

IV. SOILS

Our present knowledge has two aspects: soil development per se (pedology) and the soil in relation to plant growth (edaphology).

SOIL DEVELOPMENT

Present state of knowledge: Most of information on atolls is from observations by biologists, geologists, etc. There are no analytical data of consequence in the literature. The Arno work characterizes only the wet atolls.

From studies on old raised coral islands the ultimate course of soil development on such materials is known. Present atoll soils are regosols and lithosols, representing relatively primitive stages in this development. Apart from catastrophe or uplift it is probable that these soils are foredoomed to self extinction as weathering reduces land height to sea level.

The probable short time course of soil development and effects of climate on it are inferred from observation, and from studies elsewhere, rather than known with any certainty. There are differences in existing soils attributable to moisture regimes, salinity, typhoon history, guano deposits, vegetation and man's activities but knowledge of their effects is sketchy and not well organized.

Suggested future research: Land formation, composition, age and weathering; permanency in relation to typhoons and solution. Soil development in relation to climate and time.

SOIL IN RELATION TO PLANTS

Present state of knowledge: As a first approximation, some of the probable effects on native vegetation and agricultural plants can be inferred from studies elsewhere. Ecological studies have stressed effects of soil and ground water salinity on vegetation but much more detailed information is needed. There are indications that soil nitrogen and phosphorus, and hence the cycle of these elements in vegetation, may be considerably affected by soil organisms (Baas Becking's notes) and sea birds. The Arno observations indicate soils are not as "impoverished" as often believed but some mineral deficiencies are known or suspected. The physical properties of soil can only be considered adequately in relation to moisture regimes and groundwater.

Suggested future research: Many investigations of this nature are probably best undertaken in connection with other projects; thus detailed observations should be made in connection with ecological studies, and agricultural improvement will require fertility investigations. Determination of the causes and distribution of the coconut maladies observed may require long term investigation. Evaluation of the soil resources of a given area will be needed for estimates of its potential productivity and carrying capacity.

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