WHAT IS THE INFLUENCE OF RIVERS ON AMAZONIAN SOILS?

Rocks, rivers, and soils

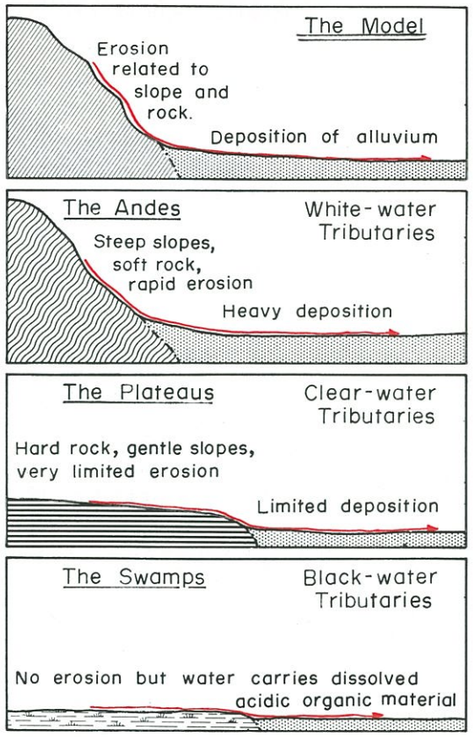
The rivers which run through the Amazon Basin reflect the geology of their source areas and influence the qualities of soils. The combination of ancient rocks to the north and south, and the great age of soils over practically all of the Amazon Basin, has produced low fertility soils. Only the rivers running from the Andes carry fertile silts, and these are deposited on only a limited area, the flood plains which are known as the varzea.

The white-water tributaries

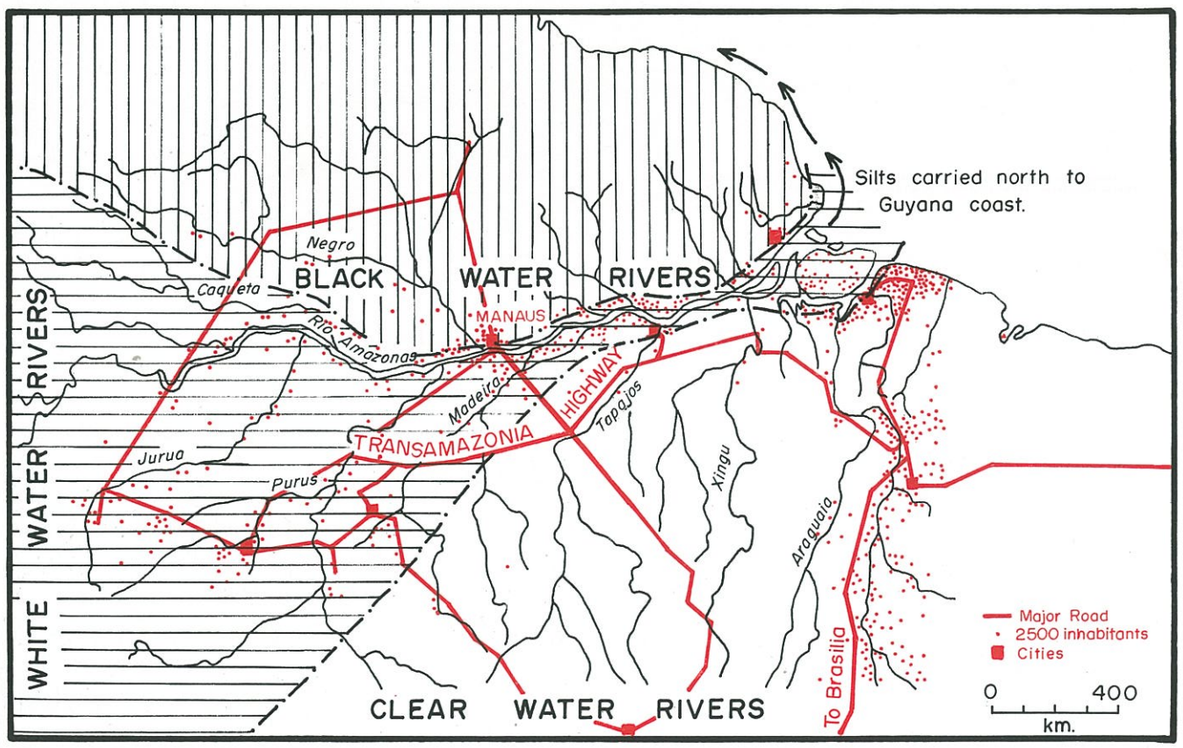
These tributaries all have their source in the Andes Mountains. They carry a vast amount of sediments and dissolved nutrients, because the Andes are still rising and being eroded rapidly by ice and running water. The mountain streams in narrow valleys hurtle down on to the plain, in the upper parts of the Amazon Basin, carrying with them a large amount of alluvium.

Floods are frequent because the basin has a very small gradient - a fall of about 2 centimetres per kilometre. Floods often rise 16-20 metres above the average level. As flood waters spread over the flood plain, their speed is reduced and they are less able to transport sediments. The material they carry is deposited on the flood plain.

The varzeas gain on average 8 tonnes of silt per hectare annually. This 'top dressing' of the soil by the addition of Andean silt makes the varzea an area of permanent cultivation. The drawback is that for some weeks each year the land is under water.



Below: This map of population, roads, and rivers indicates that there are close relationships between them.



The high nutrient content of the rivers and the fertility of their banks are also favourable to fish life, so that the white-water rivers are a source of protein to the local populations. The deep fertile soils have attracted a ribbon of moderate population density. This stretches from Belem at the mouth of the Amazon upstream to Iquitos in the heart of Amazonia, and along tributaries such as the Madeira.

The clear-water tributaries

These tributaries are in many ways the direct opposite of the white-water tributaries. They rise on ancient shields which are no longer rising nor being eroded much. Because they flow over very hard, old rocks, they carry tiny amounts of sediment. They are clear not only visually, but also biologically and chemically. Their very pure water is of little value for supporting fish life and has little impact on flood plains.

Flooding is less common than on the white-water tributaries, because of the low relief of the headwaters. Even the transport role of the clear-water rivers is limited. Ocean going ships can travel 3500 kilometres up the Amazon, but even canoes find it difficult to pass through the rapids where the clear-water tributaries of the Amazon leave the shield region. The areas beside clear-water tributaries such as the Xingu and Tapajos have very low populations compared with areas beside the Madeira and other white-water tributaries of the Amazon.

The black-water tributaries

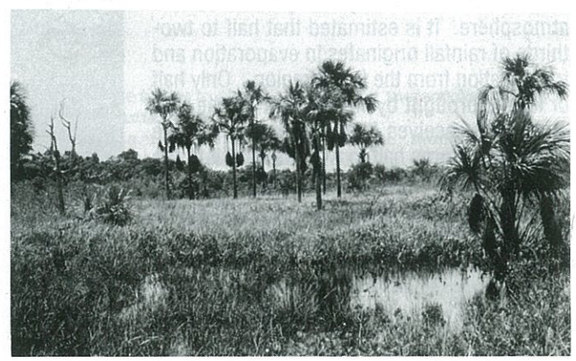
Because they rise in the areas of swampy sandy deposits on the edge of the shields, black-water tributaries, such as the Negro, are coloured by the decayed swamp vegetation of these areas. Like the clear-water tributaries, they carry little sediment. They are renowned mostly for the size and number of their mosquito populations.

These tributaries, rising mostly in the north of the Amazon Basin, support even fewer people than the southern clear-water tributaries. The black-water rivers are known locally as "starvation rivers". The areas along their banks like the the areas along the clear-water areas are practically unpopulated in comparison with the varzea, in the area of the white-water tributaries.

(a) Draw a table consisting of three columns, headed 'White-water Tributaries', 'Clear-water Tributaries', 'Black-water Tributaries'. Then compare the following features of the tributaries of the River Amazon: origin, erosive power, river colour, sediment in solution/suspension, river life, deposition of alluvium, scope for agriculture, suitability for transport, population density.
(b) Formulate two generalisations about the relationships between rivers and agriculture potential.

Above: Varzea settlement is part of an aquatic world. The river demolishes its bank in one place and builds up a new one somewhere else. An old river course gradually silts up and changes from a fish-pond to a swamp for growing thatch to a fertile field for cattle. And people change with the river, shifting their settlements, using different areas for different purposes, and always dependent on the floods for that precious silt which makes their land so fertile. (See also the map on page 21).

Top photograph of the front cover: The long-term settlement of Amazonia has been possible along the course of the main rivers flowing from the Andes. This is because the silt of these white-water rivers is regularly deposited by floods, leaving a new layer of rich fertile soil year after year. Riverbank settlers tolerate the regular floods because they know that without them farming would be much less productive.



Above: In the sandy swamps at the edges of the shields, there is savanna vegetation with numerous palms. These areas are drained by the black-water tributaries.