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ENVIRONMENTAL AND ECOLOGICAL STATISTICS: AN INNOVATIVE CROSS-DISCIPLINARY JOURNAL FOR STATISTICS, ECOLOGY, AND THE ENVIRONMENT

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Abstract. This article is especially put together to provide an informative introduction to the relatively new and innovative cross-disciplinary journal for statistics, ecology, and the environment. Information on the editorial group is given. So also instructions for the authors. Contents of the first eight issues comprising the first two volumes for 1994 and 1995 are spelled out. The headquarters of the journal published by Chapman & Hall are located at the Penn State Center for Statistical Ecology and Environmental Statistics with Professor G. P. Patil as the Editor-in-Chief. A convenient subscription order form follows.

Launching the Journal

It is exciting – Environmental statistics is in a take-off stage both for reasons of societal challenge and statistical opportunity. It is becoming clear that environmental statistics is demanding more and more of non-traditional statistical approaches. This is partly because environmental studies involve space, time, and innovative environmental sampling and monitoring. Also, environmental statistics must satisfy environmental policy research in addition to disciplinary and interdisciplinary environmental research.

Albert Gore, Jr. (1991), then the U.S Senator and now the Vice-President, put it very succinctly in his address on 'Environmental Statistics: A Policymaker's Perspective' to a recent Conference on Statistics and the Environment:

> Statisticians have an important role in assisting our country and our global civilization in the effort to understand the dramatic changes that are underway in the environment....There is so much information. We need help to navigate through it....We have silos of data rotting, so to speak – sometimes literally – that co-exist with the most massive hunger for understanding about the nature of these problems and how to solve them. We really do need help in getting at that data and extracting the important patterns that can lead to insight and understanding – and use that understanding first of all to arrive at a consensus of why it's important to act and then to design the specific responses that are greatly needed.

It is insightful when Phillip Ross (1991), the Chief Statistician of the United States Environmental Protection Agency says:

> And, in the environmental area, most of the problems, at least in a regulatory context, that come up need immediate decisions. We are often asked to come in after the information has been collected and the analysis is not quite accomplished, and asked to make some sense of it. This emphasizes a need to recognize that environmental statistics is a discipline, an area which really needs to be recognized, to help improve the kinds of environmental decisions we can make in concert with the management.

In this connection, it is also important to make a special note of the current thrust on environmental accounting and statistics. As Peter Bartelmus (1992) of the Environment and Energy Statistics Branch of the Statistical Division of the United Nations puts it:

> The objective of sustainable development is to integrate environmental concerns with mainstream socio-economic policies. Integrated policies need to be supported by integrated data. Integrative frameworks for the different statistical systems in the fields of economy, environment and population would facilitate the provision of comparable data for the analysis of integrated development.

And, we need to be aware of the contemporary context when it comes to implementing statistical ecology initiatives to cope with global resource impacts. As Hennemuth and Patil (1983) have put it:

> Our living resources are reasonably well described, and their value to our life support is generally well recognized. However, the need for conservation and management often is lost in the shambles of adversarial proceedings. Science generally becomes part

> of the debate, and often enough the scapegoat. It seems far easier to use science to obfuscate rather than clarify. We scientists can take credit for studies which help define the productivity and value of our natural resources, but we must also accept some blame for being less than helpful in the public decision process. As ecologists, statisticians, environmental scientists, decision makers and managers, we now need to stand forth together to clearly define the issues and chart ways to achieve the related goals of resource conservation and environmental management.

Finally, it is instructive to recall C. R. Rao (1994), the famous statistical pioneer, from his recent keynote address to the Seventh Annual Conference on Statistics of the United States Environmental Protection Agency:

> Statistical methods were initially developed for use in biology, demography and behavioral sciences, and later in business and quality control in industrial production. While the basic methodology of estimation, testing of hypotheses and decision making is common to all areas, there are special techniques developed to answer specific questions in each area. Environmental statistics is a relatively new subject and as in other new areas of application there will be a need to develop special statistical techniques for use in environmental studies.

Largely in response to spatial, temporal, non-identical, and non-independent situations involving sampling, assessment, and decision making for both policy and research, environmental statistics is already a subject area by itself. And because of the current environmental and ecological crisis and because of the more and more instrumental role that statistics has begun to play, there is room for several publication outlets and experiments. *Environmental and Ecological Statistics* is one such experiment. I very much hope that it offers a joyous and fruitful experience to all of us interested and involved.

The emphasis of the *Environmental and Ecological Statistics* is expected to be on statistics, ecology, and environment. It is expected to be cross-disciplinary, where environment-related disciplines will communicate with each other. A fine mix of Editorial Group members and reviewers will be encouraged to have publishable and constructive discussions in the Journal rather than to produce routinely anonymous referee's reports. This is expected to help cross-disciplinary content and dialogue. Since the Journal is to be truly cross-disciplinary, it needs an unusually large and broad editorial group. Response has been great.

Gameplan

How do we accomplish our goal that the Journal is cross-disciplinary, prestigious, and relevant? One approach can be to encourage simultaneous appearance of cross-disciplinary discussion. Such an approach may help 'each contribution with the discussion' become cross-disciplinary, prestiguous, and relevant. We can ask each author also to provide a brief cross-disciplinary biographical sketch.

Thus, *Environmental and Ecological Statistics* will publish papers on practical applications of statistics and related quantitative methods to environmental sciences addressing contemporary environmental issues. Emphasis will be on applied mathematical statistics, statistical methodology, and data interpretation and improvement for future use to advance statistics for environment, ecology and environmental health, and to advance environmental theory and practice using valid statistics.

Besides clarity of exposition, a single most important criterion for publication will be the appropriateness of the statistical method to the particular environmental problem. The Journal will cover all aspects of the collection, analysis, presentation, and interpretation of environmental data for research, policy, and regulation. The Journal will be a forum for communication for a broad community of scholars, field workers, and policy makers. The Journal will be cross-disciplinary within the context of contemporary environmental issues and the associated statistical tools, concepts, and methods.

The Journal will broadly cover theory and methods, case studies and applications, environmental change and statistical ecology, environmental health statistics and stochastics, and similar areas. Special features include invited discussion papers; research communications; technical notes and consultation corner; mini-reviews; letters to the editor; news, views, and announcements; employment opportunities; hardware and software; data management; etc. The Editor-in-Chief will be assisted by International Advisory Board, Editorial Board, Associate Editors, Editorial Collaborators, Book Review Editor with Associate Editors, Hardware and Software Editor, Data Sets Banking and Management Editor, Managing Editor, and Editorial Secretary. The Editor-in-Chief will also assume duties of special issues, news, views, and invited discussion papers.

Initially, *Environmental and Ecological Statistics* is not proposed to be a journal of any one professional society. This is primarily because the Journal is expected to reach a rather broad community involved in both a variety of environmental situations and the implicit statistical issues and the solutions.

The Journal is scheduled to be a part of the Series in Environmental and Ecological Statistics to be published by Chapman and Hall, a well-known publishing house based in London and New York. Chapman & Hall has maximal outreach in view, particularly since statistics has become a societal instrument to deal with environmental and ecological crisis. Therefore, the publishing house has decided on subscription rates that are comparable with most societal journal publications.

A Sampling of the Response

How does the gameplan above sound? A sampling of the response follows. It would be nice to hear from you also.

- This is an appropriate time to start a new Journal, which can provide an important service to the rapidly growing field of environmental statistics.
- This is a tremendously important endeavor. Perhaps with better statistics in environmental studies, we can generate better data and save our country a lot of money!
- I am very supportive of the creation of a journal of this type. Such an endeavor will not only fill a much needed gap in the scientific literature, but will also serve to bring together scientists with common interests in a very important area.
- This looks like an exciting new venture. Texts for graduate statistics students will be fine to introduce them to applications in the environmental area. However, a scientist working for a government agency or private company needs something quite different. These new initiatives seem very worthwhile and I am delighted to see the subject taking off at a fast rate.
- This is a field that is increasingly recognized in our profession and that will be very much in the public eye in the nineties. A new journal in this field represents an exciting adventure.
- I note especially that the Journal is not proposed as a journal of any one particular society. I think this is important as it underscores the cross-disciplinary nature of environmental research.
- I am very enthusiastic about the fields of environmental statistics and ecological geostatistics and would be honored to be an associate editor. I have discussed this with my administrators and they are supportive.
- I am looking forward to the considerable challenge in creating a prestigious cross-disciplinary journal. Unfortunately, prevailing attitudes in science make prestigious and cross-disciplinary seem like contradictory goals.
- Will the publisher price this journal low enough that individuals can consider subscribing to it? Institutional and personal library budgets are tight. A low subscription price may make the difference between success and failure.
- The new Journal meets a real and immediate need. It would be most beneficial to the scientific community if the scope of the journal could be expanded to include new graphical analyses, advances in the field of scientific data visualization, and new developments in the field of environmental data-information management.
- I would like to accept your invitation. I feel I can make a significant contribution to the Journal and help make it an outstanding example of applied statistics.
- It is a great honor and privilege to me that you invited me to serve. I gratefully accept this invitation and anticipate working together on this highly important and challenging initiative.
- I accept your kind invitation; with the Silver Jubilee of Statistical Ecology at the Sixth International Congress of Ecology coming up, the level of enthusiasm in this area of statistics and quantitative methods is too much to pass up. Besides, it will give us an opportunity to work together, something I am really looking forward to.
- I was very pleased to learn about your efforts in developing publications and volumes in the field of environmental and ecological statistics. This is a much needed resource for the further development of statistical research in the increasingly important area of the environment. I am sure this will be a most successful publication.
- Congratulations for having succeeded to initiate such a series. Environmental and ecological statistics is indeed an important and specific enough subject to deserve a specific publication series under your distinguished guidance.
- You are still as active and innovative in the field of statistical ecology and environmental statistics as ever!

A Call for You to Participate

You are invited to participate in this exciting forum. It is collectively ours. We can shape it together, and we can enjoy it together. It can be truly rewarding and fruitful indeed. It would be a timely synergism in the cause of society, environment, and statistics. Please let me know. I look forward to hearing from you.

You may also wish to participate in a broader forum of which the journal, *Environmental and Ecological Statistics*, is a significant part. Chapman and Hall has initiated a special Series in Environmental and Ecological Statistics, primarily designed to help accomplish the needed knowledge transfer and outreach. The Series will make plans and publish monographs and textbooks, modules and manuals, handbooks, and advances and edited volumes. As coordinating editor, I invite you to participate in one capacity or the other as editors, co-editors, authors, and co-authors in this equally exciting forum. I look forward to hearing from you and to working with you.

Editorial Group

Editorial Collaborators

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Contents of the First Two Volumes

The Journal has been fortunate to have begun well and have a good start. In what follows, we provide the overview of the balance and the mix of the papers published so far with a listing of the contents of the first eight issues comprising the first two volumes.

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Notes for Authors

1. Submission of Papers

Five copies of the paper should be sent to the Editor-in-Chief for review purposes. These should be typed double-spaced on one side of A4 paper with large left and right margins. Whenever possible, authors are encouraged to submit final versions of their papers on IBM diskette in LaTex format (preferred) or in ASCII format.

The journal makes no page charges. Twenty-five offprints of each paper will be provided free-of-charge to the corresponding author. Additional copies may be purchased from the Publisher on an offprint form which will be provided by the Publisher with galley proofs.

Each article will provide a short biographical sketch of the author(s). These should be submitted on a separate page. The sketches may be five to ten lines in length and should emphasize cross-disciplinary highlights relating to statistics and the environment.

2. Format of Papers

Footnotes (other than the author's footnote) should not be used anywhere in the paper. The author's footnote should be submitted on a separate page and should include a full mailing address for each author as well as any funding sources, acknowledgements, etc.

The paper should be divided into numbered sections with an 'Introduction' as the first section. Subsections may be used and should be numbered as 1.1, 1.2, etc. The use of sub-subsections is discouraged, except in very long papers. When

sub-subsections are used, they should be numbered as 1.1.1, 1.1.2, etc.

Figures, tables, and cross-referenced formulae should be numbered consecutively throughout the paper using arabic numerals. Please do not number items separately within sections. Equation numbers should appear on the right-hand side. Avoid numbering formulae that are not referred to.

Boldface should generally be used for vectors and matrices.

The order of material in the paper should be as follows: Title; Authors' names; Abstract; Keywords (in alphabetical order); Numbered Sections; References; Appendices.

Words and phrases appearing in the title of the paper should not be repeated in the list of keywords. Multiple appendices may be identified as Appendix A, Appendix B, etc.

3. Figures and Tables

Figures and tables should appear on separate pages at the end of the manuscript. Please indicate an appropriate insertion point within the body of the manuscript.

Authors are responsible for submitting camera-ready copy of all figures when the paper is accepted for publication. Colour reproduction is charged to the author.

If data are used in the paper, then the data set should also be given in the paper or, if this is impractical, readers should be advised of how the data may be obtained. Public availability of data is ordinarily a requirement of publication; however, the editors may waive this requirement in appropriate circumstances.

Simulated or artificial data sets should be clearly identified as such.

4. Reference Style

Refrences should be listed in alphabetical order at the end of the paper. Citations should be in the following format:

> Jones and Smith (1984, p. 106) claim that ... ... as is well-known (Archerson, 1980; Jones and Smith, 1986a,b; Williams, 1990, 1992).

Long lists of citations should appear in chronological order. Use the *et al.* if a citation involves more than three authors. References to books almost always require a page, section, or chapter number.

Names of journals must be given in full without abbreviations. Please adhere closely to the following format in the list of references.

Billiam, A. T. (1986). Effect of surface runoff on water quality measurements. Journal of Environmental Science, 84, 161-165.

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U. S. EPA (1989) Methods for evaluating the attainment of cleanup standards. Volume 1: Soils and solid media. Statistical Policy Branch, U. S. Environmental Protection Agency, 401 M Street SW, Washington, DC 20460.

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