

New smart cage can smoothen cattle transport in India

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A modular, flexible cattle cage developed by researchers that can be adjusted to fit different vehicles, complete with a ramp that doubles as a door can help ease transport of cattle in villages, particularly take farm animals to the cattle market.

In the heart of India's rural landscapes, where cattle are vital companions to farmers, the journey from one town to another can often be perilous—not just for people, but for the animals.

Traditionally, cattle are transported in open or ill-fitted goods carrier trucks with no proper loading mechanisms. This exposes them to high stress, injuries, and even fatal accidents. These outdated practices also create logistical headaches for farmers and transporters, all while violating basic animal welfare norms.

An innovation by Prof. Sandip S. Patil from Guru Gobind Singh College of Engineering and Research Centre in Nashik, Maharashtra has the potential to change that scenario.

Through a project funded by DST-SEED (Science for Equity, Empowerment, and Development), his team has developed a cage that can make cattle transport safer, easier, and cheaper.



Fig 1: Prof. Sandip S. Patil & his team from Guru Gobind Singh College of Engineering and Research Centre in Nashik, Maharashtra

This is not just a cage, but a science-driven mobility solution designed with telescopic mechanisms, foldable ramps, and reinforced metal frames, engineered to reduce injuries, lower stress, and dramatically improve loading and unloading for cattle.

It is armed with telescopic sliding, that can match the size of the vehicle, a roller-assisted movement that allows for easy cage adjustment, foldable ramp cum door that provides a seamless way to load cattle and doubles up as a safety gate, a cross-link mesh design that adds durability while improving airflow. The design was tested with field surveys, farmer feedback, and Computational

Fluid Dynamics (CFD) to ensure proper ventilation.

The cage can reduce animal injuries and stress during transit and has simplified handling, especially for small-scale farmers. It is cost-effective and scalable, ideal for rural and semi-urban regions, compliant with animal welfare laws, potentially reducing legal issues for transporters and adaptable to double-storied configurations, making it suitable for larger vehicles and heavier loads.



Fig 2: *Modular Cage with adjustable ramp for ease of loading and unloading as per the specified guidelines obtained from the user*

This system can also be used in dairies, *Gaushalas*, veterinary operations and for safe and efficient short-distance livestock movement and can help communities by cutting losses, saving labour, and promoting humane transport practices.

The design has been recognized with patents and academic publications, including two Indian patents in 2024 for modular and double-storey versions.

Trial of the transport cage carried out in Ambad Village, Nashik. Plans are underway to scale the project through CSR funding and wider implementation efforts.

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