## **Guide on deploying the LUTO model on**

## **a High-performance computing (HPC) node**

Why deploy LUTO on an HPC?

Running LUTO (Land-Use Trade-Offs) requires 50G to 200G, depending on the spatial gratuity, of memory, and 10 to 30 CPU threads to parallelize the parameter searching and output writing. To answer the many “what-if” questions, we often want to test LUTO with different scenario settings such as climate change, demand trajectory, and cost and revenue. Intensive computation and, oftentimes, multiple scenarios exploiting nature demand an efficient way to run LUTO and deploy it on HPC is a proper choice.

Knowledge requirement.

Although we have tried our best to wrap the deploying process into several simple commands, it is still suggested that users have a basic level of understanding of Python and Linux commands.

* For the Python part, users are assumed to know what packages are, understand how to create a Python environment with [Conda](https://conda.io/projects/conda/en/latest/user-guide/install/index.html), and be able to type commands using iPython.
* For the Linux part, users are assumed to understand the concept of relative and absolute paths, know how to change directories, and use bash to execute a script.
* For the code management part, users are assumed to have the knowledge of cloning (i.e., downloading) the LUTO model and updating the code from [GitHub](https://github.com/land-use-trade-offs/luto-2.0).

The minimal deploying case.

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| No. | Operation | One-time operation? |
| 1 | Install the Gurobi TM optimizer | Yes |
| 2 | Login to the HPC | No |
| 3 | Clone LUTO from GitHub | Yes |
| 4 | Download and convert input data | Yes |
| 5 | Install the conda management app | Yes |
| 6 | Create the Python environment | Yes |
| 7 | Generate setting file | No |
| 8 | Submit tasks to HPC | No |