

“AKRUTI – KRUTIK – FORCE”

(Inclusive Rural Advancement through Technology Deployment)

DAE- SOCIETIAL INITIATIVE FOR LARGE SCALE DEPLOYMENT OF TECHNOLOGIES

BACKGROUND

Over the past 50 years a large indigenous Science & Technology (S&T) know-how has been generated in various national laboratories and in parallel, several technologies have been imported. Urban sector has received the highest attention by way of deployment of large number of these technologies and know-how in urban areas resulting in rapid urban development leading to **urban rural divide in terms of prosperity and opportunities**. Further, India's young population is expected to be the largest in the world in decades ahead, over 500 millions. Creating gainful and productive work for them is the greatest challenge. Technical know-how generated in national laboratories related to basic needs such as water, food, energy and environment has been underutilized. Deployment and adaptation of this know-how to the rural needs could provide a creative opportunity for expected 500 million youths in rural and urban India to contribute to the national wealth with prosperity for everybody including villages.

KEY DRIVERS

Organisations nurturing know-how for water management, land utilization and energy production and conservation, all done in an environment friendly manner are the key drivers of emerging global economy. All these four factors viz. water, land, energy and environment are the lifeline for the rural economy where ~ 70% of Indian population resides contributing only ~ 30% to GDP. Moreover good environment is an issue of great concern and worry for healthy existence of our present and future generations.

VISION

In a country of the vast size such as ours, technology innovations and adaptation has to be evolved in a greater measure particularly since such technology has to fit with varied local conditions and need to be applied quickly to enhance the

quality of life of larger population. Considering the wealth of technology and innovative capability generated in BARC & DAE units as an off-shoot of R&D in Nuclear Energy and its applications in power and non-power areas, Department has launched **DAE – Societal Initiative** for utilization of Non-Power Applications (NPAs) and Spinoff technologies (Spinoffs) in the area of water, land, agriculture, food processing and urban-rural waste management. Within this framework of societal initiative, structured programme called “**AKRUTI - KRUTIK - FORCE**” has been formulated and is being implemented by BARC for techno-economic growth of the rural sector, as one of the many schemes for large-scale deployment of NPAs and Spinoffs. This programme will enable to take the fruits of technology to grass-root level to every villager in the remote corner and provide inclusive growth to the rural sector and tap the hidden innovative capability of large rural population.

MISSION

“Empower Villages with Science & Technology (S&T) based eco-friendly work plan for sustainable Techno-Economic growth of rural sector”

PROGRAM STRUCTURE

Based on interactions and experience of BARC scientists and engineers with National R&D laboratories, Agriculture Universities, KVKs, Farmers’ Co-operatives, other Government Departments, Industries and NGOs; a detailed formatted programme has been worked out that would compliment, supplement and augment the efforts of all existing programmes of different organisations, departments and ministries. Further, large scale deployment of several technologies in the rural sector will lead to economic upliftment, improvement of quality of life, inclusive growth of the rural sector and contribute to increase in rural GDP.

The programme AKRUTI-KRUTIK-FORCE aims to create structured and scalable network of technology nodes in rural areas providing easy access to modern technologies to all villagers in their own villages. ‘AKRUTI’ is an acronym for ‘Advance Knowledge and RUral Technology Implementation’ programme. Through this programme, the technology centre called AKRUTI node is set up in a village. This is done under the guidance of BARC, through technically oriented NGOs working in that village. AKRUTI node will park number of BARC developed technologies for use by villagers. These technologies are demonstrated and taken to different villages

around the AKRUTI node via working centres established in different villages around AKRUTI. These working centres are called KRUTI Kendra viz. KRUTIK. KRUTIK stands for '**K**nowledge and **R**ural **T**echnology **I**mplementation **K**endra, which works with villagers and farmers' groups and deploy these technologies in their own villages and in the fields. These groups are known as **FORCE** meaning **F**armers' **O**rganised group for **R**ural **C**reative **E**ntrepreneurship. Each member of FORCE group is made familiar with technologies of AKRUTI through KRUTIK. AKRUTI and KRUTIKs will be managed by technology oriented villagers and NGOs operating in the village.

AKRUTI and KRUTIKs will function coherently and will create large number of FORCE groups in different villages who will benefit from the use of the technologies in AKRUTI node. Some of them will play a role of successful entrepreneurs. The present existing Self Help Groups (SHGs) created by various nationalised banks can play an important role to create a band of rural entrepreneurs. This way, present SHGs will become FORCE for this programme and provide lively-hood security for villagers.

PROGRAM ACTION PLAN

In the beginning, it is planned to set-up few AKRUTI nodes in different states. This will be initiated with the active participation from mission oriented NGOs in pre-selected rural areas. This programme is proposed to run under budget neutral mode as far as DAE is concerned. BARC will provide know-how and technical expertise whereas infrastructure and manpower has to be arranged by collaborating NGOs including managing finance through existing various State and Central government grants, aids and development funds or bank schemes of macro and micro finance.

The scope of work on technology related activity covers both farm and non-farm areas such as propagation of new crop varieties, agro-processing, preservation, water management, soil testing and improving land fertility etc. Further, the scope of physical location of work could be in urban areas for technologies having direct implication to rural development such as implementation of plant similar to 'SHRI' - Sludge Hygienisation Research Irradiator at Vadodara, Gujarat or Bio-gas plant based on biodegradable solid waste - 'NISARGRUNA', spread over urban areas of different states of India. Inputs used for these plants are sewage sludge and biodegradable solid waste respectively, generated in cities and produce weed-free, high quality

organic manure (OM) eliminating the waste and sewage completely. The OM is used for topsoil conservation and recovery of degraded land of agri-fields. The OM is also an excellent clean media to create value added products such as bio-fertilisers with additional processing. Moreover, NISARGRUNA could be a great asset in a village, providing high purity Methane gas which is an excellent house hold fuel or can be used for electricity generation.

Initially, working models of AKRUTI nodes will be set up in few villages using BARC developed technologies for demonstration. Subsequently, the modality to incorporate technologies from other R&D centres of different departments will be worked out, in consultation with concerned departments so that proper co-ordination and co-operation is established within these departments for the same purpose.

PROGRAM INITIATION

The programme implementation has commenced and eleven AKRUTIs are in operation in five states of India, as a result of DAE-Societal Initiative launched by Dr. Anil Kakodkar, Secretary, DAE & Chairman, Atomic Energy Commission. The 'AKRUTI' programme has received excellent guidance and encouragement from Dr. S. Banerjee, Director, BARC. Active interest and support from Dr. R. B. Grover, Director, Knowledge Management Group, BARC and Dr. K. B. Sainis, Director, Bio-Medical Group, BARC has refined this programme. Apt advice and useful discussions in the formative stage of AKRUTI, with Shri S. Prabhakaran, Ex-Member (Finance) Space & Atomic Energy Commission & former Chairman of DAE-Societal Initiative Steering Committee has laid the strong foundation of this programme. Interest in the programme and its appreciation by Dr. Vasant Gowarikar, Chairman, The Rajiv Gandhi Science & Technology Commission (RGSTC), Govt. of Maharashtra, and realising the timely introduction of the project due to its direct relevance to our rural economy resulted in financial support by RGSTC for AKRUTIs in Maharashtra State. The excellent active participation of concerned BARC scientists and engineers and cooperation from all Heads of Divisions and Group Directors of BARC has brought the programme to the present operational status.

Administrative guidance from Controller and IFA, BARC and financial management support from Accounts Division of BARC has smoothened operation of this programme and enable faster implementation.

PRESENT PROGRAM STATUS

Three AKRUTI nodes are set up in Maharashtra State (MS) financed by Rajiv Gandhi Science and Technology Commission (RGSTC), Maharashtra in collaboration with three NGOs viz. CARD, PARIVARTAN and NIRMITEE as follows:

1. 'AKRUTI-NIRMITEE' - by NIRMITEE at Uddhar, Dist. Raigad, MS
2. 'AKRUTI-PARIVARTAN' - by PARIVARTAN at Chiplun, Dist. Ratnagiri, MS
3. 'AKRUTI-CARD' - by Community Action for Rural Development Society (CARD), at Khirala village, Dist. Amravati, MS

In addition, eight more AKRUTI nodes are in operation, one each in Andhra Pradesh (AP), Madhya Pradesh (MP), Karnataka, Assam (NER) and four in Maharashtra as follows :

4. 'NAYUDAMMA's AKRUTI' at Kaviti Mandal, Dist. Srikakulam, AP
5. 'AKRUTI' by Fresh-O-Veg Krishak Club at Indore, MP
6. AKRUTI-YMC by Yusuf Meherally Centre, Tara Village, Dist. Raigad, MS
7. AKRUTI-ANKUR by Ankur Pratishthan and Sanshodhan Sanstha, at Ambajogai, Dist. Beed, MS
8. 'AKRUTI' by Vivekanand Ashram at Hiwara Bk, Tal. Mehkar, Dist. Buldhana, MS
9. 'AKRUTI' by Loknayak Jayaprakash Narayan Leprosy Eradication Trust at Vasai East, Dist. Thane, MS
10. 'AKRUTI' by Malenadu Education & Rural Development Society at Sirsi, Dist. Uttara Kannada, Karnataka
11. 'AKRUTI' by Shanti Sadhana Ashram (SSA) at Basistha, Guwahati, Assam, NER

First five AKRUTIs are functional since two years. Out of which AKRUTI-PARIVARTAN and AKRUTI-NIRMITEE were inaugurated by Dr. Anil Kakodkar, Chairman, AEC and Secretary, DAE on 8th June 2008 at Chiplun and Dr. Srikumar Banerjee, Director, BARC, on 1st Nov. 2008 at Sudhagad near Pali, respectively. At AKRUTI-PARIVARTAN electricity generation was demonstrated by connecting 10kW, biogas generator to Nisargaruna Biogas plant, whereas at AKRUTI-NIRMITEE, during the inauguration function, public address system, lighting and electrical equipments were run on the electricity generated through NISARGRUNA plant.

On the advise and guidance of Dr. R. Chidambaram, Principal Scientific Advisor to Government of India, (PSA to GoI), umbrella MoU has been signed on 10th Oct. 2008 between Bhabha Atomic Research Centre, Mumbai and Office of the PSA to GoI, New Delhi for delivering technologies through Rural Technology Action Group (RuTAG) and “AKRUTI” programmes under DAE – societal Initiative. Under this framework, `Rural Technology Delivery Centres – RTDCs will be set up jointly by different RuTAGs, BARC and local technically oriented NGO and technologies will be delivered to villages through `AKRUTI-KRUTIK-FORCE' format via RTDCs.

Federation of Farmers Associations (FFAs), Andhra Pradesh has submitted Project Proposal called ‘SAMARPAN’ to Rajiv Gandhi Foundation, Delhi to set up AKRUTIs in Andhra State for deployment of BARC-DAE and Department of Space (DoS) technologies. Number of technically oriented NGOs from all over the country are in contact with BARC to set up AKRUTI nodes in their respective areas.

TECHNOLOGY DEPLOYMENT ACTIVITIES IN AKRUTI NODES

Three NISARGRUNA plants in AKRUTI nodes of Maharashtra are running successfully. Demonstration experiments with Foldable Solar Dryer, Domestic Water Purifier, Soil Organic Carbon Testing Kit and SHRI Sludge utilization are carried out in different villages and fields. New seed varieties of BARC have been sown second time in more than 100 locations around these AKRUTI nodes through KRUTIKs amongst the villagers and farmers in the surrounding villages. Laboratory training in tissue culture technology for village farmers as an `AKRUTI TRAINEE' in BARC has also been initiated. CARD, Amravati is the first beneficiary of this programme. Water filters (without electricity) to meet the village need of clean bacteria free drinking water are being assembled in all three AKRUTIs of Maharashtra and Foldable Solar Dryers are also fabricated in AKRUTI-NIRMITEE at Pali.

AKRUTI node at Indore, MP has reported average 19% increase in the yield for TAG-41 BARC groundnut variety as compared to local seeds. This is based on the production of 76.07 quintals from 4.2 quintals of sowed TAG-41 seeds in eight different fields of four villages viz. Datoda, Badiya, Nirmar Khadi and Sulgaon.

Investigations for underground water based on Isotope hydrology have been initiated in ‘AKRUTI-CARD’ at Amravathi and ‘AKRUTI-ANKUR’ at Beed District. Some of the activity photographs at different AKRUTI nodes are enclosed herewith.

Field data collection, documentation and database generation of technologies deployed in the field has started. These AKRUTI nodes in different regions have created a good network of information and data exchange and feedback on technology deployment. The regular collection of crop databases over few years could form the strong basis for crop insurance for future, providing safety network and protecting farmers from uncertainties of nature.

WHO CAN PARTICIPATE

- Technically oriented NGOs engaged in S&T based rural activities who can manage HR, finance and required resources for deployment of BARC technologies.
- Financial institutes, Banks, social organisations like Lions Club, Rotary Club and Religious Trusts may also participate by providing financial support to above NGOs.
- Big Business-Houses and Corporates through their CSR (Corporate Social Responsibility) schemes can also participate in this programme for progress of rural sector - the future markets.
- State and Central government departments having schemes for rural development based on S&T work programmes deployed through rural organisations with financial support can utilize this S&T based AKRUTI work plan with technologies.

MARKET SUPPORT FOR FUTURE GROWTH

Presently, the agri-produce and other related products produced through this programme by various FORCE groups, will be utilizing the existing infrastructure for distribution, marketing and financing schemes, which have been already formulated by various ministries, departments, banks, PSUs & other organisations. Commodity exchanges and associated organisations like National Bulk Handling Corporation (NBHC) can play a vital role in taking these products to market place and provide right valuation to the efforts of village communities in particular to the farmers on expansion of this programme in future. *BARC has signed MoU with SBI, NBHC and farmer's co-operative to create appropriate support schemes for this programme of "AKRUTI – KRUTIK – FORCE" on its large scale spread.*

AKRUTI TECH PACK

In order to encourage locals from rural areas and also urban entrepreneurs to start AKRUTI activity in rural sector a Technology Package named '[AKRUTI Tech Pack](#)' is offered at an affordable price. 'AKRUTI Tech Pack' consists of following

Technologies

1. [Foldable Solar Dryer \(FSD\)](#)
2. [Vibro Thermal Disinfector \(VTD\)](#)
3. [Soil Organic Carbon Detection & Testing Kit \(SOCDTK\)](#)
4. [NISARGRUNA](#) (Bio-gas plant based on biodegradable waste)

[Domestic Water Purifier \(DWP\)](#) a water filter technology for bacteria free clean drinking water without electricity will be offered **additionally to the above as option**.

For increasing the rural awareness of benefits of radiation processing, consultancy service for irradiation of agri produce on trial basis without charges to AKRUTI Tech Pack holders will be provided. Women Entrepreneurs are provided additional incentives.

SUMMARY

The basic need of opportunities for innovation, work and entrepreneurship for the rural areas can be accomplished by canalising modern indigenous know-how and technologies through this structured program “AKRUTI-KRUTIK-FORCE” with the existing financial support in the initial stage. This will enable the villagers to deploy and make use of the technologies with local adaptation for themselves, which itself will generate village entrepreneurship and make this activity self-sustaining and wide spread. In-turn, it will create a strong, wide spread network for embedded innovative S&T culture in rural areas.

Know-How, like a dormant bacteria waiting for a right climate to become active, **Exists In The Country**. AKRUTI-KRUTIK-FORCE can work like a catalyst to speed up deployment, use and spread of NPAs & spin-offs. Thus, BARC-DAE technologies in AKRUTI node, deployed by KRUTIK through villagers amongst FORCE groups will create `People Centred Research & Extension for Assured Livelihood of the rural sector. **Livelihood security of the rural sector will ensure the food security of the nation.**

A.M. Patankar,
Head, Technology Transfer & Collaboration Division,
Bhabha Atomic Research Centre,
Trombay, Mumbai-400085
Tel : 022-25593897
Fax : 0091-022-25505151
Email : headttcd@barc.gov.in