



**Open Access to Knowledge and Information: Scholarly Literature and Digital Library Initiatives – The South Asian Scenarios.** A. K. Das. The United Nations Educational, Scientific and Cultural Organization (UNESCO), UNESCO House, B-5/29, Safdarjung Enclave, New Delhi 110 029. 2008. 137 pp. Price not mentioned.

This book discusses the initiatives taken by various institutions in India towards digital library, open courseware, open access (OA) journals and finally, national and institutional repositories.

OA is a term often used but misunderstood, even by academicians. OA literature is often digital, available free of charge, and usually free of most licensing restrictions. OA research articles fall into two categories: OA journals and OA repositories. Unlike other professionals, research scholars write journal articles for free to advance knowledge in their field and, possibly, their careers. The entire process of writing a research paper, reviewing by other peers and editorial decisions are carried out at nearly no cost. However, the publisher charges for access to the journal. In the OA model, it is available free for readers but not free for producers. OA journals normally charge the authors (who are likely to pass on the cost either to the publisher or the agency that funded the research) to publish the research paper. These charges may be exorbitant in some cases, but the charges are also waived by a few OA journals. However, scholars publish their research for impact and the most prestigious journals in many fields are not OA yet.

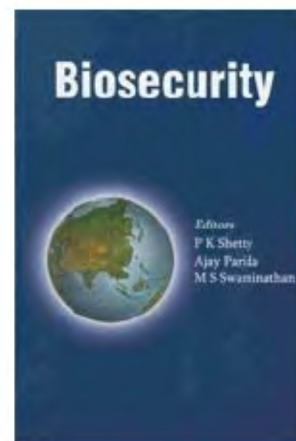
Therefore, a researcher, especially from South Asia/India, is likely to publish in a journal that is considered prestigious internationally, rather than just OA. In these cases, OA repositories would greatly help. Many OA repositories comply with the

OA initiative protocol (OAIP) for meta-data harvesting, thus allowing a user to access a paper without being aware where the archive is located. Almost all publishers of journals allow archiving a post-print of the research paper after peer review in an institutional repository. Thus the author can submit the paper in a repository after it has been accepted for publication. However, most publishers do not allow archiving of papers that have been copy-edited and published by them. While many OA repositories in India claim to have thousands of papers, because these are not post-prints submitted by authors but the copy-edited paper published by the society/publisher. Thus many of these papers are inaccessible outside the organization, which defeats the very purpose of OA. Unless authors clearly perceive the advantages of depositing in a repository (like improved impact etc.), it is unlikely that post-print deposition will increase. Most of the research in developing countries like India is publicly funded and the funding agencies can mandate that the research papers arising from this funding should be deposited by the authors in an institutional repository. This would greatly impact the open access movement in India.

The book would be a good starting point for novices who are unaware of the number of digital libraries, OA journals, etc. in India. It would have been better if the authors had discussed the access to these websites, the advantages and disadvantages of some of these OA initiatives and the details of the holdings. Instead, this book is just a compendium of screenshots of many digital libraries, OA journals and repositories in India. A few typographical error, like, 'IISc, located at Bangalore, is India's most renowned research institution....' (p. 101) could have been avoided.

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**Biosecurity.** P. K. Shetty, Ajay Parida and M. S. Swaminathan (eds). National Institute of Advanced Studies, IISc Campus, Bangalore 560 012 and M.S. Swaminathan Research Foundation, Taramani, Chennai 600 113. 2008. 255 pp. Price not mentioned.

It was 24 July 2008 and I had just finished reading the Foreword of this book by K. Kasturirangan stressing that 'India's preparedness and capability in the area of biosecurity is a serious concern', when the TV channels brought the news of serial bomb blasts in Bangalore. There were explosions in Ahmedabad the next day, followed by finding of unexploded bombs in Surat. These events brought back the real-life security threats that the country has been facing in the past few years. In the overall context of national security, this book on biosecurity is timely.

The National Commission on Farmers in its recommendations has proposed a National Agricultural Biosecurity System. Following these recommendations a two-day discussion meeting on setting up a National Agenda for Biosecurity was jointly organized by the National Institute of Advanced Studies (NIAS), Bangalore and M.S. Swaminathan Research Foundation (MSSRF), Chennai, in November 2006. It was held at the J.R.D. Tata Auditorium of NIAS. The present volume is a collection of the papers presented at the above meeting. Though titled *Biosecurity*, the main focus is on agricultural biosecurity related to plants and animals. In the first paper, M.S. Swaminathan has further elaborated on the recommendations of the Farmers' Commission. A Biosecurity Council for political and policy overview, a National Centre for Agricultural Biosecurity with four

wings for crops, animals, aquatic resources and microorganisms, and a National Agricultural Biosecurity Network are proposed. The network is to include the Agricultural Universities, and research institutions under the Indian Council of Agricultural Research (ICAR), Council of Scientific and Industrial Research (CSIR), and Indian Council of Medical Research (ICMR). The need for all three is stressed, the first for political commitment, the second as a strong scientific centre, and the network for countrywide operations. Further, the need for a National Agricultural Biosecurity Fund is highlighted, as disease outbreaks are sudden. This was perhaps the first meeting of its kind in the country. The Food and Agricultural Organization of the United Nations (FAO) has been concerned with agricultural biosecurity, and has organized several meetings as brought out in the paper by Renu Swarup. Further, Gopi Ghosh (FAO Representative in India) mentions that biosecurity is a key concern of the FAO. Countries such as Australia, New Zealand, Norway and the United States have already set up institutions and made necessary legislations to deal with biosecurity.

Agricultural biosecurity is as diverse and complex as biology and needs to protect diverse organisms, including humans. The book covers biosecurity in natural resources – land, water and environment, integrated pest management, aquaculture, animal and human health. Authors have addressed biosecurity in their own areas of specialization. Renu Swarup has quoted the FAO definition of biosecurity. S. M. Virmani in crisp, jargon-free language states that the FAO biosecurity is aimed to protect: (1) agricultural systems, (2) human health and consumer confidence in agricultural production, and (3) the environment, and promote sustainable production of agricultural commodities. Panjab Singh has further elaborated biosecurity stating the ‘protection of animals, plants and human health against alien species including pests, pathogens and diseases, and protection of native species, including lower taxa and microorganisms, against contamination, hybridization, local eradication or extinction’.

The papers can be considered under two major heads: (i) Natural events, including accidental, unintentional introduction of invasive plant and animal species, and microbes. (ii) Deliberate introduction of live species either as bio-

logical weapons or in terrorist attacks. Both may involve either natural species or genetically engineered and more potent organisms. The natural events are considered first. Papers by J. S. Smara and P. D. Sharma, and S. M. Virmani deal with biosecurity in terms of saving land, water and environmental resources. Deteriorating natural resources have been mentioned as one of the reasons for stagnating crop productivity in the Indo-Gangetic plain and slowdown of agricultural growth in the last few years. The authors state that 120 mha land in the country is degraded due to increased soil erosion, waterlogging, salinity/alkalinity, soil acidity, etc. Virmani has raised pertinent questions: How to sustain 4% growth rate in agriculture? How to reverse the process of land and water resource degradation? How to minimize the negative impact of global warming? And how to improve environment quality in future? Both papers recommend extensive adoption of resource conserving technologies. V. Prakash has added the dimension of nutrition security. M. Mahadevappa describes the behaviour and management of an invasive species, *Parthenium hysterophorus* that was reported for the first time in the country from Pune in 1956 and has currently spread over a large area. Plant biosecurity, integrated pest management, and biosecurity in aquaculture are respectively covered in papers by R. K. Khetrapal and Kavita Gupta, T. P. Trivedi and S. Ayyapan *et al.* Plant and animal viruses have a high mutation rate that often alter their host range. Historical perspective of emerging viruses as the greatest challenge to biosecurity is addressed in the paper by B. Sesikera.

In order to prevent the entry of exotic insects and new pests, countries and states (e.g. California, USA) have adopted quarantine restrictions on agricultural commodities. Till recently, it was not possible to export Indian mangoes to USA. Even the mangoes produced in Hawaii could not be sent to the US mainland due to the presence of fruit flies endemic to Hawaii. Arun Sharma describes the control of such hazards through the use of radiation technology. H. K. Pradhan describes the different risk groups (RG) I–V, and bio-safety levels 1–4. RG-I is low individual and community risk; RG-II moderate individual and limited community risk; RG-III high individual and low community risk; RG-IV high individual and community risk and RG-V includes ani-

mal and human pathogens not present in the country. Mohan Kanda and P. K. Singh (National Disaster Management Authority) stress the need for national biosecurity measures in the fast changing era of liberalization, privatization and globalization. They conclude that most of the agencies in the national system have lost the ability to keep up with the rapid new developments, and point to the need of one-time catch-up exercise.

Bioweapons (BW) as weapons of mass destruction (WMD), bioterrorism (BT) and agro-terrorism (AT) are entirely different ball games from agricultural biosecurity. Biological warfare and terrorism is covered by D. Raghunath and AT by P. K. Shetty. WMD includes nuclear, biological and chemical weapons. BW require relatively simple technologies and equipment compared to the chemical and nuclear weapons. Further, using the recombinant-DNA technologies, innocuous microbes can be made to produce potent toxins. Therefore, they are especially attractive to the terrorists. Agro-terrorists can use viruses, bacteria, fungi and insects to damage crops and animals. Ricin obtained from castor beans, widely grown in the country for its oil, has been used in terror activities. Global analyses show mainly three types of terrorist activities: those fighting for religious or political reasons to negotiate better deals or release of their group members; mercenaries who would do anything for any group/religion/or country for money, and distressed individuals, in all societies, who at times, opt for random killing of innocent people to attract attention. It is relatively easy for such individuals or groups to opt for BT. However, since there is a time gap between the action and the damage, unlike in bomb explosions or shootings, the latter are more widely used. Both papers list several examples of BT using different types of disease-causing organisms. Just to cite a few instances closer to our society that are not well known – an Indian religious group in the US attempted to contaminate the salad bar of a local restaurant with *Salmonella* in 1984. The motive was to incapacitate the voters in a local election. Imagine, if a similar attempt was made during the recent vote of confidence in the Indian Parliament. In the early eighties, a Tamil militant group threatened to spread diseases in tea and rubber plantations in Sri Lanka. A disgruntled employee in Texas attempted

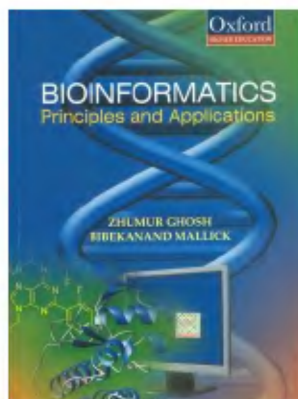
to contaminate muffins and donuts with *Shigella dysenteriae* cultures. Anthrax spores have been most widely used. A form of BT currently being practised by some environmental activists in destroying the field experiments, glass-houses and laboratories of public and private institutions engaged in genetic engineering experiments, is missing in the book. Recently, animal lovers have attacked scientists using animals in their experiments.

The important issue of dual-use technologies and products is briefly discussed; it is difficult to make such distinctions in biological sciences. I recall a personal experience: I had approved the import of agar for a plant tissue culture project in a country under UN sanctions. However, the same was not allowed by the higher authorities as agar-solidified media can be used to grow microbes for BW. Indian scientists in the past have faced similar problems regarding laboratory equipment from foreign suppliers.

Overall, the book brings out valuable biosecurity perspectives for the benefit of researchers in biological and agricultural sciences. I missed two things in this book; first an index and second, an action plan. Only one well-written paper deals with biological weapons. Certainly there is more information and preparedness in the country, though it may not be in public domain. Lastly, any organization is as good as the personnel manning it at different levels – not only the leadership that sets the goals. At a time when science is not attracting the best of the brains, and agriculture remains low on the list of professions for youngsters, it would not be easy to attract bright persons to work in a not-very-glamorous area of agriculture biosecurity and AT. The restrictions on publishing new findings may be another disincentive. Perhaps, some of the best molecular biologists/virologists/biochemists working in leading national research institutions can be invited to join the network. With their insight into the molecular mechanisms, devoting just 10% of their time towards BT and AT can bring critical inputs for rapid progress to a national cause.

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**Bioinformatics: Principles and Applications.** Zhemur Ghosh and Bibekanand Mallick. Oxford University Press, 1st Floor, YMCA Library Building, Jai Singh Road, New Delhi 110 001. 2008. 536 pp. Price: Rs 365.

#### Stew much

A duck once met a porcupine; they formed a corporation  
Which called itself a Porcuduck (a beastly conjugation!).  
A stork to a turtle said, 'Let's put my head upon your torso;  
We who are so pretty now, as Stortle would be more so!'  
The lizard with the parrot's head thought: taking to the chilli  
After years of eating worms is absolutely silly.  
A prancing goat – one wonders why – was driven by a need  
To bequeath its upper portion to a crawling centipede.  
The giraffe with grasshopper's limbs reflected: Why should I  
Go for walks in grassy fields, now that I can fly?  
The nice contented cow will doubtless get a frightful shock  
On finding that its lower limbs belong to a fighting cock  
It's obvious the Whalephant is not a happy notion:  
The head goes for the jungle, while the tail turns to the ocean  
The lion's lack of horns distressed him greatly, so  
He teamed up with a deer – now watch his antlers grow!

Translated by Satyajit Ray from a Bengali poem in *Abol Tabol* by Sukumar Ray.

I thought it will be good to quote the above poem by Sukumar Ray in this review, since one comes across more completely

irrelevant quotes for each chapter in this book. More seriously Sukumar Ray, though he published *Abol Tabol* in 1923, captures an aspect of the spirit of bioinformatics aptly – the ability to construct virtual reality and give the researcher a new perspective. Also, it is easy for purveyors, practitioners and dabblers in bioinformatics to slip from the sense to the 'non'sense. One can find examples of this from student essays to articles in high impact factor journals. It obviously also occurs in books, websites and reviews!

Bioinformatics has grown, and grown in many directions – from the early days of literature information access and sequence analysis to the current 'omics', systems biology and biodiversity applications. No doubt, it has made and will continue to make important contributions in the history of biological understanding of life. Bioinformatics has got integrated so much into biology that even hard-core 'traditional' biologists who called a crab a crab only when it was properly specimened and labelled, nowadays accept and look for the stories and relations that are decipherable from strings of symbols or expressions thereof.

A problem, if one may call it so, arises from the hype and hoopla that the spin doctors put on the ilks of bioinformatics and biotechnology. But that is a factor of our 'market-driven' times of education and research priorities where education is a commodity – the fancier the packaging, the more the takers. Thus, we saw an unprecedented rise in the number of colleges, universities and institutions offering courses of all hues using the new mantras in biology. Equally perplexed students, no doubt financially supported by their parents and well-wishers plunged into these courses, many times to the delight and benefit of those who reaped the dividends. Into all this of course, must come the textbooks which are the wherewithal of learning. The textbook scenario, akin to the courses, exploded at the onset of the 21st century. During the period 1999–2005, one saw a mushrooming of books on bioinformatics from outside and inside our country. Some were masterpieces, like *Bioinformatics – Sequence and Genome Analysis* by David Mount, and *Discovering Genomics, Proteomics and Bioinformatics* by A. Malcolm Cambell, and have gone on to their second editions. Also *Bioinformatics for Beginners* (called earlier 'For Dummies' but renamed for the sensitive Indian market!)