

# Place of Science in a People's Movement

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WHATEVER I am going to say here is based on the collective experience and insight gained by the Kishore Bharati Group in the field of development and social change since 1972. Located in village Palia Piparia of Bankhedi Block in the eastern tip of Hoshangabad District of Madhya Pradesh, the Kishore Bharati Group has conducted a wide variety of experiments concerned with economic growth, social organisation, youth involvement, health and education, both formal and non-formal. Although the economic development and health programmes have been concentrated mainly within Bankhedi Block and surrounding villages, the educational and youth involvement work has allowed us to interact not just with the people of Hoshangabad District but with various groups of people in other parts of Madhya Pradesh as well.

The focus of all these activities has been to explore the fundamental causes of the severe poverty, exploitation and disparity in our society, and to evolve ways of resolving these contradictions. The strategy has been to subject all of our experiences to exhaustive scientific analysis with the purpose of evolving general principles which could have wider social application. This exercise of building up theoretical understanding through field-level practice has been further enriched by relating whatever we have learned with what Government agencies, other voluntary groups, and people's movements have been

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learning in different parts of the country. For this enrichment we must thank those hundreds of activists and thinkers who have more than willingly shared their experiences and analyses with us, and thus have made us a part of the nationwide struggle for social justice and development.

The experiences of others, including those of Government agencies, voluntary groups and people's movements, are used here as case studies for bringing out contradictions in our society and for evolving hypotheses for further experimentation. Nowhere are these case studies presented as personal criticism of people who are working in these organisations. I must convey my feelings of fellowship to all such people for they too, like us, must be engaged in their own battles against injustices, irrationality, stagnancy and other mechanisms of backwardness within their own organisations.

Let me begin with a meeting to which I was invited last year around this time to review the Science and Technology (S & T) component of education in the context of the Sixth Five-Year Plan. The purpose of the meeting was to make recommendations to the Planning Commission to make S & T education more relevant to the socio-economic needs of Indian society. The chairman of the meeting began by inviting the experts to make their recommendations. One after another, the experts started reeling off their views on various schemes and ideas which need to be implemented. After three such statements, a couple of us intervened and inquired whether a critique of the S & T component of education in previous Five-Year Plans was available. Of course no such critique could be produced. We then suggested that the meeting should first attempt to find out the manner in which the previous plans had failed to relate S & T education to the needs of society. Only then would we have a scientific basis for making fresh recommendations, we argued. What amazed us was total lack of interest in the entire body of national experts who had gathered there to spend even a few minutes on this question.

Judging the mood of the meeting, the chairman had to resolve the dilemma by announcing, "We all know what was wrong with the previous Plans. We must now begin afresh and make new recommendations." The meeting then went on merrily for the next four hours, each expert making a fresh recommendation, often totally unrelated to what was said by others, and fully oblivious of the fact that what was being recommended by him or her had already been implemented in one form or another in the previous Plans. Whenever one of us tried to point this out, there were hurried attempts to hush up such uncomfortable questions so that 'we make the best use of the valuable time of the experts.'

At the end of the meeting I wondered whether these scientists and educationists would have picked up a research problem without surveying the previous literature. Obviously not. Why then was this scientific practice of analysing previous experience before beginning a new piece of research work so blatantly

ignored at this meeting on S & T education? Why didn't this unscientific approach disturb the national experts assembled there for the very purpose of improving science education?

The story of this meeting is typical of all the meetings which I have had a chance to attend during the last several years — be it on adult education, or on rural development, or on bonded labour, or on collective management, or on appropriate technology, or on the role of voluntary agencies. In all of these meetings, there has been a commonality — a complete lack of interest in analysing the historical experiences not only of others, but also their own, a general unpreparedness to learn from the past, and yet there has been an eagerness to make quick recommendations unmindful of the fact that these so-called new ideas have been part of the nation's previous experience. One is struck by the absence of scientific methodology at such high echelons of Indian bureaucracy and technocracy. How does one explain this contradiction?

Let me take another example. In 1969, I attended a UNESCO workshop of a small group of molecular biologists and biochemists at the All-India Institute of Medical Sciences. At our request, a special meeting was convened to discuss the implications of recent developments in the field of genetics for the policy of malaria eradication being followed in India and other Third World countries. Some of the leading authorities on malaria eradication from a national level agency were called to discuss this issue. That was a time when disturbing reports regarding the reappearance of malaria were being received. The heady dream of seeing an India free of malaria was already being doubted. There was sufficient scientific basis to face the unpalatable fact of mosquitos resistant to DDT appearing on the scene. The biologists referred to the genetic mechanism of the appearance of drug resistance. It was explained that mutations leading to drug resistance appear randomly at very low frequencies, maybe one in a million. The drug may wipe out all the sensitive organisms except the mutant. The mutant would then reproduce making the drug ineffective. It was also explained how the simultaneous use of two or three drugs would reduce the probability of the appearance of drug-resistant mutants by a million times or more. The practical point of this theoretical understanding would be to add one or two more insecticides to the DDT spray, and thus save the country from the appearance of resistant mosquitoes. The malaria experts were amused, to say the least.

The seniormost amongst them politely pointed out that their concern was with practical programmes of eradication and not with biological theories which, though founded on scientific lines, were of value only within the confines of laboratories. He further explained that the National Malaria Eradication Programme had been sanctioned and blessed by funds and technical guidance from WHO, the DDT spray programme was running at full steam and no changes could be undertaken on the basis of theoretical concepts. When pressed by the biologists, the experts reiterated that even if a few resistant mosquitos had appeared, it would not matter since the programme

was nationwide. "A few resistant mosquitos must not cloud our view," they stressed. The biologists lost the argument, but as all of you know, resistant mosquitos have won the day!

Why is it that the seniormost scientists working for malaria eradication ignored scientific arguments and biological facts? It is difficult to believe that they were not familiar with the genetic arguments advanced by the biologists. Why is it, then, that the malaria experts, and also such an august body as WHO, pressed on with DDT spray when scientific theory belied the very basis of the programme? What is the fundamental reason behind this irrationality? It is unbelievable that even now DDT spray is being piously applied by malaria workers all over the Indian countryside, when the entire body of scientists, not to speak of the public, know that mosquitos are fast turning resistant. Equally unbelievable is the fact that respectable international aid programmes continue to support and encourage this totally unscientific waste of the nation's resources, and continue to buttress the attrition of Indian manpower. And probably even more disturbing is the knowledge that leading technocrats and opinion-builders of the nation have turned a blind eye to this contradiction in the management of one of the crucial health problems.

We are not talking of isolated instances. We are referring to a national pattern. Let us take a third example.

The textbooks recommended by a leading national agency carry a chapter on population to generate awareness amongst children regarding this critical national problem. We have analysed the population chapters threadbare. These chapters talk of the accelerating rate of population growth which negates the fruits of increasing production and thus creates poverty. The chapters argue that India's poverty problems could be resolved merely by controlling population and by increasing production.

The thesis being presented in these textbooks does not explain why India's godowns are full of grains, while multitudes, who in fact produce the grain, remain under-nourished and even die of hunger. These textbooks do not refer to the problem of distribution of resources, disparities in society, and the extremely low purchasing power of the people living below the poverty line.

A couple of years ago, at a training course for 400 science teachers of Hoshangabad District, we asked the teachers to conduct a survey of malnutrition in Hoshangabad and surrounding villages. The objective was to train these teachers in scientific methods of data collection and analysis on the basis of a problem existing in their own environment. When given this project, the teachers laughed, for they had read in their school textbooks that Hoshangabad District was surplus in wheat. How, then, could there be any malnutrition, and that too in and around the district headquarters of Hoshangabad? Maybe you would find cases of malnutrition in some remote tribal villages, one of the teachers pointed out. However, we persuaded the teachers to go ahead with the survey. Within hours reports started pouring in regarding children suffering from severe malnutrition

right in the middle of the town. By evening, the teachers had data to prove that malnutrition was characteristic of Harijan and tribal sections of the villages.

We had then the scientific basis for raising the next question: "How is it that these children are suffering from malnutrition, while each village of the region is exporting wheat?" And then, suddenly, the brighter teachers asked, "Why is it that the textbooks teach that poverty is chiefly a result of population growth negating the fruits of production?" Should our textbooks not explain to children the percolation or lack of percolation of the benefits of increased production to the people living below the poverty line? How is it that our textbooks have managed to ignore this basic malaise of our society, namely, that the fruits of increased production do not reach the poor, despite being available in so called abundance? Does it not make you wonder that a single scientific survey enabled the Hoshangabad teachers to see through the population-production myth being promoted in our textbooks, while the irrationality behind this myth has escaped the attention of a leading national agency given the task of educating India's children?

I would now like to take up one more example to substantiate the point I am making. Three years ago, I was introduced to a British Council expert, in the office of one of the heads of departments of the National Council of Educational Research and Training (NCERT).

The British Council expert explained that he was in India to advise NCERT on audio visual aids, especially on the production of slide-cum-tape modules. I inquired whether he was aware of the conditions in Indian schools which lacked funds for buying even chalk and *taat-pattis*, or of the fact that most of the schools were beyond the reach of electricity and worked in single rooms often loaned to them by the grace of a local feudal landlord. The British expert showed awareness of all this. I naturally, then, wanted to know the logical basis on which the British Council wanted to take up such an irrelevant activity in the Indian school system. The expert had no answer.

Yet, during the last three years, the British Council programme has grown and spread. Hundreds of science education workers and experts have been trained and have become busy in producing fancy slide-cum-tape modules all over the country in teacher training institutes and science education centres. At a meeting of teacher-educators in Jabalpur last month, a number of such modules were exhibited with great pride, for these represented the entry of the teacher-training institutes into an advanced technology framework, having been given a large amount of modern equipment such as expensive cameras, projectors, and tape-recorders under a foreign-aided programme. When anyone tried to find out what use would be made of these prize exhibits, there was always an uncomfortable silence.

Another shocking effect of this kind of activity also emerged at the Jabalpur meeting. The language of the module was so highly Sanskritised that it was totally incomprehensible to the primary school children for whom the module was prepared. Even

the advice on better nutrition showed no awareness of the conditions of poverty from which these children came, since the module advised the children to eat plenty of fruits, vegetables, milk products and meat!

When the attention of the experts was drawn to these gaps, a village teacher quipped, "Why do you worry at all? This material will never reach the primary school anyway." This simple truth so well understood by the village teacher was apparently beyond the comprehension of the national experts and international aid agencies who are behind this programme. The irrationality of this activity is further emphasised by our knowledge that the audio-visual teams presently engaged in producing these expensive modules have neither shown any interest in the past nor ability for producing simple wall charts for class-rooms! Suppose a question was raised in the Lok Sabha regarding this national wastage of energy and diversion of valuable resources, how would NCERT explain the implementation of a programme which ignored the socio-economic conditions of Indian schools?

From what I have said so far, an impression might be emerging that unscientific traditions and irrational thinking characterise only the highly educated elite and thus constrain only the national level agencies. The irrational processes in fact seem to pervade the rest of society as well. Ten years ago I attended an All-India Conference of Sarvodaya Workers at Nasik in the august presence of Jayaprakash Narayan. The conference had decided to start concentrated programmes for strengthening the *Gramdan* movement. Each State was asked to select three districts for special effort so that the energies of all the cadres could be concentrated to show successful results. After this general session each State unit met separately.

At the Uttar Pradesh meeting, the State-level secretary asked the workers to propose the names of three such districts. No one dared to speak. The secretary then suggested that Ballia District should be the first to be selected 'because JP was born in this district'. He went on to propose that Agra could be the second district since the president of the State unit hailed from there. And the third district should be, of course, the one to which he belonged. The readiness with which almost 300 Sarvodaya workers raised their hands affirming the proposal was amazing. No one questioned the criteria of selection. An entire year's programme had been planned without any reference to the socio-economic conditions in a particular region, or to the availability of manpower, or to the potential response of the people. Why is it that the mere birth of Jayaprakash Narayan becomes a valid basis for selecting a district, and that this makes sense to hundreds of trained cadres? Does it not show a critical gap in the training of these workers or possibly in the entire tradition of Sarvodaya?

Let us now try to understand the basis of this widespread irrational and unscientific behaviour in our society. It is only with this understanding that

We can hope to build up a programme to resolve the crisis. I recall the first training course we organised in 1972 for 40 village science teachers of Hoshangabad district. On the very first day we asked the teachers to measure the length of a table lying before them. A metre stick in hand, each together went up to the table and carefully measured its length and recorded the reading on a slip of paper. At the end of the exercise the readings were transferred from the paper-slips to the blackboard. Suddenly there was a lot of whispering among the teachers. Several of them stood up and protested. The readings showed tremendous variation — these varied from 98 cm to 108 cm. A second attempt was made. This time the variation was reduced. The readings now varied from 100 cm to 106 cm. On the third attempt the range of variation was from 101 cm to 105 cm. However, the fact was that the variation remained. It could be reduced by practice and improved skill, but could never be made zero.

There was a great deal of hue and cry among the teachers. How could it happen? Science was concerned with eternal truth, one teacher philosophised. "How could the truth be variable?" another demanded. Obviously neither the table nor the metre stick was changing in length, most of the teachers insisted. Year after year we have repeated this exercise with fresh batches of teachers until it has become an accepted feature for about six hundred teachers engaged in science education in the district's two hundred and odd middle schools. That variation was intrinsic to all scientific observation is a concept which has been culturally and philosophically one of the most unpalatable for our science teachers.

The question is, therefore, whether such variation in observation is a phenomenon confined to natural sciences alone, or whatever such variations characterise social sciences as well. We now have evidence of two kinds of variations in observation in social sciences. The first one concerns sampling errors. As an example, an interesting story needs to be told. Two years ago we organised a youth camp to study the impact of severe drought affecting Madhya Pradesh. Some of the youth had surveyed the effect of drought on employment conditions. The data collected by them were being examined.

One of them from the village Kamti remarked that there was hardly any unemployment problem in his village, for his data showed that labour was not available for digging wells. He gave precise figures of the wells awaiting completion. Immediately, another young fellow from the same village expressed his disagreement. He produced data on the large-scale migration of the landless and marginal farmers from the same village to find employment on railway lines and on PWD roads. A detailed analysis followed. It was revealed that both the young men had presented correct data. Then what was the truth about unemployment? The difference in the two positions turned out to be the results of the different socio-economic background of the two persons—one of them hailed from a rich farmer background, while the other was a small farmer living in the poorer part of the village. The first one found it difficult to get labour because his people either underpaid or did not pay at all,

and also because they could not ensure long-term employment. The second one, being closer to the reality of poverty, had first-hand experience of a different kind. The particular social background of the first observer constrained his view, since it emerged from observations of partial reality of the richer few.

Thus in social sciences, observational differences are often a result of the way samples are collected, which in turn is a consequence of the socio-economic differences in the backgrounds of the observers. It is our contention that such errors can be corrected by scientific training as we were able to do during the youth camp two years ago.

There is a second source of observational differences, however, which seems to be beyond the realm of scientific training. Let us consider an example. I was a member of a small team sent by the Department of Science and Technology of the Government of India in 1978 to Orissa to do developmental planning for a cluster of five villages in Puri district. During our stopover in Bhubaneswar, the Government experts briefed us on the results of their survey of the same cluster of villages. We were told that the primary need of the area was for developmental programmes, especially a large-scale cattle development effort involving artificial insemination centres, fodder cultivation, veterinary services and cattle feed supply networks.

However, during our own survey, we were struck by the drought conditions and the extreme poverty of the region. How such a drought-stricken area could support a cattle development programme, we failed to understand. We stopped by at a number of landless peasants working on the fields of others, and asked them, "Suppose the Government is willing to undertake programmes according to your needs, what would you like the Government to do for you?" One of them pointed to the barren hillock nearby and suggested that the hillock be afforested. Another suggested that the contract of the local minor forest produce, such as *mahua*, should be subdivided into small contracts and be given to the poor people on bank loans, so that the rich contractors from the north did not take away their wealth. The third suggested that the large tracts of unused Government land, as well as land belonging to the rich people, be redistributed amongst the landless. Not one of them even mentioned a cattle development programme.

What then was the basis of the briefing given to us at Bhubaneswar? When pressed, the Government experts told us flatly that we had been talking to the wrong people. They took us to the homes of a couple of rich farmers who gave us good refreshment and of course asked us to recommend cattle development programmes to the Government in New Delhi.

Here was an example of observational differences in social sciences whose basis must be understood. When viewed from the perspective of rich farmers and the vested interests of Government experts, large-scale and well-funded development programmes appear to be the need of a region. However, when

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cent of the Soviet national income<sup>43</sup>. The figures include expenditures from all sources, that is, the budget, industrial and agricultural enterprises, cooperatives, trade unions, and other organisations. Coupled with the investment in industry and agriculture and other sectors of the Soviet economy, this represents an appreciable input for the country's technology. (To be Concluded Next Week) □

#### FOOTNOTES

A. Kolomensky. *Kak my ispol'suem inostrannuyu tekhniku* (How do we use foreign technology?), Moscow, 1930, p. 59.

29. V.I. Kasyanenko, *Kak Bylazvovovana tekhniko-ekonomicheskaya samostoyatel'nost' SSSR* (How the USSR won technological independence), Moscow, 1964, p. 127.

30. The workers in Moscow engineering works, for example, undertook to submit 10,000 rationalisation suggestions and inventions to the Fund in 1932. *Trud*, (Labour), January 26 1933.

31. *Za industrializatsiyu*, (For industrialisation), February 26, 1933.

32. See V.I. Kasyanenko. *op cit.*, p. 198, A. Kolomensky, *op cit.*, pp. 24-44.

33. A. Kolomensky, *op cit.*, p. 17.

34. *Sovetskaya tekhnika za dvadtsat' pyat' let* (Soviet technology over 25 years), Moscow, 1945, pp. 40-41.

35. *Akademiya nauk SSSR. Kratkii ocherk istorii i deyatelnosti* (The USSR Academy of Sciences. A short essay on its history and work), Moscow, 1968, pp. 33-34.

36. *Ibid.*

37. *Organizatsiya nauki v pervye gody sovetskoi vlasti (1917-1925)* (organisation of science in the early years of Soviet rule, 1917-1925), Leningrad, 1968, p. 6.

38. *Sotsial'no-ekonomicheskie i organizatsionnye voprosy nauki v SSSR* (Socio-economic and organizational problems of science in the USSR), No. 1 (Moscow, 1970), pp. 119-120.

39. See A. Lapirova-Skoble. *Novye puti nauki i tekhniki v SSSR* (New Paths in Sciences and Technology in the USSR), Moscow, 1928, pp. 9-15.

40. E. V. Chutkerashvili. *Kadry dyla nauki* (Cadres for Science), Moscow, 1968, pp. 61-62.

41. N.M. Katyntseva. *Rol' rabochikh fakultetov v formirovanii intelligentsii v SSSR* (The Role of Workers' Faculties in Moulding the Intelligentsia in the USSR), Moscow, 1966, p. 8.

42. E. V. Chutkerashvili, *op. cit.*, p. 69.

43. *Pravda*, December 14, 1979. ●

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viewed from the perspective of massive poverty, redistribution of resources and changes in management practices of the existing resources appeared to be the need. There is a wealth of evidence to show that such differences are related to the vested interests dominating the social structure. Scientific training can be of little help in such cases.

It is our experience that, whenever confronted with economic interests and questions of socio-political power, scientific processes often reach their limits. We have gone deep into this subject, and have been amazed by the wide spread influence of this type of observational differences on the very directions and priorities of rural development. We first became aware of this malaise of development programmes through one of our own experiences. We had organised a small cattle development programme, including a cross-breeding service, in Bankhedhi in 1972. We had been advised by some of the leading authorities concerned with milk co-operatives and cattle-breeding that milch cattle was the most suitable cottage industry for generating massive rural employment. Successful examples of Amul in Kheda district of Gujarat and of Bharatiya Agro-Industries Foundation at Uruli Kanchan in Pune district of Maharashtra had often been quoted to us.

After three years of this work, we looked at our data to see who were the people who had benefited from the cross-breeding service. We found that most of the beneficiaries were well-to-do farmers and successful lawyers or *banias* from a nearby town. A small number belonged to the middle farmer class. No one had come forward for cross-bred cattle from among the marginal farmer and landless classes. "How would such a programme help the rural poor?" we wondered. We were upset by these data and decided to check with another local voluntary agency also involved with cattle-breeding. Their experiences matched with ours, although this agency worked in an irrigated region and had easy access to the markets of the towns.

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However, we were continuously reading newspaper reports and hearing seminars in which a reputed voluntary organisation was claiming that the benefits of cattle-breeding are distributed amongst all classes of the rural population. We then decided to look at the registers kept at the insemination centres of this voluntary agency. There was a big gap between the public claim by this agency and the data in its registers. Here, too, the poor sections of population were excluded from the benefits of cattle-breeding. Why, then, did this voluntary organisation as well as several important Government agencies continue to present cattle development programmes as a means of solving rural poverty? Nowhere do we read analyses showing the differential impact of cattle development on rural people. Why is it that our observations do not match with the observations of several leading agencies of the nation while the reality in all such experiences is the same?

It appears as if there is a conscious effort to suppress and mutilate certain kinds of observations in social sciences. There is growing evidence to this effect. Last year, All India Radio, Bhopal, interviewed us. During the interview we narrated our experience of cattle development. The first part of the statement referred to the number of beneficiaries, to our attempts to popularise fodder and to spread knowledge of animal husbandry. In the second part of our statement, we pointed out how the programme had failed to make any impact on rural poverty. The taped interview was taken away by AIR and we were dumbfounded when it was broadcast a week later. The first part of our statement presenting a glamorous view of our work was broadcast, but the second half was methodically excluded. Suppression of scientific observation was clearly in evidence.

This experience of ours should help in understanding the experience I have narrated from Orissa. It is not a question of a lack of scientific method in our thinking. It is clearly a question of confrontation with vested interests which prevent scientific processes. (To be Continued) □