

BOOK REVIEWS

paniculata, *Operculicarya decaryi*, *Pachypodium saundersii*, *Petrea volubilis*, *Podocarpus gracilior*, *Portulacaria afra*, *Sesamothamnus lugardii* have been individually described with their common name, native place, cultivation technique, feeding, methods of propagation, repotting time which is of specific help.

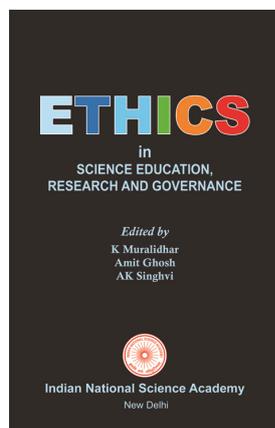
The monograph condemns the misconception and myths against bonsai raised by the Vaastu experts by putting forth a rationale and scientific view. The monograph by Bewli, clearly reflects how spending time with a hobby cultivates skill, knowledge and makes one an expert in that area. The author's exemplary effort in giving a holistic idea on bonsai cultivation is commendable.

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Ethics in Science Education, Research and Governance. K. Muralidhar, Amit Ghosh and A. K. Singhvi (eds). Indian National Science Academy, Bahadurshah Zafar Marg, New Delhi 110 012. 2019. viii + 127 pages. Price: Rs 500.

The book under review is a first step towards development of a comprehensive discourse on the broad theme that would

provide some guidelines for ethical practices in science education, research and governance. The book is a well thought of effort at a time when the country is attempting to address various issues like plagiarism, predatory journals, fabrication of data, ghost authorship, use of money as a surrogate for quality, gender bias, redundant educational practices, examination and evaluation system, etc. The book talks of unethical practices in the arena of science education, research and its governance which have become rooted in the Indian academia as a result of either willful adoption or sheer ignorance, mainly as a result of rising pressure to perform, competition and a desire for quick success. The book is an initiative of the Indian National Science Academy (INSA) with chapters from members of Inter-Academy panel and senior fellows of INSA as a continuing effort of INSA to address issues of contemporary interest to science and societal well-being.

The chapters written by eminent experts and professionals have been edited and reviewed by senior INSA fellows with a detailed introduction to the book by one of them, Prof. K. Muralidhar, who gives the basic concept and philosophy of modern science in relation to the increasing importance of ethical conduct in order to preserve the integrity of the individual, society and environment without compromising on fair practices. It starts with the definition of science and moves on to the description of fundamental and application oriented science, as an apt start to suggested discourse on morals, ethics and laws that govern scientific culture. The introduction also emphasizes on understanding professional ethics, best practices of ethical conduct, mandatory set of norms for scientific temper and resolution of ethical dilemmas. India has aligned its central challenges with the Sustainable Development Goals of the United Nations and emphasized that appropriate science and technology solutions are the only vehicles to ethically resolve them. It stresses on the need for ethical, moral and intellectual component in education to remove ignorance.

In the conceptual premise of ethics in higher education and academic research, the authors have stressed on incorporating ethics and value education in the curriculum to promote awareness, responsibility and compassion and overcoming prejudice, discrimination and

unethical practices. Authors highlight the value of ethics in academic research and talk of issues in research ethics. Postulates for maintaining ethical standards in higher education mentioned in the book are reliability and integrity, objectivity, genuineness, respect for intellectual property, novelty in publication, protection of subjects – both human and animal, agreement for consent, confidentiality and anonymity. The professional obligations of a teacher as listed in Code of Professional Ethics for Teachers have been referred to for defining their personality traits that will ensure ethical conduct while also developing new pedagogies and imbibing 21st century skills to stay globally competitive and be an academic leader. Including moral science in the curriculum is suggested so that the higher education system becomes a wholesome template to nurture mind full of cognitive capabilities accompanied by a balanced view of value system.

Ethical conduct of research while seeking answers to new questions as a part of research practice is a chapter focusing on ethical principles of choice of specific research questions, collaboration, relationship of mentor and mentee, conducting, reporting and publishing of research. Wasteful expenditure of public money and careful choice of research lessons are the first ethical lesson in research. Care is required to not deliberately lean towards hot trends and avoid use of high-end equipment, if not required, with suggestions for a rigorous audit by funding agencies to ensure judicious use of financial resources. It is necessary to encourage young researchers to do independent work, be self-reliant, original and be informed of ethical practices in planning, conduct and reporting of research to avoid any chances of misconduct.

While discussing ethics in measurement practices, the authors start a very well-written chapter with a quote that summarizes the gist of the writing: 'The calamity of the information age is that the toxicity of data increases much faster than its benefits.' The emphasis is on the relevance of maintaining proper lab records and the dangers of improper or hurried communication of research which should be done logically and coherently to enhance the impact of the publication. Authors stress on conciseness to emphasize novelty while stating objectives very clearly and avoiding

jargon. The right options of visual display of data and correct choice of statistical method for fidelity of analysis are the choices to be made for precise representation of results. The authors detail various biases that effect precision and accuracy of data and propose the formation of institutional ethical committees for support in all aspects of ethical conduct.

In the chapter on the ethics of publication, the authors opine that information generated from research and its publication is built on trust of honest reporting, without misrepresentation or fabrication. Any deviation from highest standards of ethical behaviour in reporting research affects individual and institutional reputation. The responsibilities of a researcher, while reporting research, include reporting and giving due credit in terms of authorship, mentioning specific contribution and giving acknowledgement for taking help while also specifying the exact role in the research output by any individual or agency. Undesirable authorships like honorary, ghost, gift, anonymous, surrogate define the extent of the problem and it is suggested that the practice may at best be avoided. The responsibilities of authors towards originality, integrity, good records, avoiding plagiarism, conflict of interest, intellectual property, copyright agreement, disclosures, confidentiality are emphasized. The ethical conventions of publications including decision on where to publish, warning about predatory journals and responsibilities of editors, reviewers and publishers in ensuring highest quality of published material are reported as the hallmarks of ethical conduct in publishing and disseminating the knowledge generated from the research output for societal impact and professional advancement.

Ethical practices in science governance are important for effective science leadership and overall impact of science for societal good. Decisions on science

policies and thrust areas are proposed and implemented by the government in consultation with scientists. Hence, professional ethics in decision making towards policy implementation becomes crucial. Some of the areas where ethical practices in science governance require focus and are discussed in the book include choice of academic leader, establishing scientific institutions, conflict of interest in scientific enterprise, assessment of research output and its impact, funding of sponsored research, funding policies, recruitment ethics, ethical aspects of social recognition of scientific excellence, etc. It is emphasized that unethical practices also result from lack of well-reasoned and deeply researched economic viability model for a scientific organization.

The chapter on ethical practices in scientific outreach mentions that communicating research performed through public funds in a simple language is a social obligation and can be done through numerous channels of communication including press and social media. The authors explain the interdependence of science, ethics and public consultation very well, while also highlighting the responsibilities of journalists and public suggesting that they be careful and not legitimize inappropriate beliefs, product, practice and help in preventing unethical use of science in marketing.

The chapter focusing on ethical issues associated with gender bias and discrimination at work place opines that any gender bias or harassment of women in academia must be seriously dealt with through strict measures to promote gender equity. It is important that for a gender neutral and supportive environment, the issues of safety, work-life balance, perception of roles, representation in committees, resource allocation, etc. are properly defined and implemented.

Amongst the recommendations offered by the editors, regarding use of ethical

means in professional arena, it is emphasized that each person/institution/administrative system work in a fair, unbiased, unprejudiced and be accountable in dealings at all levels. Suggestive guidelines are offered for ethical practices in higher education, research, measurement practices, use of animals and humans in research, publication, governance and outreach. This attempt of consolidating ethical conduct in science, first of its kind in India, helps concentrate and bring to the forefront of the ethical questions raised from time to time in the scientific arena and offers guidelines for ethical conduct by everyone involved in scientific enterprise in the country and globally.

The authors have been successful in bringing all ethical concerns in science in this book and help create an awareness towards scientific ethics disciplinary. The book does not touch upon a suggesting the mechanism for scrutiny of cases where ethical conduct has been violated. It also does not suggest the mechanism of dealing with such issues and the penalties and disciplinary proceedings that must be imposed based on severity of the charge. This may have been done deliberately so as to use the platform only to create awareness and leave the mechanism to deal with misconduct to policy makers. However, the book has been very successful in giving an exhaustive look into various facets of ethical practices in education, research, outreach and governance of science and proposes to become a very relevant publication that must be read by anyone who deals with any aspect of science.

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