

many of our teachers, even at the highest level, are woefully outdated about the contemporary frontiers of knowledge, even in their own fields; they do not make any special effort in improving their teaching skills and methodologies. Due to such a faulty system, the present generation is neither able to contribute in any significant way towards new concepts or ideas, nor undertake any original work, and students fail to develop innovative and original thinking. They are forced to develop such faculties that suit the current examination system². One of the critical factors affecting the quality of universities and institutions imparting higher education, is our inability to attract and retain talented persons in the teaching profession and furtherance of research in the university system. On 15 December 2008, the Cabinet had approved a higher academic grade pay of Rs 6000 for all assistant professors at the entry level, so as to make it more attractive compared to the entry level grade pay for the Civil Services and other professionals

under the Sixth Central Pay Commission. A pre-selection screening process to identify candidates who have the basic aptitude and interest in the teaching profession may, to an extent, help in getting better teachers. In accordance with new developments and advancement in the field of life sciences, the CSIR-UGC has revised the syllabus of NET examination. It is comprehensive and well integrated with basic as well as applied aspects of biological sciences like botany, biotechnology, microbiology and zoology. But there is some scope for improvement of the examination scheme, for better screening of teachers and research scholars in future.

1. In the present scheme of examination, out of 39–45 questions requiring descriptive answers, the candidate is required to attempt maximum of 15 questions; this provides internal choice up to 70%. To ensure 50% internal choice and equal importance to each section, there should be one descriptive question from each section with internal choice.

2. To maintain standard and quality of higher education in the country, NET should be essential for appointment of teachers in the universities/colleges. State-level eligibility test should not be treated equal to NET.

3. Course contents related to research methodology must be included in the syllabus. This will help in developing research aptitude/temper among the young generation who opt for teaching and research as a career.

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Yes, scientists also need money

I read the correspondence by Chaturvedi¹ entitled 'Do scientists also need money?' with great interest. I also belong to the same era as Chaturvedi, and it may be of interest for the readers to know what another ripe old man has to say about the question.

I agree with Chaturvedi that scientists (as implied by Chaturvedi, the term 'scientist' is used in a generic sense; it includes teachers and researchers in science and technology) do need money, not only for a secure future, but also for present comfort. Let scientists make it known that they cannot be taken for granted. They should stop doing free additional jobs and should fix norms for honorarium for every such job. One exception could be that of reviewing a research paper for a scientific journal, provided the journal does not charge money from the authors. In this connection, let me cite some instances from my own experience to illustrate how various agencies, including universities, treat scientists.

About a decade ago, I received an invitation from a well-established and well-known Central University for exam-

ining an M Tech thesis with an honorarium of Rs 50 only. I promptly returned the thesis at my own cost and wrote a letter to the Vice-Chancellor, politely asking him to come to senses. Naturally, there was no response!

In a recent invitation from another relatively younger Central University, I was invited to examine a Ph D thesis. The honorarium bill required an undertaking on my part that I would declare this income in my income tax return! On the one hand, the University expects the examiner to give a fair assessment of the thesis, and on the other hand, it suspects that the examiner may not be honest enough to declare the income in his tax return. Needless to say, I declined the offer mentioning the reason explicitly. To the best of my knowledge, there was absolutely no effect of my letter on the Vice-Chancellor or the administrative machinery of the University.

Long ago, I was invited as an expert for a selection by a Central Government Ministry. There was no honorarium; even the actual taxi fare was not paid. I was told that I would be paid road mileage

allowance in due course. And to make things worse, an amount less than one-fourth of the actual taxi fare was sent to me by money order and the postal commission was deducted from the computed amount! I refused to accept the money order and wrote a letter to the concerned official in not too sweet a language. As usual, there was no reaction.

In the first meeting of an important committee of another Central Government Ministry, I was given a nominal sitting fee and a travelling allowance calculated on the basis of road mileage. The total amount barely met my actual taxi fare. Again, I had to decline the unkind offer and wrote to the concerned officer, with copy to the Chairman (who, incidentally, was a high-profile retired judge). Nothing happened, as expected. Despite my resignation from the committee, I continued to receive the agenda and minutes of the meeting for more than two years!

Unfortunately, the salary scale of scientists is decided by a Pay Commission, which is dominated by bureaucrat members. The latter look after themselves

well, and make sure that all other jobs, including those of scientists, have substantially lower salary and perks. Even scientists who occupy high administrative jobs in the Government fail to project the case of their fellow scientists. However, while the scientists have to survive with whatever scale the Government prescribes, they can at least demand a respectable honorarium for every addi-

tional job they are requested to undertake. By refusing to do such a job for free or for a pittance would not make them poorer; on the other hand, the message will be clear that they need to be taken more seriously and more respectfully. It is important for a scientist to live with dignity; one who does not care for it does positive disservice to himself and to the whole scientific community.

1. Chaturvedi, U. C., *Curr. Sci.*, 2008, **95**, 433.

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Biofuels: concern about substrate selection

The search for suitable sources of biomass for generation of biofuels is actively going on in different parts of the world. Biomass being a renewable source of energy is seen as a long-lasting and sustainable solution to the energy crisis. In this context, USA is diverting substantial part of its corn to produce bioethanol¹; Brazil is extensively using sugarcane². In a similar manner every country can look for the suitability of biomass depending upon its geographical position, energy needs and abundance of biomass. In India, we have a lot of forest residue, agricultural residue, wild grasses, non-fodder crops, etc., which may be diverted to the biofuel programme. But a thoughtful selection of the biomass is required as it should not hamper our ecological balance.

Diverting lignocellulosic biomass, especially agricultural and forest residues, towards the biofuel programme may have a serious implication for the ecosystem, and it should be well thought of before the operation begins on a large scale. Residual plant biomass contains organic compounds: sugars, starches, proteins, carbohydrates, lignins, waxes, resins and organic acids, and the mineralization process converts these organic compounds

to the relatively stable substance that is humus, which feeds the soil population of microorganisms maintaining high and healthy levels of soil life³. This humus is a life force of the soil. It makes the soil fertile as it is mineral-rich, improves aeration and adds growth-promoting chemicals. Diversion of a huge quantity of residual plant biomass towards biofuels may lead to lesser humification followed by a negative impact on the population of indigenous microflora, subsequently disturbing the biogeochemical cycles. So substrate selection should be carefully planned without hampering the ecological balance. In the Indian context, municipality solid waste like waste from large vegetable and fruit markets (market organic waste), waste from private homes and biodegradable industrial waste should be preferred over forest and agricultural residues for the biofuel programme.

Due to the large volume of biodegradable industrial and municipality waste, landfills are becoming increasingly expensive and stringently regulated. Instead of burying this waste in landfills, it can be diverted for the production of bioenergy, thus serving two

purposes: environmental sanitation and biofuel generation. There have been a number of reports on the utilization of this type of waste as feedstock for bioenergy production, especially in the form of biogas^{4,5}. The biogas produced can be used for generating electricity and in dual-fuel internal combustion engines.

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Natural groundwater recharging ponds: struggle for survival

Groundwater abstraction has drastically increased during the last few decades in order to fulfil the needs of the domestic, agricultural and industrial sectors. Due to this increased abstraction, out of the 5711 blocks in India, 310 have come under

the 'over-exploited' category, whereas 160 have reached the 'dark' category¹. Rainfall is the only source of groundwater recharging, which is also declining as concluded from the analysis of the last three decades of rainfall data. Moreover,

approximately 80% of the yearly rainfall is concentrated in three months of the year (mid-June to mid-September), of which considerable portion gets converted into run-off. If the current situation continues, the day is not far when water will