

The Power of Uncertainty: Reflections on the Nature of Transformational Initiatives

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If uncertainty is at the heart of the knowledge of the world that is possible for us, what implications does this have for transformational initiatives? Does it lead to confusion, enfeeblement, non-action? Does it paralyse us? Or does it define a particular course of action, with certain defining characteristics that derive from our recognition of the ineluctable presence of uncertainty? These are large philosophical, existential questions which can yet be answered.

What is the way to act in a world beset by fundamental uncertainty? If uncertainty is at the heart of the knowledge of the world that is possible for us, what implications does this have for transformational initiatives, whether by the government, social activists or citizens? These questions have gained renewed attention thanks to the grave crisis the world economy has just been through, and due to the emergence of climate change as a central issue defining our time. This is, therefore, as opportune a moment as any, to reflect on the nature of knowledge that Economics provides us. We propose to do this by drawing upon the work of some of the greatest economists the world has ever seen. But we will also perforce draw upon insights from other disciplines, without which we cannot do full justice to the questions at hand.

1 Three Kinds of Uncertainty

For the purpose of our analysis, we consider three types of uncertainty – related to time, context and nature.

Uncertainty Related to Time

The natural starting point for an economist dealing with uncertainty is Knight (1921) who introduced the distinction between risk and uncertainty. Briefly understood, risk describes a future outcome whose probability can be reasonably determined, while uncertainty refers to an event whose probability cannot be known in advance. We could even call it a distinction between calculable and incalculable uncertainty.

The most important text that took uncertainty seriously was Keynes' *General Theory*. But Keynes' clearest statement on the matter is to be found in an article in the *Quarterly Journal of Economics* in February 1937, which he wrote in response to critics of the *General Theory*:

...our knowledge of the future is fluctuating, vague and uncertain... By 'uncertain' knowledge, let me explain, I do not mean merely to distinguish what is known for certain, from what is only probable. The game of roulette is not subject, in this sense, to uncertainty. Or, again, the expectation of life is only slightly uncertain. Even the weather is only moderately uncertain. The sense in which I am using the term is that in which the prospect of a European war is uncertain or the price of copper and the rate of interest twenty years hence. About these matters there is no scientific basis on which to form any calculable probability whatever. We simply do not know (Keynes 1937).

It is stunning to read perhaps the greatest economist of the 20th century affirm radical uncertainty in no uncertain terms! Of course, Keynes laid the foundations of the modern welfare state

This is an edited version of the Ranjan Roy Memorial Lecture delivered at St Stephen's College, Delhi University in March 2010 and the Malcolm Adiseshiah Centenary Lecture delivered at the Madras Institute of Development Studies in April 2010. The views expressed are personal.

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whose interventions he saw as correcting the fallibility of the market mechanism.

Arguing from the opposite end of the ideological spectrum but agreeing with Keynes fundamentally on the nature of knowledge in Economics was Friedrich von Hayek. In his classic 1945 piece “The Use of Knowledge in Society” and his 1974 Nobel Lecture “The Pretence of Knowledge”, Hayek questions the very possibility of rational calculation by central planners. Hayek was highly critical of what he termed scientism: a false understanding of the methods of science, which has been forced upon the social sciences – such as the view that all scientific explanations are simple two-variable linear relationships. Hayek points out that much of science involves the explanation of complex multi-variable and non-linear phenomena. Of course, the irony is that Hayek had a touching faith in the power of unrestrained markets, assigning them near omniscience, quite ignoring his own insights into the nature of knowledge and also ignoring the fundamental revolution in Economics inaugurated by the work of Keynes.

Perhaps the economist who captures most beautifully the insights of both Keynes and Hayek is the relatively unsung G L S Shackle. In a much more radical position, he questions both Hayek’s naiveté about markets and Keynes’ simplistic optimism about state intervention. Shackle introduces the notion of inceptive choice, where the person who chooses cannot “foreknow what the sequel of his present choice will be, for if his own choices are inceptive, if his own choices are non-implicit, in some degree, in their antecedents, so are the choices of others and so are all the choices-to-come of himself as well as others” (Shackle 1975: 23). Since “the ultimate permissive condition of knowledge is the repetition of recognisable configurations” (Shackle 1972: 6), this limits the possibilities of knowing the courses of action that will be chosen in future. Shackle criticises his teacher Hayek for not fully acknowledging the implications of the decision-maker’s “unknowledge” for the possibilities of self-regulation in a market economy.

Shackle’s work potentially takes economics into novel territory such as the role of imagination to assess the plausibility of alternative outcomes while taking economic decisions. But the very freedom that is the basis for imagination makes perfect knowledge an impossibility. Shackle, therefore, posits a fundamental hiatus between freedom and knowledge, as also between time and reason. In an incredibly insightful, less than three-page long chapter of his 1972 work *Epistemics and Economics* titled “Time, Novelty, Geometry”, Shackle writes:

Time is a denial of the omnipotence of reason. Time divides the entirety of things into that part about which we can reason and that part about which we cannot. Yet the part about which we cannot reason has a bearing on the meaning of the part that is amenable to reason. The analyst is obliged to practise, in effect, a denial of the nature of time. For he can reason only about that which is *in effect* complete; and in a world where there is time, nothing is ever complete (Shackle 1972, p 27).

We must immediately recognise, however, that Shackle’s work has remained on the fringes of mainstream economic theory. The standard response to uncertainty in economics can be traced to von Neumann and Morgenstern’s (1944) expected utility theory, which led on to Nash’s (1951) non-cooperative equilibrium and

game theory, Savage’s (1954) reformulation of expected utility theory and climaxed in Arrow and Debreu’s (1954) derivation of the necessary and sufficient conditions for existence and optimality of general equilibrium under uncertainty. Of course, these formulations were challenged by Allais (1953), and Arrow (1963) himself acknowledged the empirical implausibility of the relevant necessary and sufficient conditions in the face of uncertainty. Indeed, even more recently, Arrow has warned that “vast ills have followed a belief in certainty, whether historical inevitability, grand diplomatic designs or extreme views on economic policy. When developing policy with wide effects...caution is needed because we cannot predict the consequences” (Arrow 1992: 46).

Over the last 40 years, but especially following the work of the psychologist and the 2002 Economics Nobel Laureate Daniel Kahneman with Amos Tversky on prospect theory, the expected utility hypothesis has been under attack, and alternatives proposed. For our purposes, however, it is important to recognise that all of this work is concerned with one project – finding probabilistic solutions aimed at taming uncertainty, attempting to collapse the radical distinction between risk and uncertainty first postulated by Knight and later developed by Keynes and Shackle. For, as Keynes has said, “The calculus of probability was supposed to be capable of reducing uncertainty to the same calculable status as that of certainty itself. Actually, however, we have, as a rule, only the vaguest idea of any but the most direct consequences of our acts” (Keynes 1937).

Before going on to elaborate the other sources of this inescapable uncertainty, we can examine a telling example of where a dogmatic belief in efficient and self-adjusting markets can lead. Long-Term Capital Management (LTCM) was a United States (US) hedge fund founded in 1994, with 1997 Economics Nobel Laureates Myron Scholes and Robert Merton on its board of directors. LTCM used complex mathematical models to take advantage of trading strategies such as fixed income arbitrage, statistical arbitrage and pairs trading, combined with high leverage. LTCM was initially highly successful with annualised returns of over 40%. But it lost \$4.6 billion in less than four months in 1998 and collapsed by early 2000. The failure of LTCM is a classic case-study of the impossibility of accurately anticipating unforeseen and relatively unforeseeable events such as the 1997 east Asian financial crisis and Russia’s 1998 default on its sovereign debt. LTCM collapsed despite having the best economists on its board because it mistakenly thought it could conjure away an uncertain and unknown future by turning it into a set of calculable risks (Lowenstein 2000). What truly boggles the mind is that even post-LTCM, little was done about derivatives; and the regulations that had provided the basis for financial stability continued to be weakened. According to Joseph Stiglitz, this blind faith in the certainties of unfettered markets has led to as many as 100 economic and financial crises in the last 30 years (Stiglitz 2010).

Uncertainty Related to Context

Apart from the “time” dimension of uncertainty which has found recognition in economics, we need to also acknowledge the existence of a contextual element in uncertainty, which disciplines

like Anthropology have best brought to the fore. The question they ask is: how do we understand the “Other”? Or, what happens when we try to understand the other? One of the most evocative treatments of this question is found in the work of the Brazilian anthropologist Eduardo Viveiros de Castro (2003).¹ As de Castro explains,

The real problem lies in knowing which are the possible relations between our descriptive practices and those employed by other peoples. There are undoubtedly many possible relations; but only one impossible relation: the absence of a relation. We cannot learn these other practices – other cultures – in absolute terms; we can only try to make explicit some of our implicit relations with them, that is, apprehend them in relation to our own descriptive practices (de Castro 2003, p 11).

de Castro cautions us against “the fantasy of an intellectual intuition of other forms of life ‘in their own terms’, for there is no such thing. ‘Their terms’ are only determined as such in relation to ‘our terms’, and vice versa. Every determination is a relation. Nothing is absolutely universal, not because something is relatively particular, but because ‘everything’ is relational” (ibid).

One of the richest descriptions of this relationality is to be found in the work of the German philosopher Hans-Georg Gadamer. In his 1960 magnum opus *Truth and Method* Gadamer expresses the matter through his notion of the fusion of horizons:

What do we mean by ‘placing ourselves’ in a situation? Certainly not just disregarding ourselves. This is necessary, of course, in that we must imagine the other situation. But into this other situation we must also bring ourselves. Only this fulfils the meaning of ‘placing ourselves’. This placing of ourselves is not the empathy of one individual for another nor is it the application to another person of our own criteria but it always involves the attainment of a higher universality that overcomes not only our own particularity but also that of the other. To acquire a horizon means that one learns to look beyond what is close at hand, not in order to look away from it, but to see it better within a larger whole and in truer proportion. Understanding is always a fusion of horizons which we imagine to exist by themselves (Gadamer 1960, pp 271-73).

Our knowledge thereby loses the certainty of its own voice by acknowledging the need to listen to and understand the knowledge produced by the other whose situation we claim to be trying to transform. Thus, the acknowledgement of the otherness of the other demands recognition of at least six different elements that shape our knowledge:

(i) The context where we are trying to intervene is not a blank canvas or as the Roman legal term goes, *terra nullius* (“land belonging to no one” or “empty land”). These are situations and contexts with a dynamic of their own. The impact of what we do is mediated through the ongoing dynamic of the context where our initiative rolls out. We need to study and understand this dynamic.²

(ii) What is more, there is a great diversity to this dynamic across the contexts where we intervene. So our initiatives need to be sensitive to the variety of dynamics that we encounter.

(iii) These contexts also have knowledges of their own that are often paradigmatically different from ours and from each other. An appreciation of these and an effort to understand them will greatly benefit the course of our own initiative.

(iv) Whether we like it or not, however unaware we may be of this, interventions are not unidirectional or omnipotent. They, willy-nilly, transform those who seek to bring about change – beyond their wanting, doing or even knowing. Change will, therefore, never flow univocally from one direction.

(v) The presence of the other also compels the question: who is the calculator? Is there at all a decision-maker acting in pristine isolation and autonomy? What is the meaning of studying the calculation of the individual, atomistic *homo economicus*, in a world characterised by deep interdependencies?

(vi) Finally, we need to recognise that transformational initiatives are generally located in contexts of deep inequalities and discrimination, some historically inherited, others created anew, whether based on gender, caste, ethnicity, race, community or class. Every intervention inhabits a contested terrain and itself becomes a site for further contention and contestation. This makes outcomes profoundly uncertain and indeterminate. It also demands an understanding of questions of power and justice and the articulation of an appropriate approach towards them.

Uncertainty Related to Nature

Nature has its own dynamic and autonomy that circumscribes and shapes human action. The current crisis of global warming is an example of what happens when we act as if nature does not matter. The roots of the crisis may be traced to the way economics has sought to conceptualise itself and its relationship with nature.

The founders of neoclassical economics, on their own testimony, aspired to create a science patterned exactly on Newtonian mechanics. Newtonian mechanics could visualise change only as locomotion, which is both qualityless and reversible. The economic process is seen here as a circular flow between production and consumption, with no outlets and no inlets. This flow is isolated, self-contained and ahistorical, neither creating nor being affected by qualitative changes in the natural environment within which it occurs. Keynesian macro-dynamics (starting with Harrod) and all its concepts of national income, investment and incremental capital-output ratio also find no place for physical entities. Even the classical political economy of Ricardo expressly saw land as a factor immune to qualitative degradation (“the original and indestructible powers of the soil”), and though Marx was centrally concerned with dynamics, viewing the economic process as essentially historical and qualitative in character, even he did not integrate natural resources into his main analysis. It is true that Marx speaks of labour as a “process between man and nature” (Marx 1976: 283). But the terms of this interaction are that “man, through his own actions, mediates, regulates and controls the metabolism between himself and nature” by working on “objects of labour that are spontaneously provided by nature” (ibid: 284). This dual conception of “free gifts of nature” and the imperative to exercise “control over nature” runs through the entire gamut of thinking in Economics. Progress is seen as co-terminus with the conquest of nature.³ Allied to this is the presumption that unlimited quantities of waste can be costlessly dumped into the bottomless sink of the

environment. Along with the assumption of free gifts goes also the assumption of free disposal.

Following Debreu (1959), the neoclassicals posited the “rational expectations hypothesis”⁴ which presumes that decision-makers in the market know the probability distribution of future outcomes, the future being visualised as stationary and stochastic (Davidson 1982: 182).⁵ “At the initial date there should exist a complete set of forward, contingent commodity markets, on which it is possible to buy or sell goods for delivery in any future time-period and state of the world” (Dasgupta and Heal 1979: 472). Such an approach can provide accurate predictions only if the stochastic process is ergodic – but that is ruled out when we are dealing with irrevocable ecological phenomena which produce a whole range of effects unobservable by the price system.⁶ As Shackle has shown there are a range of phenomena for which no “pre-image” exists in our minds. We have no previous observations on the basis of which probability distributions can be constructed since the phenomena we are dealing with are unprecedented. This means that we cannot have an “omni-competent classificatory system” for listing hypothetical scenarios which are endless and beyond human imagination (Shackle 1972: 18).⁷

Another neoclassical device of dealing with the problem of uncertainty is to discount the future. This approach could be said to have been derived from the contributions of Gray (1914) and Hotelling (1931).⁸ The market mechanism supposedly mirrors the preferences of individual economic agents while allocating resources efficiently. When the problem is inter-generational, we run into the ontological difficulty that many of the relevant economic agents are not yet in existence to be able to express their willingness to pay!⁹ And in discounting the future it is assumed that the future will be brighter than the present. But a high rate of discount will also imply a faster rate of depletion,¹⁰ which could mean that the growth path becomes unsustainable and that the future ends up being bleaker than today.

The key problem here is again uncertainty. For, “the discounting of time is at one and the same time the discounting of uncertainty” (Perrings 1987: 116), the latter being an increasing function of time. And the higher the discount rate, the more we will deplete an exhaustible resource while raising the level of economic activity. This will imply higher disposals into the ecosystem, which will in turn, bring about environmental changes, raising the level of uncertainty. This will once again raise the discount rate and so on. Thus, the device meant to tackle the problem of uncertainty only ends up aggravating it!¹¹

Following the publication of Nicholas Georgescu-Roegen’s *The Entropy Law and the Economic Process* in 1971, what is called for is a revolution in economic thinking, nothing short of a Kuhnian paradigm shift, which compels the abandonment of the mechanistic dogma by forcing the realisation that qualitative and irrevocable changes necessarily characterise the environment of which economic processes are a part – that both the assumptions of free gifts and free disposal are untenable, there being a dynamic, two-way inter-relationship between the economy and the environment. We must see the macroeconomy as an open subsystem of the finite natural ecosystem and not as an isolated circular flow of abstract exchange value.¹²

Viewed in the light of the Entropy Law, the economic process is, in fact, not circular, but unidirectional, involving a continuous transformation of the flow of low entropy received from the environment into high entropy or irrevocable waste which is returned to the environment. This is a one-way flow, not a circular one. The flow of blood is to the circulation of exchange-value as the digestive tract is to the unidirectional entropic flow, beginning with environmental resources and energy, through firms and households, and ending with high-entropy waste into environmental sinks.¹³

What is more, this entropic flow has a continuously degrading impact on the environment from which the economy must incessantly draw its low entropy. Each qualitative transformation of the environment within which the economy operates, demands a readaptation from the economy. Thus, the very sustainability of the economic process depends on its ability to so adapt. No model which seeks to understand the economy can be complete if it ignores the broader ecosystem of which the economy is a part, and the co-evolutionary path of the subsystem and its parent.¹⁴ The changes in the environment are both exogenous and increasingly, in our high-entropy age, caused by the interaction of the global economy with the environment.¹⁵

In such highly complex and highly coupled systems, characterised by both intricate interconnections, as well as novelty, uncertainty has a deep presence. For we still have significant levels of ignorance about upcoming threats (most severely highlighted by the current context of climate change) that are at best poorly understood and at worst completely unknown.

2 Implications for Action

We have thus established the inescapable presence of what may be termed irreducible uncertainty in our knowledge of the world. We have also understood the many sources and ramifications of this uncertainty. The question for us now is – how is one to act given the nature of the human predicament? Does the recognition of these multiple uncertainties lead to confusion, enfeeblement, non-action? Does it paralyse us? Or does it define a particular course of action, with certain defining characteristics that derive from our recognition of the ineluctable presence of uncertainty? These are large philosophical, existential questions. But to these I propose specific, concrete answers, based on and illustrated through the work done as part of Samaj Pragati Sahayog, living in a tribal area over the last 20 years, and also by reference to my early work in the Planning Commission over the past year.

Uncertainty Is the Best Corrective to Fundamentalism: The biggest contribution of a recognition of uncertainty as an essential feature of human knowledge about society is that it leads to a rejection of the notion of a single truth or the correct path. What saves science from degenerating into a dogma is the acknowledgement of the limits of knowing. This liberates us from the tyranny of certainty, whose claim is a part of the arrogance of power and the aspiration for which leads to a suppression of dissent, enquiry and the sense of wonder and mystery that has to be the beginning of all science. Uncertainty demands humility, the non-presumption of the arrogance of complete knowledge or

certainty. It calls for a non-assertion of the definitive correctness of one's own viewpoint – an acknowledgement that truth resides in a multi-point matrix, not in any one location. That it flows from multiple directions and is embodied in relationships.

Uncertainty Demands Nimble-Footedness: Uncertainty requires an openness to mid-course correction as new knowledge is acquired over time. This means an abandonment of the heavy-handed inflexibility which characterises so many of our development interventions.

Uncertainty Calls for Dialogue: The loss of certainty opens up the possibility that we must also look elsewhere, to other sources for help and support in our quest for knowledge. Uncertainty, therefore, necessitates deep listening and the building of common ground across differences, respecting a diversity of approaches and standpoints regarding the same problem. It calls for an attempt to learn from the context where change is being attempted – an open and rich dialogue, a true engagement, which is both transparent and participatory. For it is transparent and participatory processes that are also more accountable and open to mid-course correction. They also facilitate the building of social trust, which is a powerful and often indispensable resource in situations of uncertainty (Luhmann 1979).

This Dialogue Neither Romanticises Nor Devalues So-called People's Knowledge: It would be a mistake to valorise any one form of knowledge over another. We need a corrective to the stridency of both the bottom-up activist and the top-down planner. Neither by itself is appropriate or adequate. What matters, what enlightens, is deep dialogue, an engagement from which something quite unanticipated, something novel emerges and guides action.

Uncertainty Demands a Fusion of Horizons a la Gadamer in at Least three Senses – historical, embracing different stakeholders and across multiple disciplines. Since we attempt change in a specific context and this context has a unique history, it is characterised by a range of stakeholders and requires an understanding of issues that reside in a multiplicity of disciplines. Effectiveness of action demands that we make the requisite effort to bring together diverse perspectives in each of these three dimensions.

Interface with Nature: We must weave our interventions into the contours of nature. Once we recognise the contours defined by the balances in nature, our entire approach needs to shift from an attempt to control nature towards a creative weaving of our interventions into the flows and dynamics of natural processes. This requires a new imagination, to use Shackle's term, to visualising the future. The best positive examples of this are the watershed approach and the move towards organic farming. The most significant negative illustration is the interlinking of rivers project. In a country like India which gets seasonal rainfall from monsoons, the periods when rivers have "surplus" water are generally synchronous across the subcontinent. Further, given

the topography of India and the way links are envisaged, it might totally bypass the core dryland areas of central and western India, which are located on elevations of 300+ metres above mean sea level (MSL). It is also feared that linking rivers could affect the natural supply of nutrients through curtailing flooding of the downstream areas. Along the east coast of India, all major peninsular rivers have extensive deltas. Damming the rivers for linking will cut down the sediment supply and cause coastal and delta erosion, destroying the fragile coastal ecosystems. Most significantly, the plan could threaten the very integrity of the monsoon system. The presence of a low salinity layer of water with low density is a reason for maintenance of high sea-surface temperatures (greater than 28°C) in the Bay of Bengal, creating low pressure areas and intensification of monsoon activity. This layer of low saline water controls rainfall over much of the subcontinent. A disruption in this layer consequent upon massive interlinking of rivers, which would curtail the flow of fresh river water into the sea, could have serious long-term consequences for climate and rainfall in the subcontinent, endangering the livelihoods of a vast population.

The Unity and Integrity of Natural Cycles Must Compel Giving Up Our Silo-Based Approach to Transformation: We cannot expect to find a solution to India's water crisis unless we come out of the silos into which we have divided water and take a holistic view of the hydrologic cycle. We face a situation where the left hand of drinking water (under the Department of Drinking Water Supply located within the Ministry of Rural Development) acts as if it does not know what the right hand of irrigation (within the Ministry of Water Resources) is doing. Today groundwater is both the single largest source of rural drinking water (over 80%) and irrigation (over 60%). Both tap the same aquifer without any coordination whatsoever. Indeed, we are close to entering a vicious infinite regress scenario where our proposed solution (deep drilling by tube wells) only ends up aggravating the problem it seeks to solve. If one continues along the same lines, the initial problem will recur infinitely and will never be resolved. This regress appears a natural corollary of what has been termed "hydroschizophrenia" (Llamas and Martínez-Santos 2005), which entails taking a schizophrenic view of an indivisible resource like water, failing to recognise the unity and integrity of the hydrologic cycle. This is the central message emerging from the mid-term appraisal (MTA) of the Eleventh Plan we have just completed.

Our Interventions Need to be Location-Specific: Since we intervene in very diverse contexts, we need to give up the bureaucratic one-size-fits-all, monocultural approach. Interventions must thus reflect every element of diversity – social, cultural and physical. Across India we are faced with multifarious variations – in rainfall received, in soil and rock type, in slope and contour, in animal forms, in kinds of vegetation, crop or forest – and each of these and each combination of these has different implications for the possibilities of striking, harvesting and storing water as also the possible forms of livelihood. Many of these variations occur even within a small micro-watershed. And this natural

diversity has a complex interplay with the sociocultural-economic tapestry of these regions. That includes values regarding life-goals, priorities (e.g., security in view of pervasive, inherent uncertainty), understanding of and relationship with natural forces and resources, development of markets, etc, which have evolved over centuries, if not millennia. This canvas of *differentia specifica* poses a unique challenge to the development planner, the scientist, the social worker. Those who seek to intervene in any context, but especially in one with such diversity and potential fragility, cannot do so on the basis of a notion of mastery over nature and society. With mastery and control, comes the resort to simple tech-fixes – monocultural, unilinear, indiscriminate. Irrespective of the specific challenges of each situation, an unthinking, insensitive bureaucracy seeks to impose its own pet solution – tube wells, eucalyptus, soyabean, Holstein Friesian. Appropriateness does not matter. Sustainability is of no concern. Dialogue is not attempted. History is given a go-by. With disastrous consequences.

In our development programmes, unfortunately, we have sought to impose simplistic answers, top-down, without making the effort to understand the context, in all its diversity and complexity. We have been narrowly preoccupied with single variables like aggregate income, neglecting completely the entire range of issues involved in eco-system resilience and stability. Disciplines, narrowly defined through specialisation, have not spoken to each other. Nor have they spoken to the people in whose name solutions are sought to be developed. They have not been mindful of the balance that must be retained if our interventions are to be sustainable. Nature and society are not to be mastered or subdued. They are, rather, to be deeply understood so that we can weave our interventions in a creative manner into their delicate fabric; consistently learning each step of the way – light, nimble and innovative in our tread.

The MTA of the Eleventh Plan attempts a corrective in this direction. For example, the MTA highlights the fact that problems surrounding groundwater overuse are not just a matter of the share of extraction in annual replenishment. The relationship between extraction and replenishment is complex and depends upon the aquifers from which groundwater is extracted. The foundation of good groundwater management is a clear understanding of aquifers, which requires knowledge of geology – of rock types and rock structure. For groundwater availability is dependent on the water storage and transmission characteristics of these underlying geological strata. The geological diversity in India makes aquifer understanding challenging, but all the more important because the local situation dictates the approach to managing groundwater. Moreover, these local situations also determine how groundwater overuse, droughts, floods, etc, impact drinking water security. The vulnerability of different hydrogeological settings to the level of groundwater development is different.

About 54% of India (comprising mainly the continental shield) is underlain by formations usually referred to as “hard rocks”. Groundwater resource in hard rocks is characterised by limited productivity of individual wells, unpredictable variations in productivity of wells over relatively short distances and poor water quality in some areas. The initial thrust of irrigation by tube

wells following the green revolution was restricted to India's 30% alluvial areas, which are generally characterised by relatively more pervious geological strata. But from the late 1980s, tube well drilling was indiscriminately extended to hard rock regions where the groundwater flow regimes are extremely complex. Deeper-seated aquifers often have good initial yields, but a tube well drilled here may be tapping groundwater accumulated over hundreds of years. Once groundwater has been extracted from a deeper aquifer, its replenishment depends upon the inflow from the shallow system or from the surface several hundred metres above it. The path this water has to traverse is characterised by relatively unfavourable media, which greatly slows down the rate of groundwater recharge. This poses a severe limit to expansion of tube well technology in areas underlain by these strata. Similarly in the mountain systems, which comprise 16% of India's land area, effects of groundwater overuse do not take very long to appear. As the processes of groundwater accumulation and movement are vastly different in different geological types, the implications of any stage of groundwater development will vary significantly across types of geological settings. Clearly, therefore, a much lower level of groundwater development across 70% of India's land area (hard rock and mountain) could be as “unsafe” as a comparatively higher level in alluvial settings.

Conflict and Contention

Power, Justice, Love: The fruits of India's development have been shared very unequally, especially in certain geographies (adivasi enclaves, drylands and hills) and with specific social groups (dalits, Muslims). In recent years India has witnessed the fastest growth of high net-worth individuals worldwide. In the same period in the “other India”, across 200 districts, lakhs of people have committed suicide or taken to the gun. Martin Luther King suggests a different response to injustice – the path of love. But the love he spoke of was no ordinary love. King (1958) elaborates the very different meanings of three words for love in the Greek New Testament. *Eros*, in Platonic philosophy means the yearning of the soul for the realm of the divine. It has now come to mean a sort of aesthetic or romantic love. *Philia* signifies the intimate love between friends, a reciprocal love, where we love because we are loved. But the love King advocates is best expressed in the Greek word *agape*. *Agape* implies understanding. It intimates a creative, redeeming goodwill for all, an overflowing love which seeks nothing in return. *Agape* is not a weak, passive love. It is love in action (King 1957).

Through a profound inversion of Nietzsche's critique of Christianity, King provides a reconceptualisation of the relationship between power and love. Nietzsche sought to determine the conditions of a new affirmation of life by overcoming what he regarded as the nihilistic despair produced by Christian values. King interrogates the very terms of this problématique by providing a radical restatement of his own spiritual tradition. He questions the legacy of viewing love and power as polar opposites, where love appears as a rescinding of power, and power as a rejection of love. King argues that “power without love is reckless

and abusive, and love without power is sentimental and anaemic” (King 1967: 247). And this new understanding of power helps King positively formulate the unbreakable bond between love and justice: “power at its best is love implementing the demands of justice, and justice at its best is power correcting everything that stands against love” (ibid).

Love must necessarily take on the larger structures of injustice that stand in its way. This love includes but goes well beyond isolated acts of kindness. At the same time, because love is our weapon, we do not seek to defeat anyone and must try not to end up humiliating those positioned against us. For the struggle is not against persons, it is for transformation of the opponent’s view and the system of oppression. And even more for the self-renewal of those who work for change. As King says, “to retaliate with hate and bitterness would do nothing but intensify the hate in the world. Along the way of life, someone must have sense enough and morality enough to cut off the chain of hate. This can be done only by projecting the ethics of love to the centre of our lives” (King 1958: 19).¹⁶

Such an organic link between inner transformation of the individual and larger social change is invariably missing in our politics. But there is more. In our pursuit of structural change we cannot overlook the immediacy and enormity of suffering. Sadly, this has been the record of many movements for justice. The millennial quest, based on various teleological certainties of the dynamic of History (with a capital H), has often led to people being treated as cannon fodder. The finiteness of their life-times appears to have little import for leaders who invariably belong to classes quite distinct from those who suffer injustice. As a result, the desperation for finding tangible solutions appears much less evident in leaders than for the masses they lead.

We are confronted with a paradox. Narrow preoccupation with daily issues results, for example, in the sterile “economism” of the working class. But the quest for millennial goals of a distant Shangri-la means a striking lack of concern for real-time solutions and an unyielding “protest for the sake of protest”. The former reflects a complete absence of broader vision, the latter a cruel neglect of immediate anguish. The challenge of creative politics is to strike an imaginative balance between the two, without disadvantaging either.

We must stop viewing conflict as an arena of our victory over the “other”. It is better regarded as a problem in search of a solution. A conflict needs not so much a victory, as a resolution. Indeed, a “defeat” that moves society forward on the moral landscape, that empowers the disadvantaged and sensitises those in power, deepening democracy in the process, could even be preferred to a “victory” that fails to achieve any of these.

A key to moving forward in this direction is to give up the antediluvian unitary and insurrectionist conception of Revolution (with a capital R). The unique appeal of “scientific socialism” was its claim to have discovered the “laws of motion of society” that definitively predicted the inexorable coming of a new dawn. This teleology has ended up becoming the chief weakness of Marxism. If change is visualised in these terms, means-ends questions will be run roughshod over and horrors of the Stalinist kind will continue to be perpetrated.

It is crucial that we firmly abandon the “victim” mode. Those suffering injustice are not completely constituted by their affliction. Their identity is beyond that constructed for them by their oppressor. But the dehumanising experience of pain and the utter obduracy of their persecutor appear to push them, with an apparent historical inevitability, into the language of the tormentor. At the root of this desperation is an overestimation of the potency of violence and a lack of recognition that power is a relationship with an immeasurable and unknowably indeterminate fluidity and vulnerability.¹⁷ The sterility of unidirectional oppositional politics is evident in the presumption that change flows from one direction alone and that all we can do is to contest or circumvent it. For there are huge possibilities of visualising change from different vantage points, of flows of knowledge, insight and power from multiple directions. We need a vision of transformation that threads all these potentialities together.

A one-track, single-event notion of revolution must also be discarded because it leads to complete neglect of crucial nitty-gritty detail that forms the heart of transformation. It is this dry spade-work that also contains solutions to immediate distress. Running mid-day meals in schools under active supervision of mothers, local people managing sanitation and drinking water systems, social audits in vibrant gram sabhas, participatory planning for watershed works, irrigation commands collectively managed by farmers, women leading federations of self-help thrift groups and workers running industrially safe, non-polluting factories as participant shareholders – all these and many more are the immediate, unfinished, feasible tasks of an ongoing struggle for change. Unfortunately, activists typically push these questions into a hazy future, to be all answered after the revolution, so to speak. These are difficult questions that necessitate intricate answers. And we need to begin looking for these here and now, in the living laboratories of learning of our farms and factories, villages and slums. Not in some imaginary distant future after a fictitious insurrection.

Thus, between the fragmentary non-governmental organisation (NGO) oases of excellence and the Revolution with a capital R, we need to discover a strategic middle-ground that builds upon the power of partnerships, synergising diverse strengths of players, acting thus far in relative isolation. Only thus can a critical mass for change be built up.

Uncertainty Flowing from Contention also Demands Inclusive Approaches to the Land Question:

Land acquisition initiatives such as the Special Economic Zones (SEZ) Act and the proposed Land Acquisition (Amendment) Bill (LAAB) portend a serious conflict in India’s countryside. The fact that the Supreme Court has held that the state is the “trustee of all natural resources” must be regarded as posing a challenge to the doctrine of eminent domain, for it qualifies the assertion of absolute sovereign power by the state over natural resources. The inclusion of labourers, sc/st families, vulnerable persons (disabled, destitute, orphans, widows, unmarried girls, abandoned women, or persons above 50 years of age, without alternative livelihoods) and the landless, is a very significant provision in the resettlement and rehabilitation (R&R) policy which must become part of

the LAAB. The LAAB and the SEZ Act also appear inconsistent with land ceiling laws and do not incorporate the special protection for STs in the Indian Constitution, whether those under Schedules V and VI, the Panchayats (Extension to the Scheduled Areas) Act, 1996 or the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006.

It needs to be clearly understood that the process of industrialisation or infrastructure development in rural India cannot be sustained in the long-run if opposition by project affected families (PAFs) continues unabated and they are not made the very first beneficiaries of its outcomes. It is estimated that 70% of 190 infrastructure projects in the pipeline have been delayed due to land acquisition problems. Enlightened state policy aimed at ensuring long-term sustainability of the process must gain decisive ground over a short-sighted recourse to available legal loopholes. There are many possibilities here, which need to be regarded as very small investments that ensure the long-term sustainability of the development process. One is to provide land in the command area of irrigation projects, as mentioned in the R&R policy. The other is to utilise the long period that separates project initiation and land acquisition as also the gap between first notification, displacement and project construction to train PAFs in skills that could be used on the project. Facilities and products created by the project could be made available to PAFs (Fernandes 2008). Compensation could also be tied more closely to future valuations as an inflation-adjusted monthly pension combined with a savings bond. The pension could be partially tied to the profits of the project (Banerjee et al 2007). The best route could be to make PAFs shareholders in the proposed project given their contribution to a key element of share capital. The safest way to disincentivise land acquisition from degenerating into a real estate proposition (as it has, reportedly in quite a few cases) is to resort to leasing or temporary alienation which will not sever the relationship of the landowner with her land. This would mean that if the project does not take off or shuts down or comes to a close, the land would be returned to the original landholder.

Each of these initiatives can help restore the faith of people in the democratic process, which is under strain in the remote hinterlands of India. The way forward is to move away from the vision of “subjects” inherent in the eminent domain doctrine towards that of citizens, whose rights are guaranteed under the Constitution. Ultimately, we have to go beyond narrow legality to seek broader legitimacy. This demands giving a cutting-edge to many provisions of the R&R policy, making each of them mandatory and not reducing them to what they are in effect – conditionalities without consequences (Ramanathan 2008). But it also requires an unequivocal commitment to imaginatively exploring ways of rebuilding the livelihoods of those adversely affected by development projects.

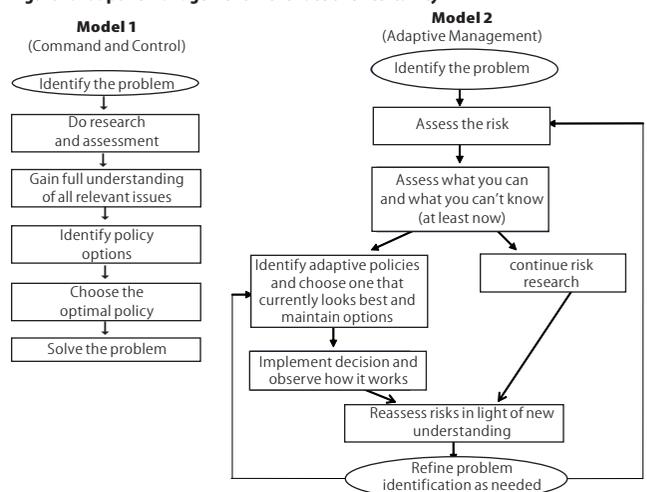
Institutional Implications

Uncertainty Demands Forging of Partnerships: Certainty is the requirement and characteristic of top-down, unilinear visions of change. Rejecting the illusory certainty of a single voice is a liberating, enriching, inclusive experience. It potentially

provides the benefits of multiple perspectives and standpoints, each of which has a unique value. We need to recognise that a multidimensional, multistakeholder, multidirectional and multidisciplinary matrix of relationships governs the dynamics of change in a deeply interconnected way. While we may never fully fathom the depths and intensities of these inter-connections (which is the residual uncertainty that ineluctably characterises our interventions), the more we are cognisant of these and the more we forge partnerships that bring all of them together, harnessing their respective strengths and insights, the more sustainable will our interventions become (in social, ecological and financial terms). Emerging from iterative, consultative, inclusive processes, they will also, therefore, be both more richly informed and more widely acceptable. What we need, therefore, are consortia or partnerships of players and agencies each of which are poles of change. Both civil society and the state need to be open to and prepared for such partnerships. By prepared I mean not only willingness but also a degree of prior preparation for what would in most cases be a novel and certainly demanding experience. As so many examples already illustrate, no real change is possible without that.¹⁸ But above all what I have learnt of living and working in the tribal areas of central India for 20 years is that the people of this country will need to be prepared to activate themselves. Democracy ultimately is a lot of hard work that demands that we move way beyond the victim mode. Neither waiting passively for the state to deliver nor activating ourselves only to fight for our rights can bring about real change. Transformational initiatives will succeed only if they are energised by the active participation of the people themselves. The space for this needs to be created by the state, which has to also facilitate this participation by building people’s capacities and supporting their initiatives in this direction.

Recognition of Uncertainty Calls For and Enables the Growth of New Kinds of Organisations: An acknowledgement of uncertainty in all the dimensions we have explicated creates the conditions for the evolution of lean, learning organisations based on partnerships. This kind of nimble-footed organisation is engaged in a process of continuous self-transformation even as it facilitates

Figure 1: Adaptive Management in the Face of Uncertainty



Source: Kasperson (2009).

learning by its members (Pedler et al 1997). It pledges itself to building partnerships with other organisations, which show a similar commitment to remaining lean and open to learning from others. Rather than unilinear “command and control” strategies, it follows “adaptive management” (Figure 1, p 60) practices where surprises are expected and learning through experience and evolving knowledge is built into the organisational DNA (Kasperson 2009).

Following Shapiro (1988) and Thompson (2008), we could even describe these as “clumsy institutions”, in which “contestation is harnessed to constructive, if noisy argumentation” (Thompson 2008: 172). Clumsiness is preferable to its alternative elegance, which would seek optimisation around just one of the definitions of the problem and a unique solution, thereby silencing other voices. Clumsy institutions are agile and flexible enough to facilitate adaptability to turbulent environments. They can absorb plural perspectives and frames of reference found in inter-organisational partnerships.

A New Vision for Reform: Such an institutional design hints at a completely new definition of “reform” for the neglected parts of India. Over the last 20 years, reform has been restricted to the corporate sector. But the large mass of this country will not benefit till reforms are extended to the public sector in rural development. It is here that we need new institutional designs that will make the poorest people of India active participants in the development process. Perhaps the best example is provided by what is being attempted through the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), which is clearly the most radically new programme ever conceived in the history of independent India.

The MGNREGA has given rise to the largest employment programme in human history and is unlike any other in its scale, architecture and thrust. Its bottom-up, people-centred, demand-driven, self-selecting, rights-based design is new and unprecedented. MGNREGA enjoins the state to provide a guarantee of employment to each rural household that demands work. But it also demands of the people that they participate actively in the design and implementation of the programme. For only then will it realise its true potential.

Thus far, the programme has suffered because it continues to rely on the same ossified structure of implementation that has failed rural development for six decades. The programme demands new imagination to be brought to bear on its institutional design. We need to empower the main implementing agency, the gram panchayats (GPs), with the requisite personnel and build their capacities so that they can make people aware of their entitlements, as also the unique demand-driven character of the programme. And move people beyond their long-held belief that they will get work only when government decides to “open” work. We also need to build GP capacities to enable them to develop detailed micro-plans that truly reflect the needs and aspirations of the people. Without this effort, what is truly new about the MGNREGA will not come into play. This empowerment initiative is what will strengthen the roots of democracy in India and place rural governance on a completely new and stronger

foundation. This demands lively partnerships with civil society organisations and research institutions which can provide critical inputs in each of these vitally important aspects.

MGNREGA is also exciting because it has a self-limiting character which has not yet been adequately recognised. The ultimate potential of MGNREGA lies in a renewed focus on improving the productivity of agriculture and convergence to engender allied sustainable livelihoods. Millions of small and marginal farmers are forced to work under the MGNREGA because the productivity of their own farms is no longer enough to make ends meet. Among agricultural labour households in India, the percentage of those who own land is around 50 in Rajasthan and Madhya Pradesh, 60 in Orissa and Uttar Pradesh and over 70 in Chhattisgarh and Jharkhand. And if we focus on tribals, the proportion shoots up to as high as 76-87% in Chhattisgarh, Jharkhand and Rajasthan. MGNREGA will become really powerful when it helps rebuild this decimated productivity of small farms and allows these people to return to full-time farming, thereby also reducing the load on the MGNREGA. There are many such examples to be found under MGNREGA, although they remain small in number. For example, the First annual report of the National Consortium of Civil Society Organisations on MGNREGA (2009) reports that earthen dams on common land have recharged the wells of thousands of poor farmers who earlier worked as labourers to build these dams. These farmers are now busy making a series of investments to improve their own farms. Rising incomes also improve capacity utilisation and greater expectations act as incentives for more investment. Under the programme, farmers have come back to the land they long abandoned – as increased output, in an atmosphere of renewed hope, spurs further investment. Converging MGNREGA with other programmes for rural livelihoods would carry this momentum forward in a positive upward spiral, which will broad-base the growth process via downstream multiplier-accelerator effects (Shah 2009).

Our endeavour is to not merely to help MGNREGA realise its full potential but also to carry that positive momentum forward in a redesign on similar (though necessarily different and specific) lines of all our other development initiatives – to make each one of them more transparent, accountable, participatory and professional.

3 Conclusions

The totalitarian state, the invisible hand of the market, and science and technology – these were the three main bastions of certainty in the 20th century. As the century ran its course, each one of them, at different points of time, palpably and demonstrably reached their limits. It is in the space created by their dethronement that the power of uncertainty has the potential to flower. It is only this fracturing of fundamentalisms that has forced each of these fulcrums of power to seek answers to unresolvable challenges in other domains. It is now for us to seize the moment by showing the requisite imagination and creativity in very concrete terms to harness the possibilities created by this unleashing of the insuperable recognition of uncertainty.

This needs to be very carefully understood. For, there is a very real possibility in precisely the opposite direction. So overwhelmed

by the collapse of these certainties, we could allow ourselves to be gripped by the worst cynicism and despair, an alarmist fear of cataclysmic consequences. This could lead to either an extremist stance of counter-violence or a giving up, translating in its most desperate form, into large-scale suicide. Both of these responses are in evidence in contemporary India. Both can, in one sense, in a large swathe of compassion, even be understood. But neither serves any useful purpose whatsoever. Violence, as is already evident, only incites the draconian character of the state. And surely we can find a better option for our farmers, than their swallowing the poisonous fluid.

Our challenge is not to allow ourselves to be overwhelmed by the undeniable darkensses of the time but to seize the light that still shines within so many endeavours, small, unsung but powerful, many outside the government but also several within it. And envision the forging of strong alliances among them. Where we exercise our imagination to creatively utilise the spaces that democracy is perforce obliged to provide its citizens, exemplified in recent years, after the watershed general elections of 2004, by the Right to Information Act, the MGNREGA, the Forest Rights Act, the Right to Education Act and the upcoming National Food Security Act. These have resulted from an acknowledgment of the need to forge new instruments once the certainties of old had all run their course.

But let us hasten to remind ourselves that these are spaces that have as yet only been just created. To realise their full potential will require all the resourcefulness at our command. That will give reform a completely new, intricate and powerful meaning. That will demand forging of new kinds of institutions and partnerships. Building these will not mean a denial of the state, markets or science and technology. Rather, it will mean a harnessing of their respective strengths in a completely new alignment of forces.

The prime minister has described the Planning Commission as “an essay in persuasion”. The word essay has an incredible range of meanings that includes trial, test, effort, attempt, especially an initial tentative effort and the result or product of an attempt. This is an *aagraha* (an attempt to persuade) with key players in the central and state governments, as also in civil society and academia across disciplines, to forge partnerships with each other that would help roll out a wide range of best practices that are already in place in isolation but need to be mainstreamed at scale without the customary loss of quality that such scaling normally entails. Let us move, deeply cognisant of our own individual, discrete limitations but fully aware of the enormously powerful potential of our coming together.

NOTES

- 1 I thank Mekhala Krishnamurthy for guiding me to this reference.
- 2 Much of the devastation wrought by colonial settlers in their assignation with the aboriginal/indigenous people across the globe had to do with the presumption of *terra nullius*. Many of the mistakes we are making in our own adivasi areas also have a similar origin.
- 3 “It is the necessity of bringing a natural force under the control of society, of economising on its energy, of appropriating or subduing it on a large scale by the work of the human hand, that plays the most decisive role in industry” (Marx 1976, p 649).
- 4 The hypothesis entails “supposing that the entire sequence of future prices will be ‘announced’ at the initial date in order that the inter-temporal equilibrium is sustained” (Dasgupta and Heal, 1979, p 337). They deploy the hypothesis despite an awareness that “we simply do not know how expectations are formed. But we do know that rational expectations yield tidy formulations. These are easy to work with. This forms the motivation for the constructions that follow. But it is worth bearing in mind that as a description the rational expectations hypothesis is likely to be way off the mark here” (ibid). Quite clearly, considerations of neatness and ease weigh more heavily than those of accuracy of description.
- 5 A stochastic process is stationary if the random variables are well-defined for all points in time and if their cumulative probability distributions are independent of time.
- 6 After their analysis is complete, Dasgupta and Heal add with complete honesty: “it is clear that the foregoing construction is of very little use for analysing resource markets in the world we know” (op cit, p 349). At another point they say, “the rational expectations hypothesis...is so far-fetched. Each individual is required to possess the correct theory of how the economy behaves in order to make the hypothesis credible. Such a requirement is, however, not credible” (ibid, p 436).
- 7 This leads Shackle to advocate an exciting dia-chronic approach for unraveling the “broad

current of self-determining, or organically evolving history” (ibid).

- 8 Right from the start, however, there was a lively recognition of the fact that the whole procedure entailed serious ethical problems, because of which it was not found acceptable by most economists till as late as the 1960s. Ramsey was the first and most trenchant critic: “we do not discount later enjoyments in comparison with earlier ones, a practice which is ethically indefensible and arises merely from the weakness of the imagination” (Ramsey 1928, p 543). Harrod regarded it as “a polite expression for rapacity and the

conquest of reason by passion” (Harrod 1948, p 30). See also Pigou (1932) for similar observations.

- 9 See Martinez-Alier (1987, Ch 11) for a brilliant exposition of the consequences of methodological individualism for the inter-generational allocation of resources. Standard discounting procedures do little more than ensuring a “trickle ahead” for future generations. See Norgaard and Howarth (1991).
- 10 In his 1974 Richard T Ely Lecture, Solow expresses the judgment that “the market will tend to consume exhaustible resources too fast” (Solow 1974, p 12).

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- 11 In a study of the twin implications for environmental preservation of uncertainty and irreversibility, Arrow and Fisher concede: "if we are uncertain about the pay-off to investment in development, we should err on the side of underinvestment... Given an ability to learn from experience, underinvestment can be remedied before the second period, whereas mistaken overinvestment cannot, the consequences persisting in effect for all time" (Arrow and Fisher 1974, p 317). The authors cite "extinction of a form of life, the destruction of a unique geo-morphological phenomenon, the toxicity and the persistence, indeed the increasing concentration, of the hard or non-degradable pesticides" (ibid, p 319) as examples of irreversible changes in the environment produced by economic activity.
- 12 Alfred Marshall in his magnum opus *Principles of Economics* suggests: "The Mecca of the economist lies in economic biology" (Marshall 1920, Preface to the 8th edition, p xii); "The forces of which economics has to take account are more numerous, less definite, less well known, and more diverse in character than those of mechanics; while the material they act upon is more uncertain and less homogeneous... economics, like biology deals with a matter, of which the inner nature and constitution, as well as the outer form, are constantly changing... economics has no near kinship with any physical science. It is a branch of biology broadly interpreted" (ibid, Appendix C, p 637, emphasis added). However, in Marshall's own body of work, the influence of these insights can be said to be virtually non-existent. This could be because he saw himself as writing only the Foundations, which in his view, "must give a relatively large place to mechanical analogies" (ibid, Preface to the 8th edition, p xii).
- 13 This corresponds to what biologists call the "metabolic flow" through which a living organism sustains its highly ordered structure by sucking in low entropy from the environment to compensate for the continuous entropic degradation it is subject to (see Erwin Schrodinger 1944).
- 14 Co-evolution is once again a biological concept which describes the reciprocal relationship between two closely interacting species (see Norgaard 1984).
- 15 "The virtue of the thermodynamic approach to evolution is its ability to connect life ecologically to the rest of nature through shared matter and energy flows" (Wicken 1988, p 442).
- 16 The standpoint of agape love finds strong support in recent advances in neuroscience and economics, both of which have traditionally been bastions of selfishness as the central motive of human behaviour. Neurobiologists like Donald Pfaff (2007) marshal a new understanding of genes, neuronal activity and brain circuitry to explain our concern for the other. The path-breaking work of economists like Samuel Bowles (Bowles and Gintis 1993; Gintis et al 2003) questions standard textbook assumptions of the selfish homo economicus and emphasises the role of altruism in the very survival of humankind in the difficult years ahead.
- 17 In India, the general elections of 1977 and 2004 are a striking example of this unknowable fluidity and vulnerability of power.
- 18 One of the most striking of these is the partnership between the government of Andhra Pradesh and the Mazdoor Kisan Shakti Sangathan for NREGA social audits.
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