



Urbanization and Global Environmental Change

AN IHDP CORE PROJECT



Sponsored by:

Forecasting Urban Land-Use Change A NASA-Sponsored UGEC Workshop

Organizers:

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Aims and Scope

The **International Human Dimensions Programme on Global Environmental Change (IHDP) Urbanization and Global Environmental Change project (UGEC)** is organizing a workshop focused on forecasting urban land-use change and Earth system responses.

The purpose of the workshop is fourfold:

- (1)** to present and compare methodological advances in forecasting urban land-use change with satellite data;
- (2)** to characterize impacts of urban land-use change on the Earth system (e.g., loss of agricultural land, habitat fragmentation, carbon sequestration and emissions);
- (3)** to assess the utility of current models and forecasts of urban land-use change for land managers, urban planners, policymakers, conservation agencies and other stakeholders who have an interest in identifying the likely location, size and shape of future urban growth;
- (4)** to facilitate a discussion among users and developers of models in identifying gaps in knowledge, methodologies, and typology of case studies.

One output of the workshop will be a paper on state-of-the-art methodologies and case studies of forecasts of urban land-use change, with focus on urban centers in middle and low income countries.

Workshop Schedule

Workshop Dates: April 1-3, 2011

Location: Arizona State University, Tempe, Arizona, USA

The workshop will be held in parallel with an NSF-sponsored workshop, "Advances in Urban Remote Sensing," co-organized by Elizabeth Wentz (Arizona State) and Maik Netzband (Ruhr-University Bochum, Germany).

Morning sessions will be held independently within the urban remote sensing and urban forecasting workshops. The afternoon sessions will be held jointly between the two groups.

Workshop Participants

Approximately 20 participants are invited to meet for 2-3 days. Participants commit to participating in the entire workshop. The themes of the workshop will be examined from different disciplinary perspectives (e.g., geography, urban planning, remote sensing, economics, conservation, and landscape ecology) and methodological approaches (e.g., remote sensing, statistical and econometric modeling, system dynamics modeling, agent-based models). Workshop participants will include urban growth modelers, urban planners, users of urban growth models, and other stakeholders.

Workshop Topics

Background papers written by selected participants will present overviews of the current state of knowledge on the themes and will serve as the basis for the discussions. Workshop discussions will be organized around 3 broad policy-relevant themes: data, spatial and temporal scales, and applications. Participants will receive the papers in advance and be asked to submit comments and questions. Minimal presentations will be given at the workshop. During the workshop, participants will discuss research questions and gaps raised by the background papers. At the conclusion of the workshop, the group will produce a report that documents the workshop discussion.

Questions to be discussed in the background papers and during the workshop include: What do we know about future urban land-use change and how does it relate to other land uses and land covers? What is the policy relevance of urban growth models; do they provide solutions to problems associated with rapid urbanization in the face of global environmental change? Are there steps to be taken that make urban growth forecasting more policy relevant?

Workshop Rationale

Developing nations are faced with projections of rapid urbanization (United Nations, 2004). Between 2000 and 2030, developed countries will contribute only approximately 12% of their current urban population to the increase of global urban population. Urban areas of the less developed countries will absorb nearly all growth of the world's total population. By 2030, Asia and Africa will each have more urban dwellers than any other major area, with Asia alone accounting for over half of the urban population of the world (which now is one of the least urbanized regions in the world). 20 out of 25 highest estimated average annual urban population rates of change between 2000 and 2030 are projected for African nations (United Nations, 2004). For example, countries such as Ethiopia, the Congo, Pakistan, Bangladesh, Nigeria, Vietnam, Indonesia, Saudi Arabia, India, Egypt, Philippines and China had significantly high existing urban population at the turn of the century of above 10 million urban residents and around or higher than average (2.3%) estimated annual urban population rate of change for that period.

While estimates regarding the growth of urban population are available, we do not know how they will compare to the extent, rate of growth and the pattern of physical urban expansion. Assuming similar urban expansion patterns to those experienced to date, the amount of urban land could double or easily more than double, factoring in rising incomes (Seto and Fragkias, 2005). The comparative importance of extent, rate of change or pattern within the urbanization and global environmental change framework is great; distinct spatial manifestations of urban growth have the capacity to drive the occurrence and intensity of environmental effects. From a population growth perspective, negative environmental effects of cities with larger populations are potentially severe but rates of change of urban population are weakly correlated with environmental problems (United Nations, 2001). The urban physical development perspective, while considering the importance of extent and rates of growth of urban space, emphasizes the significance of pattern in the severity of environmental effects of urban growth; the effects of different urban forms though is still understudied and less understood and have been defined as a research priority by the UGEC project.