

Digital Tools for Rural Transport Planning + Waterway Mapping



ADB Green Roads Webinar Series

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Erica Brandt

B2P Director of Strategic Partnerships

erica@bridgestoprosperty.org



Cameron Kruse

B2P Director of Digital Technology

cameronkruse@bridgestoprosperty.org



Today's Webinar

Gaps and barriers in rural transport network improvement

B2P's approach to make rural connectivity easy + cost-effective

Demo of Fika Map and Waternet



Globally 1 IN 7 rural residents

can't safely reach
markets, jobs,
schools, clinics,
and hospitals
because of gaps in
transport networks





Rural isolation is a root cause of poverty.

Women, girls, people with disabilities, and the elderly are impacted the most.

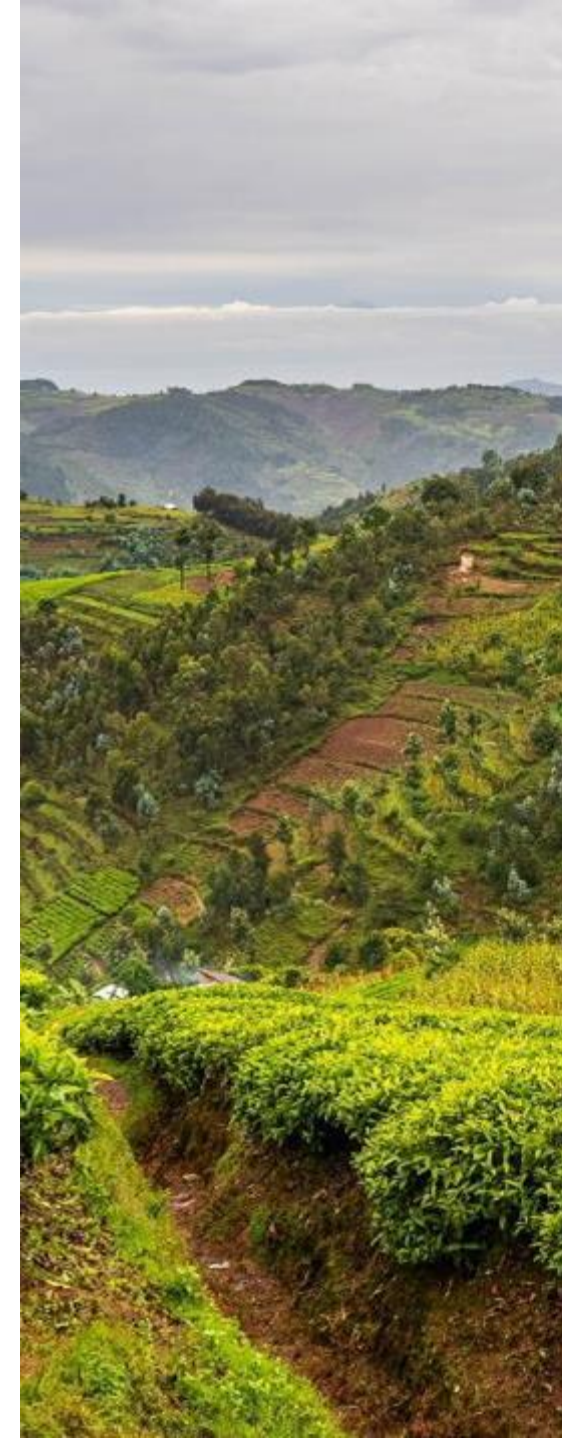
Transport investment is often disproportionately funneled into expensive urban or national projects.

Yet often, the surrounding communities struggle to reach those major roads due to insufficient connecting infrastructure.



Barriers to investment in rural networks

- *Limited budgets, competing priorities* – using population density or other metrics to prioritize leaves poor communities behind
- *Perceived inefficiencies, high cost, and high maintenance needs, especially related to traditional methods* - decision makers don't have a range of cost-effective and climate-resilient solutions at their fingertips
- *The most rural trails, roads, and waterways are often unmapped and unreported* – we don't know the scope of need, or have rural projects ready for investment



Rural transport development is critical to addressing the end of poverty on any meaningful timeline, and to meeting the SDG targets.



- *market access*
- *food security*
- *climate resilience*
- *health*
- *livelihoods*
- *education*

all depend on functioning transport networks



Spot improvements in rural transport networks are particularly cost effective + impactful



+75%
Farm
Profits



+200%
Attendance
for Girls



+45%
Vaccination
Rates



+30%
Household
Income



1. Brooks, W.; Donovan, K. Eliminating Uncertainty in Market Access: The Impact of New Bridges in Rural Nicaragua. *Econometrica*, 88, 5. <https://doi.org/10.3982/ECTA15828> (2020).
2. Gender, time use, and poverty in Sub-Saharan Africa, The World Bank, 2006
3. Hine, J.; Abedin, M.; Stevens, R.; Airey, T.; Tamala Anderson, M. Does the Extension of the Rural Road Network Have a Positive Impact on Poverty Reduction Resilience for the Rural Areas Served? If So How, And If Not Why Not? EPPI-Centre, Social Science Research Unit, Institute of Education, University of London (2016).

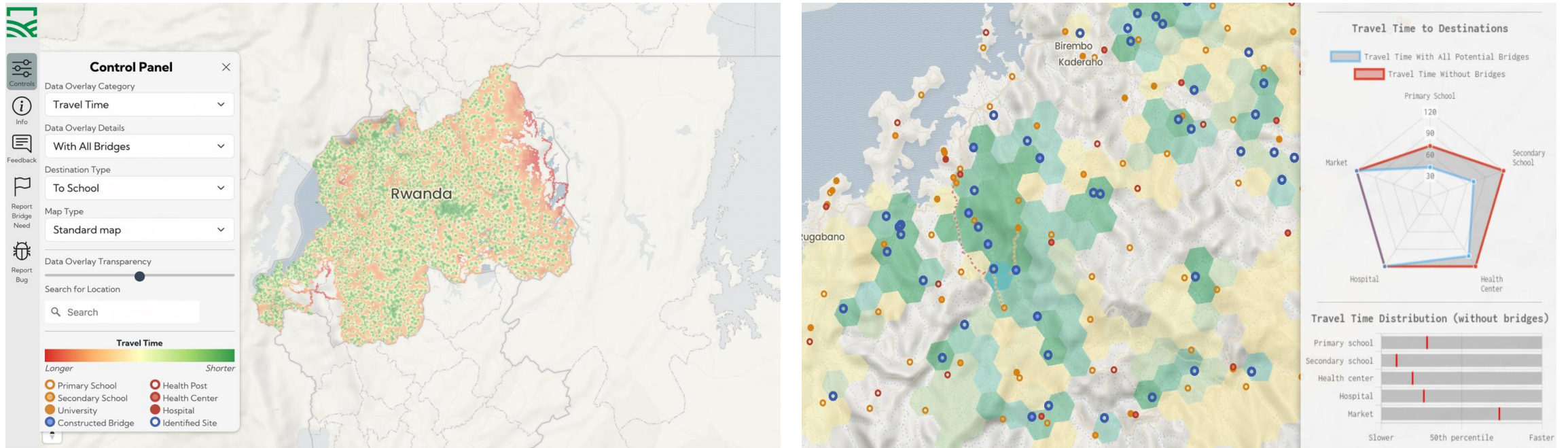
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B2P is a non-profit organization – we partner with governments and development partners to make it cheaper, easier, and more sustainable to solve bottlenecks in rural transport networks.



1. We help quantify and map the need and impact of rural transport investments

In addition to field-based community-centered needs assessments, we are also developing Fika Map—a tool suite which identifies the scope and distribution of transportation barriers through entire regions or nations using publicly-available data and machine learning technology, and estimates the cost and social impact of addressing those barriers, once identified.



Coming up – demo from Cameron!

2. We develop and standardize cost-effective, climate-resilient, low maintenance, labor-based solutions for rural network spot improvement

Standard designs are iterated to be applicable for a wide range of topographies and site conditions.



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3. We help institutionalize effective solutions within government and build up the local private sector

To ready the technologies to roll out at scale, a variety of adaptable and adoptable resources are available for partners: standard designs/drawings, comparison tools, manuals, training materials, and policy options.



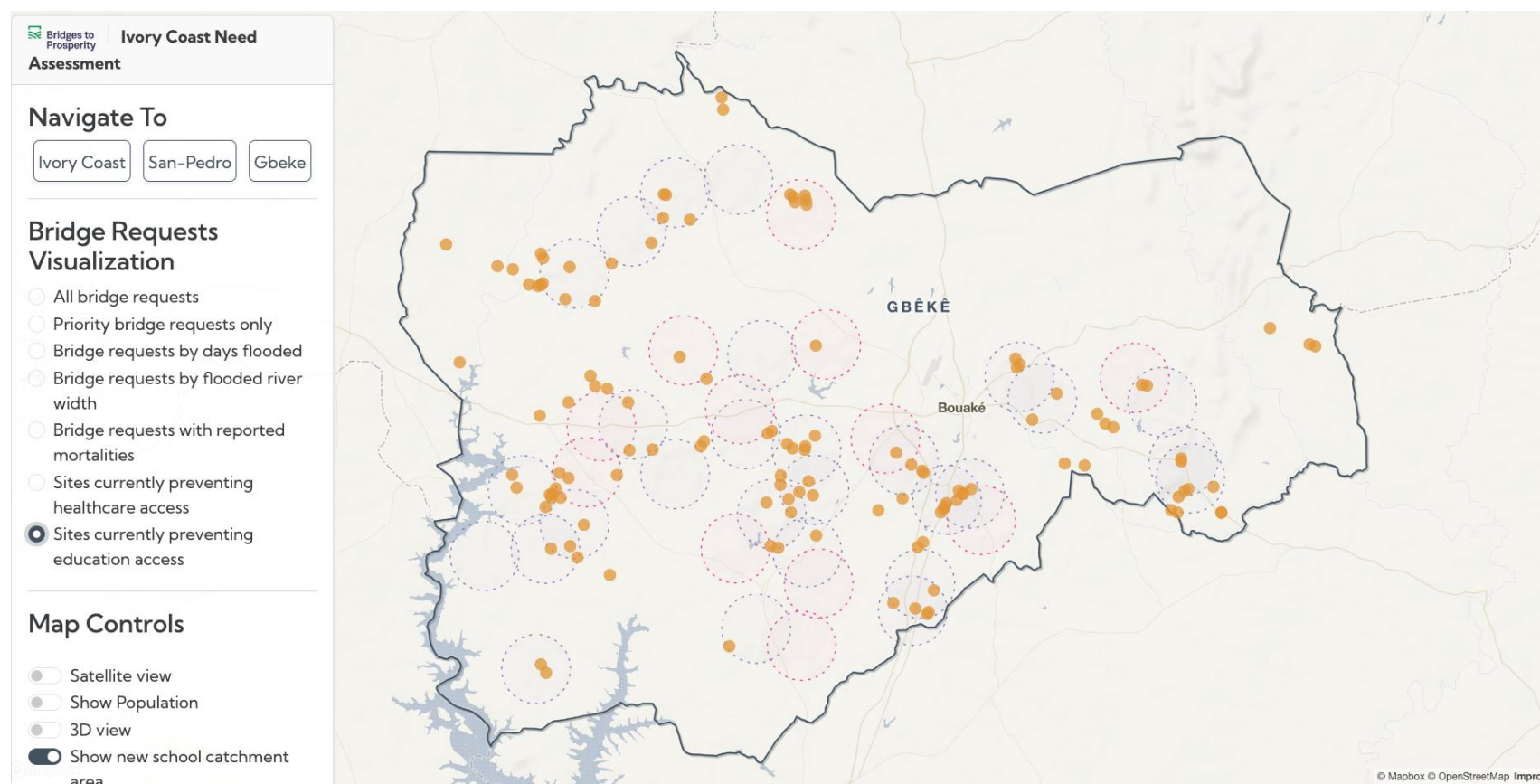
4. We support innovative approaches to holistic and cross-sector rural transport planning and programming

Case Study 1: Pairing an AfDB/UNRA economic corridor road project with catchment area interventions



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Case Study 2: Enhancing impact across sectors on an education-focused MCC compact in Cote d'Ivoire



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Case Study 3: Building a multi-stakeholder coalition to transform rural road network management



OFFICE OF THE PRIME MINISTER
MINISTRY OF WORKS AND TRANSPORT
MINISTRY OF LOCAL GOVERNMENT
MINISTRY OF FINANCE, ECONOMIC PLANNING AND DEVELOPMENT
NATIONAL PLANNING AUTHORITY



**Bridges to
Prosperity**



**Community
Road
Empowerment**

The Transformative Rural Roads Coalition is collaborating to unlock a future where government has the **strategies + systems + support** to successfully build and maintain a sustainable rural road network without bottlenecks or backlog.

Back to #1 -

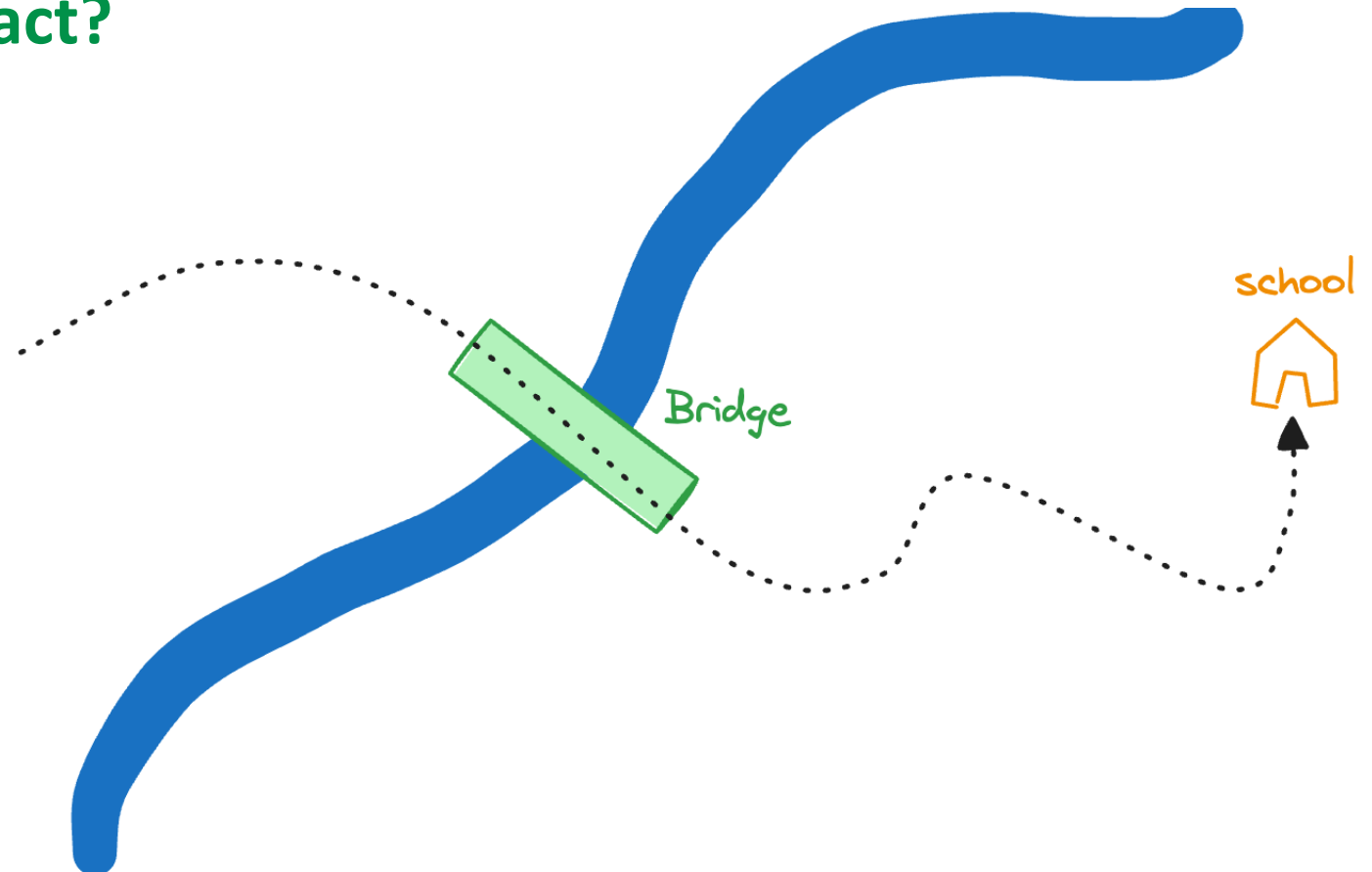
1. We help quantify and map the need and impact of rural transport investments

Fika Map

Could technology scale our impact?

Fika Map started as a project to:

- Predict bridge locations at scale
- Predict bridge impact at scale





What we've learned

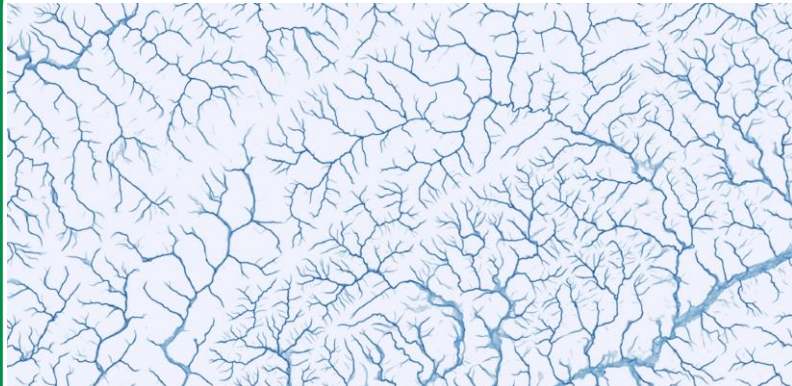
To predict rural bridge/spot improvement need, and predict where rural bridges should be built we need to identify:

- Rural poverty
- The barriers exacerbating this poverty
- The destinations and lack thereof that would contribute to a solution
- The infrastructure needs that would connect rural populations to services they need access to



Closing Data Gaps

Waterway Detection



A deep learning model prediction of waterways, and stream order at a global scale. This is imperative in communities where there is a large data gap.

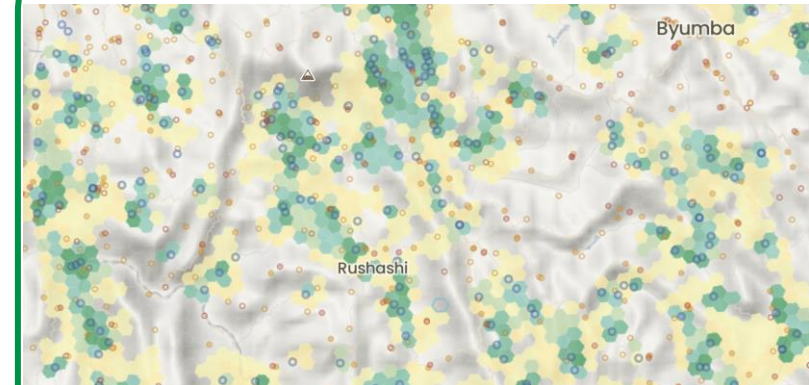
Supporting Models

Travel Time Model



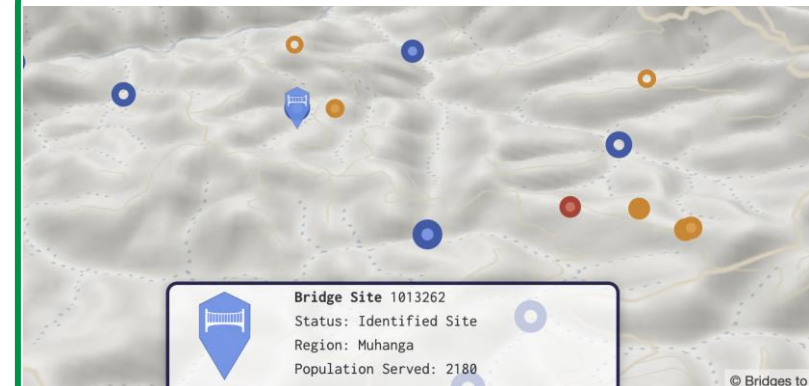
Prediction of travel paths to essential destinations that can be used to measure potential impact of bridges

Impact Model



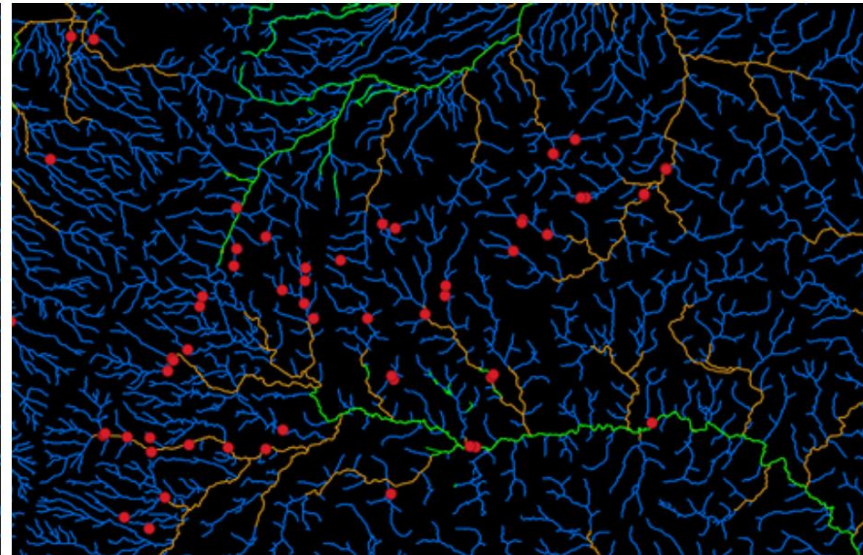
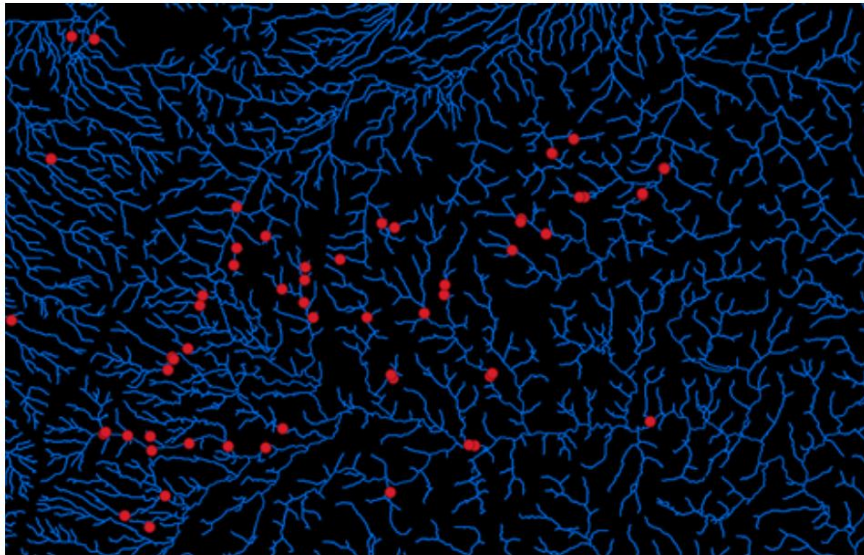
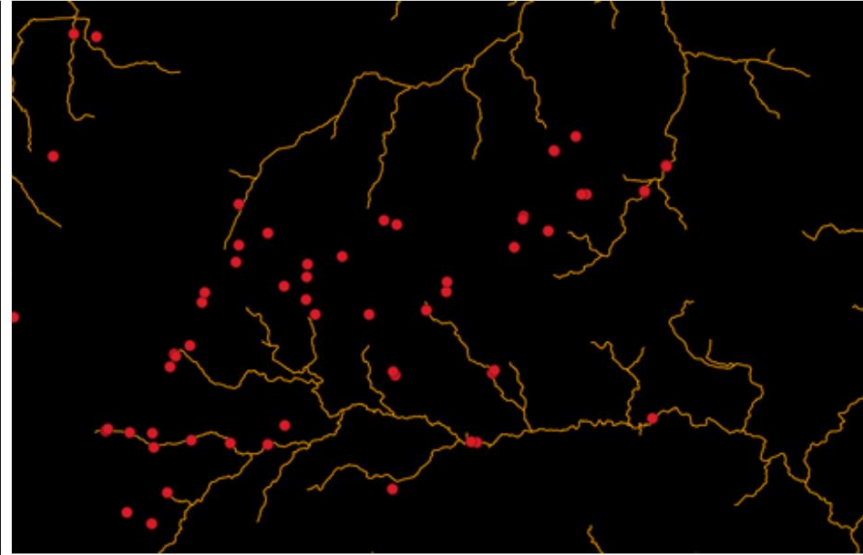
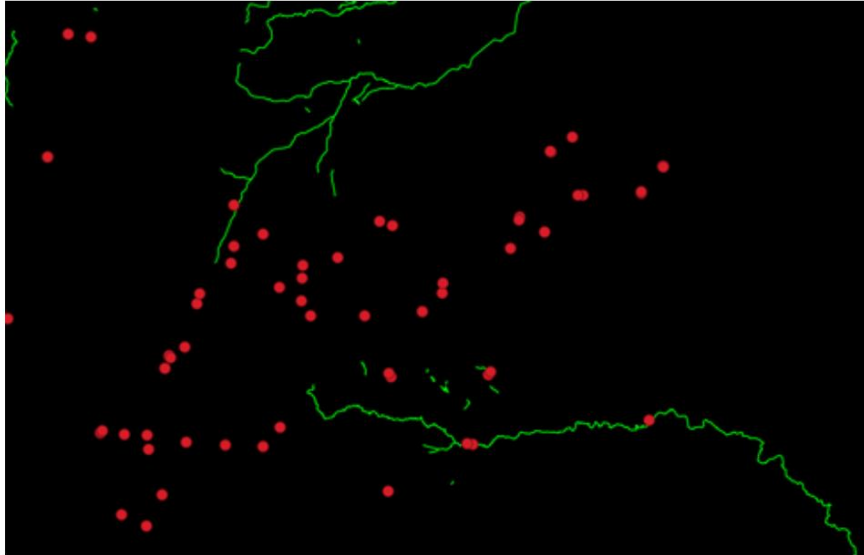
This model uses change in travel time to predict the impact that a rural bridge location would have on surrounding communities

Remote Site Prediction



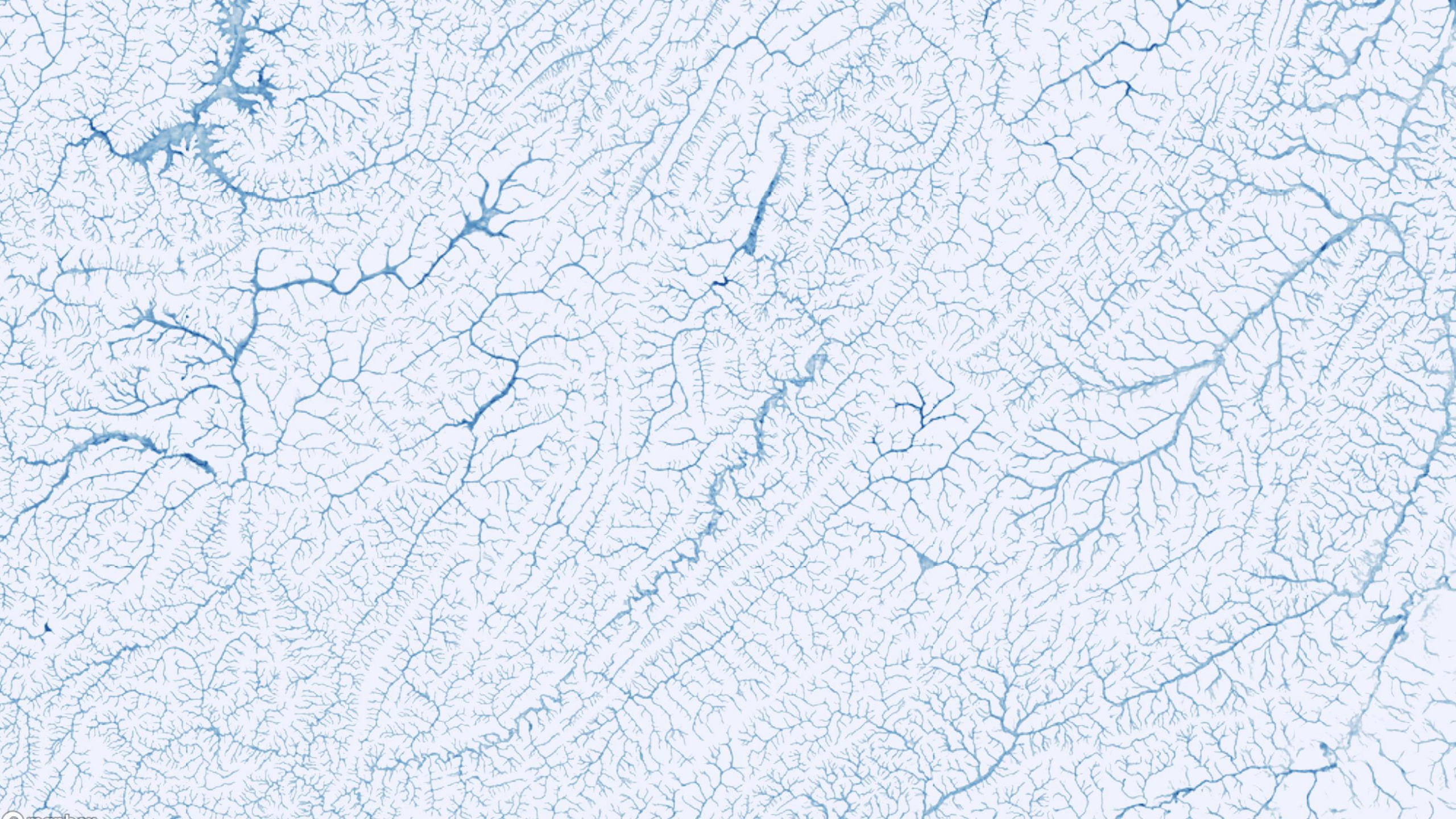
A machine learning model that can remotely predict potential bridge sites and guide our on the ground assessments

WaterNet

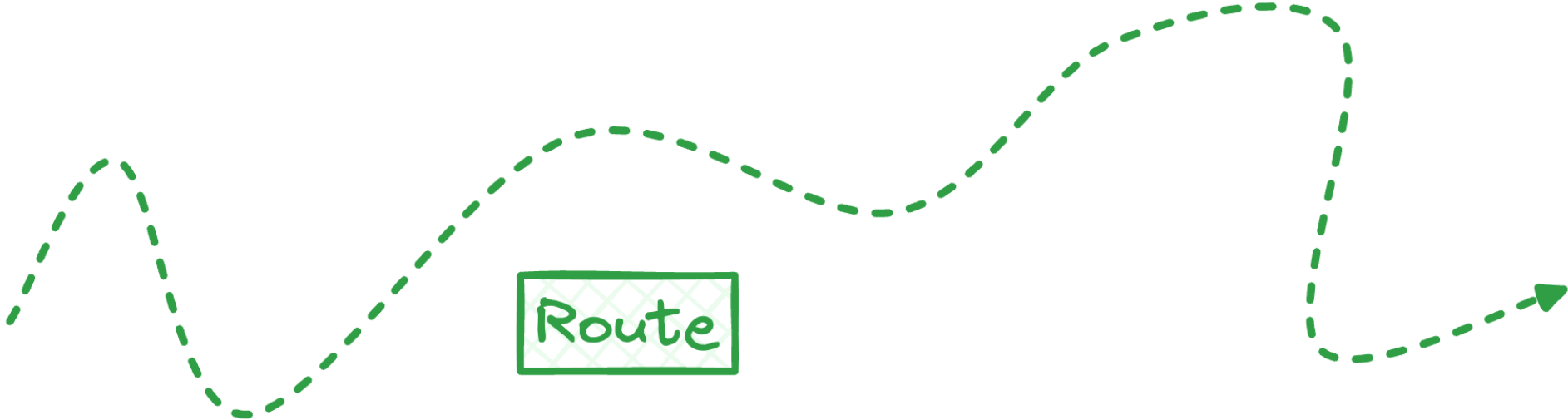


● *Water crossing* — *OSM* — *TDX-Hydro* — *B2P Waterways model*

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Travel Time and Walking Paths Model



Route

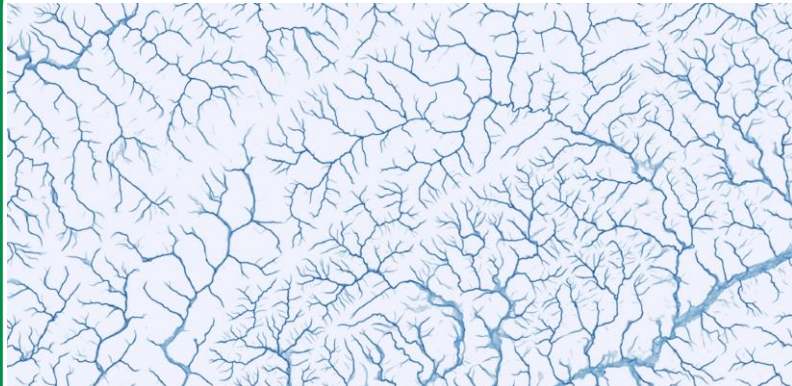
Time





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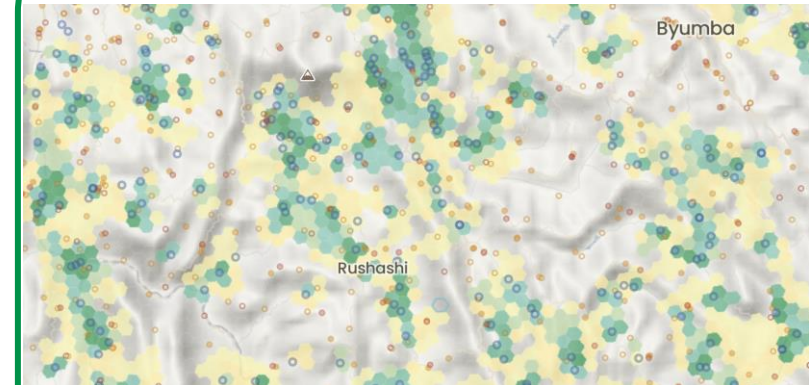
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Travel Time Model



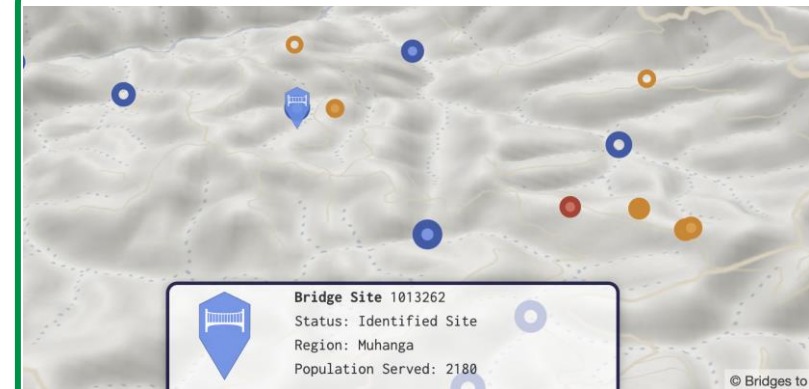
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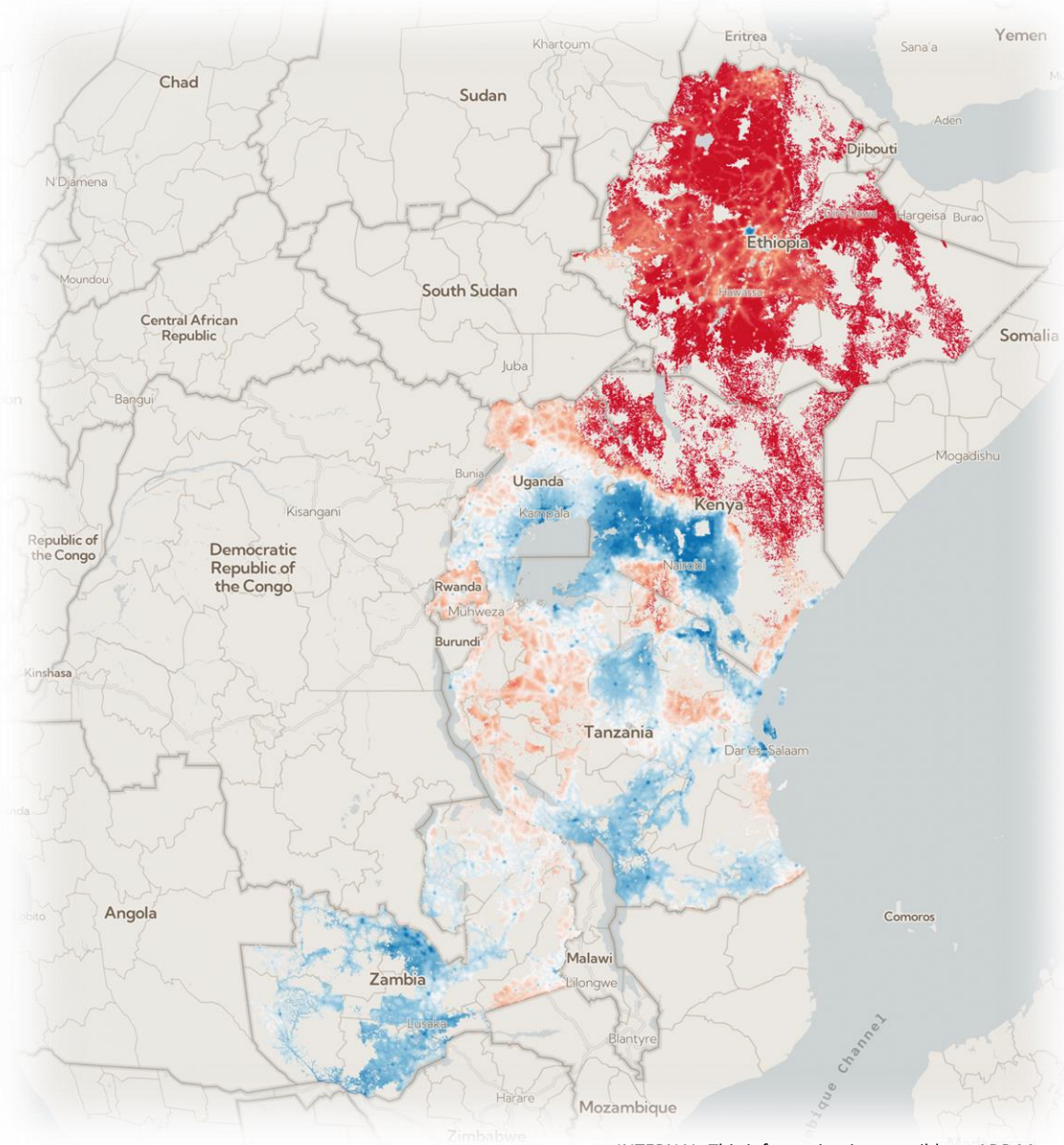
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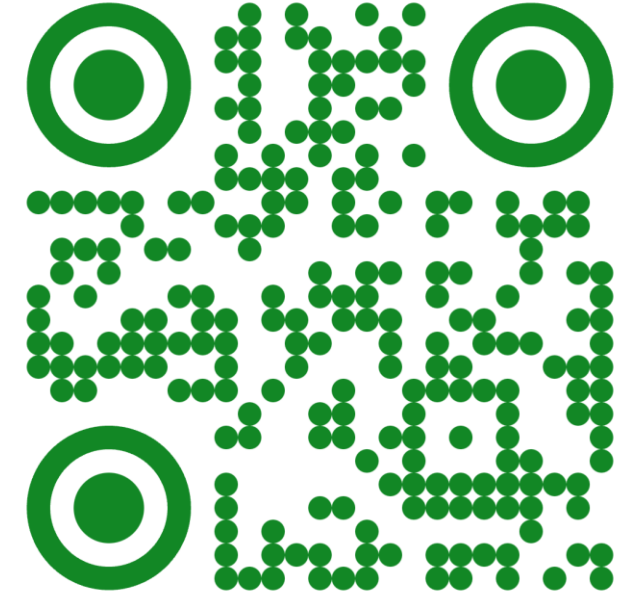


A machine learning model that can remotely predict potential bridge sites and guide our on the ground assessments

The Future of Fika Map



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fikamap.com

- Fika Map v2 coming soon
- Keep closing data gaps
- Predict where rural bridges/spot improvements are needed globally
- Predict global impact of rural bridges
- Use models to advise on other infrastructure (e.g. roads)
- Go beyond rural bridges



Bridges to
Prosperity

Thank you!

Erica Brandt

Director of Strategic Partnerships
erica@bridgestoprosperity.org



Cameron Kruse

Director of Digital Technology
cameronkruse@bridgestoprosperity.org