

REPORT OF THE WORKING GROUP

on

*“Attracting and Retaining Young People to Careers in
Science & Technology”*

November 2006

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1. Introduction

The Planning Commission constituted a Steering Committee on Science & Technology for the formulation of XI Five Year Plan (2007-12) under the chairmanship of Dr. R. Chidambaram, Principal Scientific Advisor to the Govt. of India. To assist the Steering Committee and to finalize its recommendations, various Working Groups were constituted. A Working Group on *“Attracting and Retaining Young People to Careers in Science and Technology”* was set up vide O.M. (No. Prn.SA/ADV/SC/2006 dated May 8, 2006) under the co-chairmanship of Dr. S.K. Joshi, Honorary Distinguished Scientist (CSIR) and Dr. R. Natarajan, Former Chairman, AICTE, with Dr. Arvind Kumar, Director, HBCSE, Mumbai as its Member Secretary. The composition and terms of reference of the Working Group are given in the said O.M. (enclosed).

The first meeting of the Working Group was held on June 16, 2006 at 10.30 a.m. at the office of the PSA to Govt. of India, Vigyan Bhavan Annexe, New Delhi. Members present were: S.K. Joshi, N. Mukunda, Deepak Pental, J. Shashidhar Prasad, Praveen Chaddah, Arvind Kumar and Pawan Agarwal (special invitee). The meeting lasted the full day. An outline of key recommendations and their provisional budgetary allocations were arrived at by the end of the meeting.

The first draft of the recommendations was sent by e-mail to all the members on July 1, 2006, for their feedback. The modified draft incorporating the feedback was placed before the second meeting of the Working Group held on July 21, 2006 at 10.30 a.m. at the Office of the PSA, New Delhi. Members present were: S.K. Joshi, N. Mukunda, Deepak Pental, J. Shashidhar Prasad, Praveen Chaddah, N. Sathyamurthy and Arvind Kumar. The report of the Working Group was finalized in this meeting.

2. Background

The problem of attracting and retaining young people to careers in science and technology is a major concern. Prime Minister, Sri Man Mohan Singh observed at the 2005 Science Congress, “I am concerned by the fact that our best minds are not turning to science, and those who do, do not remain in science”. The issue has been widely discussed in recent years and documented in several reports. Some of the key reports/articles in this connection are given in references at the end of this report. These form the background and starting point for the present report.

3. Some Key Issues and Observations

The deliberations of the Working Group served to identify several key issues surrounding the problem of attracting students to careers in science and technology, and the possible measures to address them. Many of these are in common with those in the earlier reports, while some new insights and suggestions have also emerged.

3.1 As has been documented in earlier reports, very few of the most meritorious students of the country opt for careers in science after the 'plus two' stage. Most of them choose careers leading to professional degrees in engineering, medicine, computer science and allied areas. While it would be wrong to oversimplify the reasons for this circumstance, two factors certainly stand out:

- i) The general perception among students (and also their parents) about science careers is not positive. The feeling is that careers in science are demanding and require a long time for entry to the job market, that good employment opportunities do not exist for science degree holders (including those with Ph.Ds) and even for those who are employed, the jobs are not monetarily rewarding.
- ii) Very few colleges/universities, indeed hardly any, offering admission to science degree courses after Class XII, has a brand name like the IIT's have in engineering. For exceptionally meritorious students this factor sometimes outweighs the concern regarding jobs.

These reasons deter even those among the bright students, who otherwise have genuine desire to pursue science careers.

3.2 How to make science an attractive career option for the talented ? Besides the more general academic reforms in the university sector detailed below, the Working Group made the following specific recommendations on employment and salary matters pertaining to scientists:

First, scientists need to be treated differently from other Government employees in service and salary matters. Their peer reviewed good performance needs to be given due recognition through a suitable scheme of incentives. The incentives may include additional pay (besides normal salary), salary raise, enhanced research grants, travel support, sabbaticals, and so on.

Going further, it may be desirable to have entirely different compensation package, unrelated to the normal pay scales for scientists in universities and national institutes and laboratories, whose academic and research work, as seen by their peers, is outstanding. The present system tends to put everybody – the outstanding and the mediocre – in the same pay bracket. There are several ways to recognize and reward

the outstanding: a differential pay structure that takes into account the performance of the scientist, appointment of outstanding scientists as National Professors by the Academies (see 3.16), Endowment Chairs, Fellowships, liberalized rules for consultancy, and so on.

Also, a 15 years assured career support scheme should be put into operation, that guarantees (a reasonably attractive) financial support to meritorious students who opt for science stream after the 'plus two' stage. The scheme may be applicable to, for example, the KVPY scholars, the top students (medal winner) in each subject selected from the National Olympiad Programme, the top 200 ranks in IIT-JEE and a similar number from AIIMS and other prestigious medical entrance examinations, etc. The scheme must also permit horizontal entry for very good students who have chosen different educational pathways and demonstrate merit at subsequent undergraduate and postgraduate stages. A suitable committee may be constituted to work out the operational details for implementing the scheme.

The phase I of this scheme will support approximately 1500 students during their undergraduate and graduate education with a fellowship. It is expected that around 500 students would opt for pursuing research and the support in phase II would be through attractive fellowships. Those who do good research and complete their Ph.D. would be given an appointment for 5 years in the grade Rs. 10,000-325-15,200 plus DA and HRA in the phase III of the scheme.

- 3.3 As far as the question of science institutes with a brand name like the IITs is concerned, the Govt. has already approved the creation of three new institutes, named the *Indian Institutes of Science Education and Research (IISER)* at Pune, Kolkata and Chandigarh. (The first two have begun their teaching terms from August 2006.) The IISERs are intended to be world class institutions offering integrated M.Sc courses, wherein students will be exposed to the best of teaching and research ambience in the country. It should be noted that while there has been major investment by the Govt. in the past in creating top institutions in engineering, medicine, IT and allied areas, there has not been so far an investment of that kind for institutes in science offering admission after Class XII. IISER is a step in this direction, and it is suggested that the country should have two more IISERs during the XI Plan. The Govt. has announced a National Institute of Science Education and Research (NISER) at Bhubaneswar under the auspices of the Department of Atomic Energy.
- 3.4 The Working Group felt that the issue of attracting good students to science needs to be addressed holistically and several strong initiatives need to be launched in parallel, besides the creation of new high profile institutes. The university system underwent a steady overall decline for almost three decades, beginning with the 1960s, though the last decade has seen many commendable initiatives by the UGC to revamp the system. The time is now ripe to complement these efforts with massive new inputs to revitalize the universities. The focus cannot be exclusively on the most meritorious students - the top rankers of IITJEE, KVPY Fellows and Olympiad students. There is a need to take care of the large number of very good students also,

who for one reason or another, may not have made it to these categories. It is possible to nurture these students only if a sizable number of high quality university science departments exist in the country, which can groom them into good scholars and researchers. To this end, universities/colleges, which already have many accomplishments to their credit and who show promise for future growth, should be identified and provided the needed boost. It was felt that the support to such deserving institutions be very substantial, more than the 'critical value' needed for their qualitative upgradation; sub-critical inputs diffused over a large number of places are unlikely to yield dividends. The Working Group emphasized several measures in this connection, as given below.

3.5 Like the IISERs, and NISER at least ten universities in the country need to be brought at par with the best universities in the world. The identified universities must provide education at the undergraduate and postgraduate levels and conduct research of high standard. A financial assistance of Rs.200 crore for each identified university will be required for upgrading infrastructure, laboratories, instrumentation and for their repairs and maintenance in the science departments. Adequate recurring grants must be ensured for basic infrastructure and services.

3.6 Another important measure is to select about 20 universities in the country (other than those included in 3.5) and provide them with major support (Rs.75 crore each) to upgrade their science departments and launch new integrated M.Sc courses after Class XII. Infusion of this new integrated programme will also affect positively the existing conventional UG and PG programmes.

It was emphasized that in any integrated M.Sc. programme, students should have exit option available after 3 years, and be able to acquire a B.Sc. degree, if they so chose.

3.7 The IITs and the leading post-graduate universities have excellent departments offering M.Sc. programmes and also have good research ambience. It should be possible for them to start undergraduate programmes. About 20 such institutions may be identified. This, at present, seems to be a relatively straight-forward measure that, however, will need adequate financial and manpower support for implementation. It should be noted that the best universities in the world have both PG and UG programmes at the same campus. Suitable block grants may be given to further upgrade the research facilities at these institutions.

3.8 The central universities, by and large, are better funded and attract good faculty and students. It is essential to have at least one centrally funded university in every State of the country. Larger States may have two or more such universities. A central university is likely to catalyze improvement in the other State universities in its neighbourhood. Rather than create a new university funded by the Centre in each State (which will mean high cost in building infrastructure), it would be better to convert an existing good State university into a centrally funded university. In the XI Plan, as a start, ten promising State universities may be identified for becoming central universities.

- 3.9 The Working Group strongly felt that steps must be undertaken to enhance the perceived status of conventional B.Sc. degrees in universities as a career option. Currently, the low morale of B.Sc. students in the country is a truly worrying feature of higher education scenario in the country. A large number of college students pursuing B.Sc. degrees, several of them talented and motivated, feel 'left out' and 'discarded' by the system.

An important proposal to address this problem is to help universities initiate post-B.Sc. 2-year B.Tech programmes, followed by the usual M.Tech programmes. These B.Tech/M.Tech programmes can create a 'niche' in engineering education by emphasizing areas that have stronger science base and are interdisciplinary in nature such as Optical Engineering, Materials Engineering, Nanotechnology, Space Engineering, Nuclear Engineering, Robotics, Biotechnology and Bio-engineering, Bio-informatics, Environmental Engineering, Agricultural Engineering, etc. It should be noted that most good universities in the world have engineering and science departments at the same campuses and there is much flexibility for students to choose course combinations in science and engineering. In the growing knowledge-based economy of the country, there will be increasing need for engineering education with strong science base and the proposed programmes will, therefore, be very relevant.

To implement this idea, about 20 universities having potential for excellence with strengths in relevant terms of qualified faculty and infrastructure may launch this programme. If the measure succeeds, students who do not clear IIT-JEE and similar examinations would prefer going for B.Sc.-B.Tech at these selected universities than go for B.Tech at low quality engineering colleges. This can markedly enhance the status of B.Sc as a career option and will also lead to good quality engineering graduates. Equally important, it can go a long way in reducing the excessive examination related stress young students face in our country by opening up more career choices after the "plus two" stage.

- 3.10 The establishment of the three Inter-University facilities (IUCAA at Pune, IUAC, New Delhi and UGC-DAE Consortium for Scientific Research at Indore) is one of the most successful UGC initiatives in the past decade or two to upgrade science education in the universities. These centers are noted for their good work and academic ambience and have offered excellent opportunities to several thousands of university/college teachers and research students for carrying out internationally competitive research. A substantial block grant to each of these Centres will strengthen their programmes further, resulting in direct benefit to many active and motivated teachers and research students.

- 3.11 In the system of competitive research grants to universities and colleges, the overheads component should be increased to 25% of the grant with no ceiling, so that project related expenditure on infrastructure does not cut into the resources of the

university/college. Further, efficient mechanisms need to be introduced to evaluate and monitor research projects, so that the time between submission of a project and release of funds for the (accepted) project does not exceed 6 months.

3.12 Another important reform that can be readily implemented is to permit B.Tech degree holders direct admission to Ph.D. Science Programme. Experience bears out that several of the best engineering degree holders in IITs, etc. have strong inclination to pursue science research, and a rigid insistence on M.Sc. may unreasonably close this vital input channel for Ph.D. Science.

3.13 The measures above are restricted to only a modest number of selected universities and institutions in the country. It is, however, equally vital to support the large number of colleges in non-metropolitan areas who mostly cater to students from rural/semi-urban parts of the country. About 400 science and engineering colleges should be identified for support to the tune of Rs.1.00 crore each for improvement of their libraries and teaching laboratories, particularly for undergraduate students.

3.14 There needs to be a massive strengthening of INFONET in the university system. Internet is a great equalizer and availability of online research journals and other resource material can bridge the large gap that exists today between metropolitan and non-metropolitan universities/colleges. The INFONET will not only improve access to research journals, it will also bring course ware/lectures by leading scientists from institutes across the world within the reach of remote colleges. The importance of this measure cannot be overemphasized, and it needs to be accorded a high priority.

There are many creative and enterprising research oriented people outside the university system or the national institutes. The university system should make its online access to journals, books, etc., available to such free lancers also, possibly with some token registration fee.

3.15 A similar effort needs to be made in direct satellite/EDUSAT based programmes. While hardware and technical facilities for this are seeing rapid expansion in India, the corresponding effort on software/content development is sub-critical. Major scientific institutions/universities need to be involved in a big way to make available good science based programmes to large numbers of students and teachers in the non-metropolitan areas, who otherwise have poor local library facilities and laboratory infrastructure. To implement the idea, a few co-ordinating centres would need to be identified and given the required flexibility and financial support to ensure that quality programmes in sufficient number are produced for the satellite channels.

3.16 The three national level Science Academies have been taking notable initiatives to improve science education in colleges/universities. These include refresher courses

for teachers, summer programmes, and publication of journals on science education, such as the high quality journal 'Resonance' published by the Indian Academy of Sciences. These educational initiatives need to be strongly supported.

One important suggestion is that the Academies jointly float a scheme of National Professorships (about 100 in number) for outstanding academics/researchers in universities/institutes. A National Professor may get compensation and incentive package, at the same level as say the INSA Professorships. The compensation may also include award of a suitable research grant. The selection of National Professors may be entrusted to a joint body of the three Academies. The administration of the scheme may be entrusted to INSA.

Additionally, to retain good young researchers in science after Ph.D. to continue their research career, about 500 National Post-doctoral Fellowships may be instituted. The post-doctoral fellows may join universities/institutes/national laboratories or may also join R&D laboratories of industry. The emoluments for the PDFs may have two categories, the higher category (about 100 in number) to be awarded to exceptionally meritorious young researchers. The tenure of the Fellowship may not exceed 5 years. The scheme may be administered by a science department of GOI.

- 3.17 The suggestions above relate to institutions as a whole. There will be, of course, as at present, schemes of direct support to teachers. College teachers should be encouraged to do research and those who are pursuing worthwhile research should be offered financial support in terms of laboratory equipment, books, etc. Pedagogic research aimed at improvement of theoretical and experimental teaching should be included for this support.
- 3.18 As is well known, mobility is essential for modern scientific research. An active researcher needs to interact frequently with peers in his/her research area at different symposia/conferences. This mobility is conspicuously absent among college teachers in India. A strong and vibrant Visiting Teacher scheme needs to be launched and sustained in colleges across the country. Good active college teachers should be able to go on say six-month sabbaticals every five years or so at reputed research institutions/university departments. The same kind of mobility is equally needed for Ph.D./PG/UG students working on their projects. The contingency grant for research for teachers and students should adequately take care of such visits. Funding occasional international travel of teachers and research students for presentation of papers/talks at conferences abroad should also be made possible. The current quantum of support under these schemes should be enhanced and the same should be possible through a single source. This is a simple practical measure that can go a long way in boosting the academic ambience of colleges in the country.
- 3.19 It is known that many scientists in national institutes and universities continue to be active in research and education well after superannuation. This is an important human resource that should be utilized for the benefit of the country. The educational system could greatly gain from their academic and research expertise, by encouraging

such scientists to teach at colleges/universities. For this purpose, a suitable support scheme for retired scientists should be implemented.

- 3.20 Lastly, the schemes at different educational stages aimed at identifying and supporting talented students in science and mathematics should be strengthened and expanded. The country undoubtedly has a large pool of untapped talent, particularly in rural areas and in socio-economically underprivileged sections of the society. Vigorous steps need to be taken to search for talented students throughout the country and encourage them through scholarships and other kinds of support. The number of scholarships, the scholarship amount, and facilities for nurturing talented students should be substantially increased.

The new NTSS of NCERT aims to search and support talent starting from Class VIII level. NTSS is a comprehensive scheme to identify talent, not restricted to science and mathematics only. In view of the vast numbers of school going children in the country it is recommended that the total number of National Talent Scholarships be increased manifold to say 10,000 every year. The quantum of scholarship must also be enhanced to Rs.1000/- p.m. after Class VIII (which may be upgraded further after Class XII) to enable talented students, particularly those without adequate means, to progress in their education without financial hurdles.

At the senior secondary level, there are currently two major talent search and nurture schemes: Olympiads and KVPY. The Olympiads is not a scholarship scheme: it is a multistage selection and training programme for International Olympiads. It needs modest support to the tune of about 10.00 crore for increasing the reach of the Olympiads throughout the country. The KVPY scheme is an elaborate student fellowship scheme, based on an aptitude test, followed by interview. The top Olympiad students who represent the country at different International Olympiads automatically qualify for the KVPY Fellowship.

The total number of KVPY Fellowships awarded per year is currently about 150. Considering the total student strength at the senior secondary level in India, this number is rather small. Since most of the top Olympiad and KVPY students do not opt for science careers, a practical measure is to at least triple the number of KVPY Fellowships. The top twenty Olympiad students in each subject identified by Homi Bhabha Centre for Science Education after the summer training camps may automatically qualify for KVPY Fellowships. This will raise the number of Olympiad students who automatically qualify for KVPY Fellowship to about 100 from the current 28. Additionally, the number of Fellowships through the normal KVPY selection procedure should be substantially increased. In time, the Fellowship amount and contingent grant should also be enhanced.

There is also a case for an independent scholarship scheme at the undergraduate and post-graduate levels, in which a much bigger number (about 1500 at UG level and 1000 at the PG level) of students are selected through some criterion based on both

merit and need. This is necessary because experience shows that several very good students in science and mathematics shine at somewhat later stages, and it is unfair to deny them the possibility of scholarship, just because they missed it in their earlier stages of education.

All students on scholarship should go through annual nurture camps at good universities/institutions. With the proposed increase in the number of scholarships, additional institutions will need to be identified for student nurture programmes.

4. Key Recommendations and Budget estimates for XI Plan

| A | MASSIVE REVITALISATION OF UNIVERSITY SECTOR | Rs. in crore |
|---|---|--------------|
| 1 | Select 10 premier universities in the country for major support to bring them on par with global standards. Each university will have strong UG, PG and research programmes. Each university to get financial support of Rs.200 crore in the XI Plan, besides enhanced recurring grants for improved basic infrastructure and services. (See 3.5) | 2000 |
| 2 | Select about 20 universities other than those in item (1) above for special assistance to launch high quality integrated M.Sc. courses after Class XII. Each University to receive Rs.75.00 crore over a five-year period. (Exit option with a B.Sc. degree should be available after 3 years in any integrated M.Sc. course.) (See 3.6) | 1500 |
| 3 | Special grants to IITs and leading PG universities (total about 20) for starting quality undergraduate courses in sciences. The grants will include support for upgradation of research facilities also. A practical straight forward measure that can be readily implemented, if financial and manpower support is assured. Each grantee institution to receive 5.00 crore. (See 3.7) | 100 |
| 4 | Each State to eventually have at least one centrally funded university. In the XI Plan ten promising State Universities to be identified for becoming centrally funded universities. Rs.100 crore for each university for this transition. (See 3.8) | 1000 |
| 5 | Initiate post B.Sc- 2-year B.Tech programmes (followed by M.Tech degree courses) in about 20 universities. These programmes should create a niche in engineering education by emphasizing areas that need strong science base, and are inter-disciplinary in nature. Availability of such programmes will enhance the status of B.Sc. as a good career option and generate good engineering graduates needed for the new knowledge based economy. (Students who cannot make it to IITs, etc. would prefer to do B.Sc-B.Tech in good universities than go for B.Tech at low quality engineering colleges.) (See 3.9) Each University to receive Rs.75.00 crore to launch post BSc.-2-year B.Tech (followed by M.Tech) programmes. | 1500 |
| 6 | Additional one-time grant to the three Inter-University Centres (IUCAA, IUAC, UGC-DAE Consortium) already noted for offering excellent research opportunities to university/college teachers and students. (See 3.10) | 300 |
| 7 | Infrastructure support to about 400 colleges identified for their potential for excellence. Support essentially for teaching laboratories and libraries. (See 3.13) | 400 |

| | | |
|--|--|------|
| 8 | Strengthen INFONET in the university system massively. This will not only improve access to research journals but also will bring quality courseware within the reach of remote colleges. Allow access even to free lancing researchers on token registration fee. (See 3.14) | 500 |
| 9 | Involve major scientific institutions/universities in a big way for Satellite/EDUSAT-based and Web based higher education programmes for large scale use, especially in non-metropolitan areas. Identify a few coordinating centers and give them support and operational flexibility for producing quality science programmes. (See 3.15) | 100 |
| B NEW INSTITUTES | | |
| 10 | Creation of new world class science institutes (IISERs); 4 created in X Plan including NISER, 2 more to be created in the XI Plan. These will be the equivalents of IITs in science. (See 3.3) | 1000 |
| <i>Overheads component for all research grants should be 25% of the total grant, with no ceiling. The time between project submission and release of funds (if accepted) should not exceed 6 months.</i> | | |
| C 15 YEAR ASSURED CAREER SUPPORT PROGRAMME | | |
| 11 | i) Phase I (5 years) Support to KVPY scholars, Medal Winners in Science Olympiads, top rankers in IITJEE examination who opt for science stream undergraduate and graduate education after 10+2 (~ 1500 nos.) | 75 |
| | ii) Phase II (5 years) Fellowships after graduation for pursuing doctoral research (~500 nos.) | 50 |
| | iii) Phase III (5 years) Appointment for 5 year after Ph.D. grade Rs. 10,000-325-15200 + DA & HRA (~200 nos.) (See 3.2). | 25 |
| D SUPPORT TO SCIENCE ACADEMIES | | |
| 12 | Strengthening the initiatives of Academies and rewarding excellence i) Educational programmes (summer programmes / refresher courses, etc) | 30 |
| | ii) National Professorships (100) (Compensation at the level of INSA Professorship; research grant may also be awarded.) To be administered by INSA. | 30 |
| | iii) National Post-doctor Fellowships (500) (This includes 100 Fellowships for outstanding young researchers.) To be administered by a Science Department of the Govt. of India. | 100 |
| | Note: A joint body of the three National Academies may be responsible for selection of National Professors and PDFs. (See 3.16) | |

| E | INDIVIDUAL SCHEMES FOR TEACHERS AND STUDENTS | |
|----|--|--|
| 13 | <p>Promoting research and mobility among teachers and students.</p> <p>i) Support to individual college teachers for research (See 3.17)</p> <p>ii) Support for Visiting Teacherships. (Good teachers to be able to go on 6 month sabbaticals every five years to reputed places.) Contingency support to Ph.D/PG/UG project students for visits to other institutions. (See 3.18)</p> <p>iii) Support for retired scientists teaching at colleges/universities (See 3.19)</p> <p>iv) Permit direct admission of B.Tech degree holders to Ph.D. in Science.</p> | <p>200</p> <p>10</p> <p>5</p> <p>-</p> |
| 14 | <p>Scholarships for students (See 3.20)</p> <p>i) NTSS Total number of scholarships after Class VIII to be raised to 10,000 (from the current 1000) for the whole country. The scholarship amount to be raised to Rs.1000 per month, which may be further upgraded after Class XII. Facilities for nurturing students to be enhanced.</p> <p>ii) KVPY Number of Fellowships to be tripled. Nurture camps to be essential part of the programme, as at present. Additional institutions to be identified for nurture camps.</p> <p>iii) National Scholarships (for 1500 UG & 1000 PG students)</p> <p>iv) Olympiads (6 subjects) <i>(Support for enhancing the reach of the Olympiads throughout the country.)</i></p> | <p>100</p> <p>50</p> <p>50</p> <p>10</p> |
| F | CAREER INCENTIVES FOR SCIENTISTS | |
| 15 | <p>Recognise and reward good performance of scientists through various incentives : differential pay structure, salary raise, enhanced research grants, travel support, sabbaticals, liberalized consultancy rules, appointments to Endowment Chairs, National Professorships, etc. (See 3.2)</p> | - |
| | Proposed outlay for XI Plan | 9135 |

Say **Rs.9100 crore**

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Abbreviations

| | |
|---------|---|
| AICTE | All India Council of Technical Education |
| AIIMS | All India Institute of Medical Sciences |
| DAE | Department of Atomic Energy |
| EDUSAT | Educational Satellite |
| GOI | Govt. of India |
| HBCSE | Homi Bhabha Centre for Science Education |
| IIT | Indian Institute of Technology |
| IIT-JEE | Indian Institute of Technology – Joint Entrance Examination |
| INFONET | Information Network |
| INSA | Indian National Science Academy |
| IISER | Indian Institute of Science Education and Research |
| IUCAA | Inter-University Centre for Astronomy and Astrophysics |
| IUAC | Inter-University Accelerator Centre |
| KVPY | Kishore Vaigyanik Protsahan Yojana |
| NCERT | National Council of Educational Research and Training |
| NPL | National Physical Laboratory |
| NTSS | National Talent Search Scheme |
| PDF | Post doctoral Fellow |
| PG | Post Graduate |
| SAC-C | Scientific Advisory Committee to the Cabinet |
| UG | Undergraduate |
| UGC | University Grants Commission |

November 20' 2006

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No. Prn.SA/ADV/SC/2006
Government of India
Office of the Principal Scientific Adviser to the Government of India

311, Vigyan Bhawan Annexe,
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New Delhi 110011
Dated: 8th May, 2006

OFFICE MEMORANDUM

Subject : Constitution of Working Group under the Steering Committee on Science on Technology for the Formulation of Eleventh Five Year Plan (2007-2012).

Planning Commission has constituted a Steering Committee on Science and Technology for the Formulation of Eleventh Five Year Plan (2007-2012). To assist the Steering Committee and to finalize its recommendations, a Working Group is being constituted on "Attracting and Retaining Young People to Careers in Science and Technology". The composition and terms of reference of the Working Group would be as follows :

I. Composition

Sr. Name, Designation and Organization

No.

- | | | |
|----|--|------------------|
| 1. | Dr. S.K. Joshi, Vikram Sarabhai Professor, NPL, New Delhi and Dr.R. Natarajan, Former Chairman, AICTE | Co-Chairman |
| 2. | Prof. N. Satyamurthy, IIT, Kanpur | |
| 3. | Prof. J. Sashidhar Prasad, VC, University of Mysore | |
| 4. | Dr. R. Pillai, Dy Chairman, UGC, New Delhi | |
| 5. | Prof. N. Mukunda, IISc, Bangalore | |
| 6. | Dr. P. Chaddah, Director, IUCDIF, Indore | |
| 7. | Prof. Vijay Khole, VC, University of Bombay | |
| 8. | Prof. Deepak Pental, Vice Chancellor, Delhi University, Delhi. | |
| 9. | Dr. Arvind Kumar, Director, Homi Bhaba Centre for Science Education, Mumbai | Member Secretary |

II. Terms of Reference

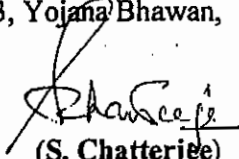
1. To evolve S&T manpower development strategies for attracting and retaining highly talented persons in science and technology. In particular to suggest measures for attracting talented students to remain in science at 10+2 level, and for encouraging the best students among science/ technology graduates to opt for research and development.
2. To suggest steps to improve the quality of undergraduate, post-graduate education and research in universities.

3. Recommendations already made by other recent reports/ initiatives i.e. (SAC-C report by Prof. Mukunda, et al; March 31, 2005 seminar of the Office of PSA and the follow-up, UGC report, etc.), may be the starting point for discussions.
4. To suggest ways to decouple the remuneration structure for outstanding researchers/ faculty members from the prevailing government/ UGC scales of pay with the aim to establish some parity with the compensations in private/ MNC R&D organizations.
5. To consider any other important and relevant item.
6. To indicate approximate financial outlay for implementation of the recommendations.
7. The Co-Chairmen may co-opt other members, if required.
8. The expenditure on TA/DA in connection with the meetings of the Working Group in respect of the official members will be borne by their respective Ministry/ Department. However, in the case of non-official members, they will be entitled for TA/DA as admissible to Grade-I Officials of the Government of India and the expenditure in this regard would be met by the Planning Commission.
9. The Working Group would submit its report by 15th July, 2006.


(S. Chatterjee)
Adviser

Copy forwarded to:

1. Chairman, all members and Member Secretary of the Working Group.
2. Dr. V.L. Chopra, Member (S&T and Agriculture), Planning Commission, Yojna Bhawan, New Delhi
3. Dr. P.K. Biswas, Advisor (S&T), Planning Commission, Room No. 213, Yojana Bhawan, Sansad Marg, New Delhi


(S. Chatterjee)
Adviser

