Sustentabilidade em Debate

Scaling up and Sustainability: the experience of rural India

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RESUMO

Desde a sua gênese como um conceito essencialmente ecológico, a noção de sustentabilidade já percorreu um longo caminho, abrangendo múltiplas dimensões, como a cultural, a social e a econômica. A ênfase moderna na eficiência, no lucro e produtividade constitui uma ameaça às diferentes esferas da sustentabilidade. Este artigo apresenta visões sobre os conflitos entre intensificação e sustentabilidade no setor agrícola, na Índia. Usando uma representação gráfica da sustentabilidade, o trabalho ilustra os conflitos que são criados quando há intensificação de uma dimensão. Esta ferramenta gráfica é usada para ilustrar a consequência da intensificação sobre a sustentabilidade global, no contexto da Índia rural. O texto sugere abordagens alternativas e mais sustentáveis para assegurar os padrões de vida dos pobres no meio rural.

Keywords: sustainability, rural India, agriculture, scaling up, multidimensional

ABSTRACT

From its genesis as a primarily ecological concept, the notion of sustainability has come a long way to encompass multiple dimensions, including cultural, social and economic. The modern-day emphasis on efficiency, profits and scaling up has posed threats to the multiple realms of sustainability. This paper provides insights into the conflicts between scaling up and sustainability in the agricultural sector in India. Using a graphical representation of sustainability, the paper illustrates the conflicts that are created when there is scaling up of one dimension. This graphical tool is used to illustrate the consequence of scaling up on overall sustainability in the context of rural India. It suggests alternative and more sustainable approaches to secure the livelihoods of the rural poor.

1. Introduction

Till recently, 'sustainability' pertained largely to 'ecological' or environmental sustainability, amidst evolving socio-economic systems within natural habitat ecosystems. For instance, modern hunting practices were deemed unsustainable with respect to species existence. However, more recently, the concept of sustainability has evolved beyond its ecological origins and now encompasses multiple realms, including cultural and economic dimensions, adapting itself to the various objectives of the economy, environment and society (Tisdell, 1991). In its transformation into a multidimensional concept, sustainability has gradually become a 'bridging concept' between the natural and social sciences (Paehlke, 2005). 'Sustainable development', as a concept, has been described as a 'contested discursive field' providing an interface for the simultaneous articulation of political, economic, social and environmental concerns (Becker *et al.* 1999).

When an integrated seamless social-ecological system seems to be the emerging reality and sustainability can no longer be isolated to one sphere, the challenge becomes one of identifying the multiple spheres that together define sustainability and of locating and choosing from the sustainable options. Apart from the challenge of identifying and analysing the multiple dimensions of the individual system components that comprise sustainability, there is also the issue of the inherent conflicts and trade-offs that exist between dimensions. This conflict is exacerbated when it is accompanied by forces of 'scaling-up' or expansion in one or more dimension(s).

This essay looks at the conflicts (and overlaps) between different systems in a holistic sustainability perspective, with particular focus on agriculture and rural India, in the context of a societal trend towards economic scaling up. The consequence that scaling up has on sustainability is illustrated using a simple graphical framework. We use this framework to illustrate how scaling up, pursued in different ways, can either limit or expand sustainability options. In this context, we focus on the sustainability, (in terms of individual dimensions as well as overall), of rural small farming households in the face of multiple pressures of scaling up. However, though we do not explicitly address temporal dimensions of sustainability, by focusing on the ability to continue into the future, this definition retains the temporal element that forms the essence of the popular definition of sustainable development as provided by the Brundtland Commission (WCED, 1987).

In the next section, we discuss the notion of multidimensional sustainability or 'whole sustainability' (Sachs, 1999) and the meaning of 'scaling up'. This is followed by a discussion introducing the methodology we use to illustrate the concept of multidimensional sustainability and the implications of scaling up. Drawing on this framework, the next section discusses some real-world instances of scaling up, with particular focus on its impact on overall sustainability in rural context. Finally, we conclude with a discussion on alternative approaches that can promote sustainable development.

2. Multidimensional Sustainability and Scaling Up

The notion of sustainability, as it is understood today, has its origins in the environmental revolution of the 1960s (Sachs, 1999). This revolution, accompanied by the growing recognition of the limits of notions such as 'development' and 'growth' (Meadows *et al.,* 1972, Becker *et al.*, 1999), propelled the emergence of an alternative

conceptualisation of progress, represented by 'sustainability' and 'sustainable development'. Having its roots in various disciplines including ecological, social and institutional, it was natural that the concept emerged with an inherent multidisciplinary approach. As Sachs (1999) described, in so far as development is a "multidimensional open-ended processual construct", sustainable development or sustainability implied *multidimensional* sustainability.

Identifying the dimensions that define sustainability continues and will continue to be a challenge akin to the dilemma faced in the poverty literature –i.e. if poverty is interpreted as multidimensional, what are the relevant dimensions of poverty and is there an acceptable hierarchy across these dimensions? In a similar vein, the identification of dimensions of sustainability in the context of a merged composite system poses a challenge. As ecological, social and economic systems merge and intertwine with each other in a seamless global system, so too have the corresponding dimensions of sustainability. Increasingly, progressively lesser space on the globe remain as pure one-dimensional systems. In identifying dimensions, besides the ecological/environmental dimension that it began with, sustainability has come to encompass dimensions relating to social and economic viability. Moreover, in the same context, one is required to make an assessment of whether there exists a hierarchy between dimensions. According to some authors, sustainability is perceived as having an implicit hierarchy whereby economic processes were subordinate to ecological and social aspects (Becker *et al.*, 1999).

In the ecological dimension, sustainability is interpreted as the future viability of a given ecosystem. In the social or cultural dimension, 'sustainability' is seen as the endurance or continuation of 'cultures' or social systems particularly in the context of a globalizing profit-led market. Thus we hear about 'agrarian cultures' transforming into 'agribusinesses', compromising food sovereignty and diversity thereby undermining sustainability. In the public domain, notions of sustainable lifestyles and the increasingly materialistic nature of economic activities have come to the fore in the face of diminishing resources.

Empirical applications of the concept of sustainability have largely manifested in the development of indicators or indices capturing sustainability of one or a combination of dimensions. In the ecological dimension, there have been several attempts at measuring and representing sustainability including 'ecological footprint' (Wackernagal *et al.*, 1996), 'environmental sustainability index' (Esty *et al.*, 2005)) among others. Indicators that combine two or more dimensions to provide an index or framework for examining multi-dimensional sustainability have also been developed - combining ecological-social (Azar *et al.,*1996), and combining ecological-economic-social Sustainable Livelihood Security index (Saleth, 1997).

The multidisciplinary and cross-cutting nature of sustainability deems it necessary for the concept to be 'place-based' (Wilbanks 2007) if it is to be feasible. As the manner in which sustainability is construed differs across the scales at which it operates (Costanza, 1991), the notion and definition of sustainability is crucially dependent on the scale at which it is viewed from. Though, in theory, scale can be viewed as a continuum between micro to macro, in reality, processes and activities tend to cluster at some levels giving the scale spectrum a certain kind of lumpiness (Wilbanks, 2007). Scale may be geographical, clustering around the local, the regional the global or it may be temporal, ranging from the short, to medium to long term. At the global level, for instan-

ce, overall sustainability would imply sustainability of the global environment and the global economic system. Viewed from a more disaggregate local, household level, overall sustainability would refer to the sustainability of the household's cultural and social activities, as well as its economic lifestyle and patterns of consumption. Therefore, sustainability can be interpreted differently at different scales (Wilbanks, 2007) and definitions of sustainability and its dimensions must specify the scales at which they operate in order to be meaningful. Some of the indicators of sustainability that have been developed are scale-specific and can be used only at a given scale in a specified context (example, land use sustainability (Walter et al 2009), farm level sustainability (Gameda *et al.*, 1997; Calker *et al.*, 2006), whereas others are more generic and have been applied at different scales such as the Impact Population Affluence Technology (IPAT) formula (Herlich *et al.*, 1971).

We interpret *sustainability* (in any dimension), at a given scale, as the ability of that dimension to sustain its efficient functioning into the future. The '*scale*' of a dimension of sustainability can be defined as its size, in terms of its functions, relative to the ecosystem[1] within which it is located (akin to the mainstream idea of 'scale' as being the physical size of the economy relative to the ecosystem (Malghan, 2010)). For example, economic scale would refer to the extent of functions of the economic dimension, namely economic activities, relative to the ecosystem. Similarly, ecological scale would refer to the relative size of ecological functions, i.e. ecosystem services, provided. '*Scaling up*' of a dimension refers to an increase in the relative size of that dimension, which is essentially an increase in the functions of that dimensions, assuming the size of the ecosystem remains fixed. Therefore economic scaling up would indicate a relative increase in economic activities, ecological scaling up would indicate greater provision of ecosystem services and so on. In this paper, the concept of sustainability has been restricted, in terms of scale, to the context of sustainability of rural small-scale farming households.

3. Methodology

As the previous discussion illustrated, multidimensionality is an inherent aspect of sustainability. According to Sachs (1999), if a 'whole development approach' is adopted, then sustainability should extent to the social, ecological, economic and political dimensions. Sustainability may be achieved in each of the dimensions – 'partial sustainability', and this would be a necessary prerequisite for overall sustainability to be achieved.

If multidimensionality is accepted, then the accompanying issue is that there exists inherent conflicts and trade-offs between dimensions of sustainability (Hediger, 1999). The most noticeable of these conflicts has been that between the economic and ecological dimension. A theoretical representation of the dimensions of sustainability defining overall sustainability/sustainability space and the conflicts between realms of sustainability can be illustrated using a graphical representation in the two-dimension space.

Consider two dimensions of sustainability in the context of agriculture: an environmental indicator, water quality; and an economic indicator, agricultural output. Each dimension has a threshold level of functioning. As much as there is 'vagueness' in identifying the dimensions of sustainability (akin to 'horizontal vagueness' in multidimensional poverty literature (Qizilbash, 2003)) there is also ambiguity surrounding the choice of threshold level within each dimension of sustainability (vertical vagueness). However, it is reasonable to assume that, with suitable scientific and/or socio-eco-

nomic backing, the value of thresholds, for most dimensions of sustainability, can be determined at some absolute level or over a suitable range. These dimension specific criteria/threshold would ensure that partial sustainability is met in each dimension. For example, water quality will need to be maintained at particular levels of specified pre-defined parameters to ensure that it meets the minimum needs of the environment and the population. Similarly, agricultural output (representing the economic dimension) will need to be sustained at a minimum level to meet the needs of the population at a given time. Using this two-dimensional sustainability framework, we can understand the potential conflicts between (economic) scaling up and sustainability. 'Scaling up', defined as a relative increase in the functioning of a dimension can be interpreted in the context of this graph as a shift in the outward frontier. It is the nature of the shift that determines the sustainability of scaling up. Figure 2,3& 4 depict different types of scaling up.

Given the threshold level for each dimension and the trade-off involved in expanding the scale of functioning of any one dimension, the level of production and corresponding level of water quality which can be attained is confined to a triangular space denoted as 'sustainability space' in the figure below.

In figure 2, scaling up involves an expansion in the functioning of one dimension (in this case, economic). However, this is attained without compromising on achievable water quality. Sustainable intensification of agricultural production (Pretty, 2000) or regenerative organic agriculture (LaSalle *et al.*, 2008) offer one type of scaling up that can initiate the expansion of the sustainability space by increasing agricultural productivity within the water quality threshold (from triangle *abc* to *a'bc'*).

In figure 3 scaling up has enhanced the level of functioning of both dimensions, increasing the sustainability space unambiguously. Technologi-

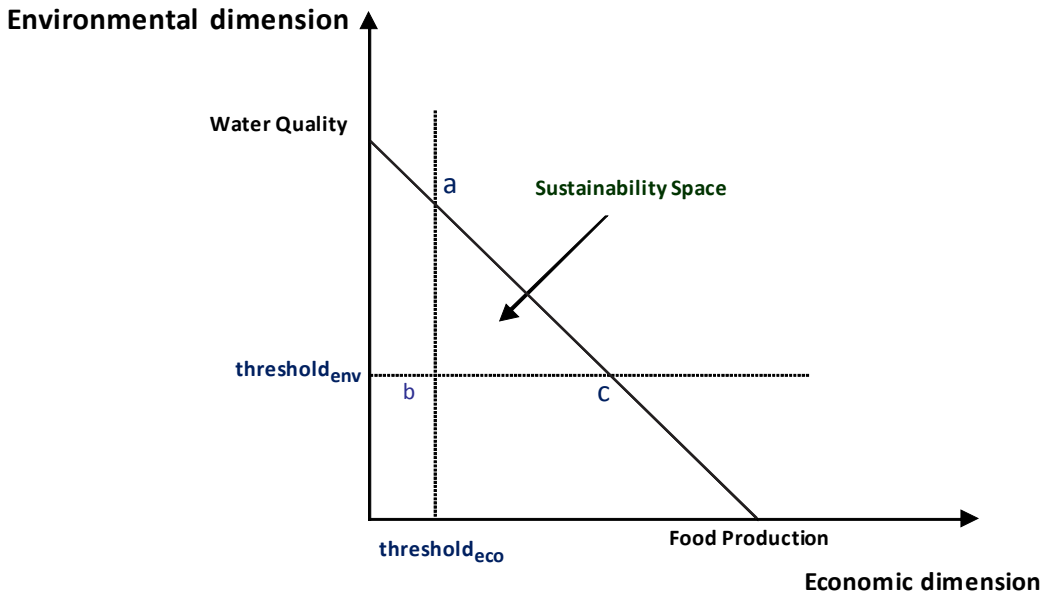

Figure 1: Sustainability Space
Source: *Adapted from Verburg et al. (2003)*

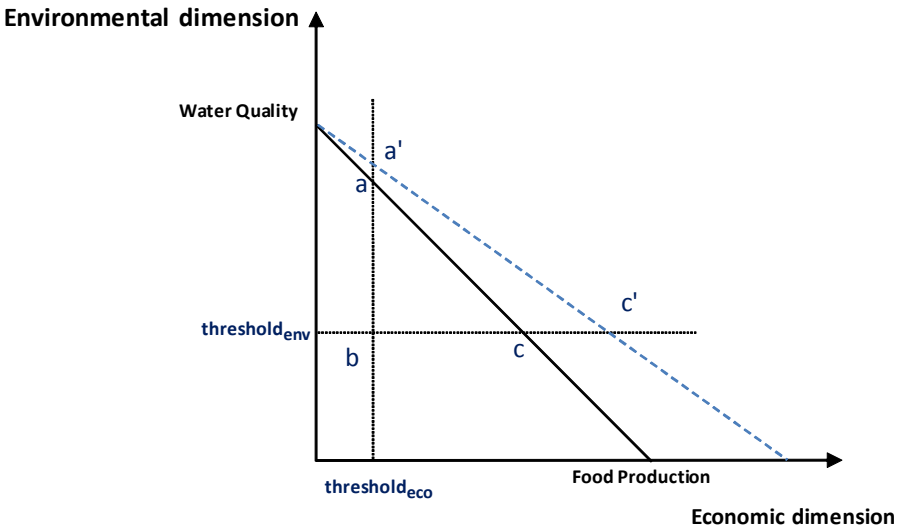

Figure 2: Scaling up of one dimension without trade off

cal improvements that achieve sustainable food production with better water quality may be a probable instance of such a shift.

In Figure 4a, the scaling up of the economic dimension has resulted in a 'scaling down' of the environmental dimension, as maximum achievable levels of water quality falls . However, with regard to sustainability, the implication is a change in the sustainability space from triangle *abc* to *a´bc*[1]. The case of uni-dimensional scaling up represented by Figure 4b is different. The scaling up of the econo-

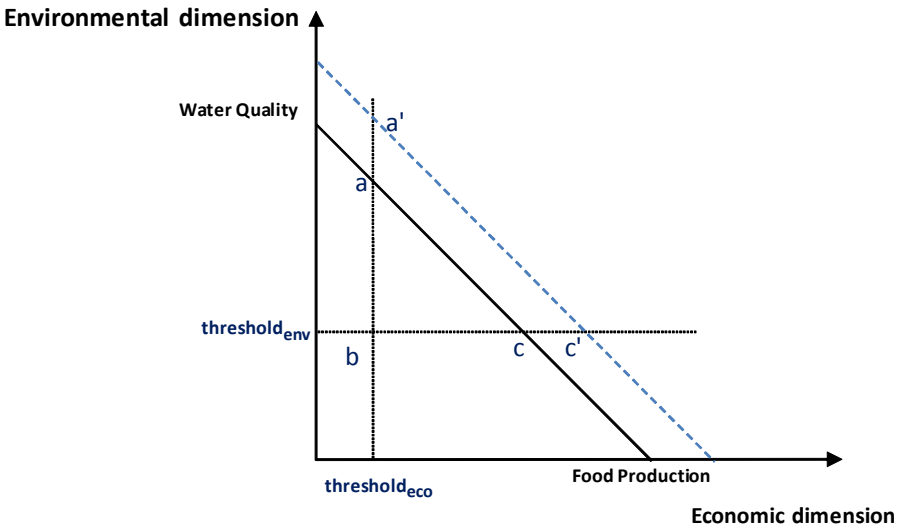

Figure 3: Scaling up of both dimensions without trade off

mic dimension compromises water quality to such an extent that it can no longer meet the threshold requirements. Effectively, this implies the complete loss of a sustainability space (since ensuring partial sustainability is a prerequisite for achieving whole or multi dimensional sustainability). This loss of

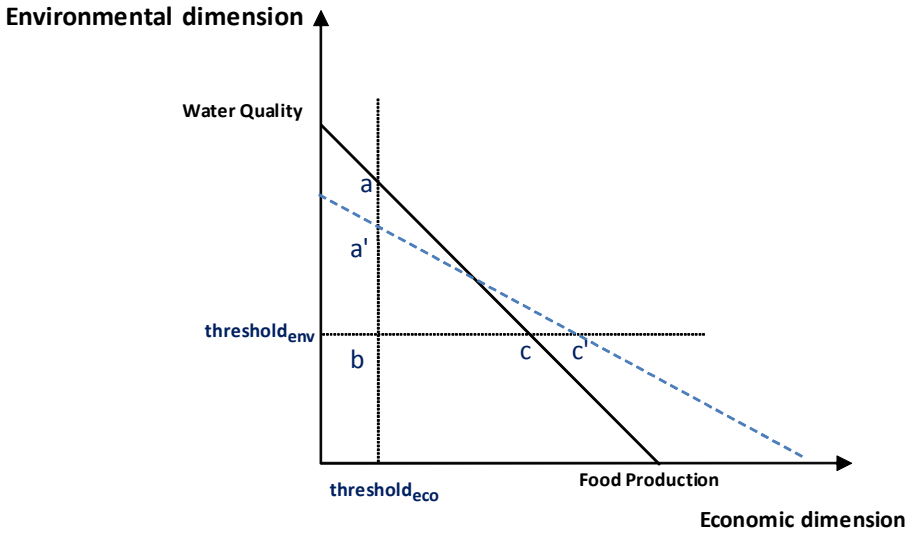

Figure 4a: One-dimensional scaling up and partial trade off

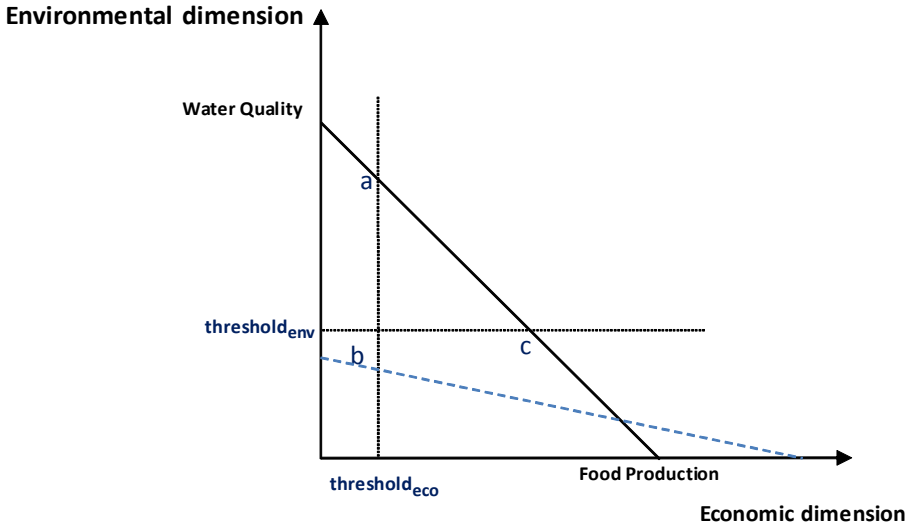

Figure 4b: One-dimensional scaling up and complete trade off

sustainable options as a result of scaling up is commonly witnessed in the real world. Such a conflict may be envisaged for other combinations of dimensions such as social-economic, or institutional-social. Resilience theory implies that there will be large trade-offs if we want to regain some options favouring sustainability once the thresholds are breached (Walket *et al.,* 2004).

If the above representation across two dimensions of sustainability is extended to include more dimensions of sustainability, we can visualise an n-dimensional sustainability context. Other dimensions may include political, social and institutional[2]. As the number of axes (representing each dimension) increases, more thresholds are introduced and subsequently, the sustainability space shrinks. Thus,

with 'scaling up' of any of the multiple dimensions, the sustainability space is affected and hence, also the options for sustainable development.

In the following section, using the framework described above, we explain how 'scaling up' as it has been pursued hitherto has effectively reduced the sustainability space or sustainable development options. The nature of scaling up and its implications for the scope to move towards sustainable development are examined in the following sections in the context of recent changes in agricultural sector in rural India.

4. Scaling Up and Sustainable Development

Across the developing world, efficiency, networking and scaling up seem to be the popular mantra. Profits are no longer finite nor is profit-seeking considered taboo as a goal in itself. 'Scaling up' has been deemed as the natural progression for any economic activity. Coupled with a growing population and increasing demands for food, and more recently, biofuels, the agricultural sector has witnessed tremendous scaling up in the last century. However, scaling up of agriculture brings with it threats to the sustainability of the sector across several dimensions – ecological, economic and cultural[1]. Moreover, there arises a conflict across the realms of sustainability with each dimension competing with the other. Exemplified here is the fact that any intervention with the intention of economic scaling up could potentially bring with it an inherent threat to multidimensional or whole sustainability. Rural India has witnessed scaling up in the form of (i) expansion of agriculture promoted by policies (e.g., the grow-more-food campaign (Barker *et al.,* 1985)) and (ii) 'scaling up' of consumption through the activities of corporate enterprises. Section 4.1 describes scaling up via agricultural policy. Section 4.1.1 provides a contextual background on the current status of agriculture in rural India. The consequences of scaling up on overall sustainability, is examined in the next section (4.1.2) using the framework discussed above. Section 4.2 discusses the consequences of consumption scaling up in rural India.

4.1 Rural India: Scaling Up and Sustainability

Rural India with its predominantly agricultural landscape presents a scenario where the conflicts between sustainability and scaling up are particularly apparent. There has been an increasing emphasis on productivity and output (partly as a result of the growing population and increasing demand, and partly due to the overall trend towards economic 'scaling up' in the global world).The following section highlights the predicament of agriculture in developing India and the challenges to its overall sustainability, given the emphasis on economic scaling up and enhancing short term agricultural productivity.

4.1.1 Agrarian Situation in India

India's investment in agriculture has been huge, though declining in the post 1991 economic reform period. This investment has mostly been in research, development (R&D) and irrigation. In 1993, government expenditure on agriculture was approximately Rs. 8072 million (in 1960/60 prices) which accounted for almost ten percent of total expenditure (Fan *et al.*, 2007). Meanwhile, the sector's contribution to the nation's GDP dipped from 34.7% in 1980 to 21.7% in 2004 and to 17.8% in 2008 (Planning Commission, 2011). Nevertheless, about 60% of India's land is still under agriculture and 78 % of the population depend on it for their livelihoods, inclu-

ding landless labourers who work in the sector. Nearly 80% of the land-owning population in the sector possess less than two hectares of land, and contribute over 40% of the country's food production (Fan *et al.*, 2007). Irrespective of its declining contribution to GDP and large but declining public investment, agriculture remains the most important sector to Indians in general. This large societal dependence on a sector of low economic status has contributed to widespread disparities in living standards manifested in the consequent public discourse in Indian society (Pradhan *et al.*, 2000; Dev, 2000)..

Historically, compared to other developing economies, India has had relatively smaller agricultural land-holdings. Crop-animal systems were common and varied across different agro-ecological zones of the country. Mixed farming with intercropping and animal tending was considered the backbone of small and marginal rain-fed agriculture (Jodha, 1980). Within such a diverse but small scale system, the crop component mainly comprised of food crops catering to diverse nutrient needs. This along with animal components of the system ensured relatively balanced nutrition and quality manual labour (Shiva, 1992; Kothari, 1994). Current trends in cropping patterns as well as consumption patterns reveal a tendency towards reduced diversity in both cultivation and consumption (Table 1&2). The cultivation of coarse cereals has fallen over the years (table 1). This has been accompanied by a fall in consumption of these coarse cereals – bajra, ragi, jowar, gram rajma (table 2), despite their relatively better nutritional content compared to popularised grain crops like wheat and rice (table 3).

Between mid-1950s and 1990s, despite rural India witnessing a two-fold increase in the number of households, the number of landless households declined significantly in the same period. The simultaneous decline in the number of large farms and the growth in number of small farms in the same period indicate a greater subdivision of large holdings (Fan *et al.*, 2005). Clearly, the trend in Indian agriculture with regard to size of landholdings has not been towards conventional scaling up.

4.1.2 State Policies, Scaling up and Small Farming

But development policies in the agricultural sector did not take cognisance of the trend on the ground and consequently have greatly threatened the viability of these small-scale farming en-

Table 1: Change in Cropping Pattern
(thousand hectares)

	Bajra	Ragi	Jowar	Gram	Rice	Wheat
1950-60	11,119	2,353	17,174	8,856	31,670	11,575
1960-70	11,929	2,439	17,970	8,460	35,606	13,969
1970-80	11,885	2,518	16,393	7,634	38,632	19,978
1980-1990	11,197	2,403	16,166	6,986	40,565	23,270
1990-2000	10,036	1,936	11,814	6,977	43,333	25,613
2000-2002	10,034	1,783	9,867	5,894	44,827	26,092

Source: Directorate of Economics and Statistics, Ministry of Agriculture.

Table 2: Change in consumption pattern
(% share in total cereal consumption)

	1954	1977	1983
Rice	25	-	48.1*
Wheat	2	16.1	27.41
Coarse Cereals**	73	45.64	41.37

*for 1989; ** coarse cereals include jowar, bajra, maize, ragi, barley, small millets and gram
Source: Suryanaryana 1997

Table 3: Nutritional Content of Different Food Crops
(per 100 gm of edible portion)

	Protein (gm)	Minerals (gm)	Ca (mg)	Fe (gm)
Bajra	11.6	2.3	42	5
Ragi	7.3	2.7	344	6.4
Jowar	10.4	1.6	25	5.8
Bengal Gram	17.1	3.6	202	10.2
Green Gram	24	3.5	124	7.3
Rajma	22.9	3.2	260	5.8
Wheat	11.8	0.6	23	2.5
Rice	6.8	0.6	10	3.1

Source: Shiva, 1992.

terprises. Though some of the threat was inadvertent, attributable to the lack of a holistic approach in agricultural policies, the global trend towards commercialisation, intensification and scaling up have also greatly influenced contemporary agricultural policy in India. Many of these tendencies are manifested in the 'green revolution' wave that originated in the sixties.[1]

The thrust on policies for agriculture has been of three predominant types – a) the promotion of market-derived synthetic inputs b) skewed access to credit in favour of large-scale units; and c) land reform policies, that have (ironically) threatened the viability of small farmers.

Agricultural policy in India has promoted the usage of synthetic marketed inputs (chemical pesticides, fertilizers and power, see figure 5) and mechanisation in farming. Extension of irrigation facilities and popularisation of bore-wells may have increased productivity in the short term, but have also depleted groundwater reserves in many states (Chandrakant *et al.*, 1990; Purushothaman *et al.*, 2011). Moreover, modern agricultural policies with its focus on short-run profit maximisation and intensive use of external inputs have inadvertently eroded practices that were suitable to the local socio-ecological systems (Singh, 2000; Shiva, 1992) Agricultural policy as it evolved in independent India with its emphasis on superior cereals like rice and wheat also reduced agro-biodiversity (table 1) while increasing the market dependence of small farms (Kothari, 1994).

With regard to credit policy of the government, asset-based lending policies that require high collaterals and have high transaction costs have hampered the flow of credit to small scale farmers (Sarap, 2008). The fledgling crop insurance schemes in India charge high premiums and currently, for most marginal farmers, these insurance products remain unaffordable (NABARD, 2008). Access to credit in needed times, even in small amounts to buy seeds or manure (this need arose as a result of depletion of village commons that were source of green manure and cattle grazing), has been so limited that small farmers are often forced to lease out their land to big farmers or industries (FAO 2004). Though the farmers ought to be the stewards of their lands, under such lease/ contract farming, they usually have no say in the use and management of the land which is used for intensive cultivation that can deteriorate the soil, water and biomass base (Purushothaman, 2005). Despite the government embarking on a three-year 'doubling of agricultural credit policy' (DACP) in 2003-04, small and marginal farmers have not experienced significant increase in access to credit (Figure 6).

Moreover, a structural shift in the channels in which credit is disbursed has also compounded the credit bias favouring large-scale farmers. There has been a steady growth in scheduled commercial banks and a secular decline in cooperative banks. Co-operative banks, having the largest outreach at the grassroots level, this trend bodes unfavourably for financial inclusion of small and marginal farmers (Mehrotra 2011).

Finally, though land reforms in many states helped the landless people and addressed, to varying extents, the social objective of distributed land ownership, it also had unintended consequences for the viability of small farms. As common lands used by communities also got distributed, small farmers and those who were still landless were deprived of valuable biomass for

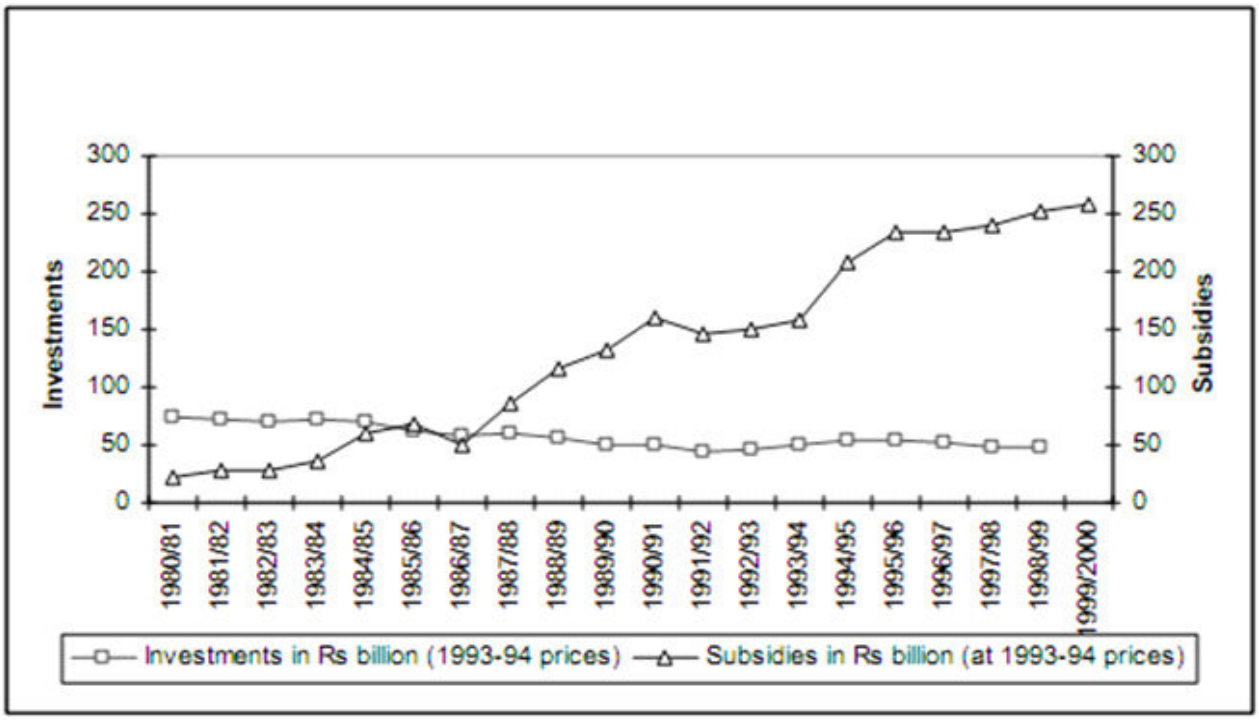

Figure 5: Input Subsidies (fertilizer, power, canal irrigation) and Public Investment in Agriculture (1980-2000)

Source: Fan et al, 2007

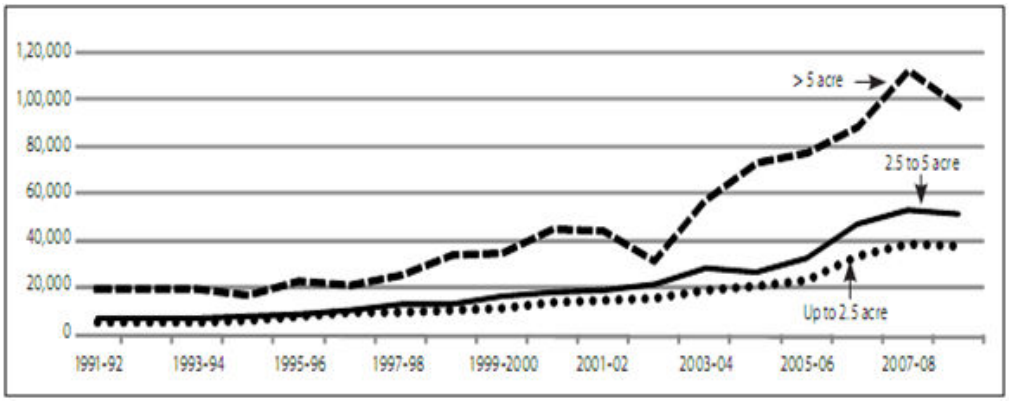

Figure 6 :Land size-wise credit (per account) disbursed by Commercial Banks (in Rs.)
Source: Mehrotra, 2011

fodder, fertilizer and fuel. Common lands in rural areas shrunk due to encroachments, acquisitions or allotments for corporate industrialisation and urbanisation. Livestock keeping which helped small farmers in many ways- as insurance for difficult times, as a source of manure, and as a source of protein for the family, suffered as a consequence. Vanishing pastures and introduction of hybrid cows brought out a visible change in the kind and size of livestock and farmyard manure available per farm (Jodha, 1986, Kumara *et al.*, 2006).

Viewed in terms of the framework introduced earlier, the impact of such policy interventions (that encourages one type of technology over another in the sole interest of increasing short-term productivity) on sustainability is represented by Figure 4b. Though the highest achievable level of production in the economic dimension has increased, this has been achieved at a drastic cost to the environmental dimension. The threshold functionings of the environmental dimension, not being met, has eliminated any options for sustainable development, removing the sustainability space in its entirety. Even if the impact on the environmental dimension were not as drastic (as in the case of Figure 4a where there continues to be some sustainability space/ options), if the erosion of cultural and institutional norms and the accompanying loss of ecological know-how were to be factored in as per their respective dimensions, then this could also lead to the complete loss of the sustainability space (as in Fig 4b, but in a three or more-dimensional space) leaving fewer or no options favouring sustainability. Thus we find shrinking or threatened sustainability space for agriculture as a productive system or a livelihood option.

4.3 Profits and Social Well being – Incompatible Bedfellows?

Besides agricultural policy, there have been other popular policy/profit-motivated interventions in rural India that have impacted overall livelihood sustainability. Over recent years, several corporate entities have begun to target rural consumers as a viable market for their produce. These efforts are ostensibly motivated by rural development but also clearly appeal to the profit-making objective of corporate entities. There are many who believe that social well-being and corporate interests can go hand in hand, without one competing with the other (Wilson *et al.*, 2006; Prahalad, 2005). Contemporary rural India presents a scenario where poverty is being tackled by extending consumer markets i.e. the short-run scaling up of consumption or per capita expenditure.

C. K. Prahalad's work (2005) drew on corporate success stories tapping the potential untapped market among the poor in Brazil, Mexico and India. He and others attempted to dispel the notion that the demographic that forms the 'BoP' (Bottom of the Pyramid, encompassing 80% of humanity who live on less that $2 a day) were victims of poverty entrenched in a life of misery and deprivation. Instead, these groups, in their opinion, ought to be viewed as a valuable untapped consumer market.

Big success stories in India with regard to this approach included business ventures like Nirma washing powder, Lifebouy soap, Annapurna salt and ICICI bank (Murch *et al*, 2003). The advantage of BOP based marketing is that it activates a vast, relatively untapped market, and also involves some socially responsible investment. However, in the many successful instances of corporate intervention in rural India cited by Friedman (1999), Prahalad (2005) and others, the overall impact on the BoP of merely increasing consumption cannot be overlooked. The corporate formula for poverty reduction, through access to consumer goods, though attractive at first glance, is riddled with multiple problems and may, in the long term, worsen the sustainability of rural lifestyles and livelihoods.

A typical rural village in today's India attests to these impacts. One is confronted with the waste and garbage of discarded packets, plastic sachets and polythene covers – a testimony to the corporate selling campaigns ostensibly posing as social welfare interventions. It did not matter that these people depended on a dirty, shallow water hole for potable water or on an occasionally flowing stream for bathing; but detergents, soaps and shampoos were in plenty. The garbage strewn across the countryside, besides destroying the natural environs has also impacted the local wildlife as well as domestic livestock which inadvertently consume these. Besides the "effluents of affluence" (Martinez-Alier, 1997) that privileged, materialistic mainstream lifestyles left suburban villages with, rural communities are now confronted with the growing problem of "effluents of the non-affluent" as well. By the time we gather momentum in clearing the bulging dustbins that are our cities, our country sides will be no more pristine landscapes while, in the meantime, both landscapes continue to be growing abodes of poverty.

If these interventions that focus on consumption scaling up also created a responsible long term producer, supplier or a prudent consumer out of the people at the BoP, then a scenario illustrated in Fig.3 may have been achieved. Otherwise, solely consumption-oriented initiatives fail to trigger any lasting change in the quality of rural livelihoods, and instead of creating a livelihood for the rural masses, it can create a lifestyle, which is unsustainable by any yardstick, whether economic, ecological or cultural. As studies have found, a large share of income that could potentially be used for education or healthcare is instead diverted towards purchasing non-essential goods including alcohol and tobacco (Subramanian *et al.,* 1996, Banerjee *et al,* 2007*)*, besides changes owing to influence of advertisements and the need to emulate urban consumers. Commercialisation and privatisation of commons also has impacted rural consumption patterns. The loss of common lands lead to reduction in livestock-keeping; consequently traditional milk products such as buttermilk and ghee become scarce. Similarly, deprivation of forest products and loss of biodiversity (e.g. wild varieties of spinach) have also impacted consumption adversely (Deaton *et al.,* 2009).

Thus rural consumption patterns reveal a steady decline in nutritional intake, accompanied by

an increase in consumption of non-food items. The change in diets has translated into a reduction in nutrient intakes as reflected in Table 4.

Moreover, the consumption expenditure amongst the rural poor is also extremely variable, indicating an inability to smoothen consumption over time (Jha, 2007). Moreover the prioritising of consumption expenditure has also unfortunately coincided with the lacklustre achievements in education and skill-building among the poor across all categories (of age, caste, place (rural and urban) and gender) (World Bank, 2004).

Now, examining the consumption-focused profit-motivated intervention using the graphical representation introduced earlier, such an intervention is essentially a scaling up of the consumption dimension (as represented by per capita expenditure) with no concern for the other dimensions including ecological or socio-cultural. The scaling up of the consumption dimension has been accompanied by the reduction in maximum sustainable outcomes in other dimensions, reducing overall sustainability space to the extent of eliminating it, as represented by Figure 4b. Social and cultural institutions are especially vulnerable to influences of consumerism (apart from ecological damage) and many have collapsed as a result of the multiple distractions of urban and market influences (Aldridge, 2003). If these dimensions are also accounted for, then the sustainability space would shrink even further.

Clearly, the kind of strategic innovations needed for the morphing of the economic pyramid into a diamond i.e. where the bulk of the population are middle class and either extremities of the income spectrum form a minority, requires much more than business acumen. The BoP type approach may in fact increase poverty as well as have other damaging consequences in other facets of rural life (Warnholz, 2007) The much-heralded frugality of the Indian population (Chakarvaty,1990) and the stability of the banking system (Arun *et al*., 2001; Sinha, 2011) will become a thing of the past and we may soon be caught in the trap of excessive credit-based spending, far beyond the capacity of our social-ecological systems. In the following section, we focus on some alternative strategies to bring about the transformation in rural landscapes.

5. Alternative Approaches

In the context of the graphical representation of trade-offs presented here, ideally, scaling

Table 4: Trends in Nutrient Intake in Rural India

	1975-79	1988-90	1996-97	2000-01	2004-05
Energy (Kcal)	2340	2283	2108	2255	1834
Protein (g)	62.9	61.8	53.7	58.7	49.4
Calcium (mg)	590	556	521	523	439
Iron (mg)	30.2	28.4	24.9	17.5	14.8
Vitamin A	257	294	300	242	257
Thiamin	1.6	1.5	1.2	1.4	1.2
Riboflavin	0.9	0.9	0.9	0.8	0.6
Niacin	15.7	15.5	12.7	17.1	14.7
Vitamin C	37	37	40	51	44
Folic acid	*	*	153	62	52.3

Source: India Nutrition Profile, Department of Women and Child Development, Government of India

up should involve an increase in maximum production possibility in at least one dimension without adversely affecting the other dimension (a tilt of the frontier line on a fixed axis, e.g. fig 2) or in both dimensions (an outward shift of the frontier line, e.g. figure 3). Scaling up, if pursued in either of these ways will unambiguously improve the options in the sustainability space. However, as we have seen from the previous discussion, scaling up, as it has been pursued, has not been either of this and has often resulted in eliminating the options for sustainable development (figure 4b). In the next section, we consider interventions that could generate the aforementioned expansion of the sustainability space (figure 2 & 3).

Western models of agricultural production that encourage environmental stewardship such as niche-certification and price premiums are intended for a richer audience and may not be viable in the fragmented, small-holding landscape of India where most of the produce is either consumed by the farmer or directed towards local markets comprising of low income households. Instead, localised certifications, targeting local markets such as the farmer-regulated Participatory Guarantee Scheme (PGS) in India suggest a possible direction for the future (Khosla, 2006). Based on guided peer support and mutual knowledge building amongst farmers, the PGS seeks to build a localised organic certification mechanism that is maintained by farmers and recognised by local consumers. Such localised approaches envisioned by eco-localists like Curtis (2003) cognise the heterogeneous nature of landscapes, people and processes and are inherently more sustainable across dimensions.

Emerging trends in agricultural policy in India also suggest a shift to more sustainable practices, for example, the use of local seed varieties (NABARD, 2008). Further, organic locally generated manures and integrated pest management are also being promoted nationally and in some states as in the National Policy on Organic Farming (2004) and the Karnataka State Policy on Organic Farming (2006). Such regenerative agricultural practices can increase agricultural productivity as well as enhance the ecological and socio-cultural sustainability in rural communities (Pathak *et al.*, 2010; Purushothaman *et al.*, 2011). 'Sustainable intensification' (Pretty, 2000) characterised by low-input usage and regenerative agriculture can potentially increase the sustainability space, as depicted in Fig 2 & 3 if not overtaken by perverse incentives for intensive practices.

Small farmers could be successful entrepreneurs, without being entirely market dependent for food and farming inputs. Fan *et al.* (2005) recommend that in order to free small farmers from the "poor but efficient" trap that they are caught in, government policy must intervene to ensure easier availability of small credit, careful and locally appropriate diversification of crops into high value commodities. With appropriate institutional support, high value crops including horticulture, may be a viable option for sustainable development in the rural context (NAAS, 2008; Weinberger *et al.,* 2007). A diverse small farm sector could cater to the vast domestic market demand, supported by storage and processing infrastructure, non-farm employment for the off-seasons, and health and education amenities. The need is to link existing government programs for employment guarantee, food security and crop improvement to support functional small farms. If such support is not forthcoming, there is likely to be more migration to cities, more degraded fallows and soaring food prices. Cost-effective national food security policies together with synergistic farm policies could ensure a distress-free farming community, which could, in turn, be the beginning of sustainable and equitable economic growth in India.

On the demand side, making the BoP better savers, producers and consumers would mean helping the small to be sustainable. This apparently is simpler than trying to link both consumption and production activities in rural societies to the global market in the name of poverty reduction. In the Indian context, vast domestic demand for low value high volume merchandise amidst diverse agro-climatic zones is a potential source of a variety of options for socio-ecological sustainability of a multitude of localised small enterprises. After the great economic meltdown of 2008, it may well be an era of localization which could usher in more options for sustainability for millions of poor producers and consumers.

Unlike the mainstream corporate approach, these farmers need to be seen as producers of valuable, indispensable products who, together, are stewards of a vast and crucial ecosystem. Rather than attempting to eliminate small scale farmers from the Indian landscape, government policy must ensure their survival by incentivising sustainable agricultural practices that can form the basis of rural livelihoods as also of the agro ecosystems.

6. Conclusion

"How we think about scale depends on what we think is important" observed Norgaard (1994). Evidently, given the manner in which 'scaling up' has been pursued with no regard for long term consequences and implications for sustainability, 'what we think to be important' has been clearly misplaced. Short-term materialistic well being has been valued over sustainability, whether ecological, socio-cultural or even economic, a result of the excessive focus of conventional economics on output, production, dehumanised 'growth' and consumption (Schumacher, 1973). In agriculture, particularly in a developing country like India, with a vast population dependent on rural agricultural land, issues of sustainability become of great relevance. Short-sighted approaches having scant regard to issues of sustainability that seek to uplift this dependent population including corporate initiatives with the ostensible purpose of social wellbeing have had devastating consequences in these landscapes.

This paper demonstrated the manner in which current policies are shrinking the choice of sustainable options. As the sustainability space shrinks with the growing needs of the ever-expanding low income population, the challenge for developmental catalysis to achieve a positive transformation in rural India is to try and locate an optimal point within this shrinking space. Context-specific holistic interventions can be tailored such that options for sustainability across multiple dimensions can be better optimised without compromising development options in the long term.

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Endnotes

[1] Ecosystem, in this case, refers to the larger social- ecological- economic context.

[2] Moreover, such scaling up in production may influence the threshold levels in the environmental dimension and may further reduce the options with regard to sustainability. However, for the sake of simplicity, in this paper, we have assumed that threshold levels are independent.

[3] The indicator to represent socio-cultural sustainability may not be as readily conceivable as indicators of economic or environmental dimensions. However, there have been considerable developments in indicators to represent social and cultural well-being particularly in the literature dealing with alternative indices to GNP such as the Happy Planet Index (Abdallah *et al.*, 2009), index of Gross National Happiness (Mcdonald, 2005) and others. Socio-cultural dimensions in such studies have been represented by indicators including divorce rate, extend of gender discrimination, volunteering activities, prevalence of crime, and extent of migration in a community. In the context of rural India, at a local scale, an appropriate indicator of socio-cultural sustainability could be a measure of community infrastructure or the presence of social organisations or the extent of interaction or presence of younger generations within the village.

[4] Such a conflict between scaling up of agriculture (via one-dimensional intensification) and sustainability (across multiple dimensions namely, social, ecological and economical) was evident in the results of a study conducted in selected districts of Karnataka by Purushothaman *et al.* (2011).

[5] For a discussion on the nature and sustainability impacts of the green revolution, please see Evenson et al., 2003 and Hazell 2003 respectively.