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Rural Development through Education

Abstract

Based on the belief that learning in real life situations stimulates the intellect – a system of multi skill education for in- school and out of school youth has been developed.
Such a system has been implemented on an experimental basis in 4 schools for over 5 years. It integrates education- with rural development by giving services through the school to the community at modest charges.

Plans are now being made to extend such education, through State Channels to more schools, using Community, Polytechnics as resource groups.

Part I states the philosophical base and the scheme. Part II deals with the problems faced in implementing and the evaluation so far, Part III outlines the plan for the future extension to more schools.

[A detailed report entitled "Rural Development Through the Educational System" is available from Vigyan Ashram, Pages 100; Rs. 25]

The Great Divide

The people of India, under the leadership of Pandit Jawaharlal Nehru, have given a high priority to Science and Technology. In the over forty-five years since Independence, we have made considerable progress in agriculture as well as industry and also in development of our own technology. But we must admit that the world has been moving faster and the gap between the developed countries and us is, if at all, even wider, And worse still the main problem of poverty is still looming large. The divide among the haves and have-nots, has increased. Every step forward, we take in science and technology seems to even widen this divide. The green revolution, which

has undoubtedly helped the nation to be self reliant in food, is also being accused of being responsible for widening the gulf between the rich and the poor. There is some thing seriously wrong in our approach, if a great step forward, like the agricultural research is also widening the gulf rather than narrowing it.

Let us understand this great divide, the divide between the rich and the poor, the educated and the illiterate, the organized labour and the landless, the successful small entrepreneur and the unsuccessful unemployed, the urban and the rural-, how did this divide arise and what adds to it? How can we bridge it?

If we accept that true knowledge is wealth, we can look at how knowledge is percolating from its fountains to the needy. Knowledge, like all wealth grows exponentially. That is the law of nature and we cannot change it. Any flaws in the distribution of this knowledge will therefore have a much more visible effect on the growth of knowledge and therefore all wealth. My perception is that a large section of our society is severely handicapped with regard to some integgectual skills and are therefore unable to use the available knowledge that flows past them. They therefore remain poor while the knowledge makes those who receive it, richer. All section of the society do not " receive the knowledge uniformly, because} of the flaws in our knowledge: distribution, i.e. education system. To make matters worse, those who are responsible f6r the distribution of this knowledge, the educated in general' and the educationists in particular, do not appreciate the quantitative significance, of this handicap. They are therefore equating rising of educational standards with' increasing the content of the syllabus or increasing the level of literacy. These effects are likely to be self-defeating, as the enlarged syllabus makes it even more difficult for the educationally handicapped to cope with the changes. Similarly, every disillusioned literate can be a disincentive for the neoliterate. What are these handicaps and what can we do about them so that we; can remove these hindrances to knowledge flow ?

Before we go into the solution of this problem, we should clarify our objectives. What are the characteristics of good education"? What kind of development do we want?

Education should be an enjoyable, experience. After learning 'something new one should be eager to use that learning in real life and get th6 satisfaction of having learnt it. We see this in children. A child is eager to learn to walk and to talk. It is a pleasure and it keeps trying, and practicing. A child learning to ride a bicycle' enjoys the learning process and would find every excuse to take the bicycle out and use it in everyday life and gather the experience. If we can achieve this even to a limited extent, everybody will have true knowledge born out of practical experience and therefore usable. Moreover, they would be keep to use it. All development springs from human knowledge, and the endeavor to learn more and more. In such a society, development will be a direct consequence of an effective education system. Such, a true development will be a constant effort to improve one's own life. A development that is the result of proper education will be a true sustainable development.

Piaget Theory

Jean Piaget, was a biologist, who drifted into the psychology of learning and worked for 40 years to develop a cogent theory that is now widely accepted. This theory has great relevance to India's problems.

Very briefly, the child is born with the human biochemistry and a few instincts-among them the ability to grasp with the thumb and the fingers and to suck. With this and the inherited nervous system and the brain as the "hardware" the new born child interacts with the environment and gradually builds up a picture of the "reality" outside, by creating a mental structure in its own brain. It continues to learn through such an interaction with its environment and builds up a "model", by a process of assimilation and accommodation. It continues this learning process throughout its life and uses this model to anticipate results of its actions in the real world.

This natural process of learning is analogous to and is perhaps the origin of the scientific approach consisting of observation, recording, and study making a hypothesis and verification by further experiments/observation. It is worth nothing that this natural method of learning is never completely lost or given up. Every one continues to learn by this method throughout ones life, experiencing the pleasure of learning as well as the keenness and satisfaction of finding a use for it. The human

child or the adult form, however, may not use this method in its formal and conscious learning stage.

This is where our problem starts. This process of learning cannot be expedited by giving information from others. Where the prerequisite structures or concepts are not formed, we cannot teach anything based on these concepts. Thus for example, a child of 3-4 years that does not have the concept that a volume of a liquid remains constant, even as we pour it from one vessel to other cannot understand properly the methods of measuring volume in a measuring cylinder. If at this stage if, we pressurize the child, it will adopt a self defense mechanism of reproducing to us what we wish to hear, without really understanding it. This is the beginning of rote learning. If this pressure teaching continues long enough, the child and then the adolescent and adult adopt this unthinking "learning" as the standard method of formal learning. This what we have achieved in our learning system. The same child however continues to learn by the natural and scientific method in its real life outside the classroom. One can seethe approach to their method of solving simple problems such as untying a knot- or repairing small gadgets or devices. Here one always uses ones own observation and previous experience and makes a hypothesis about what has gone wrong and what needs to be done.

Coming back to our problem of children who have abandoned the natural method of learning, can we correct the ill effects of education, by increasing the learning environment where it learns without tension and wants to use that acquired knowledge in its everyday life?

We have experimented with a course designed for rural areas with the above objectives. The course has been accepted by the Maharashtra State Education Board for the SSC examination from 1985. Now the State is planning to introduce it in 30 more schools on an experimental basis and if successful, it could be extended to all secondary schools in Maharashtra.

The extension to more schools will be used for modifying the course on the basis of the experience in 4 schools to date.

The Principles of the RT system

Based on the above understanding of the problem, we have experimented with a new education system, that integrates education and development, reducing the costs of both.

The basic principles are:

1. Multi skill training
2. Using the acquired skills in real life conditions, by giving services to the community.
3. The community paying for these services on cost plus basis.
4. Using the surplus as an incentive to staff and students.

1. Multi skill training

Multi skill training, not only broadens the horizon of experiences of the growing child, but also gives it the capability to act - it has now acquired some commonly required skills so that it can concretize its ideas on solving its own problems. The child becomes a handyman. Also the rural problems, and often all problems at the ground level need a multidisciplinary approach to understand and think of a solution. Thus it is always a generalist who refers the given case to a specialist for solution.

The multi skill training programmed also reduces the cost 'of education because, at a given time the batch of students is working with different pieces of equipment thus reducing the number of equipment required to give hands on experience to all students. For the same reason the school equipment has greater utilization. Also being equipped for a variety of jobs, the school is better equipped to meet its own requirements for equipment as also services. The school can therefore be better equipped by its own efforts.

2. Using the Acquired skills in real life

This is done by giving services to the community. The provision of services not only brings realism to the education, but links education to the rural life and also the community. It establishes relevance; gives ample opportunities to- allow interaction between the staff and students with the community, and encourages them to understand the needs and use their skills for meeting these. This is development at the

base level. It also gives confidence to the student to later start on 'his own if he wishes. This is a necessary step to encourage both invention and enterprise. Everyone is not inclined to do that but given the right environment, the seeds of invention and enterprise can germinate.

3. The community pays for these services

This economic transaction is necessary. It brings the criterion of economic viability in what the teacher teaches and the student learns. It also reduces the cost for both the user and the giver. For the school, part of the equipment cost and most of the material cost is borne by the community who use these services. Also it is an evaluation and quality control mechanise, by the community. If they don't use these services, either they are not relevant or they are not good. We have found this is the least cost solution for providing services to the rural area. By providing services through the educational system, the demand for these services increases until they become commercially viable; thus it lays the foundation for creating new job opportunities.

By provision of essential services through schools, even in areas, where such services are not commercially viable because of low demand levels, the community benefits and therefore can be induced to pay the cost of the equipment and other infrastructure facilities for starting such a programme for the school. By thus involving the community, the financial burden on the government is reduced thereby making it economically feasible to consider such a system for more secondary schools. This also makes it possible for community to demand the services from the staff and the school as they have invested in it. The community now has a stake in the proper functioning of the school.

4. Using the surplus as an incentive

The distribution of the surplus allows the staff to be given a core salary for the time they spend on actual instruction. The remaining time is then available for giving services to the community, on a cost + basis. The earnings of the staff are then linked to the leave: of services. At the same time the students have an opportunity to get hands on experience. The community gets the services it needs. All are benefited. There is also a healthy working relationship between the parties concerned.

The Experience

This type of system has been under trial through Vigyan Ashram, Pabal since 1983. The Vigyan Ashram was set up in Jan 1983; submitted a proposed syllabus to the State Education Board, which accepted it from June 1985, with due formalities and procedures. From 1988, the programmed was extended to three more schools in the region, where the, explicability was studied by provision of trained teachers to these schools, where the programme was conducted, without direct involvement of Vigyan Ashram.

The State Education Department is now proposing to extend this to 30 more schools, in as many districts, also setting up a system of training teachers and giving them to those schools where the community comes forward to give the facilities, (costing around Rs.40, 000 for the equipment) A detailed report on the philosophy, the start up problems and the results of these trials, along with the detailed syllabus and list of equipment etc is available in the form of a report entitled "Rural Development through Education System".

The important conclusions from the past 10 years experience are as follows:

1. There is better academic performance by students, in spite, of diversion of 20% time to this "prevocational" training.
2. Where the cooperation of the school is not forthcoming, this can become a farce; some benefits still acme and the students do feel the interest.
3. The school and the community has immense potential for benefiting and is willing to collect funds for it.
4. Community services can rise up to: Rs. 30-50,000 per quarter or be as low as Rs. 200-300, depending on the initiative taken by staff and Headmaster.
5. It has an indirect effect on the community, it reduces superstition, brings a modern outlook etc.
6. It provides for non-formal training of school dropouts, in the same system, and the two complement each other.

Services provided through School

- Workshop Fabrication and Repairs—Blood and Urine Medical Test
- Electrical wiring and repairs— Agricultural Products tests

- Water Prospecting, electrical method—Solid Analysis
- Hand pump repairs—Pest Management
- Construction Work — Poultry & Dairy Products sale
- IC Engines and Tire service — Drinking water tests, & Treatment
- Plumbing and sanitation —- Sewing and Knitting

PART II

Formulating the Syllabus

The Beginning

Starting with the idea that we should have a multiskilled course, that would train students and give services at the same time; we had a large number of short course in technical as also art subjects. But it was impossible to get teachers for any of them. I had therefore to give up that idea and then decided to have a common set that would be useful everywhere in India.

I depended on my own needs in the village to decide the topics to include in the syllabus. The list included. Water Resource Development, Construction, Workshop Technology, Energy, and Environment. Agriculture, Animal Husbandry, Home and Health and finally Engineering Drawing. These topics were of immediate relevance to us in Pabal and thought they should be relevant everywhere.

Even though these topics would be common for all, there was a need for flexibility, to suit local needs. The project system solved this problem. The projects to be selected in the final year could be anything, related to the above topics and that would be a good exercise of total planning and review. Also even in the practicals of earlier stages, we did not aim at graded exercises but had some useful articles to be made. This change made the objectives clear to the students and also produced articles that could be tested in use and perhaps save money for the school.

Thus the syllabus was drawn up based on the perceived needs of the rural community and services that could result from them. The actual development of exercises was similarly dictated by the local needs, as also what was possible.

Most of the exercises were therefore simple. What the students could do easily and was also needed by the community, stayed while that which was difficult and/or was not useful as service td the community, was dropped. Perhaps they are still a few which do not fit in the above description. But this seems a good guideline for drafting the syllabus.

The Course Content

The following is a description of the practical work done by the students Engineering

- Measurement of Length, weight, force, pressure, fain; use of vernier scales.
- Making one of the following articles of ferrocement construction.
- Sheet; water tank; or wash basin
- Making 3m RCC columns
- Welding, soldering practice; making articles like chains, hitch hooks, stools, chairs, chappal stand etc. fixing Hingers; adhesive and veneer bonds.

Agriculture

- Growing one crop- tilling, sowing, irrigation, pest management, harvest, and sell.
- This includes study of pest control equipment.
- Growing one batch of poultry broilers; -
- Dairy and Al centre visit
- Energy & Environment
- Preparing a map, using plane table survey, (farm, percolation tank, dam site etc.) Hand pumps Repairs.
- Simple electrical circuits; connect one lamp and switch; staircase wiring with two-way switch, two room house wiring.
- Fuse wire; load protection, fuse selection, etc. connecting 3 phases motor; reverse direction of motor.
- Diesel engine; starting and stopping; names and functions of parts; care.
- Biogas plant, smokeless cliullah, solar Cooker/Water Heater, use, and care.

Home & Health

- Sewing and knitting

- This covers different kinds of hand stitches; simple repairs and alterations; buttons and hooks, velcro etc. simple patterns cutting.
- Knitting needles, simple patterns;
- The following are at present done by some groups as part of the project. It is now proposed to put it in the practicals for all students.
- MPN test for water quality
- Measuring Haemoglobin in blood to detect anaemia.
- Making simple preserved food products; Lemon squash; tomato sauce; pickles; jam/jellies etc.
- Agriculture product analysis; moisture content; fat and lactometer tests
- Soil analysis; sampling, pH and N, P, K

Projects

Four projects are done by each student:

The Projects are intended to:

i. Give the concepts of planning, report writing, drawing conclusions, referring to earlier work.
ii. More practice in using acquired skills.
iii. Produce assets for the school or the community.
iv. Some idea about the cost, market price, and potential demand.

The following are examples of projects to illustrate possibilities. These have been carried out.

Engineering

- Drinking water system including water tank, piping and waste water disposal, for home or school
- Setting up a WC block.
- Part construction of a house or sanitary system.
- Fabrications of simple workshop equipment such as bench or pipe vice, drill stand; power hacksaw.
- Fabrication of useful transport aids-wheel barrow, trolley, cycle trailer etc.
- Fabrication of simple farm furniture for home or school -- rack, cots, chairs, school desks, writing table, blackboard, and stand etc.
- Fabrication-of simple implements such as harrow, weeding tools seed drill etc.

- Services such as repairs, sharpening etc up to a predefined value.

Agriculture

- Growing a complete grain or cash crop in 10 gunthas.
- Setting up drip irrigation for some fn-'it trees.
- Pest control service to five crops.
- Making silage.
- Making and selling plants-nursery for fruit trees or for social for estry.
- Growing and selling 25 broiler birds.
- Dairy-operation for 3 months; including milk tests, records, profit calculations.
- Attachments to a village Al center for 3 months.

Energy & Environment

- Wiring of households or school premises.
- Complete installation of a water pump, electric motor, or diesel engine.
- Watershed survey and planning.
- Survey of at site for percolation tank.
- Location sites for wells; VES tests. .
- Pump Head survey and selection of a pump.
- Setting up or maintenance of Biogas plant or smokeless chullahs.
- Maintenance of hand pumps.
- Building of small bunds and water harvesting channels.
- Maintenance of diesel engine; including measuring efficiency.

Home & Health

- Making complete simple garment.
- Developing and testing simple menus for low cost, solar cooker use etc, time saving or better nutrition etc.
- Health survey of children
- Survey of an aemia patient in risk groups - small children, pregnant women etc.
- More diagnostic tests; blood sugar; blood grouping, jaundice test etc.
- Drinking water quality of village sources.

- Methods of purification of drinking water, and their effectiveness by MPN test.
- Making Milk products like Khoa, pedhas, paneer etc., and selling.
- Making food preserves and selling.
- Soil analysis or moisture content of agri products as service.

Text Books

While the practical lessons did hot raise any controversies, some of our textbook lessons did. They raised certain fundamental questions on the methods of teaching. It is therefore perhaps appropriate to raise them here.

In our textbooks, (as also practicals) we start with measurement.

In the lesson on measurement, we started with units and gave a table to Illustrate different things we measure and their units. The first item was weight, for which we gave kilogram and gram as the units. Some science teachers raised an objection, saying that weight is a force and the unit should be Newton and not gram or kilogram. I only remarked whether they would ask their grocer to sell them one Newton of Wheat! They were insistent that though we may use wrong terminology in everyday life, we should teach the correct concepts, particularly in a physics lesson. I would not agree to create a schism between the classroom and the everyday life. We certainly teach them the difference between weight and mass later, but we would not avoid .the use of the word weight in the sense in which it is used in everyday life. They would not even be convinced by our showing chemistry instruction book, asking for weighing out so many grams of a reagent!

Another controversy was our statement that every measurement is an approximation, no measurement is absolute. Also that even so called subjective properties such as taste and colour can be measured, to different levels of accuracies, and such measurement are necessary. Thus we wished to convey to the students that every-measurement consists: of two parts, choosing a unit and then a comparison of the item to be measured with the chosen unit. The said teachers were of the conviction that, measurement is absolute, any error is due to the observer, and subjective things cannot be "measured."

Yet another controversy, probably with more justification, was our refusal to accept the usual distinction between distance and displacement; the distance is taught as a sealer and the displacement as a vector. We thought this was a wrong way to teaching when a distance between two cities becomes distance or displacement according to whether we wish to call it a scalar or a vector quantity. We had discarded the convention, and said a distance is always a vector. But we don't always need all the information; sometimes, it is enough to know its absolute value only. The reason why we needed to call distance, a vector was that we explained that space was the only parameter that had three dimensions. So if we used only two of its dimensions, we needed to know 'which two therefore we have to give the direction as well. Therefore it becomes a vector. But when we use all three dimensions, as in volume, then there is no ambiguity as all dimensions of the space are used. Thus, length and areas are vector but volume is not.

There were several such points of dispute and therefore we never got the textbook agreed upon.

The Teaching Method -

No matter how it is organised, the teaching method is finally, determined by who actually teaches. We had stressed, practical work. But some how our instructors always preferred to dictate notes and be in the class -room rather than have a practical demonstration. The former dropouts turned teachers always enjoyed being called Sir by the students. So a lot of our teachers still stuck to the dictation/rote-learning mode of education.

It was difficult for me to do away with their dictation, because it was necessary that the students have some thing in their notebooks. The students have no habit or ability to take their own notes after hearing the lecture. We tried to provide charts giving the main points of the practicals-or lectures. We liked to have the students elaborate these points in their own words, to provide them their notes. But the charts remained charts, and both the students and the instructors seemed more at ease with dictation. We now intend to try the practicals handbook.

Another of the problem in teaching Rural Technology was the difficulty the students have even with simple arithmetic. A large proportion of the rural students, including

many 12th pass and even several "graduates" cannot do simple proportions (much less inverse proportions) Many cant even do multiplication or division by 10 or multiples of ten. Teaching number system and how to do these operations with multiples of ten, was tried but forgotten soon thereafter. Only after repeated use of this information, are they able to understand this method.

One of the major problems was that the instructors, who were a product of the educational system we want to drastically change, cannot be changed through just a one year of practical course. It is much easier to impart the technical training, than to give the new outlook. What is hoped, and it is only a hope- there has been no study to check it, is that the practical, real life work will bring them to use their natural logical method of thinking; and this will happen, with some persistent persuasion, not only in their technical work but also in other everyday life.

Brief evaluation

1. The programme was implemented in 5 schools for varying periods; one school from 1985, three schools from 1988 and in one school the programme was run from Oct 1989 to Dee 1992 and terminated.
2. The programme has faced no major problem in terms of the subject matter to be taught. It is neither too heavy nor too difficult to understand.
3. The cost is Rs. 287 per student per year. This was the budget cost and it has not exceeded till 1992. The capital cost per student intake is Rs. 667 as per budget, but an ABC analysis indicates that it could be halved to about Rs. 350 or less.
4. The three schools, which were a special project for replicability study, had a total expenditure of Rs. 7,87,874 during the four-year period; during the same period they gave total community services of the value of Rs. 3,45,539 or 44% of the total recurring expenditure.
5. Staff, students, rendered the services or both combined. In each case it has certain advantages; but in every case the community has received the benefits and has paid for it.
6. It has helped the students in better performance all round, in spite of 20% time diverted to this course, from the conventional academic course.

7. It has encouraged a section of the students .to use the acquired knowledge out side the classroom in their everyday life.
8. It has given an opportunity to out Of school youth to acquire some useful skill training from the school system.
9. It has influenced the community in general in thinking about new ways of doing things and to that extent reduced dependence on superstition.
10. It has delivered services, which were otherwise not viable commercially and helped to nurture demand for these.
11. The staff has tendency to be complacent and even arrogant towards the community they serve, because of the technical skills they have acquired. They need to have an incentive system and some community control.
12. They need a resource group for discussing their technical problems and consultation in giving services; otherwise they stop at even minor hurdles.
13. There should be a good information system and communication channel by which two-way information between the resource group/supervision bodies and the school staff and management is facilitated and documented. A computerised system is recommended.
14. The Khamgaon school where the programme was run for a little over three years (the scheduled period for which grant was available) was a failure. The main reason were non co-operation by the school principal, who created hurdles; lack of a resource group for guidance. However, they still could show that the students enjoy the training; some services have a scope in any community.

PART III

The Future : How Do We Scale up This Educational System ?

The Proposal

The Maharashtra State Council of Educational Research and Training put forward a proposal some time back, to extend this system to 30 schools in as many districts. The Ministry of Human Resource Development, New Delhi has now a' scheme which can fund such programmes in the States. The proposal is now being-considered by the State Government. In the meanwhile preparations are going on for getting ready for the programme.

It is time for a wider debate about the philosophy and contents of this Rural Technology system. Input from the professional scientists and the educationists could make valuable contributions.

The Need

Granting that such a system is to be implemented in a much larger number of schools, where are the teachers to come from? They will have to be trained, who will train them and how? Which schools will be selected and on what basis?

The following is the scheme now under consideration.

1. The schools will be selected on the following criteria.

    a) The school should be located in a village of less than 10,000 population and taluka and district headquarters will be avoided. The school should have less than·200 students preferably, in 9rh and 10th' Standards.

    b) The community must come forward to pay for the 'cost of the equipment, approx. Rs. 40,000 and where this is done the government should provide teachers.

    c) The teachers will be paid a fixed salary for a part time job; •the remaining time they will provide services to the community from the school facility and will get a share of the income earned from this. The services will be as described earlier.

Services Provided Through School

Workshop Fabrication and Repairs — Blood and Urine Medical Tests
Electrical wiring and repairs —Agricultural Products tests
Water Prospecting, electrical method — Soil Analysis
Hand pump repairs — Pest Management
Construction Work — Poultry & Dairy Products sale
IC Engines and Tyre service — Drinking water tests & Treatment
Plumbing and sanitation — Sewing and knitting

Initially some publicity will have to be given, perhaps through video and print material about the kind of services given by schools where such programmes are running. Such video cassettes are already available. This may help in persuading some

communities to collect Rs. 40,000 for starting a school in their village, with the clear expectation that they will then get the above-mentioned services in their village at affordable costs.

d) Where the school is able to raise resources, the school will be selected, subject of course to the constraints on the total schools planned and their geographical distribution.

e) Community Polytechnics will be involved in this scheme as a resource group for the village school.

The Min of HRD started a-scheme called "Community Polytechnics" in 1978 with the idea of utilising-the technical expertise and the equipment and student resources for rural development. They designated some selected polytechnics as "Community Polytechnics" and gave them funds for this work. In a review of the scheme in 1987, it was found that while most of them had established a base in the village society, their work had involved neither the staff, nor the students and certainly it had little to do with the normal educational programme of the polytechnic.

The review suggested a way of linking the technical, education programme to the rural development.

i) First, the staff and students will select projects for the final year students, (as required by the syllabus) which relate to real life conditions and which also are good for practical experience for the students.

Such projects can be selected of relevance to the real life problems of the rural areas. These could relate to cost reduction or increase in productivity of existing operations or design of new processes for existing needs. This is thus normal development work, and not "rural development" in currently implied meaning. Examples of projects done in hand or in the wait list are shown elsewhere.

ii) The second important activity is to develop training material, both text and teaching aids. We understand best when we try to simplify and teach some one else. The students should try to (a) identify what the applications of their learning are, in a different real life situation, (b) explain the concept and application method in a simple language without using technical jargon, (c) and demonstrate either the application or the principle, by doing. This

will reinforce their own learning and at the same time also generate new methods of teaching for lower levels of the same subject.

iii) The technical staff/students should also serve as an easily accessible, low cost, technical consultancy group for the rural area. This does happen already in some cases, but is to be formalised and encouraged. This will have a particularly significant role in the use, and applications of computers and generally in the conversion of a felt need into a technical project.

iv) With the above activities implemented, the staff of the Community Polytechnic, set apart for the rural- development work will act' as 'the transfer agents or facilitators for the link between the above three activities and the work in the rural areas, particularly the school instruction and services through the school. Their role will be in arranging training of multi-skilled instructors for the school, overseeing the linkages created, acting as a channel of information, and a resource group.

The Information and Referral System

There is another role for the Polytechnics-in-carrying the Information technology to the rural area. This has also been recommended in the 1987 review of the Community Polytechnic Scheme, and which has been included in the Programme of Action of the Education Policy in 1992.

A computerised system is not effective unless it goes to the whole system. If a part is computerised, the manual part then becomes the bottleneck and the whole system is not fully utilised. But what will the role of the computers be? Who will-install them and at what cost? Who will do the maintenance and training functions? The Polytechnics can be trained for these functions. But how .can the Information Technology fit into the rural area? Obviously the information about the existing situation that we want to change has to be measured and sent from. The rural area we need trained people who can. measure and record and do preliminary processing and then send it through the system.

We talk of the Information Technology revolution, now in the offing, but are not clear exactly how we can exploit it for fighting our backward economy. The general trend

is for its use in the further development of the already developed section of our society. There is nothing wrong with this; but a nation cannot progress-fast if only 5% of its population can contribute to the core activity and the rest are only providing passive labour. We therefore need an information system that starts with; the needs and facts of the rural scene, and poses technical questions, for solving. These technical problems will be sent through-the technical wing of the school, upwards to the Polytechnic, Engineering colleges, or the IITs and National Laboratories, so that the problems are posed to that group where the problems match the talents of the technical group. Also some times the same problem coming again and again indicates a deeper malaise, and often such problems can be good material for fundamental research. This is how research into cholera or malaria started. The linkage between the research group and the field where it will be applied must be good for that research to be effective in application. The information system will-be used for feedback on programme implementation, .the current economic indices, local surpluses and deficits, and perceived needs and problems.

There are some in the country, who advocate a separate science and technology establishment, specifically for "Rural Development". This is totally wrong in my view. Most scientists are interested in challenging problems. If such challenging problems do not come to surface from their own environment, they take up those from wherever they can locate them. Since they need, a problem that is not only identified but also background information to help them solve it. They go for currently published material for locating such problems.

If we have an information system that can list and document such problems that need technical solution and for which an economic value can -be assigned, and particularly if there are agencies which are waiting for funding projects of this nature, I do not see why the existing science and technology and education institutions will not be able to solve most of these and make the application of such development work almost automatic.

If the above proposed two way linkage between the rural needs and the technical expertise for solving the country's problems is established, the population at large will reap the benefits of science and technology and will willingly support more funds for

the research and development activity. They will then see modern technology not only the distant space applications but also in their immediate environment. This does not have to be "hitech" and in most cases it will be the imaginative application of what is already known and used elsewhere.

Such a system will improve our education by linking it to real life situations and it will produce development by using the education system as the channel for delivery of technology. What has been said for rural areas is equally valid for the whole country.