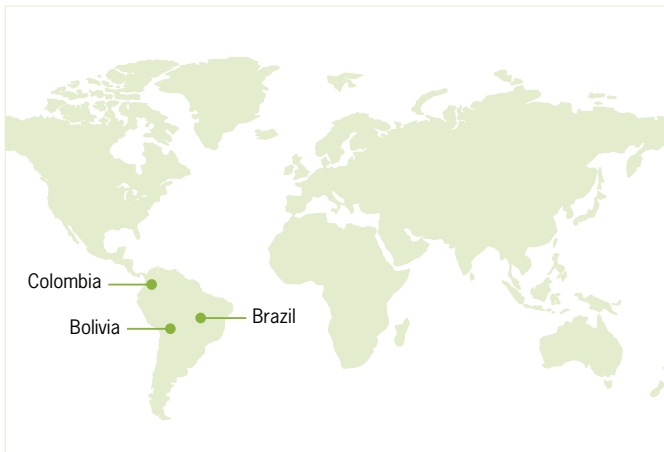


### 3.6 Terra Preta do Indio: Recovering the Past, Regaining the Future of Amazonian Dark Earths

#### There goes the notion of a pristine, untouched forest

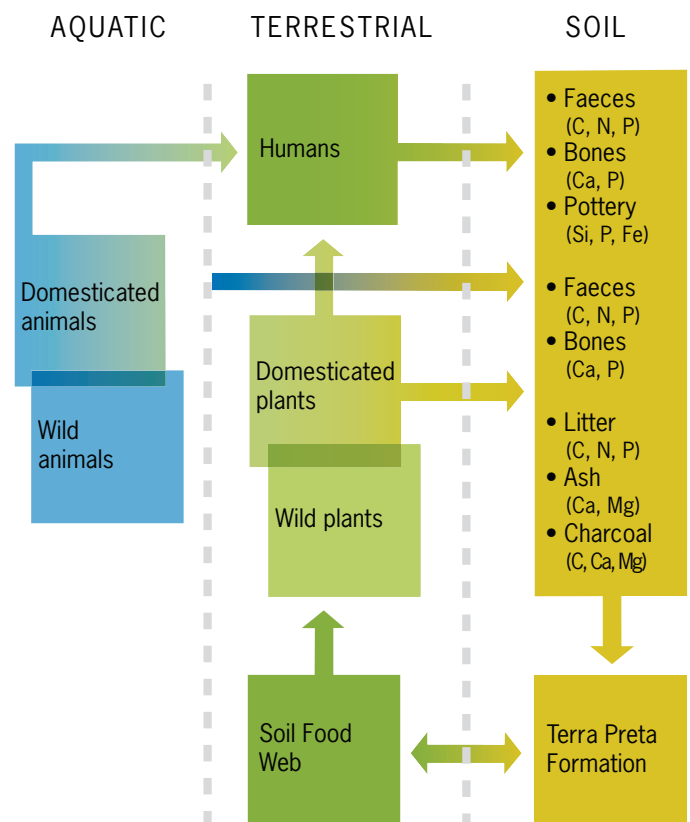


In 1966, the Wageningen-based soil scientist Wim Sombroek wrote the very first scientific publication about Terra Preta, the fertile Amazonian Dark Earth, first mentioned by the explorer Charles Orton in 1870. With the Terra Preta research programme, scientists in Wageningen start looking into this special inheritance of their predecessor. They will do so together with colleagues from Brazil, Colombia and Bolivia. “This is a very exciting programme,” says scientific coordinator professor Thom Kuyper, “our programme can throw a new light on Europe’s colonial history and at the same time our research engages with current controversial debates on solutions for sustainable land use in the tropics and climate change.”



Terra Preta, or black earth soils, are mainly found on bluffs near the Amazon and its tributaries, while smaller patches have also been localised in wider areas of the Amazon forest. These soils are characterized by their abundant presence of charcoal, high amounts of phosphorous and calcium, and consequent high fertility. The fact that fish bones and pottery remains are found in these soils shows that they are so-called anthropogenic soils – created, or transformed, through human labour. Archaeologists and soil scientists determined that these soils are remnants of ancient, pre-Columbian societies, created between 3000 and 500 years ago. This throws up all kinds of questions about human history in the Amazon. The prevalent idea still has it that – apart from some small, primitive Amerindian groups – the large forests were not affected by humans. Kuyper: “The Amazon supposedly was without history until 1492! Now we may have to add another few thousand years of history to that – history of people and civilizations that have vanished, or were extinguished.” There goes the notion of a pristine, untouched forest.

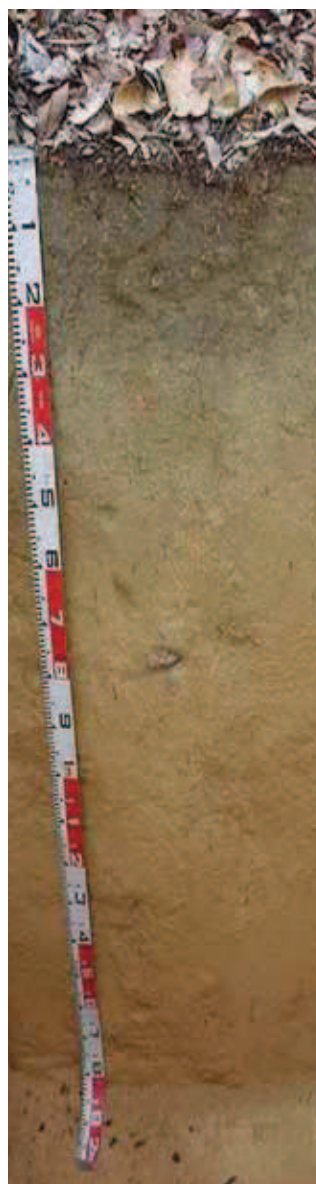
Considering their geographic extent and properties, the Terra Preta soils cannot possibly have been created by a few small and dispersed groups of Indians. Apart from this pedological proof, there are reports by early travellers about the existence of big cities, but these were generally discarded as being delusions of Europeans suffering from tropical frenzy. Nevertheless, some estimates today say that up to 50 million people may have inhabited the Amazon at some point in time. One remarkable fact is that the Amazon forests are home to a high proportion of useful tree species, for instance with edible fruits. Some forest ecologists consider this too as evidence for centuries of interaction between humans, soils and vegetation. Kuyper: “This concrete example of the Terra Preta soils allows us to reconceptualize the relationship between ‘man’ and ‘nature’. The notion of soil as ‘social artefact’, and in particular of the Amazonian landscape as a nature-culture hybrid, may help to devise adequate policies towards its conservation, use and development.”



The Terra Preta programme has two practical goals. First, improving the livelihoods of small holders in the Amazon. If the programme successfully seizes the scientific challenge of finding out how exactly these fertile soils can be re-created, this could benefit the farmers, and as a consequence the forest. The lowland Amazonian area is threatened by high rates of environmental degradation, which is mostly caused by deforestation for agricultural expansion. The poverty-driven slash and burn

agriculture of small farmers – which continues at a high rate due to the low fertility and therefore productivity of most Amazonian soils – threatens the forest's ecosystems. And so do large-scale agricultural practices such as soy and rice agro-industries and cattle. The potential impact of creating Terra Preta Nova is thus considerable. The productivity of Terra Preta can be up to three times higher than the surrounding soils, allowing up to six maize harvests annually. Perhaps even more importantly, these soils can be cultivated continuously – often without external inputs – for at least 100 years, which theoretically could put a stop to poverty-driven deforestation.

The second goal of the programme is to contribute to critical research on a currently highly relevant subject: the possibility of sequestering carbon in the soil to mitigate increasing atmospheric CO<sub>2</sub> levels. “Optimists speak of a triple win in these forests”, says Kuyper. That is, generate energy from pyrolysis (‘burning’ biomass under oxygen-poor conditions); sequester carbon to mitigate climate change; and improve the productivity of soils all at the same time. “But I’m rather suspicious of any supposed triple win. We must look very carefully into the inevitable trade-offs.” The fact that the indigenous inhabitants, over the course of probably many centuries, have added carbon to these soils by partial burning of the forest and agricultural residues, and that these soils partly as a result of this practice have become so fertile, does not guarantee that we can, today, successfully imitate this process on a gigantic scale and within just a couple of years. In search for solutions to our waste problems, it may seem an appealing idea to dump our carbon in South American soils – and we may even be willing to pay carbon credits for this. Kuyper: “But my gut feeling tells me this activity cannot be scale-neutral. We must experimentally establish what could be the consequences of such large-scale dumping for the forest soils.” Their large-scale use as carbon sinks may well prove contradictory to enhancing the productivity of these soils. “The claims of proponents of biochar have, I think,



Regular tropical soil



Man-made Terra Preta



a pretty thin empirical foundation and are based on selective interpretation.” Moreover, ethical questions that also accompany the debates on biofuels and their potential threat to poor people’s food security, must be raised as well: are we really going to use large stretches of potential agricultural land for sequestering carbon if this does not lead to enhanced soil fertility?

One of the most interesting aspects of this programme, according to Kuyper, is that the subject at hand forces us to consider the role that science plays, or should play, in socio-political processes and decisions. The interdisciplinary programme – which apart from soil scientists, foresters and agronomists, also involves economists, historical anthropologists, archaeologists from Brazil and paleobotanical specialists from Colombia – may come up with new findings concerning the early presence of civilisations in the Amazon. If it does, it will have repercussions on the arguments of environmentalists on the one hand – ‘the Amazon was devoid of human influence and should stay that way’ – and the logging industry on the other hand, which will for their own profit seize upon the notion that for thousands of years people have been cutting down trees in these forests.

Kuyper: “Due to all sorts of administrative hiccups the start of this programme was delayed, but we are now ready to select the nine PhD students from our partner universities in Brazil, Bolivia and Colombia. I know for a fact that Wageningen is going to benefit from this scientific cooperation.”