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Need for Acid Sulfate Soil researchers and managers to collaborate with those in the Blue Carbon Initiative

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There is a global interest in the science and better management of Acid Sulfate Soils (ASS). Much of this interest has concerned understanding the acidification processes and environmental impacts associated with oxidation of pyrite (FeS2) in coastal marine-sourced sediments. This acidification and associated metals release occurs in situ, but can be exported to near-coastal wetlands and waterways. The initial pyrite formation is microbially-associated reduction of iron and sulfur involving organic carbon sequestration, particularly during sealevel rise and sedimentation after the last glacial maximum. Subsequent to establishment of present sealevel and reduction of coastal sedimentation rates, natural hydrological changes in some coastal locations enabled landscape drainage leading to formation of ASS. This acidification caused illite clay mineral destruction and export of previously sequestered carbon. Human-induced drainage of coastal wetlands, however, has been a major factor in the formation of ASS.

The Blue Carbon Initiative is a global program aiming at the retention and restoration of coastal and marine ecosystems so as to retain and restore sequestered atmospheric carbon and thereby reduce global climate change. This program involves understanding the science of this carbon sequestration, but also encourages changes in policy for better management and restoration of these coastal ecosystems.

Therefore, it is clear that the workers involved with ASS have much intention in common with those in the Blue Carbon Initiative, particularly with coastal wetland restoration. Both of these groups intend to use hydrological management with wetland ecosystem restoration. However, as ASS workers have shown, caution must be exercised with changing the hydrology. Also, with the previously indicated illite clay mineral loss, there is a reduction in availability of potassium that is an essential nutrient for growth of the globally most widespread mangrove, Avicennia marina. Therefore, mangrove restoration might involve a need for fertilizer application, as has been found necessary with sugar cane growth on coastal ASS in Australia.

There is an apparent need for research and better understanding the role of microbes in the many processes involved in ASS and the Blue Carbon Initiative sequestration of atmospheric carbon. There is another need for microbiological research concerning potential carbon sequestration with with the ubiquitous use in global agriculture of appropriate melanitic endophytic fungi, as is now done with Rhizobia bacteria on legume seed application.