Climate change poses significant risks for smallholder farmers, which are extremely difficult to quantify. **Until now—Sourcemap and CIAT are working to create a Cost of Inaction (COI) Calculator: an online platform that translates agricultural climate change risk into potential lost production (USD). The COI Calculator is an advanced modeling platform, combining CIAT agricultural climate risk data and Sourcemap supply chain mapping technology into an easy-to-use platform that the private and public sectors can use to identify smallholder producers' adaptation needs; leveraging data to design site- and crop-specific solutions that ensure sustainable supply chains.**

Brands and governments are scrambling to plan and account for climate change's projected impacts, but the complexity of current models make it difficult drive actionable decisions. By allowing users to easily model agricultural supply chains and climate risk exposure, in terms of lost revenue to smallholders, the COI Calculator streamlines decision-making and increases the resilience of agricultural value chains to a number of climate-related risks. Leveraging and combining supply chain data (commodity volumes and prices) from Sourcemap and climate risk data from CIAT, the COI Calculator can identify the actual cost of business-as-usual for each farm in a given supply chain; helping users identify the producers and crops where investment will be most impactful. Users upload data to the free online platform, which automatically calculates the most likely COI value for each farm and supplier, based on historical variability and future climate scenarios. The results are displayed in an interactive heat map visualization (Figure 1). Users can upload multiple scenarios to help plan for a sustainable supply chain into the future. The COI Calculator democratizes long-term and strategic climate change planning for a wide range of stakeholders, bridging the gap between emerging climate science and the tactics of climate adaptation.

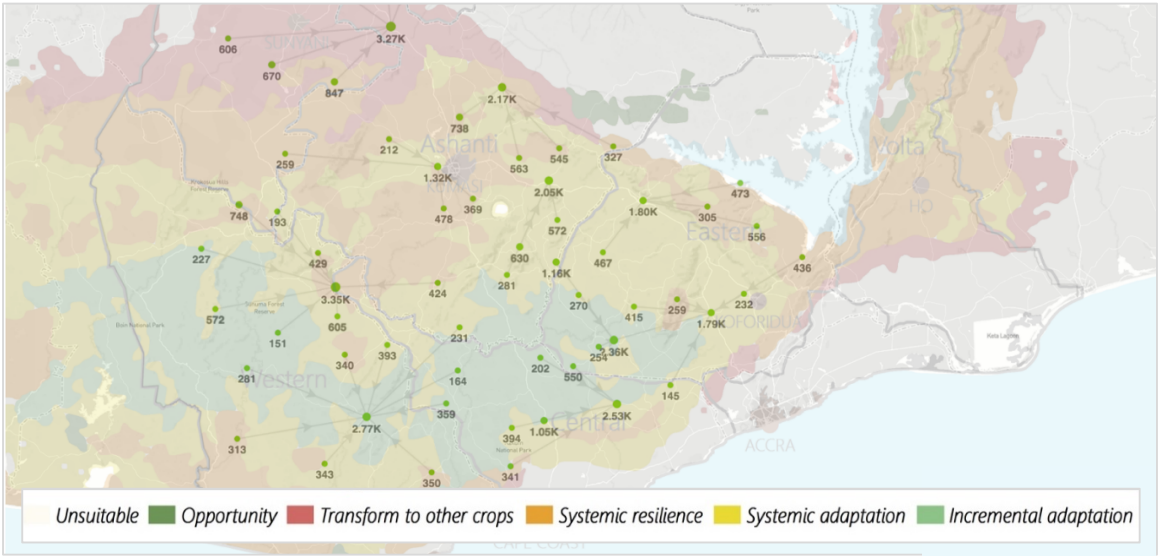

Figure 1. *COI Calculator displaying: 1) CIAT's climate change impact zones for cocoa in Ghana, compared to 2) Cocoa farm and cocoa cooperative locations in Ghana and their projected costs of inaction (USD) for not appropriately adapting to climate risks.*

About Sourcemap:

Sourcemap is an MIT-incubated startup that uses advanced database technology, network modeling and geographic analysis to power the first generation of software capable of mapping global supply

chains and *all* associated risks: operational, social, and financial. Sourcemap offers both enterprise-ready and public-facing versions of its award-winning supply chain mapping interfaces, and works with leading brands including Mars Chocolate, The Hershey Company, and the Sustainable Apparel Coalition – an industry network that includes Walmart, H+M, Nike, and the Gap.

Implementation Plan:
The COI Calculator builds on existing data and proven technology to deliver a fully functional public platform within 12 months as a proof of concept. At launch, the scope will be limited to cocoa production in Ghana to build on CIAT's experience. New technology and processes will be developed to automatically convert the climate modeling data into a Cost of Inaction based on the crop, location, and volume. Users from the public and private sectors will be invited to evaluate the beta platform and their feedback will serve to deliver a hardened public-facing tool. In the second phase (year 2), usage data and user feedback gathered during year 1 will be used to provide advanced risk analytics, and the tool will be expanded to cover the rest of the CIAT product and regional portfolio.

Approach:
The COI Calculator will be designed and developed using an agile methodology with user-centered design processes to ensure that the platform is useful and usable for a wide range of stakeholders, including regional managers, farmers and cooperatives, traders and manufacturers, governments, and non-governmental organizations. CIAT will contribute climate risk data and risk methodology, and Sourcemap will contribute the supply chain modeling and user interface; the two organizations will jointly develop the calculator algorithm. Alongside technical development and testing, the project team will perform stakeholder outreach to identify and invite representative stakeholders to the beta platform. The platform will be reviewed based on their feedback before a public launch. Trainings and ongoing service and support will be provided through the duration of the beta test and public launch.

Use Case:
Major brands in the food & agriculture industry are increasingly evaluating their business performance by measuring their triple bottom lines, or their economic, social, and environmental returns, across their extended (direct and indirect) value chains. Two of the world's five leading food companies are working with Sourcemap to analyze and report on smallholder livelihoods in the face of a shifting climate landscape. The COI Calculator will provide a critical level of precise temperature and precipitation modeling for the near future, which will directly impact companies' sustainability investments and engagement with local governments.

Future Work:
After public launch, the COI Calculator will be expanded to cover additional crops and regions in the CIAT portfolio. User feedback will be gathered to inform the development of a universal reporting format for easy exports. The data models and calculator algorithms will also be made available through an API so that other organizations may incorporate the COI metric in their platforms. The platform will be maintained either through grant funding, by introducing a membership model to solicit donations, or by creating a 'freemium' structure where heavy users of the data pay for intensive use of the servers. All submitted data will remain the property of platform users, however the aggregate and anonymized usage statistics will be used to refine the algorithms and the performance of the system as a whole.