Sustainable Livelihoods Assessment: An Industrial Ecological Approach to Reconciling Jobs and the Environment

Saleem H. Ali

Professor of Environmental Planning, University of Vermont
Adjunct Professor, Brown University Watson Institute for International Studies

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Summary

How can we integrate ecological sustainability criteria from "mines to markets" in economic development planning for particular industrial development paths in order to match natural strengths in supply of resources regionally with demands for particular products and services? This proposal seeks to develop a novel tool that utilizes methods from industrial ecology and complex systems science to assist in planning for industrial development that is most ecologically suitable for a particular unit. Unlike contemporary approaches that focus on "green jobs" within a new economy, the proposed research will focus on innovations within existing industrial sectors to assist them in planning for a more economically efficient and ecologically sustainable labor profile.

Introduction: Relevance to INET RFP and Core Competencies

Growth in natural systems is always considered an intermediate step towards stability. Organisms grow during certain stages of development and then after maturity stabilize in terms of physical criteria as well as their ability to consume resources. Indeed, unfettered growth in natural systems is considered a disease – the pathology of cancerous cells stems from their uncontrolled growth. However, in the mantra of modern economics it is assumed that growth is essential for well-being, largely because of a need for constant livelihood.

The field of "sustainable economics," which has been identified by INET as one of six thematic areas for this grant cycle, grapples with ways to consider economic growth in the context of human livelihoods. Furthermore, INET has also identified "human capacity and economic development" as a priority area. The proposed research will explore ways to develop an integrated assessment methodology for charting the environmental and social impact of a particular industrial development decision using techniques from the emerging field of industrial ecology such as life cycle analysis and combining them with conventional economic techniques for measuring labor impact such as economic multipliers.

Much of the epistemic conflict between environmental science and economics is premised on a contention between job creation and environmental regulation. The central challenge to reconciling jobs and the environment is the tension between durable resource development, which generally supports ecological metrics, and disposable product development which supports more reliable employment. The proposal will also consider the role of hybrid livelihoods in some regions that allow for subsistence resource acquisition (eg. Having household gardens and energy supply) alongside a globalized model. Earlier work on "sustainable livelihoods" has been focused on local development efforts by donors

rather than understanding the full context of employment in the production and consumption of goods and services. This research proposes using methods from the emerging field of industrial ecology to compare development paths based on particular investments in product or service dispensation. The metrics could also be provided to consumers as an additional mechanism for "constructive consumption."

The partnership between INET and CIGI is particularly appealing and appropriate for this proposal since any planning methodology requires a strong governance interface. Once the assessment methodology has been developed, governments would be invited to apply the tool for particular industrial plans in partnership with business. My affiliation with the World Economic Forum as one of their "Young Global Leaders for 2011" will also be helpful in this regard.

The University of Vermont, where I am based has developed a core capacity in the study and application of novel approaches in economic analysis through the Gund Institute for Ecological Economics. Furthermore, my partnership with scholars at leading research centers in Industrial Ecology such as the Yale School of Forestry and Environmental Studies will provide an opportunity to refine the methods needed to develop a sustainable livelihoods assessment tool.

Such a tool would radically change how economic development planning decisions are made on the supply side and inform consumers about choices regarding goods and services on the demand side.

Historical Context

Economists have successfully branded themselves as scientists with mathematical exactitude who can artfully negotiate the vagaries of human consumption patterns through pricing mechanisms. Yet the life support systems that sustain the planet have eluded their grasp, and often been relegated to the residual category of externalities. Given the resistance of conventional economics to consider ecological constraints directly, a parallel field of ecological economics had to develop, led by a few rebel researchers. Most notably, the Romanian-American economist Nicholas Georgescu-Roegen, who had been a protégé of Joseph Schumpeter, dared to embrace other physical sciences, such as physics and biology in his analysis of the economy as part of a complex ecological system. His seminal book *The Entropy Law and the Economic Process* (1971), was the first treatise to consider physical constraints on economic growth.

In the last decade there seems to be a promising shift across the tectonic plates of economic thought that just might close the fault lines. Ecological economists have moved closer to pricing strategies that have been the pulse of conventional economic analysis. For example, to conserve a wetland, they are now making the case for how the ecosystem provides an economic service of preventing property damage from hurricanes or naturally cleaning effluent. While they might not have accurate pricing for "nature's services" at this stage, at least they are trying to delineate monetary indicators in tangible terms rather than using the polemics of priceless value (Kareiva et al, 2011).

At the same time, conventional economists are also beginning to think outside their hallowed box and

consider the consequences of neglecting ecological constraints. However, economic growth still remains sacrosanct to mainstream economists. While there is little doubt that economic growth is necessary for developing countries to climb out of poverty, what is less clear is the necessity for economic growth in mature economies where population is also stabilizing. A troika of inertial forces has prevented our move forward in addressing this issue. The first part of the challenge is an assumed need for growth in order to sustain technological innovation. However, pathways to innovation can also be found through constraints and resource scarcity and end-user innovation (von Hippel, 1994). Second, is the questionable assumption that links economic growth to quality of life that has been challenged among others by Nobel laureate Daniel Kahneman (inter alia, 2003). Third there is an incipient reluctance from the global economic system to grapple with the question of inequality of wealth. On the issue of inequality, environmental sustainability advocates also have a checkered record since they often advocate local insularity (McKibben, 2008) even though international trade is well established as the most potent antidote to global inequality.

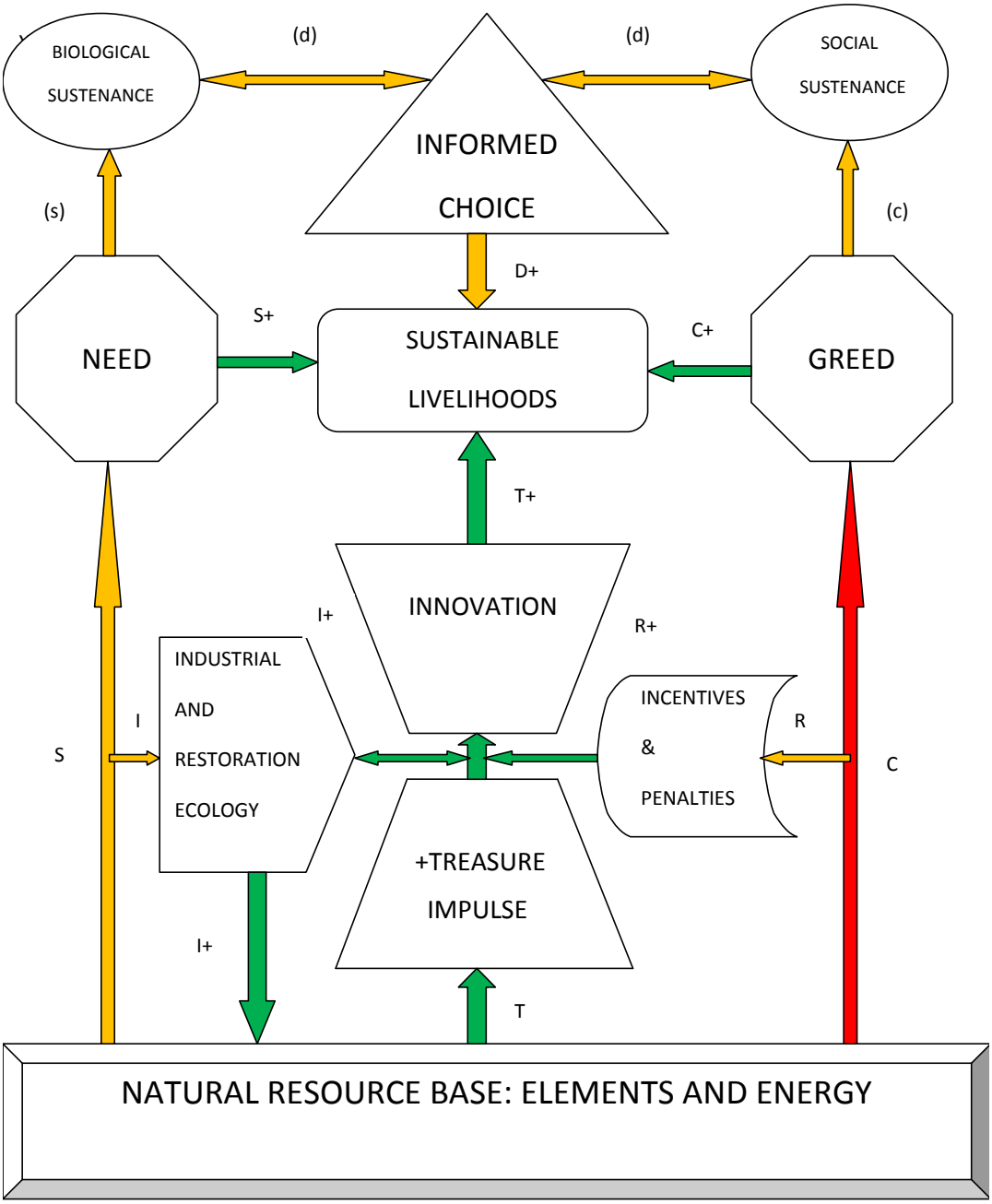
If there is a nefarious necessity in this whole debate, it is perhaps the specter of regulation. The common good of planetary protection will have a political price that pits proponents of individual liberty against the regulators. We need a new approach to govern economic development that would involve regulating the scale of consumption in developed countries, while creating incentives for constructive consumption and trade in developing countries for poverty alleviation. It's high time we have a more nuanced and "naturalized" approach to economic growth that acknowledges the resilience as well as the constraints of ecological systems.

Integrated view of a pluralistic sustainable society (Refer to Figure 1 on Page 4)

In my book *Treasures of the Earth: Need, Greed and a Sustainable Future* (Yale University Press, 2010), I tried to critique the insularity of minimalist tendencies of modern environmentalism that often neglect the opportunity costs of livelihoods in the developing world. For example, an environmentalist's call for reduction of consumption of luxury goods might not consider the impact of such a decision on a country like Botswana which has used diamond wealth for developing a fairly robust democratic economy.

As a follow-up to this book, I have tried to develop a framework for how to conceptualize the challenge of sustainability in a way that integrates livelihoods around human "need" (biophysical necessities) and "greed" (psychosocial attributes that contribute to the quality of life) which is show in Figure 1. Green arrows indicate positive pathway towards ecological, economic and social sustainability; red arrows define negative pathways for same criteria and yellow arrow defines pathways whose impact can be positive or negative depending on decisions nodes. S= Subsistence and survivalist demand; C =direct greed-based consumption (or plunder); R = Regulatory measures; I = Innovation Capital; T = Technologically driven demand; D = Democratic process. Lower-case notation suggests subsidiary pathway of concept in upper-case. + Indicates pathway with definite positive potential for sustainable development.

Figure 1: Livelihoods as the Natural Interface in a Sustainable Pluralistic Economy



Variables to be considered in Assessment tool for Development Planners

Research and analysis of multiple variables from the supply and demand sides would be needed to develop this tool and test its efficacy at an international level. Here are some the key variables that will be investigated in this regard. One or two key industrial sectors will be chosen as a pilot for the purposes of this proposal. The choice of that sector would be based on scoping data garnered through a workshop of experts convened at the start of the project. For each of these variables, a composite index may need to be developed which would be fed into the integrated planning framework. Some of the budget is allocated to reaching consensus among experts and decision-makers around the development of such indices for application.

Products and Services Demands Assessment: For a given industry, such as the automotive sector, consumer needs could be assessed based on secondary demand data. However, for measuring sustainability, it would be important to consider 3 scenarios for meeting demand and its impact on livelihoods: i) durable products with service sector employment (reusing old cars operating with employment for those who service them readily); ii) High turnover 'disposable' product with direct employment throughput; iii) Disposable product with technologically driven material recovery and reuse (Pathway T, Figure 1).

Natural Resource Base Inventory: Key ecological strengths within a governed jurisdiction that will be undertaking the planning exercise will be inventoried. Indicators to be developed include, mineral resource based, arable soil, energy availability from local renewable sources versus ease of importing energy.

Human Capital and Labor Availability: Demographic indicators of workforce composition and existing skill-set will be evaluated and a needs assessment for particular educational or skill deficits determined. A qualitative assessment of how such a deficit could be overcome would be included as a supplement to the analysis.

Existing Economic Profile and Infrastructure Indicator: The industrial capacity of the jurisdiction could be measured through available indices. What would be different from conventional measures of economic performance here would be an inclusion of an "opportunity" variable within the analysis, accounting for what range of development paths the economic profile of the country could reasonably afford.

Diversification potential: With the proposed development paths that emerge from the aforementioned evaluation criteria, a measure of diversification from capital flows generated by a particular sectoral development would be evaluated, under norms of governance that are prevalent. Instruments such as sovereign wealth funds could be an example of how such a metric could be calibrated.

Ecological and Social Evaluation for Development Paths using Industrial and Restoration Ecology Indicators: Once the integrated analysis of economic opportunities using the aforementioned criteria has been undertaken, techniques such as Life Cycle Analysis will be used to consider relative impacts of material usage choice for industrial development path as well as the resilience of the environment to industrial impact and the restoration potential.

Multiplier Effect of Employment for Development Path

Each development path will also be evaluated using conventional techniques of multiplier analysis to gauge the extent of employment potential. An additional metric of temporal stability of such employment will be added based on data for similar sectors or through appropriate models of projected employment based on projected changes in demand scenarios.

Two key deficit areas to be evaluated for policy analysis:

Demand is absent for goods and services that have most livelihood potential: Considering the development paths of particular economies with limited alternatives may suggest specific trajectories that are most viable from a sustainable livelihoods perspective but for which there is limited demand. An example in this regard is recent ongoing research by the author on the pearl farming sector in small-island states as a means of creating positive incentives for coral reef conservation. This sector may have high potential for sustainable livelihoods under the aforementioned framework but demand for South Sea pearls is highly limited to the Japanese market. In such cases the assessment tool would help to develop consumer education and policy interventions to assist in creating positive demand or vice versa.

Trade Needs Analysis

The Natural Resources inventory and related metrics may also lead us to note particular trade inputs for the success of a particular product. Trade linkages across the planet could be analyzed using tools from complex systems research to propose an optimal strategy that minimizes ecological impacts while providing maximum livelihood potential in areas with greatest need. Such an analysis has never been done from an industrial ecology perspective and could be revolutionary if applied to international trade governance.

Ultimate Goal

Once such an integrated tool has been developed with the requisite research and testing in specific jurisdictions within countries and internationally, the sustainable livelihoods assessment could become a new mechanism for trade and labor negotiations and international environmental policy. Currently there is a fracture between international organizations such as the World Trade Organization and environmental organizations such as the United Nations Environment Programme, which has very limited authority. A tool of this kind could provide a methodologically rigorous means of harmonizing these disparate organizations and giving them a common means of functional evaluation.

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Biography of applicant: Saleem H. Ali is Professor of Environmental Planning at the University of Vermont and a Fellow of the Gund Institute for Ecological Economics. His latest book is titled Treasures of the Earth: Need, Greed and a Sustainable future (Yale Univ Press, 2009). He was selected by the World Economic Forum as a "Young Global Leader" in 2011 and an "Emerging Explorer" by the National Geographic Society in 2010. Prior to embarking on his academic career Dr. Ali worked at General Electric and at Industrial Economics Inc. He received his doctorate in environmental planning from MIT, Masters in environmental studies from Yale University and Bachelors in Chemistry (summa cum laude) from Tufts University. Dr. Ali received his secondary schooling in Lahore Pakistan and is a citizen of both the United States and Pakistan.

Initial Budget Estimate for INET Proposal (based on a total 24 month grant)

Details of budget distribution over the 2 years will be worked out in consultation with INET as needed if proposal advances to Stage 2. However, it is estimated that this distribution will be divided evenly across both years of the grant.

Saleem H. Ali, University of Vermont, 2011

Category	Description	Estimated budget
Experts Group Workshop	An opportunity to convene a select group of experts through a cost-effective webinar/seminar to consider industrial sector for focus of proposal and vetting variables proposed for assessment framework	$5000
Data acquisition for Life Cycle Analysis	Acquiring data sets for material flows and	$10,000
Data Acquisition for Economic indicators	Some indicators data may be available free	$10,000
Graduate Student Support	Two-year support for a doctoral student would be matched with one year TA from the University	$40,000
Two month summer salary for PI	Devoting two clear month of time	$20,000
Project web site	Working with nonprofit web developer Tamarack media in Vermont, rapid dissemination of findings will be essential	$5,000
Publishers subsidy	University of Chicago Press has expressed a strong interest (providing a letter of support for this proposal as well) for a series of monographs emanating from this research	$5000
Conference presentations expense	Dissemination of the findings will be critically important as this project moves forward -- expenses for presentations at major international forums	$5000
University overhead 10% Maximum	The University of Vermont will absorb remaining overhead cost	$10,000
TOTAL		$110,000