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## People Science Forum

Ten Week Upasaki Prof. V M Parvathamma Memorial Space Eco Literacy and Sky Watch  
Orientation Programme

### BACKGROUND MATERIAL FOR THE WEEK # 07

Week	Agenda	Vision	Action
# 01 of 10	Climate Change	Wedonthavetime	One creative response
# 02 of 10	Pandemics since 1000 AD	Public Health	One action
# 03 of 10	Eco Sense is Cost Free	Ecological Sense	One Case
# 04 of 10	ISU and ISS	Space Quest	My Future in Space
# 05 of 10	Lakes	Eyes of Earth	Lakes in my Life
# 06 of 10	ISRO	Self Reliance	Social Implications
# 07 of 10	<b>Ecological Engineering</b>	<b>Tunnel Effect</b>	<b>Social Action</b>

### WEEK # 07 OF 10

Subject : Tunnel Effect by Ecological Engineering  
Focus : Closed Cycles Open Societies 2020  
Two Page Background note enclosed

Topics :

- Ecological Engineering
- International Environmental Technology Centre IETC UN  
International Ecological Engineering Society

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Mitsch and Jorgensen summarized five basic concepts that differentiate ecological engineering from other approaches to addressing problems to benefit society and nature: 1) it is based on the self-designing [capacity of ecosystems](#); 2) it can be the field (or acid) test of ecological theories; 3) it relies on system approaches; 4) it conserves [non-renewable energy](#) sources; and 5) it supports ecosystem and [biological conservation](#).

Mitsch and Jorgensen were the first to define ecological engineering as designing societal services such that they benefit society and nature, and later noted the design should be systems based, sustainable, and integrate society with its natural environment.

Bergen et al.[8] defined ecological engineering as: 1) utilizing ecological science and theory; 2) applying to all types of ecosystems; 3) adapting engineering design methods; and 4) acknowledging a guiding value system.

Barrett (1999) offers a more literal definition of the term: "the design, construction, operation and management (that is, engineering) of landscape/aquatic structures and associated plant and animal communities (that is, ecosystems) to benefit humanity and, often, nature." Barrett continues: "other terms with equivalent or similar meanings include [ecotechnology](#) and two terms most often used in the [erosion control](#) field: soil bioengineering and biotechnical engineering. However, ecological engineering should not be confused with 'biotechnology' when describing genetic engineering at the cellular level, or 'bioengineering' meaning construction of artificial body parts."

The applications in ecological engineering can be classified into 3 spatial scales: 1) macrocosms (~0.1 to hundreds of meters); 2) ecosystems (~1 to 10s of km); and 3) regional systems (>10s of km). The complexity of the design likely increases with the spatial scale. Applications are increasing in breadth and depth, and likely impacting the field's definition, as more opportunities to design and use ecosystems as interfaces between society and nature are explored.[10] Implementation of ecological engineering has focused on the creation or restoration of ecosystems, from [degraded wetlands](#) to multi-celled tubs and [greenhouses](#) that integrate microbial, fish, and plant services to process human [wastewater](#) into products such as fertilizers, flowers, and [drinking water](#). Applications of ecological engineering in cities have emerged from collaboration with other fields such as [landscape architecture](#), [urban planning](#), and [urban horticulture](#), to address human health and biodiversity, as targeted by the UN [Sustainable Development Goals](#), with holistic projects such as [stormwater management](#). Applications of ecological engineering in rural landscapes have included wetland treatment and community [reforestation](#) through traditional ecological knowledge. [Permaculture](#) is an example of broader applications that have emerged as distinct disciplines from ecological engineering, where [David Holmgren](#) cites the influence of [Howard Odum](#) in development of per culture.

Source : Wikipedia

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SEL SW Background Notes by

**Prof. V. Jagannatha, Formerly Scientist/Engineer ISRO**

Member IEES Beijing 1996, Planning Member, Internet Conference on Material Flow Analysis of Intetrated BioSystems, Unite Nations University, 2000, Fellow IOBB Perth Australia 2008