

## Chapter 23

### Science and Technology for Development

#### 23.1 Development Dimensions of Science and Technology

1. Technology has been at the heart of human progress ever since the emergence of humans on the planet earth. The much talked about global village of instant communication and abundant information is a product of technological progress. Any dispassionate enquiry into the connection between technology and human development cannot but leave one with the indelible impression that if properly managed they would act as mutually reinforcing forces in taking the economy, society, and polity into a virtuous circle of human progress. The recent digital, genetic and molecular breakthroughs are pushing forward the frontiers of how people can use technology to eradicate human poverty / capability-deprivation. These technologies have come to create new possibilities for improving health and nutrition, expanding knowledge, stimulating economic growth and empowering people to participate in their communities. This is what Human Development Report (HDR) 2001 means when it says, “In fact the 20<sup>th</sup> century unprecedented gains in advancing human development and eradicating poverty came largely from technological breakthroughs”. Today, people all over the world have high hopes that the emerging new technologies will lead to healthier lives, greater social freedoms, increased knowledge and more productive livelihoods.

2. But, there are some problems. Technological progress does not automatically translate itself into human development, because, it is not inherently good or bad. Whether it confers benefit on humanity or causes damage depends on how it is used. Further, like economic growth, technology and technology-supported growth and development have a tendency to concentrate themselves in certain regions and thereby initiate and accelerate the process of divergence. These problems are further compounded by the on going mega process of globalisation, in which the market plays a very decisive role. The HDR 2001 recognizes this fact. It observes that market is a powerful engine of technological progress, but it is not powerful enough to create and diffuse the technologies needed to eradicate poverty. All this, is to say that active government intervention is necessary to make technology pro-poor – regions and people. Probably these and some other concerns might have prompted UNDP to devote its 2001 HDR to a detailed discussion of the strategies/institutions to be evolved in making new technologies work for human development.

3. In the opinion of the Committee, Karnataka government which has been very keen on eradicating regional imbalances, among other things, through the dispersal of technologies across its regions and sub-regions, need take note of the aforesaid connections between science and technology and development. With such an end, an attempt is made here to capture the regional dimensions of science and technology in Karnataka.

#### 23.2. Bangalore: IT Global Hub

4. Karnataka is India’s pride. By its extraordinary contribution to the advancement of Science and Technology and to two of its frontier areas – Information Technology (IT) and Biotechnology (BT) – the state has secured a pride of place for India in the global map of

Science and Technology. Karnataka has moved quite far in the field of Science and Technology – from Industrial Revolution of the eighteenth century down to the ongoing Cybernetic Revolution. Considering its incredible contribution to the field of IT, it has been rightly called the ‘Silicon State’ and ‘IT Capital of India’. Even though its contribution to the field of BT is not that impressive, it is not insignificant. At the inaugural session of ‘Bangalore Bio 2002’ which began on Monday the 15<sup>th</sup> April 2002, it was proclaimed that Karnataka had catapulted itself to become the ‘Biotech City’ and that had been acknowledged nationally and globally. The State has been emerging as the cradle of Biotech Revolution. But these hi-tech knowledge-based activities/ industries have come to concentrate themselves in and around Bangalore and in a few places outside Bangalore district. In the opinion of our Committee an assessment of regional imbalances of these activities may also provide some explanation for regional imbalances in socio-economic development. As such redressal measures may also have to consider some measures for the redressal of regional imbalances in science and technology and its frontier areas. So, our focus here is to give a brief account of the present position and to identify some of the important reasons for regional imbalances and based on it to suggest some short run and long run measures to disperse these activities, as far as possible, to every district in the State.

5. There are some sound reasons for the excessive concentration of IT and BT research activities and companies in Bangalore and in one or two other cities in Karnataka. Most of the advanced centers of learning and research are located in Bangalore. The Indian Institute of Science (IISc), the Indian Space Research Organization (ISRO), the Indian Institute of Management (IIM), the Indian Institute of Information Technology (iiit-b), LRDE, Centre for Artificial Intelligence and Robotics, Institute for Social and Economic Change (ISEC), National law School of India University, etc, have contributed a lot for the concentration of IT and BT industries in Bangalore. Further, the Government has taken measures to develop the required infrastructure, namely, human resources, communication, and IT Parks. Institutions catering to venture capital needs of the new companies have also come up in a big way in Bangalore. The city is connected by air to most of the important cities in the world either directly or through some other metropolitan cities in India. Some such factors have been responsible for private sector companies - Indian and foreign – to enter the field in a big way. Given the predominance of these efficiency - promoting variables over those of equity in the location of IT and BT industries, and given the demands of the ongoing mega process of liberalization, privatization, and globalization, the Committee intends to view their regional imbalances in somewhat a different perspective. We confine our inquiry to only three aspects: (i) the institutional structures available to promote science and technology throughout the state through certain well defined projects and programmes; (ii) a brief review of IT and BT industry in Karnataka; and (iii) the measures already taken and to be taken to disperse these activities to different parts of the State.

### **23.3. Promotion of Science and Technology Projects in Karnataka**

6. The Karnataka State Council for Science and Technology (KSCST), Indian Institute of Science (IISc) Bangalore, is charged with the responsibility of formulating and implementing programmes meant to promote science and technology in different parts of the State. As at February 2002, KSCST has implemented 12 such projects in Karnataka. First we give a brief account of these projects and then we inquire into their regional spread.

**(1) Natural Resources Data Management System (NRDMS)**

7. The Project was launched in 1992. The KSCST has so far established one State level coordination centre and 16 district centres. The principal objective of this project is to empower the grassroots level decentralized institutions in devising ways and means for optimizing the use of natural resources. It provides the basic framework for local level integrated planning through the use of Geographic Information System, Spatial Decision Support Systems, Sectoral Models etc. (for the names of the districts see Table 23.1)

**(2) Student Projects Programme (SPP)**

8. It is entirely a student – centred programme. It is designed to encourage final year students of different disciplines to orient their study projects in the direction of the needs of the people in the State. Between 1996-97 and 2001-02 the KSCST has accorded sanction to 1065 such projects spread across 19 districts, and has funded over 250 proposals. (Table 23.1)

**(3) District Committees of Science and Technology (DCST)**

9. The KSCST has so far (between 1990-91 and 1997-98) established ten such Committees in ten districts. The principal objective is to carry the latest development in science and technology to district level with a view to enabling local talent to find solutions to local problems. (Table 23.1)

**(4) Energy Parks Programme (EPP)**

10. The Government of India's Ministry of Non-conventional Energy Sources (MNES) initiated this programme in 1995-96 with the express intention to create awareness among the general public and particularly among the students, about renewable energy. Between 1994-95 and 2001-02, 11 such parks are established in nine districts. (Table 23.1)

**(5) Rural School Science Centres (RSSCs)**

11. The RSSCs are established in all the 27 districts in the State, with a view to educating students, teachers and general public on the latest developments in science and technology through seminars, symposia, discussions and exhibitions. The designs (in electronics and physics) prepared by students are also exhibited. Between 1992-93 and 2000-01, 516 such centers are established. (Table 23.1)

**(6) Pilikula Nisarga Dhama (PND)**

12. There is only one such nisarga dhama in Karnataka. The PND is an Integrated Science and Entertainment Project spread over 350 acres of land at Pilikula, which is about 10 kms. from Mangalore. The Dhama also intends to educate the public and students about the latest development in science and technology.

(7) **Utilisation of Nutrient-Rich Organic Sludge in Afforestation of Waste lands in Karnataka.**

13. The project came into being in 2000. It is in operation in only two districts – Bangalore Rural and Davanagere. The project is directed to tackle the ever-growing problem of the disposal of nutrient - rich municipal wastes. An attempt is being made on experimental basis to reclaim degraded lands through the application of organic sludge.

(8) **Ecological Dynamics of Small Farm Operations and their Potential for Organic Farming**

14. The project, which came into being in 1999, has been in operation in five districts – Kolar, Haveri, Uttara Kannada, Davanagere, and Gadag. It is a small farmer-friendly project. The project aims at exploring the potential and ecological dynamics of small farms for organic and natural farming. About 150 small farmers in five major agri-eco-systems of Karnataka covering dry zones, transition zones, and heavy rainfall zones are involved in this project.

(9) **Monitoring and Understanding the Multiple Functions of Agricultural Bio-diversity in two Selected sites of Western Ghats in Karnataka**

15. The project implemented in 2001 has been in operation in only two districts – Udupi and Uttara Kannada. Down the ages natural processes and human management have generated and sustained a vast array of genetic species and ecological diversity. The present project endeavours to identify some of the functions and management of sustained agricultural bio-diversity at Mala in Udupi district and Holanagadde in Uttara Kannada.

(10) **Identification and Development of Moisture-Stress-tolerant lines in Sorghum through Pollen Selection**

16. This project has been in operation only in Dharwad since 1999. Given the fact that moisture stress is one of the major stresses in agricultural crops, management of stress and identification of new stress-tolerant lines has come to acquire importance in agricultural research. An attempt is made in this project to identifying such lines of stress- tolerant ones through pollen selection with focus on Sorghum, a dry land crop prone to continuous stress.

(11) **Community – based Forest Conservation Programme**

17. This project was implemented in 2001 in only two districts - Bangalore and Tumkur. It is a project in which the local people are involved in conserving the forests. Under this project, Savanadurga Reserve Forest in Bangalore (Rural) district has been chosen to begin with. The project, among other things, is expected to explore the socio-economic trends and people's behavioural traits towards conservation of forests and their sustainable use.

**(12) Studies on Pharmakinetics of Modern Veterinary Antibiotics and fixing Milk withdrawal Period from Public Health Point of View**

18. The only district in which this project has been in operation since 2001 is Bidar. The project has been undertaken keeping public health in view. Of late, a wide range of antibiotics and their formulations are used for animal care. But the information and data on the prevalence of adverse drug- resistance in veterinary pathogens and on the milk residues and their after effects are fragmentary. And the present project is an attempt to study these aspects.

**23.4 Regional Dispersal of Projects / Programmes**

19. From the point of view of regional distribution of projects promoting science and technology, the first five of them are relevant. The remaining seven projects are somewhat area-specific and are found in one or two districts only. So, we have taken the first five projects for the assessment of regional imbalances. The distribution of projects across the districts, divisions, and regions of Karnataka are presented in Table 23.1.

- (1) Of the five programmes / projects the only programme which is present in all the districts is 'Rural School Science Centres' (Project No. 5). But there are wide variations. Among the districts, it varies from one centre in Udupi to 80 centres in Dharwad. Among the divisions, it varies from 63 centres in Mysore to 267 centres in Belgaum. And among the regions, it varies from 165 centres in SKR to 351 centres in NKR. That way the districts of NKR are better placed than those of SKR.
- (2) Another programme, which merits attention, is 'Student Projects Programme' (Project No. 2). The project proposals of students of 19 out of 27 districts have been accorded sanction. Eight districts (Six belonging to SKR and Two to NKR) have not availed to these facilities. Regional variations are found in terms of the number of projects sanctioned. Among the districts, it varies from a low of one project in Gadag to a high of 181 in Belgaum. Among the divisions, it varies from a low of 115 in Mysore to a high of 477 in Belgaum. And among the regions, it varies from a low of 390 in SKR to a high of 675 in NKR.
- (3) In respect of projects 1,3, and 4 (Natural Resources Data Management System, District Committees of Science and Technology, and Energy Parks respectively), there is no maldistribution of projects across the districts. But there are districts which do not have the projects.

20. As for as Project No 1 is concerned, one centre each is found in 16 districts and one State centre is found in Bangalore Urban. There are no such centres in the remaining ten districts (five belonging to SKR and five to NKR). Whereas project No.3 is in operation in only ten districts (seven in NKR and three in SKR). And in respect of project No. 4, Energy Parks are found in 9 districts (seven belonging to SKR and two to NKR). There are 18 districts, which do not have such parks (eight belonging to SKR and ten to NKR). Of the nine districts, which have parks, Dhakshina Kannada claims three and the remaining eight districts, one park each. (Table 23.1)

21. As far as redressal measures are concerned, the projectless districts, irrespective of the divisions and regions to which they belong, deserve attention. For the names of such districts see Table 23.1.

### **23.5. Information Technology (Industry) in Karnataka**

22. It is heartening to know that Karnataka, by being in the forefront of IT, has come to be known as Silicon State of India, and its capital city Bangalore by showing spectacular growth in IT sector is rightly called IT Capital of India. The UNDP, in one of its recent reports has considered Bangalore the fourth best technological hub in the World. The IT revolution, which began in Bangalore with the entry of the multinational Texas Instruments in 1984, has gone very far. Today, the IT industry has about 1,20,000 professionals in Bangalore itself. About 40% of the business happens in extremely high-tech areas like IC Design, Systems Software, and Communication Software. The City has over 46 IC Design Companies, 108 Companies in Communication Software, 166 in Systems Software and hundreds of Companies in Application Software, Software Services etc. The city also takes pride in several small and medium companies, which are riding the technology wave. The city has developed both vendor and people sophistication. Every Silicon Valley start-up technology company prefers to have its design centre in India and particularly in Bangalore.

23. The City offers IT enabled or teleworking services that a typical overseas outsourcing client would be looking for. It also offers the highest bandwidth in the country; presently the international gateways are operated by Videsh Sanchar Nigam Limited (VSNL) and Software Technology Parks of India (STPI). The STPI runs the largest network in Bangalore connecting 189 IT Parks that have hundreds of companies. It has MOUs with a large number of international carriers like British Telecom, Japan Telecom, Singapore Telecom, AT &T, Telstra etc, and its clientele has grown from a mere 13 in 1992 to over 1000 companies today.

24. The government of Karnataka has done what best it could to encourage and support the growth of IT industry. Karnataka is the first state in India to launch IT policy in 1997. The infrastructure base – in human resources, communications and IT parks – required for IT industry, has been created and maintained in the State. The State boasts of the best technical manpower in IT sector. It has one of the best telecom infrastructures. And the first and the best IT park in the country, the International Technology Park Limited (ITPL) is located in Bangalore.

25. The value of Software exports from Karnataka has gone up from Rs. 1700 Crores in 1997-98 to Rs. 6691 Crores in 2001 (Dec 31), and of Hardware exports from Rs. 121 Crores to Rs. 580 Crores between the same reference points. This achievement on the export front is really noteworthy.

26. This in brief is the success story of IT industry in Karnataka. How beneficial it would have been to the people living in different parts of the State, if this industry were to be found across all the districts and divisions of Karnataka. But it is not so. The industry with very great employment and export potential is concentrated in and around Bangalore, and to some extent in Mysore and Mangalore. And these three districts belong to South Karnataka. This way Karnataka suffers from the problem of extreme imbalance; most of the districts in Karnataka are starved of IT industries, and this imbalance also contributes to regional

imbalances in development. So, redressal of regional imbalances need take into consideration the regional imbalances in IT industry also.

27. We may think in terms of a two-way strategy to ensure equitable dispersal of IT industry. One, by creating the overall IT environment comprising highly skilled technical manpower, educational and research institutes, venture capital and anchor companies; this is a long term measure. Two, in the meantime, we may institute measures to augment the skills and competence of technical graduates of other districts so that the people of such districts are given the opportunity to take advantage of the fast growing IT industry. So, we need initiate both the processes. The HPC FRRIs did recommend to the Government in its First Phase of Recommendations to establish Engineering Skill Fine Tuning and Application Centres in North Karnataka – one each in Gulbarga and Belgaum - to train the technical graduates to acquire the skills required to face the competition effectively and get into the industry. We regret to note that this is not implemented even after one year although this project was included in the 2001-2002 Budget Speech.

28. The government of Karnataka has been taking measures to disperse IT activities throughout the state.

- To encourage the growth of IT industry in North Karnataka, an IT Park has been set-up in Hubli. Apart from this, a number of incentives and concessions are offered in Mahithi - the Millennium IT Policy - for the establishment of IT Parks by private entrepreneurs.
- To create the right environment for the young and talented IT professionals, the Government is establishing 12 Incubation Centres in Co-ordination with local engineering colleges in the districts of Uttara Kannada, Shimoga, Mandya, Kodagu, Gulbarga, Gadag, Dharwad, Chitradurga, Bellary, Belgaum, Udupi and Chickmagalur.
- The Department of IT in collaboration with Government of India's Ministry of Information Technology, has set up Earth Stations at Mysore, Manipal, Hubli, and Mangalore.
- The Government has engaged the services of the globally renowned placement consultant from Mckinsey and Co to explore the possibilities of leveraging IT and IT enabled services with strategies for creating a million job opportunities in Karnataka in the IT sector.
- The Government has set up a venture Capital Fund called KITVEN to provide venture Capital to IT industry.
- Efforts are being made in association with Visvesvaraya Technological University to impart 'soft skills' to graduates in the Engineering colleges in NKR.
- The Government proposes to establish a Hardware Park to promote hardware manufacture near Devanahalli where an International Airport is coming up.

### 23.6 Proposed Extra Measures

29. In addition to the above measures, the Government need take some more measures to disperse IT activity across all the districts.

- The incubation centres should be set-up in all the districts.
- The Earth Stations will take care of the band-width of the IT companies. But to attract more IT companies, other infrastructure facilities like roads and air connectivity need to be developed connecting Bangalore and Hubli, Mumbai and Hubli, and Bangalore and Gulbarga. Gulbarga need also be considered for the establishment of an Earth Station.
- IT Investments can be attracted to Hyderabad-Karnataka (HK) region by developing roads of international standards connecting Hyderabad and the district headquarters of Bidar and Gulbarga districts. They need also be connected by air.
- The incentives announced by the New Industrial Policy of 2001-06 of – investment subsidies to all new IT industries, additional subsidies to special categories of entrepreneurs like SC / ST and women, 100% exemption from stamp duty for all types of documents executed by IT industry, special concessions for exports, waiver of conversion fee etc. – ought to be extended to the entire North Karnataka Region.
- In addition to establishing an I.T. Park in Hubli, it would be desirable, from the point of view of regional dispersal, to consider Gulbarga and Bagalkot for the establishment of I.T. Parks.
- Information Technology may be very effectively used in strengthening and deepening the roots of grass roots level decentralized governance and planning. If it is to become farmer-friendly, it has to be used to provide the latest information on weather conditions, prices of agricultural and horticultural products, latest developments in farm-practices etc., to the farmers in rural areas.

30. With such short term and long term measures, the IT industry, despite its tendency to concentrate itself in places like Bangalore, can be made to move to every district and confer its benefits and advantages on them.

### 23.7. Bio-Tech Industry in Karnataka

31. Biotechnology is another frontier area in science and technology, which has immense potential for application in agriculture, human health care and environment management. With a view to harnessing the potential that biotechnology holds, the Government of Karnataka launched the Millennium Biotechnology Policy on 24-02-2001 with certain well defined objectives: to keep the entrepreneurial community informed of the investment opportunities in biotechnology, genomic, bio-informatics, bio-fuels, contract research etc.; to sustain and maintain the pre-eminent position of Karnataka and Bangalore in the field of biotechnology; to provide specific infrastructure as well as expand human resources for the development of biotechnology; to encourage the growth of bio-informatics in Karnataka; and to provide institutional framework to achieve the objectives set. The vast diversity in agro-climatic conditions of Karnataka, abundant skilled manpower, and advanced



research centres, have made the state a hotspot and a desired destination for Bio-tech industry. Considering the growth of BT industry and its potential, Karnataka has attracted the title " India's Knowledge Capital". It is expected to lead the next generation wave. The biotech sector is no longer a nascent industry in Karnataka. There are around seventy companies in Bangalore City amounting to an investment of over Rs. 800 Cr. So far the biotech companies have exported goods worth Rs. 250 Cr .The BT industry is likely to catch up with IT in a short span of time. V.T.Kulkarni , Secretary , IT and BT says , " IT took ten years to attain full blown status, but our estimation is that biotech will take around five years to reach its height.Eventually, it will be a bigger boom than IT". But,like IT industry, Biotech industry is also concentrated in and around Bangalore city. Of course efforts are being made to carry this activity to different parts of the state wherever it is feasible. Here we discuss the measures taken and being taken by the Government to develop and disperse biotech industry in Karnataka.

- As announced by the Chief Minister in his Budget speech 2000-01, a Vision Group on Biotechnology headed by Ms. Kiran Muzumdar Shaw has been constituted.
- A Biotech park is being established in the Biotech Corridor in Bangalore extending from the Indian Institute of Science to the University of Agricultural Sciences. A common facility centre will also be set up with in the Biotech Park which will have common infrastructure and incubation facilities for Biotech companies. To meet the emerging demand for trained graduates, the Government proposes to introduce Bio-Technology courses in Government colleges (Chief Minister's 2002-2003 Budget Speech)
- The Government of Karnataka in association with ICICI has established the Institute of Bio-informatics and Applied Biotechnology (IBAB) at Bangalore. It offers Masters and Doctorate Programmes in Biotechnology, carries out research and development activities and incubation facilities.
- Centre for Human Genetics is being set up in Bangalore with leading Scientists and Policy makers on its Governing Board. The Centre will bring together a group of highly talented Indian Scientists to join the ongoing revolution in understanding human genes.
- An Institute of Agri- Biotechnology is set-up in the University of Agricultural Sciences, Dharwad. This institute will cater to the needs of the farming community and its focus will be on applied biotechnology in improving Crop productivity. The Government has already released Rs. 5.00 Crores for this project.
- Karnataka Biotechnology Development Council (KBDC) is being set-up under the leadership of V. Prakash, Director CFTRI, Mysore. The Council will develop norms for setting up biotechnology companies in Karnataka. It will also provide advice to biotech industries in areas like Bioethics, Intellectual Property Rights, Eco-Friendly technologies, Bio-diversity etc.
- A Marine Biotech Park is being set-up at Karwar. The park will act as a focal point in the area of Marine Biotechnology.
- To attract biotech activities to North Karnataka region, the set of incentives and concessions provided in the new Industrial Policy should be extended to entrepreneurs who come forward to establish their units in this region.

- With a view to developing Agricultural Biotechnology, proposals have been sent to the Department of Biotechnology, Government of India for incorporation in the X Five Year Plan (2002-07). A grant of Rs. 54.82 Crores is requested. A similar proposal for a grant of R. 3.50 Crores is also sent in order to develop Bioinformatics – a confluence of Biological information with computational approaches. Proposal is also sent for a grant of Rs. 2.10 Crores for establishing an Agricultural Technology and Market Intelligence Cell, which would cater to the day to day information requirement of the farmers of Karnataka in particular and market intermediaries in general.
- To make the best use of the soil resources, it is necessary to make use of the Remote Sensing and Geographic Information System in managing and monitoring natural resources and watershed areas. These tools need also be used to delineate and characterize water resources by developing models for the management of these resources.
- Biotechnology need also be applied to areas such as Forestry, Marine and Fishery, Sericulture, Veterinary and Animal Husbandry, Fuels etc.
- To encourage the farmers to adopt B.T.- based agricultural practices, in the initial stage, it may be desirable on the part of the Government to offer some attractive incentives. For instance, it could offer participatory insurance to insulate such farmers against unforeseen risks.
- Above all, the institutions that would meet the growing demand for conducting research and development as well as training the required manpower in these areas, is the need of the hour. In this regard, Rs. 34 Crores has been proposed in the Tenth Five Year Plan.

### **23.8 Science City Dharwad**

32. The Government of Karnataka has been keen not only on the development of Science and Technology and its two frontier areas - IT and BT - but also in enabling the people at large to have access to the fruits of such development. Rural areas and backward regions have come to matter in this area of development. Yet it has to go a long way to come closer to the hitherto unreached areas and people. In the opinion of the Committee, carrying Science and Technology to backward areas ought to be an integral part of the overall strategy in promoting development, eliminating deprivations and in reducing regional imbalances. The Committee welcomes the Government's proposal to set up a Science City in Dharwad and for allocating Rs. 20.00 Lakhs for project formulation. (2002-2003 Budget Speech)

33. In brief it is to be said the programmes and projects meant for promoting science and technology should be carried to each and every district, so that regional imbalances can be reduced to the minimum.

34. As to the two frontier areas of science and technology – IT and BT – which are concentrated in one or two districts, a two- way strategy need be used to make their benefits to reach the people in all parts of the State. One, wherever it is possible and feasible to disperse these activities, that line of action should be adhered to. Two, wherever it is not so, the best way is to see that people living in different parts of the State are enabled to participate in these activities. Among other things, the development concerns of the State which include such things as elimination of ignorance, illiteracy, remediable poverty,

preventable diseases, and regional inequalities in development opportunities and actual development, should also form an integral part of the concerns of Science and Technology and its frontier areas.

35. From the measures that the Government has been taking, and proposes to take hereafter, we come to know that the Government has been using both the strategies. The Committee also favours this two-way strategy: enabling the educated persons of the lagging regions to acquire the competence to enter the IT and BT industry irrespective of their location; and attracting IT –BT activities to lagging regions by creating the required overall environment for such units to flourish.

**Table- 23.1**  
**Projects and Programmes promoting Science and Technology in Karnataka by Districts (2002)**

Sl.No.	District	Natural Resources Data Management Systems (Nos.)	Students Projects Programme (Nos.)	District Committees of Science and Technology (Nos.)	Energy Parks Programme (Nos.)	Rural School Science Centre (Nos.)	Pilikula Nisarga Dhama (Nos.)	Utilization of Nutrient Rich Organic Slege in Afforestation of Waste Lands (Nos.)	Ecological Dynamics of Small Farm operations and their potential for organic farming (Nos.)	Monitoring and understanding the multiple functions of agricultural Bio-diversity (Nos.)	Identificat-ion and Develop-ment of Moisture-stress-Tolerant Lines in Sorghum Through Pollen Selectin	Community based conser-vation programme in Savana-durga Reserve Forest in Karnataka (Nos.)	Studies on Pharma Kinetics of Modern Veterinary Antibiotics and fixing milk with drawal period (Nos.)
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Bangalore (U)	1*	83	-	-	2	-	-	-	-	-	1	-
2	Bangalore(R)	1	-	-	-	17	-	1	-	-	-	-	-
3	Chitradurga	-	6	-	-	27	-	-	-	-	-	-	-
4	Davanagere	-	115	-	1	4	-	1	1	-	-	-	-
5	Kolar	1	18	-	1	16	-	-	1	-	-	-	-
6	Shimoga	1	29	-	1	15	-	-	-	-	-	-	-
7	Tumkur	1	24	-	-	21	-	-	-	-	-	1	-
8	Chamarajanagar	-	-	-	1	3	-	-	-	-	-	-	-
9	Chickmagalur	-	-	-	-	17	-	-	-	-	-	-	-
10.	Dakshina Kannada	1	49	1	3	7	1	-	-	-	-	-	-
11	Hassan	1	24	1	-	3	-	-	-	-	-	-	-
12	Kodagu	1	-	-	-	4	-	-	-	-	-	-	-
13	Mandya	1	-	-	1	21	-	-	-	-	-	-	-
14	Mysore	1	42	1	1	7	-	-	-	-	-	-	-
15	Udupi	-	-	-	-	1	-	-	-	1	-	-	-
16	Bagalkot	-	96	-	-	18	-	-	-	-	-	-	-
17	Belgaum	1	181	1	1	41	-	-	-	-	-	-	-
18	Bijapur	1	31	1	-	41	-	-	-	-	-	-	-
19	Dharwad	1	59	1	1	80	-	-	-	-	1	-	-
20	Gadag	-	1	-	-	24	-	-	1	-	-	-	-
21	Haveri	-	109	-	-	43	-	-	1	-	-	-	-

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Sl.No.	District	Natural Resources Data Management Systems (Nos.)	Students Projects Programme (Nos.)	District Committees of Science and Technology (Nos.)	Energy Parks Programme (Nos.)	Rural School Science Centre (Nos.)	Pilikula Nisarga Dhama (Nos.)	Utilization of Nutrient Rich Organic Slege in Afforestation of Waste Lands (Nos.)	Ecological Dynamics of Small Farm operations and their potential for organic farming (Nos.)	Monitoring and understanding the multiple functions of agricultural Bio-diversity (Nos.)	Identificat-ion and Develop-ment of Moisture-stress-Tolerant Lines in Sorghum Through Pollen Selectin	Community based conser-vation programme in Savana-durga Reserve Forest in Karnataka (Nos.)	Studies on Pharma Kinetics of Modern Veterinary Antibiotics and fixing milk with drawal period (Nos.)
1	2	3	4	5	6	7	8	9	10	11	12	13	14
22	Uttara Kannada	1	-	-	-	20	-	-	1	1	-	-	-
23	Bellary	1	2	1	-	20	-	-	-	-	-	-	-
24	Bidar	-	100	1	-	10	-	-	-	-	-	-	1
25	Gulbarga	1	91	1	-	6	-	-	-	-	-	-	-
26	Koppal	-	-	-	-	8	-	-	-	-	-	-	-
27	Raichur	1	5	1	-	40	-	-	-	-	-	-	-
	Bangalore Division	5	275	-	3	102	-	2	2	-	-	2	-
	Mysore Division	5	115	3	6	63	1	-	-	1	-	-	-
	<b>South Karnataka</b>	<b>10</b>	<b>390</b>	<b>3</b>	<b>9</b>	<b>165</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>2</b>	<b>-</b>
	Belgaum Division	4	477	3	2	267	-	-	3	1	1	-	-
	Gulbarga Division	3	198	4	-	84	-	-	-	-	-	-	1
	<b>North Karnataka</b>	<b>7</b>	<b>675</b>	<b>7</b>	<b>2</b>	<b>351</b>		<b>-</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>-</b>	<b>1</b>
	<b>Karnataka</b>	<b>17</b>	<b>1065</b>	<b>10</b>	<b>11</b>	<b>516</b>	<b>1</b>	<b>2</b>	<b>5</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>

**Source :** Karnataka State Council for Science and Technology, Indian Institute of Science, Bangalore, letter No. 49/GN/993, dated: Feb 19/20, 2002

**Note :** \* It is a State Centre.