

**Ecological Security and Capabilities: A Conceptual
Framework for Sustainable Development**

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Introduction

The concept of sustainable development is not new and in fact can be traced back to many of the early civilizations. For example, Kautilya, the chief minister for the Chandragupta Empire in 321 B.C. India based his economic strategy for the empire on the sustainable management of ecosystems and the equitable sharing and management of these resources by the various stakeholders living within specified geographical borders (Kautilla 1992).

However, the recent interest in sustainable development can be traced back to the 1972 United Nations Conference on Human Environment (UNCHE) held in Stockholm. This conference was one of the first to explore the links between ecological conservation and economic development. This was followed in 1974 by another conference in Bucharest that focused on the links among population growth, resource use and economic development.

These conferences led to the introduction of the term, eco-development and was adopted by the United Nations Environment Program (UNEP) as a planning concept (UNEP 1975). However, the eco-development planning tool emerged as a potential weapon to fight social injustice, economic exploitation and ecologically and technologically inappropriate development and was deemed as too radical by the mainstream political and leading business communities.

This in turn led to the development of the IUCN World Conservation Strategy which tended to bridge the divide between conservationists and development advocates. But focus was still on traditional development focusing on economic growth using neo-liberal economic policy paradigms. Moreover, the strategy did not involve grass root movements and lacked the emphasis on poverty reduction and other social ills.

Then in 1987, the Brundtland report, "Our Common Future", was published. The report was one of the first to provide a clear definition for sustainable development. The definition, now widely accepted within the development community defines sustainable development as, "meeting the needs of today without comprising the needs of future generations".

This was in a way a radical move forward and was no doubt a monumental achievement. It was able to for the first time bring to the forefront issues relating to equity and environmental integrity in addition to the traditional objective of economic growth. But its main feat was the inclusion of inter-generational equity issues that have been largely ignored in the past.

However, by adopting the term needs, the Brundlant report had inevitably reduced development to the fulfillment of needs. The term needs is quite broad and lends itself open to a variety of interpretations, depending on the objectives and goals of the user. Therefore, although needs can range from the needs for values, rights and freedoms to the needs of education, shelter, food, and other materialistic goods.

The Brundlant report itself emphasized the essential or basic needs of the poor. However, the question that begs itself is, can a concept like sustainable development that is meant to address issues related to equity, distributive and use of natural resources within and across generations be reduced to mere goods? Moreover, should a term like needs that is open to such a variety of interpretations be used in the first place to define a development paradigm? This paper addresses some of these questions and suggests an alternative approach to sustainable development that is more definite, inclusive and supported by an established branch of literature within the economic, ecological and philosophical literature.

The paper is structured as follows. We will, in the next section, put forward our argument why development or poverty reduction has to be seen as more than the provisioning of needs. In section three, we shall argue that the capability framework presented by Nobel Laureate Amartya Sen provides an ethical as well as operational framework to guide countries trying to achieve sustainable development. However, the capability framework in its present form does not address the role ecosystems play in capabilities. In section three, we close this gap by introducing the concept of ecological security as the sixth freedom to Sen's existing five freedoms. The paper ends with not a conclusion but with a list of some of the major challenges we face in implementing sustainable development strategies that go beyond needs in countries, especially in developing countries.

Needs to Capabilities

Fukuda-Parr and Kumar state that the Basic Needs perspective approached poverty as the deprivation of material requirements for minimally acceptable fulfillment of human needs (Fukuda-Parr and S.Kumar 2003). The key word in this definition lies with “material requirements” and “minimally acceptable”. This definition of poverty leads us to assume that only material needs are critical for the reduction of poverty and all that is required is for the poor to be given a minimally acceptable level that is defined by policymakers and experts (Illich 1992). For example, Erich Fromm believed that “the sane society” is an arrangement that

Corresponds to the needs of man, not necessarily to what he feels to be his needs (because even the most pathological aims can be felt subjectively as that which the person wants most) but to what his needs are objectively, as they can be ascertained by the study of man (Fromm 1954)

However, Ventura and Henry state that the Basic Needs paradigm incorporated both material and non-material needs. They go on to state that the type of basic need program that materializes in a country really depends on the definition of poverty that is used. Therefore, if poverty is defined as income deprivation, then the basic needs approach developed would basically be focused on removing the constraints of economic growth and that income will eventually trickle down to the poor. Empirical evidence in many of the developing countries shows that this has not occurred.

The Institute for Development Studies in 2003 Policy Brief argues that the Basic Needs approach as a derivative of utilitarian economics and seeks to achieve the greatest happiness for the greatest number. In many ways this view is similar to the views held by Streeten and Burki who see the Basic Need approach targeting the population in general rather than specific targeted groups.

In spite of the limited success of the Basic Need approach, what it did do is to move away from a uni-dimensional perspective of wellbeing and poverty to a broader concept of multi-dimensionality encompassing health, food and shelter. Although the focus was still a very commodity or material oriented, the move to multi-dimensionality was a positive step.

Can the Basic Needs framework provide a platform for sustainable development? The answer is a qualified no. The Basic Needs paradigm does not place much importance on the sustainability dimension. First, the sustainable flow of material needs will depend largely on the natural resource base and healthy ecosystems. The Basic Needs approach does not consider ecosystems and their services implicitly. Second, the Basic Needs approach focuses primarily on the ends and is not concerned with the process. For example, in the Canadian International Development Agency (CIDA) policy paper on meeting basic Human Needs, the objective was to provide primary health care, basic education, and shelter. No mention is made of inquiring from the people what are their priorities they value doing or being. There is very little emphasis on making people agents of change who are responsible for achieving the ends themselves (the agency dimension). Third is the concept of choices and the ability to choose the processes they are most comfortable with and with the end they value the highest instead of being told what their needs are and then given the need. Finally, fourth but not least is the aggregative nature of the basic needs approach that ignores individuals and/o groups of people who are socially, ecologically and economically excluded and do not factor or are lost in the aggregate measure.

Voices of the Poor has demonstrated that individuals, especially the impoverished and destitute want the freedom to make choices and choose what they value doing and/or being.

The views expressed by many of the poor from all parts of the world coming from a variety of cultures and religion points towards the freedom to choose a life they have reason to value; the ability to achieve the doings and being they value. Voices of the poor, a study carried out by the World Bank to understand what poor people want came to the conclusion that income and materialistic pleasures were not the main goals wanted by the poor but more fundamental objectives of having choices in decision making, having the freedom or capability to voice their opinions and more importantly having those opinions heard and taken into consideration. Being able to have dignity was another critical element identified in the study as having high priority among the poor.

It would be difficult to make a system sustainable if people are not directly involved in the process and are allowed to determine the type of life they value. This is the main failure of the many development paradigms, Basic Needs included. A paradigm or approach that does not involve people in an inclusive manner in determining the ends and means is one that cannot be sustainable.

Human Well-being and Capabilities

There have been many formulations and definitions of human well-being (see Alkire, 2002 for a comprehensive discussion). Most commentators would agree that human well-being is multi-dimensional and includes a necessary material minimum for a good life, the experience of freedom, personal security, good social relations, and the conditions for physical, social, psychological, and spiritual fulfillment (MA 2003). Within this list, a distinction needs to be made between the determinants of or means to well-being and its constituents—that is, as an end (Dasgupta 2001, Sen 1999).

Sen argues that although determinants of well-being—for example material wealth and income—are important, they should not become ends by themselves (see Box 3). He goes on to argue that what people value as a constitutive element of well-being is the ability to achieve doings and beings individuals' value—the freedom to choose (Sen 1992, 1999). An example would be the choice to fast versus starving. The end product is the same but, in the case of the former, the individual chooses to go hungry while in the latter, the individual has no choice. Sen calls these combinations of doings and beings from which people can choose to lead the kind of life they value **capabilities**. By adopting capabilities as the indicator of well-being, the emphasis is now, not only on what is actually achieved at the end but also the processes by which these ends are achieved. In this way, the agency dimension—the act of participating and doing it for oneself—of human well-being is also captured explicitly.

BOX 1:

Income may be the most prominent means for a good life without deprivation, but it is not the only influence on the lives we can lead. If our paramount is in the lives that people can lead- the freedom they have to lead minimally decent lives-then it cannot but be a mistake to concentrate exclusively only on one or other of the means to such freedom. We must look at impoverished lives, and not just at depleted wallets...An impoverished life is one without the freedom to undertake important activities that a person has reason to choose.

Sen 1999

The *World Development Report 2000/01* defined poverty as “the pronounced deprivation of well-being” (World Bank 2001).

In this light, **poverty** can be defined as **capability deprivation**.

By defining poverty as capability deprivation, we have embraced not only the multi-dimensional nature of poverty but also have shifted the attention away from a narrow focus on income and/or commodity deprivation to include choice and agency deprivation. Moreover, focusing on what people can do and be—people’s capabilities—and allowing for plurality of the various links individuals and/or groups of individuals have with ecosystem services is not at all antagonistic with the need to be sensitive to the environment. As Sen puts it “Since many human freedoms and components of the quality of life are dependent on the integrity of the environment, development cannot but be sensitive to the quality of the environment. He goes on to say that the opportunity to live the kind of lives that people value -and have reason to value- depends inter alia on the nature and robustness of the environment”.¹

The notion of using capability and poverty as capability deprivation is not an abstract idea. It is been increasingly adopted by many of the multi-lateral development agencies working in poverty reduction. For example, the Development Assistance Committee (DAC) of the OECD used capabilities extensively in its guidelines for poverty reduction (OECD 2001) and the United Nations Environment Program (UNEP) in its poverty reduction and environment framework report (UNEP 2002).

Ecosystems and Ecosystem Services

Sen emphasizes that the opportunity to live the kind of lives that people value and have reason to value depend inter alia on the nature and robustness of the environment (Sen 2003). But what does robustness of the environment really mean? Does it imply the conservation of nature in its pristine condition as conservationist have argued or does it mean something more inclusive that includes humans and treats the relationship between people and ecosystems in a holistic manner.

¹ India Development and Participation. Jean Dreze, A.Sen. 2002

The latter approach—called the ecosystem approach—although not a new concept, has been gaining popularity over the last two decades and has been adopted by many of the international environmental conventions as the ideal way to address issues relating to the sustainable use and management of ecosystems.

There are many different ways of defining ecosystems and the services and goods they provide for human wellbeing. In this paper, we draw on the work done by the Millennium Ecosystem Assessment to guide us in defining ecosystems and the services they provide for human well-being.

The MA's approach represents the latest thoughts and developments by the world's experts in ecosystem science.

Box 2.

Ecosystem services are the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfill human life. They maintain biodiversity and the production of ecosystem goods, such as seafood, forage, timber, biomass fuels, natural fiber, and many pharmaceuticals, industrial products and their precursors. In addition to the production of goods, ecosystem services are the actual life supporting functions, such as cleansing, recycling, and renewal, and they confer many intangible aesthetic and cultural benefits as well.

Daily et al.1997

Ecosystems are defined by the MA as: “A spatially explicit unit of the earth that includes all of the organisms, along with all components of the abiotic environment within its boundaries”

It is becoming increasingly clear that ecosystems provide more than just goods for humans (see Box 3). They also provide critical life-supporting services. Ecosystems also provide cultural and spiritual values for human societies. Daily (1997) categorizes the various “services” ecosystems provide into the following three components:

1. Provisioning;
2. Regulating; and
3. Enriching/Cultural.

Provisioning services such as food, fiber and fuels (e.g. charcoal) have been the main driving force behind human use of ecosystems. The level of contribution towards well-being is normally determined by the magnitude and rate of goods harvested (the flow) from the natural ecosystem.

BOX 3: EXAMPLES OF ECOSYSTEM SERVICES IN DRYLANDS

PROVISIONING SERVICES

Human food (plant and animal products, livestock fodder)
Fibre
Fuels (woodfuel, fossil fuels)
Timber
Pharmaceuticals (e.g. from plant products)
Minerals (metal ores, construction stone, gem stones)
Fresh water

REGULATING SERVICES

Purification of air and water
Hydrological regulation
Detoxification and decomposition of wastes
Crop pest control
Maintenance of biodiversity
Climate regulation

CULTURAL SERVICES

Aesthetic values
Spiritual and social values

SUPPORTING SERVICES

Primary production
Soil formation
Pollination of plants
Nutrient cycling
Provision of habitat

Regulating, or sometimes called “supporting” service, is the actual life-supporting functions ecosystems provide for the existence of humans. These are the services that are commonly forgotten or taken for granted by societies. The level of contribution towards well-being by this service is normally determined by the size and quality (the stock) of the natural ecosystem.

But exhaustive conversion of natural ecosystems into human controlled ecosystems (high flow rates) has jeopardized the continued existence of these regulating services. The absence of markets and price signals in these services has meant that changes in their conditions have been ignored. It is also becoming increasingly clear that the public good nature of these services may make markets redundant in addressing the issue and new methods of making sure that these services are not lost need to be found.

Cultural or enriching services of ecosystems are one of the most overlooked services ecosystems provide, especially to many people in developing countries. Many of the religions and cultures in these countries believe that nature is a living entity and pray to various elements of nature. These beliefs and values surrounding natural forces have provided spiritual guidance for many societies for many generations.

But these are destroyed at an alarming rate as the ecosystems get degraded or converted into human-dominated ecosystems. The breakdown of these spiritual and cultural norms has had a devastating effect on social relations among people and their values.

Similar to regulation, the level of contribution this service provides for well-being is determined by the size and quality (the stock) of the natural ecosystem available.

The sustainability of provisioning services depends on the maintenance of regulating and supporting services. **Regulating services** directly regulate the environment, whereas **supporting services** indirectly sustain the environment over long time scales. For example, crop production relies directly on the maintenance of the soil's ability to infiltrate and retain water. Often less considered is the importance of maintaining the functional capacity of key groups of soil microfauna and flora for decomposition of animal and other wastes, thereby reducing human health risks and releasing nutrients for uptake by plants. Soil formation is an example of a supporting service, which is necessary to regenerate soils over very long time scales. With increases in pressure on ecosystems, we have become more aware not only of the importance of regulating and supporting services but also of the importance of the cultural services they provide, such as aesthetic value.

Regulating/supporting and cultural services are difficult to quantify and value over large areas, and therefore their importance to human well-being is usually less understood and under-valued compared with **provisioning services**.

A fundamental problem for sustainable ecosystem management is that there are usually direct tradeoffs among provisioning services and regulating, cultural or supporting services. For example, upstream dams and drainage schemes implemented in the Tigris-Euphrates river system have increased provisioning services, such as fresh water and food production, but at the expense of the Mesopotamian marshlands, which have decreased in area by 90% during the past 25 years (UNEP, 2002). The degradation of the marshlands has led to loss of habitat for many species of migratory birds, mammals and fish, and the displacement of the indigenous people

It should also be recognized that there is a high degree of synergy among the different services, for example, as a result of strong inter-linkages among primary production and hydrological and nutrient cycles. Over-use of provisioning services, such as excessive biomass harvesting, can impair the productivity of the regulating and supporting services, such as water and nutrient cycling, which in turn negatively impact on the ability of the ecosystem to produce goods, such as biomass. This feature of interdependency among ecosystem services is normally not taken into account in management and policy decisions, especially at watershed and national scales. Moreover, the loss in regulating services, compared with the provisioning services provided, tends to be much greater when sensitive land is put under unsustainable cropping or grazing practices. Such areas include, catchment headwaters, shallow soils or steeply sloping land, and landscape sink areas such as wetlands and riverine buffer areas.

Maintaining ecological functioning will depend heavily on matching appropriate land use to local conditions so that provisioning services are obtained with minimal loss in regulating and supporting functions. In fact, management systems evolved by local communities have achieved this balance in the past by adapting to variability and exploiting diversity, thereby strengthening the resilience of both the ecosystem and the production system (Mortimore, 1998). However, when economic drivers such as privatization of land and other political constraints (e.g. change or enforcement of political boundaries that restrict traditional movement of pastoralists) prevent mobility and resultant flexibility, for pastoralists, then the resilience of ecosystems can break down (Gunderson et al., 2002).

Capabilities and Ecological Security

Many capabilities are intrinsically linked with ecosystems and ecosystem services (see Figure 1). However, the degree of dependency of these links varies across individuals and/or groups of individuals.

It is an unconditional fact that all people—rich and poor—depend on services provided by ecological systems. This is however only true in the long run. In the short run, the poor are more heavily-dependent on these services than the rich. For example, the rich can buy clean water or the equipment to filter and purify water if it is contaminated. The poor on the other hand have limited resources to pursue these options and usually have no option but to depend on natural water systems and/or public water supply systems. And, many of these systems in developing countries do not meet minimum standards for human consumption.

Another example is the smog crisis in many urban cities. The rich are able to isolate themselves from the smog by buying air-conditioners, air-cleaners, special surgical masks, etc. Poor people—especially the young—are less able to escape exposure to the full impact of the smog with disastrous effects on their health.

The same can also be said for extreme natural events like floods and tropical storms. These tend to have a bigger impact on the poor who do not have the resources to build appropriate shelters or usually have their homes built on land prone to landslides and floods.

It has also been documented that poor women and children suffer disproportionately in acquiring dwindling natural energy supplies for cooking and heating. The suffering is amplified by the greater amount of time they spend in badly ventilated shelters when using highly polluting fuels like coal and firewood.

These examples point to a close relationship between people and ecosystems. For some, there will be a variety of options—in the short to medium term—to substitute but for others, especially the poor and the impoverished, the options are limited and their degree of dependency on well functioning ecosystems is high and critical for them if they are to achieve the capabilities they value doing and being.

After an extensive survey of the literature on the various linkages between poverty and ecosystems, we identified the following 10 constituents of well-being closely related with ecosystems. But we must emphasize that the final selection of well-being constituents and their relevance will of course be determined by the communities or individuals concerned, ideally from a participatory process:

1. **Being able to be adequately nourished.**
2. **Being able to be free from avoidable disease.**
3. **Being able to live in an environmentally clean and safe shelter.**
4. **Being able to have adequate and clean drinking water.**
5. **Being able to have clean air.**
6. **Being able to have energy to keep warm and to cook.**
7. **Being able to use traditional medicine.**
8. **Being able to continue using natural elements found in ecosystems for traditional cultural and spiritual practices**
9. **Being able to cope with extreme natural events including floods, tropical storms and land slides.**
10. **Being able to make sustainable management decisions that respect natural resources and enable the achievement of a sustainable income stream.**

Note: There are many other constituents of well-being that we have not listed above—including education. We exclude these in this study. We are only concerned with the constituents of well-being that are directly related to ecosystems and their services.

There is a large degree of complementarity among the 10 constituents of well-being. For example, being able to get clean water will also contribute considerably towards freeing the poor from contracting diseases. In the same vein, some of the prerequisites for being able to live in a safe and clean shelter are access to clean air and water. The high degree of complementarity suggests that addressing one constituent will provide considerable synergies towards achieving some of the other constituents of well-being.

In identifying the 10 constituents of well-being, we have also tried to move away from a one-dimensional approach that focuses solely on commodity, income and opulence to a broader multi-dimensional approach to well-being.

Box 4.

The market values commodities, and our success in the material world is often judged by our opulence; but despite that, commodities are no more than means to other ends. Ultimately, the focus has to be on what life we lead and what we can do or cannot do, can or cannot be. I call the various living conditions we can or cannot achieve our “functionings,” and our ability to achieve them, our “capabilities”

Amartya Sen, 1987

The 10 constituents we have identified in this paper are similar to the concept of functionings and capabilities that Amartya Sen argues are essential to evaluate human wellbeing. We have attempted to simplify the framework developed by Professor Sen (see Box 3) in order to operationalize his concepts and ideas but at the same time retain the essential properties of his work.

The 10 constituents can also be seen as a more detailed description of the World Bank’s broad classification of health, vulnerability and livelihoods that it uses in its framework to address the poverty-environment nexus.

However, in order to not get trapped in the traditional mistake of confusing means and ends and to prevent us from collapsing the ends to a list of commodities or services, we integrate the concept of capabilities within the 10 constituents. This will prevent us from emphasizing, for example, health facilities but the capability of people to use the health facilities which they value. By expanding the focus to capabilities, we are able to broaden the information space to evaluate wellbeing and measure the effectiveness of policy responses to improve wellbeing or reduce poverty by including choice, autonomy and deliberation.

It is for this reason that we start each of the 10 constituents with the words “**Being able to**”—the ability to achieve a functioning or constituent an individual values. In this way we introduce the concept of putting the poor at the centre and hand them control over their well-being. In this case they are not “victims” who are in need of aid but active participants of the development process.

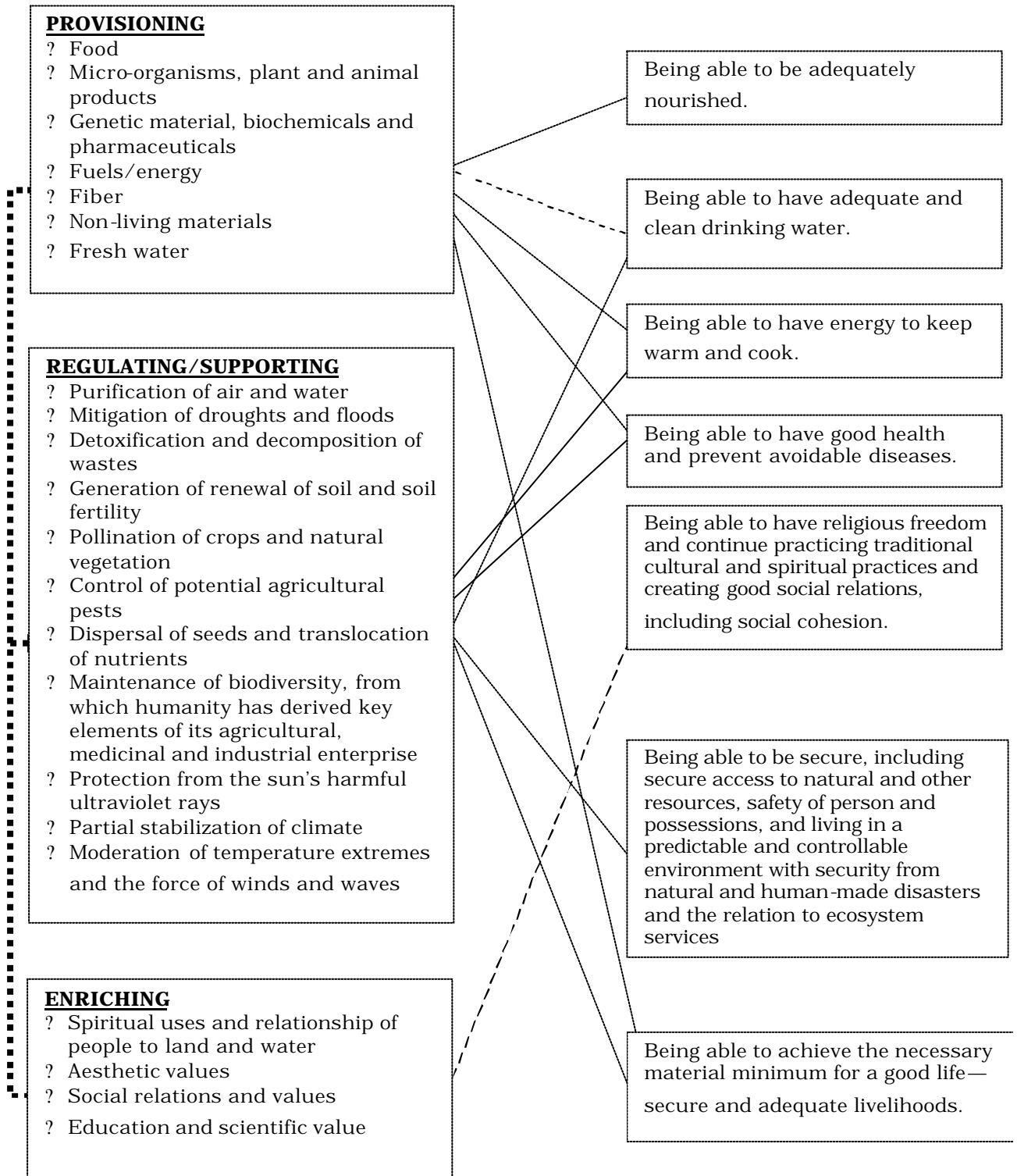
Being able to be adequately nourished and its relation to Ecosystem Services

The ability of individuals living in drylands to be able to be adequately nourished depends on their ability to be able to:

- ✍ grow the food themselves; and/or;
- ✍ purchase the food; and/or;
- ✍ collect food from the natural ecosystem.

Many rural households in developing countries rely quite heavily on producing their own food (subsistence farming and pastoralism) and sourcing additional food products from the wild. In fact many societies rely on the biodiversity of wild foods to achieve a balanced diet (Gujit et al. 1995). Antzen documents the use of wild plants (morogo, berries, monkey orange) by local communities in the Sand veld of the Kalahari for food (Arntzen 1998)

FIGURE 1: LINKS AMONG CONSTITUENTS OF WELL-BEING AND ECOSYSTEM SERVICES IN DRYLANDS.



Ecosystems offer many food products that have been staple diets of habitants living in these ecosystems. In fact, many of these food products are now being considered “health foods” in commercial food markets. Examples range from lentils, Faba beans (the poor person’s meat), and chick peas. However, clearing land for commercial production of agricultural crops reduces the source of these indigenous food crops. This has removed a staple and sustainable food source that has acted as a buffer during times of distress. Although the trend toward commercialization may have created a source of income and food, the main problem has been that the benefits have only accrued to a minority while the majority has been excluded from reaping the benefits of these new sources of economic opportunities.

Another impact of clearing land for commercial agricultural activities has been the removal of soil cover. Removing native vegetation leads to a rapid removal of soil cover inadvertently leading to soil erosion and a loss of the regulating function of nutrient recycling and protection against soil erosion and nutrient loss. Although some loss of soil is unavoidable, it is important to ensure that the trade-off between the benefits of the commercialization process and the costs of loss in some of the regulating services are weighed and analyzed before final decisions are adopted.

Being able to have adequate and clean drinking water and its relation to Ecosystem Services

Water is a critical resource and its scarcity makes it a valuable commodity. Ecosystems are usually perceived by many as very homogenous landscapes, but this is far from the truth. There are critical hotspots within ecosystems—wetlands, rivers, lakes, and water catchments—resources that habitants depend on for their water supply.

The ability to have adequate and clean water for drinking and other social needs like bathing depends on their ability to be able to:

- ✍ buy water in the private market;
- ✍ have access to water provided by the public sector;
- ✍ get water by themselves directly from surface water or groundwater systems;
- ✍ harvest rain water.

The viability of commercial agriculture and livestock is dependant on a secure and adequate water supply. This, in turn, sets up competition with the demands for social purposes. If stakeholders, especially the poor, have to purchase water in a private market, they may have to compete with commercial demands which may eventually lead to exclusion. Provisioning of water by the public sector in drylands is usually confined to urban centers. Even then, the availability of piped water for the poor who normally live in the slums is limited and, when available, the time spent waiting to collect water at public water points becomes long and tedious.

For the rural dwellers the picture is bleaker. The provision of water by the public sector is nearly absent and inhabitants have to either lay down tube wells to get ground water, get water from surface water, or harvest rain water. The appropriation and use of ground and surface water in many dryland areas in developing countries was traditionally determined through communal rules developed by the respective communities. However, liberalization of markets in developing countries has put pressure on many of the communal institutions overseeing the distribution of water rights. The commercial and small elite groups have been able to appropriate the rights to water which have in turn excluded the impoverished from these traditional supplies of water.

The privatization of water in the drylands is in many ways driven by the distinction between the equilibrium and non-equilibrium theories surrounding ecosystems and the “hotspots”. Proponents of the non-equilibrium suggest that private rights are not the best suited tenure arrangements but agree that in the hot spots that are characterized more by equilibrium conditions, private rights could be used. This has led to privatization of water supplies that are primarily in the equilibrium spots with little recognition that people living in the non-equilibrium areas also depend on the hot spots for their capabilities. This privatization has basically excluded them from these supplies of water, especially during times of stress. A typical example is the experience Maasai pastoralists face now during droughts when they are excluded from the water resources in the uplands—their traditional water sources in the past—which have now all been all privatized (Amman and Duraiappah forthcoming).

Being able to have energy to keep warm and to cook and its relation to Ecosystem Services

The ability to have energy to keep warm and to cook depends on availability and access to:

- ✍ fuelwood;
- ✍ energy from the public sector like electricity from the grid or off-grid;
- ✍ alternative sources of fuel.

Biomass, especially firewood, is the main source of energy. There was for a while, a belief that fuelwood collection was the primary driving factor for excessive deforestation in drylands. New studies have shown that collecting firewood by the poor for cooking and, to a lesser extent, for warmth during winter months is not the main cause of deforestation. Instead, land-clearing for urbanization or commercial/economic activities like agriculture have been a bigger factor (Duraiappah 1998). The dwindling stock of fuelwood, and other traditional sources of energy, has left the poor with very few choices.

Efforts by governments to introduce new or alternative forms of fuel to meet energy needs have produced marginal results. One of the main reasons has been a lack of effective policies with the poor not being able to take advantage of the new fuels. Poor infrastructure in rural drylands also makes transportation of alternate fuels expensive and this expense makes buying fuel difficult and sometimes impossible for the poor. There have been recent trends in providing off-the grid electricity through alternative energy sources, for example, solar energy in drylands is a viable alternative. Now the challenge is to make solar energy more cost effective. It will also be important to look at the possible excess energy as an important income generator. If solar energy collectors in rural areas could transport stored energy to other areas with energy deficits this could be an excellent source of income.

Being able to have good health and its relation to Ecosystem Services

The ability to be healthy and prevent avoidable diseases depends on being able to:

- ✍ have access to the traditional medicines that drylands offer;
- ✍ have access to public health facilities;
- ✍ purchase medical services from private health facilities.

Ecosystems produce a variety of plants that have medicinal properties. Many people living in these ecosystems have been using these plants to maintain their health as well as to cure ailments and illnesses for centuries. The outright destruction and removal of these plants has resulted in rural populations losing access to this vital natural health system. No longer able to access natural sources of medicine, many of the poor have been forced to turn to modern health facilities. With no other alternative, this may not have been too much of a problem if these health facilities were efficient and effective in providing the health care the poor needed. Unfortunately, in many instances, the facilities are poorly managed and as the “Voices of the poor” study will attest, the poor feel disenfranchised when visiting these health facilities (World Bank 1999). Coupled with few choices, and with a health system they do not trust, the recent trend towards privatization of health facilities has put yet another barrier for the poor to access, and to use, health facilities.

Being able to have religious freedom and continue practicing traditional cultural and spiritual practices and creating good social relations, including social cohesion.

There is really no substitute for religious and cultural values. In spite of the modern economic liberalization, sacred groves have and will continue to play an important role in the spiritual dimension of human well-being. Sacred groves are one example – seeing a herd of cattle migrating through the landscape may have high esthetical maybe even spiritual value for a pastoralist. Religious festivals also provide an avenue for people to enjoy and forget about the hardships they face in their daily lives. They offer a place of solitude, a place to escape from reality and also a place where disputes and conflicts are resolved. Gods and idols that are believed to reside in sacred areas also play a very important role in people’s lives. When migrants enter into a new area, they do not often have the same affiliation with these sacred areas and they may break traditional rules on usage of these areas. Through any means, destroying these areas destroys the symbols and the social fabric that holds these communities together—and when the social capital that binds communities together is broken, conflict is often a result.

Being able to gain the necessary material minimum for a good life— secure and adequate livelihoods.

There are a number of ways people can achieve the necessary material minimum for a good life in rural areas. They can either:

- ✍ convert all resources into commercial agricultural activities;
- ✍ use their land for eco-tourism;
- ✍ carry out traditional livelihood activities like pastoralism and a combination of subsistence and cash crop agriculture;
- ✍ become paid labour;
- ✍ undertake a combination of paid labour and work on their ‘own’ land;
- ✍ find new markets for the regulating services drylands offer (e.g. carbon sequestration that can be used in CDM (Clean Development Mechanism) credits);
- ✍ engage in off-farm activities and Small Medium Enterprises (SME);
- ✍ use any combination of, or all of, the above strategies.

Livelihoods are sustained by the provisioning service ecosystems provide. In order to secure livelihoods, it is imperative that the flow of the provisioning service be maintained. This is, in turn, highly dependent on the regulating and supporting services ecosystems provide. The challenge for an ecosystem management regime is to decide the rate of harvesting and to ensure that individual rates of harvest do not have an impact on the regulating service that is necessary for ensuring security of the livelihood. In ecosystems, the focus needs to be redirected toward protective security issues relating to drought and flood preparedness and mitigation, mobility of habitants, conflict resolution and ensuring equitable and fair access to scarce resources like water, grazing land and land in general.

An emerging market for the regulating service of carbon sequestering provides an option that people may use as an income generating activity. The ownership and distribution of the credits from selling the carbon credits are issues that need to be carefully addressed. Effectively achieving carbon sequestering would require a lot of land, it would be difficult to verify, and there would probably need to be some sort of contracts made with communities, but still the impacts may not be pro-poor (see Petra Tschakert’s work in Senegal). It is one option that needs to be discovered and discussed carefully with local communities and not imposed upon them from the top.

The social and ecological complexity of ecosystems needs to be taken into account when looking for new income generating options for the people living there.

Being able to be secure and having a sense of security, including secure access to natural and other resources, living in a predictable and controllable environment with security from natural and human-made disasters, safety of person and possessions and its relation to Ecosystem Services.

Security is a major constituent for human well-being. To be able to reduce vulnerability to extreme events like a drought is a capability people value. There are a number of ways to reduce the degree of vulnerability and improve personal resilience. The ability to have security of natural resources and to respond to, adapt to, and cope with extreme events depends on the ability of local communities to:

- ✍ maintain buffers in the ecosystem so that they can be used during times of distress. This involves a communal effort in order to reduce the cost of extreme event insurance;
- ✍ set aside critical inputs needed in order to allow the system to rebound after an extreme event. This will imply setting up security mechanisms like seed banks, food banks, and water banks;
- ✍ have access to and control over buffer grazing lands (for pastoralists) that have not been encroached on by other users. The other users would also need to be able to have access to suitable buffer lands for their sustaining activities, ensuring that this does not cause conflict among these strategies for coping.

The integrity of the regulating and support services provided by ecosystems must be kept intact. The use, and maintenance, of buffers is a strategy in the drylands that attempts to retain the integrity of regulating and support services, further emphasizing the importance of these ecosystem services to the livelihoods of rural populations. The degree of regulating and support services available determines the rate of provisioning service apportioned to stakeholders. However, if this rate exceeds the regenerating rate of the ecosystem there will be a loss of function and resultant land degradation. The regulating and supporting services not only act as buffers during times of distress, but also determine the rate of regeneration of the ecosystem and the future rate of provisioning that the ecosystem can offer.

There is a close relationship between many of the constituents of well-being and the provisioning, regulating and enriching components of ecosystems and a high degree of interdependency and synergy among the constituents of well-being with each other (see Figure 1).

For example, being adequately nourished undoubtedly contributes toward the capability of being healthy which in turn is needed for the capability to earn a livelihood.

We know that the provisioning service of ecosystems is highly influenced by the regulating/supporting services. Over-use, mis-use or excessive conversion of ecosystems into human or artificial systems damages regulating/supporting services which in turn reduces the flow of provisioning services that ecosystems can provide. We also know the close linkages that constituents of well-being or capabilities have with ecosystem services and that the nature of these relationships differs across individuals and/or groups of individuals. These three observations point toward a complex environment having a high probability of conflicts occurring between individuals and/or groups of individuals.

Challenges

Exclusionary practices—intentional or not—by the ‘non-poor’ prevent the poor from having access to services offered by ecosystems. For example, water rights are often granted to commercial operations drawing income into an area without measuring the affect of this extraction. The result is that the inhabitants of that same area have access to less water and the poor are deprived of this basic right. Clearly, some groups have not been able to take advantage of the new economic regimes of liberalization, privatization and globalization. Some of the main drivers enabling this inequality are:

- ✍ institutional² failure;
- ✍ lack of appropriate instruments;
- ✍ inefficient and corrupt government agencies;
- ✍ lack of information, participation and involvement by the poor in decision-making;
- ✍ lack of economic facilities;
- ✍ lack of social opportunities like safety nets;
- ✍ gender-based exclusion;
- ✍ lack of ecological security in terms of protection from adverse events;
- ✍ mistrust of bureaucracies and formal institutions due to lack of transparency concerning common property resources and the equitable transfer of rights during privatization.

By focusing directly on enhancing capabilities and reducing capability-deprivation, the process of analyzing the linkages between drylands ecosystems and poverty reduction can now be seen in an adequately broader way; looking at both “the constructive prospects as well as destructive possibilities”. Some examples of the constructive dimensions include participation in decision making, transparency in access to ecosystem services and fairness in the use of ecosystem services. Similarly, examples of destructive possibilities range from exclusion of some groups by others in the access to ecosystem services and the inability of markets to address issues of fairness and justice in access to ecosystem services.

² Women and Human Development. M. Nussbaum. 2000

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