

Case Study: Responsible AI

Dynamic World



The Dataset

Dynamic World is a dataset developed through a partnership between Google and the World Resources Institute, using training data from the National Geographic Society. Dynamic World is a near real-time global land use land cover dataset with 10m resolution. Dynamic World analytical data can enable reliable measurement of land cover and land use for environmental and social benefit, like improved understanding of the human footprint, biodiversity, conservation, and agricultural and forest management.

Dynamic World can help scientists and developers detect and quantify land changes and map trends around the world. It can also help governments, companies, and researchers better assess, develop, and reach science-based targets to protect, manage and restore ecosystems. Given its near real-time data availability, it advances our collective understanding of how we use the Earth's land and what human pressures influence natural landscapes. From its early development stages, the Dynamic World partnership recognized the importance of responsible AI practices to amplify sustainability impacts while also safeguarding against potentially harmful impacts of the dataset. In order to ensure alignment with [Google's AI Principles](#), the Dynamic World team requested an AI Principles review in April 2021.

The Approach

The Dynamic World team had already extensively considered the potential benefits and risks of the dataset before requesting an AI Principles review. Their primary concern was misuse, particularly the potential risk of harm if bad actors used the dataset to exploit the environment or local communities by targeting particular areas for deforestation, resource extraction, land seizure, and other destructive acts. With a shared goal of amplifying the social benefit (AI Principle # 1) of Dynamic World and minimizing potential misuse, the Dynamic World team and the AI Principles review team worked together to design several safeguards for the dataset, specifically considering human rights and surveillance issues.

The Dynamic World dataset was built within the Google Earth Engine, which has a clear statement of use, emphasizing that the product is only intended to be used for development, research, or educational purposes and *not* for sustained commercial purposes without a commercial license. In order to access Google Earth Engine, potential users must submit a request through the Google Earth Engine registration portal. Requiring users to request access helps the Earth Engine team restrict potential abuse.

The AI Principles review team also worked with the [World Resources Institute](#) and [BSR](#) (Business for Social Responsibility) to ensure that Dynamic World continues to uphold high standards of scientific excellence, in accordance with AI Principle # 6. Additionally, the Dynamic World team prioritized open science, in alignment with AI Principle # 7, “Be made available for uses that accord with these principles.” Following the example of the European Commission’s [Copernicus mission’s](#) open [data and services](#) terms, the Dynamic World team decided to follow open data principles, making the model’s [training](#) and [test data](#) as well as the Dynamic World dataset freely available under CC-BY-4.0, and the [model available on Github](#) under an Apache 2.0 license. By sharing these resources, the team hopes to stimulate the potential benefit of AI and human intelligence approaches in the remote sensing community.

The Outcome

Once the AI Principles review was complete, the Dynamic World team also consulted with BSR to explore concerns related to surveillance and to validate the mitigations proposed during the review process. Thanks to the effective collaboration between the AI Principles review team and the Dynamic World team, the dataset [launched](#) on June 9, 2022 and is now available for use [in Google Earth Engine](#). You can learn more about this project on its [website](#). The Dynamic World project illustrates an AI application with very clear and compelling social and environmental benefits whose risks of harm are much less obvious. By thoughtfully developing the dataset with Google’s AI Principles in mind, the Dynamic World team was able to carefully assess potential risks and develop safeguards to build a state-of-the-art dataset that enables powerful positive social and environmental impact.