AI + Climate Futures in Asia

Towards Responsible AI for Climate Action

Action Points for Global Philanthropy and Development Organisations

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Action brief #1

Towards Responsible AI for Climate Action: Action Points for Global Philanthropy and Development Organisations

This action brief is part of a project on AI + Climate Futures in Asia, supported by The Rockefeller Foundation.

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Any errors or omissions are our own.

Machine learning technologies are expected to play a significant role in addressing climate action - they can improve our understanding of complex systems, optimise the working of existing systems, and advance scientific research.

For example, the use of AI technologies can help generate better intelligence about changing weather patterns, supporting policymakers, disaster response agencies, and vulnerable communities to better prepare and adapt to climate variability. Equally, AI can be used as a tool to monitor emissions by companies and hold them accountable for reducing their environmental footprint. In our research, we found several use cases and applications that could have a potentially transformative impact on climate action in the region.

However, the use of AI is also fraught with multiple challenges and risks. The lack of climate-relevant data, specific to local contexts, prevents the development of contextually appropriate interventions. Companies building AI applications are typically unaware of the complexities of local contexts - many are driven by commercial interests and do not adequately consult with domain experts or vulnerable communities. Local government departments and communities often do not have the resources to adopt and leverage these new applications. The development, deployment and disposal of AI-based products also have a significant environmental footprint, one that is likely to increase.

Addressing these challenges and aligning AI innovation with climate action is a complex socio-technical issue. It will require considerable resources and expertise - most importantly, it will require sustained investments dedicated to advancing the public interest. While many of these investments will necessarily require government action, others can be led by global philanthropy and development agencies.

This brief provides recommendations for global philanthropy and development organisations to support the responsible development and use of AI for climate action.

Recommendations

#1 Local and participatory data curation

Localised data sets that reflect the priorities of vulnerable communities and geographies are needed for inclusive and effective AI interventions. Private players are not incentivized to collect such data unless it is commercially viable. Public funding and investment is needed to fill this gap.

Development organisations can support participatory data collection and curation activities across the region. These efforts should be focussed on specific problems that have been identified through a consultative process, including representation from local communities vulnerable to climate change. The aim should be to develop a long-term data strategy - i.e. working with vulnerable communities and geographies to identify key climate-related challenges and risks and then identifying and monitoring the data needed to drive change on these issues.

Creating mechanisms through which local communities and other relevant stakeholders can review and provide feedback on the data insights generated is also essential for a truly consultative process. Development funding can support data communication and visualisation initiatives that allow governments and communities to access data insights as well as monitor progress and developments. Citizen science initiatives for environment monitoring and the strategic use of data must also be expanded in the region to support problem-driven localised data collection.

#2 Interdisciplinary collaboration and theories of change

Solutions that deploy AI will only be as good as the definition of the problem, but many AI models are based on available data and insights generated from that data, rather than a specific theory of change about how the problem at hand can be addressed. Building such a theory of change requires domain knowledge and localised expertise.

Models that are built on such a collaborative theory of change and rooted in climate science and local knowledge systems are needed to drive meaningful impact. Even within the machine-learning community, there is a growing camp of engineers making the case for smaller and more domain-specific models - in the case of weather monitoring, this would include for example physics-based and chemistry-based models, where the emphasis is on applying scientific knowledge to build more accurate models, rather than rely on big data about historical patterns alone.

Development organisations can support platforms and initiatives for sustained interdisciplinary collaboration between data scientists, climate scientists, domain experts and local stakeholders. Particular attention should be paid to ensuring that indigenous knowledge and practices are incorporated. The ability to access and foster such partnerships is a unique leverage that development organisations have over private technology companies.

These models must be explainable and auditable by local stakeholders. They should be able to review and challenge why certain variables were chosen and the weights assigned to them in the model. This review should be ongoing so that stakeholders can evaluate the efficacy of the model as well as offer alternatives. This can drive trust, ownership and adoption.

#3 Ongoing evaluation

Investments in AI for climate action are growing in the region. Pilots across sectors are underway and many applications are already in the market. However, there is almost no evidence of the impact and outcomes of these interventions. Development organisations are well-positioned to develop an impact assessment framework and related measurement tools for their investments, which can also be used by the broader ecosystem. These frameworks and measurement tools should be developed with civil society and community organisations, and linked to a broader theory of change for AI use in climate action.

Parameters that should be included in the evaluation include the accuracy and reliability of the application; its suitability for addressing a given problem; the expertise of the vendor in the particular domain and the business model intended to drive sustainability; the broader social impacts on people's rights and access to opportunities, and the availability of institutional measures to prevent and redress harm. Evaluations should also evaluate the environmental impacts of AI applications and the production pipeline.

This can also help build a repository of evidence of successful examples of AI use, including best practices and how values such as equity, and privacy are safeguarded. The dissemination of these findings among policymakers and other decision-makers can help drive increased and appropriate investments in building the foundational digital and data infrastructures needed to drive AI innovation. It can also act as a catalyst for further private-sector investments and entrepreneurial ventures.

#4 Equitable Data Sharing Mechanisms

A major challenge to accessing and building climate data sets is the reluctance of actors to share data. Companies are concerned about sharing proprietary data and civil society organisations are concerned about extractive and unequal data-sharing arrangements. Governments are similarly concerned about the misuse of public data, as well as the reputational costs involved in sharing data that reflects poor performance on climate action indicators.

New arrangements for equitable and safe data sharing are needed. Development organisations can invest in experiments to develop new legal and technological tools for data sharing. For example, new forms of data licensing and contracting for climate data are required in the region - having such licenses or contracting arrangements in place can give actors confidence in sharing their data. These contracting tools should enable parties to decide how to efficiently allocate data access and usage rights, and also efficiently allocate those types of liabilities associated with the data.

These new arrangements should not be restricted to the FAIR principles for data sharing (Findable, Accessible, Interoperable, and Reusable) whose ultimate goal is to optimise data sharing and the reusability of climate data. Rather, they should centre CARE principles that emphasize collective responsibility, reciprocity, and accountability. Under a CARE framework, data usage must be restricted to specific use cases and must ensure that the communities that are the data subjects benefit from that data access.

#5 Demonstrative projects and pilots

New participatory models of data curation and AI development that prioritise the public interest need to be tested in the field and their impacts monitored and evaluated. Global philanthropy can play a catalytic role in providing civil society and community organisations with the financial and technical resources they need to develop and test pilots. Data collection and processing are hugely expensive and laborious tasks, requiring specialised skills and expertise. Civil society organisations also need technical support, including access to affordable computing and resources for ongoing monitoring and fine-tuning of the models they are testing. Obtaining sustained funding for experiments and pilots is hard, particularly in countries and geographies with limited resources.

Global philanthropy and development organisations have a critical role to play in making climate action bets, even if risky, and providing the patient capital needed to support experimentation. They can support and help unlock the value of pilots, which governments and multi-lateral agencies can then scale in the region. Seeing the success of these pilots can help catalyse government action and can also be used to advocate for further investments in digital infrastructure, data collection, and community-centred models for technology design.

Even beyond the pilot stage, financial support is required to sustain the adoption and use of AI interventions. Our study found that commercial actors are not incentivised to invest in technology solutions for vulnerable populations because of the lack of a revenue model. Investments from philanthropy and global development organisations can help plug this gap and the success of these projects could unlock other sources of public funding in the medium to long term.

#6 Foundational research

An opportunity area common across all domains is the potential of ML for advancing scientific research and knowledge. In agriculture, this may mean supporting new research on climate-resilient cropping strategies and new food and seed varieties.

Similarly, support for foundational research on new materials that can reduce the carbon footprint of the built environment will be critical for a rapidly urbanising Asia.

Market dynamics alone may not facilitate such research, nor a thorough phase of testing and evaluation. While the market is flushed with applied AI applications, global philanthropy has a role in driving such foundational research.

#7 Green Computing

The energy and water consumption of AI, along with other harmful environmental impacts, is expected to increase. Using AI to address climate action can thus be counterproductive unless advancements are made in green computing. Global philanthropy and development organisations can support foundational research in more energy-efficient and less polluting forms of computing.

They also have a unique role to play in making a comprehensive and long-term evaluation of green computing initiatives and developing future pathways accordingly - for example, switching to renewable sources of energy could result in new unintended harms such as loss of livelihoods and increased deforestation in the region.

By creating systems to measure and monitor the environmental impacts of AI production and deployment, and including this as a criterion for further investment in AI for climate, global philanthropy and development organisations can also play an important agenda and norm-setting role.

Conclusion

Development agencies must be mindful of the tacit influence they wield and ensure that their technology investments prioritize climate justice. It should therefore be remembered that AI may not always be the best solution to address a problem. Its use should be weighed against other technological and non-technological solutions, particularly as there is a risk that it may distract or divert resources from less "flashy" tools or approaches.

AI is also only a tool - while it can provide better or more timely information, relevant actors need to have the incentives and capacities to be able to act on that information. Often, action will require complex trade-offs, the harms of which are experienced most acutely by already marginalised communities. For example, an AI tool can be used to detect high-emitting brick kilns in the region, but shutting down these kilns could result in a loss of livelihoods for workers.

Top-down AI interventions can also displace local knowledge systems and practices. At the same time, a focus on developing participatory and bottom-up AI interventions should not become a replacement for top-down measures that address the political causes of climate inaction. To conclude, the focus on AI must not distract from the political action needed to address the climate crisis.

About the Project

About DFL

Digital Futures Lab is an interdisciplinary research collective that interrogates the complex interaction between technology and society in the global South. Through evidence-based research, public engagement and participatory foresight, we seek to realise pathways toward equitable, safe and just digital futures.

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About the Project

Commissioned in early 2023 by The Rockefeller Foundation, this project explores the intersection of Artificial Intelligence and Climate Action in Asia. It examines opportunities, challenges and risks across three domains – agriculture and food systems, energy transitions, and disaster response in nine countries - Bangladesh, China, India, Indonesia, Malaysia, Singapore, Thailand, The Philippines and Vietnam.

We assembled a network of regional experts to help guide our investigation and provide context specific insights.

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