

block was that the cheque and the accompanying statement did not make it explicit as to whom the money ought to be paid. The 'cheque receiving section' is reluctant to act since the 'bill preparing section' is located 'far away' in the next room and has not yet revealed these secrets. But in the university nothing happens of its own volition. Divine intervention too won't help here. Nevertheless, the cheque serenades down the road to the wrong cash section and finally to *THE* cash section; from where with amazing agility it hops over, on the same day, to the State Bank of Travancore (SBT). This one cheque is sure to win a frequent flier award, for back it goes to its progenitor, the Syndicate Bank, NPL Campus, New Delhi. Persuasive arguments about government cheques,

CSIR account means huge funds, etc. cut no ice in the SBT. Hopefully by the end of December the cheque would have redeemed its honour and would be worth much more than the pale pink paper on which it is scribbled. Till it is credited I am keeping my fingers crossed and maintaining my family of three on a shoestring budget.

Even when it is credited, it would be another month before the university order condescendingly permitting me access to the amount comes out. And it would be a fortnight before the university audit passes my bill claiming the arrears and issues another cheque. And if I am the first to the post I might be lucky enough to cash it, else it would be another couple of days of uncertainty in which you try to make ends meet and make outstanding

contributions to earth science and try to continue subscribing to *Current Science* and also try to take snide remarks on a tax-free bonanza in your stride.

We in India are riding the crest of infotech, space science and nuclear science, but the troughs are too deep to fathom and many a soul gets mired in it, never to come up again.

Incidentally, I joined as CSIR-RA on All Fools' Day, 1998, but then it doesn't really matter!

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## Quality of research in science

The article entitled 'Let us do justice to science' (*Curr. Sci.*, 1998, 75, 78-79) and the two subsequent elaborations (*Curr. Sci.*, 1998, 75, 750; 979) bring to focus a number of serious problems leading to the questionable quality, in general, of research in India. Major among them are: (i) Poor quality of Ph D theses which include routine, repetitive and imitative research. (ii) Absence of discrimination between a good researcher, a good teacher and a good teacher-cum-researcher in career advancement. (iii) Contrived evaluation of Ph D thesis. (iv) Indiscriminate admission of candidates to Ph D, without adequate evaluation of research aptitude, in general.

However, a few institutions have mostly been successful in countering those problems. Consequently, not only the Ph D thesis of those institutions satisfy quality standards but quality papers from them get published in international journals also. The logical question that follows is: Why is it that such institutions are not replicated or other institutions improve themselves to such standards? As often happens, logical questions evade logical answers. However it would be introspective to analyse the existing situation.

I shall consider the research environment in agriculture. Not only public funded institutes but also universities are engaged in research and teaching. Such

institutions, follow the pattern of land grant universities in USA for their Ph D programmes. All State Agricultural Universities (SAUs) and premier research institutes of the Indian Council of Agricultural Research (ICAR) which enjoy a deemed university status come under this category. An advisory committee is set up for each Ph D/M Sc student and the student has to complete a set of courses in tune with his field of research. Performance in the courses is evaluated through a set of examinations. The question papers are usually set by the course instructor(s) and a grade is awarded which carries a grade point. A student has to obtain a minimum grade point average (average of grade points weighted by the number of the credit hours per week of each course taken by the student) before he/she becomes eligible to proceed to work for his/her Ph D/M Sc thesis.

Conventional universities (to contrast them from Agricultural universities) which are governed by UGC regulations follow the British system. A student who gains admission to Ph D has no mandatory course work to do but can work for his thesis. In other words, the thesis provides total fulfilment of the requirements of a Ph D degree. In contrast, in the land grant system, Ph D thesis provides only a partial fulfilment.

Right from admission, the system comes under various constraints:

In many institutions, only those with B Sc (Agriculture) degree are eligible for admission to M Sc/Ph D. One argument is that universities offering Ph D under the British system do not take Agricultural graduates. Thus teaching and research are geared to the standards of B Sc (Ag) which vary widely across universities. In addition, in premier research institutes, there are various kinds of quota not coming totally under the rigours of admission criteria. However, admission is selective based on a competitive entrance and an oral examination mainly in premier research institutes, and varying standards exist across SAUs. Standards for research scientists to be eligible to become faculty members also vary across institutions. As has been repeatedly pointed out, the absence of weightage for career advancement for a good teacher and good teacher-cum-researcher continues to be a crucial dampener.

There are scientists who guide Ph D students; but it is not uncommon to find a few faculty members who do not teach any course. The thesis problem is selected around routine research tending to be lackadaisical in output. Naturally, academic excellence and originality in research remain to be conscientiously promoted.

While agriculture is a major sector of the country, job opportunities are grossly incommensurate with the number who

get Ph D every year. If we concede that the quality of Ph D remains often below par, it is rational to argue that, not all, need be taken into a research career. But then the evaluation system to screen those fit for a research career should be strong and stringent. Real merit and performance should be the sole criteria. Agriculture is a state subject. Implementation of a stringent common system of admission across SAUs remains still a distant option. Several, possibly valid, reasons exist, but it is high time that we see reason behind reasons to make the distant option an immediate reality.

The quality of research, as revealed, particularly, by a student's thesis is a function of student's aptitude and acumen which again is a basic function of the standards maintained in B Sc or/and M Sc, as the case may be.

Three major elements need immediate attention and remedial action to gear up the quality of education and hence promote capability for research: (i) A dynamic and updated syllabus encompassing modern developments in the subject. (ii) A good teacher who can teach the subject with practical case studies, where needed, to catalyse research aptitudes of young minds. (iii) A select band of students carefully chosen solely on their subject knowledge and research aptitude.

These needs are inter-dependent and currently, this inter-dependence is in disarray. The result is a haphazard combination of the three elements.

Since research and teaching are integrated in the system, adequate scientific infrastructure and environment are essential for quality research. This is an area of crucial concern. Often funds are released from projects for purchase of high-tech instruments, particularly in areas concerning molecular biology and biotechnology. But no provision is made for necessary infrastructure required for their efficient use like the supply of uninterrupted power, water and chemicals, appropriate funds for maintenance and upkeep of equipments, for example. The recipient institutions, though are supposed to provide for them, many times do not do so due to paucity of funds. It is therefore not uncommon to come across equipments stacked idle and at times, unopened even!

Thus research, with its modern ramifications, finds itself as a square peg in

a round hole. It is high time we recognize the maladies and provide a smooth path for purposeful research through an intensive malady-remedy analysis. Nothing substantial would accrue by sheer criticism and crying hoarse for quality research.

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The article entitled 'Let us do justice to science' by Saad Tayyab (*Curr. Sci.*, 1998, 75, 78-79) and correspondences on this issue (*Curr. Sci.*, 1998, 75, 749-751) have done a commendable job of bringing the problems faced by the research scientists to the fore. Being a beginner with less experience in research, I would still like to throw some light on the problems faced by the research scholars. In my opinion, there is a need to put some restrictions so that the quantity of research can be checked and the quality promoted. Almost all the research institutions and universities, except a few, have research scholars who may be stipend holders and non-stipend holders. The stipend holders are admitted either through projects or research aptitude tests, e.g. NET, GATE, etc. The number of non-stipend holders far exceeds that of stipend holders, barring a few industry-sponsored candidates. One of the reasons why many students enroll themselves for a Ph D degree is certainly the low fees in universities. Hence all the universities must restrict Ph D registration to a certain number per annum based on a research eligibility test, without increasing the fees. I hope this will effectively minimize the unwanted number of research scholars.

Even in the case of stipend holders, a majority of them utilize the research scholarship for sustenance and preparation for competitive exams. The causes for this are many. Firstly, despite being good students they are not sure of their future after completion of Ph D. There are very few scientist/teaching positions available.

The private sector prefers fresh technology graduates. As far as post-doctoral fellowship is concerned, it is also a time-consuming process and it may take several years after completing the Ph D to get one. No one likes to stay unpaid for an indefinite period. This is because, in the university system, it takes at least six months to get the first salary even after approval of the project from the funding agencies, mainly government. This issue needs greater attention.

The research scholars who join through NET get a stipend of about Rs 5,000 per month. This revision of pay scales after implementation of the recommendations of the V Pay Commission has left the scholars equivalent to class III employees as far as the basic salary is concerned. The problem will be severe when we consider the situation after the next ten years when a revision will take place, normally. Assuming an average inflation of 10% or devaluation of the currency by the same amount in real terms or both, Rs 5,000 will be equivalent to Rs 1,743 in the year 2008. Suppose that the relative distribution of prices of commodities remain the same, how could one survive then. I strongly feel the need to have some revision every year keeping the minimum living index in view.

This problem will certainly become more compounded with the proposed hike of fees. Currently, the IITs are charging Rs 8,000 per semester for Ph D. I do not think that too many scholars can afford this with the prevailing stipend, hence these institutions are having a shortage of good, qualified students at the research level. Research work should not be taxed this way.

Lastly, there is a strong need to regularize the funding mechanism. Except a few institutions and universities, the majority of them have a very poor system of payment. There are cases when the scholars do not get their stipend for several months. A research scholar, in my opinion, is too small an entity to take on the completely rusted finance sections of the universities and the CSIR.

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