5. CONSERVATION MANAGEMENT PRACTICES

A. General recommendations for engineering activities

Engineering activities will be cheaper, more efficient and less harmful to the environment if attention is given to erosion and sediment control in the planning and design phases of a project rather than only during construction. Basic considerations in erosion and sediment control are:-

i) Bare soils will erode more rapidly than vegetated, mulched or paved areas.

ii) Erosion rates are significantly influenced by the amount of overland flow which in turn is effected by surface infiltration rates.

iii) Sand and silt sized material is removed easily from drainage waters, however it is usually impractical to remove the finer particles that contribute to turbidity of drainage waters.

An erosion and sediment control programme is based on the following principles:-

i) Keep the area of soil exposed to a minimum.

ii) Minimise the time the soil is exposed and as far as possible avoid having the soil exposed during periods when high intensity or prolonged rain is prevalent.

iii) Carry out earthworks in a manner that allows for the different erodibility and fertility of topsoils and subsoils.

iv) Control surface drainage.

v) Trap eroded soil before it damages downslope land, structures or waterways.

v) Where revegetation of bared areas is to be undertaken, the following measures should be followed, as appropriate:-

(a) The surface of the subsoil should be loosened and/or roughened (e.g. by scarifying on broad areas, or by saw-tooth finish of cut batters) prior to topsoil spreading.

(b) Topsoil should be moist when spread, (i.e. neither too wet nor dry), and depths of about 5 to 10 cm are probably sufficient in most cases; deeper layers of topsoil may slump on steep slopes.

(c) The area should be sown with grasses & legumes. Specific recommendations for seed and fertilizer mixtures can be provided by SCA district offices. Autumn sowings are generally most successful for establishing vegetation with minimum management inputs such as follow-up watering or re-seeding.

(d) In critical areas (e.g. batters, steep areas, drainage lines) early stability can be assisted by chemical and/or organic mulches.

(e) Follow-up waterings, fertilizing and mowing may be necessary to establish and maintain a persistent and dense vegetative cover.

vi) Construction traffic should be confined where possible, to existing or proposed road alignments. Drainage line crossings which are to remain when construction activities have concluded should be established as early as possible. If it is necessary to cross, drainage lines at other than sites where permanent crossings are to be established, temporary culverts or causeways should be established.

vii) Measures should be undertaken to prevent construction traffic depositing soil onto roads outside the construction site.

viii) Roads, parking areas, footpaths and driveways should be paved as early as practical.

ix) Control of drainage by either temporary, or preferably permanent works is necessary from the start of construction. Interception banks and/or channels should be used to divert upslope drainage away from bared areas. This is particularly important for cut or fill batters. Cut-off drains to intercept ground-water flow may be required above cut batters. Berm drains should be installed on high batters. Cross drains and/or channels and/or pipes should be established as necessary within the construction area to prevent the uncontrolled concentration of surface drainage.

x) Drains should be designed and should discharge in a manner that will not cause scouring and erosion. Pipes or paved or grassed channels may be needed to convey water down steep slopes and batters. Prevention of erosion from drain outlets may require level-spreaders, and concrete or rip rap aprons.

xi) The increased flows that usually accompany development of an area and the possible need to stabilise natural waterways should be allowed for in planning and construction. The increased flows may be modified by using grassed waterways, sediment/retardation basins and overland flow rather than concrete pipes and channels.

xii) The settleable fraction of eroded material in water draining bared areas should be removed by passing the water through sediment basins or, over grass filter-strips, or by other means before it enters natural waterways or underground drains, or damages down-slope land or structures. Sediment removal is generally easier if only small volumes of water are involved. Reducing the time between installing pipes and completing drainage pits and inlets, and providing temporary inlet protection during construction will significantly reduce the sediment load leaving a construction site.

xiii) Construction tracks, borrow pits and other temporary works that involve land disturbance should have similar drainage control, surface stabilization and sediment control measures to those used for permanent structures and works. Once they are no longer required for construction, the areas should be re-instated and stabilized. Careful planning and design may enable temporary works to become a permanent feature - for example a sediment basin could become a water trap in a golf course or a lake in an urban park.

B. General recommendations for agricultural activities

i) As far as practicable areas of different capability should be treated as separate management units. This may involve fencing to facilitate control of grazing.

ii) Natural waterways should be carefully managed. In grazing areas, waterways which receive substantial flows should be excluded from grazing; in cropping areas such waterways should not be cultivated.