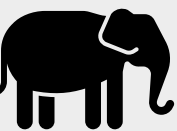


Hanging Solar Fences, Sound Alerts, Warning Lights



**A solution for
preventing “elephants entry into agricultural
fields | human fatalities | animal killings” and
enhancing the welfare of captive elephants**

Published by Elsa Foundation

India

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About us:

Elsa Foundation is a non-profit charitable trust that focuses on the conservation of biodiversity, prevention of cruelty to animals and animal rights issues of both domestic and wild animals. It opposes keeping wild animals in captivity.

We have travelled to several countries to study best practices and implement them in India.

The foundation supports various government bodies, in informed policy-making and decision-making on critical issues impacting biodiversity and the rights of animals.

Our work areas are research, advocacy, awareness, publication, support in policy and decision-making.

Website: www.elsafoundationcharity.org

Cover Image: Crown Solar

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Other Publications By The Foundation

Captive Elephants Slavery

Appalling living conditions of captive elephants and the problems faced by them

Wild Elephants Capture and Taming

A wholistic view of this barbaric practice

Six highly critical problems can be addressed by hanging solar fences, sound alerts and warning lights

- 1. Elephants entry into Agri fields and crop consumption.**
- 2. Human fatalities due to accidental close encounters between humans and elephants at the Agri fields.**
- 3. Elephants killed by farmers by using live AC power**
- 4. Due to crop consumption / human fatalities, the capture of wild elephants and converting them to captive elephants by barbaric taming process. Life-long chained captivity of these elephants.**
- 5. Prolonged chaining of forest department camp elephants**
- 6. Elephants killed by train accidents**

CHAPTER ONE: CRITICAL PROBLEMS-1, 2 & 3

- Introduction
- **Critical problem 1:** Elephants entry into Agri fields and crop consumption.
- **Critical Problem 2:** Accidental Human-Elephant interaction at Agri fields and fatalities of humans.
- Problems with horizontal fences
- **Critical Problem 3:** Illegal fatal live AC used in fencing by farmers
- National level data on elephant killings by electrocution and poisoning

Introduction

Hanging solar fences provide a solution to six highly critical problems that are found in all elephant states, which are explained here

- ✚ Elephants entry into Agri fields and crop consumption.
- ✚ Human fatalities due to accidental close encounters between humans and elephants at the Agri fields.
- ✚ Elephants killed by farmers by using live AC power
- ✚ Due to crop consumption / human fatalities, the capture of wild elephants and converting them to captive elephants by barbaric taming process. Life-long chained captivity of these elephants.
- ✚ Prolonged chaining of forest department camp elephants
- ✚ Elephants killed by train accidents

Critical Problems-1 & 2

Why there is are human-elephant negative interactions

There are two main reasons for human-elephant negative interactions

Encroachment of elephant habitats, corridors (reference section gives details of research done in Coimbatore, Dharmapuri and Hosur forest regions)

Elephants' preference to consume agricultural produce (crops and other species such as plantain).

Why do elephants prefer to consume agricultural produce?

It has to be borne in mind that, according to elephants, whatever is green, is food for them. They cannot differentiate between a privately owned farm and a forest resource. Elephants prefer agricultural produce as it is highly nutritious, tasty and easily available in the villages near the forest border.

Impact

Loss of revenue due to loss of crops

Accidental encounters of humans and elephants at Agri fields and the resulting human fatalities.

The impact of this goes up to "retaliation killing" of elephants, killing elephants with AC power supply as a preventive measure (even before they consume crops). The death toll on both human and elephant sides is rising. This is a highly critical matter and needs immediate remedy



Damage to agricultural produce caused by elephants

Problems with horizontal fences used in Agri fields



Pulling the fence pole using trunk and breaking the fence. Pic - The Wild Elephant



Breaking horizontal power fence using tusk (tusk does not conduct electricity). Pic – Protect Elephants



Pushing the horizontal fence post using foot pad in the non-power conductive portion. Toe nails are also used to push (Toe nails do not conduct electricity). Pic - The Wild Tube



Pushing the horizontal fence post using trunk in the non-power conductive portion. Pic-The Wild Tube



**Main solar cable carrying post (on right) and supporting post (on left) damaged by elephants.
Poles do NOT carry the power**

**Another method of breaking a horizontal fence is -
Dropping a large tree branch on the fence**

Dangerous horizontal metal rail bar fences



Elephant died trying to cross iron rail bar fence. Pic – The News Minute



Elephant alive and trapped under metal rail bar, while trying to crawl through the gap. Pic - Newsflare

As horizontal power fences (or)
Diamond mesh fences (or)
Barbed wire fences are NOT effective
in protecting the Agri fields from
elephants, in several incidents across
the country, farmers had illegally
passed live AC power in the horizontal
fences, which had killed several
hundreds of elephants and other
animals in the past few decades.
Farmers have also poisoned and
killed elephants

Two female elephants and a makhna killed by illegal electric fence in Dharmapuri

Two calves that were part of the group however were saved in time by Forest Squad.

March 07, 2023 09:02 am | Updated 08:10 pm IST - DHARMAPURI

P.V. SRIVIDYA

COMMENTS SHARE

TN govt. created “Power Fencing Rules” under the “Wildlife Protection Act” to prevent such incidents in future. It is attached in the Appendix section. This is an excellent initiative



The three female elephants which were electrocuted by an illegal electric farm fence near a village in Marandahalli on Monday, March 6, 2023. | Photo Credit: N. Bashkaran

Two adult female elephants and a makhna were electrocuted by an illegal electric farm fence here, near a village in Marandahalli late Monday, March 6, 2023. Two calves that



In this incident two mother elephants were killed and two young calves became orphans

Data of elephants killed by electrocution and poisoning

ELEPHANT CASUALTIES BY ELECTROCUTION

State	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Andhra Pradesh	0	1	2	2	1	0	2	5	1	NR
Arunachal Pradesh	0	0	0	0	NR	NR	0	0	0	NR
Assam	11	7	13	9	11	24	9	11	13	12
Chhattisgarh	4	NR	2	5	3	2	6	2	7	4
Jharkhand	3	1	0	0	0	1	1	5	5	4
Karnataka	14	4	15	8	6	10	9	8	9	7
Kerala	4	0	3	1	5	4	6	4	2	6
Maharashtra	0	0	0	0	0	0	0	0	NR	0
Meghalaya	9	3	3	0	1	3	0	5	0	1
Nagaland	0	0	0	0	0	0	4	2	1	1
Odisha	13	6	4	14	6	9	24	9	8	13
Tamil Nadu	2	6	9	8	7	11	10	15	9	5
Tripura	0	0	0	0	0	0	NR	0	0	0
Uttar Pradesh	0	0	0	0	3	0	3	3	0	2
Uttarakhand	3	1	4	1	4	3	3	2	NR	NR
West Bengal	1	6	9	15	9	2	4	5	10	2
Total	64	35	64	63	56	69	81	76	65	57

*NR- Information not received from State.

Total reported electrocution elephant killing cases in 10 years: 630

ELEPHANT DEATHS BY POISONING

State	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Andhra Pradesh	0	0	0	1	0	0	0	0	0	NR
Arunachal Pradesh	0	0	0	0	NR	NR	0	0	0	NR
Assam	3	1	3	1	4	6	8	0	1	6
Chhattisgarh	0	NR	0	0	0	0	0	0	1	0
Jharkhand	0	0	0	2	0	0	0	0	0	0
Karnataka	0	0	0	0	0	1	0	0	0	0
Kerala	0	0	0	1	0	0	1	0	0	0
Maharashtra	0	0	0	0	0	0	0	0	NR	0
Meghalaya	0	0	0	0	0	0	0	0	0	0
Nagaland	0	0	0	0	0	0	0	0	0	0
Odisha	3	1	0	0	0	1	0	0	0	0
Tamil Nadu	0	0	0	0	0	0	0	0	0	0
Tripura	0	0	0	0	0	0	NR	0	0	0
Uttar Pradesh	0	0	0	0	0	0	0	0	0	0
Uttarakhand	0	0	0	0	0	0	NR	0	NR	NR
West Bengal	0	0	0	0	0	0	0	0	0	0
	6	2	3	5	4	8	9	0	2	6

*NR- Information not received from State.

Total reported elephant killings due to poisoning in 10 years: 45

Data about electrocution & poisoning given by Project Elephant (MoEF) to Mr. Sagnik Sengupta

CHAPTER TWO: CRITICAL PROBLEM - 4

- **Illegal capture of crop consuming wild elephants and converting them to captive elephants**
- **Killing / Permanent disability of elephants during such capture operations**
- **Serious impact of such operations**

SECTION 11A OF THE WILDLIFE PROTECTION ACT

Hunting of wild animals to be permitted in certain cases.—(1) Notwithstanding anything contained in any other law for the time being in force and subject to the provisions of Chapter IV,— (a) the Chief Wild Life Warden may, if he is satisfied that any wild animal specified in Schedule I has become dangerous to human life or is so disabled or diseased as to be beyond recovery, by Order in writing and stating the reasons therefor, permit any person to hunt such animal or cause such animal to be hunted;

Provided that no wild animal shall be ordered to be killed unless the Chief Wild Life Warden is satisfied that such animal cannot be captured, tranquilised or translocated:

Provided further that no such captured animal shall be kept in captivity unless the Chief Wild Life Warden is satisfied that such animal cannot be rehabilitated in the wild and the reasons for the same are recorded in writing.

Explanation. —For the purposes of clause (a), the process of capture or translocation, as the case may be, of such animal shall be made in such manner as to cause minimum trauma to the said animal]

Section 11A does NOT authorise forest departments to capture crop-consuming elephants

Elephants are classified as Schedule-I animals in WLP Act, despite this, several states violate the law and have been capturing “crop-consuming” elephants and converting them to captive elephants using a brutal taming process that lasts for several months. They are kept in life long chained captivity.

In this unscientific & unethical capture & taming process, several elephants were killed / permanently disabled / a pregnant elephant delivered prematurely and the calf died.

Details of brutal illegal captures and elephants killed / injured

Refer to the foundation's report "**Elephant Capture and Taming**" in the below link to know about the flaws in capture operations, capture process, photos, and list of killed / permanently disabled elephants and to know the scientific, humane and ethical way of capture and translocation done in Africa.

<https://elsafoundationcharity.org/category/elephants-research/>

The serious impact of such mindless capturing of wild elephants

- The most precious gene pool of wild elephants lost
- Young male elephants do not have senior males to guide them, which results in negative interactions with humans, which further aggravates the conflict.
- Elephants' limbs are broken during the capture process leading to lifelong permanent disability and suffering every day.
- Life-long chained elephant slavery at forest camps
- Prolonged chaining of elephants at camps leads to multiple health problems for elephants (refer to the foundation's book "Elephant Slavery" for more details)

See the 'Reference' section at the end, to know the scientific publications on few of these topics

CHAPTER THREE: CRITICAL PROBLEM-5

- Chaining of captive elephants at forest camps
- **Impact-1 of chaining:** Prolonged chaining and standing in abnormal postures causes fatal diseases
- Documented facts about impact of chaining by various elephant biologists
- **Impact-2 of chaining:** Helplessly chained camp elephants attacked by wild elephants
- **Impact-3 of chaining:** Elephants sleep deprived permanently

Critical Problem-3: Chaining of captive elephants at forest camps (run by state govts.)



Camp elephant's front legs chained using a shackle chain (8 shape) and hind leg tied to a tree



Camp elephant chained on diagonally opposite legs and forced to stand like a statue on a hard surface



Camp elephant chained on diagonally opposite legs and forced to stand like a statue on a hard surface
Pic – Bhaskar Vishnu

The three chained forest camp elephant pictures displayed in this section are shot in three different states. This chaining practice at elephant camps is done in several states. The duration of chaining varies among states (it is between 12 to 24 hours per day)

Impact-1 of chaining: Fatal diseases

Elephants chained for a prolonged time, forced to stand on abnormal postures, forced to stand on hard surfaces contract several foot-related diseases including Arthritis, Pododermatitis (inflammation of the interdigital skin), Osteomyelitis (A bacterial infection that causes the toe bones to disintegrate), Degenerative joint diseases, Chains cause “Abrasion, Skin cracks & Wounds”, Overgrown nails, Excessive foot pad growth, Stiffen joints, Infection due to standing on their own excretion, Abscesses, Foot rot, Tissue damage due to rocking and swaying stereotypical movements (psychological illness due to chaining), Psychological stress.

When corrective actions are not done, these diseases will become fatal.

Due to the shackle chain (8-shaped chain) closely tied on the front legs, the 4 to 5-tonne elephant is forced to stand in an abnormal posture for 12 hours and more. It is unable to spread its legs and distribute its weight, which results in the fatal problems mentioned above.

Serious problems due to chaining – Scientific facts by various elephant biologists

The forefeet of elephants have a digit-grade structure and hind feet are semi-plantigrade (Mikota et al, 1994) implying weight-bearing by the digits of the forelegs and sole & digits of the hind legs. Thus, an elephant that is severely restricted in its movement due to chaining cannot have a choice in its decision to shift weight from the fore/ hind legs by assuming suitable postures such as lying down/spreading its feet to a suitable distance to distribute weight uniformly.

Kurt and Garai (2007) suggest the formation of deformed limbs to be a consequence of abnormal postures caused by chaining on uneven substrates. Restricting movement and/or keeping the elephant on cold, damp concrete surfaces is thought to lead to degenerative joint diseases in elephants (Mikota, et al., 1994).

Abrasions caused by continuous chaining can result in skin cracks and wounds which are difficult to heal in elephants; chain scars occurred more on the hind feet as chains exert pressure when pulled by the elephant (Kurt and Garai, 2007).

Overgrown nails/cuticles and excessive footpad growth, are linked to inadequate exercise leading to poor wear and tear of the feet, necessitating regular feet trimming procedures such as the trimming of the pad, filing of the cuticle/ nails (Mikota, et al., 1994).

According to Varma (2009) and Buckley (2008), captive elephants in natural habitats— large spaces with earthen natural substrate— required little foot care. According to the authors, joints stiffen in elephants made to stand for long periods on concrete; in a confined environment and also liquid waste from the elephant is difficult to remove, which can lead to infection. The rocking/ swaying stereotypic movements exhibited by elephants result in pressure on feet and nails with consequent tissue damage and thin footpads.

Non-human animals such as elephants undergo trauma in close confinement captive situations: such situations include loss of control by the elephant over its life, deprivation in the form of social isolation, chaining and restricted movement, among other features. Trauma is described as a form of stress in which the animal experiences a physical/ psychological event that is perceived to be life-threatening. Manifestation of such stressors includes behavioural expressions such as stereotypy, increased aggression, etc. (Bradshaw, 2007).

Increased frequency of stereotypic behaviour was observed among elephants that were chained (both fore and hind legs) as compared to the same elephants being let loose in a fenced place (penned) (Friend, et al., 1999).

The rear feet of “penned” elephants (free to move inside a fenced sanctuary) were cleaner and healthier as the elephants’ excreta (dung/ urine) did not accumulate around their feet (Friend, et al., 1999).

Severe and chronic cases of foot/leg problems in elephants in zoos have led to euthanasia of some elephants: of the sixteen captive Asian elephants euthanized in a span of ten years (1977-1987) in the U.S., nine were euthanized due to severe pododermatitis (Mikota, et al., 1994).

The study by Friend et al., (1999) observed penned elephants (free to move inside a fenced sanctuary) appearing to be more relaxed— a previous study (Delmeier, et al., 1985) on confined calves (Holstein bulls) showed such calves performing increased locomotor behaviours as compared to those which were left free in a yard.

In a study of foot problems, the most number of foot ailments, considered to be major, were observed in elephants in temples of Tamil Nadu (Subramaniam et al., 2010). The same authors suggest the practice of keeping elephants on hard substrates to be a cause for foot ailments which initially appear as minor problems, if neglected, lead to major ailments of the foot.

Unhygienic/ unsanitary conditions of the tethering site were said to be one of the predisposing factors for foot ailments such as pododermatitis/ abscesses/foot rot (Subramaniam et al., 2010).



Clockwise from the top left

Overgrown nails

Osteomyelitis (A bacterial infection that causes the toe bones to disintegrate)

(Pic by Elephant Aid International)

Cracked nails

Various infections / injuries caused by prolonged chaining, standing on hard substrates



For more details about various problems faced by captive elephants, refer to the foundation's book "Elephant Slavery" in the below link

<https://elsafoundationcharity.org/category/elephants-research/>

Chained captive male elephants kept at forest camps are exposed to attack by wild male elephants in musth.

During musth wild elephants consider other male elephants in the area as competitors for mating and fight with them.

In all these incidents mentioned in the following pages the camp elephants were chained on multiple legs and there were no hanging solar fences. The chained helpless elephants were brutally attacked by the free-roaming wild elephants.

This is a serious issue of captive elephants' safety that should NOT be compromised.

THE TIMES OF INDIA

Kumki Cheran injured after fight with wild elephant

Mar 2019, Coimbatore, Tamil Nadu

TNN | Mar 14, 2019, 08.35 PM IST

COIMBATORE: Cheran, one of the kumkis of the Tamil Nadu forest department, was injured after a wild elephant attacked him in the early hours of Thursday. The kumki suffered a injury on his back, when the wild elephant tried to attack it.

Cheran is in the Chadivayal elephant camp for rest and rejuvenation. "It looks like the wild elephant and Cheran got into a fight, which is common among elephants from different herds," said district forest officer D Venkatesh.

"However, the noise made by the two elephants during their clash alerted the forest officials who came to the spot and stopped the fight," he said.

The officer said the wild elephant had got behind Cheran and tried to attack his backside with his tuskers. "There is a small cut, but it is like a scratch. Not deep," said Venkatesh.

Kumki Sujay loses tusk in fight with wild elephant

TNN | Jan 18, 2017, 10:48 AM IST



COIMBATORE: Kumki Sujay of the Chadivayal elephant camp in Coimbatore lost its tusk after a wild elephant attacked it in the early hours of Wednesday.

Forest department officials said a wild elephant that had been roaming around the camp for the past one week entered the camp and got into a fight with Sujay, a 46-year-old kumki. They said the wild elephant was in musth.

Around 4am, loud noises were heard, and forest officials, elephant handlers and locals around the camp gathered to drive the wild elephant away.

"Their tusks were locked and the wild elephant was bigger in size. It injured Sujay and broke its right tusk," said S

Ramasubramanian, district forest officer. He added that crackers were used to drive the wild elephant away.

Dr Manoharan Sadiyappan, the veterinarian of the forest department treating Sujay, said the elephant was out of danger. "There has been a lot of blood loss and the socket area where the tusk is attached to the trunk has been injured. We are treating it. Sujay has slowly started consuming green fodder as well. We hope it recovered soon," said Manoharan.

Sujay was brought to Chadivayal camp from the Theppakadu elephant camp in May 2015. It was one of the twins, and its twin brother's name is Vijay. Sujay has been part of several operations including the operation 'Madukkarai Maharaj'.

Manoharan said Sujay was extremely disciplined and obedient. Despite being smaller in size, Sujay was strong and powerful.

The forest department plans to give Sujay rest. It will not be taking part in any operations in future after this injury. "Tusks are very important in operations. So we will give Sujay rest and hope he will recover soon," said Ramasubramanian.

Kumki elephants injured in fight with wild tusker

April 2015, Mudumalai, Tamil Nadu

April 22, 2015 12:00 am | Updated 05:45 am IST - Udhagamandalam:

SPECIAL CORRESPONDENT

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An injured kumki elephant being treated at Theppakadu in the Mudumalai Tiger Reserve on Monday.

Two kumki tuskars at the Theppakadu elephant camp of the Mudumalai Tiger Reserve (MTR) were injured when they were attacked by a wild tusker during the small hours of Monday.

Deputy Director, MTR, D.Chandran said that a 52-year-old kumki tusker Mudumalai, which was in masth, had been attacked by a wild tusker which was also in masth.

In the fight that followed, Mudumalai had sustained injuries on its trunk and some other parts of its body.

Another 27-year-old kumki tusker Jambu, which got entangled in the fight, had sustained minor injuries.

Elephants stable

Pointing out that medical attention was provided without delay to the injured kumkis immediately after the wild elephant had been chased away, he said that both were stable and their condition was being monitored round the clock.

Mudumalai was one of the most impressive looking kumki elephants in Theppakadu, Wildlife Veterinarian E.Vijayaraghavan said.

He added that such fights occurring between elephants when were in masth was not abnormal.

News Article by "The Hindu"

Captive elephants losing lives to wild tuskers

Deccan Herald - Oct 2020, Sacrabaylu, Karnataka

It has been known that three captive elephants died in an attack by rogue elephants of the region in the last five years



Nrupathunga S K



DHNS

Last Updated 24 October 2020, 20:16 IST

Elephant Ranga mentioned here is different from another captive elephant nick named "Rowdy Ranga", that died of a road accident



The death of a 35-year-old male captive elephant 'Ranga' after being attacked by three wild elephants in a forest area near Sakrebailu elephant camp on Thirthahalli road has exposed the apathy of the officials of the forest department.

It has been known that three captive elephants died in an attack by rogue elephants of the region in the last five years. The elephants 'Rajendra' and 'New Tusker' had died after being attacked by wild elephants. This is the third such instance in which a captive elephant died.

Ranga was born to female elephant Geetha in the camp and it was known for its strong and healthy body.

Sources in Sakrebailu elephants camp stated that three wild elephants must have attacked Ranga, the most active and strong tusker in the camp when it was left for grazing in the forest. The rectum part of Ranga was pierced and inner thighs were severely injured in the attack. It seems the rogue elephants might have pushed Ranga from 20 metre height to the ground.

Local people have alleged that Ranga would have survived if the legs were not tied with a chain.

Wild elephant enters Kodagu's Dubare camp and injures tamed elephant

Jan 2023, Karnataka

Published: 12th January 2023 04:27 PM | Last Updated: 12th January 2023 04:27 PM

🖨️ | A+ A A-



The musth wild elephant roaming inside the Dubare Camp in Kodagu. (Photo | EPS)

By Express News Service

MADIKERI: A wild bull elephant that is suspected to be in musth has injured a tamed elephant in Dubare Elephant Camp of Kodagu. The popular tourist destination of Dubare Elephant Camp has been ordered to shut down for tourist visits as a precautionary measure. The foresters are involved in chasing the bull elephant back into the forest.

At midnight hours on Wednesday, a wild bull elephant ambushed a tamed elephant in Dubare Elephant Camp near Kushalnagar. The tamed elephant, Gopi wailed in pain following the attack even as the mahouts, caretakers and foresters at the camp rushed to the spot. The foresters burst crackers and tried chasing the wild elephant, but in vain.

Sources confirmed that the bull elephant is accompanied by another wild elephant and the two elephants are roaming across the Dubare Camp area. Several staff from the department are involved in the chasing operation of these elephants back to the forest. The tuskeders are suspected to have migrated from the Maldare forest area.



Wild elephants sleeping on the ground. Pic – The Animal Reader

As captive elephants are chained on multiple legs / chained using a shackle chain (8-shaped chain), they cannot lie on the ground and sleep during the night.

During the daytime, they are sent for grazing but they are tied with a shackle chain at the spot of grazing, so during the day also they cannot lie on the ground and sleep in several FD camps.

Elephants in the wild sleep / take rest by lying on the ground also. They get complete rest in such activity. Also, old elephants with knee joint problems such as arthritis need to take rest by lying on the floor

Since captive elephants are never allowed to sleep by lying on the ground, their health condition deteriorate

Such sleep deprivation is the highest form of cruelty

CHAPTER FOUR

CRITICAL PROBLEM-6

Elephants Killed By Train Accidents

Critical Problem-6: Elephants killed by train accidents

ELEPHANT CASUALTIES IN TRAIN ACCIDENTS

State	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Assam	7	1	3	5	10	10	2	2	5	8
West Bengal	4	13	3	5	3	2	6	5	0	0
Tamil Nadu	2	0	0	0	2	0	0	0	1	3
Jharkhand	1	1	0	0	2	0	0	1	1	0
Kerala	0	0	0	0	2	0	1	3	0	0
Odisha	11	1	0	1	0	2	7	1	4	3
Tripura	0	0	0	0	0	0	NR	0	0	0
Uttarakhand	2	0	0	0	2	5	1	2	NR	NR
Uttar Pradesh	0	1	0	0	0	0	0	0	0	0
Karnataka	0	0	0	0	0	1	2	0	1	1
Total	27	17	6	11	21	20	19	14	12	15

*NR- Information not received from State.

Data given by Project Elephant (MoEF) to Mr. Sagnik Sengupta

In several states train tracks pass thru the forests. Elephants frequently cross such tracks and are killed by speeding trains.

Total elephants killed in train accidents in a 10-year period as per the above table: **162**

Note: The death toll is definitely higher than 162



Pic by Sourav Dasgupta



Pic by Vinayan

CHAPTER FIVE

**Solving all these critical
problems using**

✦ **Hanging Solar Fences**

✦ **Warning Lights**

✦ **Sound Alerts**

Need for hanging model DC solar power fence

Due to all the critical problems explained in the earlier section an alternate method is needed to prevent negative Human-Elephant interaction, for creating free moving spaces for camp elephants, to prevent wild elephant attacks on camp elephants and to prevent train accidents of elephants.

Hanging solar fences emerge as a viable, economical and easy to instal fencing model to solve all the critical problems explained in this report

The following sections explain in detail the components and functioning of hanging solar fences.

The most important is: Solar power is sustainable, renewable and protects the environment

Safety of hanging solar fences

- The power in a solar fence is DC supply so it is not fatal to any animal (or) human (including small animals such as pigs, goats etc.)
- The power supply is pulsating current, which means the current flow keeps switching between ON and OFF
- Even in 'ON' condition the current supply is for a minor fraction of a second
- When birds sit on the fence power cable, as their feet do not touch the ground, the earth circuit closure does not happen, so the birds are not killed
- If any animal (or) human is trapped in the fence due to any reason, the energiser will automatically switch off the fence power.
- SMS alerts and speaker sound alerts are triggered when an animal damages the fence / trapped in the fence, so the farmers can rush to the spot

Technical features that help farmers

- On / Off can be done using a cell phone
- If any short circuit happens in the power line due to a tree branch fall / animal entry / human entry, then, an SMS alert and speaker sound alert is triggered.
- Sound alert creates fear among animals and they move away from the field
- Blinking lights on the fence indicate power supply is ON
- The same lights alert the humans and animals and they do NOT go near the fence
- Low maintenance
- The same fence can be used for all animals (cattle, bison, wild boar, deer, goat, elephant)

Warranty

- Warranty of 10 years for the fence.
- Warranty of 5 years for battery

Compliance with standards

- In compliance with International (IEC) (or) Indian (BIS) standards

Government Approvals

- Refer to the Tamil Nadu rules in Appendix. The same can be replicated across other elephant states

Solar Panel:

Absorbs sun light and converts solar energy to DC current.



Charge Controller:

If the battery is fully charged then this device will cut off the power supply from the panel



Battery:

A 12 V battery. The size of the battery is directly proportional to the backup time. Size is measured in Amperes.



Energiser:

Converts 12V DC to a maximum of 10 Kilo Volt DC and supplies to the fence . Earth line and lightening divertor line are connected to this.



Fence:

Fence carries the 10 KV DC Power in pulsating mode (repeated on-off cycle). Blinking light indicates power supply and also alerts the animals.



Alert Speaker:

Connected with fence. If an animal / human damages the cable / If a tree branch falls on the fence, then speaker sound is triggered to alert the farmer and also to threaten the animal / human.

Image of a complete solar unit set-up at a farm:

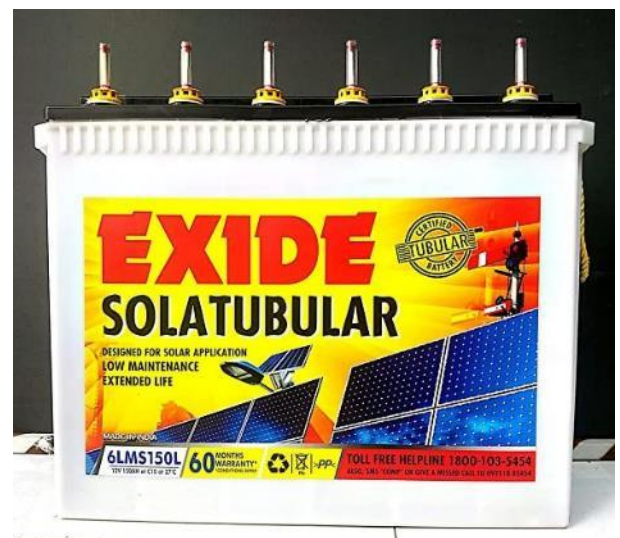
Complete unit after installation



Images of individual components



Solar Charge Controller



12V Tubular Battery



Two Different Brand Energisers. The black device on the left picture is the speaker (Sound alert)



**Left: Speaker (Sound alert)
fixed separately on roof top**

**Alert sounds can be
customised with sounds
such as siren sound (or)
carnivorous animal's sound.**



**Lightening diverter -
To be earthed and
connected to the
Energiser**



GI Earth Rods

Power gate with rectangle frame. It is mandatory to have a hanging fence in front of this



Power gate without frame. It is mandatory to have a hanging fence in front of this



Power gate without frame. Pulling the power cable and latching it manually



Blinking lights that should be fixed on fence posts to alert animals and humans



Rotating beam of light that can be fixed on fence posts to alert animals even at a long distance.

This mimics the presence of a human at the field

Pic – Growex Zatkan

To know the technical specification of all the components and the govt approvals needed, refer to the

Tamil Nadu Power Fences (Registration and Regulation) Rules 2023

attached in the 'Appendix' section.

This can be replicated by other states

Maintenance is very less in solar fences.



Details about different types of cable material

Costly and larger diameter – High Tension (HT) Cable (used by govt for power supply to all)

Economy and smaller diameter – Galvanised Iron (GI) Cable

Main Cable Carrying Post and Support Post Material – GI

Image: Crown Solar



Side view of the Type 1 Hanging Fence

A gap is maintained between the hanging and horizontal DC power cables

Image: Crown Solar

Type 2 Fencing: Vertical Power Cables with Normal Diamond Mesh (High Cost)



Diamond mesh in the back is NOT powered by solar.

Erection of diamond mesh is costly.

Chapter Six

Best Practices in Fencing



Weed near and below the fence to be removed regularly. If NOT done then it will create a short circuit and the fence power will NOT work



Weed grows fast and regularly. Farmers use chemicals, once in few weeks, to remove weed. Other successful alternate is using high quality and high thickness weed mat (left) below the fence.

New weed mats don't have holes

Make holes on the mat to fix the poles of solar system



For weed prevention, building a concrete slab around the perimeter of the field is another costly option. Govt subsidy may not be available for constructing this.



Hanging fence in front of a gate. Operated using a rope on the top, to push and pull when an entry (or) exit has to be done (mechanism similar to a window screen)



Ensure that solar unit door is always closed tightly, to prevent rats from biting the cables and also littering their offspring inside the unit.



The bottom and middle portion of the hanging cable needs to be tied to a horizontal cable for preventing free movement and getting entangled

Bottom of the hanging fence should be tightly wound to give a closely packed spring shape.

This is to give some weight at the bottom and also to prevent the hanging cable from getting out of the knot that is tying it to the horizontal cable



Left:

Projections on the fence pole to pass the horizontal cable that helps in holding the hanging cables straight and prevent entangling

OTHER BEST PRACTICES

Earth Rod

Keep the area under which “Earth Rods” are buried, moist. This is to improve the power conductivity in the fence

Battery Maintenance

Fill water in the battery as per the frequency mentioned by the manufacturer.

Sound Alert Speakers

Install sound alert speakers at multiple locations along the perimeter of the farm to alert the elephants and ensure that they do NOT enter the Agri field, even if they break the horizontal cables using a heavy tree branch

Blinking Alert Lights / Rotating Beam Lights

Install them at multiple locations along the perimeter of the farm.

This will alert the animals and they don't come near the fence

Solar Panel Cleaning

Regularly clean the solar panel with a very soft & dry cloth to remove any dust deposited on it

Chapter Seven

Wrong fencing methods that should NOT be done



This fence is NOT effective due to the following reasons

- Fence cable made with low quality material
- Standard procedure for effective fencing NOT followed
- The shape of the cable is NOT spiral (**Note:** spiral cables give stability)
- There is NO weight at the bottom of the hanging cable to provide stability, hanging cable not tied to a horizontal cable at the bottom to prevent free floating movement.
- Due to the above reasons, the cables are entangled
- Huge gap in-between cables
- Hanging cables NOT reaching the ground level leaving a huge gap near ground.

WARNING – NEVER DO THIS



- The loosely hanging solar fence (not done as per fencing standards) is tied very close to government live electricity AC cables (on top)
- Due to wind, if the free-floating solar cables gets entangled to the live AC wire, then live AC power will start flowing in the solar fence.
- This is extremely dangerous and fatal to both humans and animals

Chapter Eight

Risks and Mitigations

Risk 1: If it rains heavily (or) it is very cloudy for one (or) two days (or) The farm is in a hill station in which it is always cloudy, then will the solar panel work?

Mitigation 1: Fully charged solar batteries are capable of supplying DC power to the fence, for 3 to 4 nights, without sunlight. The back-up time depends on the capacity of the battery and length of the fence.

(Note: Solar power is NOT supplied to the fence during the day time, because the wild animals always enter the Agri field during the night. They do this to avoid the humans)

Mitigation 2: Due to some rare, unavoidable circumstances, if the battery is in low charge, then the battery can be charged from the govt AC power outlet using a charging device (or) can be given to a charging shop.

Very Important: While charging in this method the battery should be disconnected from the energiser



“Battery Charger” device for charging the battery using the government AC power	Prior permission from govt electricity department is mandatory for using this charger.
--	---

Risk 2: How to prevent wild boars from entering the field, as they burry the ground below the normal un-powered fence and enter the field

Mitigation: By installing a low-lying (near ground) horizontal power cable in the fence

Mandatory: Regular weed removal (or) use of weed mat is mandatory for this model to work.



Risk 3: Elephant breaking a heavy tree branch, dropping it on a horizontal fence (behind the hanging fence) and damaging it

Mitigation: If the horizontal power cable touches the ground (or) the horizontal “earth cable” running in the fence, then, the power supply to the entire fence around the field will immediately stop.

The chances of occurrence of this scenario are rare. In case this occurs then the sound alert speakers will be triggered and will frighten the elephants.

The farm staff can go near the spot, stand at a safe distance and ensure that the elephants don't enter the field by beating any noise-making object such as a drum / steel plate etc. The staff should also use high-power flashlights (torch lights) to indicate the human presence, to the elephants.

Throwing firecrackers on elephants should be strictly banned, as they may cause serious injury to the body / blindness (due to the injured eye)

If anyone says “Hanging solar fences did not give the desired results”, then, they

- Have NOT installed the fence as per the SOP & Best Practices
- Have used low quality components (Not approved by IEC / BIS standards)
- Have NOT done the scheduled maintenance of the components
- Have NOT removed the weed near & below fence

Chapter Nine

News About Hanging Solar Fences and Success Stories

Hanging solar fences effectively tackling man-elephant conflict in Assam

RANI FOREST

Such a fence has been installed on the fringe of Rani Reserve Forest near Guwahati and "it has helped overcome the problem of elephants destroying human settlements and paddy fields," Range Officer Manoranjan Barman said.

PTI

Updated On Aug 3, 2021 at 08:25 AM IST

New Delhi: The Assam forest department's hanging solar-powered electric fences have turned out to be an effective tool in keeping wild pachyderms at bay, thus addressing the problem of man-elephant conflict in some forest fringe areas, an official said on Monday. Steel wires are hung in a row from a three-metre high horizontal overhead wire supported by posts on both ends. The wires are connected to a solar power system and elephants receive a mild shock if they try crossing through the hanging wires.

Such a fence has been installed on the fringe of Rani Reserve Forest near Guwahati and "it has helped overcome the problem of elephants destroying human settlements and paddy fields," Range Officer Manoranjan Barman said.

Link to the full story

<https://energy.economictimes.indiatimes.com/news/renewable/hanging-solar-fences-effectively-tackling-man-elephant-conflict-in-assam/84994382>

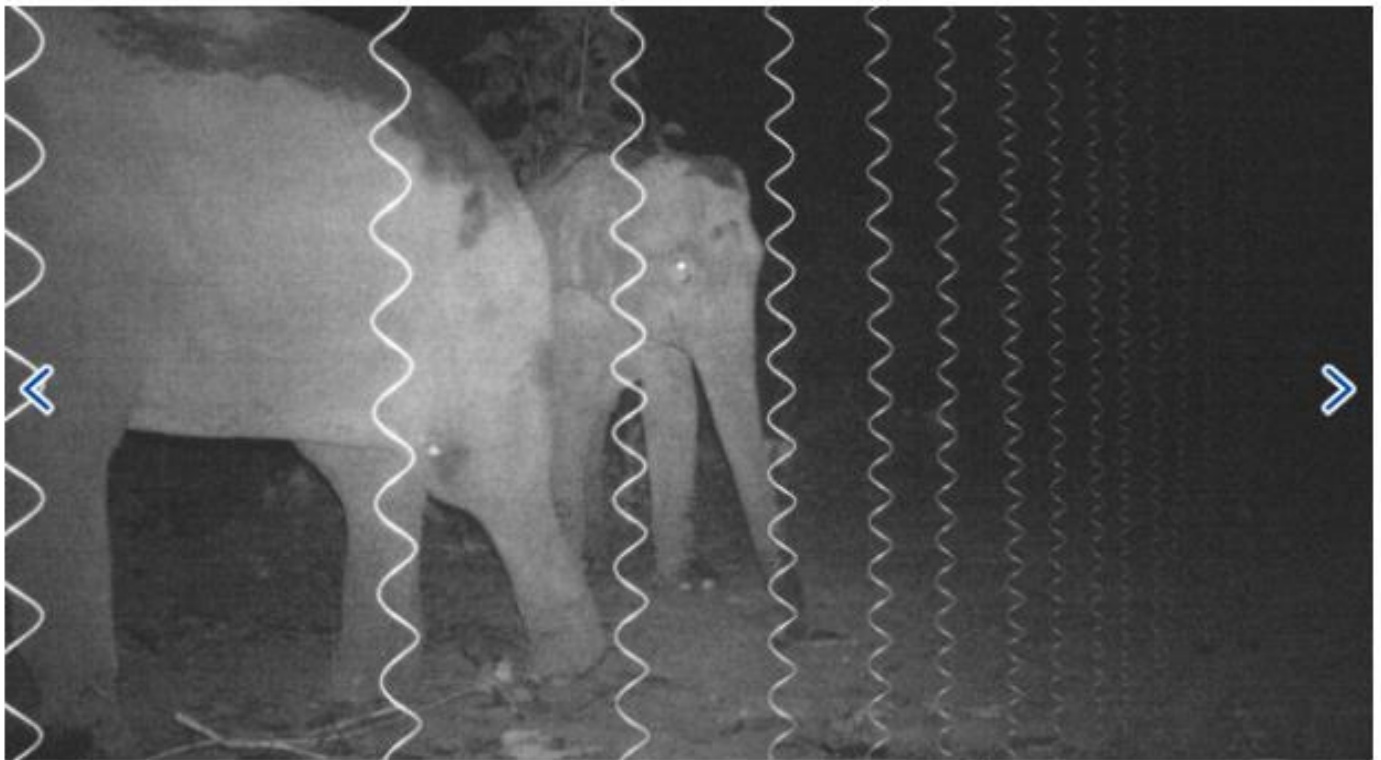
Hanging Fences Protect People and Elephants in Manas



ASSAM

Manas National Park, 7 May 2020: An effective solution to mitigate human elephant conflict was successfully tested and shows promise in Manas. Wildlife Trust of India's team had installed 5 km of hanging fence along the Manas National Park boundary to keep elephants out of human inhabited areas.

Conventional fences to keep wildlife away from farmlands and human habitation are easily crossed over by elephant herds. The maintenance cost is also higher in these fences as they get repeatedly taken down by elephants that topple conventional fence posts.



Hanging fences are a novel concept in human – elephant conflict management and have been used in Sri Lanka and also recently in southern India with promising results. The major advantage of these fences are that they are much higher than conventional fences (14 ft) and are also electrically charged (solar) to give a mild shock to the pachyderms who learn and adapt to avoid interactions with the fences. These fences hang like a curtain with a gap underneath for smaller animals to cross and cannot be toppled easily by force.

[Link to full story](#)

<https://www.wti.org.in/news/hanging-fences-protect-people-and-elephants-in-manas/>

Keonjhar: Hanging solar fence to curb jumbo deaths on rail tracks

TNN | Oct 10, 2022, 11:00 AM IST



KEONJHAR: The forest department of Keonjhar has adopted a new technique, claimed to be a first in Odisha, to prevent elephant deaths mostly in mining areas.

In a bid to protect elephants from rail accidents, the Keonjhar forest department has installed a hanging solar fence along a 800-metre railway track on both sides stretching from Jurudi Behera to Creche in Joda block under Champua forest range.

The scheme was inaugurated by Joda block chairman Kabindra Nayak in the presence of Keonjhar divisional forest officer H D Dhanraj on Saturday, the concluding day of National Wildlife Week.

Official sources said the elephant herds frequently cross the railway line. Hence, the forest department has chosen this place to install a hanging solar line. The scheme was funded by principal chief conservator of forest (wildlife).

"This is the first such hanging solar fence in Odisha installed in Keonjhar division with a total cost of Rs 10 lakh. The wires have been fixed at such a height that when an elephant comes in contact with the fence near the railway track, it will receive an electric shock of 10,000 volts for 3 milliseconds. It has been designed in a way that it will not harm the animals but stop them from crossing the tracks," said DFO Keonjhar.

The scheme was implemented to protect the elephant herds from rail accidents after a female elephant and two calves were run over by a goods train on May 19. They were part of a 22-member herd crossing the rail line at this place.

According to sources, in the past several elephants have been killed in rail accidents, while crossing the railway line.

"As several elephant habitats and corridors have been destroyed because of road or railway track construction, the man-animal conflict has increased manifold. We hope this will protect the wild elephants from rail accidents," said Dr K C Nayak, an elephant lover, who has made an elephant minar in memory of an elephant which died in his farmland in Jali village of Champua block area.

Link to story:

<https://timesofindia.indiatimes.com/city/bhubaneswar/keonjhar-hanging-solar-fence-to-curb-jumbo-deaths-on-rail-tracks/articleshow/94753198.cms>

Solar-powered fences to protect fields from elephants

TAMIL NADU

40% back-ended subsidy to be provided to farmers willing to have such fences

October 06, 2021 01:24 am | Updated 01:24 am IST - Chennai

Elephants are intelligent enough to overcome the barrier of conventional fences put up for the protection of farms.

To overcome this problem, the Agricultural Engineering Department is planning to install hanging solar-powered fences. Though the concept is not new to the State, it will be carried out with a 40% back-ended subsidy to be provided to farmers willing to have such fences.

The barrier, to be hung from a height of about 12 ft, is made up of hot-dip galvanised aluminium conductor steel reinforced wires, which are considered rust-free. This is said to be useful in protecting the fields against wild boar and bison attacks. The cost varies depending upon the number of lines of the wire. For instance, wires with five lines are estimated to cost about ₹2.91 lakh, of which the government's subsidy will cover around ₹1.16 lakh. If the number of lines is 10, the cost goes up to approximately ₹3.37 lakh, of which the subsidy component will be nearly ₹1.35 lakh.

Apart from this type of fence, the Department is also funding the installation of normal fences. A total of 510 farmers will be covered this year.

As of now, no break-up has been worked out for the two types of fences, an official says. Ten companies have been shortlisted for implementing the scheme. The government has set apart ₹5.68 crore for the scheme.

Link to story

<https://www.thehindu.com/news/national/tamil-nadu/solar-powered-fences-to-protect-fields-from-elephants/article36849853.ece>

Kerala: Hanging solar fence successful in Thundathil range

TNN | Jun 21, 2021, 10:50 AM IST



KOCHI: The experiment to ward off man-animal conflict in a small area has turned fruitful in Kuttampuzha. The forest officials installed hanging solar fence on a two-km stretch on one side of the road at ward number one in the panchayat as their efforts by installing solar fence was futile.

The hanging solar fence was installed at Meeran city four months ago and the Thundathil forest officials say the experiment has been successful so far. Armed with success, forest officials will extend the length of the hanging solar fence in the area.

In regular solar fence, five lines, where the current is passing, connected to each post, is installed at places to prevent wild animals from entering the human habitations. Solar power

electrifies the lines. There is disruption of power supply during cattle movement and maintenance is a difficult task.

"In hanging solar fence, we used a power line hauling over the normal fence and juttied out half meter away from the normal lines. The posts in normal fence face threats from wild elephants as they normally stamp it out and move forward. As short power lines are hanging from the new line, elephants cannot move forward without touching it. The small power lines hanging also function as a deterrent. We did this as a pilot project on a 2km stretch on one side of the road and it has turned out to be successful. Wild elephants often damage normal solar fence when they move to a nearby water source and eat the crops during summer," said Muhammad Rafy, Thundathil forest range officer.

Link to complete story

<https://timesofindia.indiatimes.com/city/kochi/hanging-solar-fence-successful-in-thundathil-range/articleshowprint/83698370.cms?val=3728>

Chapter Ten

Government Subsidy Scheme For Hanging Solar Fences A Case Study

Government subsidy scheme for hanging solar fence

A case study from Tamil Nadu

Features of the scheme:

Department giving subsidy: Agricultural Engineering Department

The land area that will get subsidy: 2 hectares max (about 5 acres) (or) 566 meters max fence length

Note: If the land is more than 2 hectares, then the area above 2 hectares will not get any subsidy

Percentage share given as subsidy: 40% (contributed jointly by central and state govt.)

Items included in the basic scheme: Solar panel, charge controller, battery, energiser, sound alert speaker, main poles, supporting poles, and cables. (**Optional:** See table below. GSM alert means cell phone SMS alert)

Vendor selection and rates: The government had selected a few vendors (among applied) and had fixed the below as standard rates that included all components and GST (rates are same for 2022-23)

2. Hanging Type for all animals including elephants (For a length of 566 m)

Description of work	No. of lines	Fixed Cost (Including GST in Rs.)	Variable Cost (Including GST in Rs.)	Variable cost /m length for 566 m (Rs.)	Total cost of the unit (Inclusive of all in Rs.)	40 % allowable Subsidy for the year 2021-22 (for 566 m) (7)= $40\%((3)+((5)*566))$
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Total cost for supply and installation of solar fencing unit (inclusive of all)	Without Optional Item					
	5	65,189	1,98,283	350	2,63,472	1,05,389
	7	65,189	2,16,527	383	2,81,716	1,12,686
	10	65,189	2,43,743	431	3,08,932	1,23,573
With Optional Item (Viz., Framed Gate Structure with gate handle and GSM alert)						
Description of work	No. of lines	Fixed Cost (Including GST in Rs.)	Variable Cost (Including GST in Rs.)	Variable cost /m length for 566 m (Rs.)	Total cost of the unit (Inclusive of all in Rs.)	40 % allowable Subsidy for the year 2021-22 (for 566 m) (7)= $40\%((3)+((5)*566))$
(1)	(2)	(3)	(4)	(5)	(6)	(7)
	5	92,935	1,98,283	350	2,91,218	1,16,487
	7	92,935	2,16,527	383	3,09,462	1,23,785
	10	92,935	2,43,744	431	3,36,679	1,34,672

Note1: Fixed cost is for the solar panel, battery, energiser, solar charge controller, and sound alert speaker (these are standard items used for any solar fence project irrespective of the length of the fence)

Note 2: Variable cost varies according to the length of the fence. The above table gives the cost details for max length (566 meters fence) & also per meter fence cost

Note 3: The mode of dispersing the subsidy varies among states.

Chapter Eleven

Recommendations

RECOMMENDATIONS

It is very obvious from the facts presented in this report that hanging fence provides a solution to these highly critical issues

1. **Elephants entry into Agri fields and crop consumption.**
2. **Human fatalities due to accidental close encounters between humans and elephants at the Agri fields.**
3. **Elephants killed by farmers by using live AC power**
4. **Due to crop consumption / human fatalities, the capture of wild elephants and converting them to captive elephants by barbaric taming process. Life-long chained captivity of these elephants.**
5. **Prolonged chaining of forest department camp elephants**
6. **Elephants killed by train accidents**

Recommendations for implementation of solar fence system at Agri fields

- ✚ Precious human and animal lives can be saved, so implementation to be done on the highest priority
- ✚ Irreversible huge losses to human families, due to accidental fatalities caused by animals can be avoided
- ✚ Irreversible huge loss (due to killing) to the animal families can be avoided
- ✚ Several crores of money spent for providing compensation (for crops & loss of human life) can be diverted to this project in the form of subsidies
- ✚ Poor farmers DON'T have money for erecting such fences, even with a partial subsidy, so the govt should provide a 100% subsidy to them.
- ✚ The government forest department and agriculture departments should promote this on a very large scale among farmers.
- ✚ There should be a target, deadline and strict monitoring system for efficient implementation

Recommendations for NO ELEPHANT CAPTURE policy

- ✚ Human-Elephant negative interaction happens due to crop consumption and accidental human fatalities due to elephants. In the solar fence system, since this problem is addressed to the core, this system has to be implemented on the highest priority in high conflict zones.
- ✚ The capture of wild elephants and converting them to captive elephants need to be stopped totally

Recommendations for implementation at forest department captive elephant camps

- ✚ The concept of chaining should be abolished at the camps
- ✚ A system of free movement of elephants without any interaction with the mahouts needs to be developed.
- ✚ A "Protected Contact" method needs to be implemented, to make the animal independent and live without the fear of being attacked by the mahouts
- ✚ A plan to return the camp elephants to the wild using the soft release method is to be done on priority.

Recommendations for the erection of fences on rail tracks frequently crossed by elephants

- ✚ Frequent elephant crossing zones need to be identified and the erection of fencing should be done
- ✚ In all such fenced places, an under-pass for free elephant / other wildlife movement should be made without fail

General recommendations

- ✚ A strict monitoring mechanism needs to be implemented to check if any illegal AC fencing is used
- ✚ Encroachment of forest land need to be monitored and action to be initiated on law violates
- ✚ The fencing done in farms / villages / forest boundaries should not obstruct the migratory path / habitat of the elephants
- ✚ Fencing long distances covering an entire forest range should be avoided, as this will block the migratory routes
- ✚ Throwing firecrackers on elephants should be strictly banned, as they may cause serious injury to the body / blindness (due to the injured eye)

Important role older male elephants play in the wild

<https://elsafoundationcharity.org/wp-content/uploads/2023/08/Older-male-elephants-important-role-in-guiding-young-males.pdf>

Elephant migratory route and habitat encroachment study (Coimbatore, TN)

<https://elsafoundationcharity.org/wp-content/uploads/2023/07/Coimbatore-TN-elephant-route-encroachment-2013-14.pdf>

Brick Kilns encroaching migratory routes of elephants (Coimbatore, TN)

<https://elsafoundationcharity.org/wp-content/uploads/2023/07/Coimbatore-Brick-Kilns-Encroachment-Impact-on-Wildlife-2013.pdf>

TN Dharmapuri-Hosur forest cover shrink, increased human population and construction, impact on elephants

<https://elsafoundationcharity.org/wp-content/uploads/2023/08/TN-Hosur-Dharmapuri-Encroachment-and-Impact-on-Elephants.pdf>

Captive Elephants Slavery Book

<https://elsafoundationcharity.org/wp-content/uploads/2023/06/Captive-Elephants-Salvage-Solution-To-The-Problems-28-Jun-23.pdf>

National Geographic article on appalling condition of captive elephants

[‘Nothing to do, nowhere to go’: What happens when elephants live alone \(nationalgeographic.com\)](https://www.nationalgeographic.com/animals/elephants/article/elephants-live-alone/)



TAMIL NADU GOVERNMENT GAZETTE

EXTRAORDINARY PUBLISHED BY AUTHORITY

No. 246]

CHENNAI, MONDAY, JULY 3, 2023
Aani 18, Sobakiruthu, Thiruvalluvar Aandu-2054

Part III—Section 1(a)

General Statutory Rules, Notifications, Orders, Regulations, etc.,
issued by Secretariat Departments.

NOTIFICATIONS BY GOVERNMENT

ENVIRONMENT, CLIMATE CHANGE AND FORESTS DEPARTMENT

TAMIL NADU POWER FENCES (REGISTRATION AND REGULATION) RULES, 2023

[G.O. Ms. No. 104, Environment, Climate Change and Forests (FR.5), 3rd July 2023,
ஆணி 18, சமோபகிருது, திருவள்ளுவர் ஆண்டு-2054.]

No. SRO A-25(a)/2023.

In exercise of the powers conferred by sub-section (1) of Section 64 of the Wildlife (Protection) Act, 1972 (Central Act 53 of 1972), the Governor of Tamil Nadu hereby makes the following rules, namely:-

Rules

1. **Short title and Commencement.**—These rules may be called the Tamil Nadu Power Fences (Registration and Regulation) Rules, 2023.

2. **Definitions.**—In these rules, unless the context otherwise requires,-

- "District Forest Officer" means the District Forest Officer or Wildlife Warden or Deputy Director of Tiger Reserve or Divisional Forest Officer;
- "Form" means a Form appended to these rules;
- "Owner" means a person who owns any property or is in possession or management of any property;
- "power" includes solar powered or battery operated system;
- "power fence" means fence through which electric current is passed, to give electric shock to any person or animal who touches it;
- "property" means any immovable property including land or building;
- "Schedule" means a Schedule appended to these rules;
- "Company" means any organization, which manufactures or sells power fences or ancillary equipments;
- Words and expressions used and not defined in these rules but defined in the Wildlife (Protection) Act, 1972 (Central Act 53 of 1972) shall have the same meaning respectively assigned to them in the Act.

3. Application for permission to erect power fence and for Certificate of Registration.—(1) No person shall erect a power fence, within 5 Kilometers from a Reserve Forest boundary, in or around his property without getting permission from the District Forest Officer.

(2) Every application for permission to erect a power fence shall be made by the owner in Form-I to the District Forest Officer.

(3) The District Forest Officer, on receipt of an application in Form-I shall cause inspection of the property along with an Officer, not below the rank of Assistant Divisional Engineer of the Tamil Nadu Electricity Board and may grant permission in Form-II, to erect a power fence for the entire extent or to a lesser extent, depending on the nature of topography of that area and animal trails, subject to the condition that the power fence should be in conformity with the specifications mentioned in the Schedule or reject the application, recording the reason therefor.

Provided that no application shall be rejected or no applicant shall be granted permission to erect power fence for lesser extent, unless the applicant has been given a reasonable opportunity of being heard.

(4) On grant of permission under sub-rule (3), the owner shall erect a power fence and apply for registration of the power fence in Form-III along with an Undertaking in Form-IV and a copy of the permission, within ninety days from the date of grant of the permission.

(5) On being satisfied that the power fence has been erected as per the specifications mentioned in the Schedule, the District Forest Officer shall issue a Certificate of Registration in Form-V. Otherwise, the District Forest Officer may direct the owner to rectify the defects and to make a fresh application for erection under sub-rule (4).

(6) An order under sub-rule (3) or sub-rule (5) shall be passed by the District Forest Officer within a period of not more than 45 days from the date of receipt of application.

4. Appeal.—Any person aggrieved by an order of the District Forest Officer under sub-rule (3) of rule 3 may prefer an appeal to the Conservator of Forests having territorial jurisdiction, within thirty days from the date of receipt of the order.

5. Application for Certificate of Registration for existing power fences.—(1) Every owner who has a power fence erected on his property on the date of coming into force of these rules, shall within sixty days from that date, after ensuring that the power fence has been erected as per the specifications mentioned in the Schedule, apply in Form-III to the District Forest Officer for registration of the power fence along with an Undertaking in Form-IV.

(2) On receipt of an application under sub-rule (1), the District Forest Officer shall cause inspection of the property along with an Officer not below the rank of Assistant Divisional Engineer of the Tamil Nadu Electricity Board and on being satisfied that the power fence has been erected as per the specifications mentioned in the Schedule, issue a Certificate of Registration in Form-V. Otherwise, the District Forest Officer may direct the owner to rectify the defects and to make a fresh application for erection under sub-rule (1).

(3) An order under this rule shall be passed by the District Forest Officer within a period of not more than 45 days from the date of receipt of the application.

6. Validity and renewal of Certificate of Registration.—(1) A Certificate of Registration shall be valid for a period of three years.

(2) An application for renewal of Certificate of Registration shall be made to the District Forest Officer three months before the date of expiry. The provisions contained in rule 5 shall, *mutatis-mutandis*, apply for renewal of Certificate of Registration.

7. Periodical Inspection.—The Forest Range Officer and the Foreman of the Tamil Nadu Electricity Board of the area concerned shall conduct joint inspection of the properties, wherein power fences have been erected, once in a fortnight and maintain a log book for such inspection.

THE SCHEDULE.

(See rules 3 and 5)

TECHNICAL SPECIFICATIONS FOR ELECTRIC FENCE ENERGIZERS

A. Solar photovoltaic Module

Type – Mono crystalline / Poly crystalline IEC 6215 Certified modules to be used. Peak Power output should be 100 Watts /12 V.

B. ENERGIZER - The energizer used should have certification of BIS-302-2-76 (India) or IEC 60335 or EN60335 (International) Markings with Serial number.

The Test certificate should contain the test results confirming that the unit's output matches the specification given below:

- (1) Energizer outer cover shall have IP 54 Protection.
- (2) The energizer should be powered by battery not exceeding 12 volts DC.
- (3) Peak output voltage should not exceed 10KV.
- (4) Root Mean Square current of the fence should not be beyond 10 Amps.
- (5) Pulse interval in the fence should be in between 1-1.5 seconds.
- (6) Duration of impulse should not exceed 0.1 seconds.
- (7) Maximum energy discharge per impulse measured at a resistance of 500 Ohms-5 Joules.

The user shall not install a fence energizer that receives its energy only from an electric supply system.

C. BATTERY:

- (1) Battery type should be low maintenance tubular battery.
- (2) Battery should have capacity of 12V/100AH.
- (3) Battery should be charged by solar power with a proper Charge controller to regulate the charge delivered to the battery and the energizer. If the location does not support solar energy, then a battery charger with an isolation transformer could be used.
- (4) The energizer should be disconnected from the mains while charging the battery. Energizers should not be connected to a mains DC supply unit under any circumstance.
- (5) In case of the absence of solar power, use of AC current to charge the 12V battery should require the approval of the electricity department. AC charged energizers with BIS/IEC/EN Marking, may be permitted with the approval of Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO).

D. Fence Alarm

It must be an external horn.

E. Module Mounting structure type

It shall be Hot dip galvanized GI Pole.

F. Housing box for housing energizer and battery

It must be Zinc sheet box with locking facility.

G. Fence Wire

- (1) It shall be minimum of 12 SWG high tensile hot dip galvanized high carbon ACSR cable.
- (2) Hanging Type should be 14 SWG GI (or) Stainless Steel hot dip galvanized Aluminium Conductor Steel Reinforced spring winding cable (10 feet hanging).
- (3) The distance between the fence wire in hanging type (For Elephants) shall not be less than 1.5 ft.
- (4) Tying Wire Material must be 14 SWG GI Wire with high quality zinc coating.

H. Reel Insulator

Material must be Virgin Poly Propylene or Poly Carbonate UV treated (test certificate for the material tested for insulators to be furnished from a Government authorized laboratories like CIPET India).

I. Strain Insulator

It must be Virgin Poly Propylene (or) Poly Carbonate UV treated and capable of with standing up to 15 KV (test certificate for the material tested for insulators to be furnished from a Government authorized laboratories like CIPET India).

J. Permanent wire tightener

It must be made of aluminium alloy and should withstand 15KV and should be corrosion resistant.

K. Joint Clamp

It must be MS washer GI coated.

L. Intermediate Post

- (1) It must be Hot dip galvanized "T" angle 25mm X 25mm X 3mm and erected at every 6 metres. The post should meet ISI standards.
- (2) The AED Specification for all animals including elephant - the height should be 2.0 feet BGL +8.0 FEET AGL +2.0 feet Projection = 12.0 feet and the warranty of 10 years to be provided.
- (3) The AED Specification for all animals except elephant - the height should be 1.5 feet BGL +6.0 FEET AGL = 7.5 feet.

M. Cornor Post

- (1) It must be GI Class B 2" pipe with prepunched holed to facilitate wire. The AED Specification for all animals including elephant -the post should meet ISI standards and Height should be 2.5 feet BGL +8.0 FEET AGL +2.0 feet Projection = 12.5 feet.
- (2) The AED Specification for all animals except elephant - the post should meet ISI standards and Height should be 2.5 feet BGL +6.0 FEET AGL = 8.0 feet.

N. Support Pipe

- (1) The AED Specification for all animals including elephant - It should be GI Class B, 1.1/4" Pipe should meet out ISI standards and the length should be 8.0 feet.
- (2) The AED Specification for all animals except elephant - It should be GI Class B, 1.1/4" Pipe should meet out ISI standards and the length should be 6.75 feet.

O. Lead out cable type

It should be Double insulated cable hot dip galvanized and should withstand upto 15KV.

P. Permanent tension spring

It should be GI coated 6mm coil spring.

Q. Earthing Arrangements

- (1) It should be with 4ft long non rusting SS 8mm rod with special earth for retention of moisture for long period. Minimum 5 numbers of earthing stainless steel electrodes enclosed in a cloth bag with non corrosive electrolyte for energizer 3 nos. for unit earthing, and 2 nos. for lightning diverter.
- (2) Earth line near the other domestic earth lines shall not be fixed.
- (3) At least 2 metre distance should be from the other earthing from the earthing of Electric fence.

R. Neon Tester

The five highly visible neon indicator lights should approximate readings as mentioned below:-

Excellent	Five lights	5000 V
Good	Four lights	3800 to 5000 V
Fair	Three lights	2500 to 3800 V
Poor	Two lights	1800 to 2500 V
Very poor	One light	1000 to 1800 V

S. Lightning diverter kit

It should be GI coated diverter kit with minimum 2 earthing pipe.

T. Gate Handle

It must be Poly propylene gate handle with proper insulation

U. Name Board

Proper name board shall be kept with optimum letter size in green colour with yellow background of size 1.5 X 1.5 feet (plastic board) indicating the farmers name, scheme name, company and department name.

V. Framed Power Gate

It must be 5.5 feet height must be 16 feet double framed power gate fabricated with 40 mm square MS pipe around with 100 mm square pillar MS Pipe.

W. Tool Kit

It must be Wire tightener handle, twisting tools, pliers and double ended spanner for clamp tightening should be provided.

X. Civil Works

The required Civil Works for the erection of corner post, support pipe and gate stand with concrete mixture (1:2:4) should be undertaken by the installing firms.

Y. Monitoring Equipment

Fence live light and GSM based Monitoring system or Digital Volt Meter Must display fence voltage digitally up to 15KV, Made of non-shocking plastic.

Z. General Guidelines

- (1) The user shall not erect fence passing along a electric line (EB line). There should be 6 metre between the top of the fence and the main line.
- (2) A fence should be installed to be as minimally intrusive as possible.
- (3) Fence live light shall be provided in all corners of field, where fencing unit is installed.
- (4) Concertina or barbed wire shall not be attached to the fence, wall, any existing barbed wire, concertina, or similar wiring mechanisms installed on the structures shall be removed.
- (5) Electricity Fences shall be installed or constructed by the provisions of the International Electro Technical Commission (IEC 60335), Bureau of Indian standard (IS302-2-76).
- (6) Warning signs- Warning sign Boards should be UV stabilized polyethylene plastic with statutory colour and signs.

Fences shall be appropriately identified with the warning signs stating "Warning: Electric fence." In addition, the warning signs must include universal symbols indicating the presence of the fence. A person must install warning signs at each gate or accessing point at the perimeter fencing. Their intervals should not exceed 30 feet. The warning signs should be visible on both fencing sides and shall not be smaller than 12 inches x 18 inches. A person should keep the sign in good condition to ensure readability and visibility and be quickly identified.

- (7) Emergency access- For emergency access, Automatic shut off provision, disconnect switches, and other similar devices should be installed.

SUPRIYA SAHU,
Additional Chief Secretary to Government.

FORM-I

[See sub-rules (2) and (3) of rule 3]

Application to erect Power Fence.

1.	Name of the Applicant	:	
2.	Father's name	:	
3.	Age	:	
4.	Address	:	
5.	Survey No. of the property	:	
6.	Location/site of the property	:	
7.	Type of Property (Agricultural field / House / Others)	:	
8.	Types of animals visiting the property	:	
9.	Reason for fencing	:	
10.	Extent of property proposed for fencing	:	
11.	The mode of supply to fencing (TANGEDCO/Solar/Other)	:	
12.	Specification of electric fencing proposed a. Voltage b. Current c. Safety tripping devices d. Earthing	:	

Place:

Date :

Signature of the Applicant

FORM-II

[See rule 3(3)]

Permission granted to erect Power Fence.

Permission Number

Date

Thiru/Thirumathi/Selvi _____ son/wife/daughter of _____ residing at _____ is hereby granted permission to erect a power fence in the property situated in _____ for the extent of _____.

2. You are directed to erect and apply for registration of the power fence within 90 days as per the Tamil Nadu Power Fences (Registration and Regulation) Rules, 2023.

Place:

Date :

Signature of the District Forest Officer

Date

Seal

FORM-III

[See rules 3(4) and 5(1)]

Application to register Power Fence.

1. Name of the Applicant :
2. Father's name :
3. Age :
4. Address :
5. Village and Survey No. of the property :
6. Location/site of the property :
7. Type of Property (Agricultural field / House / Others) :
8. Types of animals visiting the property :
9. Reason for fencing :
10. Extent of property fenced :
11. Specifications of the energizer used,-- :
 - a) Supply used (Solar/TANGEDCO/any other)
 - b) Voltage/Current rating
 - c) Details of the Safety device fixed details
12. Type of fence hanging/regular :
13. Details of *permission granted in Form-II, for erection of power fence (if applicable) :

If not, the date from which the existing power fence has been erected. :

Place :

Date :

Signature of the Applicant

* Copy of Permission granted to be enclosed.

FORM-IV

[See Rules 3(4) and 5(1)]

Undertaking

I Thiru / Tmt. _____, S/o (D/o) _____, Age _____ years, _____ Village / Town, _____ Taluk, _____ District, _____ State hereby undertake on behalf of M/s. (Company name and Address) _____ that we had installed the power fence on property (Survey No.) _____ as per the technical specifications mentioned in the Schedule to the Tamil Nadu Power Fences (Registration and Regulation) Rules, 2023.

Place :

Dated :

(Signature of the representative of the Company
along with Seal and date)

FORM-V

[See Rules 3(5) and 5(2)]

Certificate of Registration for Power Fence.

Registration Number

Date

1. Name of the Applicant :
2. Father's name :
3. Age :
4. Address :
5. Survey No. of the property :
6. Location/site of the property (with geo coordinates) :
7. Type of Property (Agricultural field/House/Others) :
8. Types of animals in the vicinity of the property :
9. Reason for fencing :
10. Extent of property permitted to be fenced :
11. Specifications of energizer permitted :
 - a) Supply used (Solar/TANGEDCO/Another)
 - b) Voltage/Current rating
 - c) Safety device fixed details
12. Period for which permission is granted :

Place :

Dated :

Signature of the District Forest Officer

Date

Seal

SUPRIYA SAHU,
Additional Chief Secretary to Government.



Elsa Foundation
Animal & Biodiversity Charity

Hanging Solar
Fences to
Address Human
- Elephant
Negative
Interactions
and to Enhance
Captive
Elephant
Welfare