Harnessing satellite data to measure impacts of infrastructure investment

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International Labour Organization

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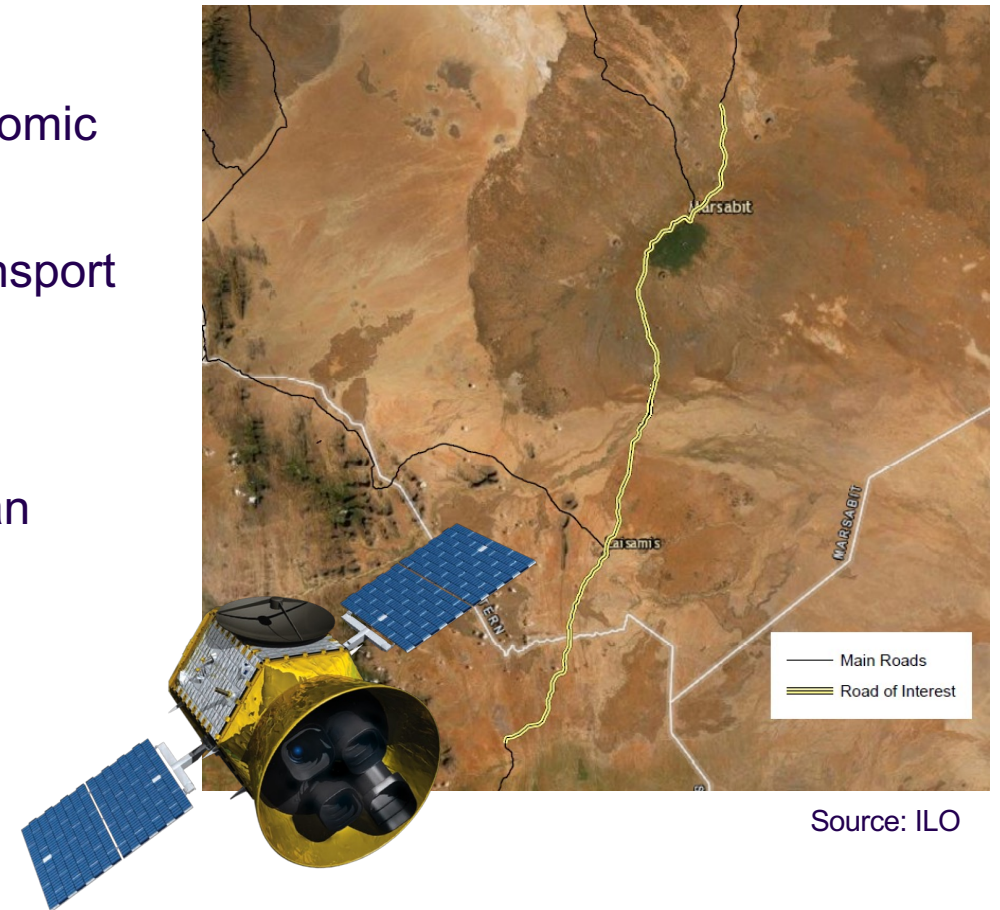
Measuring impacts of transport infrastructure

- Investments in infrastructure e.g roads aim to increase economic development and employment

- Improve access to market, increase competition, reduce transport costs

- Key to assess impacts for monitoring and future planning

- Difficult to capture long-term effects, remote sensing offers an opportunity

Source: ILO

Nighttime lights (NTL)

▶ Satellite imagery of light emissions at night from the NASA Visible Infrared Imagining Radiometer Suite (VIIRS)

▶ High spatial and temporal resolution

▶ Applied as a proxy for economic activity (GDP)

▶ Can be translated into employment

Source: NASA

Case study: Kenya transport corridor

▶ Rehabilitation of 500km of road, aimed to increase economic activity and employment opportunity for local population

▶ Administrative level analysis (areas within 2.5km of roads)

▶ Pixel level analysis up to 5km from road – spatial allocation of economic activity

▶ Control for population, conflicts, NDVI, precipitation, infrastructure projects

▶ ilo.org
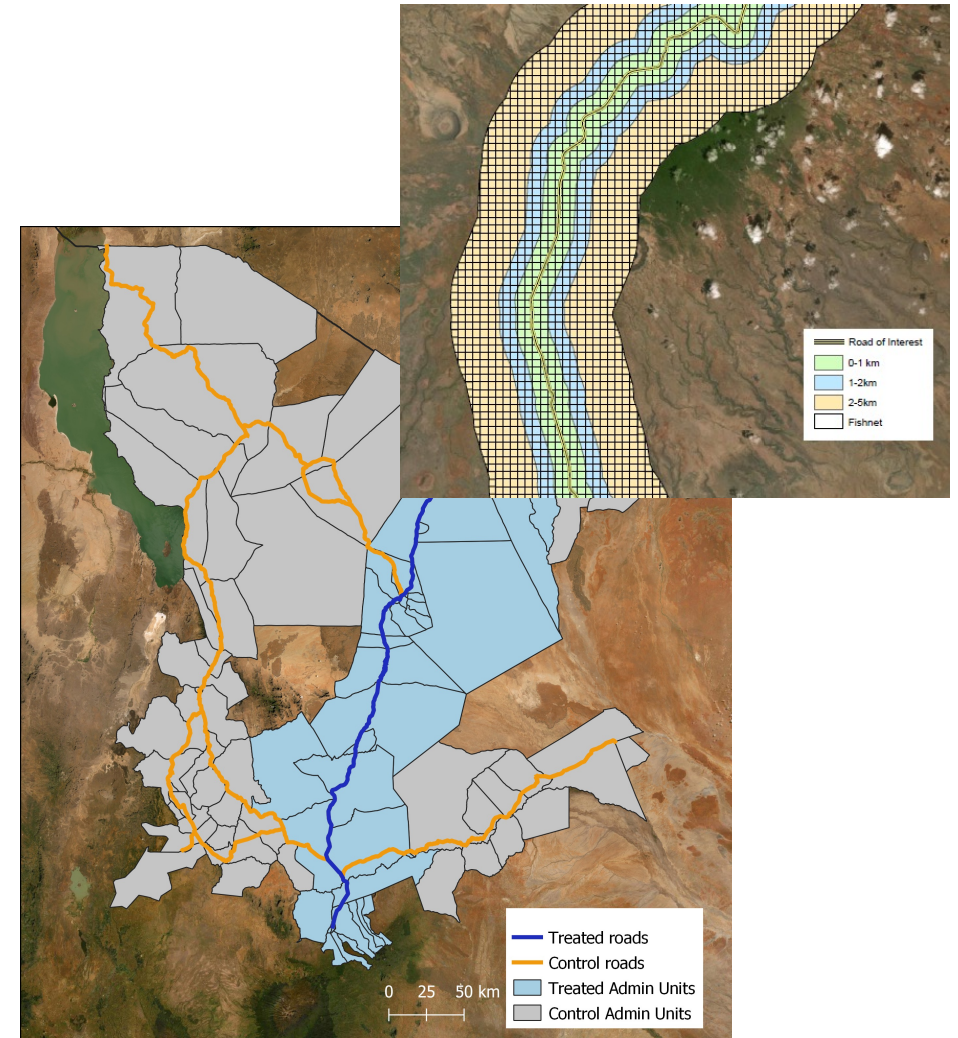
Case study: Kenya transport corridor

▶ Comparing areas/pixels before and after the road project was completed and treated vs untreated

▶ Change in NTL converted to GDP based on national level elasticity

▶ Change in GDP translated to employment

▶ More lights = increased GDP and employment

Advancing social justice, promoting decent work

▶ ilo.org
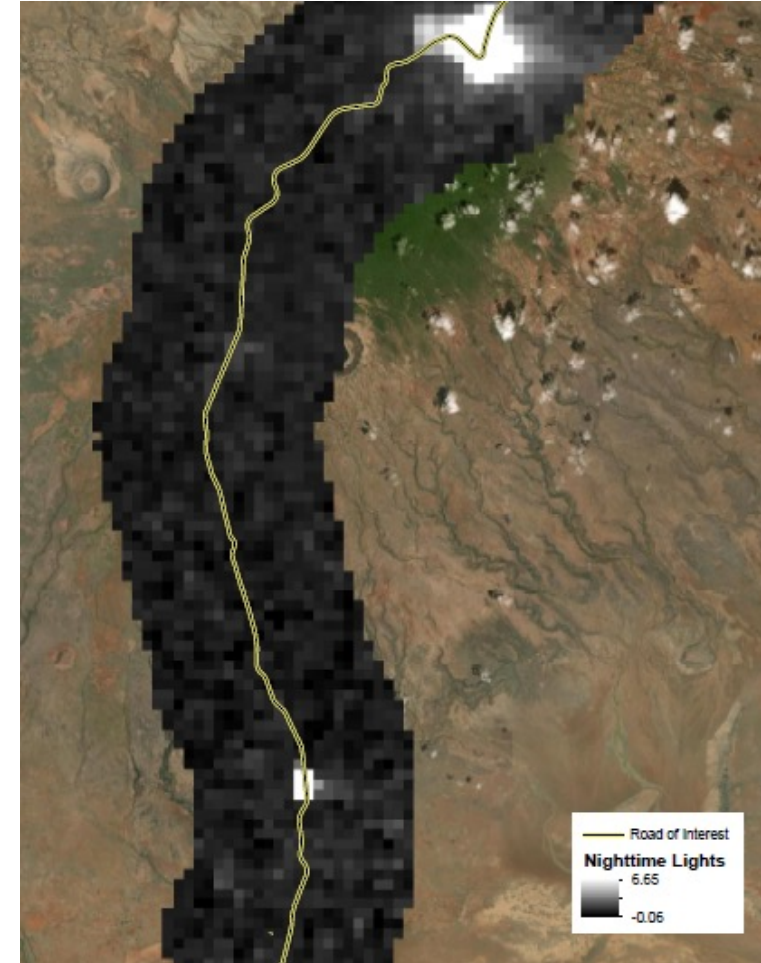
Case study: Kenya transport corridor

- ▶ NTL brightness increased between 11 – 22.8% between one and four years after completion

- ▶ Increase in GDP between 4.6 per cent, one year after completion and 9.6 per cent four years after

- ▶ Relationship between lights/GDP and GDP/employment, equates to an increase of between 1.4 and 3 per cent in employment

- ▶ Largest impacts within 1km of road, and negligible after 2km

2013

2020
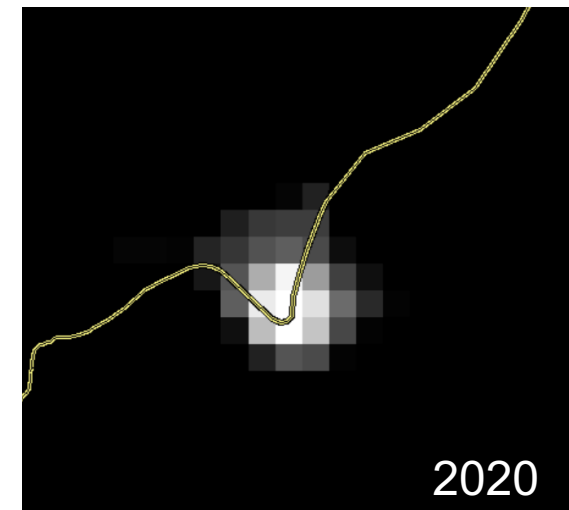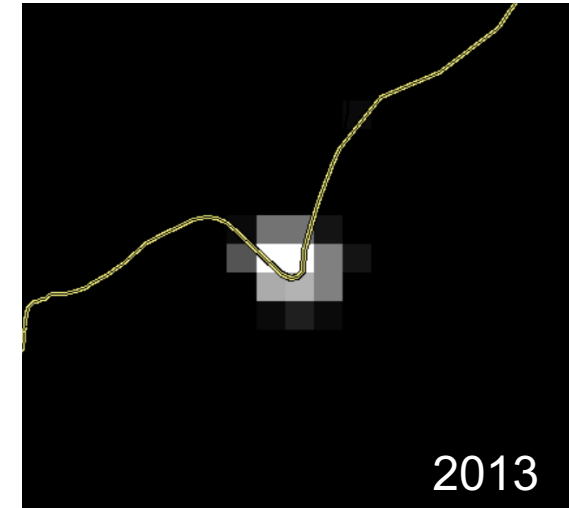
Conclusions

- ▶ Insights for policy surrounding road planning and placement

- ▶ Impacts continue to increase over time

- ▶ Removes the need for resource intensive data collection

- ▶ But supplementing with georeferenced survey data will give additional dimensions relating to incomes, sectors, working hours and gender disaggregation

- ▶ Further applications to measure the impacts of projects in other sectors e.g agriculture, energy