of groundwater to palaeochannels or buried river courses. Negligible modern recharge and over exploitation in recent times have led to the deterioration of groundwater quality in the Bhadka–Bheemda district.

Case studies of Arad and Jericho in arid, semi-arid regions by Issar highlight the role of groundwater availability consequent to climate changes in deciding the survival of cities. Global warm period and consequent spelled dryness in Arad, resulted in inhabitants dependent on a local perched horizon deserting the region. However due to availability of perennial spring fed by a regional aquifer from a large area of eastern Judean mountains, Jericho continued to flourish since prehistoric times. At Jericho, the transition from a socio-economic system of hunters and gatherers to that of farmers was enabled by technical innovation of irrigation. This study emphasizes the magnitude of the impact and its duration playing a decisive role apart from the society's ability to withstand vagaries of climate change that depend on the total resilience of its societal and natural subsystems.

Salgot and Torrens suggest groundwater recharge with reclaimed water to mitigate the shortages in southern European countries. While cautioning on the risk-related environmental impacts, they highlight the likely benefits such as improvement of reclaimed water quality, increased storage capacity, reduced evaporation losses, reduction in seawater intrusion, etc.

Baseline climate and different exposures to climate stimuli in different regions decide the vulnerability of humans to climate change apart from adaptive capacity of the population, their management skills and resource availability. The final chapter by Sukhija reviews adaptive methods for sustaining groundwater through droughts apart from suggesting adaptation strategies for sustaining groundwater resources, which include identifying deep aquifers resilient to droughts and artificial groundwater recharge through percolation ponds. However, identification of deep confined aquifers with large groundwater potential could be a challenging exercise.

Assessment of vulnerability and consequent risk to water resources due to climate-change impacts is necessary to work out proper adaptation and mitigation responses. It is necessary to adapt groundwater management accordingly and to consider the particular resilience of most larger aquifers as a buffer for climate change, considering the complexity of the linkage between climate change and groundwater. In this context, this book provides the information concerning the impacts of climate change on groundwater. This book could have included case studies from all continents than focusing mostly on European countries. Still it constitutes a good reference book for researchers across the globe. It portrays the 'state of science' with the comprehensive overview of the current insights and knowledge on possible impacts and associated technical and management challenges due to climate change through case studies. Furthermore, it also gives options for developing and safeguarding groundwater resources and the human benefits derived from them.

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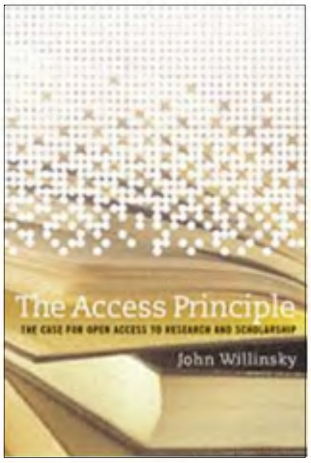

The Access Principle. The Case for Open Access to Research and Scholarship. John Willinsky. The MIT Press, Hayward Street, Cambridge, MA 02142-1493, USA. Paperback. 2006. xv + 287 pp. Price: US$ 16.95.

John Willinsky is the Khosla Family Professor of Education at Stanford University. A votary of the open access movement, his book, *The Access Principle* published in 2006 has won a number of awards for its scholarship.

At its heart is a simple idea, that 'a commitment to scholarly work carries with it the responsibility to circulate that work as widely as possible'. This is in part so that knowledge that is created can be disseminated in a manner that the largest numbers of people have unfettered access to it, but there is more to it than just that. . . .

The issues that Willinsky deals with have wider ramifications. For instance, who 'owns' knowledge? The scholar who creates it through research, or the funding agency that funded it directly or indirectly, or the commercial publishing house who owns the journal where the research was reported? And how best can it be used for public good, while ensuring that all involved parties do not go unrewarded or unrecognized?

The book is very timely: the digital revolution is upon us all in a way that demands that such issues be thought about afresh since the modes of preservation of information and the modes of dissemination of knowledge have changed radically in our lifetime. For one thing, most journals of any quality are now online. Furthermore, many of them are 'open access', namely the articles they carry can be viewed without a subscrip-

tion. However, the majority of academic journals have been in existence for a long time now and date back to the pre-digital era. The digitization of this legacy is a related issue, and the manner of the digitization and its consequent costs is relevant.

A case in point is the present journal. *Current Science* has been published since 1934, and today it is online and open access. However, chances are that you will read this review in print rather than online, since the manner in which *Current Science* is presented online is by offering pdf images of each page (or each article) in the journal. Earlier issues of the journal have now been scanned and can also be viewed, but typically they cannot be searched.

Other models of the digitization of scholarly content range from the Public Library of Science, PLoS, or BioMed Central, BMC, families of journals that are purely online and open access, the costs being entirely borne by the authors of each of the articles that have been accepted by the journal(s). These costs are, in turn, borne by the agencies that fund the research, and in this sense, it is only fair that publicly funded research should be openly and freely available.

But issues are more complex in an era of impact factors and journal citations. The most prestigious journals, at least in terms of their perceived rankings, like *Nature* and *Science* are neither open access nor are they purely digital. It will be a long time before their influence will wane, so it is important to understand the totality of the access problem.

Today it is common place that the majority of scholars in any part of the world access academic information primarily in an electronic manner, and not through the pages of a printed journal. This revolution is similar to that wrought by Gutenberg, who through the printed page freed humankind from the purely oral tradition by offering mass producible books that anyone (with enough money!) could obtain, keep, learn from, and use to advantage.

And it is the complex nature of this revolution that '*The Access Principle*' addresses through its extensive research. The 13 chapters of the book examine issues ranging from the history to what is copyright, the politics and the economics. Willinsky, like many of us, believes that openness is 'better' in an abstract way – at the end of the day its not clear from which quarter the fundamental advances are going to come, and so its best not to deny anyone the requisite opportunities. The more people who have access to knowledge, the more one can maximize the probability of any one of them using some part of it in a fundamental and future altering manner.

The first journals appeared only in the 1600s. The *Philosophical Transactions of the Royal Society* grew out of the publication of the correspondence between the members of the society thanks to the efforts and foresight of Oldenburg. Despite the reputation for secrecy that surrounds his name, one of the earliest articles was a letter from Newton on 'the theory of light and colours'. Newton appears to have held the opinion that public exposition of his research was both a duty and a privilege, and in that sense, scientific journals offered an intermediate space between the public book and the private letter.

But journals offer more than just exposure. The process of peer review, the validation, and with time, the prestige of publication – and the vanity – have all contributed to making the dissemination of science a fairly substantial business. And in the details of how this business is run lie some of the more contentious problems of the open access paradigm. Willinsky is quick to emphasize that open is not free – someone, somewhere has to invest in providing access. He lists 10 flavours of open access to underscore this point. For instance, scholars can post articles on their homepages, submit them to e-print archives, or pay a journal to allow open access to their articles. Journals, on the other hand, can subsidize access (as many Indian journals, notably those of the Indian Academy of Sciences, do), use their print versions to subsidize the online versions, allow delayed or partial open access, have a subsidy model in place, and so on. A cooperative movement such as JSTOR has played a very important role in developing tools to digitize old journals in a manner so as to make their content digitally searchable, and the access they allow is not free, but by having a flexible policy as regards revenue, they enable access in a significant manner.

The different chapters of the book are devoted to a variety of issues such as copyright and its consequences, the role of scholarly bodies and their publishing models and imperatives, the economics of open access, the role that this can play in development, and so on. The digital revolution holds within itself considerable promise. Universities, colleges and schools that did not build up physical libraries can, given enough resources, build up essentially a complete repository of the knowledge generated by humankind since whenever. Anecdotal evidence on this count is abundant and genuine, particularly in countries like India where the public investment in libraries is limited.

As a scholar who has devoted the better part of two decades to such matters, Willinsky argues the case for increased openness in scholarly publications with vigour and with wisdom, and without oversimplifying the issues at hand. The commitment to the cause is most evident in his chapter on Rights, where he proposes that access to knowledge is a fundamental human right, one that is closely related to the ability to defend other rights. The argument is tenuous but offers an interesting perspective on the ability of increased access to knowledge to have an impact beyond the areas envisioned by the creators of that knowledge. To some extent, the Right to Information Act in India has had a very similar effect – information on one aspect of public life can have consequences on other aspects.

In the end, the most compelling aspect of this book is the simplicity of the basic argument. Scholars should see that their work reaches the largest number of people and should make all efforts to ensure this. This is their dharma. Academic administrators should see that scholarly work is supported in a manner so as to have this wide reach. And this is their karma. In the long run, inclusivity is clearly more in the public interest than exclusion in any form, especially in a globalized world, and the Open Access movement can help us along this path.

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