

Soil Erosion

(Using the method of 'Relationship between vegetation cover and soil loss by sheet and rill erosion')

Vegetation type in Warje is mix forest i.e. trees, bushes and grass

By the equation of erosion relative,

$$Er = e^{-0.0235C} \text{ ---(Dunne et al. 1978)}$$

Where Er = Erosion relative, C = vegetation cover (%)

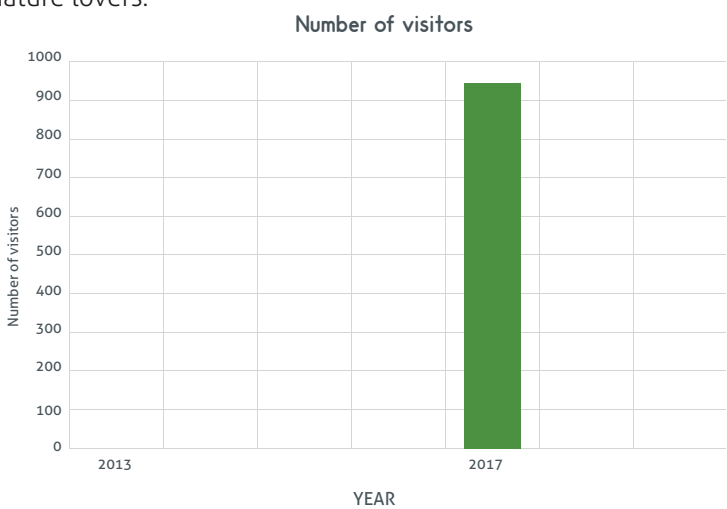
Considering vegetation cover as 50%, Soil erosion (Er) is 0.309.

As it was 0.861 before 4 years (value of total soil erosion is 1), when hardly 5% vegetation was present in the form of grass vegetation (Here Er = e^{-0.03c}, Ref., Snelder and Bryan)

Visitors

Number of visitors visit WarjeSmritiVan has been increased drastically since last couple of years. Before 2013, visitors' number was almost zero as the site was used by the people of slum area located adjacent of the site for open defecation.

Now, due to vegetation growth and visitors, open defecation problem is now solved. & now more than 950 visitors visit the place in the morning and evening. The patch of forest is an 'Oasis' for the nature lovers.



Visitors' opinion

Most of the visitors live nearby places of the site. They regularly come in the morning as well as in the evening to get oxygen and fresh air. Youth and seniors enjoy the place happily. Many citizens come for yoga and exercise. Many visitors help maintain the forest well.

Mammals found in Warje Smriti Van

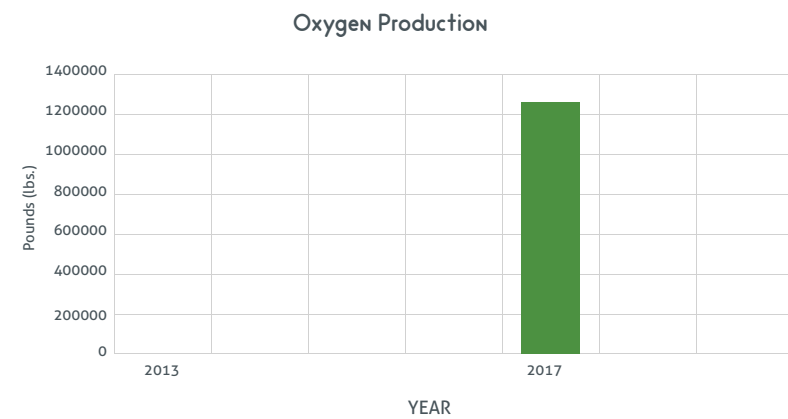
- Asian palm civet (*Paradoxurus hermaphroditus*)
- Indian grey mongoos (*Herpestes edwardsi*)
- Indian hare (*Lepus nigricollis*)

Oxygen production

A young tree absorbs approximately 130 pounds oxygen per year

So, 9500 * 130 = 12,38,900 lbs. (pounds) oxygen production

Before the vegetation growth, the hill is totally barren. Only few patches of grasses were seen seasonally i.e. during monsoon. Even the small contribution in oxygen production was 10000 lbs. per year.



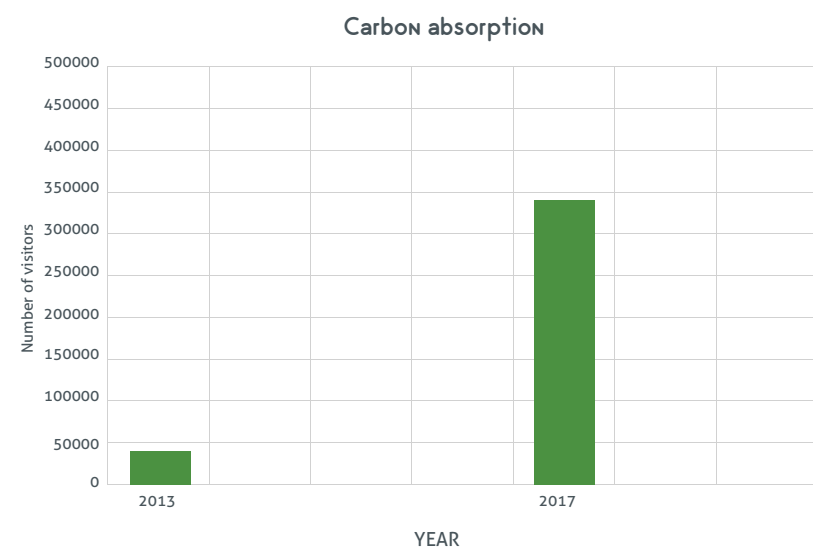
Carbon absorption

A young tree absorbs approximate 36 pounds carbon per year

So, 9500 * 36 = 2,85,000 lbs. (pounds) carbon absorption

Four years before, the barren area could absorb about 2300 * 16.8 = 38640 lbs.

Where carbon absorption by few grassland patches



Tree density

Density is the number of trees per unit area and is generally reported as the number of trees per hectare (1 hectare = 2.47 acres).

So number of trees = 9500

Total area under plantation = 16.8 Hector.

Tree density = 9500/16.8 = 565.47 Trees/ Hector



Biodiversity of WarjeForestry – SmritiVan

Pune the sprawling city known as 'Oxford of the east', 'Cultural capital of Maharashtra' is also popular because of its moderate weather. It is also one of the fastest growing cities in the Asia Pacific region. The 'Mercer 2017 Quality of Living Rankings' evaluated living conditions in more than 440 cities around the world and ranked Pune at 145, second in India after Hyderabad at 144. The same source highlights Pune among evolving business centres and nine emerging cities around the world with the citation "Hosts IT and automotive companies". Obviously, the development rate is increased with the decreased biodiversity and environment.

During the 80th century Pune expanded towards north east south and west. One of the most populated areas during that century is Kothrud and Warje, which are situated about 10 km away from the centre of Pune. It was a very small village before 1970 with farming being main economic activity. Warje is on the bank of Mutha river, which has catchment area in western hills and source of good soil as well as sufficient water for farming. With a dense forest in proximity to river and creek areas, Warje was one of the stops during sheep migration from Konkan to regions inland.

Warje saw lot of changes after 1970, with significant increase in population of Pune. The change from village to suburb took toll on the environment. Major part of the forest, fertile lands were converted into apartment complexes of concrete and tar. Most of the land in Warje is now occupied by housing complexes. Under Warje fly-over bridge, daily early morning, there is a crowd of unskilled labour who awaits daily wage-based work from contractors, transporters and construction builders.

The smaller region of 'Malwadi' within Warje has seen rapid growth in the last ten years, again mostly due to the mushrooming of several big banner housing complexes resulting in a population boom in the area and resulting in much stress on the local public infrastructure.

Biodiversity Statistic

Plant : 23 | Bird : 29 | Butterfly : 15 | Reptiles : 10 | Mammals : 03

TERRE Policy Centre

Office :306, Multicon Square Next to Manohar Mangal Karyalaya, Erandwane, Pune - 411004 (India)

Office Phone : 020- 25448650

Email : terrepolicycentre@gmail.com
info@terrepolicycentre.com



Warje is connected by an extensive network of local municipal city buses to all parts of Pune. The buses operate from the "Ganpati Matha" bus station in Malwadi and connects the suburb to Swargate, Katraj, Shivajinagar, Pune station, MarketYard, etc. extending even up to Chinchwad and Nigadi. Thanks to the proximity to the heart of the Pune City (Deccan Gymkhana - 7 km, Pune Stn - 10 km) which is insulated from the west by the large area under the National Defence Academy, land prices in Warje / Malwadi have skyrocketed in recent times.



WarjeSmritivan is in the outskirts of Pune city. Total area of the hill is around 16.8 hectares. Earlier this hill was a barren land and entirely under the ownership of Forest department. The land was used as a dump yard by the residences in its proximity and was encroached by slums and builders. TERRE's urban forestry project in collaboration with Maharashtra forest department was launched in January 2015 under the CSR partnership of TATA Motors, other CSR partner and with individuals.



Till now, total 9500 trees of 7-8 feet height have been planted in the area under TATA Motors CSR initiative and the plants have grown to 10-15 feet height. The dead land is now taking breath with rich biodiversity. There are 5 ponds that

suffice the need of watering the plants and has increased bird's population in the area.

However, to ensure the water supply for the plants in dry seasons, the water tankers are brought daily, and the plant watering is done.

Indigenous tree species planted at Warje SmritiVan site

Banyan tree (*Ficus benghalensis*)

Banyan tree is the most familiar tree in our country. Interestingly, it originated in India itself. These trees have the largest canopy coverage. Banyan tree is also the national tree of India. It is religiously worshiped by Hindus.

Neem tree (*Azadiracta indica*)

It is grown in both tropical and sub-tropical regions. Neem has endless medicinal properties and that's what makes it popular in India. It is used to control pests and deal with pox viruses. Neem is a major ingredient in soaps and shampoos and is healthy for our skin.

Peepal tree (*Ficus religiosa*)

The peepal tree falls in the category of dry season deciduous or semi- evergreen tree. This is one of those rare trees that release oxygen both in the day and the night.

Gulmohar tree (*Delonix regia*)

Gulmohar is most famous for its pretty looking flowers. In India, its flowering season is between April and June. Spotting this tree is quite easy as it grows in dry as well as tropical conditions. The tree spreads and provides a dense shade. The flowers of this tree are large and orange-red in colour.

Spathodea/African tulip tree (*Spathodea campanulata*)

This is one of the world's most spectacular flowering trees basically from east Africa. It is now planted almost everywhere in the world. African tulip tree is a large upright tree with glossy deep green pinnate leaves and glorious orange scarlet.

Saptarni tree / Blackboard tree (*Alstonia scholaris*)

Saptarni is evergreen fast-growing tree, that grows up to 40 m tall. It is native to the Indian subcontinent, Indomalaya, Malesia, and Australasia. The bark of tree is used solely for medicinal purposes, ranging from Malaria and epilepsy to skin conditions and asthma. In Ayurveda it is used as a bitter and as an astringent herb for treating skin disorders, malarial fever, urticaria, chronic dysentery, diarrhea, in snake bite and for upper purification process of Panchakarma.

Chafa tree (*Magnolia champaka*)

It is a large evergreen tree in the Magnoliaceae family. It was previously classified as Micheliachampaca. It known for its fragrant flowers, and its timber used in woodworking. The tree has a narrow umbelliform crown. It has strongly fragrant flowers in varying shades of cream to yellow-orange, during June to September. The obovoid-ellipsoid carpels produce 2-4 seeds during September to October.

Kanchan tree / Camel foot tree (*Bauhinia variegata*)

It is a small to medium-sized tree growing to 10-12 metres (33-39 ft) tall, deciduous in the dry season. The leaves are 10-20 centimetres (3.9-7.9 in) orbiculate shaped, long and broad, rounded, and bilobed at the base and apex. This is a very popular ornamental tree in subtropical and tropical climates, grown for its scented flowers and also used as food item in South Asian cuisine.

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Jungle Badam / Tropical almond tree (*Terminalia catappa*)

Golden Bamboo
(*Phyllostachys aurea*)

Jamun tree / Black plum tree
(*Syzygium cumini*)

Aam / Mango tree
(*Mangifera indica*)

Shirish tree / Frywood tree
(*Albizia lebbek*)

Tamrashimbi tree / Copper pod tree (*Peltophorum pterocarpum*)

Ber tree / Indian plum tree
(*Zizyphus mauritiana*)

Shisham tree / North Indian Rosewood (*Delbergia sissoo*)

Karanj tree / Indian beech tree (*Pongamia pinnata*)

Apta / Bidi leaf tree
(*Bauhinia racemosa*)

Chiku tree / Sapodilla tree
(*Manilkara zapota*)

Aloe vera plant

Frangipani tree / Plumeria
(*Plumeria rubra*)



Butterfly species found in Warje Smriti Van

Angled Castor (*Ariadne ariadne*)

Common Indian crow (*Euploea core*)

Common grass yellow (*Eurema hecabe*)

Blue tiger (*Tirumala limniace*)

Common mime (*Chilasa clytia*)

Baronet (*Euthalia nais*)

Bright babul blue (*Azanus ubaldus*)

Common hedge blue (*Acytolepis puspa*)

Great eggfly (*Hypolimnas bolina*)

Plains cupid (*Chilades pandava*)

Spotless grass yellow (*Eurema laeta*)

Blue pancy (*Junonia orithya*)

Brown awl (*Badamia exclamationis*)

Tawny coster (*Acraea terpsicore*)

Lemon pancy (*Junonia lemonias*)

Reptiles found in Warje Smriti Van



Spectacled Cobra (*Naja naja*)



Saw Scaled Viper (*Echis carinatus*)



Russell's Viper (*Daboia ruselii*)



Banded Racer (*Argyrogena fasciolata*)



Rat snake (*Ptyas mucosa*)



Common trinket snake (*Coelognathu shelena helena*)



Striped Keelback (*Amphispesma stolatum*)



Oriental garden lizard (*Calotes versicolor*)



Indian skink (*Sphenomorphus indicus*)



Monitor lizard (*Varanus bengalensis*)