

HARNESSING SCIENCE AND TECHNOLOGY FOR RURAL DEVELOPMENT: OPPORTUNITIES AND CHALLENGES

AMIRAH NASRIN^{1*} AND SK NOOR MAHAMMAD¹

Science and technology are now widely recognised not only in urban areas but also in rural communities. Besides being able to do their jobs and activities with greater ease, rural residents can also be more productive and competent when they learn how to use technology. Science and technology contribute a lot to improve the living opportunities of rural communities. This research article considers the necessity of S&T, approaches and utilities, the role of information and communication technology in rural development, and the technology utilised in water management. In addition, the article aims to provide a real definition of rural development. The article opens a path how science and technology can help in building local capacity, solve problems, and simplify the lives of rural people in India, where science and technology might contribute to "Shining the True Bharat". This document highlights DWCRA programmes for women and children in rural areas.

Keywords: Rural Development, Science and Technology, ICT, Digital India, DCWAR.

Introduction

Science and technology have the potential to significantly contribute to the social and economic changes in emerging nations, particularly in rural areas. Utilising, safeguarding, and improving natural, physical, and human resources is crucial for rural development in order to improve rural living conditions over the long run. In addition to provide to the rural residents with employment and income options, science and technology are acknowledged for their importance in preserving and safeguarding the rural environment. The primary reason for the growing interest in rural development is the need for systematic efforts to improve living circumstances in the rural areas where the vast majority of people reside¹.

Conceptual analysis of the blending of scientific knowledge in Rural Life:

When it became evident that the methods used in emerging nations were ineffectual in reducing poverty and inequality in rural regions, rural development became a planning priority. It became more and more obvious that, in addition to working towards boosting industrial and agricultural output, the issues of employment, health care, education, and poverty in rural areas needed to be actively addressed. It has been noticed that methodical effort is required to improve living circumstances in the remote areas. Where majority of people in developing nations reside in rural areas, this led to an increased interest in rural development.

Rural Development is defined as "it is utilization, protection and enhancement of the natural, physical and human resources needed to make long term improvements in rural living conditions. It involves provision of jobs and income opportunities while maintaining and protecting the environment of rural areas". The Government of India's Scientific Policy Resolution, which was enacted in late

¹ Assistant Professor, School of Law, Brainware University, Kolkata. India

* Corresponding Author: amn.law@brainwareuniversity.ac.in

March 1958, highlighted the critical role that research and technology play in the nation's growth².

The country has made great strides in many scientific fields thanks to strong leadership and vision. All of this has been done with the understanding that this is a basic need for research to thrive and be useful. Here, we want to talk about the DIGITAL INDIA CAMPAIGN. Connectivity on digital platforms is the most effective approach to communicate with everyone in the largest democracy in the world. The Indian government has made it a goal to use ICT advancements to minimize the nation's digital diversity³.

Application of Science in Shining Rural India:

Energy: Agriculture relies on energy in various way like fertiliser production, water delivery, and transportation, harvesting etc. Energy is also necessary to promote rural industrialisation. Firewood remains the primary energy resource and is expected to remain so for the foreseeable future. Large-scale forestation activities should be conducted scientifically and involve rural communities in order to maintain fuel availability. Tissue culture techniques have considerably potential for generating biomass. Non-conventional sources of energy that are renewable, decentralised, and non-polluting are especially important in rural locations where electricity is unlikely to be available for an extended period of time. The inputs and regions of application can be customised to meet specific needs.⁴

Biotechnology: Advancement in bio-fertilizers, aquaculture, tissue culture methods for producing biomass, etc. have a huge potential to create jobs and boost productivity and efficiency for everyday needs in rural areas. However, advance mechanisms need to be developed to implement on a large scale.

Education: In India, S&T has made significant improvements in education, but there is still room for improvement, as highlighted by the United State Dept. of Education's Reimagining the induction of Technology in Education report from 2017. The national education technology plan covers sections on teaching learning, leadership, infrastructure & assessment

Section 1: Focuses on using technology to engage and empower learners, while

Section 2: Focuses on using technology to teach.

Section 3: Leadership fosters creativity and transformation.

Section 4: Assessment for Learning.

Section 5: Infrastructure enables access and effectiveness⁵.

Information Technology: Application of IT in agriculture, energy, health, irrigation, family planning, education, transportation & employment can facilitate rural livelihood. Decentralised-planning craves appropriate perception of local resources, skills, and requirements. The National Informatics Centre (NIC), established in early 1975 by the Dept. of Electronics, has established a District Information's System (DISNIC) with centres in every district in the country. Various training and information transmission and awareness programs utilise the nationwide satellite communication network.

Water Management: Water is the primary resource required for human subsistence. To enhance access to drinking water in rural regions, scientific methods for water collecting, conservation, and recycling must be developed and implemented. Priority must be given to providing potable water in rural regions. Remote sensing is an effective tool for water targeting. National laboratories have created low-cost waste water collection and disposal methods, which should be efficiently utilised. Technologies like reverse osmosis and electrolysis can convert brackish water into drinkable water. Other important technology and infrastructure are available for further development⁶.

Women: ICT has made a big contribution to increasing opportunities for rural women. In certain rural villages, women and girls are not treated equally and face discrimination. ICT has the ability to generate job opportunities for rural women while also pushing them to pursue an education. Women are using ICT to raise awareness among themselves about enrolling in educational institutions with the goal of improving their academic skills and abilities, obtaining employment opportunities, and achieving equal rights and opportunities both inside and outside of their homes. Development of Children and Women in Rural Areas is an Indian government project that began in 1982-83 to enhance the socioeconomic standing of rural women by providing them with chances for self-employment. The concept entails organising groups of 15-20 women living below the poverty line and providing them with financial aid, skill development, and other resources to help them become self-sufficient.⁷

Agriculture: Agriculture is the foundation of economies in India. Furthermore, rising food demand enacts farmers to develop new methods of maximum yield and efficiency. Hence agricultural technology, also known as Agritech, became the solution for farmers to defeat challenges. Agritech assists farmers to overcome issues like financing, crop productivity and supplies. By the advancement of Agritech, farmers can aggravate their

production, minimise their impact on ecosystems, and secure risk-free growing conditions. The use of AI for prediction of weather and biotechnology for ensuring resilient-crops result maximum development in the field of agriculture. Similarly, by regular soil testing farmers can apply requisite deficient fertilizer to retain the fertility of soil. Apps like matir katha helps farmers how to tackle pests and when to apply fertiliser to increase productivity.⁸

Challenges in implementing Technology in Rural Life:

The following are the hurdles for using technology in rural development:

1. The literacy rate in rural areas is substantially lower than that of the urban population therefore unable to cope up with the advancement of technology.
2. Poverty: Rural poor people cannot afford costly internet and expensive accessories to utilize technology in their daily life as significant number of people are staying below the poverty line.
3. Infrastructure: Rural areas do not have adequate fundamental facilities like broad band Internet connection, sufficient energy, Communication, available cyber cafe etc.
4. Absence of participation: Rural people most of the time remain busy in securing bread and butter for their family and rest of the time remain busy in rural affairs so become reluctant in using technology.
5. Security and privacy: A huge challenge in rural people is to secure securities and privacy because due to lack of education, people use to reveal their secret password and OTP and incurred a unexpected loss.
6. Language Challenges: Since English is the most widely used language to use technology, thus rural

people who aren't proficient in English find it difficult to access it.⁹

Conclusions and Discussions

Poverty, unemployment, illiteracy, and bad living circumstances have been the major problems in rural communities. To solve the issues that rural communities face, scientific methods, research, studies, and inventions are crucial. Scientific approaches, researches, studies, and inventions are very important for solving the problems that rural areas face. Because India is a big nation with huge rural population having diversified geography and ecology, and has a rural population with a wide range of social and cultural origins, single order or mode of implementation would not work for the whole country. To meet the aspirations and basic needs of the people who live there, the model or order will need to be based on where they live and what they can do. As stated by our first Prime Minister, Sri J.L. Nehru "It is Science alone that can solve the problems of hunger and poverty." We must strive to realise the objective of integrating science into all aspects of rural development, as the whole national growth is contingent upon the swift advancement of rural regions. □

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