SCIENCE & TECHNOLOGY

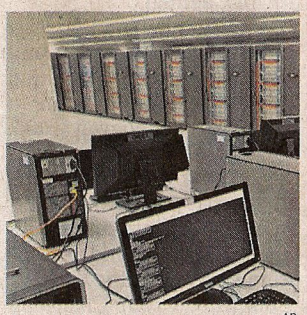
SNAPSHOTS

Tomato nutrient can stall vascular diseases

KAMAL NARANG

Tomatoes contain a nutrient which could tackle the onset of vascular diseases. Research reveals that an extracted compound, 9-oxo-octadecadienoic, has anti-dyslipidemic effects.

Supercomputer's role in unravelling DVDs



AP

Some 4000 processors of the Jülich supercomputer JUGENE were used for over four months in order to obtain the necessary precision to provide insight into the read and write processes in a DVD.

Insect meat may help lessen climate change

AFP

Insects produce much smaller quantities of greenhouse gases per kilogram of meat than cattle and pigs. The rearing of insects could contribute to more sustainable protein production and replace conventional meat.

Sex-role reversal in butterflies courtship

"None said 'there are risk

Genuine fear of genetically modified (GM) crops arising from relatively less studied science combined with the fear of the unknown and lack of transparency of the companies dealing with GM crops made most governments and their citizens in Europe and other countries oppose the technology.

Fearing that nanotechnology, another promising technology, may face the same fate, the U.K. Royal Society had published a detailed report on nanotechnology in 2004.

The report, made freely accessible to the common man, was published well before society had formed an opinion. It had listed out both the risks and benefits of the technology and the areas that still needed more investigation.

The Dutch Government had also initiated a similar exercise and for the same reasons. **Wiebe E. Bijker**, *Professor, Faculty of Arts and Culture, Universiteit Maastricht, The Netherlands, who had chaired the committee formed by the Health Council of Netherlands was in Chennai recently. Professor Bijker spoke to* **R. Prasad** *about the challenges and outcome of the exercise. Excerpts:*

When did the Dutch Government initiate the process of publishing a report on nanotechnology? Was the exercise influenced by the Royal Society's move?

The exercise had started before the Royal Society's report was published. Actually, two institutions in The Netherlands with specific roles played a part — the Rathenau Institute and the Health Council of Netherlands.

The Rathenau Institute had started the process earlier and came out with the report in 2004. It had a narrow mission of looking at the positive and negative aspects of the technology without much scientific analysis as the process was undertaken before much research was done.

What prompted the Rathenau Institute to work on such a report?

They recognised the potential of nanotechnology well before it became a part of political agenda. It worked on the report well before 99 per cent of our society had heard about nanotechnology. Work was happening only in the laboratories and they brought it out of the agenda for public debate.

How did the government respond to the report?

The government recognised the huge economic potential of nanotechnology, and was very afraid that it would face the same fate as GM technology. The Royal Society report was at the back of its mind. So when the Rathenau report came, the government asked the Health Council to map the benefits and risks of the technology.

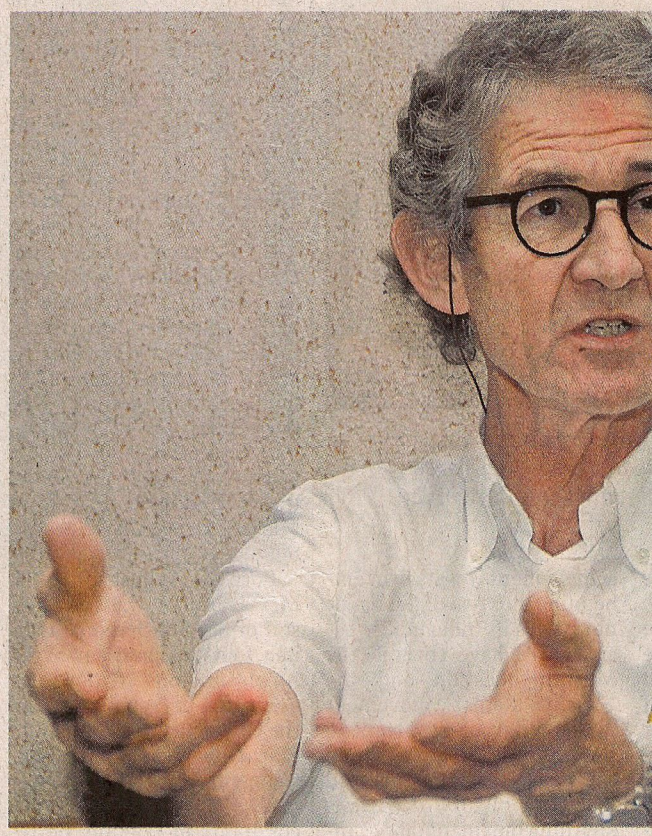
What was the composition of the Health Council committee, and when did you start working on the report?

The President of the Health Council decided not to have a committee exclusively of nanotechnologists, but decided to have others like me, an engineer, and others to be a part of the committee. [Dr. Bijker had chaired the committee]. It was a six-member committee, with five professionals involved in nanotechnology and a professional secretary with a PhD in toxicology.

We worked for two years from 2004 to 2006, and submitted the report in 2006.

How did you approach the problem?

We took very great care to balance the report. The crucial thing we did was we brought in the precautionary principle, and we gave an interpretation of the precautionary principle. We applied it to nanotechnology and told the government the benefits and risks, and that the scientists don't have answers for all the risks.



Wiebe E. Bijker, Professor, Department of Technology a Universiteit Maastricht, The Netherlands had chaired t committee. – PHOTO: N. SRIDHARAN

What was the main finding of the committee?

We found there was no complete understanding of the processes involved, and the toxicity of nanomaterials. And since there is no complete understanding, we cannot map all the risks.

So what the society/government is faced with is that there are such huge benefits but there are some risks. So do we go in for a moratorium or stop all nanotechnology development as there are some risks. Or do we invest all our money in toxicology and only continue after we fully understand the toxicology implications? Or do we trust the scientists to fix the problems when they arise?

What was your recommendation?

Risks are uncertain, and by definition we cannot hand over the responsibility to the scientists as they don't know all the facts. Toxicology is an example of 2nd class of risk and we need to involve the stakeholders — industry, doctors, patient organisations. It is important that the citizens understand that there is uncertainty in nanotechnology, for instance, toxicology.

We decided to put a lot of investment in nanotech toxicology. We also said you should broaden the scope to involve the citizens to discuss the broader issues of nanotechnology.

Is toxicology the only area of concern now?

Everybody agrees on the direction the society has to move. We don't want toxic materials and everybody agrees on that.

There is a 3rd category that the society does not want to promote — human enhancement. For example, a chip put in your brain or retina. Many

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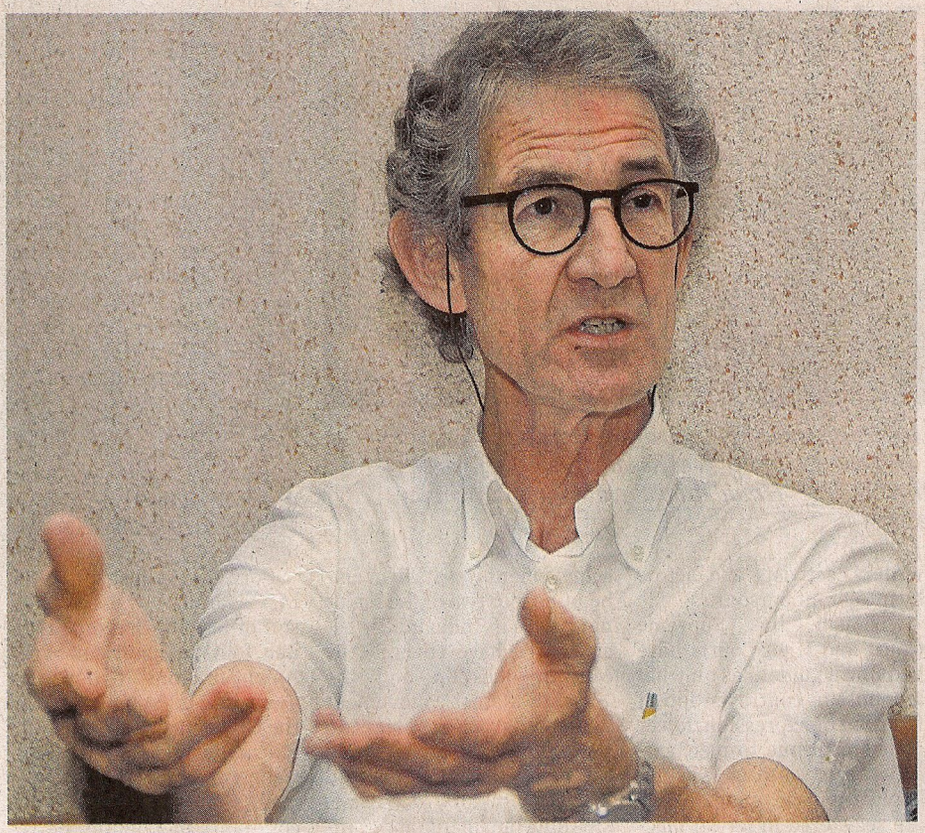
Water on Moon originated from comets

The same researcher who first discovered water on the moon, has now determined the water may have come from comets smashing into the moon.

Gestures 'can change one's thoughts'

A new study has claimed that gesticulation — clue to one's thoughts — can also change one's thoughts by grounding them in action.

'there are risks, so let's stop it'"



Wiebe E. Bijker, Professor, Department of Technology and Society Studies, Universiteit Maastricht, The Netherlands had chaired the Health Council committee. – PHOTO: N. SRIDHARAN

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There is a 3rd category that the society does not want to promote — human enhancement. For example, a chip put in your brain or retina. Many people believe that it is the fundamental identity of human beings; we should never tinker with it.

Is 'human enhancement' a perception problem?

That's not true. In the case of toxic materials, everybody agrees we don't want it. But in the case of human enhancement, not everybody agrees. Some want it and some are strongly opposed to it. There we say we should involve the general public in the debate. [Human enhancement] involves the basic values of the society.

Did the government accept your recommendations and how did they act on it?

The government accepted our advice. They came out with a policy paper signed by eight ministers. This vision translated the Health Council advice into a governmental policy vision.

Then it took yet another two years until the end of 2008 to decide on the societal dialogue. The parliamentary agreement came in fall of 2008. My guess is that that long period was partly caused by the need to set aside enough funds (4,000,000 euros).

How did the government go about involving the public in the societal dialogue?

There was an open call for projects. There were roughly 40 projects in all. There were different kinds of projects — TV production, books, teaching materials for schools, theatre played in hospitals and market place, travelling exhibitions, science café, games — that gave information about the technology.

The important point is, the public had no clue about the technology. So do we wait till the public knows something? But then it becomes too late. So where do we start? So these projects were meant to educate and create awareness about the technology before the public dialogue.

Did the projects end up creating awareness about the technology?

Yes. For instance, nearly 99 per cent of the students and 80 per cent of the parents had never heard about nanotechnology before. Students did experiments and reading the Net and produced a kind of thesis/presentation — both oral and written.

At a conference, I was flabbergasted by the level of knowledge they [students] had gained in six months' time. Awareness level was amazing. Each of the students would be able to give a lecture on nanotechnology.

When did the public debate start, and what was the outcome of the debate?

The dialogue was held between January and November 2010.

The awareness level increased. We measured it both at the beginning and at the end, and there is a very clear increase in awareness. The public understood the benefits and risks, and that there is uncertainty. None of the groups said: "there are risks, so let's stop the technology."

Scientists know they don't have the answers for all the questions. And the citizens appreciate that scientists don't know everything.

How did the scientists end up feeling at the end?

In one case, the organiser [of the debate] was the industry. They were disappointed in the end. They thought how did these kids know so much and say we should invest in this technology, but always stress on the risks involved.

Most of the scientists reckon that in the end, the public would take an informed choice. Maybe a choice which is not the one they want them to take, but definitely not a totally negative one or a totally silly acceptance of the technology.

What did you learn from the public debate?

A preliminary report says that they [public] want the government to go ahead with nanotechnology, but as long as the government tells them about the risks. The public is more afraid of a government not telling the truth about the risks of a new technology.

The more open you are, the more credible you are as a government when you make up your mind. It is also important that the citizens understand that there is uncertainty in nanotechnology, for instance, the toxicology part.

We had a public debate on GM food which went completely wrong. The public perceived that the government had already decided and was trying to push GM technology.

The credibility of the debate was eroded and it further eroded the credibility of biotech sciences itself.