Developing human-designed systems by mimicking nature is a promising approach toward sustainability. This is because over the last 4.5 billion years, nature has evolved the ability to sustain itself by closing all material loops, using only renewable energy, and by developing networks that are resilient to perturbations. Unfortunately, most disciplines and methods, including those that are meant to enhance sustainability, ignore the role of nature. Furthermore, with increasing prosperity ecological knowledge tends to deteriorate. Developing nature-inspired sustainable systems requires an understanding of the role that ecosystems play in supporting human activities, and ways of using such information for ecologically appropriate decisions. This talk will describe the framework of Ecologically-Based Life Cycle Assessment (Eco-LCA) as a way to account for the direct and indirect role of ecosystem services in supporting economic activities. A hybrid model based on an ecologically extended input-output model of the U.S. is proposed.