The Bellinger Valley

A WINDOW IN TIME

From pre-Colonial to *Contemporary Bellingen
From volcanoes and *Ice Ages to the flora and fauna of today
Includes *Species Lists

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Glossary of Rock Types

IGNEOUS ROCKS *originate from molten magma in the lower crust or mantle.*

Volcanic rocks cool rapidly on the earth's surface, producing a fine-grained rock.

Basalt: A fine-grained igneous rock with low silica content. It is composed mainly of pyroxenes and calcic feldspar (plagioclase). Basalt is dark due to its high iron and magnesium content.

Metabasalt: Basalt that has been slightly changed by metamorphosis.

Plutonic rocks are also igneous, but result from the slow, underground cooling of magma. Large crystals are characteristic of these rocks.

Gabbro: A dark, igneous rock that is the coarse-grained equivalent of basalt.

Dolerite: The medium-grained (up to 1mm) equivalent of basalt.

Granite: A coarse-grained igneous rock with high silica content. Granite is light in colour and is composed of quartz and feldspar. It contains crystals of the iron-magnesium rich minerals such as amphibole, pyroxine and mica.

Diorite: A coarse-grained igneous rock with medium silica content. It is composed of basic feldspar (orthoclase) and amphibole.

Adamellite: A type of granite containing equal amounts of potassium feldspar (orthoclase) and calcic feldspar (plagioclase).

SEDIMENTARY ROCKS *result from the deposition of particles or fragments.*
Siltstone: Consolidated silt composed mostly of very fine quartz grains. The grains can be felt but not seen.

Conglomerate: Rounded pebbles of any size cemented together.

Diamictite: pebbles imbedded into mud or silt (a type of conglomerate).

Greywacke: Weakly metamorphosed claystone or mudstone with imbedded sand particles.

Argillite: Siliceous siltstone that has been weakly metamorphosed. Silicon from marine plankton has been added to the silt deposits on the sea floor.

METAMORPHIC ROCKS *have been altered by heat or pressure.*
Slate: The metamorphic form of claystone or mudstone. Slate has a microscopic grain size and a low lustre.

Phyllite: Similar to slate, but more lustrous due to the better alignment of mica, etc.

Schist: Rocks that form alternating bands of pale minerals and dark minerals.

Chapter 3

Soils

Soils are the 'salt of the earth', providing nutrients directly, or indirectly, to all plants and animals. Soils vary according to the degree of weathering, the mineral content of the parent rock, the amount of organic matter and the local topography.

Climate plays a major role in the weathering of rocks. The high seasonal rainfall of the Bellinger Valley causes rapid physical weathering. Continuous cycles of hydration / dehydration weakens the structure of rocks, eventually causing them to crumble. Chemical weathering is also rapid here. Under humid conditions, feldspar and ferro-magnesian minerals react with water and atmospheric gases to produce clay. High rainfall also causes leaching. Nutrients are 'washed out' of the topsoil and accumulate in the subsoil. Eventually they may be leached from the subsoil. In the absence of vegetation cover, heavy rains can result in the loss of topsoil. Some subsoils are also prone to erosion from ground water.

When organic matter is incorporated into the soil with the help of fungi and bacteria, the structure and fertility of the soil is improved. The presence of loam indicates that organic soil processes have played a part in soil formation.

Thousands of years of these processes have resulted in the mosaic of soils that are found in the Bellinger Valley today.

The following soil types are based on the Russian 'Great Soil Group' classification system. It is used here as a general guide.

Kraznozems on basalt

These are the deep red acid clay soils of the Dorrigo plateau. They result from the deep weathering of volcanic basalt rock, on flat to gently undulating land, in areas of high rainfall. The moderately fertile **red clay loam** topsoil grades into a **clay** subsoil of low fertility. Kraznosems are friable and porous. Basalt lava originates in the mantle and is rich in minerals.

Podzolic Soils

These are the clay soils that form on weathered sedimentary or metamorphic rock. A marked texture-contrast between the topsoil and subsoil is characteristic of these soils. The lower topsoil is typically pale, or bleached, and subsoils are often strongly acid. Irons in the clay turn red when they are oxidised under dry conditions and yellow when they are hydrated in prolonged wet periods. They are heavily leached and infertile. Although water filtration is slow these soils are prone to saturation following periods of heavy or prolonged rain.

Soils derived from sedimentary rock are generally infertile. By the time sediments reach their destination, they have already been stripped of nutrients by the leaching process.

Yellow podzolic soils are acidic and infertile. They generally occur in the tributary valleys, in situations such as south-facing slopes, where wet conditions predominate, or in areas of restricted drainage. They have a topsoil of **clay loam** and a subsoil of **mottled yellow clays**. Mottling is caused by alternating wet/dry periods.

Red podzolic soils occur mainly in the undulating lower valley, in drier situations, such as on the crests of hills. They are also acidic and infertile. While the topsoil is hard-setting brown **clay-loam**, the subsoil contains a layer of **bright red clay**. Nodules of iron and magnesium are sometimes found in the subsoil in areas of high acidity.

Brown podzolic soils tend to develop in intermediate situations, such as reasonably well-drained, or north-facing slopes. They are characterised by their **brown clay** subsoil.

Lithosols

These are the stony skeletal soils of the steep ridges and side slopes. The topsoil is a dark **grey-brown loam** and can be as shallow as 3cm. The **clay** subsoil may reach a depth of up to 1m.

Lithosols develop on metamorphic rock and contain fragments of weathering rock throughout the profile.

Red Earths on Granite

Red earths develop on coarse-grained acid igneous rock on well-drained sites. The soils that have formed on the Gleniffer adamellites are red and have the gritty texture of coarse sand.

The **sandy clay loam** grades into **gritty clay loam** subsoil. They are highly permeable, acidic and infertile. Leaching is rapid and they are prone to erosion.

Structured Loams

These soils of the floodplain are derived from the seasonal accumulation of fine alluvial sediment and organic matter.

They are dark, friable, well-drained and very fertile. The clay content of the soil increases with depth.

Alluvial Grey Earths

These are the soils of low-lying swampy areas. They are grey because constant waterlogging has displaced the oxygen. They are highly acidic and infertile. The grey-brown silty-loam topsoil grades into a grey silty-clay subsoil.

Calcareous Sands

These coastal soils develop on old sands and contain many shell fragments. They have a high carbonate content and are generally deficient in cobalt and copper.

Although these soils are highly permeable and quick-drying, subsoil moisture is usually retained in the high watertable.