



## AKRUTI - DAE Societal Initiative

# AKRUTI - Advanced Knowledge & RUrAl Technology Implementation

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### Abstract

To derive nuclear technology enabled societal benefits, the Advanced Knowledge and RUrAl Technology Implementation (AKRUTI) programme has been formulated and implemented in collaboration with many divisions of BARC, DAE units, the Rajiv Gandhi Science & Technology Commission (RGSTC) of the Government of Maharashtra (GoM) and NGOs working on technically oriented activities in rural sector. Seven AKRUTI nodes in Maharashtra and seven in other states of India have been set up, and most of them are functional for more than a year. Technologies deployed in various villages by NGOs, through village working groups under the guidance of BARC experts are: NISARGRUNA, Domestic Water Purifier, Soil Organic Carbon Detection Testing Kit, Foldable Solar Dryer, Vibro Thermal Disinfestor and Isotope Hydrology for investigation of underground water resources. A Tissue Culture Laboratory for micropropagation of banana plants with field hardening facility and Fruit Processing Unit has also been set up. A Rural Human and Resource Development Institute is being proposed, to train a committed work force to further spread the AKRUTI programme. This institute will work as a centre for DAE outreach programmes, for DAE technologies.

### Background

Large-scale deployment of Non Power Applications (NPAs) and spinoffs, is the 4<sup>th</sup> key driver of major programmes of the DAE. As one of the schemes of this major programme to deliver or reach nuclear technology enabled societal benefits to the rural population, a structured programme called "AKRUTI-KRUTIK-FORCE" has been formulated and it is being implemented by BARC, for techno-economic growth of the rural sector. This programme has been worked out to complement, supplement and augment the efforts of similar programmes of different organisations,

departments and ministries. The programme, more popularly known as AKRUTI programme, is promoted as part of DAE Societal Initiative. AKRUTI programme is the culmination of interactions of a very large number of divisions of BARC and DAE units and collaborative experience of BARC-DAE scientists and engineers with National R&D laboratories, Agricultured Universities, KVKS, Farmers' Co-operatives, other Government Departments, Industries and NGOs. Technologies deployed in this programme cover areas related to water, land improvement, agriculture, food processing and urban-rural waste processing for value addition.



**Programme Structure**

The programme AKRUTI-KRUTIK-FORCE is designed 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, AKRUTI node is set up in a village, where technologies are deployed and demonstrated.

The programme is run under the guidance of BARC, through NGOs working to bring science and technology to that village. AKRUTI node parks a number of BARC developed technologies for use by villagers. These technologies are set up and demonstrated by village working groups. They take technologies to different villages around the AKRUTI node via working centres called KRUTIK established in different villages around AKRUTI. KRUTIK stands for 'Knowledge and RUrAl Technology Implementation Kendra, which works with villagers and farmers' groups and helps them to 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 a FORCE group is made familiar with technologies of AKRUTI through KRUTIK (Fig. 1). AKRUTI and KRUTIKS

are managed by technology oriented NGOs operating in the village. All the activities are carried out by villagers and managed by NGOs under the guidance of BARC-DAE scientists/engineers.

**Current Status**

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

- 'AKRUTI-NIRMITEE' - by NIRMITEE at Uddhar, Dist. Raigad, MS
- 'AKRUTI-PARIVARTAN' - by PARIVARTAN at Chiplun, Dist. Ratnagiri, MS
- 'AKRUTI-CARD' - by Community Action for Rural Development Society (CARD), at Anjangaon Surji, Dist. Amravati, MS

Out of the above three functional AKRUTIs, AKRUTI-PARIVARTAN and AKRUTI-NIRMITEE were inaugurated by Dr. Anil Kakodkar, the then Chairman, AEC and Secretary, DAE on 8<sup>th</sup> June 2008 at Chiplun and Dr. Srikumar Banerjee, the then Director, BARC, on 1<sup>st</sup> Nov. 2008 at Uddhar near

Pali, respectively. Due to visits of many NGOs from all over India to these three functional AKRUTIs, eight more AKRUTI nodes came into existence through self financed mode; one each in Andhra Pradesh (AP), Madhya Pradesh (MP), Karnataka, Assam (NER) and four in Maharashtra at the following locations described hereunder.

- AKRUTI-YMC by Yusuf Meherally Centre, Tara Village, Dist. Raigad, MS



Fig.1 : AKRUTI Programme Format



- AKRUTI-ANKUR by Ankur Pratihthan & Sanshodhan Sanstha, Ambajogai, Dist Beed, MS
- AKRUTI by Vivekanand Ashram at Hiwara Bk, Tal. Mehkar, Dist. Buldhana, MS
- AKRUTI by Loknayak Jayaprakash Narayan Leprosy Eradication Trust, at Waliv Tal., Vasai (East), Dist. Thane, MS
- AKRUTI by Fresh-O-Veg Krishak Club at Indore, MP
- NAYUDAMMA's AKRUTI at Kaviti Mandal, Dist. Srikakulam, AP
- AKRUTI by Malenadu Education & Rural Development Society at Sirsi, Dist. Uttara Kannada, Karnataka
- AKRUTI by Shanti Sadhana Ashram (SSA) at Basistha, Guwahati, Assam, NER

Further, to demonstrate application of AKRUTI for CSR and R&R (Rehabilitation & Redeployment) plan, three departmental AKRUTIs have been initiated as follows :

- AKRUTI-Nongjri, Nonghyllam, West Khasi Hills Dist, Meghalaya, NER [AMD-CSR]
- AKRUTI-Dorbar Shnong, Nongmensing, Shillong, Meghalaya, NER [AMD-CSR]
- AKRUTI-SEZ at Dibbapalam, Vizag, AP [BARC-VIZAG - R&R]

Andhra Pradesh Industrial Infrastructure Corporation-APIIC gifted land of three acres to BARC at Dibbapalem village for AKRUTI-SEZ.

### Setting Up Akruti Node

Setting up of each AKRUTI node involved a number of steps, including preliminary survey of the location and the NGOs working in the area, selection of the S&T oriented NGO with good credentials, a series of discussions and finally signing of MoU after approvals from competent authority of BARC. Field deployment of technologies in a stepwise manner is coordinated by TT&CD in close association with various Divisions of BARC such as NA&BTD, FTD, DD, IAD and RTD and AMD-Shillong and BARC-Vizag involving a number of scientists and engineers engaged in developing these technologies. The group of scientists and engineers is recognized as AKRUTI team (Fig. 2, Annex-I) and works synergistically to guide and deploy technologies through village working group, under the AKRUTI NGO. This enables the villagers to acquire the knowledge to use, operate, run and maintain the equipment. NGOs in turn, set up KRUTIKs in surrounding villages, in consultation with BARC and create FORCE groups.

### Technology Deployment Activities

Seven NISARGRUNA plants in AKRUTI nodes of Maharashtra are running successfully. Four of them are generating electricity using bio-gas. During inauguration, electricity generation was demonstrated by connecting 10KW, biogas generator to Nisargaruna Biogas plant at



Fig. 2: AKRUTI Team with Dr. R. K. Sinha, Director, BARC (seated fourth from left) on the occasion of award distribution ceremony of "Group Achievement Award – 2009". Also seen are Shri S. K. Ghosh, Director, ChEG & Dr. V. Venugopal, Director, RCh&IG (seated 1<sup>st</sup> and 3<sup>rd</sup> from left).



AKRUTI-PARIVARTAN (Fig. 3), whereas at AKRUTI-NIRMITEE, public address system, lighting and electrical equipment were run on electricity, generated through NISARGRUNA plant.

Demonstrations of Foldable Solar Dryer (FSD), Vibro Thermal Disinfestor (VTD), Domestic Water Purifier (DWP), Soil Organic Carbon Detection Testing Kit (SOCDTK), SHRI Sludge and New Seeds utilization are carried out, in different villages and fields. DWPs (without electricity) to meet the village needs of clean, bacteria-free drinking water are being assembled, in all the three AKRUTIs of Maharashtra. Foldable Solar Dryers (FSD) are also fabricated in AKRUTI nodes and more than 35 products have been developed using FSD (Fig. 3). Soil testing using SOCDTK has been carried out, by more than 300 farmers in their fields.

Exploration for sustainable underground water source using Isotope Hydrology technique has been initiated, in five sites in different AKRUTIs. At AKRUTI-CARD in Amravati, in a water scarce area, sustainable underground water source with capacity of 30,000 LPH has been identified and established, for use of farmers (Fig. 3).

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 in addition to four more from different



Fig. 3 : AKRUTI Field Activities



Fig. 4 : Tissue Culture Facility at AKRUTI-CARD

AKRUTIs. A tissue culture laboratory and field hardening facility (Fig. 4), with a capacity to produce 50,000 banana plantlets has been set up and completely functional in AKRUTI-CARD, Amravati. One more Tissue Culture facility at AKRUTI-Vivekanand Ashram in Buldhana, has been upgraded

Seven varieties of groundnut, soyabean and mustard seeds weighing 4310 kg have been sown on 250 different plots. AKRUTI node at Indore, MP has reported an average 19% increase in the yield for TPG-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 TPG-41 seeds, in eight different fields of four villages viz. Datoda, Badiya, Nirmar, Khadi and Sulgaon. New seed varieties of BARC have been sown for the third time, in more than 100 locations around these AKRUTI nodes through KRUTIKs amongst the villagers and farmers in the surrounding villages. All the above activities are carried out by locals and managed by NGOs, under the guidance of BARC experts.

**Rural Techno-Entrepreneurship**

A technology package called AKRUTI Tech Pack (ATP) for technically oriented individuals/ entrepreneurs/industry/ companies to promote techno-economic activity in rural sector through AKRUTI programme is offered for EXCLUSIVE RURAL DEPLOYMENT at an affordable price. ATP is made of four technologies - NISARGRUNA, SOCDTK, FSD and VTD and one optional technology - DWP with



consultancy. Women Entrepreneurs (WEs) are further encouraged by providing additional concession on ATP deployment charges with other conditions remaining same.

### Community Managed Drinking Water Plant

A number of technologies useful for purification of water by removal of microbes and / or contaminating ions like Iron/Fluoride/Arsenic have been developed at DD, BARC. Some of which have been transferred to industry for effective dissemination in to communities. Actual implementation of these technologies for rural sustainable field use and collection of data is therefore highly relevant. A first BWRO plant with 300 LPH capacity has been installed and commissioned in the field through AKRUTI-PARIVARTAN in Dapoli in the coastal village called Farare for data collection regarding economic sustainability of the deployed technology in field.

### Future Direction for Akruti Programme

A dedicated, trained work force needs to be created to speed up the growth of AKRUTI programme and support the growing network of AKRUTI nodes. Creation of Rural Human and Resource Development Institute (RHnRDI), co-located with educational institutes has been proposed, for creation of opportunities in rural sector and for local technical guidance through participation of educational institutes, for healthy growth of AKRUTI programme.

### Conclusion

AKRUTI programme complements, supplements and augments the efforts of existing programmes of different organizations, departments and ministries, to facilitate large scale deployment of several useful technologies in rural areas. AKRUTI programme enables the villagers to deploy and use DAE technologies evolved with local adaptations under guidance from BARC. 'AKRUTI-KRUTIK-FORCE' format, enables transfer of the fruits of technology to grass-root level and to every villager in the remote corners and provides inclusive growth to the rural sector

and tap the hidden innovative capability of the large rural Indian population.

### References

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2. Website : <http://www.barc.gov.in/akruti-tp/index.html>

#### Annexure

#### Group Achievement Award-2009

#### AKRUTI TEAM

1. Dr K B Sainis, Director, BMG
2. Dr S F D'Souza, AD, BMG
3. Dr S P Kale, NA&BTD
4. Dr S J Jambhulkar, NA&BTD
5. Dr K S Reddy, NA&BTD
6. Dr J G Manjaya, NA&BTD
7. Dr A M Badigannavar, NA&BTD
8. Dr V M Kulkarni, NA&BTD
9. Dr S T Mehetre, NA&BTD
10. Dr A K Sharma, Head, FTD
11. Dr R Chander, Ex-SO/H, FTD
12. Dr M P Jain, FTD
13. Shri D D Shinde, FTD
14. Dr P K Tewari, Head, DD
15. Dr S Prabhakar, DD
16. Dr R C Bindal, DD
17. Smt S T Panicker, DD
18. Shri V S Somarajan, DD
19. Dr G Singh, Head, IAD
20. Dr K Shivanna, IAD
21. Dr S Sabharwal, Head, RTDD
22. Shri M R Shah, RTDD
23. Shri A Ramaiah, IFA
24. Shri P Prabhu, Ex CAO, PD
25. Shri G S Ravi, BARC-Vizag
26. Dr R Mohanty, AMD-NER
27. Smt S S Murudkar, TT&CD
28. Shri T H Salunke, TT&CD
29. Dr N Khalap, TT&CD
30. Smt S S Mule, TT&CD
31. Shri A M Patankar, Head, TT&CD, Group Leader