

Environmental Impact Assessment of Peruru Banda Hill Before and after the Construction of The Vakulamatha Temple at Tirupati, Andhra Pradesh, India

Mrs. Chiranjeevi Althi¹, Dr. T. Ramashri, Professor², Dr. R. Jagadiswara Rao³, Tirupati, AP⁴

¹Dept. of Electronics & Communication Engineering (ECE), SVU College of Engineering, Tirupati, AP

⁴Dr. R. Balaram Dept. of Geology, SVU College of Science, Tirupati, AP

²Dept. of Electronics & Communication Engineering (ECE), SVU College of Engineering, Tirupati, AP

³Retired Professor of Geology, SVU College of Science & Chairman, Rayalaseema Vikas Parishad (RVP),

***Corresponding Author**

DOI : <https://doi.org/10.51583/IJLTEMAS.2025.1411000069>

Received: 19 November 2025; Accepted: 27 November 2025; Published: 10 December 2025

ABSTRACT

This paper deals with an environmental impact assessment of the Peruru Banda Hill comprising of granite, located at around 8 km west of Tiruchanur, Tirupati District, Andhra Pradesh, India before and after the construction of the Vakulamatha Temple by the Tirumala-Tirupati Devasthanams (TTD) in June 2022. Studies using multi-date Google Earth Pro (GEP) satellite images generated from the software available in the public domain revealed a remarkable improvement in the environmental condition of the temple portion of the Hill, while the remaining portion of the hill is either highly water-logged or marked with rugged hilly region at varying elevations owing to illegal mining by local artisans. This paper provides a methodology helpful to the TTD Engineering Department to transform the entire rocky and water-logged areas of the hill into a high-value prime land through appropriate mining of Peruru granite and conjunctive use of surface water and groundwater in the nearby Peruru Tank.

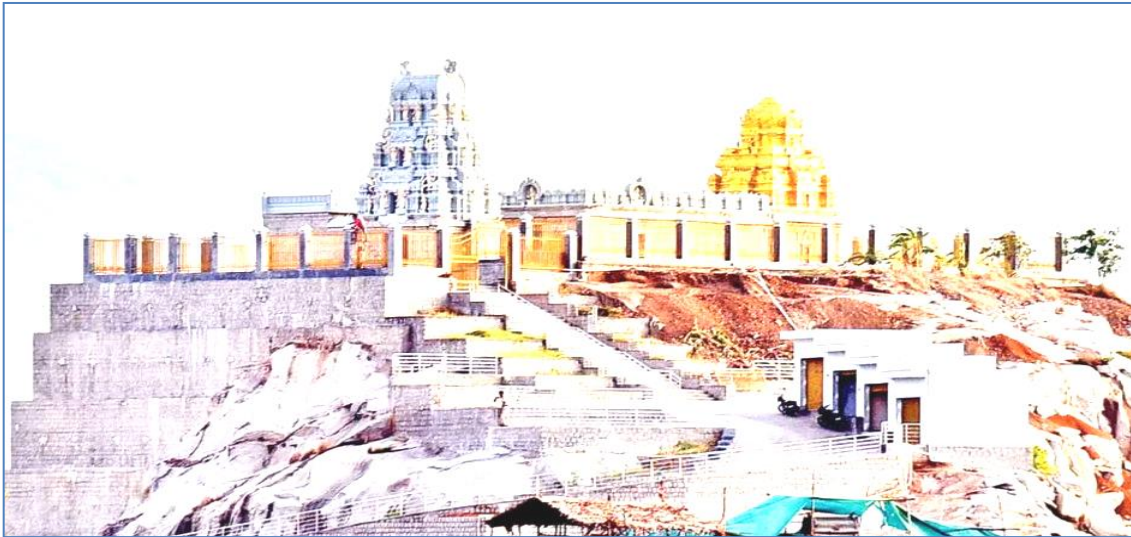
Keywords: Tirumala-Tirupati Devasthanams (TTD), Peruru Banda Hill, Vakulamatha Temple, Environmental Impact Assessment, Illegal Mining of Granite, Transformation of water-logged and Rocky Portions into Prime Land through legal mining..

INTRODUCTION

Peruru Banda is a residual hill comprised granite trending in an east-west direction measuring 860 m along length and 266 m along breadth in a 23-ha land west of Pathakalva village at around 8 km west of Tiruchanur, Tirupati District, Andhra Pradesh, India. It lies between north latitudes 13°35'52.44" and 13°36'02.79" and east longitudes 79°21'45.66" and 79°22'14.15" as per the globally followed World Geodetic System WGS 84 Datum revised last in 2004. As per the Survey of India topographic map 57 O/6, the hill has a maximum height of 204 m with reference to sea level and 34 m with reference to ground level.

Vakulamatha temple was constructed by a Vijayanagara ruler on the eastern fringe of the Peruru Banda Hill in the 16th century. For want of maintenance, the temple went into ruins ever since its construction. With the renovation of the temple by the Tirumala-Tirupati Devasthanams (TTD) in June 2022, the temple is being visited daily by a large number of pilgrims (Fig. 1).

Fig. 1: Aview of the Vakulamatha temple constructed by the Tirumala-Tirupati Devasthanam (TTD) on the eastern fringe of the Peruru Bund Granite Hill in June 2022



Because of good construction and maintenance by the Engineering Division of the TTD, there has been a remarkable improvement in the environmental condition of the temple portion of the Hill. In contrast to this, the remaining portion of the hill remains mostly water-logged with rugged hilly terrain subjected to illegal mining by the local artisans.

This paper is aimed at providing a methodology which the TTD Engineering Department could adopt to transform the entire water-logged and rocky areas of the hill into a highly-valued prime land with sizeable income coming through sale of granite obtained through legal mining.

Quarrying Of Peruru Granite

Quarrying of Peruru granite has been carried out since around 10th century with local artisans developing ingenious methods of mining that produce little sound and little air pollution. The first one involves burning firewood at surface (Fig. 2) and the second one uses a mini-explosive placed in a single narrow hole to a small depth (Fig. 3). By this, various dimension stones used in civil engineering works, road metal, fence posts, household utilities and kitchen tools could be produced (Figs. 4 and 5). The works of Mahalingam (1970) and Craddock (1996) highlight the exceptional skills exhibited by Peruru artisans.

Fig. 2: Firesetting on granite of Peruru Banda



Fig. 3: Driving a hole into the rock with hammer for mini-blasting.



Fig. 4: Making road metal using a hammer



Fig. 5: Obtaining dimension stones of various sizes



Constructions Using Peruru Granite

Some of the important constructions, which used Peruru granite include Chandragiri Fort (Fig. 6), Rayalacheruvu Tank (Fig. 7), compound walls of temples (Fig. 8), railway bridges (Fig. 9), College buildings (Fig. 10) and Rock-wall Protection walls along the Tirupati-Tirumala Second ghat road (Fig. 11).

Fig. 6: Chandragiri Fort was constructed using Peruru granite in the 10th century.



Fig. 7: Rayalacheruvu Tank was constructed using Peruru granite in the 14th century



Fig. 8: The compound wall of Govindarajaswamy temple at Tirupati was constructed using Peruru granite



Fig. 9: A railway bridge near Tirupati was constructed using Peruru granite



Fig. 10: The College of Arts of Sri Venkateswara University at Tirupati was constructed using Peruru granite



Fig. 11: A rock-wall protection wall was constructed along the Tirupati-Tirumala second ghat road using Peruru granite



Environmental Changes in The Peruru Banda After The Construction of The Vakulamatha Temple

In order to understand the environmental impact of the Vakulamatha temple on the western portion of the Peruru Band Hill, two high-resolution Google Earth satellite imageries have been generated using the Google Earth Pro software made available in the public domain on free basis. Of these, Figure 12 refers to the imagery dated 30th April 2022 corresponding to the date of construction of the temple, while Figure 13 refers to the imagery dated 17th April 2025 corresponding to the environmental conditions as on now.

Fig. 12: A Google Earth Pro (GEP) image of Peruru Banda Hill captured as on 30th April 2022

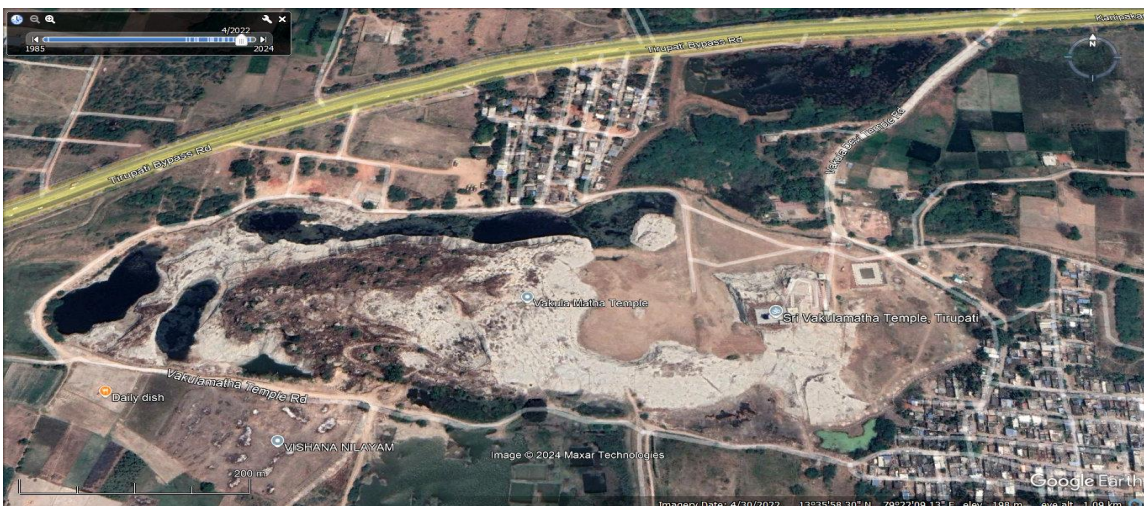
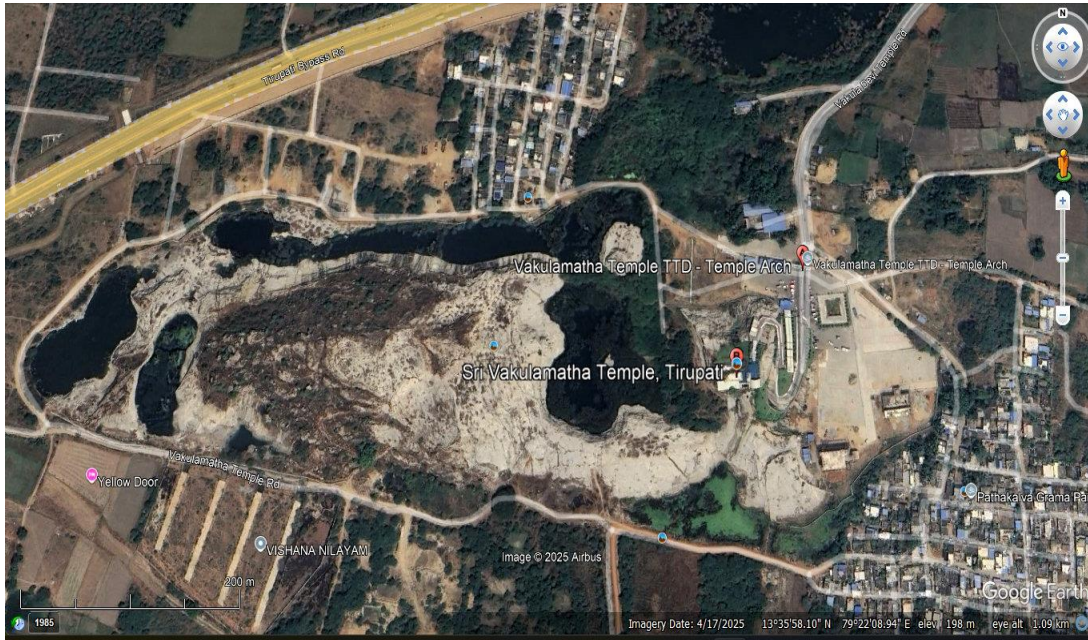


Fig. 13: A Google Earth Pro (GEP) image of Peruru Banda Hill captured as on 17th April 2025.

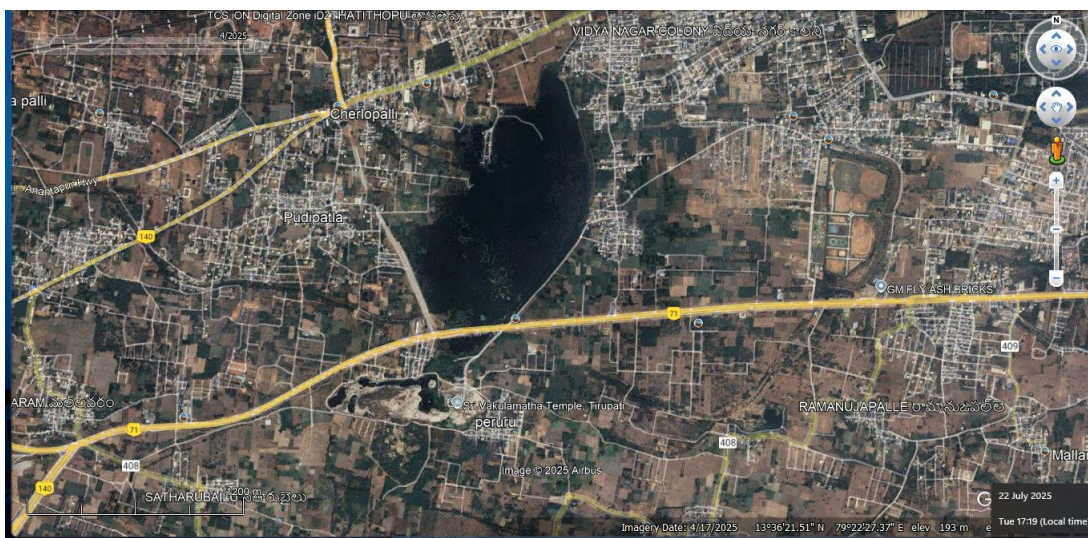


From the observation that there is near doubling of water-logged area in the western portion of the Peruru Banda, it can be concluded there has been a change of environment from bad to worse. This change has been attributed to the entry of floodwaters from the Peruru Tank abutting the Peruru Banda Hill in the north entering into the low-lying areas.

How oo Transform The Water-Logged Area of The Peruru Banda Into Dry Land?

Fig. 15 is the Google Earth Pro image showing both Peruru Banda Hill and Peruru Tank abutting it in the north. It is evident from this Figure that all the low-lying areas of the Peruru Band Hill are fed by the surface water in the Peruru Tank.

Fig 4: A Google Earth Pro (GEP) image of Peruru Banda Hill and Peruru Tank captured as on 17th April 2025.



The works of Jagadiswara Rao et al (1978), Srinivasulu (2006) and Venkateswarlu (2021) in the Upper Swarnamukhi river basin indicate that the Peruru Tank is so heavily silted that any small rain fills the Tank to the brim with excess water submerging the low-lying areas in the Peruru Banda Hill and other low-lying areas in Tirupati. The only way this problem could be tackled effectively is through dredging of sediments accumulated in the Peruru Tank and use the dredged material to fill up the low-lying areas of the Peruru Banda Hill into a

level land of high economic value. Large-scale pumping of abundant deep groundwater of high quality associated with the Peruru Tank could be used to meet the growing water requirements of the Peruru Banda Hill.

CONCLUSION

This Paper provides a methodology helpful to the TTD Engineering Department to transform the entire rocky and water-logged areas of the hill into a high-value prime land through appropriate mining of Peruru granite and conjunctive use of surface water and groundwater in the nearby Peruru Tank.

ACKNOWLEDGEMENT

The authors thank Prof. V. Uma, Vice-chancellor, Sri Padmavati Mahila Visvavidyalayam, Tirupati for encouragement.

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