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**Spatial and Temporal Patterns of Biotic Exchanges of CO₂ Between
the Atmosphere and Tropical Landscapes and Their role in the
Global Carbon Balance.**

**John F. Richards and Elizabeth P. Flint
Duke University**

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Progress Report

Since mid-September we have been engaged in final revision of the data base for South and Southeast Asia. In October we revised our second chapter for the forthcoming volume Effects of Land Use Change on Atmospheric Carbon Dioxide Concentrations, edited by Virginia Dale. "Trends in Carbon Content of Vegetation in South and Southeast Asia Associated with Changes in Land Use", in response to a second round of reviews. Both this chapter and "A Century of Land Use Change in South and Southeast Asia" (submitted in revised form in July) are have been accepted and are now in the hands of the technical editor. Our time series of land use data and carbon content estimates for live vegetation in 93 zones comprising thirteen Asian nations at four dates was finalized in the course of manuscript revision. We sent machine-readable copies of the spreadsheets containing tabular data for Southeast Asia to CDIAC in October, and the following month delivered the South Asian data. At the same time, we sent these files to the research groups of Sandra Brown and Charlie Hall, who have entered this information in their geographic information systems, and also to Skee Houghton.

The chapters in the Springer Verlag volume will be available in their entirety through CDIAC by the end of this calendar

year--or about the same time the volume is in print. In October we sent Lotus spreadsheets containing tabular data on land-use changes and carbon content of live vegetation for each ecological zone and nation in Southeast Asia to CDIAC. Within a month we sent similar data for South Asia. Accompanying these files were the two draft chapters and our most recent publications. Simultaneously we sent these files to Sandra Brown, Charles Hall, and Skee Houghton. Elizabeth Flint has been actively sharing data and insights with Sandra Brown in particular in order to generate compatible biomass estimates for forests in these two regions.

After Tom Boden and Richard Daniels, the staff person assigned to our data base, reviewed these materials, we discussed the best means of constructing the data package. Our first decision, agreed jointly, was that the data set would be made available in three forms: flat ASCII files, ARC/INFO files, and the original Lotus Spreadsheet files.

The final set of files to be contained within the numeric data package include the following:

- 93 Lotus ecological zone spreadsheets (land-use and carbon)
- 13 Lotus country total spreadsheets
- 1 Flat ASCII data file with land use data for all 93 ecological zones
- 1 Flat ASCII data file with land use data for all 13 countries
- 1 Flat ASCII data file with C/ha for each land-use type, all

93 ecological zones

1 Flat ASCII data file with C/ha for each land use type, all
13 countries

1 Flat ASCII data file with Mg/C for each land use type all
93 ecological zones.

1 Flat ASCII data file with Mg/C for each land use type all
13 countries.

Additional ARC/INFO files will contain digitized outlines of
each nation and ecological zone within the data base.

In the second important decision, we agreed, at the request
of Tom Boden and Richard Daniels of CDIAC, to make a selected set
of back-up Lotus data files available for each of the final
ecological zones and nations. This is especially important bec-
ause of the complexity and scale of our research and the widely
varying sources for our land-use and carbon estimates. The back-
up data files are to be listed in the published descriptions of
the data set and to be available upon request for those who
require further detail, citations, or validation. The actual
files are to be housed in the archives at CDIAC and will be
released with our permission. The set of back-up files for each
ecological zone has been placed within a logical structure and
sequential listing. Citations for documentary sources are
included within each file.

This decision compelled us to review over three thousand
Lotus-123 spreadsheets containing numeric data and documentation
held in our current files. Since early January Elizabeth Flint

has been culling, revising, summarizing, and linking these files. She has reduced the total number of back-up spreadsheets to approximately 1650 files, (totalling over 44 megabytes of data), and has sent these forward to Oak Ridge. This has been an extremely time-consuming and labor-intensive, but necessary process. With this back-up data, social scientists and ecologists can have a clear idea of how the estimates were constructed for each date, land-use category, and ecological zone or country.

Based upon his reading of the back-up files, Richard Daniels has devised a 0 to 10 set of accuracy flags that will be inserted for each date upon each of the final tables. Each accuracy flag number offers the user a nicely-calibrated and defined sense of the quality of the data for that date. Our next task is to apply this scale and place the appropriate accuracy ratings on each of the final spreadsheets. Elizabeth Flint will be meeting with Daniels at Oak Ridge in late March. During the same trip, she will present a paper entitled "A Coordinated Research Program on Carbon Fluxes in the Tropics. II: Changes in Land Use from 1880-1980 in South and Southeast Asia", as part of a three-paper series also including Sandra Brown and Charlie Hall. These papers will be presented as part of the session on tropical landscapes of the Eighth Annual U.S. Landscape Ecology Symposium.

Finally, we are supplying estimates of land-use and carbon for 1970 and 1990 to supplement the most recent data for 1950 and 1980. Elizabeth has been compiling these estimates using data

already available in our current files. We expect to encounter further demands on our time and energy as CDIAC completes its checking and analysis of the numeric data base. We are pleased with the careful and exhaustive approach taken by CDIAC and are anxious to see publication of the data base by the end of 1993.

Future Work

We are now finalizing our land use estimates for South and Southeast Asia as of 1970 and 1990, which are to be used by Inez Fung and Sandra Brown in the large joint paper now underway. At Sandra Brown's request, we just have implemented improvements in our categorization of wetlands for our 13-nation data set. These changes in methodology will be maintained in the future.

We will proceed with compiling land use data on Latin America and the Caribbean as planned. We expect that we will be much more efficient in the compilation and arrangement of data after revising the files for CDIAC.

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