

HIGHER TECHNICAL INSTITUTE

CIVIL ENGINEERING DEPARTMENT
DIPLOMA PROJECT

ECOLOGICAL RECLAMATION AND
REFORESTATION OF DISTURBED
LAND

C/1006

BY

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JUNE 2006

HIGHER TECHNICAL INSTITUTE	PROJECT NO 3630
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CHAPTER 1 - INTRODUCTION

From the dawn of his existence, man has always disturbed the land. Even though its use has altered and increased exponentially, it has always been a means of survival. This has been done either through growing crops for food or through mining economically valuable metals and minerals. Man's activities did not change the landscape drastically, but has changed the natural conditions of land and this should be considered as land disturbance. The major causes of this disturbance are the extraction and processing of non-renewable resources (fossil fuels, minerals) and wastes from renewable resource use (agriculture, forestry, tourism and recreation). The major challenge in the increasing pressure of development is not the halt of this progression but to create and tune the methods and techniques of bringing these ecosystems back to their original self-sustaining state. The process of restoring the natural state of disturbed areas is a series of carefully planned actions which will ensure the sustainable organization and utilization of renewable resources (soil, flora, water, fauna).

Reclaiming drastically disturbed land results to ecosystems that are basically raised from scratch. The reclamation process begins the minute soils and geological materials are allocated and replaced. It is the moment when the decisions and planning of the new ecosystem are made. These decisions of course are not stagnant but are transformed and changed through time according to the development and climatic differentiations. Changes in nature are inherently slow over long periods of time and this must be taken into serious account when making decisions since the results will not be seen in a short period and careful re-evaluation should be taken periodically in order to avoid harmful and irreversible results.

The human factor now plays a vital role in all natural life on the planet, thus a reclamation-constructed ecosystem can be seen as having many homocentric characteristics such as, products produced for human use, land uses and effects on human environment. This does not neglect the natural processes in land reclamation but simply recognizes the influence of humans. Natural processes include living organisms as well as the surrounding land. Having all these factors in mind, the new ecosystems on reclaimed land must be integrated with the larger landscape surrounding them and evaluated holistically in terms of ecological principles. The term 'reclamation' has been defined in 1974 by the National Academy of Sciences as, an attempt to create an ecosystem similar to the original or predisturbed ecosystem. It can include introduced species that respond similarly to the native species which they replace. It is self-explanatory that the term includes a stable ecosystem and that the characteristics of the system are consistent with the surrounding environments and land uses (Chambers and Wade, 1990).

The overall process of ecological reclamation consists of the following steps: a) Site characterization, b) Reclamation planning and engineering, c) Material management and Soil manipulation, d) Topographic reconstruction, e) Replacement of topsoil or soil substitute, f) Addition of soil amendments, g) Revegetation, h) Irrigation and i) Site monitoring and maintenance (Toy and Daniels, 2000).

These steps will be the core issues that this project will address in order to present a holistic approach to the ecological reclamation and reforestation of disturbed land.

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