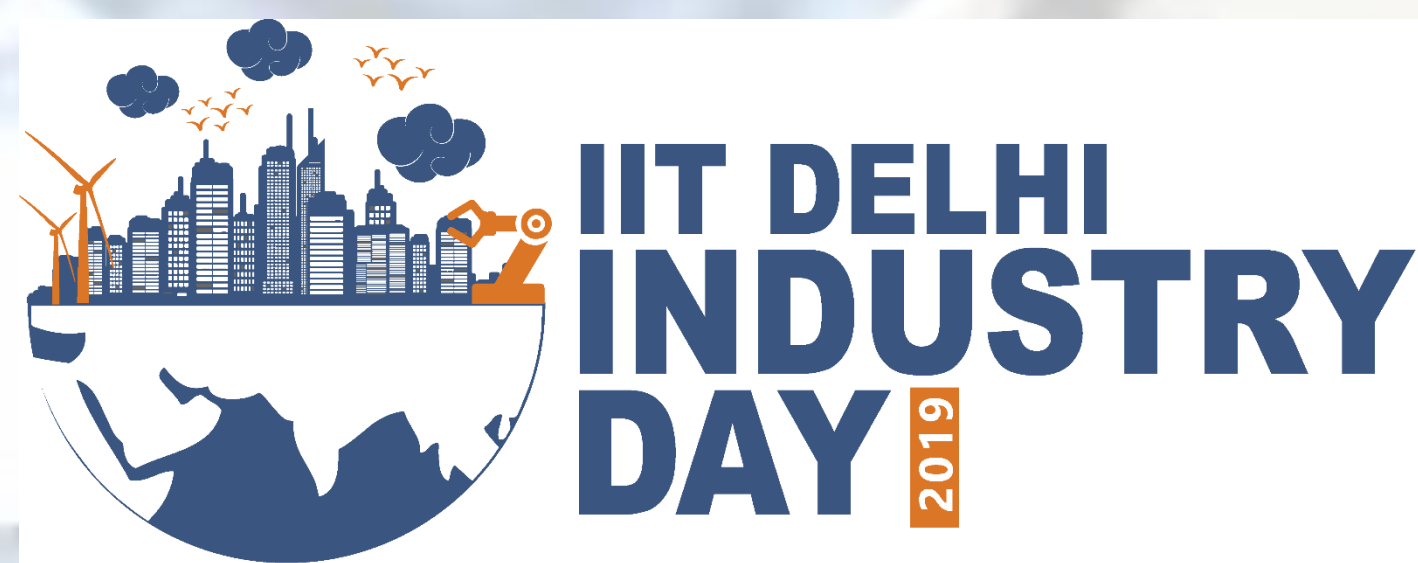


Sustainable Environment

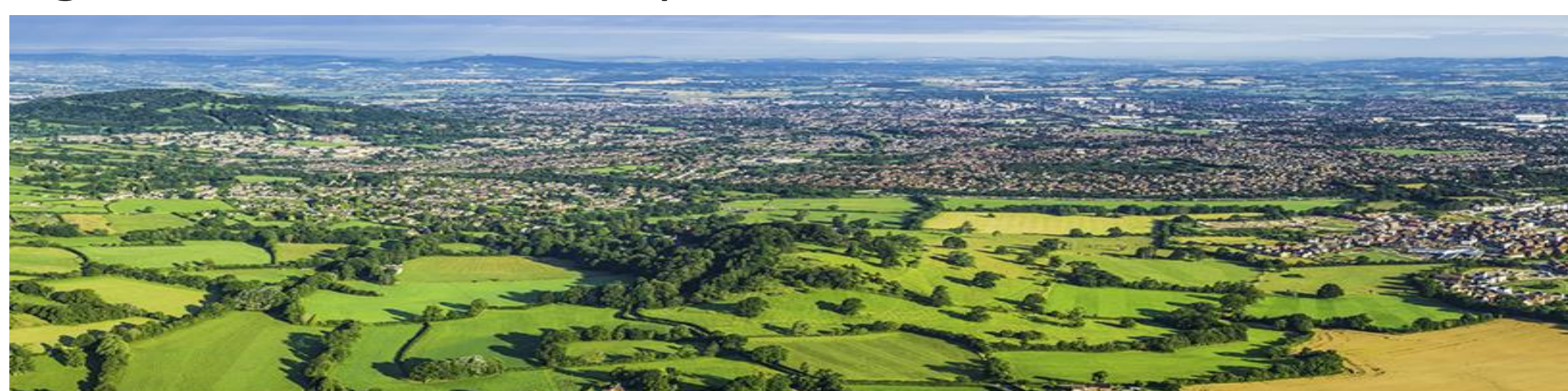
Optimal Design of Green Belt to Establish Coordination Between Environment and Industrial Areas

Durga Prasad Tripathi, Aravind K Nema*



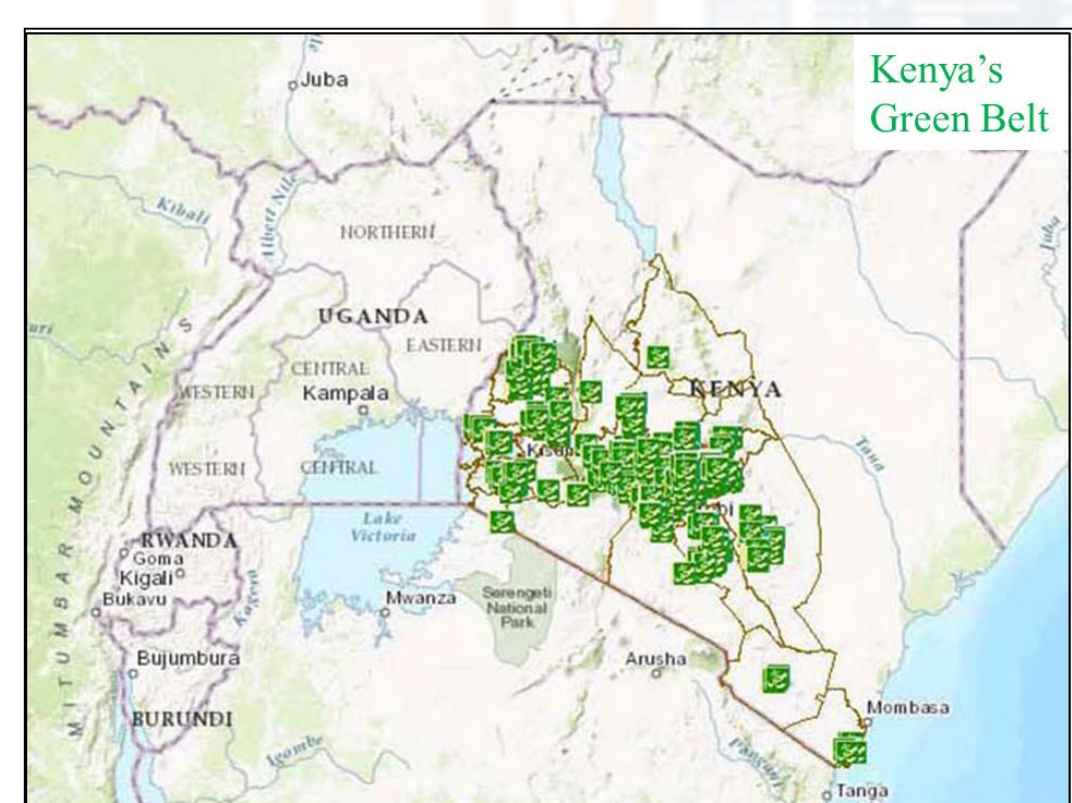
Abstract

With excessive use of land for urbanization and industrialization, depletion of the green belt area becomes major concern for the society. Due to degradation of green areas of the world, problems like urban heat island, air and noise pollution and animal habitat extinction have evolved with time period. Present poster is discussing benefits and design process of green belt with examples.



Introduction

Initially the idea of green belt as a source of pollution abatement was initiated by three nations: The Britain, USA and Kenya. A British Social Activist, Ebenezer Howard, in 1898 advanced the concept of greenbelt.

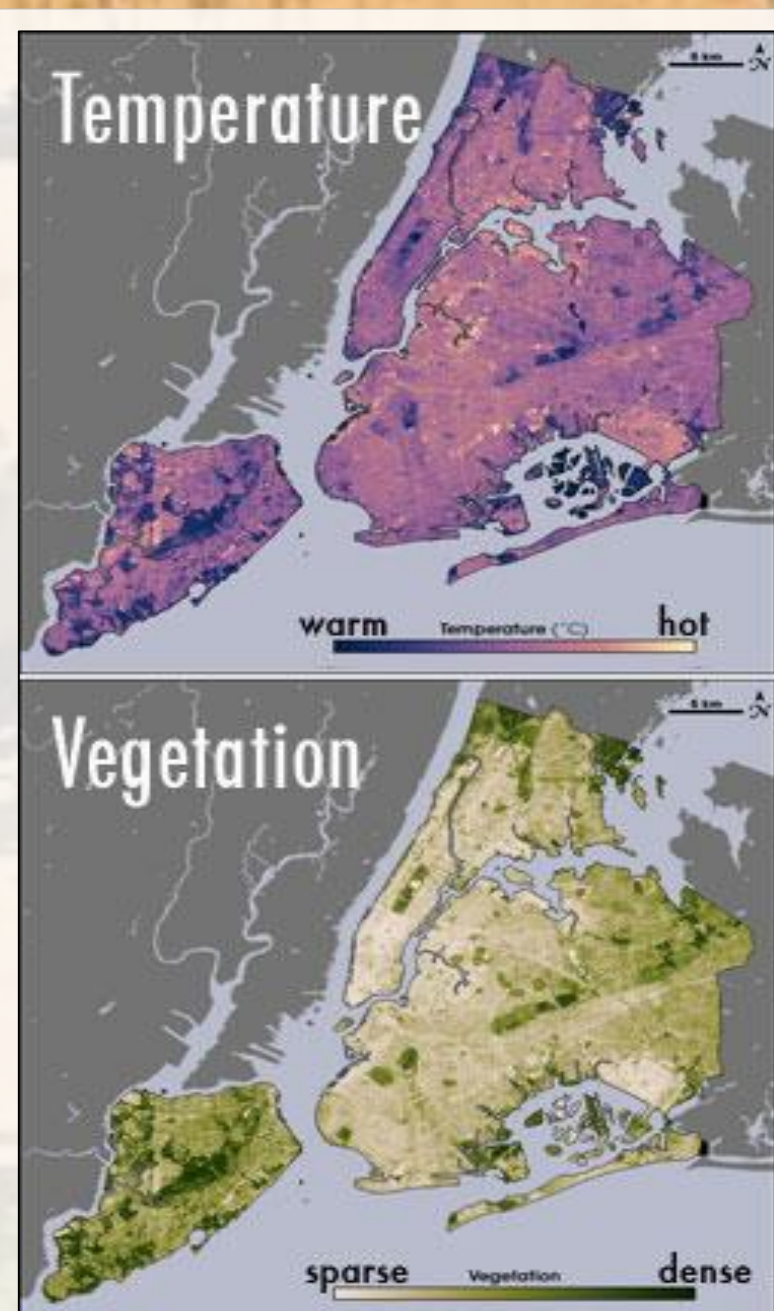
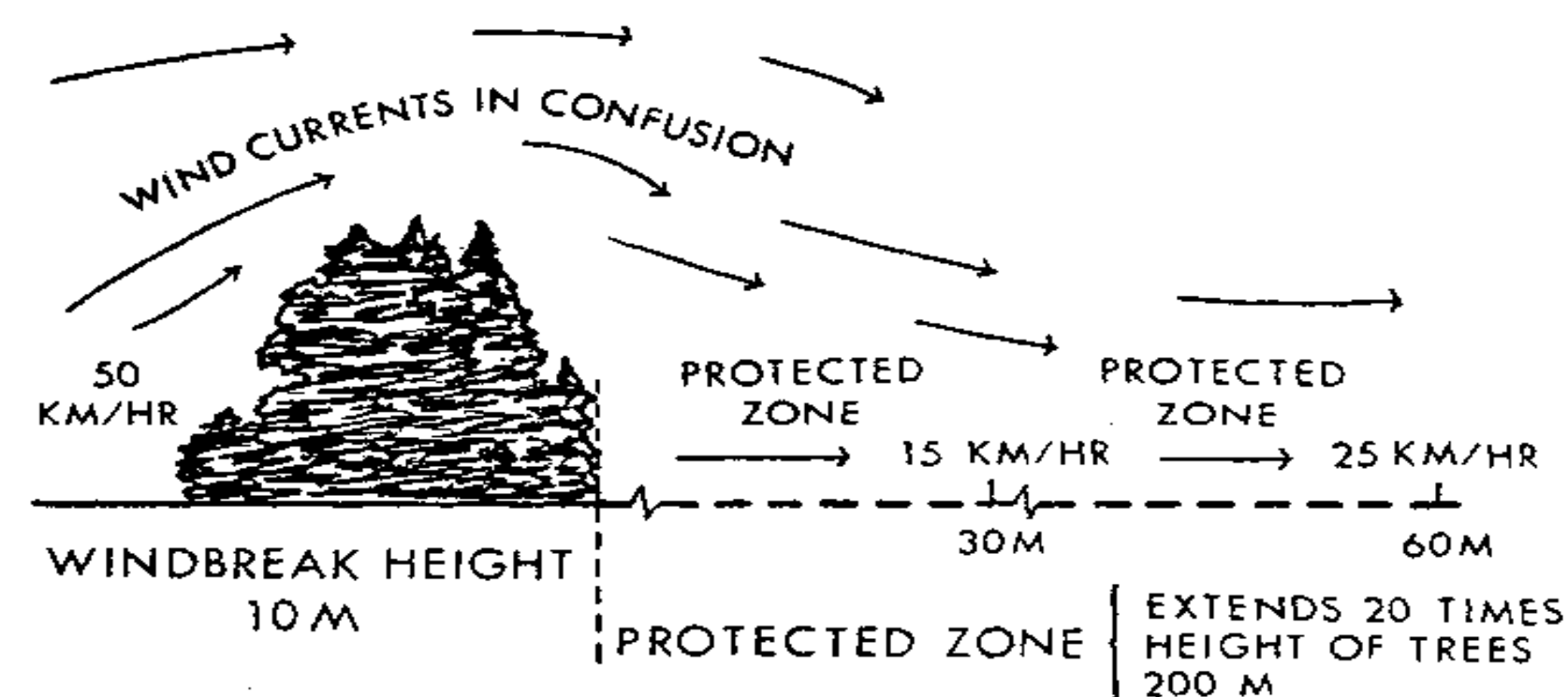


The term green belt refers to the mass plantation of trees (evergreen and deciduous) and main purpose of plantation is to lower the air pollution effect by filtering, interception and absorbing pollutants. Trees have been reported to remove air pollutants such as SO_2 , hydrogen fluoride and some compounds of photochemical reactions and collect heavy metals like mercury (Hg) and lead (Pb) from the air.

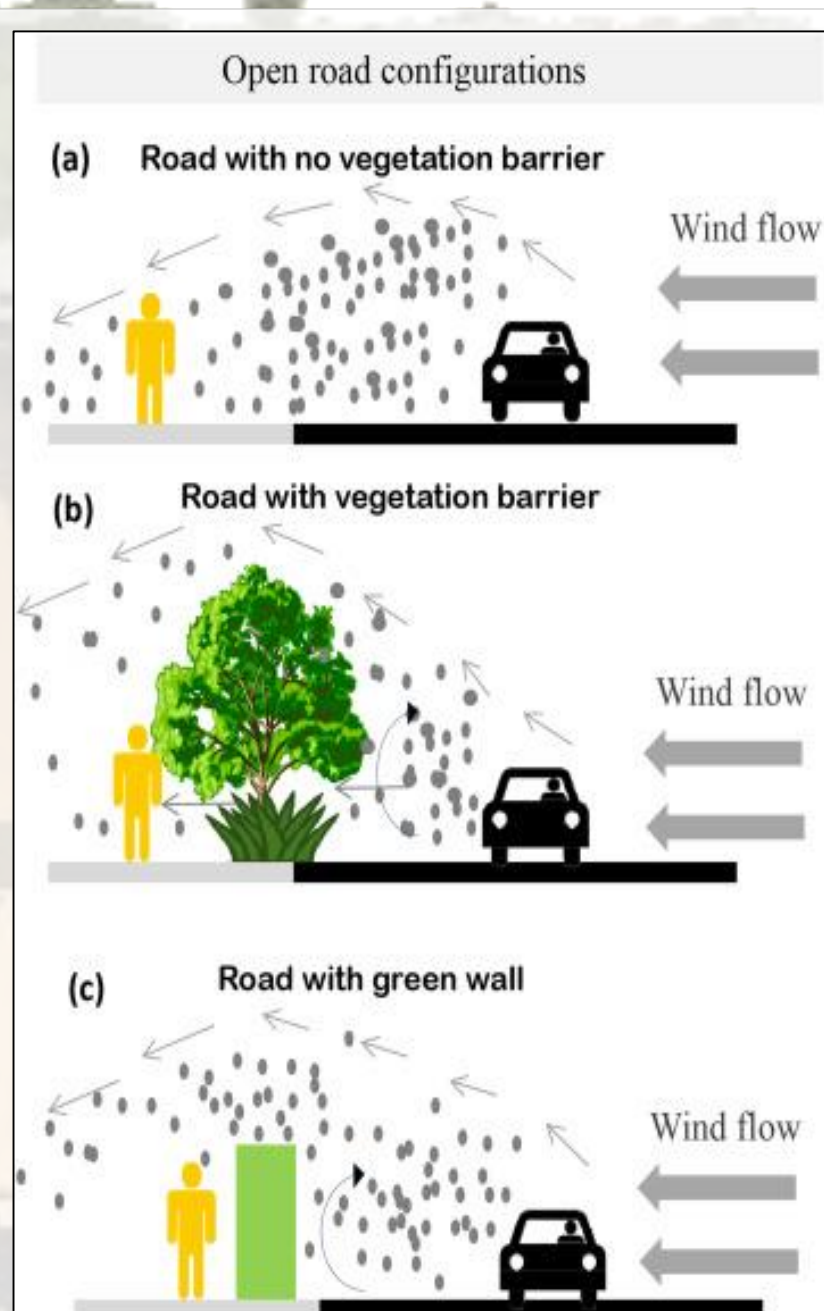
Objectives

Purposes of Green Belt development varies from the micro level air pollution reduction to enhancement of socio-economic status of the region

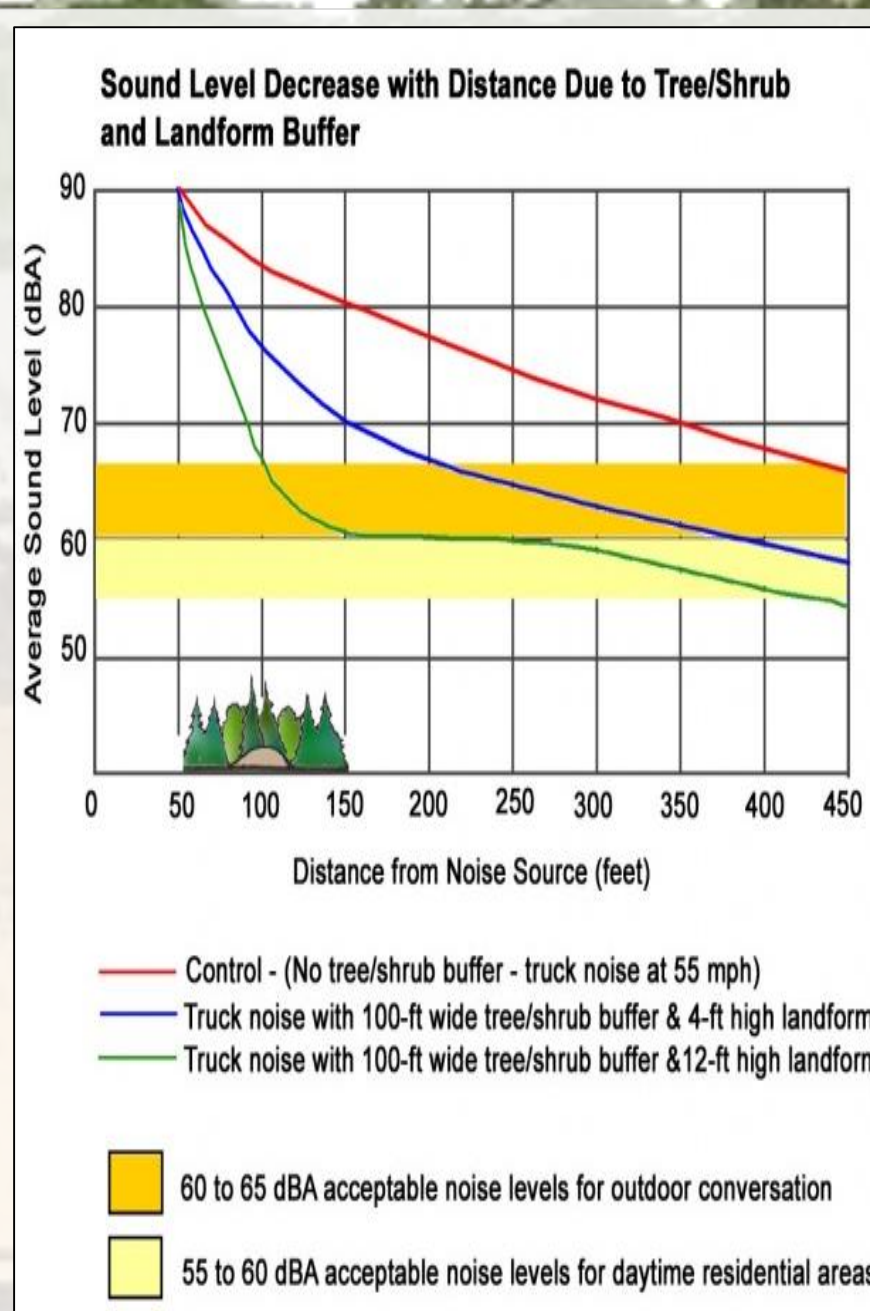
- The species used for planting and the width of Green Belt varies from industry to industry; it depends upon the nature and concentration of air pollutants.
- Temperature reduction
- Improve air quality
- Noise pollution reduction
- Aesthetic appearance
- Protect natural or semi-natural environments



Location: New York City (Satellite data from NASA)
Source: UCAR, 2011



Dispersion patterns of road pollutants under open road configurations
Source: Abhijith et al., 2017

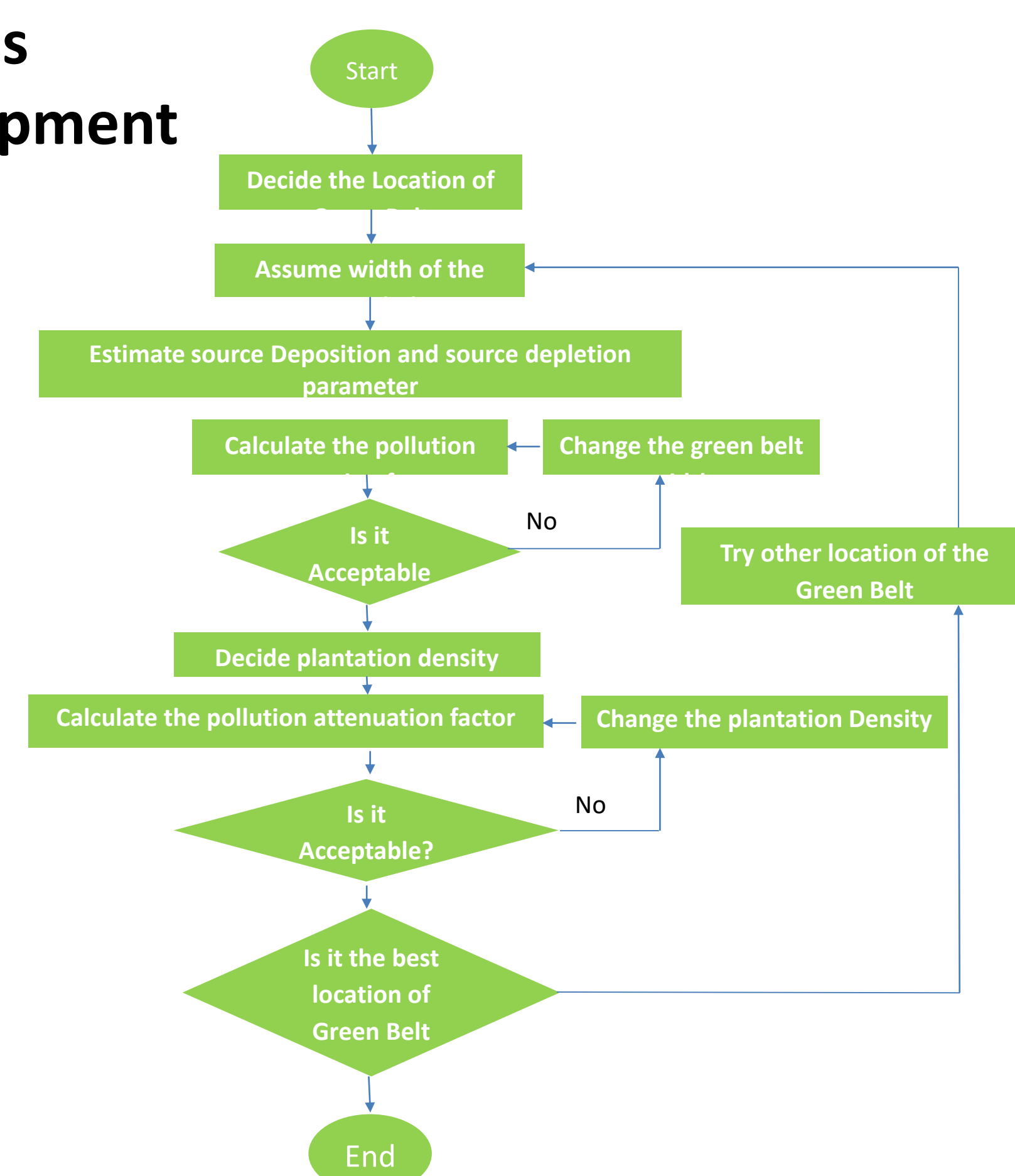


Source: Conservation Buffers, 2008

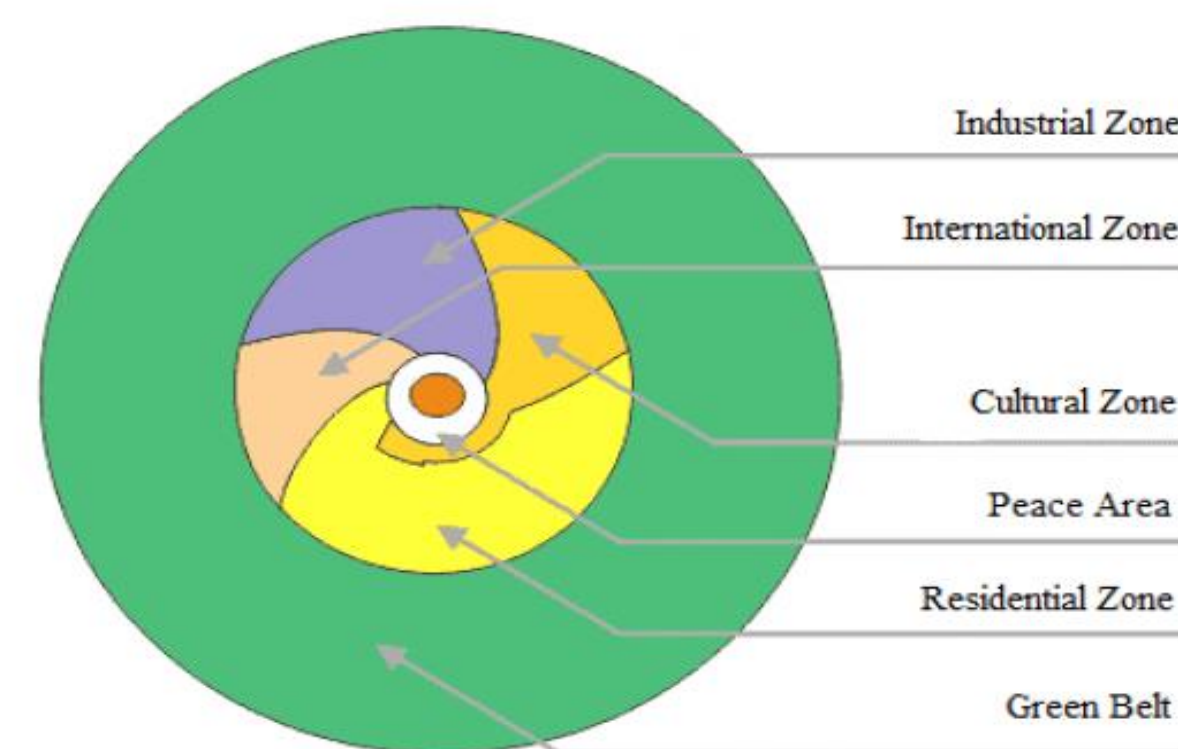
Industrial Significance

- The Greenbelt rather addresses people's basic needs and helps avoiding future problems by protecting clean air and water, supporting regional food production
- Optimal Design of Green Belt in the vicinity of industrial area to protect surrounding environment from air and noise pollution generated through industry
- Act as shield in between industrial pollution (air, water and noise) and surrounding environment

Green Belt Design Process and an example of GB development



The master plan of Auroville (Tamil Nadu, India) divides the city into 6 regions, that includes a galaxy shaped township and a 1.5 km wide outer green belt around.



The Zones of Auroville as named in the Master Plan of Auroville



The Galaxy Plan

Plant Species	APTI	API Grade
Terminalia catappa L.	9.50±0.49	3
Azadirachta indica A. Juss.	9.48±0.31	2
Ficus bengalensis L	10.02±0.40	4
Ficus religiosa L	10.10±0.21	4
Mimosa elengi L.	12.24±0.05	5
Mangifera indica L.	19.03±0.29	6
Delonix regia (Boj. ex. Hook.) Raf	10.25±0.37	0
Tabebuia aurea (Silva Manso)	10.84±0.40	1
Millingtonia hortensis L.f	11.13±0.08	0
Kigelia africana (Lam.) Benth	10.50±0.11	2
Artocarpus heterophyllus Lam	9.76±0.34	4
Pongamia pinnata (L.) Pierre	11.12±0.50	1
Tamarindus indica L.	8.45±0.25	1
Bambusa bambos (L.) Voss	8.95±0.24	2
Cassia siamea Lamk	12.06±0.21	2
Thespesia populnea (L.) Sol. ex Correa	10.14±0.48	2
Psidium guajava L	9.73±0.25	2
Tectona grandis L.	9.86±0.16	2
Polyalthia longifolia Sonn	10.39±0.44	2
Phyllanthus acidus (L.) Skeels	10.67±0.02	1
Moringa oleifera Lam	11.50±0.01	1
Anacardium occidentale L	14.88±1.11	4
Lagerstroemia speciosa (L.) Pers	10.77±0.63	1
Swietenia macrophylla King	10.69±0.52	3
Morinda coreia Buch.-Ham	10.58±0.31	3
Ficus benjamina L	11.94±0.45	2
Annona squamosa L	10.60±0.47	0
Cinnamomum tamala Buch.-Ham	11.14±0.41	1
Butea monosperma (Lam.) Taub.,	8.99±0.21	2
Manilkara zapota (L.) P. Royen	13.76±0.76	4

- Plant species around the Neyveli, Tamil Nadu thermal power station were evaluated
- Nagy and Szabo (2019) unveils that assessment of anticipated performance of different plants will be very useful while considering tree species for the greenbelt development
- Plants with high APTI (Air Pollution Tolerance Index) and API (Anticipated Performance Index) values are recommended for the development of the green belt around the thermal power station

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