Reference Sources: Amazonian Dark Earths, Terra Preta de Indio
Donna Lynk, NCSU Horticulture HS 403 2008
http://www.honeybees-by-the-sea.com

BBC Horizon The Secret of El Dorado May 16, 2007 W*atch this Program 49 min -*
http://video.google.com/videoplay?docid=-1177691269867720140&q=secret+of+el+dorado&total=29&start=0&num=10&so=0&type=search&plindex=0
This documentary program chronicles the search for large prehistoric civilizations in the jungle of Amazonia and discovery of the Terra Preta de Indio soils that made them possible. The beginning segments lay the foundation for the historical and archeological argument for vast settled populations practicing large-scale agriculture as reported by Francisco de Orellana in 1542. Retracing the expedition route of Orellana in his quest for El Dorado, famed City of Gold, new evidence points to highly successful and complex societies. Clearly shown are the excavated Terra Preta horizons and the underlying matrix of native ferrasols from which the Indians produced some of the world's best soil from the world's worst. The extent of the managed soil of Terra Preta is mapped, estimated to cover twice the area of Great Britain, perhaps 10% of Amazonian land showing evidence of ancient management. Modern experimental test plots graphically demonstrate the fertility and dynamism with the addition of the Terra Preta principle component, Biochar or agrichar, to the soil.. Of particular interest to me, this program features the very researchers whose names are so familiar as I conduct my inquiry into Terra Preta.

Cornell University Terra Preta Home and 'Science Brief'
http://www.css.cornell.edu/faculty/lehmann/terra_preta/TerraPretahome.htm
Home page for Cornell University's Dr. Johannes Lehman, Soil Biogeochemistry . Dr. Lehmann is a leading researcher into ADE and the use of Biochar in Agriculture.

'Science Brief' link provides an excellent summary of the research into Terra Preta, outlining applications for Soil Fertility, Carbon sequestration and production of Bio-energyhttp://www.css.cornell.edu/faculty/lehmann/terra_preta/Flyer%20terra%20preta%20landuse%20strategy.pdf

Eprida Home
http://www.eprida.com/home/index.php4 Site of sustainable producers of Biochar and Bio-energy from peanut biomass in Georgia.

Flash animation
http://www.eprida.com/eprida_flash.php4 Flash animation biomass-CO2- Carbon cycle Must see, brief flow chart cradle to cradle carbon cycle

Explanation
http://www.eprida.com/home/explanation.php4
Information about biochar and Terra Preta, love the following quote:
"The charcoal acts like a coral reef for soil organisms and fungi, creating a rich micro ecosystem where organic carbon is bound to minerals to form rich soil".

Glaser, B. et al, "The 'Terra Preta' phenomenon: a model for sustainable agriculture in the humid

tropics" Naturwissenschaften Volume 88, Number 1/ Feb. 2001: 37- 41
http://www.springerlink.com/content/ch88m96jtrfrj4gk
Online abstract emphasis on the role and stability of black carbon in TP soils, short, sweet and informative.

Lehmann, Johannes, Dirse C. Kern, Bruno Glaser, and William I. Woods (eds). 2003. Amazonian Dark Earths: Origin, Properties, Management. Kluwer Academic Publishers, Dordrecht, Netherlands. The Forward. Written by Wim Sombroek

This book, published in 2003, is the first book to be written on the subject of Amazonian Dark Earths. This speaks to the fact that research into this ancient soil is quite new. (According to the NCSU due date record it has been checked out only once, in 2004!) It is edited by Dr. Johannes Lehmann, Cornell University and contributed to by over 50 authors. I found the forward by Wim Sombroek echoed my own desire to create my own 'Terra Preta Nova' using the principles of the ancients.

Lang, Susan "Simpler way to counter global warming explained: Lock up carbon in soil and use bioenergy exhaust gases for energy" Cornell Chronicle May 11, 2007 Cornell University
http://www.news.cornell.edu/stories/May07/biochar.climate.ssl.html
This article is focused on the benefits of long term carbon sink by pyrolysis and sequestration. Outlines biomass bioenergy production.

Liang, B. et al. Black Carbon Increases Cation Exchange Capacity in Soils , 2006.
http://www.css.cornell.edu/faculty/lehmann/publ/SoilSciSocAmJ%2070,%201719-1730,%202006%20Liang.pdf
On-line abstract discussing the benefits of BC, Black Carbon in soil. The idea of 'increased surfaces' in the soil was very interesting, and speaks to the permaculture idea of 'edges' being the most productive area.

Marris, Emma, "Putting the Carbon Back: Black is the new green." Nature 442 Aug. 10, 2006 624-626
http://www.nature.com/nature/journal/v442/n7103/full/442624a.html
Great article, If you read only one, read this one. Brief history of Terra Preta, touches on World Conference on Soil Science 2006,good overview of the potential for biochar and cleaning the environment.

Petersen, J., E.G. Neves, and M.J. Heckenberger. 2001. "Gift from the past: Terra Preta and . Prehistoric Amerindian Occupation in Amazonia". p. 86–105. C. McEwan (ed.) Unknown Amazonia. Imprint: British Museum, London
Article from archeological perspective on the people and soils of the Amazon.

Steiner, **Christoph,** Wolfgang Zech and Wenceslau G. Teixeira,
"Microbial Activity as Soil Quality Indicator in Annual and Perennial Plantations Treated with Charcoal, Mineral- or Organic Fertilizer in a Highly Weathered Amazonian Upland Soil" 18th World Congress of Soil Science, 2006,.
http://www.css.cornell.edu/faculty/lehmann/biochar/WCSS2006/Steiner%20abstract.pdf
Online abstract stressing the stability of Soil Organic Matter in Charcoal amended soils and the increase in Microbial Activity in these soils. Mentioned here, as elsewhere, is the fact that Char increase the ph of soil, which in the highly acidic soils of the Amazon is beneficial.

Steiner, **Christoph,** "Charcoal as Soil Amendments, Research and Prospects Carbon Negative Energy and Soil Restoration" **United Nations Climate Change Conference** Bali, Indonesia 2007. Excellent Power Point presentation:
http://www.unccd.int/publicinfo/balisideevent/docs/SteinerUNCCD.pdf