

CENTRE OF SCIENCE FOR VILLAGES



Magan Sangrahalaya,  
Wardha (India)

01689

**To the Scientist of India**

" I would like you to be men, who stand up before the world firm in your convictions. Let your zeal for the dumb millions be not stifled in the search for wealth. I tell you, you can devise a far greater wireless instrument which does not require external research but internal--and all research will be useless if it is not allied to internal research-- which can link your hearts with those of the millions. Unless all the discoveries that you make have the welfare of the poor as the end in view, all your workshops will be really no better than Satan's workshops.

Gandhi  
13-7-27

"What have we to do if we are to save India in this scientific age? First, we have to resolve to decide all social problems by non-violent means. Secondly, science should be utilised for producing instruments that would serve man and not armaments that would kill. Thirdly, the prevailing situation alone should decide whether science should be ordered to produce big machines or small ones. If we keep these axioms in mind, we can derive immense benefit from science. Let the growth of science be steady and unimpeded, this is my desire".

Vinoba Bhave

LIBRARY AND DOCUMENTATION UNIT

ANAND BHAVAN

## NEED OF THE HOUR

Economic development of our country can proceed if and only if both production and distributive justice are simultaneously enhanced, especially in our vast number of villages. It is paradoxical that with its abundant labour and unutilised resources our country and people continue to be poor. Gandhiji after his experience in three Continents—Asia, Europe and Africa—came to the conclusion that it is through low capital, labour-intensive, decentralised industries that we could produce a self-reliant and regionally inter-dependent society as would bring a comparative and peaceful world into being. The experiments in village industries, he got initiated, were meant not only to improve the existing crafts in the rural areas, but also to introduce new techniques on the basis of the latest scientific knowledge which could improve rural economy. Efforts so far have fallen far short of expectation of Gandhi.

His concept of the rural habitat was an ideal setting which could afford man the fullest expression to his being in close communion with fellow human beings on one hand and Mother Nature on the other. As we look to the results of rural development work done by voluntary agencies under Gandhi's inspiration for the past 50 years we find that there is great impact of 1500-2000 small groups of dedicated people working independently and covering a large number of villages. The field of their activities is varied e.g. Khadi and Village industries, welfare of tribals, removal of untouchability, basic education, agriculture and cow protection (Goseva), welfare of women and children etc. etc. This is no mean achievement in a country where, the gulf dividing urban and rural sector wide, the communication between the elite and the masses weak and the understanding of realities of the villages by the decision makers—poor:

There it is that the matrix of these constructive work organisations, which have established a rapport with the rural

poor, can act as agents for discovering patterns to bring new life in the rural scene through the application of science and technology.

Hence in light of this, the essential need for an organisation which performs the following functions became evident :-

1. Introducing new occupations, means and modes of production on the basis of newer knowledge of technology, as related to the locally available resources and under taking field trials and training to ensure the emergence of viable professions.
2. To provide a channel for laboratory scientists and technologists to interact with rural life and its realities, and thus enabling scientists and technologists to learn from the artisans, traditional methods as obtained in the villages so that the scientific basis of such accumulated knowledge of the ages is understood and thus enable its technological improvements.
3. To Provide a forum to rural innovators to interact with Science & Technology specialists and experts so as to imbibe the scientific methods by practice, and encourage the multiplication of innovation.
4. Preparation of documentation and [dissemination among the Scientists and Technologists, results of researches and such techniques and processes which have the potentiality of meeting the desired criteria.
5. Undertaking adaptive R. D. D and detailed designing to suit the technology to locally available raw materials and skill levels.
6. Formulation in techno-economic terms of projects where relatively long term R. D. D. is necessary and collaborating with national laboratories for project implementation

**BIRTH OF CSV**

In 1935, when Gandhiji started the All India Village Industries Association (AIVIA) he invited the top scientists of the day like Dr Jagdish Chandra Bose, Acharya Prafulla Chandra Ray, Sir C. V. Raman, Prof Sam Higginbottom; Sir Robert McCarrison and others of his time to be on its Advisory Committee. AIVIA aimed to develop the existing village industries and undertake experiments to improve these techniques on the basis of the latest scientific knowledge available, and there by bring in to being a harmonious vibrant rural economy. Concurrently, Shri E. W. Aryanayakam carried forward Gandhiji's idea of Nai Talim, the new system of education based on learning from work experience. The work of AIVIA was performed under the leadership of Prof. J. C. Kumarappa. He was also the Chairman of the National museum on village industries called Magan Sangrahalaya started by Mahatma Gandhi in 1938 at Wardha. It is in this Sangrahalaya that the Centre of Science for the Villages (CSV) was started in Aug 1976 by Shree Devendra Kumar for the fulfilment of the Gandhian concept of science & spiritual welfare of all. This had the blessings of Acharya Vinoba Bhave who signed its original prospectus which has the following guidelines:

- a) The kind of techniques which we pick for taking to the villages should be such as will touch the life of the poor sections of the people first and can be easily made use of by them thus bringing a glimmer of hope for change in their otherwise moribund state.
- b) These techniques should increase the avenues for rural employment, preventing the erosion of talents from the villages and they should enrich the life of the total community with special priority to the interests of those living below the poverty line.

- c) All these institutions which are engaged in rural work whatever be the nature of their respective work, should along with their usual activities, undertake some appropriate techniques about which they take the responsibility of introducing in the villages in their field.
- d) in the process of introducing new techniques, it is necessary that the technological institutions and scientists coordinate their efforts with the voluntary constructive work agencies. This will present an opportunity of interaction between the scientists and the social workers in the process of taking science to the villages.
- c) Establishing co-operation between the voluntary organisations, the scientific institutions along with the industries of the country. The industrial sector should not only look for increasing production, but also be geared for the welfare of weak and removal of disparity in the land.

### **FUNCTIONS & ACTIVITIES :**

The CSV has divided the technologies, in the transference of which it wants to concentrate itself, as to fall under the following four heads :

- I. Rural Housing & Environment
- II. Rural Crafts & Industries
- III. Energy & Fuel
- IV. Agricultural & Household Tools & Appliances

The activities done so far will be illustrative of the future plan of work. These are :

## Documentation and Dissemination

Various techniques generating Centres in India including the Various CSIR laboratories and other technological institutions of education and research along with institutions engaged in technological transfer in the country have been kept in close touch with and the necessary laboratories about their work obtained in our technological centres. The number of such institutions with which a liaison has been kept is round about 50 and similar institutions in other parts of the world have also been kept in touch, number about 30.

There is a regular correspondence giving information to people working in villages who require technical guidance in such matters and for which purpose an English bulletin by the name of 'Science for Villages' With a monthly periodicity has been brought out since August 1976. This covers both the approach and the practical work going on in the field. The documentation and dissemination activity needs to be much strengthened as the demand of it is increasing.

### Demonstration:

Such techniques as have been tested and tried in the various laboratories and places of technological innovations are collected in the centre and subjected to a selection from amongst them are tried with the help of generating institutions, demonstration of the same is tried at Wardha. So far we have had under four heads indicated above the following demonstrations :

(1) CBRI techniques in rural housing have been used in construction of 2000 sq. ft. house constructed on black cotton soil, demonstrating six type of innovations; in rural sanitation about 100 lavatories have been got constructed utilising techniques evolved for simple flush lavatories by NEERI and other research laboratories; in the village warud mud-walls were treated with a non-erosion technique and soak pits and other enviro-

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omental methods demonstrated; lime pozzolana mixture for a cementitious material substituting portland cement has been evolved and tried in the field at Bhadrawati; candle filter, filled in earthen water pots for safe drinking water.

(II) To add new modes of employment in the villages based new techniques from the laboratories, the utilisation of the banana fibre from the waste stems into making pulp and paper; spirulina algae tank evolved by a Repley Fox of France for cheaper source of protein for rural India was made; making leaf cups by CFTRI method; paints, distempers phenyl and other minor chemical techniques were tried out.

(III) In energy and fuel : Solar devices (water heaters, and water lens, solar steam cooker from ICRIAT (Hyderabad), Yantra Vidyalaya (Bardoli) Brace Research Institute (Canada) Japanese model and ICAR, (Jodhpur) were demonstrated. Chinese type domeless biogas digesters were got constructed at Dattapur, water heating tank evolved built by Mary Farge (Paris); improvements in smokeless oven (chulha), experimentation in making solar basket from old newspapers.

(IV) Agriculture and household tool : Cycle trailer; agriculture hand tools by Yantra Vidyalaya, ball bearing well pulley using old cycle axle etc.

#### LOOKING FORWARD :

The Structure for the Centre briefly is that of a core of scientists equipped with a documentation and dissemination unit, workshop facilities, and, a small analytical and testing laboratory. To begin with an 'area' would be selected, Artisans from this 'area' receive training through project-work at the centre. In the course of project-work, skills and understanding related to the newer techniques would be imbibed by the artisans. Concurrently the project work would aim at developing basic marke-



ting and managerial skills so that the artisans could operate and run the production units without recourse to day-to-day assistance from the Centre. When the artisan trainees have gained sufficient experience and confidence in the utilisation of the new techniques, the Centre would provide infrastructure support in the initial stages of the establishment and operation of the production units. It is through this process of project work that one aims at the creation of professions in the rural economy without which there can be no transfer of technology and improvement, as well as diversification of production.

The production units brought about in the above manner will help in augmenting the training capacity available to the Centre. Thus, for example the training programme may involve an initial apprenticeship in the production units followed by completion of the training at the Centre.

At this stage it is apparent that the production units in an 'area' may require the services of a very small quality control laboratory located in the 'area'. This laboratory would also serve as an extension cell. The exact form of extension stations (if necessary) which takes advantage of the existing infrastructure would have to be explored and worked-out. As a step towards gaining experience in this direction techno-economic surveys and build of contacts with respect to two other 'areas' in the district, one of which would be in a relatively remote region.

Many of the rural oriented technology available from the CSIR and other laboratories, including higher education institutions, require an incapable Adaptive RDD work at the Centre, so as to gear it to the local sociological, economic skills and resource conditions and thereby ensure the creation of rural industrial professions. The Adaptive RDD work would entail either sponsoring of work with existing laboratories and consultancy visits by S & T specialists. An interaction which would help in the laboratory level S & T personnel gaining an insight of rural requirements.

**THE NEXT STEP :****Matrices of rural inter-relations :**

The Village can never be considered in isolation. After a deep study of functional interdependent structures, a group of Villages would emerge which can be totally called as BMS Complex where S stands for Satellite which is the smallest village of mainly agriculturists. These villages individually cannot sustain any artisan population. A cluster of satellite villages depend upon Mandi village (M) which has greater population and/or better connected with other villages. The Sub-system of Mandi complexes is served by a still bigger village (itself a Mandi) which has access to non-local materials. This BIG or BAZAR (B) village has higher production function of artisans.

The BMS complex, thus, is small enough to allow effective participation in the management of the production organisation by the smallest person and at the same time allows access to the towns for providing a channel for the technology transfer.

The projects immediately identified and taken up have been selected on the criterion of their criticality in opening large number of employment opportunities and/or having such product range which satisfy the need of scarce and essential raw materials. This is illustrated by the following projects :

**1. Construction Material**

- \* Studying the local soil condition and establishing a technically appropriate composition of soil for mud constructions and transfer the technology to the rural builder.
- \* Studying and establishing viable prototype of lime pozzolana production unit suitable for a production organization in the rural context.

**2. Heavy Pottery**

Transferring the techniques of brick making from black cotton soil and clay pipes and structurals from local clays to the rural artisans,

### 3. Construction Techniques :

Transferring new building techniques to rural artisans with a view to :

- \* establish new avenues of employment;
- \* afford better housing and sanitary amenities to the poorest in villages;
- \* prepare the rural artisan for undertaking the various new prefab structures which will transform the rural scene.

### 4. Banana Fibre & Paper Technology

Transferring technique of pulp and paper making from plantain (Banana) stem fibres for introducing new avenues of employment in plantain growing areas where presently this fibre is going waste;

### 5. Energy : Bio-Gas

Identify the constraints in the way of transfer of bio-gas technology, with particular reference to plant design, and developing a strategy for introducing biogas plants in wardha Block through introducing a new artisan in the village-the Biogas Wallah

#### (a) The future Programme :

Apart from the five projects for which the reports are being submitted a number of such other projects have also been identified and will be taken up shortly. They are

- \* Small sized high temperature (1100 °C) furnace to enable the village potter to fire large number of diversified products like filter candles, refractories, ect. very essential for furthering industrial growth.
- \* Design improvements in village 'Awa' to improve heat efficiency and resultant products in the pottery sector.

- \* Essential oil distillation skills which could take up various seasonal douriferous materials available in the villages.
- \* Wood distillation for forest areas.
- \* Transport through bullock cart.
- \* Internal village roads.
- \* Improving the tools and appliances in rural homes to help mitigate drudgery of women.
- Agricultural implements.
- \* Solar energy appliance.
- \* Wind Mills.
- \* Improving home cooking ovens.
- \* Utilizing agricultural fibrous waste in particle boards.
- \*\* ect. etc.

The approach is that the transference of technology to the villages will have to take into consideration :

- (i) The BMS Composition of the village economy.
- (ii) The criticality of the technique as would open up new vistas.
- (iii) The beneficiaries of the technique which is converted into trade should be those of lower strata.
- (iv) Even if a sophisticated technique is used, it be broken into components which touch all the three dimensions of B. M. S.

The initial projects will be followed by others fulfilling the above criteria, and the S & T Field Agency will become pioneering experiment in creating not only conduit for the technologies developed in laboratories to reach the villages but also be transformer of the same to become appropriate for Rural India.

Through the approaches mentioned above CSV aims at converting processes into professions for the villages and changing techniques into trades and occupation for those below the poverty line.