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## **THE PEAT SOILS OF SARAWAK**

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## **THE PEAT SOIL OF SARAWAK**

### **Existing Knowledge and Information Gaps**

#### **1 Definition**

Peat in strict definition usually refers to the accumulation of a purely one hundred percent organic material and the distinction between soil and vegetative accumulation is not clear (Andriessse, 1992). Over the years, 'peat' has been alternately referred to as 'organic soils' and Histosols. Tie (1979) refers to peat as organic soils on the basis of mass composition i.e. soils that contain at least 65% organic matter or conversely, less than 35% mineral content. The more recent definition for organic soils as adopted by the Soil Division of Sarawak is based on profile partition, i.e. soils that have 50 cm or more organic soil matter within 100 cm or more than twice that of mineral soil materials overlying bedrock within 50 cm (Teng, 1996). On the other hand, USDA defines a soil type as organic soils (or Histosols) if more than half of the upper 80 cm of the soil is organic or if organic soil material of any thickness rests on rock or on fragmental material having interstices filled with organic materials (Soil Survey Staff, 1998).

#### **2 Genesis of Peat Deposits**

Peat soils in Sarawak occur in large basin swamps and in small interior valleys that have developed in comparatively recent times (Andriessse, 1972). <sup>14</sup>C dating from Baram (Miri Administrative Division) in northern Sarawak indicates that the sea was at the inland margin of the peat swamp about 5400 years ago (Wilford, 1996). The large basin swamps are dome-shaped. Organic soil deposits occupying the central portion of the dome, generally known as 'ombrogenous peat', comprises mainly of disaggregated tree trunks, branches, leaves, roots and fruits (Yogeswaran, 1995). The surrounding base and along fringes of the peat dome and lower bank of streams draining the peat swamps on the other hand are predominated by 'topogenous peat' which comprise mainly of slightly to moderately decomposed plant matter and fine clastic sediments.

Anderson (1961, 1964, 1976, 1983) and Anderson and Muller (1975) observed the domed topography of peat deposits and the relationship between the concentric zonation of surface vegetation and increasing peat thickness, acidity and decreasing nutrient availability. The variations in peat type within the deposits reflect the succession and lateral migration of the surface vegetation and associated environs concurrent with coastal progradation (Anderson and Muller, 1975).

Subsequent studies (Tie and Kueh, 1979; Tie, 1990; Esterle et al., 1992; Tie and Esterle, 1992) corroborated Anderson's working hypotheses on peat formation and soil nutrient-mediated vegetational changes with topography. Tie (1990) for example demonstrated that the initial formation of lowland peats in Sarawak took place under low-lying, poorly drained but largely terrestrial conditions rather than an aquatic situation with a permanent water body. As successive layers of peat in the shape of an 'inverted saucer' were accumulated, the deposit grew vertically and laterally. As the peat at the center became thicker, the rate of growth decreased as a result of lower soil fertility due to leaching.

#### **3 Classification**

Soil classification in Sarawak dated back to 1966 with the maiden publication of *A Classification of Sarawak Soils*. Several revisions were made thereafter (Lim, 1975; Scott, 1985; Tie, 1982). Classification of organic soils in Sarawak differed to a certain extent from the USDA Soil Taxonomy. For instance, the degree of decomposition was not