United States Environmental Protection Agency

Sustainable Whole Systems Health Indicators

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Promoting Healthy Communities:

Developing and Exploring Linkages between Public Health Indicators, Exposures and Hazard Data

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“EPA protects us from our environment”

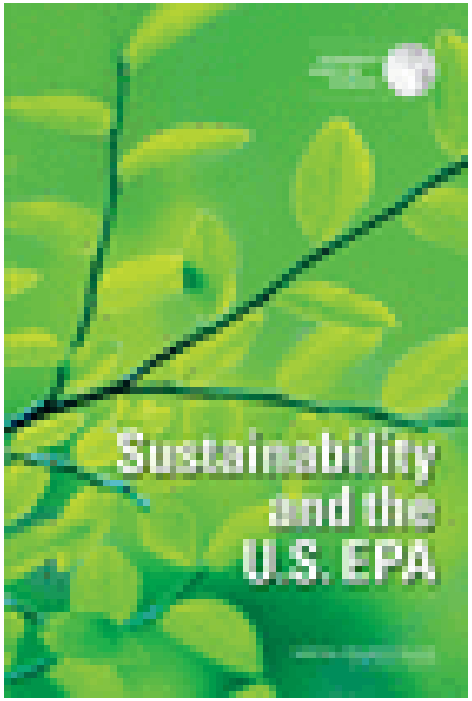
Anon.

- 1970s-1990s Environmental laws passed to identify regulate hazardous substances to protect human health
- Motivated by existing pollution
- Risk-based
- Regulate one substance at a time
- Limited consideration of the value of ecosystem services upon which life depends

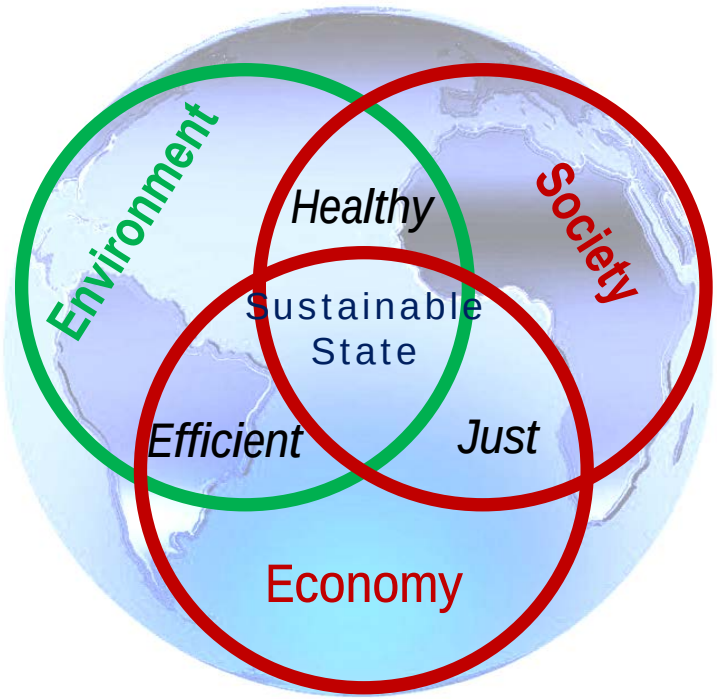
NAS Report: Sustainability and the U.S. EPA, 2011

Provides a framework to help the agency better assess the social, environmental, and economic impacts of various options as it makes decisions.

- *Recommends that EPA … go beyond an approach based on assessing and managing the risks posed by pollutants that has largely shaped environmental policy since the 1980s.*
- *Although risk-based methods have led to many successes and remain important tools, they are not adequate to address many of the complex problems that put current and future generations at risk, such as depletion of natural resources, climate change, and loss of biodiversity.*
- *Sophisticated tools are needed to address cross-cutting, complex, and challenging issues that go beyond risk management.*



Paradigm shift:



The NAS report recommends that *EPA formally adopt as its sustainability paradigm the widely used "three pillars" approach, which means considering the environmental, social, and economic impacts of an action or decision.*

Health should be expressly included in the "social" pillar.

How does this apply in community settings?

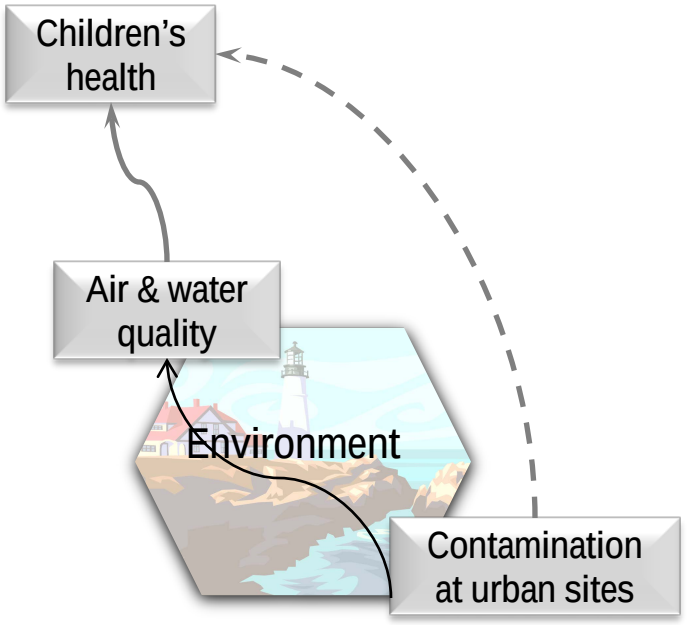
Communities face social, economic, and environmental trade-offs in a resource-constrained world. These trade-offs are often not well characterized in terms of the implications and interactions between human health, ecosystem services, economic vitality, and social equity. Conventional decision-making often does not adequately address this problem.

SHCRP Research Framework 2011

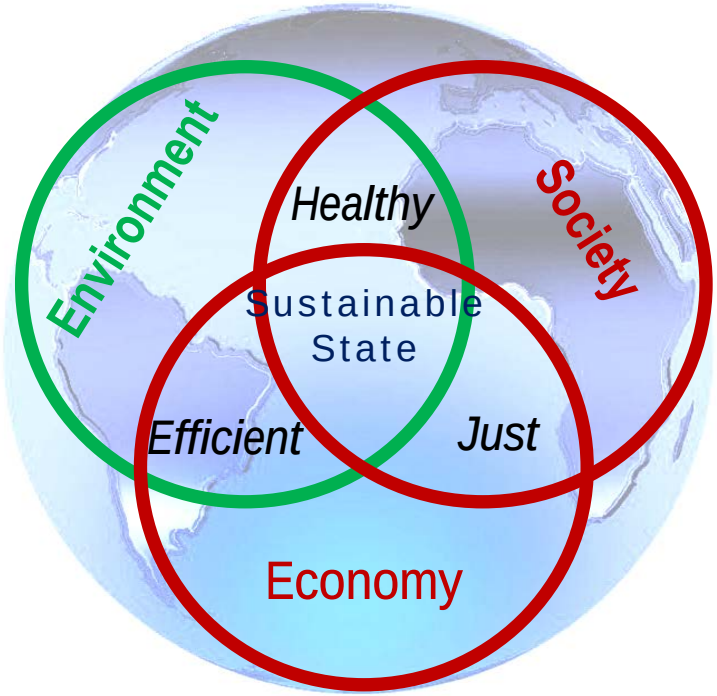
Traditional linear approach is necessary but not sufficient

- Study effects of x on y
- Regulate to reduce/remove

"x" at the source



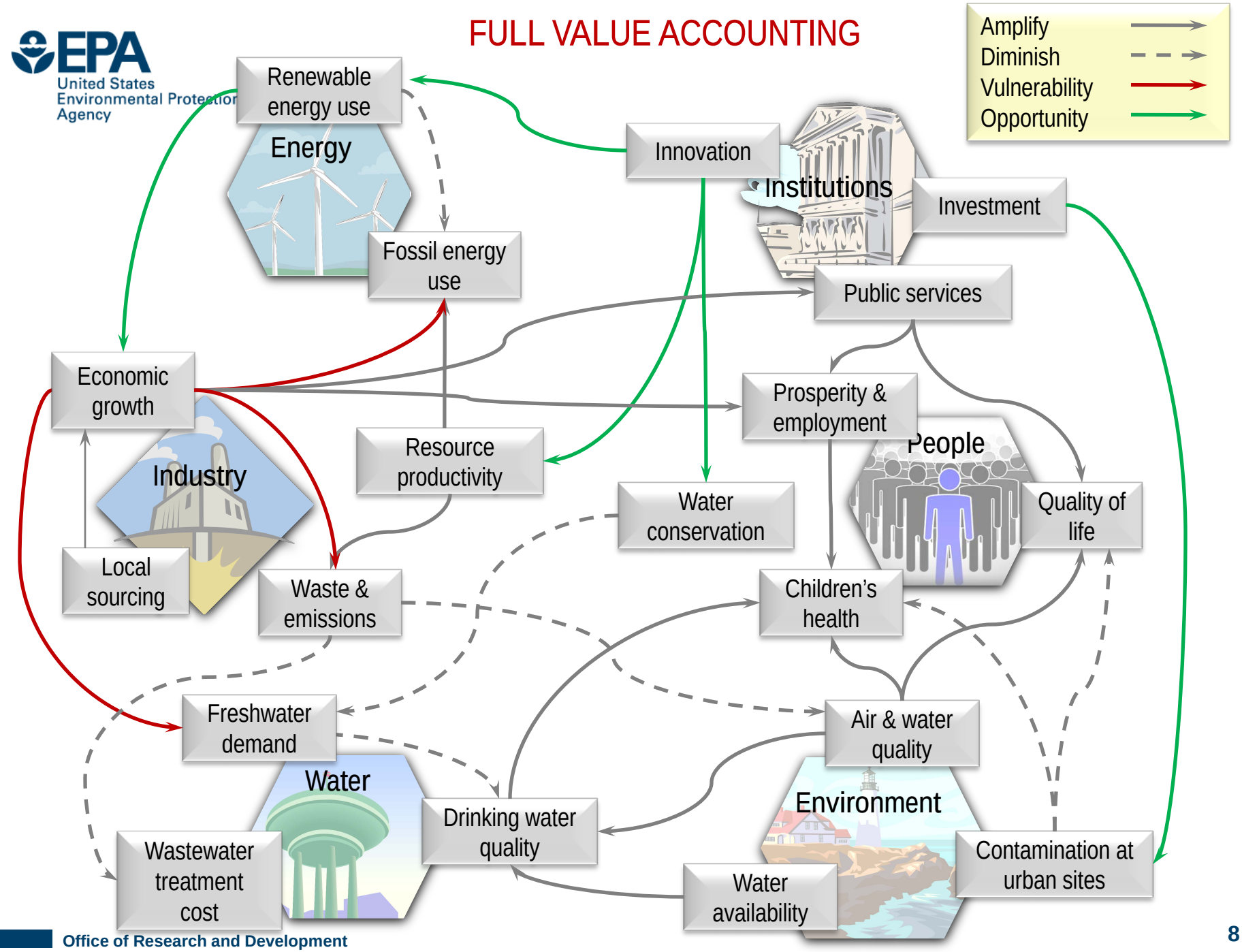
Rather,



We need to inform and empower decision-makers to equitably weigh and integrate human health, socio-economic, environmental, and ecological factors to foster community sustainability under alternative decision scenarios.

SHCRP Framework, 2011

FULL VALUE ACCOUNTING

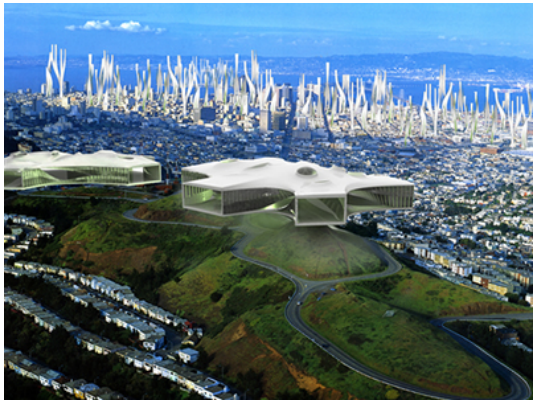


Goal: SHC will provide Agency and community stakeholders with…

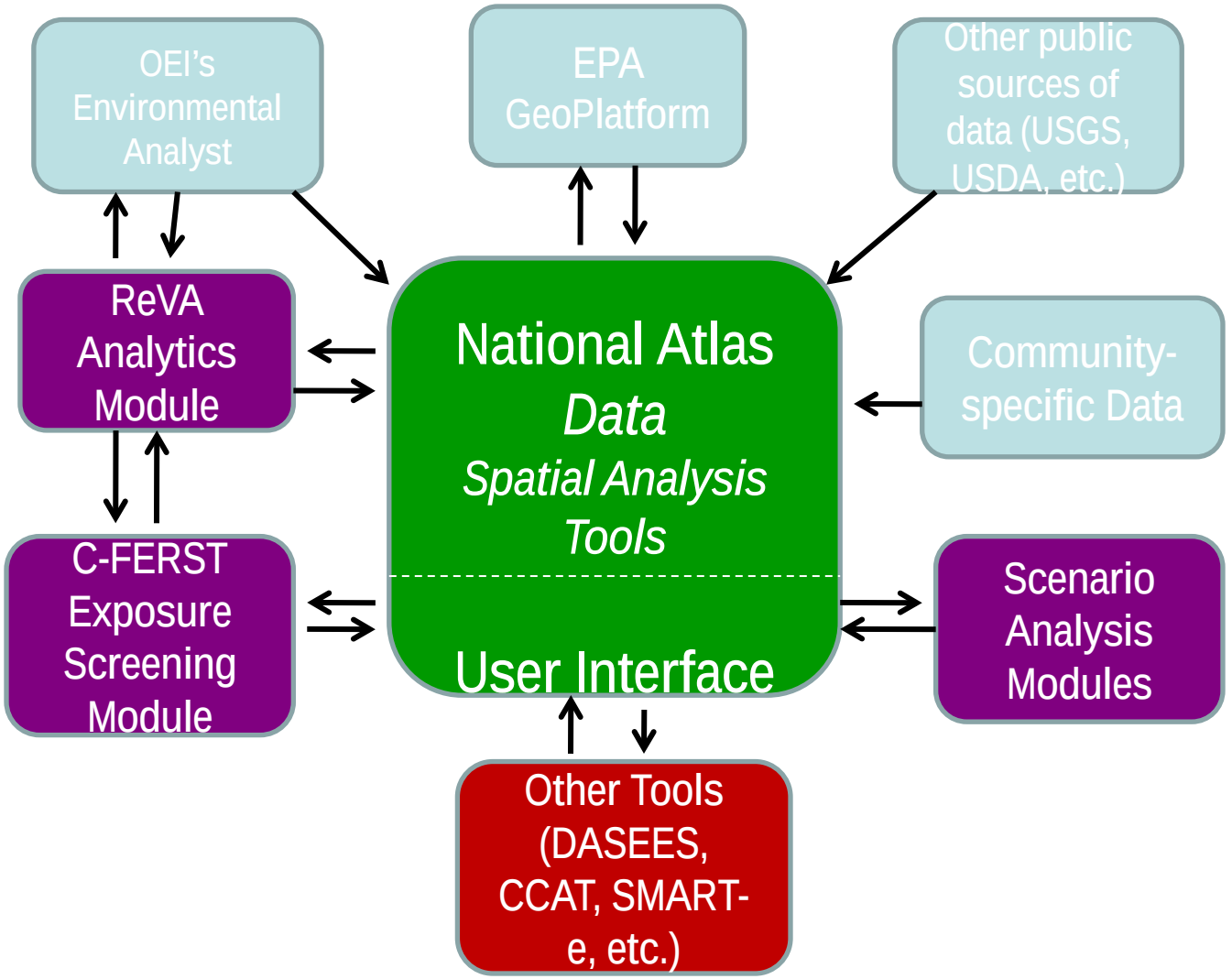
Holistic, integrated, and functional science, practical technical tools and support to find solutions that are sustainable: that is, they are equitable, efficient, and effective.

User-friendly, web-based tools:

- Community-Focused Exposure and Risk Screening Tool
- Tribal-Focused Environmental Risk and Sustainability Tool
- Urban Atlas
- National Atlas for Sustainability
- Cumulative Community Assessment Tool (for EJ)



ACCESS to Tools for Decision-Making: Interoperable Data Bases and Models



Many Indicators and Indices needed:

- Ecosystem Services and Benefits
- Community Health & Well-being
- Health – Disease Prevalence
  (and by life-stage)
- Human exposure (biomonitoring)
- Social and Environmental Equity
- Economic “viability”
- Sustainability

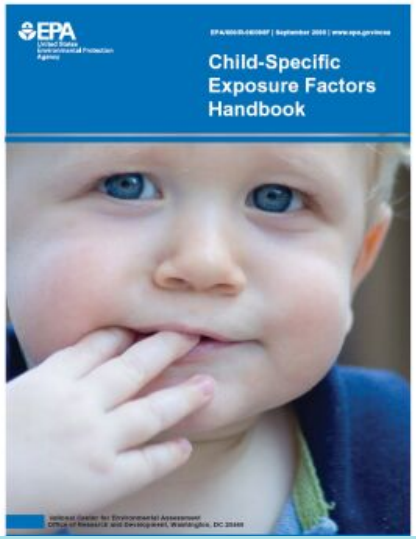
Children's Health Indicators: in Communities where they live, learn and play

- EXPOSURE: Age-specific exposures and exposure factors, including soil and dust ingestion and bioavailability of contaminants

- EFFECTS: Cumulative risks of complex exposures
  - Chemicals, air pollutants, and materials and products with which children come into contact
  - Total body burden

- TEMPORAL Exposure & Effects Linkage: Prenatal and early exposures with risks of life long diseases such as autism, asthma, neuro-developmental disorders, metabolic and endocrine disorders, obesity, cardio-vascular disease, cancer.

- SOCIAL/ECONOMIC determinants of children's health and health disparities in community contexts
  - Urban vs. rural environments
  - Place-based combinations of stressors
  - Community outreach and communication



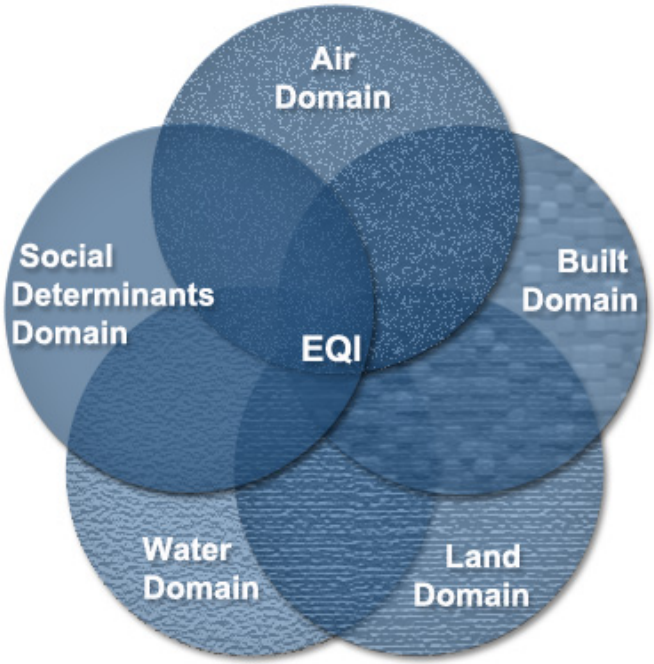
EPA-NIEHS Children's Environmental Health Center Program, since 1998.

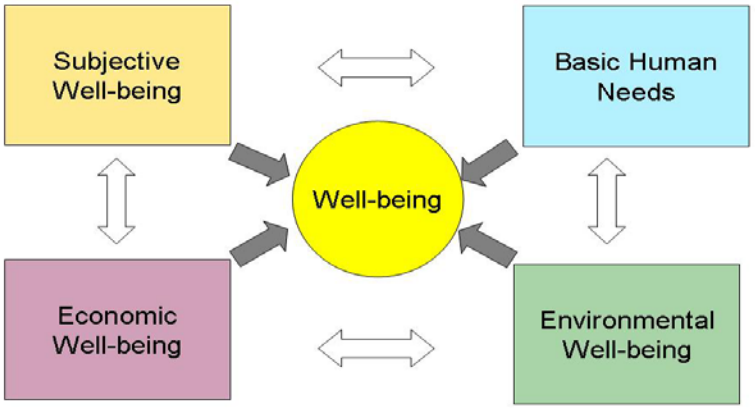
Sustainability Indicators

Inventory and searchable data base of sustainability indicators

Development of indices to reflect components of sustainability, e.g. Environmental Quality Index, Human Well-being Index….

Development of new indicators to assess sustainability and track performance





Stakeholders will use tools, models and indicators to provide Integrated Approaches to Decisions for Sustainable Communities

- To determine how alternative community building and infrastructure, land use, transportation, and waste, materials and revitalization decisions (individually and collectively) affect:
  - Ecosystem Services
  - Community Health and Well-Being

- Ultimately, improving the ability of communities and the Agency to evaluate proactively and retrospectively the full cost and value (social, economic, and environmental) of environmental management options.