Prelim Bits 16-10-2023 | UPSC Daily Current Affairs

Dhib and Nimr

In light of recent Israel-Palestine conflicts, the status of Arabian wolf and leopard becomes endangered in the region.

- **Dhib** – Arabian wolf (Canis lupus arabs)
- **Nimr** – Arabian leopard (Panthera pardus nimr)

Dhib is world's smallest wolf and Nimr is the world's smallest leopard.

- **Geographical Range** – Whole of the Arabian Peninsula.

Negev desert extends from southern Israel till the Gulf of Aqaba, Judaean desert is between Israel and the Palestinian West Bank and Arava Valley forms the border between Israel and Jordan.

- Both are *critically endangered in the northern half* of their range.
- **Challenges**
  - Hunting of both prey and predators.
  - Competition between wild and domestic prey
  - Over-grazing of the vulnerable vegetation
  - Man-Animal conflict if leopards are forced to hunt livestock
  - Armed conflicts between Israel and Palestine

There has been no armed conflict in the Negev and Arava valley as they are unanimously considered as part of the state of Israel.

- **Conservation** - Increase tolerance and coexistence within pastoralist landscapes.
- To reduce hunting of both animals and their prey.

Status of Nimr

- It has *lost as much as 98% of its historical range*.
- Its populations are highly isolated and fragmented.
- It is *extinct in its entire northern range* like Sinai Peninsula, the Negev, and the Judaean Desert.
- Remnant nuclei are Oman, Yemen and southern Saudi Arabia.

Status of Dhib

- It remains the *sole apex predator* across most of its range.
- Their stable population is confined to the Arava Valley and Negev Desert in Israel.
- They have threat in pastoral areas as their acceptance is low unlike crop growing areas.

Arabian wolves suppress smaller canids like jackals and foxes in this region and thus play an important ecological role in the desert ecosystem.

References

Down To Earth| Dhib and Nimr

One CGIAR Partnership

The ICRISAT has signed the CGIAR Integration Framework Agreement (IFA) to work towards a One CGIAR approach.

- **One CGIAR approach** – It is an initiative of Consortium of International Agricultural Research Centres (CGIAR).
- **Objectives** – A unified approach to *transform food, land, and water systems* to address the challenges posed by climate crisis.
- To deliver a *food and nutrition secure future* by working together.
- **Partnership** – It involves the CGIAR System Organisation and 12 One CGIAR research centres.

CGIAR	
Set up	1971
Body	Publicly-funded network of agrifood research centres.
Research Centres	15 international agricultural research institutes.

- It holds *world's largest public collection of unique plant, livestock and aquatic organism germplasms* that is used for food production and to ensure global food security.

Impact Areas of CGIAR
• Climate adaptation & mitigation. • Environmental health & biodiversity. • Nutrition, health & food security. • Poverty reduction, livelihoods & jobs. • Gender equality, youth & social inclusion.

- **Significance of joining of ICRISAT** – It has the potential to drive profound transformation across the world's arid regions.

References

1. The Hindu Business Line| ICRISAT joins One CGIAR partnership

2. CGIAR| Impact areas of CGIAR

NexCAR19

Recently, India's homegrown CAR-T cell therapy, a form of immunotherapy got market authorisation.

- It is an indigenously developed CD19-targeted CAR-T cell therapy.

NexCAR19 is India's 1st CAR T-cell therapy to get approval from the Central Drugs Standard Control Organization (CDSCO).

- **Produced by** – Immunoadoptive Cell Therapy Private Limited (ImmunoACT) in Mumbai.
- **Treatment** – Relapsed refractory B-cell lymphoma and leukaemia.

CD-19 is biomarker for B lymphocytes that is utilised as a target for leukaemia immunotherapies.

- **Working Mechanism** – It works by redirecting a genetically altered patient's own immune cells (T-cells) in the laboratory, to directly identify and attack cancer cells.
- CAR T-cells have the *potential to act as 'living drugs'*, providing long-term protection against relapse.
- **Cytokine release syndrome (CRS)** – It is one among the side effects of CAR T-cell therapy.
- When CAR T-cells multiply, large amounts of cytokines is released into the blood, which ramp up the immune system.
- **Advantages**
  - NexCAR19 has relatively higher safety profile of CRS.
  - It has excellent balance of efficacy and low toxicity.
  - Phase I and II clinical trials data indicated a 70% overall response rate.
- **Enhanced Accessibility** – It can be accessible at 20 Indian government and private hospitals across major cities.
- **Reduced Cost** – It will around Rs 30-35 lakh per patient which were previously around $400,000 or over Rs 3.3 crore.

References

Down To Earth| NexCAR19 Therapy

Pharmacopoeial Discussion Group (PDG)

Recently, Indian Pharmacopoeia Commission (IPC) became the member of PDG.

- **Formation** – 1989
- **Members** – European Pharmacopoeia (Ph. Eur.), the Japanese Pharmacopoeia (JP) and

the United States Pharmacopeia (USP) and Indian Pharmacopoeia (IP).

IPC was only Pharmacopoeia body in the world to be selected for pilot phase initiated in September 2022.

- **Observer** – World Health Organization (WHO) since 2001
- **Objective**
  - To harmonize global pharmacopoeial standards.
  - To reduce manufacturers' burden of having to perform analytical procedures in different ways.

A pharmacopoeial general chapter or other pharmacopoeial document is harmonized when a pharmaceutical substance or product tested by the document's harmonized procedure yields the same results and the same accept/reject decision is reached.

- **Meeting** – Twice a year and holds monthly status and technical teleconferences to advance harmonization work.

Global Impact of IPC as PDG Member

- **International Recognition** – It will improve the acceptance of Indian pharmaceutical products in global markets.
- **Progressive pharmacopoeia** – It will establish IP to designs drug quality standards at par with global standards.
- **Increases Production** – It will lead to production of world class pharmaceutical products for domestic and export markets.
- **Access to Global Markets** – PDG membership will facilitate enhanced export to other member countries.
- **Improves Regulatory Compliance** – It is due to exchange of information and best practices with other PDG members.
- **Global Health Impact** – The harmonization of standards helps to prevent the circulation of substandard or counterfeit drugs.

References

1. PIB| IPC joins in PDG
2. USP| PDG

Quantum Algorithms

Quantum computers can efficiently solve problems that are very difficult to solve with a classical computer.

- While hardware is available to build a quantum computer, exploiting its quantum features requires smart algorithms.

- **Algorithm** – It is a sequence of logically connected mathematical steps that solve a problem.
    - For example, an algorithm to add 3 numbers can have 2 steps, add the 1st 2 numbers in the 1st step and the result to the 3rd number in the 2nd step.

Classical Algorithm	Quantum Algorithm
Higher sequence of steps	Relatively lesser steps
Use semiconductor based gates	Use quantum gates
Bit is used to encode information.	Qubit is used to encode information.
2 distinct states (0 or 1).	3 distinct states.
No state of superposition.	It exhibit state of superposition that is to exist as 1 and 0 at the same time.

- **Shor's algorithm** – It is one of the earliest quantum algorithms which is the *factorisation algorithm* developed by Peter Shor.
- **Grover's and Deutsch-Jozsa algorithms** – It is the quantum search algorithm developed by Lov Grover.
- It *looks for a numerical pattern in a large list* of numbers.
    - For instance, to identify a pattern from a list of one-million patterns, the classical approach may need half a million steps but the quantum algorithm will require only a 1000 steps.

For every 100x increase in the list's size, Grover's algorithm will need only 10x more steps.

References

The Hindu| Quantum Algorithms