SANCTIONS- WHO DO THEY HURT

One of the reactions to the nuclear explosions at Pokhran has been the imposition of sanctions by the United States on various Indian institutions. These include all the research institutes funded by the Dept. of Atomic Energy (like the Tata Institute of Fundamental Research, Mumbai and the Institute of Physics, Bhubhaneshwar) and various other institutes and companies which ostensibly do work which could potentially be used for helping the nuclear program. There has been a lot of hue and cry about the effects of such a step on Indian science, to the extent that a letter has been circulated among the various universities and institutes pointing out the disastrous effects this would have on scientific progress in India.

What do the sanctions entail concretely? Scientists working in the targeted institutions can now not collaborate with any institution in the United States. They will in all likelihood be denied visas for visits or conferences. Equipment cannot be bought for laboratories from US companies. Are all these necessarily calamitous for Indian science?

Before we can answer such a question, we need to answer a more basic question as to what constitutes Indian Science? Without going into debates about swadeshi science vs. international science, I think an operational definition could be that Indian science is what is done by scientists working in India. Though by no means a non-controversial definition, it is certainly the least value loaded one. Once this is accepted, then it follows that we need to look at the various dimensions of science as it is being practiced in India.

With the second largest scientific human resources in the world, we certainly have an impressive scientific infrastructure. We have a large network laboratories associated with Atomic Energy, Space and Defense. There are also the CSIR laboratories and the Regional Research Laboratories as well as the research institutes like TIFR and IISc, Bangalore. At the lowest level, we have some two hundred and twenty five universities. Of course, like the society we live in, the scientific world is also divided into haves and have nots. The budget of the labs doing work in Atomic Energy, Space and Defense is presumably huge though this is never disclosed by the government. Out of the remaining, the research institutes, which are few in number, get a disproportionately large percentage of the total amount of funds. The Universities, on the other hand, are constantly starved of funds for even basic facilities. So we have a scenario where a few research institutes, with a few hundred scientists are lavishly funded in terms of infrastructure as well as other scientific resources while the universities by and large languish with chronic shortage of money even for teaching laboratories, let alone research laboratories. The state of libraries, classrooms and laboratories in most of our universities (including prestigious ones like Delhi University) has to be seen to be believed.

It is no one's contention that the research institutes are not doing good science. The point is that the whole idea of promoting islands of excellence by lavish funding within the overall sea of deprivation of the large number of scientific workers in the Universities is short sighted. If for nothing else, the science planners have to realize that science is ultimately done by human minds and if the nursery for scientific talent (the universities and colleges) are starved for funds, there will never be an overall promotion of science in the country.

The result is the caste system in the scientific community. If you are one of the lucky ones working in the research institutes or the lavishly funded labs, you have access to the latest equipment, journals and of course foreign trips for collaborations and conferences. On the other hand, if you happen to one of the vast majority who teach in one of the Universities, you have to contend with libraries which have no funds for journals, labs which have no maintenance grants to repair equipment and in some cases even classrooms with no lights. It is in these circumstances that the average scientist at a university works. For her, just routine duties are a chore, leave alone path breaking research. Yet, even in this morass, individuals do their bit; one occasionally finds a paper written by some scientist teaching in some small town in international journals.

Now as for the sanctions, the Atomic Energy, Space and Defense establishments have always been restricted in terms of their access to latest technology. Yes, there will be restrictions on their personnel traveling to the US for visits (witness the denial of visa to Prof. Chidambran for attending the crystallographers conference) but other than that, there will not be too much change since they have been operating with quasi sanctions for a long time. The people most affected by the sanctions will be the handful of scientists working in the research institutes. Most of these people travel frequently to the West for purposes of academic visits and conferences. In some cases, there are active collaborations with institutes and laboratories in the West. These activities will definitely be curtailed. As for their poor country cousins working in the universities, their horizon in most cases is limited to the next Indian Science Congress being held in Jaipur or Chennai. For them the sanctions have no meaning. Occasionally, some university department may face problems in importing some equipment, but this will be rare.

This whole debate about sanctions, reminds one of the situation faced by the Soviet Union and China in the last several decades. Scientists working in these countries had almost no access to information (in the pre Internet days), exchange visits and certainly no equipment (including computers) from the West. This meant that they had to in some senses reinvent the wheel and of course look for research problems in which this embargo had the minimum effect. Yet, even in the face of this "adversity", they did world class science. From the Soviet space programme to the particle accelerator in China, the facilities created by them can claim to be among the best in the world while their researchers in many fields are world class.

Contrast this with the situation here. In 1911, a Dutch scientist H.K. Onnes discovered superconductivity. To get to the low temperatures, he needed liquid helium which he made from the sands obtained from the Malabar coast of India. It is shocking that even today, we cannot build a liquid helium plant by ourselves! In all these years, can any one of our labs or institutes claim to have made any extraordinary contribution to science? We shall not even comment on these ivory towers doing “relevant” science, since even the basic design of the bullock cart wheel has not been improved in our country for the last millennia or so!

Of course, there are many reasons why science in India as compared to say the Chinese science is in such a bad state. Centralization of decision making, excessive bureaucratization, skewed priorities etc. But I think there is a important reason which contributes to the present state of science in India. This is the lack of confidence in one’s own capabilities. A majority of our scientists work on research problems which have already been explored by their counterparts in the West. The research agendas are decided by the dons working in Princeton and Berkeley and our scientists merely follow it faithfully. Rarely do we see a new field being explored by them or even any new fundamental idea being generated. It is then obvious that these people who tread the trails blazed by their brethren in the West, will also seek recognition by the West. Thus the whole cycle of visits and conferences, at an enormous cost to the exchequer. The efficacy of these short visits or conferences in promoting good science in the country is certainly doubtful.

Thus, the sanctions imposed by the West need to be looked at in this perspective. These could in fact have a very positive impact on Indian science. Maybe our scientists will finally be forced to leave the apron strings of their Western counterparts. Who knows, in this process we may even see the blossoming of truly Indian science, i.e. one which is not only practiced here but also is born out of the minds of researchers who are intellectually free.

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