

Perceptions and Acceptance of Public Risks



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Let me start with some recent newspaper headlines which I found somewhat disturbing.

- I. Public agitation against the Koodankulam nuclear power project
- II. National moratorium on Bt Brinjal
- III. Inter-state controversy over the Mullaperiyar Dam

The Nuclear Power Corporation of India is building two 1,000-megawatt nuclear power plants on Tamil Nadu coast at a cost more than Rs.10,000 crores. The plants have been under construction for nearly a decade and are almost ready for commissioning. Suddenly, there is a public uproar against the safety of the plants, presumably in the backdrop of the Fukushima nuclear event, with a demand that the project be scrapped. Repeated assurances by the experts do not seem to be convincing the agitators. That this country cannot afford to say NO to nuclear power is also not convincing to the agitators.

The Bt brinjal is suite of transgenic brinjals created by inserting a crystal protein gene from the soil bacterium *Bacillus thuringiensis* into the genome of brinjal cultivators. The Bt brinjal has been developed to give resistance against specific insects, in particular the brinjal fruit and shoot borer. The Bt brinjal was approved for commercialisation in India in 2009, but after a public outcry, the Indian government applied a moratorium on its release.

The Mullaperiyar Dam is a masonry gravity dam on the Periyar River in the Kerala state. The dam was constructed between 1887 and 1895 by the British Government to divert water eastward to Madras Presidency area, the present-day Tamil Nadu. The dam and the river are located in Kerala but the dam is controlled and operated by Tamil Nadu state under a period lease. The dam is an 'endangered' scheduled dam under the Kerala Irrigation and Water Conservation (Amendment) Act, 2006, the control and safety of the dam and the validity and fairness of the lease

agreement have been points of the dispute between Kerala and Tamil Nadu states.

All the above projects are clearly in public interest but acceptable public risks as perceived by a section of the population are prompting them to agitate against the projects. Repeated assurances by the specialists do not seem to be cutting ice with the agitators. It is also unrealistic to expect full consensus in matters of public perception. Are the long term interests of the country being compromised by these agitators? What is the way forward?

One would be tempted to say "Well,



As far as safety is concerned, the Russian-built VVER-1000 reactors set up at the Kudankulam Nuclear Power Plant have some of the most advanced safety features. The reactors have a unique passive safety feature which provides cooling to the nuclear fuel without the need for operator action or power supply.

it is the responsibility of the government to protect the interests of the public and take appropriate decisions based on a majority view". There are two wings of the government that are mandated to take decisions in public interest – the bureaucracy and the elected representatives. What are their past records? Let us take two examples – the introduction of Euro-II cars and CNG in Delhi. Both these decisions came through judicial interventions, neither executive nor legislative interventions. One might say after all, we are democracy. Let the people decide".

But the question is: "Is the public informed enough, particularly on issues that are highly technical?" especially when

there is no consensus? Are there channels to express and force their choices other than the periodic elections? How to protect the system from vested interests? This indeed is a challenge to the democracies.

Let me start with a simple analysis of our day-to-day decision making processes. We are all used to a cost-benefit analysis in most of our decisions. When the decision also involves a risk, a risk-benefit analysis also becomes important. The issue becomes important if costs, benefits and risks are spread over a long period of time.

Sometimes, the costs of not making the right decision at the right time also becomes important and has to be taken into account in the decision making process. All of us make such choices in our day-to-day life almost on daily basis.

Let me take for example the purchase of a house that most of us have done at some time or another. We need to worry about the cost, the rental value, anticipated appreciation, potential risks, etc. Some of us have delayed the decisions for so long that we lost golden opportunities that we repent later. Sometimes, the costs or the risks need not all be beneficial. Take the case of adventure sports like bungee jumping. While the costs are

financial, the benefits are psychological and the risks are extreme.

When the choice involves matters of new and emerging technologies, the choice indeed becomes complex. I always say don't offer to buy a colour television or a cell phone to your family because by the time you purchase the item, it is already out-of-date and you may be open for ridicule. In some areas like the emerging stem cell therapy, we are as ignorant as any other non-specialist. But in all these cases, the costs, benefits and risks are confined to individuals or a small group of people like a family and we make choices. When the costs, benefits and the risks are not limited to an individual or a family but involve the



Building of the Riband dam near Pipri in the Sonbhadra district of Uttar Pradesh displaced around 2,00,000 people. However, due to a misjudgment of the catchment area, people had to move again as reservoir area expanded in the early 1960s. In 1975, people were again displaced for the NTPCL Shakthinagar thermal project.

public at large, the decision making process is indeed very complex and may involve not only financial and technical but also ethical and moral issues. More importantly, the population benefitting from the choice may not be the one that bears the costs and risks. In such cases, it is nearly impossible to have a consensus, leaving pockets of disgruntlements. They are also open for exploitation by vested interests.

Let me take one well known example – the Singrauli resettlements. The area in the eastern part of Madhya Pradesh and the adjoining southern part of Sonbhadra district in Uttar Pradesh is collectively known as Singrauli. Due to rich coal deposits in the area, Singrauli is often referred to as India's energy capital. A cluster of thermal power plants, both government and private owned, dot the area with a declared potential for 35,000 MW of generation capacity. The history of displacement in this area is indeed revealing. The entire area of Singrauli was originally covered by dense forest. The river, Rihand, dammed in late 1950s (Govind Vallabh Pant Sagar Dam) to create an artificial lake called the Rihand reservoir.

The building of the dam displaced around 2,00,000 people. However, due to a misjudgement of the catchment area, people had to move again as reservoir area expanded in the early 1960s. In 1975, people were again displaced for the NTPCL Shakthinagar thermal project. Not only tribals were disproportionately affected but the so called

compensatory development had little to talk about – no schools, no health centres, no roads, not even electricity and clean drinking water. Very high unemployment among the displaced communities has also been noted. It is not surprising that in 1993, a proposal to expand the Rihand Ash Dike through World Bank financing met with stiff resistance from the villagers.

The pattern is replicated across India, souring relations between the government, corporate, NGOs and the public. In contrast, there are important lessons to be learnt in another case – relocation of Yeravadi tribes in Sriharikota., the hub of India's space launch programme. By a conscious decision,



For building the Sriharikota satellite launching facility, the hub of India's space launch programme, it was consciously decided to co-habilitate rather than rehabilitate the local Yeravadi tribes, which made them partners. The island has seen no conflicts in the last few decades.

the strategy was to co-habilitate rather than rehabilitate the locals which made them partners. The island has seen no conflicts

during the last few decades. One may also recall some of the recent discussions on human-animal conflicts where even ethical and moral issues surface. Sometimes, especially in the case of new and emerging technologies, neither the cost nor the risks can fully be enumerated. A hope to arrive at a consensus through truly democratic means is indeed a utopia. We also seem not to learn from our past experiences.

While costs, benefits and the risks at the public level are all complex, risks are even more complex. The insurance people have always been doing risks analysis, but mostly based on past experiences. We all know that risk perception is a highly personal affair. It is said that pleasure and pain are personal and subject to individual experience. It could be your own experience or that of your close ones. Risk defined as unexpected pain is no exception and is highly personal. On the other hand, personal experiences, however extensive they are, cover a miniscule of risks one faces in one's life time. Risk perceptions are therefore not always logical, they are often psychological.

Much of superstitious beliefs and phobias that one sees around belong to this class. I was surprised to discover at the age of 60 that I am afraid of space constrictions during my visit to Cu Chi tunnels in North Vietnam. Technology risks are even more complex. Sometimes these risks are totally futuristic. Risk communication therefore plays a very important and challenging role in moulding individual risk perceptions, especially when the risks are of technical, futuristic and probabilistic. It is also important to note that not only media play a major role in moulding risk perceptions but they are also most effective on the younger population. On matters that depend on public perceptions, I believe that wide-spread contact with the student community is the most effective way of communication.

Risk acceptance is even more complex. Acceptance at personal level is highly individualistic. I mentioned about adventure sports where even a risk to life is willingly taken. Risk acceptance at the personal level and at the collective level need not be the same. At the collective level, sociology and culture play a very important role in defining public risk acceptance.



The British De Havilland Comet was the first commercial jetliner in the world, but first few years of experience with Comet jet engines in the 1950s were disastrous with a series of accidents, which made Britain “say no to jet engines” and miss the opportunity to be the world leaders in this technology though they were the pioneers.

Let me ask you a simple question: “What is the most serious risk to life that an average Delhi resident faces?”. Is it pollution, terrorist attack, acts of war, natural disasters like floods and earthquakes, traffic accidents, or anything else? Following the devastating earthquake in Bhuj, I had received an international delegation to discuss strategies for earthquake proofing Delhi. One of the delegation members remarked that the biggest risk that an average Delhiite faced was fatal traffic accidents. He was wondering why India is paying so little attention to regulating traffic while worrying about a possibility of an earthquake. Clearly, public perceptions and acceptance of risks differ widely. Here again, media can play a major role, but a sustained campaign and demonstrated compensatory benefits to offset the risks accepted are more likely to be effective.

Sometimes it is argued that why should anyone opt for a risky choice at all? Why can't we take only safe choices? At the outset, we all know that there is nothing that is absolutely safe. More importantly, a safe choice of today may not remain so over a period of time. On the other hand, a risky choice of today may turn out to be safer in course of time. Let me take the example of jet engines for passenger travel. The first few years of experience with Comet jet engines in the 1950s were disastrous with a series of accidents. We now know why, but at that time the feeling was “say no to jet engines”. Great Britain precisely did

that. Fortunately the world didn't and moved forward. Britain lost the opportunity to be the world leaders in this technology though they were the pioneers.

When India introduced the fly-by-wire aircrafts, A-320, in the early nineties, we opened our account with the air crash on the outskirts of Bangalore. The memory of another A-320 air crash in 1988 in Habsheim, France in the prestigious Air Show was still fresh in our memory. We grounded the entire fleet of A-320's for a long period,

but fortunately resumed after convincing ourselves that there was no safety issue with the aircraft. In fact, our airports were underprepared to exploit some of the safety features of the aircraft. When our airports were ready, still an accident took place in Mangalore. They said “Ah, the pilot was sleepy”. When they were negotiating with the pilots, yet another aircraft landed on the nose wheel. They said “Ah, the pilot had a fake certificate”. When DGCA is tightening



One of the first fly-by-wire aircrafts, A-320 that was inducted into Indian Airlines in the early 1990s crashed on the outskirts of Bangalore during landing, leading to the grounding of the entire fleet of A-320's for a long period. But there was no safety issue with the aircraft.

the licensing procedures, I continue to travel by air. My wife believes that the road journey to the airport is more risky than the air journey itself! Any time I overhear someone whispering “Solpa adjust maadi” (which in Kannada roughly translates to “Please adjust a bit.”), I feel a chill in my spine. Still I take the plane knowing fully well that anything can happen but the balance of advantage lies in utilising this technology while

continuously upgrading the safety features.

In contrast, one accident in the early days of airship development led to complete denial of this technology for public use. While we are discussing a ban on the use of helicopters in the North-Eastern states, it hurts to think that the airship could have provided a safer option. The message is clear. The answer does not lie in saying NO to any technology option in our search for an absolutely safe option. Such an absolutely safe option does not exist either. We need to continuously evaluate the advantages and the risks and prepare the public to take informed options.

What is the dynamics of public risk perception and public risk acceptance? How does one translate financial and technical risk assessment into public perceptions? How do public perceptions mould public acceptance of the risks? What is the role of media in this? These are complex issues that warrant and interdisciplinary research and debate. Unfortunately, neither the research funding agencies nor the mandated departments support such multidisciplinary research and advocacy.

National Institute of Advanced Studies (NIAS) has a unique advantage in having technologists, sociologists, psychologists and even philosophers under one roof with no walls and is ideally placed to analyse and understand public risk perception and public risk acceptance. We recently had a two-day brainstorming session as our first effort to understand public risk from a multidisciplinary perspective. In due course we hope to contribute to the policy making process in matters not only of new and emerging technologies but also in matters of social conflicts. The INSA Science and Society Unit can play a proactive role in promoting such studies.

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