Science, Sustainability and Social Purpose:

Barriers to Effective Articulation, Dialogue and Utilization of Formal and Informal Science in Public Policy[1]

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The communication among scientists, policy makers, public policy analysts and the common people in society is often fraught with ambiguity, anxiety and some times clear confusion. Not to mention the times when it is very clear. For instance most people who follow non-sustainable life styles genuinely believe (and some scientists whom they prefer to hear, endorse that), that science will find remedies for treating all the waste they create, and generate new sources of energy after non-renewable sources are exhausted. The clarity of communication among various stakeholders is not just a function of message though that is quite important. Several barriers to effective communication among various stakeholders influencing discourse on science and society are:

- *Linking `little science' and public policy*: A first gap is in the scientific field itself i.e. the formal scientists do not recognize, respect, and reciprocate the informal scientific knowledge, creativity and innovation at grassroots level in society (Honey Bee Network, 1989-99, Gupta, 80, 87,89-98). The science underlying the successful overcoming of some of the day-to-day struggles of economically poor but knowledge-rich people does not get articulated or acknowledged. Once the alienation from the creative impulses of the society takes place, the scientific agenda does not influence the public policy agenda as much as it could. It is important to underline here that the gap between scientists and policy makers is very low in some cases such as defense, nuclear power, or the big science be it for dams, hydro-projects or chemical intensive agriculture. May be the corporate and industrial lubricants and international aid smoothen the flow of such information, influence and the institutions. Once these links get strengthened, the other links between what I may call `little science' and public policy get weakened.

- *Tension between standardised knowledge and diversified need*: The second gap between civil society and policy makers is in the field of technology and scientific knowledge, and policy support for improving livelihood strategies of disadvantaged people. For a large number of people living in the high-risk environments such as drought or flood prone regions, forest fringe areas, mountain areas etc., there is not much scientific knowledge available that can improve their livelihoods. The question of communication to policy makers does not arise. And where such knowledge does exist, the barriers are very strong because of compulsions of bureaucratic need to

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generate standardized solutions in the context of the underlying ecological heterogeneity in the region. Organizational incentives for generating technologies with limited potential for diffusion are very low (Gupta, 1992, 1986).

- Barriers to blending excellence in formal and informal sector: Thirdly, the policy makers also evolve filters and structural barriers that prevent them from recognizing the potential that exists for blending formal and informal science. Thus while providing funds or other support, they do not insist that (a) such bridges be built and accordingly, (b) faster progress in sustainable development of people's potential and resource capabilities takes place. So much so that a large number of policy documents use the term `resource poor people', as if the knowledge is not a resource or, that the people are poor in this resource as well. The example of Honey Bee network demonstrates the potential of such blending. This network exists in more than 75 countries of the world. It draws upon the technological and institutional innovations for sustainable natural resource management developed by people unaided by NGOs, market or state and, proves how much creative potential exists at grassroots level. How many research and development programs have been discontinued, modified or started in response to more than nine thousand innovations documented already? How many extension messages i.e. technology transfer information capsules have incorporated the lessons of successful people's innovations improved through application of formal science or otherwise? The answer is quite disappointing. Policy makers seem to deny the power of the `little science' and thus reinforce the continued dominance of non-sustainable development processes

- *Communicating Simply*: The fourth barrier is about the language used by civil society, policy makers and the scientists. The policy makers want scientific information in a way that they can make a difference to the popular mood of both their constituents and their clients. The scientists often are unsure, use jargon that most people outside their peer group do not understand, and have difficulty in reducing the complex information to its bare minimum simple core.

- *Vernacularising the discourse*: The fifth barrier is about the language of discourse. Very little if any discourse takes place in vernacular[2] language. Scientists do not share their findings of scientific research about local resource management or otherwise in the language that people understand. They connect globally but get disconnected locally. The civil society thus cannot participate in the scrutiny of science as well as public policy because policy discourse also does not take place in local languages many times.

- *Impermeable institutions of discourse*: The sixth barrier is about the impervious nature of scientific and policy discourse. Apart from the language, the participation of civil society is impaired in larger discourse on science and development due to (a) structural bureaucratic closeness or secretiveness, (b) inaccessible platforms of dialogue, (c) lack of institutional requirements for validating scientific agendas in

[2] I am conscious of the legacy of the term `vernacular' which during colonial period connoted some thing as inferior, the language of native people. However, I use it merely as a pointer to local languages.

consultation with other weaker stakeholders, particularly women. Honey Bee network has challenged the unaccountable nature of this discourse by insisting that we should share every thing we learn from people back with them in their language before sharing it with outsiders, and acknowledge them just as we cite our peers in science. It is a matter of great distress that several scientific disciplines (such as ethno-biology) are no less exploitative than other institutions of society. The people are never cited, and told about how the knowledge obtained from them in good faith has been interpreted or used. The question of sharing the value-added gains, consultancy etc., does not arise. The Honey Bee philosophy implies two things: First, just as honey bee takes pollen from flowers and they do not complain, we should ensure that people do not complain when their knowledge is taken by outsiders. They should be made partners in the process and get a fair share out of any economic or other gains made in the process of developing drugs or other products based on their knowledge. Second, the Honey Bee connects flower to flower and thus we should connect creative people from one part with people in another part through lateral Knowledge Networks and local language communication.

- *Dealing with risk and uncertainty: control versus accountability*: The seventh barrier is about the way the risk and uncertainty are dealt with in science and public policy. Policy makers seem to use scientific knowledge even if partially to extend their control over areas in which they are not sure otherwise. When they want to reduce their zone of responsibility they complain about uncertainty. A risky problem is converted into uncertain problem when responsibility has to be avoided or disowned and vice versa (Gupta, 1989, 1997). Policy makers are in hurry and often want the answers by yesterday rather than waiting for tomorrow. Scientists always need more time to answer questions. Fussler and James (1996) note three tendencies on the part of the scientists in this regard: Scientists perceive risk differently, (a) a highly familiar risk (speeding or smoking) is discounted or ignored; (b) a new risk (AIDS) attracts more attention than chronic risks (tuberculosis, cholera, fire arms) and (c) a familiar problem with a new uncertain cause (endocrine effects or breast cancer) gets more attention than the known causes. We need to find ways of overcoming these tendencies.

- *Why are science budgets most dispensable and reducible?* The eighth barrier is about the policy support and institutional capacity in scientific institutions in developing countries. Given the resource constraints, and increasing pressure to reduce budget deficit, science budgets (particularly basic science), low as they are, get cut often first. Department of Indian System of Medicine gets four per cent budget out of the total budget of Health sector and more than ninety per cent of livestock population and eighty per cent human population depends mainly upon alternative medicine. There is a need for international commitment to remedy this situation in time bound manner but while doing this, the bridges between little science and the big science must be built up properly.

- *Listening to weak interest groups: Developing ethical codes:* The ninth barrier is about the political weakness of interest groups favoring responsible science.

Scientific associations were supposed to perform this task but in most developing countries, these associations may have furthered career goals of a particular stream of professionals but did not intensify the dialogue on responsibility and accountability of science. The influence of international collaboration in science in some cases has been very positive but in many cases has insulated local communities of scientists from their social base. The Project Camelot led to the development of code of ethical conduct among several social science societies in USA. Similar efforts are yet to take place in many developing societies.

- *Educating Science:* The tenth barrier is about the way the science education and communication is pursued in many developing countries. The textbooks make hardly any reference to people's ability to solve local problems creatively and in innovative manner. How the frontiers of science can be extended by blending local knowledge with formal science is ignored. The media gives scanty attention to increasing popular understanding of science underlying day-to-day life. Information technology has not yet been used to democratize the access of lay people to scientific knowledge in their language and idiom. Ecological indicators which people can use themselves to monitor the status of ecosystems health are not noted or diffused or coordinated. The impact of science on sustainable development through informed and open policy debate can take place through larger participation of NGOs, civil society, creative communities and individual innovators. Only then can change in life styles take place without which sustainable development in north and south will remain a pipe dream. Science should not be used to nurture a vain hope that a highly consumptive and energy inefficient northern life styles can co-exist for long time with equally inefficient life styles of the elite in the south. The ethical basis of sustainability also requires responsibility towards future generation to be reflected in current consumption values. We need more science and not less to make transition towards better communication among and response from various stakeholders. Utilization of science in public policy requires new global partnership among formal and informal experts from around the world in an open, accountable and accessible manner so that larger civil society can ensure that its agenda and concerns are reflected in these partnerships. Otherwise, stronger global links may increase the barriers in the way of local disadvantaged but creative and innovative people. They may not be able to influence the articulation, design and resolution of conflicts in sustainable use of biodiversity, natural resources and other knowledge resources.

Sustainability is after all a concern for long term survival with self respect, dignity and mutual respect. Large number of farmers, pastoralists and artisans have used natural resources like land and water in sustainable manner in many parts of the world for a long time. Why cannot we learn from some of these traditional as well as contemporary sources of knowledge systems?

How can we provide venture promotion funds, technological links and access to scientific information so that green innovations developed by people at grassroots level and also in scientific labs around the world can be scaled up and replace the non sustainable outcomes of derooted science that we have seen so far?

The answer to this question will determine, whether we can ensure that our future generation blesses us or curses us.

BIBLIOGRAPHY

Claude Fussler and Peter James. "Driving Eco-Innovation: A Breakthrough Discipline for Innovation & Sustainability." Financial Times Pitman Publishing. 1997

Gupta Anil K 1985a Socio-Ecological Paradigm for Analyzing Problems of Poor in Dry Regions, Ecodevelopment News, (Paris) No.32-33, pp 68-74.

Gupta Anil K 1985b On Organising Equity: Are Solutions Really the Problem?, Journal of Social and Economic Studies, Vol.2, No.4, pp 295- 312.

Gupta Anil K 1987a Why Poor don't Cooperate: Lessons from Traditional Organizations with Implication for Modern Organizations, in Clare G. Wanger (ed.), Research Relationship Politics and Practice of Social Research, George Allen and Unwin, London,1987, pp.111-127.

Gupta Anil K 1987b Managing Access, Assurance and Ability: that would Rural Development Managers Learn and Unlearn? Working Paper No. 710, Indian Institute of Management, Ahmedabad, October, 1987, Presented at International Conference on Designing Curriculum for Rural Development Training, Kennedy School of Government, Harvard University, Boston, 1987.

Gupta Anil K 1989a Managing Ecological Diversity, Simultaneity, Complexity and Change: An Ecological Perspective. Third survey on Public Administration, Indian Council of Social Science Research, New Delhi. Published in "A Public Survey of Research in Public Administration, 1980-1990 (Ed.V.A.Pai Panandiker), 1997, pp.431-495.

Gupta Anil K 1989b The Design of Resource-delivery Systems: A Socio-ecological Perspective, Int. Studies of Management and Organization, Vol-18, no-4.pp 64-82, 1989.

Gupta Anil K 1990 b Scientists' view of farmers' practices in India : Barriers To Interaction In: Farmer First, (Eds. Robert Chambers, Arnold Pacey, and Lori Ann Thrupp), pp 24-30,

Gupta Anil K , N.T.Patel and Rekha N Shah 1990c Review of Post-Graduate Research In Agriculture (1973-1984):Are We Building Appropriate Skills For Tomorrow ? IIM,Ahmedabad. W.P. no-843. 1990, P.13.

Gupta Anil K 1991 Household Survival Through Commons: Performance in an Uncertain World. Presented at International Conference of Society of Advances in Socio-Economics and IAREP, Stockholm, June 16 - 19, 1991, IIMA Working Paper No.940

Gupta Anil K 1992 Creativity, Innovation and Experimentation at Grassroots Level: Building Upon Indigenous Ecological and Technological Knowledge Systems, Draft paper, Mimeo.

Gupta Anil K 1993a Honey Bee : An Accountable Global Network of Grassroots Innovators

and Experimenters, Development, Journal of SID., 65-

Gupta Anil K , Kirit K Patel, Astad Pastakia, Vijaya Sherry Chand, Shailesh Shukla and members of Honey Bee Network 1993b Secular Basis of Sustainable Spirit: Understanding Roots of Creativity and Innovations at Grassroots Level. Presented at Congress on Traditional Sciences and Technologies of India, IIT, Bombay.

Gupta Anil K 1993c Can You add without Subtraction: Reorienting Agricultural Research for Sustainable Outcomes, Invited contribution in the First Agrciultural Science Congress, National Academy Of Agricultural Sciences, Nov 12-14, 1992, IARI, New Delhi; published under the title, Can We Add Without Subtraction: Some Awkward Questions for Revitalizing Agricultural Research Strategies, in Proceedings of First Agricultural Science Congress, Ed.Prem Narain, New Delhi, National Academy of Agricultural Sciences, 1993, pp.122-129.

Gupta Anil K 1994 Transferring Science For Development and Diffusion of Technology: Agenda For Recasting Extension Science Research For Drylands / Rainfed Regions. IIM, Ahmedabad. October 1989, p 45 , also presented at International Conference in 'Making the Link', ISNAR, The Hague, November 1989, Excerpts published in Indian Farming; published under the title, Development and Diffusion of Technology: Recasting Extension Science for Drylands, in Dryland Farming in India: Constraints and Challenges, (Ed.) Dr.J.L.Raina, pp .310-340.

Gupta Anil K 1994 b Enviromental policy analysis for maintaining diversity. The Indian Journal of Social Science Vol 7 No. 1, Sage Publications, 1-31

Gupta Anil K 1995a Sustainable Institution for Natural Resource Management : How do we participate in people's plans. In People's Initiatives for Sustainable development : Lessons of Experience (Eds. Syed Abdus Samad , Tatsuya Watanabe and Seung- Jin Kim), Chapter 15, pp 341- 373.

Gupta Anil K 1995b Suggested Ethical Guidelines for Accessing and Exploring Biodiversity - A Pew Conservation Scholars Initiative, October 21, 1994 (A collective effort of Pew Conservation Scholars based on three backgrounders two of which were prepared by Gupta, 1994), Eubios Journal of Asian and International Bioethics 5 (Japan), March 1995, pp.38-40.

Gupta Anil K 1996a Social and Ethical Dimensions of Ecological Economics, Key Note Paper invited presentation at the Conference, Down To Earth of International Society of Ecological Economics, Costa Rica, October, 1994, in Ed. Robert Constanza, Oleman Segura and Juan Martinez-Alier, Getting Down To Earth: Practical Applications of Ecologial Economics, Washington DC: Island Press, 1996, 91-116

Gupta Anil K 1996b The Honey Bee Network Strengthens: Knowledge for Crops, Creativity and Compensation, Diversity, Vol.12, No.3, .76-78.

Gupta Anil K 1997a Building Upon What Poor are Rich In: Honey Bee Network : Linking Grassroots Innovations, Enterprise, Investments and Institutions, paper presented at the 22nd World Conference on "Which Globalization : Opening Spaces for Civic Engagement" in Santiago de Copmpostela, Spain, May 21-24, 1997, published as "The Honey Bee Network: Linking Knowledge-rich Grassroots Innovations" in Development, Vol.40, No.4 pp.36-40.

Gupta Anil K 1997b Managing Ecological Diversity, Simultaneity, Complexity and Change:

An Ecological Perspective. W.P.No. 825. IIM Ahmedabad. P 115, 1989, Third survey on Public Administration, Indian Council of Social Science Research, New Delhi. Published in "A Public Survey of Research in Public Administration, 1980-1990 (Ed.V.A.Pai Panandiker), pp.431-495.

Gupta Anil K, Kirit K Patel and others 1997c Participatory Research : Will the Koel Hatch the Crow's Eggs, paper presented in the International Seminar on Participatory Research and Gender Analysis for Technology Development, organised by CIAT, Colombia, 1996 ; In: New Frontiers in Participatory Research and Gender Analysis, pp.209-243.

Gupta Anil K , Agriculture Une chance a saisir, Courrier De La Planete, No.46 - Juillet-aout, 1998 - 40 FF, p.22-23.

Gupta Anil K , People's Science and Formal Science -Reorienting Research through Knowledge Networks, Forets, Trees and People Newsletter No.39, August 1999

Gupta Anil K, The Honey Bee Network: Voices from Grassroots Innovators, Cultural Survival Quarterly, Spring 1996, pp.57-60.

Gupta Anil K , Ethics of Foreign aid: Why is it always ignored?, published in "Criteria for Foreign Aid" (Ed.Frads Dolberg), Aarhus: The Development Research Working Group, University of Aarhus, Denmark, 1992,pp.30-50.

Gupta Anil K , Securing Traditional Knowledge and contemporary innovations: can global trade links help grassroots innovations? Honey Bee perspective, invited paper for World Trade Forum, Bern, Switzerland, August 27-29, 1999