

*Referred  
in Voice mesa  
22/11/18*

**SCIENCE AND TECHNOLOGY  
FOR  
THE COMMON MAN**

Prime Minister  
Shri Rajiv Gandhi's Speech  
in the Lok Sabha on April 10, 1986



सत्यमेव जयते

Government of India  
Ministry of Science and Technology  
New Delhi-110 016

The foundations of our scientific and technological development were laid many years ago by Panditji and a major thrust was given to our science and technology by Indiraji. It is on this base that we are able today to use our science and technology to help the poorest people in our country. Indian scientists have shown that they are up to the best in the world when it comes to developing technology and when it comes to taking our nation forward.

## **DEVELOPMENT — ITS MEANING AND SIGNIFICANCE**

2.1 Perhaps it is worth spending a moment on just thinking what we mean by development because everybody talks "development", "development must take place", "we are very backward." What is development? What is the difference between a backward area and a non-developed country and a developed country?

2.2 I would beg to state that there is only one difference and that is the difference in technology that they use in their day to day lives. If a country uses better technology, it is a developed country. If it uses worse or older technology, it is a backward country and an under-developed country. Within our country, the same thing holds true. What is the difference between the most backward village in India and Delhi or Bombay or one of the major metropolis? It is the level and quantity of technology that is used in our daily lives, right from the very basics to the extravagance, the extras, that you get. But the difference is in the science and technology that you apply to your life and if we are to alter the standard of living in the rural areas, if you do take that as a definition, then by definition it means, putting in more S & T into the rural areas, better technology for their improved living. Where is this going to come from and how will we target it?

## TECHNOLOGY FOR THE COMMON MAN

3.1 Much has been said of appropriate technology or suitable technology. Lots of words have been used. But ultimately what we have to see is that the best possible technology that can be used for a particular task in the circumstances in which it is being used, must be available if rapid development is to take place. In some areas, it could mean a better bullock-cart, but in other areas we see that the farmers are not really interested in a better bullock-cart, they want a tractor. So, we have to see what they are willing to use and what they are capable of using and try and bring that in for them.

3.2 Our priority is basically removal of poverty in the rural areas, and the fundamental part of that has to be the development of our agriculture and down-stream products from agriculture. We have seen that, with the most advanced technologies, the most advanced scientific developments being applied to agriculture and related industries, we have achieved a green revolution in the north-western States. This did not come about by ignoring science and technology. It came about by using science and technology at the right point and by using appropriate technology. It came about by using the most advanced and sophisticated technology, biotechnology, genetic technology, use of fertilisers and electricity. And that is what has changed the picture of our rural areas. Basically, what we mean by technology is to try and see how it can help us to produce more by using the same effort, increase productivity with better tools, with better equipment. And this is the task that our scientists have before them today.

3.3 Our scientists have many achievements behind them. They have made us self-reliant in very basic areas. Whether it is in food, whether it is in certain strategic areas of defence, in space, in nuclear sciences, they have shown that, where there is a challenge, they are up to that challenge and they have the capacity to lift India up when they are given that chance and when they are given full backing. They have responded

admirably to this challenge. Whether we look at space, the Satellites that we have put up, the launching system that we have developed, there have been tremendous spin-offs for everyone.

3.4 Today I go to the most backward area. There are many difficulties. But the main demand that comes is that for T.V., for a low-power T.V. Transmitter or a Relay Station. This is what technology is doing to the lives of our people. It is giving them a better quality of life. Whether it is a question of broadcasting or telecommunication for better administration, for better productivity or a better assessment of markets for the farmer, whether it is better weather information to help the farmer sow his seeds or help the farmer protect his crops, it is all technology working for the poorest people in our country.

### **HIGH-TECHNOLOGY FOR THE COMMON MAN**

4.1 Another example I would like to give because many times when we talk of advanced technology our mind immediately goes to large industries, to fancy offices and to very sophisticated laboratories. But what comes out of these sophisticated laboratories ultimately goes into sometimes the most mundane objects which help the poorest people. A case in point is the India Mark II Hand Pump. It looks a very simple device but today we are exporting it in thousands to different corners of the world. Inside it is perhaps one of the most advanced technology mechanisms and materials that are used. That is why it does not fail. That is why it does not break. That is why it survives. So this is the type of development that we need — high technology applied in a simple manner to everyday objects that are needed in our rural areas.

4.2 Another example is that of root nodule bacteria developed by our scientists which can be tailored to specific crops, or specific regions, climates and environments. It puts approximately 40 KG. of nitrogen every year into the soil and into the plant without any extra

expense or very very cheaply. Again it is very advanced high technology used at a very basic level and this is what is going to change the life of the average person in India. The tissue culture whether it is for better crops, better trees, faster growing trees; whether it is for vaccines, immunisation, etc; again it is very high technology but applied to everyone in the country. Disaster warning systems that would not be possible without satellites. Can one today imagine what it was like along the East Coast of Andhra five years or ten years ago when there was no disaster warning system and the damage that was done. Today it is behind us. We do not even think about it. But again it is the most advanced technology giving protection to the poorest people on that belt.

4.3 I can go on with a very long list whether it is electronic testing of soil, whether it is testing of quantity of humidity in the soil, whether it is testing grain for quality to help the farmer get the correct price, but perhaps the most striking is our programme to clean the Ganga. There can be no question about the purity of the Ganga but it still requires the most modern science and technology to identify what sort of pollutants are going into the Ganga and it requires the most modern technology to remove those pollutants and once more clean the water.

## **TECHNOLOGY FOR A BETTER LIFE**

5.4 So it is a question of putting the best technology that we have for use of our average person not for the elite. The elite will get it anyway. But our thrust must be for the rural areas. Here we come up against resistance. Resistance because there is a feeling that technology will bring about unemployment. If we think back of the time of the Industrial Revolution, the same resistance was felt then when it was said that machines coming in would bring about tremendous unemployment. But it did not happen. Employment shifted but increased. Wealth generation increased. The average person who

was poor got wealthy. He lives a better life. Today the reason for parts of our country being still very backward is that the Industrial Revolution has not yet arrived there. Mechanisation has not arrived there. We must today not only bring that mechanisation but we must help them take a jump ahead and bring them into the world as it is today instead of trying to bring them into yesterday. And anyone who thinks otherwise has a vested interest in keeping those areas backward, in keeping our people backward and dependent on an ideology, on a theory, on a political system and we must do everything possible to bring about this change so that our people are not left backward and they have the most modern tools and machines available for their own better living.

### **SCIENTIFIC TEMPER**

6.1 One of the key factors has to be that of developing a scientific temper like Panditji had said so often. Without that scientific temper, it cannot be possible and a scientific temper is not necessarily only for the scientists, the scientific temper must come into the average Indian if he is to start developing. It can be brought about by the media, it can be brought about by education and we must do everything that we can to bring this about. Once we have a scientific temper, basically it will remove the fear of the unknown which keeps people back, which keeps people from moving ahead and using the tools that are available to them. The scientific temper will help develop an inquisitive spirit where people will ask questions, where people will ask why does milk turn sour, why cannot it be kept in some way so that in the villages they do not need refrigeration. Why their plough does not plough better under certain circumstances. It is when we start thinking in this manner that a scientific temper will develop and we ourselves will start improving the tools that we have got and that we live with. Today you go to a village, you go to a backward area, you see that there has been no improvement. In my area, I see some have bullock carts which still have not got steel tyres on the wheels. They

start with the wheel that is that big, slowly it wears down, and after sometime they change the wheel and go back to a big wheel again. They have not even thought that they can put something on the wheel to prevent its wear. So, it is this type of thinking which must be brought into the rural areas and that could be the basis of our scientific temper.

6.2 Our scientists, like I have said, have developed a tremendous capability. They have developed reputation which is not limited by our boundaries, but goes right across the world and they have developed this reputation working in parallel, with perhaps the best brains in the world. The brains of our scientists are second to none. We have developed a very large infrastructure of scientists. We have developed very sound linkages among various fields. But still all is not as well as it should be as we have not got the maximum out of our investment and we have been thinking about this. We have analysed where we have done extremely well; for example, our space programme is second to none. In Atomic Energy, we have risen to great heights. In biotechnology, in certain fields in Defence we are equal to the best in the world. So, obviously, there are areas where it has worked extremely well; at the same time there are other areas where we have done miserably. So, we have done something right, obviously something wrong, and we must try and identify what was right and correct and try and use that in other areas where we want similar development. Like some Members have pointed out, it cannot be possible for a country like India to develop across the board in every single field. We just do not have the resources or the capability to do that, but we must choose those areas which we feel are vital and we must give a very strong push in those areas so that in a certain number of years we are as advanced as anybody else.

## **IMPORT OF TECHNOLOGY AND TECHNOLOGY MISSIONS**

7.1 One of the problems of a developing country is

that it is much easier to buy technology which is available in the market than to start reinventing the same technology, rediscovering what others have already discovered. But, of course, if you take that route, then you will always be left with second rate technology, because that is what others are going to give you. Now when a country comes to the development stage, that India is in today, we must rethink on this. Are we going to settle for second-rate technology for ever? Or, is there going to be a stage when we will say: "No, we want to shift over to frontline technology"? We cannot do that in every field. It is not possible. But we must identify certain areas where we will give this thrust. We have identified a number of such areas starting with those that affect the life of the average person in the villages, in the more backward or depressed areas. We are identifying these as missions; missions because we thought that the success of some of these programmes, that I mentioned earlier, was because one person was in command, he had full authority to run that exercise, he had full funding, he had the backing of all the institutions that he needed. When we talk of the mission, we intend to draw it up in that same broad concept.

7.2 We have decided on a number of missions already. Five have already been established. Drinking water — it might sound simple that we will just be digging holes in the ground and pulling out water, but out of all these five missions, the maximum amount of scientific development and technological development will go into drinking water, and the highest technology out of any of these missions will be used to give drinking water specially in those areas where there is a tremendous shortage of drinking water. Another mission will be that of oil seeds and another of vaccination for children — Vaccination for the health of our children and eradication of illiteracy. Again, we will need a very high technology to transmit the message. What is education? Education is communicating a message to the younger generation, to the children. We must use the best methods that are available to be able to do this. Telecommunication will be another mission.

## NEW APPROACH TO RESEARCH

8.1 We are dividing these thrusts into basically three areas. The first and perhaps the most important and the most difficult will be the missions, because they will stretch from the laboratory. Oil seeds for example will mean development of the oil seeds in a genetic laboratory, transferring that into the extension work of actually getting it to the farmer, explaining to the farmer how he is going to use it, turning his produce into oil, marketing the oil and getting it to the consumer, and keeping the costs down right across that exercise. So, these are extremely complicated exercises which will cut across many Ministries, many State Governments and if these are to succeed, we would need really good men at the top, who would be able to really cut through all this red tape and deliver the results that are required if this country has to survive.

8.2 On the other hand, we will have, what we are going to call, the thrust areas which will be slightly more specific. We might identify a particular line of development which we need for strategic use, may be nitrogen devices, may be lasers, may be something like that. And again, we will give everything that is required for development. The third area will be what scientists refer to as 'blue sky research' which means basic or fundamental research. Here of course, we cannot ask for results in the same way that we ask for in the other two areas. But the basic thrust will be on some sort of accountability in all these three areas, accountability in terms of scientific development in a certain time, accountability for the funds that have been spent in terms of scientific development. And we will have certain cut off points. We will decide that at this point we will not go further along this road and we will take a different track. Perhaps, we will decide that that is enough, that we cannot go further at all, and we shut that area down. But unless we do that, we cannot get results for the money and investment that we are putting in.

8.3 Our attempt will also be to try and shift the

management of our other scientific projects on to a similar type of management. But because they will be much more general, the attention that we will pay and the financing that they will get will not be of the same level as in the missions and thrust areas and basic research that we will be pushing forward.

### **BRAIN—DRAIN.**

9.1 Another point which has been talked about many times is that of the brain-drain or as I prefer to call it, 'the brain bank'. We are looking at this from the starting point and that is the education policy. When the Minister for Human Resources Development will put this in front of the House during this Session, we will see that an attempt has been made to look at the teaching of science, because we have to start building scientific temper on a much broader base of our scientific pyramid. today, we have achieved great heights, but the base is very narrow. We have very few people who go straight to the top. The average person does not have a scientific thinking of any sort. We must broaden that base, because when that base really becomes a broad based pyramid, then we will really be able to draw upon the best that is available in the rural areas. And to do this, we must build it into our education system.

9.2 At the same time, if we are to stop this brain-drain of too many scientists and technologists leaving the country, we have to tailor the subjects that we are teaching to the needs for our development. If we teach everyone very esoteric subjects which do not relate to the development in India, of course they will leave the country, they will go away and they will look for jobs else where. So, we need in the exercise of the New Education Policy to first try and assess what will be our need of agricultural scientists. what will be our need of technologists, of engineers, of other specialized training and then try to fit that back into the Education Policy. When that tailoring is done, and it is not something that we even attempt to say we will do in the next 4 or 5 years, it is only a very modest beginning that we can

make now; but — unless this sort of training is done effectively, we will not be able to use the best resources in terms of brain power in our country, for our development purposes.

9.3 Again, training does not end, qualification does not end by getting a degree from an I.I.T. or from a University. It is a continuing process; and if a scientist or a technologist is to be useful to us, he can be useful to us at every level of training, at every level of experience. We might want to use the young men who are 25 years old, and who have just got a degree. At the same time, we might prefer to send some of them out. Let them work in very advanced fields with top scientists in the world, and we might want to bring them back five years or ten years later.

9.4 So, this sort of exercise has to be a continuing process an updating exercise; it has to relate to our development process. It must relate to our education process as well. Our attempt will be to try and do this. We have taken a number of steps to attract such people back to the country; and there has been a movement back. We will continue this. However, achievements in the past are there for everyone to see, right across the world. Certain areas, like I said earlier, Space, Agriculture, Defence and in the nuclear fields, we have done extremely well, and have shown that India is equal to the best.

9.5 We have shown that when India accepts a challenge, when our scientists, when our technologists accept a challenge, they meet that challenge and they deliver the goods. Today, we must give them the backing that they need to achieve similar results in many other fields. Once more we would like to show that India can do it, and will do it.

9.6 Where science and technology is concerned, we must keep in mind that nothing but the best will do for the country; and we must work towards that end. With everybody's support, I believe we will be able to do it.

*“Reproduced from the Lok Sabha Debates  
dated 10th April, 1986 with the permission  
of the Hon’ble Speaker.”*

2