UNDERSTANDING RISK AND ADAPTING TO THE FUTURE: A LANDSCAPE APPROACH

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Humanity's actions have in part lead to appreciable climate change, which has quantifiable consequences for our oceans, cities, food supply, and species-including humanity itself. We're on a collision course with earth's changing climate, and our best chance for adapting to the inevitable is to **act now**. But before we can adapt, we must first understand.

There is hope. Geographic Information Systems (GIS) empower researchers and policymakers with the ability to integrate observations, measurements, and analyses by using geography as a unifying framework across dimensions. Now, with the advent of web GIS, the cloud broadens access to content and analytical tools which promise to catapult the global community's understanding of the complex relationships between changing landscapes, climate, and ourselves.

THE GEOGRAPHIC APPROACH

Climate change and its effects are fundamentally geographic challenges that require a geographic approach, where we endeavor to understand the constraints a changing climate imposes upon the terrestrial and aquatic systems we depend. Geography is a powerful multidimensional framework enabling scientists to explore data layers, discover emergent new patterns, and test alternative scenarios; so we can understand the risks, develop proactive adaptation strategies, and increase society's long-term resilience to climate change through policy modification. Esri is committed to providing tools to accelerate the global community's ability to access content, do analyses and share results.

Not only does GIS power analysis, informing citizens and policymakers on how landscapes are responding to change, the GIS platform also provides a framework for multidisciplinary collaboration throughout the phases of development. From design and implementation, to monitoring and evaluation, it integrates information in a way that promotes dialogue between stakeholders resulting in more sustainable outcomes.

UNDERSTANDING OUR FOOD SYSTEMS

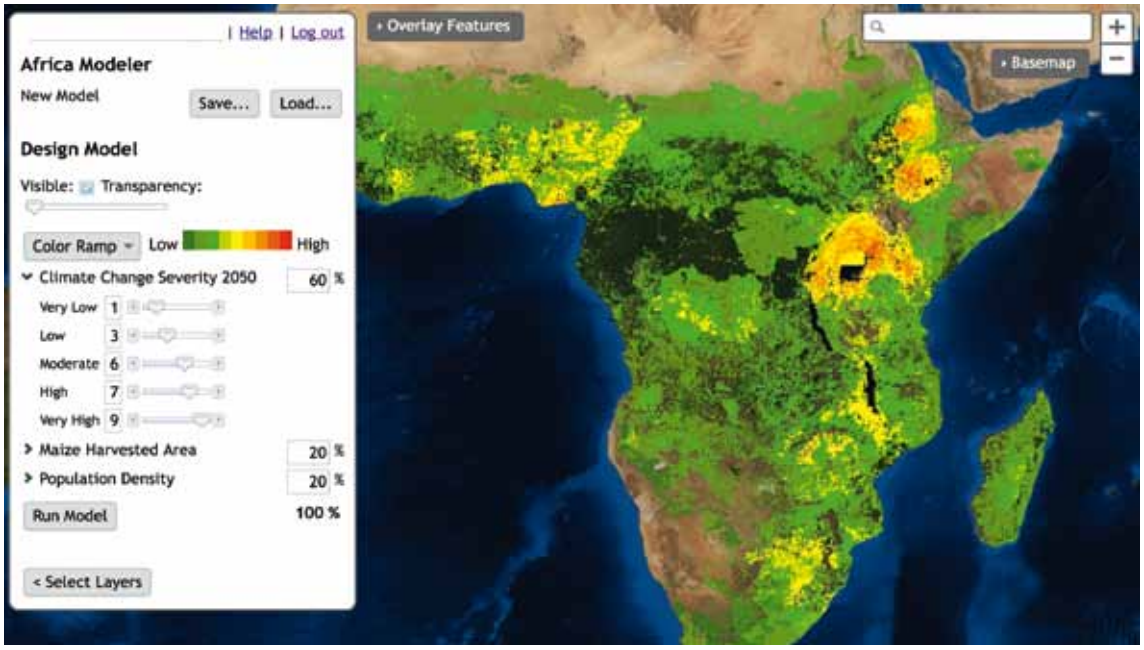
Today the global population is 7 billion, but by most estimates, it will increase to 9 billion by 2050. *Where* must we optimise use of resources? *Where* must we adopt climate-smart practices in order to meet the growing demand for food across changing agricultural landscapes?

The size and scope of these questions requires a new, integrative, landscape-based approach to development where stakeholders can explore layers and models that shed light on the ways in which layers interact with one another.

For the first time, thanks to advances in cloud and server technology, non-GIS users can explore these complex interactions by running complex scenarios such as this 'on the fly'. 'Show me areas with high maize production in agricultural land, with high population density, in areas most at risk to climate change in 2050.'

By serving these layers as live image services, that is, as actual data as opposed to pictures of data, citizens, scientists, and policymakers can ask questions of landscape layers that honour the complexity of the data.

In collaboration with many of our partners, a suite of new landscape data layers and modeling tools are being developed and put in the hands of researchers and planners, enabling the discovery of emergent patterns to inform agricultural practices to reduce hunger, increase food production and improve climate resilience.



African Landscape Modeler - Analysing areas of high maize production with a dependent population, which is prone to climate change.

Now more than ever, GIS is poised to support researchers and farmers with tools to understand and respond to changing agricultural patterns. Giving the increasing pressures caused by climate change, land degradation, population and demand for food, its role in informing solutions is likely to become even more critical into the future.

UNDERSTANDING OUR CITIES

By 2050, estimates suggest the majority of humanity will live in cities--many in coastal areas--and they will need to react to new climate realities. Cities can learn a lot from each other, but until recently this was difficult. Data about our cities is collected at different scales, and in different ways, making comparative analysis awkward, and leveraging what works slow to catch on.

Enter the **Urban Observatory**. This first-of-its kind virtual experience takes advantage of GIS technology as an integrative platform that standardises scale and representation of earth's cities, so as to visually compare and contrast detailed information from one to another. The result: a greater understanding of city life in the years to come.

This type of research and exposure can help cities understand what strategies work, in order to repeat and expand upon them, and what policies to avoid. Lessons learned through the Urban Observatory are likely to impact trillions of dollars in future societal development costs.

THREE THINGS YOU CAN DO TODAY

1. **Contribute:**
   Collect information locally and share knowledge globally

2. **Leverage:**
   Utilise the strong foundation of existing geographic information systems and data

3. **Collaborate:**
   Increase the participation of all stakeholders in decision-making and implementation

For more details, please visit http://esriurl.com/cop19 ■

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