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# Storm Resistant Fencing Panels for Palm Coconut Tree Farms

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**ABSTRACT**

In this paper, we have conceptualized a novel buffer fencing composite structure which can act as a resistant / diluting phenomenon against stormy winds, to protect coconut palm tree farms. The main objective of our novel structure is to reduce the violent wind loads on the coconut palm tree farms by slowing down the wind velocity using aerodynamically designed fencing structure. Secondarily it can be modified possibly to produce electricity generation from land falling cyclonic wind in addition.

***Key words*** *: Wind funnel, Tunnel tail, Wavy buds, Aerodynamic, Coconut palm trees*

## Introduction

In Tamil Nadu, storms have been becoming a regular event especially after Thane storm that hit east coast districts of central Tamil Nadu during North-East monsoon in 2011. After Thane, Tamil Nadu east coast have witnessed the disastrous effects of Nilam (2012); Madi (2013); Roanu-Kyant-Nada-Vardha (2016); Okhi (2017) and Gaja (2018) in consequent years. The most recent Okhi and Gaja storms in 2017 and 2018 (November) have left worst unseen experience in the post disaster management and recovery. Since the recent storm Gaja, mainly hit the Delta regions of Tamil Nadu, lot of damages have been witnessed regarding the devastating of trees and agricultural fields and ended up in huge loss for respective farmers.

### Storm Resistant Fencing Panel

Our proposed storm resistant fencing panels (SRFP) consists rows of windows, on to the boundary of which, cotton funnels are pasted. At the end of the cotton funnels, cotton tails are stitched together in such a way that both cotton funnels and cotton tails homogeneously behave during the wind passage. To step down the wind velocity, the entire inner and outer surface areas of the mentioned cotton funnels and cotton tails are embedded partially with stuffed buds for the wavy flow of the wind flowing from one side of the structure to the other side. The SRFP, can be erected with respect to the maximum height of the tree present in the given farm. The SRFP as a whole structure would have a curved profile and fitted with sharp edges at the boundaries of the windows to minimize the contact area of the wind with the structure. Based on the history of storm attacks in the given locality, the direction in which the SRFPs have to be erected, can be finalised.

### Concept Inspiration

The washed cloths are used to be dried out in the sun with the help of a rope or string tied-up at poles in distant ends. When the heavy wind lashes out, the motion of the clothes over the tied up string or rope

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gave us the spark of designing an infrastructure which can be used to protect important elements from lashing winds during the cyclonic storms.

**Fig. 1.** Drying clothes over a tied-up string outdoor

### Principal Components

Our proposed storm resistant fencing panels (SRFP)consists of few principal parts (or) components. The principal components are:

1. The external bamboo frames
2. The internal bamboo frames
3. Receiving Cotton funnel
4. Cotton tail
5. Connecting Aluminium ring
6. Cotton stuffed buds (funnels & tails)

### Technical Description

The Storm Resistant Fencing Panels (SFRP) consists of larger size bamboo frames, within which square frames of bamboo sticks are fabricated in such a way that the entire panel looks holding number of cells aligned in rows and columns.

A funnel (hopper shaped portion) is attached to each bamboo cell in one side which is made up of cotton cloth. In addition, a cotton made, hollow tubular tail is attached to the hopper shaped funnel with an aluminium ring at the junction. The aluminium ring is mechanically stitched with both hopper portion of the funnel and cotton tail, so as to make the funnel and tail functions together simultaneously. All the bamboo cells are attached with a similar cotton funnel and cotton tail as described above.

All the cotton funnels and attached cotton tails are embedded with cotton stuffed buds conically inwards in the hopper portion and longitudinally throughout in the tail portion respectively.

The SFRP is erected in such a way that it has a curved profile both horizontally and vertically, covering 40 to 50 degrees in the top view. The curved profile is possible because of the strength and flexibility offered by the bamboo frames. Since the bamboo sticks will have a cylindrical surface, the contact area of the wind mass with individual cell is less. This ensures the structural stability of the proposed panels during heavy wind.

When the stormy wind mass approaches the farm, it would get hit on to the surface of the panels (which are erected in the vicinity of the farm boundary) on one side. The impacted wind would slide

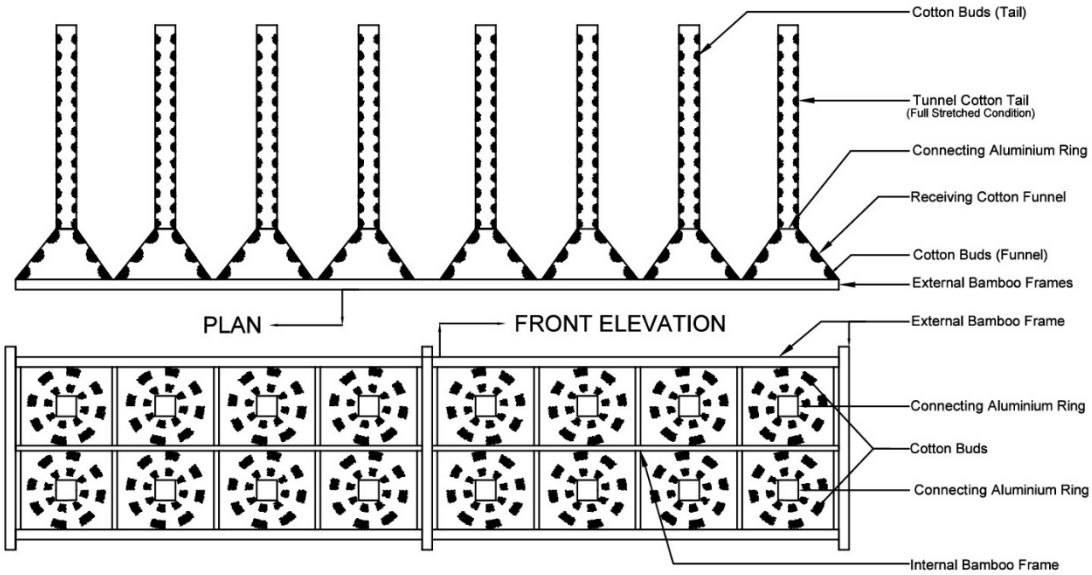


**Fig. 2.** Proposed Storm Resistant Fencing Panels (SRFP) in full stretched condition

aside into the bamboo cells and have to flow through the funnel and tail in the other side of the panel, which is supposed to carry the wind throughout its entire length. Since the cotton funnel and tail runs through the farm in a given alignment, would be freely oscillating with the violent wind flow during the storms. But, the provision of lengthy cotton tails (along the length of the farm), which is embedded with cotton stuffed buds in inner circumference, helps in reducing the impact of wind mass by allowing the wind mass to flow through the undulated wavy surface inside the cotton tail. So, the wind energy which are supposed to cause the palm coconut trees fallen down or broken at the stem region, are reduced down by surrounded Storm Resistant Fencing Panels.

**Advantages of Proposed SRFP**

The highlights of our proposed infrastructure are:

(i) No electrical / electronic equipment involved (So, no E-waste generation)
(ii) No plastic material involved in the fabrication
(iii) No power consumption
(iv) One time investment and No complex maintenance
(v) No skilled supervision required; It automatically works with the wind flow.
(vi) The infrastructure can be improvised with the means of electricity generation from the wind.

## Conclusion

Since the loss of agricultural crops and important trees during the storms can never be compensated satisfactorily, our proposed infrastructure can make a significant difference in pre-storm disaster management. In large scale execution, the proposed design can be a wealthy investment for the benefit of farmers and farm owners.

## References

Imbert, D. 2018. Hurricane disturbance and forest dynamics in east Caribbean mangroves. *Ecosphere.* 9 (7): DOI: 10.1002/ecs2.2231.

Saravanan, J. and Naveen Chander, K. 2015. Chennai Floods (2015) and Possible Solutions from Developed Countries. *International Journal of Science and Research*. 4 (12) : 1575-1580, DOI: 10.21275/v4i12.nov152333.

Saravanan, J., Jayadurgalakshmi, M. and Karthickraja, R. 2018. China's Nanjing Vs India's Delhi – A perspective for vertical forest. *International Journal of Civil Engineering and Technology*. 8 (12) : 115-123.

Source of the Image: https://www.shutterstock.com/video/clip-1009372496-colorful-clothes-laundry-drying-outdoor-under-sun used in section 3. Website access date: February 22, 2019.