

## Sustainability Primer

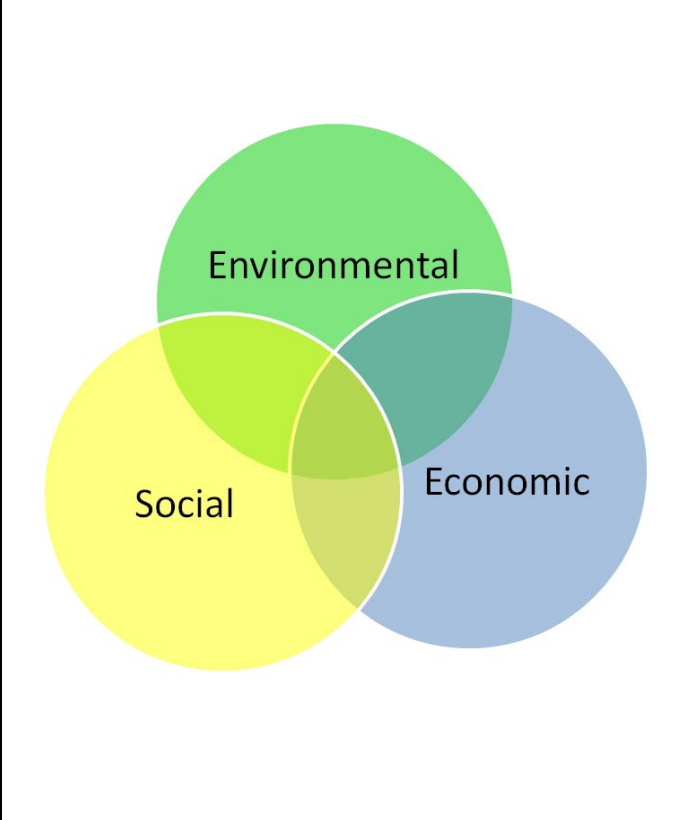
Research project proposals should embody the principles of sustainability. Sustainability is defined by the Brundtland Commission as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs,” and by the President’s Council on Sustainable Development as “...an evolving process that improves the economy, the environment, and society for the benefit of current and future generations.” A sustainable approach is a systems-based approach that seeks to understand the interactions which exist among the three pillars (environment, social, and economic) in an effort to better understand the consequences of our actions. Ideally, research that seeks sustainable solutions to protect the environment *also* strengthens our communities and fosters prosperity.

### Sustainability Criteria

Below are the three pillars of sustainability, each with six broad topics that relate to its respective pillar. A brief explanation and example are provided for each topic. The examples are not intended to be inclusive.

Environmental		
<p><b>Ecosystem Services</b> Protect, sustain, and restore the health of critical natural habitats and ecosystems <i>Example: Potential impacts of hydraulic fracturing</i></p> <p><b>Green Engineering &amp; Chemistry</b> Develop chemical products and processes to: reduce/prevent chemical hazards, reuse or recycle chemicals, treat chemicals to render them less hazardous, dispose of chemicals properly. <i>Example: Lifecycle environmental impacts</i></p>	<p><b>Air Quality</b> Attain and maintain air-quality standards and reduce the risk from toxic air pollutants <i>Example: Investigate potential greenhouse gas emissions reduction strategies</i></p> <p><b>Water Quality</b> Reduce exposure to contaminants in drinking water (including protecting source waters), in fish and shellfish, and in recreational waters <i>Example: Pathogen removal in riverbank filtration</i></p>	<p><b>Stressors</b> Reduce effects by stressors (e.g. pollutants, greenhouse gas emissions, genetically modified organisms) to the ecosystem <i>Example: Fate of modified nanoparticles in aqueous media</i></p> <p><b>Resource Integrity</b> Reduce adverse effects by reducing waste generation, increased recycling, and ensuring proper waste management; restore resources by mitigating and cleaning up accidental or intentional releases <i>Example: Improving recycling technology to prevent environmental impact of mining</i></p>

<p><b>Social</b></p> <p><b>Environmental Justice</b> Protect health of communities over-burdened by pollution by empowering them to take action to improve their health and environment <i>Example: Establish partnerships with local, state, tribal, and Federal organizations to achieve healthy and sustainable communities</i></p> <p><b>Human Health</b> Protect, sustain, and improve human health <i>Example: Parameterize model which predicts developmental toxicology</i></p> <p><b>Participation</b> Use open and transparent processes that engage relevant stakeholders <i>Example: Develop database of reduced-risk pesticides for commonly used products, create greater public access and understanding about sustainability</i></p> <p><b>Education</b> Enhance the education about sustainability of the general public, stakeholders, and potentially affected groups. <i>Example: Provide opportunities for students to learn about sustainability</i></p> <p><b>Resource Security</b> Protect, maintain, and restore access to basic resources (e.g. food, land, and energy) for current and future generations <i>Example: study impact of dispersants/oil combination on natural waterways</i></p> <p><b>Sustainable Communities</b> Promote the development, planning, building, or modification of communities to promote sustainable living <i>Example: Landscape with native plant species, green buildings</i></p>
--



<p><b>Economic</b></p> <p><b>Jobs</b> Create or maintain current and future jobs <i>Example: Create green jobs</i></p> <p><b>Incentives</b> Generate incentives that work with human nature to encourage sustainable practices. <i>Example: Conservation Reserve Program, encouraging sustainable logging practices</i></p> <p><b>Supply and Demand</b> Promote price or quantity changes that alter economic growth, environmental health and social prosperity. <i>Example: Increasing supply of green energy sources to reduce need for fossil fuels</i></p> <p><b>Natural Resource Accounting</b> Incorporate natural capital depreciation in accounting indices and ecosystem services in cost benefit analysis. <i>Example: Green net national product</i></p> <p><b>Costs</b> Positively impact costs of processes, services, and products <i>Example: Strive to develop a waste-free process—eliminating need for regulation costs</i></p> <p><b>Prices</b> Promote a cost structure that accounts for externalities to production. <i>Example: Bottle bill</i></p>
---