Issues in Tiger Conservation

What is the issue?

Reports suggest increasing tiger numbers but there comes a question of whether the rise in tiger numbers is enough to prevent their extinction.

What is the basis for determining the extinction of a species?

> *Global Tiger Day is celebrated on July 29th. It was founded in 2010, when 13 tiger range countries came together to create Tx2 – the global goal to double the number of wild tigers by the year 2022.*

- **Numbers**- Populations that are smaller than 100 breeding individuals have a high probability of extinction.
- Small populations lead to inbreeding and exposes the disadvantageous genetic variants that are present in all genomes.
- These detrimental genetic variants cause inbreeding depression, and reduced survival and reproduction of inbred individuals.
- **Landscape**- For populations to persist, they should be part of larger landscapes with other such populations that are connected.
- Small and isolated populations face a high probability of extinction because chance events may cause them to lose advantageous genetic variants, while other, detrimental genetic variants might increase in frequency. This process is called **genetic drift.**
- **Actual picture-** The distribution of tigers across their range shows that most tiger 'populations' are smaller than 100 thus revealing that most tiger populations do not have a high chance of survival.
- Also, most tiger reserves in India are small and embedded in human-dominated landscapes.

What do research findings indicate?

- Tigers can be genetically sampled using their excreta/scat, hair and other biological samples from different tiger reserves and analysed.
- Genetic variants can compared across tiger reserves.
- Sets of tiger reserves that show shared genetic variation are well connected — the inference is that the intervening landscapes facilitate connectivity or movement.
- On the flip side, sets of tiger reserves that share less genetic variation must have barriers or landscapes that affect movement and connectivity.
- **Findings-** Most land-use types were not too bad for tiger connectivity, including agricultural fields.
- The presence of built-up areas and high traffic roads greatly impeded tiger movement.

- Fencing tiger reserves and isolating them resulted in high extinction.
- The extinction could be avoided if corridors were safeguarded such as having an underpass to allow wildlife movement and connectivity.
- As long as we manage landscapes outside tiger reserves to allow tiger movement, and protect prey and tigers inside tiger reserves, tigers are sure to survive in landscapes such as central India.

What about tiger populations that are already isolated?

- **Odisha**- Black tigers were found only in the Similipal tiger reserve in Odisha demonstrating the genetic effects of isolation.
- Mutation in a specific gene causes the pseudo- melanistic or black tigers to look this way.
- Genetic drift, or random events have led to the genetic variant that causes pseudomelanistic coat colour becoming common only in Similipal.
- **Rajasthan**- In Rajasthan, genome sequences from wild tigers reveal that individuals in the Ranthambore tiger reserve show inbreeding.
- Individuals are related and carry potentially disadvantageous genetic variants, which might affect the survival and the reproduction of tigers in Ranthambore in future.

What are the strategies for the future?

- Special attention is needed for populations that are becoming isolated and facing the genetic consequences of such isolation.
- The future of such populations may depend on genetic rescue or even the introduction of novel genetic variants.
- Novel genome sequencing technology provides an opportunity to understand tigers much better in the context of their conservation.
- The future of tigers will require a ‘dialogue’ between such data and management strategies in order to ensure their survival.

References

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