



Analytics for a Better World: Maximizing Mission-Driven Impact with Optimization

Analytics for a Better World leverages big data sources to analyze humanitarian facility locations and identify ways to maximize coverage while minimizing costs.

Analytics for a Better World (ABW) is a community of academic and industry data scientists who apply their skills to the world's biggest challenges. They believe that partnerships powered by data analytics—and especially mathematical optimization—are essential for achieving the UN's Sustainable Development Goals.

ABW works with mission-driven organizations to rapidly compile disparate datasets and identify the optimal path forward while accounting for accessibility and climate change. Gurobi has been a critical tool in their partnerships with the World Bank and other governments and nonprofits.

As Parvathy Krishnakumari, former Chief Technology Officer at ABW and now Data Science & Artificial Intelligence Consultant for the World Bank, explains, "Datasets in the areas we service are often far from complete.

There isn't one single source of data on all the existing health centers in a country, for example. Or, sometimes not all human settlements in the area are known.

What data there is, might be outdated or unstructured. PISA starts on the assumption that the ideal dataset won't be available and works out the best possible solution with what's there."

Crucially, PISA aligns with the [Nine Principles for Digital Development](#), which center the needs of community members, aim to address the power imbalances in digital development, and mitigate potential harm caused by data compilation.

Optimization in a Data-Scarce Environment: The Public Infrastructure Service Access Toolkit (PISA)

ABW focuses its work in low-and-middle-income countries. At times, data are fractured or incomplete, and projects frequently begin with creating new datasets from scratch. For example, the World Bank wanted to know the [optimal placement of healthcare facilities in Timor-Leste](#) to maximize the number of people living within five kilometers of a primary health center. ABW used its open-source [Public Infrastructure Service Access \(PISA\)](#) toolkit to compile data on current center locations, road networks, population density, and flood and rain patterns to develop an optimal distribution map that would maximize access under both normal and disaster conditions. This analysis has helped the World Bank and the government of Timor-Leste make informed choices as they invest in the country's healthcare infrastructure.

The PISA toolkit is the secret to ABW's success, allowing practitioners to replicate and scale analyses in otherwise fragmented environments.

Gurobi Gives Back

The PISA toolkit is powerful, but it needed a solver to run its optimization models. For this, ABW turned to Gurobi.

"I had already used Gurobi in my teaching, applications, and research. When we started ABW, I contacted Gurobi to ask if they would like to become a sponsor of ABW, allowing us to use their solver, and they kindly agreed," shared Dick den Hertog, Science to Impact Director at ABW.

Gurobi supports ABW's work through the [Gurobi Gives Back](#) program. This program grants free, full-featured Gurobi solver licenses to registered nonprofits that work to advance the UN's Sustainable Development Goals.

Once the PISA toolkit has developed the best possible dataset, it uses Gurobi's solver to identify the optimal solution, frequently with mixed-integer linear programming.

Industry	Nonprofit and NGO
Location	Global
Use Cases	Location Planning
Website	analyticsbetterworld.org

Analytics for a Better World is a nonprofit of leading research and industry data science experts dedicated to bridging the gap to impact, unlocking the potential of AI and analytics to address the world's biggest challenges.

Results

- ◆ Expanded healthcare access to hundreds of thousands of people, increasing accessibility from 70% to 80% in Timor Leste
- ◆ Ability to identify infrastructure that is vulnerable to climate risks and model for accessibility during anticipated climate disasters



“For any NGOs that are considering joining forces with Gurobi, I would highly recommend it. It’s the best mixed-integer linear programming solver out there.”



Dick den Hertog,
Science to Impact Director

Optimizing for Climate Resilience

From roads and energy grids to schools and healthcare centers, governments worldwide are working to build and modernize critical infrastructure while investing in their futures. In lower- and middle-income countries (LMICs), these efforts are often constrained by especially tight budgets and heightened vulnerability to climate-related disruptions—but these pressures are increasingly felt everywhere. As climate risks intensify globally, infrastructure spending decisions must aim to deliver the greatest impact while also accounting for a changing climate.

The PISA toolkit, powered by Gurobi, allows ABW and its partners to identify existing infrastructure that is vulnerable to climate risks, and model for accessibility during anticipated climate disasters. In addition, Gurobi integrates and tests scalable heuristic models that identify opportunities to strengthen climate resilience, mitigate potential harms, and invest durable solutions.

In addition to building climate resilience, ABW’s work also supports the planet’s recovery. For example, together with Jean Pauphilet and Baizhi Song, both from London Business School, they developed algorithms that plan ship routes [to maximize ocean plastic removal](#).

While these algorithms did not require a solver, ABW needed to test the quality of its heuristics by comparing its results with a mixed-integer optimization model.

This model will equip nonprofit partners with the insights and planning they need to clean up the Great Pacific Garbage Patch in half the time, and for nearly half the cost.

Better Data, Better Decisions, Better Outcomes

The UN Sustainable Development Goals are a framework for creating a more peaceful, prosperous, and equitable world. But realistically, decision makers cannot evaluate progress towards these goals without data. And they cannot make effective, sustainable investment decisions without optimization.

ABW and its partners make this possible through PISA, custom-designed algorithms, and other cutting-edge methods. Gurobi is proud to support them in their work by providing the solver that helps get the job done.

“Our relationship with Gurobi has always been fantastic,” says den Hertog. “We’re very thankful for this partnership. [Gurobi] is the best mixed-integer linear programming solver out there. If they offer you a chance to use it, especially for free as a nonprofit, just do it!”

Experience Gurobi for Yourself

Our 30-day evaluation license includes:

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- ◆ Free access to our world-class technical guidance and support

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