
- The **WADA Prohibited List** is the international standard for identifying banned substances and methods in sports.
 - It is updated annually and applies to both in-competition and out-of-competition scenarios, as well as specific sports.

Way Forward

- **Increased Vigilance:**
 - Authorities need to tread cautiously and increase vigilance to prevent doping scandals from tarnishing the country's reputation.
 - NADA should ramp up testing efforts to detect and deter doping among athletes, especially high-profile ones.
 - All stakeholders, including NADA, national sports federations, the Sports Authority of India, and related NGOs, must collaborate to tackle the issue effectively.
- **China's Approach:**
 - Consideration of **criminalising doping, with penalties including jail time** for athletes and coaches, similar to China's approach.
 - China criminalised doping in sports resulting in a significant drop in doping cases.
 - Under these rules individuals encouraging athletes to use banned substances **may face up to three years in prison and a fine**. Organisers of doping may receive even harsher penalties, and knowingly offering banned substances to athletes is deemed a criminal offence.
 - In the 2022 WADA report, China had significantly fewer positive results, demonstrating the effectiveness of strict penalties.
- **Education:**
 - Athletes need to be educated about the dangers of doping and provided with proper guidance on supplements.
- **Doping Detection:**

- Develop and **implement new technologies to stay ahead of evolving doping methods**. Use athlete data, competition trends, and whistleblower information to target high-risk areas.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Mains

Q. An athlete participates in the Olympics for personal triumph and nation's glory; victors are showered with cash incentives by various agencies, on their return. Discuss the merit of state sponsored talent hunt and its cultivation as against the rationale of a reward mechanism as encouragement. **(2014)**

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