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Soil Loss: Serious Economic and Environmental Endangerment for the Island Ecosystem

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The nature takes about 300 years to generate one centimeter of top soil, but this one centimeter soil can be lost with just one erosive rainfall if soil cover is not protected. Andaman and Nicobar Islands receive more than 3000 mm rainfall annually with high intensity (>10-50 mm/hr), which leads to faster erosion of slopes leading to accelerated runoff and sediments flow. National Bureau of Soil Survey and Land Use Planning (NBSS & LUP) reported that out of 0.825 Million ha geographical area of Andaman and Nicobar Islands, more than 90% of area exceeds the permissible limit of 11.2 tones of soil loss per hectare (Sahoo et al., 2013).

Most top layer of soil in these islands is removed by water, wind and faulty tillage operations. This result in a loss of fertile soil, reduction of 50% of agricultural productivity, decreasing the quantity and quality of food we eat and therefore threatens the food supply for the Island's population. This is matter of serious concern and needs to be checked since the Islands are prone to high risk of erosion and soil fertility loss. This loss will not only be endangering to Islands but also to entire coastal ecosystem. The need of the hour is to build up a massive awareness about this problem among the cultivars of the Islands and recommending suitable soil conservation measures.

Mostly land covers in Andaman and Nicobar Islands are plantation and vegetable crops along with home gardens and reserved forest. In vegetable cultivation fields, wherein more cultural working or tillage is required, which leads to loosening of soil and permits soil erosion at higher rate (Table 1). It is suggested that vegetable cultivation needs to be advocated with proper soil management practices in these islands. The soil erosion due to water in coconut and arecanut on undulating topography of the island will be reduced significantly by adapting intercropping practices such as spices, local tuber crops, cover crops, and fruit trees. Moreover, if slopes are kept under vegetation without extensive soil tillage, they are highly resistant to soil erosion and shallow mass movements even for high intensive storms.

Table 1: Soil loss from major land uses in Andaman & Nicobar Islands

Land use	Soil loss (t/ha)	Reference
Tilled vegetable crop	120-130	Pandey & Chaudhary (2010)
Till + Gliricidia + Mulch + Vegetables	2.0-3.0	
Non tilled vegetable crop	3.0-5.0	
Coconut plantation	12.0-13.0	
Coconut + Intercrops (Spices/Tuber/ Cover crop)	1.0-2.0	Adamala et al. (2019)
Arecanut plantation	10.0-11.0	Pandey & Chaudhary (2010)
Arecanut + Intercrops (Spices/Pineapple)	2.0-7.0	Pramanik et al. (1998)
Home garden	8.0-9.0	Pandey & Chaudhary (2010)
Fodder	4.0-5.0	
Evergreen forest	0.5-2.0	Adamala et al. (2019)
Barren/Fallow land	12.0-15.0	

To prevent and minimize soil erosion, farmers and other land users are urged to adopt sustainable soil management practices and conservation measures under an enabling environment. It is well known that level of soil loss cannot be zero by adoption of possible conservation measures, but it can be minimized from severe to slight/ moderate level. Therefore, it is recommended to go for below soil conservation measures on Island's slopes for arresting runoff, reducing soil loss and protecting soils.

- Plantation as main crop and spices or tuber as intercrops on terraced lands
- Minimum/no tillage operations for vegetables cultivation
- Mulching of tilled vegetable fields and Gliricidia as border crop
- Gross/fodder cultivation on barren lands
- Check basins for plantation and fruit crops

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