

# **Efficiency, Effectiveness and Sustainability: The Basis of Competition and Cooperation**

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## **Abstract**

This short article provides a clarification to the idea of sustainability. It compares the ideas of efficiency and effectiveness with the idea of sustainability to provide some clarity and understanding of the term sustainability. Space, time, context, objective function and value are the bases used to compare, clarify and present a stand on what we understand by sustainability. The article shows the relationship of the three terms and how the idea of sustainability encompasses the ideas of effectiveness and efficiency. Based on the above analysis, the article provides a working definition of sustainability.

## **Key Words**

Efficiency, Effectiveness, & Sustainability

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## Introduction:

While the issues of sustainability have emerged to be the most critical areas of inquiry in the 21<sup>st</sup> century, the differences in the perspective among the scholars, practitioners, policy makers, etc on the idea of sustainability seemed to have created more confusion and dilemma than clarity and understanding of sustainability. Today there are over 100 educational institutions world wide that are offering over 150 degree programs on sustainability related subjects. This phenomenon suggests the growing necessity and desire to transit to a sustainable world.

Historically, the increasing ecological imbalances and unpredictable climate changes have spurred the studies on sustainability. The UN General Assembly of the UNO set up the world Commission on Environment and Development in 1982. The prime objective of the commission was to propose long term environmental strategies for achieving sustainable development by the year 2000 and beyond. Given the global mandate and political orientation of the commission, the Brundtland Report (1987) focused on balancing the economic-social-environmental objectives at the national and international levels for a sustainable course of development. Balancing social and economic aspects is only equitable; balancing economic and environmental aspects is only viable; balancing environmental and social aspects is only bearable. Balancing all the three viz., social, economic and environmental aspect is sustainable. Accordingly, the commission defined that "*Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs*".

Given the top down orientation of global policy makers, external measures to attain sustainability through the political-policy-legal perspectives are underway, as in the World Commission on Environment and Development of the UNO. In this context, sustainability is being analyzed through the lens of inter-relationships between people, governments, resources, environment, and development. Sustainability is increasingly being studied from the technological-innovation perspective. Organizational-Institutional-systems perspectives are other theoretical perspectives to the studies on sustainability. Further, from an internal perspective of an individual, sustainability is being looked into from the philosophical-moral-behavioral perspectives. In the current explorations, the question of '*whose sustainability*' and '*how to achieve*' are not clearly articulated and prioritized. Second, the issue of '*sustainability at what level or cluster*' of people, ecosystem, organization and institution is not being addressed and explained. Some perceive that the present idea of sustainability is a relative status quo of the growth and development indicators that ignore the growing aspiration of people.

While our overall objective will be to achieve global sustainability, what are the micro units of our global ecosystem? While we appreciate that the various perspectives mentioned above are significant to sustainability, how do we converge these perspectives at the grass root level of

micro units of our global ecosystem? What is the value base for our future engagement towards sustainability that can produce eternal growth to reach beyond everyone's aspiration? Our definition of sustainability is constructed to cater to the above three questions of sustainability.

Besides the lack of inadequate definition, sustainability as a distinctive and holistic criterion of assessing human endeavor has not been systematically explained. Sustainability has rather been measured and assessed through the criteria of efficiency, a criterion that has been widely used to measure most of human endeavor in the capitalistic and industrial development paradigm. While some have extended the criterion of effectiveness to explain sustainability, the notion of sustainability as a distinct and holistic criterion to assess human endeavors has not been systematically dealt with and explained. In this short article, I shall try to elaborate the nuances and the relationships among the three terminologies of efficiency, effectiveness, and sustainability.

All the three concepts are used to assess the performance of human endeavor. The concept of efficiency however has been more widely used than the other two. Subsequently, the term effectiveness came into the discussion and lately the idea of sustainability is gaining importance. While the concept of efficiency is much clearly defined and easy to understand, the other two are subjectively defined and loosely understood. While there are linkages in the three terminologies, the lack of clarity has led many to use these three terms synonymously.

**Efficiency** is measured as a ratio of output to input. Technically, *efficiency is the ratio of useful work performed by a machine or in a process to the total energy expended*. In other words, it is a measure of how productively a work or a job has been carried out. Speed, fastness, quickness, doing things right, hard working, least wastage, high returns, etc are associated with the idea of efficiency. In the industrial settings, this is the most scientific and most widely used means to measure performance. Its simplicity and accuracy has led to its far and wide application in all fields of pure science, management and increasingly all forms of human engagements. As precision of measurement in all fields including social sciences have increased, efficiency as a means of measurement has also entered all spheres of human engagements including economic-social-political-environmental assessment.

The phenomenon of efficiency is widespread today in our thinking and in practice across different types and levels of engagements. Phrases, terms and concepts like return on investment, value for money, bottom line, what do I get out of it, what is there for me, etc are common expressions today where the idea of efficiency is clearly reflected. Oliver Williamson observes that a firm in a competitive market economy exists only when it is efficient. Elinor Ostrom in her analysis of governance of common properties also brings in the centrality of efficiency. Efficiency has been the most celebrated idea in the twentieth century. The effect of this thinking has been so much so that the education and training of our children across the world have gradually moved from the natural context towards abstraction; devoid of context.

While the idea of efficiency is a micro concept that is concrete, easy to quantify and understandable, it is characterized by limited space and time in its application. In other words, it is measured in a limited and controlled space and the assessment is at a point of time. It is determined clearly by the objective function and it is value neutral. Accordingly, it has little reference to a context. These characteristics make efficiency a great tool to analyze in very specific time and space. If only every point in the space and across time were efficient, the whole system would become efficient and remain so. However, since efficiency is built on the logic of external competition and not on internal competition, a point in a system will try to be efficient at the cost of efficiency of another point in the same system. The logic of external competition in the system can lead to various dysfunctions in the system leading to un-sustainability. Indeed, the general assumption of what works for a specific time and space shall work across time and space is rather weak. Therefore, it is difficult to achieve sustainability through efficiency based on the logic of external competition. While efficiency of specific points and at specific times in a system is equally essential for sustainability of a system; the logic of internal competition and not external competition need to be the basis for this efficiency for sustainability.

**Effectiveness:** Effective means *producing a desired or intended result*. Effectiveness is an adverb of effective. This refers more to the relevance or usefulness of the output rather than mere mechanical output. The intent of the work seems to take precedence over the quantum of output or result in effectiveness. Doing the right things, working smarter, impact of the output, etc are typically associated with the term effectiveness. While the decision makers and policy makers would find more usefulness in this measure of performance, the complexity associated with measuring effectiveness and the lack of clarity on the units for assessing it make it harder to measure in real work situation.

Despite the complexities, the basic notion of effectiveness meaning desired or intended result is more acceptable in practice than the idea of efficiency. The idea of effectiveness gets closer to the concept of outcomes, say in a development intervention. Effectiveness presents a more intuitive understanding of the results of an action. It is therefore widely used by practitioners and managers at higher level of decision making. Unlike the presumption of neutrality in the objective function in the idea of efficiency, objective function is specific to individual(s) of organization in the notion of effectiveness. The general notion of effectiveness does however, incorporate the efficiency driven by the logic of external competition.

The complexities are associated with the notion of time, space, context, objective function, and value base that are associated with the idea of effectiveness. With reference to extent of space and time, effectiveness refers to a body of space, say an individual or an organization and in a limited frame of time. With regard to context, it refers to a closed and relatively homogeneous system. Its objective function is linked to the objective of the individual or an organization. There is a value base in terms of outcomes for a specific set of actor(s), institution(s) or organization(s) and is largely built on the contractual relationship of give and take.

Though both the ideas of efficiency and effectiveness have occupied the thinking process of our times, these measures have not been able to provide sufficient explanation to the growing concerns and tensions across time, space, and context. These terms seem to have limited application over longer time, broader space and different contexts with specific reference to sustainability. In other words, these measures seem to lack universality in real world application. Since the objective function is limited to a specific individual(s) or organization, it does not automatically ensure the effectiveness of some entities within a system. It therefore appears that the above notion of effectiveness with limited objective function is an extension of efficiency driven by the logic of external competition. In the light of these deficiencies in the ideas of efficiency and effectiveness that have been based on external competition, the idea of sustainability seems to be holistic, logically sound and overcomes these deficiencies. Indeed, the notion of sustainability encompasses both the notions of efficiency and effectiveness of a system and provides a more realistic and dynamic measure.

**Sustainability:** The literal meaning of sustain is *keep (something) going over time or continuously*. Sustainability is the ability to sustain. The growing environmental pollution leading to unpredictable climate changes lead to the idea of sustainability with a special reference to sustainability of the planet earth. Naturally, the idea of sustainability from planet earth at the macro level has drawn attention to the various fields of studies at the meso level and micro level.

The idea of sustainability has emerged to be one of the most popular themes across different fields and human engagement and has been broadly interpreted from the perspectives of development and sustainability of the earth. Despite the various growing perspectives to understand sustainability, there is no concrete and clear framework to clarify what sustainability means and how it could be operationalized in our reality.

While sustainability today is generally understood in terms of balancing the socio-economic-environmental objectives; the issue of how these three could be balanced has not been addressed. Further, while the balancing of the three objectives is being discussed at the national and international level but how would the balancing take place at the micro ecological unit/system level has also not been explained.

As observed, sustainability in literal sense refers to only sustenance; it does not clarify if it means satisfying the growing needs and expectations of people. While the idea of sustainability is appreciable at the macro level of the planet earth and at meso level of national governments, the micro level foundation for achieving sustainability is neither explained nor fully brought into the discussions. At the micro level, the natural cycle of birth, growth and death need to be honored and unhindered by human fear and greed. Higher growth and greater happiness at the micro level is logical and possible without affecting sustainability at the macro level, if we seek balance in the growth at the micro level. The notion of growth and development therefore is significantly linked to the idea of optimal size of an ecosystem at the micro level of an ecosystem. If only we were to achieve dynamic balance at the micro levels; say a micro

ecosystem, micro watershed, a community, a cluster of villages, etc, we can aspire for higher growth, well being of all, and the sustainability of the larger global ecosystem.

The core ideas of sustainability and its distinction from the notions of efficiency and effectiveness may be viewed from the lenses of space, time, context, objective function, and value base. From this perspective, sustainability refers to a larger extent of space with many stakeholders spread over an ecosystem and it spans over a very long period of time. The context is real; in other words, it refers to a natural open system that is diverse and heterogeneous in character. The objective function is to balance and optimize the multiple objectives of various entities of the ecosystem. In addition to freedom with self control and an approach to strengthen the weakest, sustainability is founded on the value of inclusiveness, and integration. The basic norm in the relationship among the various stakeholders is founded on giving, loving, sacrificing. The perspective of kenosis and the act of a mother's love are keys to inclusiveness and universal characteristics of sustainability. A comparison of specific characteristics of efficiency, effectiveness and sustainability are presented in Table 1.

Sustainability could be precisely understood from the rationale or scientific perspective. The *systems theory* can greatly help understand the science of sustainability. Similarly, the *theory of constraint* and the logic of *joint probability* can be used to appreciate the basic science behind sustainability. However, the simultaneous balancing of the various aspects is feasible only when the value base is universally appreciated and accepted. In other words, a synthesis of science/logic, language and universally acceptable value base of love and sacrifice can lead to sustainability at multiple levels, viz., micro level, meso or nation state level, and at the macro level of the planet earth.

**Table 1: Characteristics of Efficiency, Effectiveness & Sustainability**

	<b>Space (X1)</b>	<b>Time (X2)</b>	<b>Context (X3)</b>	<b>Objective Function (X4)</b>	<b>Value Base (X5)</b>
<b>Efficiency</b>	<ul style="list-style-type: none"> <li>• Point of space</li> </ul>	<ul style="list-style-type: none"> <li>• Point of Time</li> </ul>	-	<ul style="list-style-type: none"> <li>• Neutral to Objective</li> </ul>	<ul style="list-style-type: none"> <li>• Tight Control</li> <li>• Output oriented</li> </ul>
<b>Effectiveness</b>	<ul style="list-style-type: none"> <li>• A body of space (firm or individual)</li> </ul>	<ul style="list-style-type: none"> <li>• A frame of time</li> </ul>	<ul style="list-style-type: none"> <li>• Closed System</li> <li>• Relatively homogeneous</li> </ul>	<ul style="list-style-type: none"> <li>• With regard to objective of the body or organization</li> </ul>	<ul style="list-style-type: none"> <li>• Tight Control</li> <li>• Outcomes for specific actor(s), institution(s), or organization(s)</li> <li>• Contract: Give and take</li> </ul>
<b>Sustainability</b>	<ul style="list-style-type: none"> <li>• Large extent of space with many stakeholders (spread over an ecosystem)</li> </ul>	<ul style="list-style-type: none"> <li>• Over a longer span of time</li> </ul>	<ul style="list-style-type: none"> <li>• Open system</li> <li>• Natural / diversified</li> <li>• Relatively heterogeneous</li> </ul>	<ul style="list-style-type: none"> <li>• To balance and optimize the multiple objectives of various entities of the ecosystem</li> </ul>	<ul style="list-style-type: none"> <li>• Freedom with self control</li> <li>• Strengthen the weakest in the system</li> <li>• Holistic (Inclusiveness, &amp; Integration)</li> <li>• Humility, respect for others, tolerance to heterogeneity, &amp; equality</li> <li>• Norms: Give, service, love, and sacrifice</li> </ul>

## **Working Definition of Sustainability:**

**Sustainability is a dynamic state of deep relationships among the people and all the constituents both living and non living within a micro ecological unit that strongly values the acts of sacrifice and love for each other; where the priority is to strengthen the weak and where the spirit of high external cooperation and high internal competition not only drives its own ecological unit to eternal peace, joy and happiness but also inspires other micro ecological units for such deeper inter relationships.**

**Basic Unit:** The micro ecological unit of the global ecosystem is the basic unit; which could consist of a micro watershed, a village, cluster of villages or a cluster of habitations.

*Logic: If the basic unit of an ecosystem is healthy; the whole ecosystem shall be healthy. As every micro ecological unit will have its own characteristics, solutions and approaches that are context specific and not general in nature shall be the approach that can lead to overall sustainability.*

**Focal Point:** Within the micro ecological unit, the priority is always to strengthen the **weakest** person or family within the micro ecological unit.

*Logic: The logic of the systems theory that is the strength of a chain is the strength of the weakest link is applicable. Further, it is also strategic to stabilize the most volatile actor, the human actor within a given ecosystem to ascertain peace and harmony in the ecosystem.*

**Holistic:** Convergence and integration of different internal perspectives and external perspectives at the micro ecological unit. The internal perspectives include philosophical-moral-behavioral perspectives. The external perspectives include political-policy-legal perspectives, technological-innovation perspective, and organizational-Institutional-systems perspectives.

*Logic: Convergence and integration of multiple perspectives brings out several complexities and frictions if we were to negotiate them in a larger ecosystem or at the national or global level. However, at a level of micro-ecological unit, convergence and integration of these perspectives are feasible; a process that could be synthesized at the subsequent levels.*

**Value Base:** The acts of **love and sacrifice** for the others in the micro ecological unit is the basis for strong bonding and inter personal relationships with deep trust and cooperation among each other.

*Logic: The acts of love and sacrifice for the others have the power to heal the pain, remove the tensions of integration, simplify the complexities of convergence and integration, and complete the incompleteness in human rationality. The synergies arising out of the acts of love and sacrifice can yield eternal growth and development within a micro ecological unit. When the same value base drives the other micro ecological units, the global ecosystem can become sustainable.*



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