

From the Green Revolution to the Evergreen Revolution : Studies in Discourse Analysis

Shiv Visvanathan

**Centre for Study of Developing Societies, 29, Rajpur Road, Delhi –110054.
Email svcsds@vsnl.com**

IDS Seminar on Agriculture Biotechnology and the Developing World. 1-2 October, 2003

I

The Green Revolution today is the stuff of legend. The literature of the green revolution can never be monocultural. The diversity of perspectives from which it has been analyzed is impressive. The political scientist, Ashutosh Varshney (1995) has provided a political economy of the green revolution contrasting the Nehru – Mahalanobis and Charan Singh models. The physicist, Vandana Shiva (1991) from a feminist ecological perspective has produced a provocative link between green revolution and the terrorism and ethnic violence that followed in Punjab. If Varshney is replete with policy documents, Shiva's study unravels the green revolution from civic consciousness of an alternative agriculture. Robert Anderson (1991), a Canadian anthropologist studied the Rockefeller Foundation archive to read the green revolution as another great module of US foreign policy. The works of Bayliss Smith, Sudhir Wanamali etc. add to this first genre of narrative.

Beyond politics and policy, there are archives of autobiography. There is first C. Subramaniam's *'Hand of Destiny'* (1995) and B. Sivaraman's *'Bitter Sweet'* (1991) autobiography. The two together double up to capture the political strategies and administrative agility required to put structures into place. To these essays, we must add a third set of memoirs or reflections. In January 1990, Norman Borloug suggested to M.S. Swaminathan of a need for a collective scientific memoirs from the still surviving innovators of the Wheat Revolution (1993).

There is a third kind of archive or memoir, which reveals a continuous attempt to reflect on the same range of data fitting the original piece into new conceptual landscapes. Outstanding in this genre of writing is a series of reflections by M.S. Swaminathan (1999) (2002).

We want to posit one caveat here. The present exercise is not a critique of the green revolution. It is an attempt to explore how reflections on the green revolution lead to a new genre of political theory. What we would like to suggest is that the work of Amartya Sen and Swaminathan constitutes the two major highpoints of development as political theory in India. We would like to argue that the transition from the green

revolution I to green revolution II required a new gestalt of concepts. It was not merely a movement from one form of technology to another, a facile or simple flow from green to evergreen revolutions. It needs different litmus of what the literary critic Raymond Williams called key terms. We want to address ourselves to the following questions:

1. What was the difference, continuity or discontinuity between green revolution II and I?
2. How did the key terms nation, ideology, science, technology, nature, community change as one moved between the two frameworks. What was the nature of self-reflexivity about these terms?
3. How did these contribute the nature of agriculture and democracy in the emerging global period?

The basic attempt is to show that the scientists – technocrats of the green revolution were not only storytellers and innovators but had a profound understanding of the need to reset narratives to ready society and institutions for new gestalts. The essay is written with the deep conviction that the narratives of the green revolutions can be subject to the rules of discourse analysis to obtain new insights on its reflexivity.

II

The green revolution is a singular label, a rubric, encompassing a collectivity of tactics. How is it handled as narrative. One can begin with C. Subramaniam ANU lectures on the *New Strategies for Indian Agriculture* (1979). Subramaniam's narrative begins like a standard Malthusian narrative. Independent India itself gets submerged into milestones of demography. As Subramaniam remarks, "We started our career as an independent India in 1947 with a population of 360 million" (Subramaniam, 1979,p 1).

There is a burden of narrative tropes that any third worlder must carry. If the colonial mind and its developmental counterpart shouldered the Whiteman's burden, third world atlas had to shrug off the Malthusian imperative. Independence is not enough. We still remain facts of biology as long as we remain within demography. It is

almost as if demography prevents us from entering history, because we are still entrapped in facts of biology.

If Reverends Malthus haunts the inauguration of the Indian state, Malthusians like William and Paul Paddock haunt the sixties with doomsday predictions. “The Paddock brothers predicted in the 1970s that there would be acute famine conditions and millions and millions of people would die of starvation in the developed countries, particularly in Asia”. (Subramaniam 1979, p10) Utilizing the philosophy of triage, the Paddocks imperiously decided that India was incurable. The challenge was to convince the developed world that India had outgrown the banality of the Paddocks.

The narrative begins conventionally but implicit in it a threat to shrug off old terms of discourse.

This becomes implicit in step when Subramaniam is transferred from the steel ministry, with all its then connotations of modernity, progress, development, industry to the agricultural ministry. Agriculture was like internal exile. In fact Lal Bahadur Shastri warns him that this portfolio has been the “waterloo of many foreign ministers” (Subramaniam 1979, p2). Even his friends thought it was a political trap. The question was if agriculture was waterloo, where could one locate the playing fields of Eton.

The minister informs us that he indulged in role playing deciding to ask of agriculture the questions one would confront steel. Once he did this the Archimedean point was simple. It was the standard Nehruvian answer – science. Subramaniam observes, “Every country which has improved its agriculture has done so only through the introduction of science and technology into farming. India cannot be an exception”. The policy and the rhetoric appear predictable and standardized but that was the beauty of the tactic. The green revolution as a macro-narrative challenges no major concept or category. At a general level science, ideology, nation remain their immaculate selves. But as a series of micro-narratives each of them is subject to alchemy of tactics. Subramaniam invokes science but it is not the Leninist science of Mahalanobis pleading for hyphens between science and heavy industrialization. Yet it is not Gandhian

insistence on the simplicity of agriculture and technology. In fact it evades this Nehruvian opposition by advocating science for agriculture.

When you take profoundly different policy decisions, you must etch it in the mind of the bureaucracy. Subramaniam decides to discard the standard rituals.

“When a Minister takes charge of a new portfolio, he is usually briefed on the working of the ministry by the secretary and the senior officers in the ministry. However, I decided to adopt a different approach. I sent for the agricultural scientists available in Delhi, particularly at the Indian Agricultural Institute and asked them to talk freely and frankly about the state of agricultural science...” (Subramaniam 1995, p108)

Subramaniam decided to reorganize agriculture as a research system. There was a second set of biases he had to break. If the split between industry (steel) and agriculture was a modernist bias, Subramaniam had to also distance himself from a traditionalist bias that haunted Indian agriculture cocooning it in a smug satisfied civilizational feeling.

“Generally the approach taken in the Department of Agriculture was that India had a tradition of agriculture, dating back 5000 years”. (Subramaniam 1979, p12) This prompted in turn a feeling that given “the long tradition of practice there was no need for the farmers to learn anything new as farmers knew everything about agriculture”. Subramaniam argued that “there was no use holding the view that our farmers know all the best about farming. Most of the practices as well as the tools have their genesis in the inventive genius of our ancestors dating back to the Vedic age. Our main farm implement viz the country plough, the simple hand hoe and the sickle were developed at that time and it is a measure of our stagnation that they still dominate the rural scene”. (12) Subramaniam recognizes that India is a Vavilov zone for diversity and then argues that “if we do not participate actively in giving to our agriculture and progressive evolution we would bring discredit to our genetic heritage”. (Subramaniam 1979, p. 13).

But while farming is criticized, the traditional stereotypes around the peasant needed to be broken. Subramaniam had to break that great developmental stereotype so

dear to economists that “Indian farmers were mostly illiterate and tradition bound and would not take to this type of agriculture in which chemical fertilizers had to be applied at high rates...” (Subramaniam 1979, p23)

But rescuing agriculture from the traditionalists and breaking the stereotype of the peasant was not enough. One had to rescue science from the scientists. He had to break the old ideologies of science pursued for its own sake and weld science and extension work. “Research work at that time was not related to the problems of agriculture. There were no specific goals to be reached, and each scientist formulated his own programme according to his own inclination”. “This shows that well planned work will yield results quickly and I would strongly discourage the tendency to write in the introduction to all research projects that ‘being a research scheme no targets can be set’. This was true of Nineteenth Century science but is not valid in 1965”. (Subramaniam 1979, p30). Once he revamped the bases of agriculture which marked a generation of developmental narratives, Subramaniam had to fight a trickier battle. He had to outwit the treacle effects of ideology in India.

If science to be rescued needed conceptual lane switching, ideologically given the garb of the official had to be approached more playfully. One had to fight the arid ideas of leftism and nationalism and then cross the ideological divide and rescue America from the official Americans. What complicated this at that time while India was getting ready for the green revolution, it was facing drought conditions leading to an acute scarcity of food grains. The cabinet realized that it had to import 10 million tonnes of food grains.

Subramaniam battles with the left are legendary. On Nov. 12, 1965 the CPI party leader Hiren Mukherjee moved the motion that it continued dependence on the import of food grains under the PL-480 agreement was indigenous to the economy and derogations to our honor” (Subramaniam 1995, p166). To emphasize that it was not an ideological motivated one, he cited Vinobaji and K.M. Munshi as condemning PL-480 imports.

Subramaniam was not deceived. He thanked Mukherjee for drawing attention to the food problem and replied.

“My only charge against him as he and his party always do, he tried to take advantage of the mood of the nation”. Subramaniam suggested that “the resolution was not as innocent as it looked”. (Subramaniam 1995, p.166).

Subramaniam explained that India had to realize that so called revolutionary approaches were inadequate. Ideology was not going to solve the problems of production. Only science as a middle ground between ideologies was capable of achieving results. In a strange sense, Subramaniam was the only Nehruvian who used science to battle leftist ideology. He could confidently question the hyphenation between science and socialism”.

He made one further move by rescuing the poverty debates from the ideological custody of Marxism. He warned that if we did not import food to sustain ideological purity, “it is not we members who would suffer. Once scarcity conditions begin to persist, it would be the people in the lowest ring of the ladder who would be affected first....So when the Honorable members want me to take the risk of not importing food, they are really asking me to play with the lives of the poorer sections of the people.” (Subramaniam 1995, p170). He tried to convince them that “self sufficiency” could not be a rhetorical farm to cudgel opponents in parliament. He observed, “if look at various countries in the world, which have reached this elusive target of self-sufficiency”. But he has not abandoned the leftist bone as yet. Referring to Bhupesh Gupta’s accusations he talks of a recent visit to the FAO biennial conference. “I looked into the other countries which have been depending on imports. I found, for example, that the Soviet Union which has been trying with all the land reforms, and which I am sure will be placed before everybody as an ideal to search, has been importing food grains on a large scale” (Subramaniam 1979). He adds that the USSR had in fact purchased 7.5 million tonnes from USA. But he added that needed the Russian tractor nor the American food import was a panacea. It was just that India was in a transitional period where it was forced to proceed tactically.

It was not just leftist ideologist of a bumbling adolescent variety that Subramaniam had to tackle. He had to also address the ham handedness of the Americans. By 1965 USA had decided to use food as a weapon of foreign policy. Lyndon Johnson had in fact asked Orville Freeman to have India “over the barrel” to make it capitulate on a whole variety of issues. Subramaniam had the cultural confidence to recognize several things. Firstly that Johnson like many Americans thought they were determining the categories of the world. Unfortunately Johnson always had a sense of self importance. If anything good or important was happening in the world, it would be a Johnson initiative. Johnson thought that the Indian farmer, the Indian minister and the Indian scientist was not adequate, and that he should take a hand in the initiation of strategy”. Yet he had the grace to realize that USA was generous. But in a deeper cultural sense he noted that United States was a society that failed to understand the nature of the gift. It was generous as giver but knew little on how to give the gift. “Unfortunately, it had to be recognized that America gives generously but does not know how to give. I reached the conclusion that they would give and still create a feeling of enmity through a process of giving”. (Subramaniam 1979, p 54) In the wheat memoirs both Borlaug and he speculate on the nature of aid as a gift. Aid Subramaniam realize benefits both the giver and the receiver, helping both the American farmer and the Indian government. Borloug goes further in fact and shows the lethal nature of aid as a gift. “There are a number of small countries where wheat is not a good crop because of the climate and the soil but nevertheless at high elevations the small farmers could fit the wheat into the cropping systems better than any other crop except potatoes. Yet by continuous importation of wheat – not just under emergency conditions, they have destroyed the market for the small farmers of the Andes”.

The battle of policies was not purely a battle of categories. In retrospect one realizes that while Subramaniam had fought a successful battle at the level of science and ideology, the nation state and national security as clichés still haunted the discourse. It was much later that Swaminathan borrowed the evocative power of security not for the idea of the nation where it was ceasing to be creative. Implicitly implied but never

stated is the need for a nation to be a more porous and global concept and for food with all its connotations of vulnerability, poverty, subsistence, marginality to acquire the hyphen of security. Food security was a concept that acquired a greater impetus in the later Swaminathan era.

Subramaniam realized that may be governance except in certain structure of agriculture and food was still remote to India. To create governance as a more inclusive concept one had to relook at government. To create this wider notion of the green revolution, Subramaniam and his group had to rescue it from three other professional groups- the bureaucrat, the economist and the social scientist.

One had to begun by dispelling a British heritage – the civil service. The dominance of the civil service man who even presided over technical ministries like steel, agriculture, “led to great problems in the field of the new administration”. Such dominance was appropriate and adequate as long as governance related to law and order or revenue collection. But when government had to deal with industrial development or agriculture the civil servant appeared both inept and obtrusive. When put in charge of industrial plants these officers were more concerned with rules, procedures and regulations than with the creation of an industrial culture. As a result plants were stagnant and productivity at a standstill. Subramaniam had to carry out a virtual purge of transfers in industry, science and agriculture to allow for the green revolution as a possibility.

Secondly, beyond the embeddedness of the bureaucracy, there was the Planning Commission as the other government. Today the Planning Commission has lost its halo but in the sixties it was a source of tremendous ideological and professional power. The economist as the other technocrat had to legitimize the green revolution as a strategic possibility. The Commission found it had little to do with the process.

V.K.R.V. Rao, the economist and member in charge of agriculture and irrigation was already peeved that he was being by passed. Interestingly the green revolution as a concept, as a strategy by passed the leading economists of the time. It was probably why a whole generation was to devout itself to a critique of the green revolution

proving their radicalism by fighting furiously whether more people went under the poverty line before or after the green revolution. One must mention in this context the confrontation of Subramaniam with two economists of the Indian Statistical Institute, B.S. Minhas and T.N. Srinivasan. In a devastating critique these two outstanding scholars proved that fertilizer strategy was inept and futile. Subramaniam acknowledged that it was a devastating attack but only within the normalcy of traditional agriculture. What these scholars failed to realize was that the new strategy visualized a quantum increase in synthetical fertilizers. V.K.R.V. Rao and his ilk were easily handleable but Subramaniam and Sivaraman and Subramaniam realized that these figures were still not iconic of planning. Planning and the mystique of economics was still associated with the legend of P.C. Mahalanobis at a meeting of chief ministers to explain his agricultural policy. Subramaniam is gratified to receive Mahalanobis' support. To recount it in his words. "Mahalanobis the architect of the planning policy was also present at the meeting. After my presentation of the case, he complemented me by saying nobody else had so far understood the various implications of the agricultural production policy and that he for one would support my policy. This was an unexpected source of support because the Mahalanobis model was then being put forward by everybody as being put forward by every body as the Nehruvian model was entirely different from the model. I had proposed for the agricultural sector". (Sivaraman, 1991, p.114) It was a gratifying moment. A legendary economist proved he was bigger than his own intellectual myth and helped pave the way for the methodology of a new research programme.

Finally there was the objection of social scientists who felt that the green revolution may destabilize the society creating greater inequalities. Subramaniam was sensitive to this but he realized he had to act. To respond and unravel every academic objection was futile. He realized that it was also politically risky. As he stated it, "this was an area where risks were two fold. One was the risk of continuing scarcity, the other was that in trying to remove scarcity something would go wrong. Thus both choices involved risk. It was a question of which alternatives posed bigger, more

dangerous risk. I thought facing scarcities was the most dangerous and therefore wanted...to launch the programme”.

III

The Green Revolution was a superb achievement within the normalcy of Nehruvian science and probably its greatest celebration of governance. For all its innovation, it's questioning of the relevance of ideology, traditional knowledge, development it took many of the basic categories of discourse for granted. It had the conventional approaches to nature, to science, to productivity sans ecological consciousness. It was Nehruvian victory that was forced to re-read itself in a changing context. To understand the creative demands of the effort and Swaminathan's emergence as a political theorist for grantedness of some of its earlier categories.

There was first its immaculate faith in the power of modern western science and its belief that traditional knowledge was inadequate to create the scales, the levels of productivity required for India. C.S. Subramaniam captured the essence of this scientific project in his discussions while preparing the Science and Technology Plan for 1974. "Science and technology are working miracles. They have enabled man to reach the moon...But can science and technology enable us to deal with rural problems more efficiently and effectively... science and technology have no meaning for 80 per cent of our people who live in rural areas". (Subramaniam 1979, p 79). Accompanying the commitment to science is a tacit agreement with the developmental discourse. In the two decades after the green revolution science was subject to a massive epistemological critique. And worse the development discourse was to prove embarrassing. It could not strut out to international forums without the consolation of prefixes. It had to be community development, participative development, local development or best sustainable development. Further the new debates on ecology had created the vocabularies of risk and vulnerability. Thirdly the green revolution had given short shift to traditional knowledge and now given the resurgence of the Vavilovian debates on diversity traditional knowledge was not only not an embarrassment but a resource even a commodity.

The innovators of the green revolution took the legitimacy of the modern state for granted. The state was to be sovereign, legitimate and democratic. But the critique

of science, development and state by civil society groups had created a new conceptual domain which either questioned or pluralized the categories the innovators took for granted. Reading the old green revolution documents reminds one of the minor classic, “Night thoughts of a classical physicist”, a reflection of a classical scientist confronting the merging success of quantum theory. The green revolution suddenly seems old fashioned. The moment of gratitude becomes the moment of embarrassment. The old categories nation-state-science-development which constituted the social contrast of the fifties and sixties now floats in a sea of new concepts necessitated both by the battles of grassroots groups in the last two decades of the century and by the merging demands of globalization. In fact three cities serve as markers of this great revolutionary change Stockholm, Rio and Johannesburg. They have served as symbolic markers within which the emerging biotechnological paradigms have to be read.

In making the transition from the green revolution to the biotechnology revolution one must emphasize that the line marking the two was not a border but a threshold. The movement to the second involved a political risk of passage through what anthropologist could call a liminal space – a period when categories, concepts, institutions had to be exercised and questioned. It was a period when the democratic imagination reworked itself beyond the standard categories of electoralism development and state sovereignty. To move from green revolution to biotechnology is to create textbook history where dissent, doubt, eccentricity that haunted the years of debate on science and development is erased or lost. A linear or conventional history will not do. Such a narrative would begin once again with the invocation of the demographic trap where the green revolution gets defined as a mere breathing space, a transition, a problem solving technique that has been outrun by the pace of the problem. We must remember Thomas Kuhn’s warning that the new paradigm often creates policy histories where the dissenting and the defeated and recessive have no spaces.

I must emphasize that the transition from GR I to GR II is not a gestalt shift. We don’t move from duck to rabbit instead we explore the creative use of hybrids, hyphens, mixes, domestication in the nature of the new social debate. The reason why we

emphasize this is that the biotechnology debate is constructed primarily in terms of the opposition between public and private. In this context one hears the usual dirge of the grand role-played by state science in GR I and the benign neglect it has been subject to with the increasing role of the private corporations and laboratories. The emphasis in all these ethnographies is on globalization and the acceptance of liberal democratic theory as a matrix for biotechnological innovation. Unstated in all these theories but implicit in them is what I have elsewhere called the Good boy theory of democracy. Simply put the Good boy theory of democracy posits a reductionist notion of democracy at a time when democracies were on the resurgence at the end of the twentieth century. The Good boy theory posits:

1. an equation of democracy with electoral democracy
2. An emphasis on human rights but closely linked to private property
3. a growing recognition of the importance of intellectual property patents and contracts.
4. A questioning of the role of the nation state and its ability to cope with the emerging global issues like climate change, bio safety leading to an economization of the future etc.

The debates of marginality, equity, vulnerability, the commons finds no space in this discourse as biotechnology and the liberal imagination. The two fragments, combine to create the general property regime, the systems of regulation that are growing even more dominant. The basic linkages in this world of global linkages in this world of global regimes is between the new economics and genetic science. Law, economics and science reweave themselves for the new global regime. The next part of the argument is something the author himself might disown. I want to suggest that Swaminathan self reflective critique of the green revolution led him to a different understanding of the biotechnology paradigm. Part of this understanding arose from Swaminathan's exposure to civil society groups whose critiques were initially hostile to the green revolution and the

developmental models it celebrated. Let me emphasize this. Swaminathan's later work can be read not as state driven or globally articulated but as a response of a new civic consciousness absorbing the critiques of the grass roots movements who have not always been kind to him and counterpoising globalism of biotechnology with what Martha Nussbaum called a new civic internationalism. Swaminathan begins with two sets of oppositions – public and private and civil society versus the global state. I am not saying that Swaminathan is an anti-Seattle activist but I would like to suggest that there is one reincarnation of him that has been sensitive to the politics of knowledge. He has taken major political issues and converted them to scientific policy sites. The nature of this strategy is different from the usual biotechnology narratives because he sees a crisis of agriculture as a crisis of Indian democracy. He confronts this by two strategies:

1. To create a new vocabulary which absorbs the dissenting imaginations of the last two decades and convert them into indices and thought experiments for evaluating biotechnology
2. to absorb the usual polarities dualisms of current thought by creating hyphens and hybrid spaces. This involves creative acts of institutional translation whereby global spaces are reappropriated temporarily for third world society. He does this by playing up the new civic internationalism as a counter to the global divide between public and private biotechnology.

We must emphasize that Swaminathan is a Lockean, committed to the perpetual revolution of modifications, hyphenations rather than a Hobbesian or Rousseauian figure. Finally I am not addressing the point whether Swaminathan is curbing, domesticating, translating, absorbing, and blunting dissent. All I am suggesting is that his two manifestoes (1999,2002) have possibilities, which he may not have intended.

IV

Swaminathan seems initially defensive about the critiques from civil society. In fact he repeatedly reiterates that the green revolution was ecologically sensitive, at least as far as land. In fact in the edited dialogue on the *Wheat Revolution* (1993) he insisted that the green revolution was a land saving form of agriculture. “ Take our own current wheat production of 54 million tonnes. If we were to go back to 1965-yield level, we would need another 35 million hectares under wheat and even the remaining forests would disappear (Swaminathan, 1993, 106). In a *Century of Hope* he again insists that one of the most beneficial consequences of the Green Revolution was its “ forest saving “ nature.

One can sense that he has been constantly chewing on the critique of his works and projecting it back into the history of science. He rejects that the 1948 Paul Hermann Miller of Switzerland was awarded the Nobel Prize for his discovery of the insecticidal properties of DDT. Yet within 14 years Rachel Carsons *Silent Spring* warns against the damage of DDT. Suddenly the very properties of DDT, such a broad-spectrum action and residual toxicity became its principal weakness (1999, p 57). Swaminathan seems to gradually realize that the green revolution may also require a range of ecological sensitivities to be sustainable.

Sustainability becomes as it were a matrix, an amniotic cocoon within which he developed his later concepts. A wag once said that sustainability like the nation state is a refuge of the scoundrels and dissenting self-reflective scientists. Initially two concepts seem to compete in his scheme- sustainability and food security. If the earlier green revolution talked of scarcity, productivity and national security Swaminathan feels that the activist connotations of the

word security must be transferred from the nation to food. Butler not guns needs more activist notions. But security is a network of concepts. Food security at the individual level needs security of livelihoods. Ecological security is the foundation on which food and livelihood security rest (Swaminathan 1999, p vi). Security and sustainability become a continuum in his work.

The scientist also realizes that physicalist notions of productivity will not do. One needs not just the availability of food, but economic access to it. Equally vital was the nutritional vitality of food. Malnourishment is also denial of access. It is around the philosophy of food that Swaminathan disaggregates the concepts of poverty to focus on women, children and marginals. Once poverty is disaggregated one moves from Malthusian scarcity to deprivation and eventually equity. The poor are poor only because they have no assets. Development now is asset building and value adding to the world of poor. Suddenly sustainability becomes a rainbow concept to include dimensions of economic viability, environmental soundness and social equity. Swaminathan political theory is a continuous search for new definitions and monitoring tools to reject this paradigm shift in the approach to development. It is a rigorous effort. Levels of analysis have to be stated so linkages can be maintained and established. In fact he sees NGO's as those how mediate concepts at the global level (climate change, WTO protocols) and institutions and practices at the field level. But what breaks the protocols of sustainability are the splits between public and private, rich and poor. But the standard oppositions between big business and Ngo leads nowhere. Swaminathan is the architect of the middle path, of the third way on biotechnology. He recognizes that the green revolution was the result of public goods research supported by public funds. In contrast the technologies of the emerging green revolution are spearheaded by proprietary science and can come under monopolistic control.

The question is does the current state of biotechnology allow transition to the evergreen revolution. The answer is that the current regimes lack the framework of concepts the consensual framework of innovative categories that

the Green revolution had. One virtually needs to invent new forms of constitutionalism.

For this one needs a different kind of approach. Ecology in the first world has been a form of negative discourse of exclusion proscriptions, of don'ts rather than dos. Swaminathan observes

“ The environmental policies advocated in the richer nations are designed to protect the high standard of living associated with the unprecedented growth in the exploitation of natural resources during the last century. It is of necessity a policy based on a series of don'ts. The poor nations in contrast are faced with the desire and the need to produce more food from hungry, thirst soils... They hence need a do ecology rather than a don't philosophy.” (Swaminathan, 2002,xii)

How does such an activist ecology confront the repressiveness of biotechnology? Swaminathan believes that dualisms and divides need social trust, trusteeship, partnerships, reciprocities, translations. In fact in a cultural and evolutionary sense he argues that there is no diversity between biodiversity and biotechnology. He claims eloquently that diversity is the feedstock of biotechnology. The statement is almost like a preamble to a constitution showing the links between traditional community breeders and modern biotechnologists. One without the other seems inconceivable.

Swaminathan seems to proceed by demanding inventiveness linking technology and community and then citing the efforts as if they are a beginning of case law. Example and anecdote keep piling on each other as we move from one international conference to the other. He continuously invents concepts to suggest new notions of community. The idea of the bio village is one such concept.

The village conceived this way is no longer a passive entity; infact it is embedded in three revolutions, informational, genetic, etc. The notion of the biosphere, the community gene bank and the seed village become experiments

in new collectivities which are also thought experiments for new forms of trusteeship. Swaminathan even proposes the virtual college to decentralize groups to manage different rainfall and temperature regimes.

Deep down Swaminathan is confronting the internationalism of one tradition of science with the parochialism of globalized science. For Swaminathan civic activism can create a network of structures that cuts through the exclusiveness of the global biotechnology. Most crucially Swaminathan helps forge a link between concepts and communities invented during the climate change debate, during the informational revolution and during the ecological debates. He is virtually setting the base for a new constitutionalism using science to create new thought communities. The challenge is how do we use the civic internationalism to transform the bio regulatory rule games more concerned with safety rather than equity into a playful venture. In attempting this Swaminathan might be placing a new wager on social theory that current concepts seem unable to perform.

Bibliography / References

1. R. S. Anderson, E. Levy and M.M. Barrie (1991), *Rice Science and Development Politics: Research Strategies and IRRI's Technologies Confront Asian Diversity (1950-1980)*, Clarendon Press, Oxford.
2. L.R. Brown (1970), *Seeds of Change: The Green Revolution and Development in the 1970s*, Praeger Foundation, New York.
3. Francine P. Frankel (1971), *India's Green Revolution: Economic Gains and Political Costs*, Princeton University Press, New Jersey.
4. V. Shiva (1991), *The Violence of the Green Revolution: Third World Agriculture, Ecology and Politics*, The Other India Press, Goa, India
5. B. Sivaraman, (1991), *Bitter Sweet: Governance of India in Transition*. Ashish Publishing House, New Delhi.
6. C. Subramaniam (1979), *The New Strategy in Indian Agriculture: The First Decade and After*, Vikas Publishing House Pvt. Ltd. New Delhi.
7. _____ (1993), *Hands of Destiny*, Vol. 1, The Turing Point, Bharatiya Vidya Bhawan, Mumbai.
8. _____ (1995), *Hands of Destiny: Memoirs*, Vol. 2, The Green Revolution, Bharatiya Vidya Bhawan, Mumbai.
9. M.S. Swaminthan and S.Jana (ed.) (1992), *Biodiversity: Implications for global Food Security*, Macmillan India Ltd. Madras.
10. M.S. Swaminthan (ed.) (1993), *Wheat Revolution: A Dialogue*, Macmillan Ltd. Madras.
11. _____ (1999), *A Century of Hope: Harmony with Nature and Freedom from Hunger*, East West Books Pvt. Ltd. Chennai
12. _____ (2002), *From Rio de Janeiro to Johannesburg: Action today and not just Promises for Tomorrow*, East West Books Pvt. Ltd. Chennai.
13. A. Varshney, (1995), *Democracy, Development and the Countryside: Urban- Rural Struggles in India*, Cambridge University Press.