ARTIFICIAL INTELLIGENCE
4
Climate Resilience

LEVERAGING ARTIFICIAL INTELLIGENCE FOR CLIMATE RESILIENCE SOLUTIONS IN AFRICA PROJECT
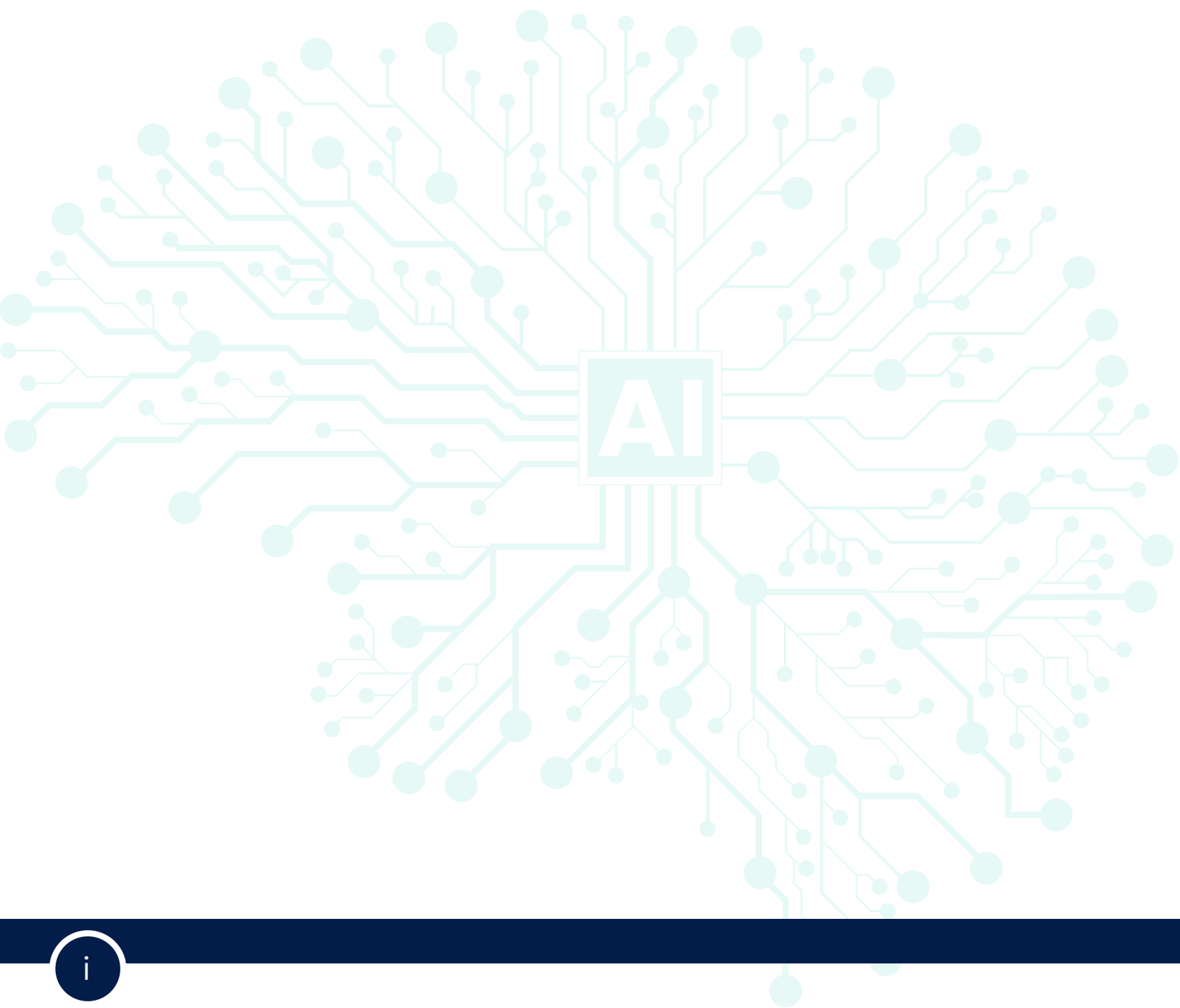
INCEPTION WORKSHOP REPORT | FEBRUARY,2025

ARIN
AFRICA RESEARCH & IMPACT NETWORK

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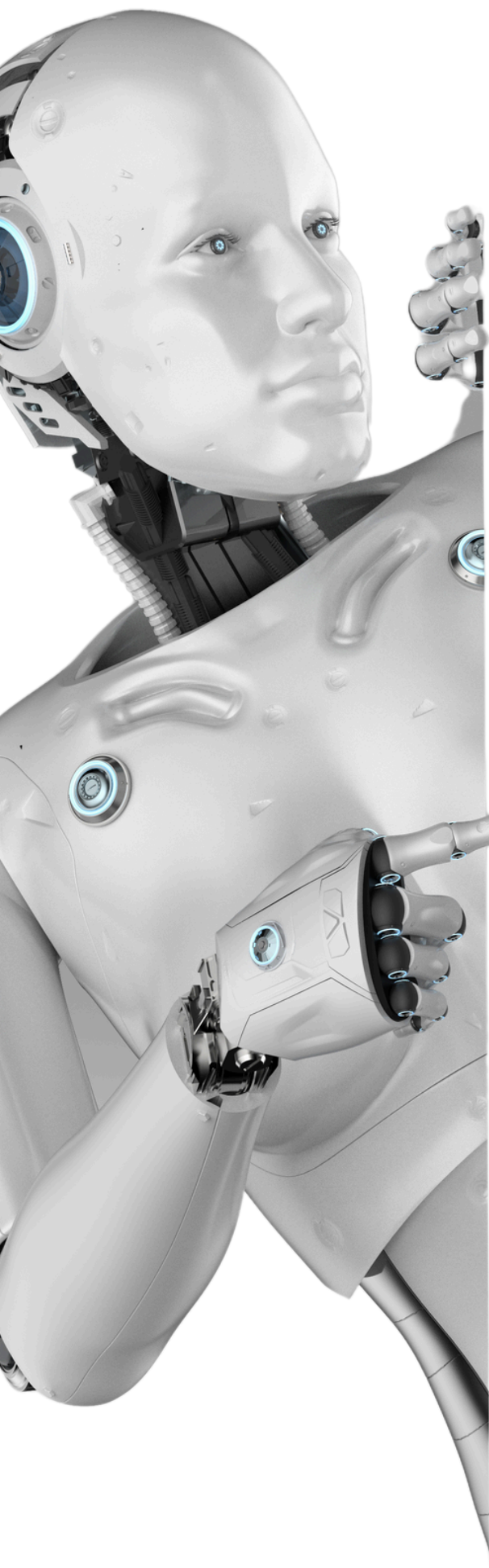
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List of Abbreviations and Acronyms

ACTS	Africa Center for Technological Studies
AI	Artificial Intelligence
AIMS	Africa Institute of Mathematical Sciences
AI4D	Artificial Intelligence for Development
ARCAI	African Research Centre on Artificial Intelligence
ARIN	Africa Research and Impact Network
AU	African Union
CAIR	Center for Artificial Intelligence and Robotics
CIPIT	Centre for Intellectual Property and Information Technology Law
COP	Community of Practice
DSN	Data Science Nigeria
DSAIR	Data Science and Artificial Intelligence Research
ECRs	Early Career Researchers
ICCA	Institute of Climate Change Adaptation
ICT	Information Communication Technology
IDRC	International Development Research Centre
IPCC	Intergovernmental Panel on Climate Change
KADSC	Kenya Artificial and Data Science Consortium
ML	Machine Learning
NAPs	National Adaptation Plans
NDCs	Nationally Determined Contributions
NGOs	Non-governmental Organizations
SGCI	Science Granting Councils Initiative
STEM	Science, Technology, Engineering and Math
UCT	University of Cape Town
UNICEF	United Nations International Children's Emergency Fund
UoN	University of Nairobi

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We thank the Africa Research and Impact Network (ARIN) for spearheading this initiative and the University of Nairobi for their partnership and support in advancing AI-driven solutions for climate resilience. We also want to thank the International Development Research Centre (IDRC) for its funding and guidance, which made this workshop and subsequent report possible.

We acknowledge the contributions of our esteemed speakers and facilitators, including Dr. Joanes Atela, the Executive Director of ARIN; Loise Ochanda, the Program Officer of Artificial Intelligence for Development - Africa, Dr. Isaac Rutenberg from CIFOR-ICRAF, and Prof Daniel Olago, Director, Institute of Climate Change Adaptation (ICCA) whose expertise and perspectives were invaluable.

We also recognize the importance of the diverse stakeholders in attendance, including policymakers, researchers, private sector representatives, and civil society organizations, whose diverse backgrounds and insights fostered a holistic understanding of the challenges and opportunities in leveraging AI for climate resilience in Africa.

Finally, we acknowledge the ongoing support of our partners and collaborators in AI and climate science. Their dedication to building capacity and fostering innovation will be crucial as we pursue our collective mission to enhance climate resilience across the continent.

Executive Summary

The "Leveraging Artificial Intelligence for Climate Resilience Solutions in Africa" project aims to address the pressing challenges posed by climate change, which significantly impacts ecosystems, livelihoods, and economies across the continent. The project is spearheaded by the Africa Research and Impact Network (ARIN) in collaboration with the University of Nairobi (UoN) and focuses on harnessing Artificial Intelligence (AI) to build resilience and adaptive capacities in response to climate-related risks.

The inception workshop, held on January 30, 2025, gathered diverse stakeholders, including policymakers, researchers, private sector innovators, and civil society organizations. The workshop aimed to introduce the project's vision, present findings from the scoping and capacity needs assessment, gather feedback, and foster an understanding of AI's potential in climate resilience.

Key discussions highlighted the urgent need for innovative, data-driven solutions to enhance climate resilience, emphasizing AI's capabilities in predictive analytics and real-time data processing. However, significant barriers to AI implementation were identified, including a shortage of skilled professionals, limited training opportunities, and gender disparities in the AI field. The workshop underscored the importance of building AI capacity among early-career researchers and policymakers, alongside fostering collaborations between academia, industry, and government.

Expected outcomes of the workshop included enhanced stakeholder understanding of the project's goals, increased awareness of capacity gaps in applying AI for climate action, and a prioritized action plan for capacity-building initiatives. Participants committed to supporting and participating in these initiatives to ensure sustainable AI integration into climate resilience strategies.

In conclusion, the project seeks to position Africa as a leader in AI-driven climate resilience solutions, advocating for tailored approaches that address local challenges and foster inclusivity. By leveraging AI's potential, the initiative aims to transform climate adaptation strategies, ultimately contributing to sustainable development and improved livelihoods across the continent.

1.0 Introduction and Rationale

1.1 Climate Change Challenges Across Africa

Climate change continues to present significant challenges across Africa, affecting ecosystems, livelihoods, and economies (IPCC, 2022). These impacts have been particularly severe in countries that depend heavily on climate-sensitive sectors such as agriculture, water resources, and energy (Tofu et al., 2025). The vulnerability of these sectors exacerbates disruptions, leading to widespread socio-economic consequences (Uzoma et al., 2025). For instance, shifting rainfall patterns, rising temperatures, and extreme weather events are contributing to crop failures, water scarcity, and an increased frequency of natural disasters (Niang et al., 2014; Li et al., 2025). These direct impacts have profound implications for poverty levels, food security, and economic stability across the continent (Jain et al., 2023).

Several factors contribute to Africa's heightened vulnerability to climate change. Over-reliance on climate-sensitive sectors, particularly agriculture, which employs the majority of the population, places many nations at significant risk (Doku et al., 2021a, 2021b; Phiri & Doku, 2024). Furthermore, limited institutional, technological, and financial capacity hinders African nations' ability to mitigate emissions and build resilience against climate change (Oiganji et al., 2025). This challenge is exacerbated by the inadequate availability of technical expertise and infrastructure, which further restricts adaptation efforts and the development of innovative solutions to address climate impacts (Mekonnen et al., 2021).

Regions such as Central, East, and West Africa are emerging as climate vulnerability hotspots, with some areas experiencing significantly higher mortality rates from climate-related events than less-affected regions (Olagunju et al., 2025). For example, climate-related mortality rates in high-risk areas can be up to 15 times higher than in less vulnerable regions (Mbuvha et al., 2024). This stark contrast highlights the disproportionate burden of climate change, particularly on low-income and marginalised communities.

National Adaptation Plans (NAPs) and updated Nationally Determined Contributions (NDCs) from African nations emphasise the urgency of addressing these climate risks (Erbil, 2025). These documents underscore that climate risks are becoming increasingly costly and complex, with some damage potentially becoming irreversible without swift action. Women, children, and persons with disabilities are particularly vulnerable, as climate change exacerbates existing inequalities (Harmeling, 2018; Ozor et al., 2020; Webb, 2021).

1.2 The Role of Artificial Intelligence in Addressing Climate Change

The urgency of mitigating climate change impacts and enhancing resilience across Africa necessitates innovative, scalable, and data-driven solutions. Artificial Intelligence (AI) holds immense potential in addressing these challenges, particularly through predictive analytics, real-time data processing, and evidence-based decision-making (Luu et al., 2025; Babatope, 2025). AI-based techniques are highly effective in analysing complex climate datasets, forecasting future trends, and assessing climate-related risks (Karthikeyan, 2025; Indiazi, 2025). These technologies generate actionable insights that can inform policy development and optimise resource allocation in the fight against climate change (Cho & Ackom, 2025).

One of AI's key applications in climate change mitigation is its ability to forecast carbon emissions based on current patterns. For instance, AI can predict how different industries or regions will contribute to future emissions, enabling policymakers to design more effective mitigation strategies (Mardani et al., 2020). Additionally, AI can be employed to monitor carbon sequestration from the atmosphere, providing crucial data for developing strategies to reduce atmospheric carbon levels (Menad et al., 2019). Moreover, AI can evaluate the feasibility and impact of major policy changes, allowing governments and organisations to assess the potential outcomes of various climate interventions before implementation (Pancholi & Shukla, 2025).

In Africa, where climate change effects are particularly severe, AI presents an opportunity to enhance knowledge and responses to climate impacts. AI-driven solutions can improve early warning systems for extreme weather events, enhancing preparedness and response at local, national, and regional levels. Furthermore, AI's capacity to process and analyse vast amounts of data in real-time facilitates more efficient decision-making, which is crucial in adapting to rapidly evolving climate conditions.

1.3 Challenges in AI Implementation for Climate Resilience Solutions

Despite its immense potential, the use of AI to address climate change in Africa faces significant challenges. One of the primary obstacles is the shortage of skilled professionals capable of deploying and interpreting AI in climate modelling, resilience planning, and resource allocation. This skills gap is largely driven by two key factors: limited training opportunities in AI-related Science, Technology, Engineering, and Mathematics (STEM) disciplines within Africa and a persistent gender disparity in the AI field. The underrepresentation of women in AI academia and the workforce further exacerbates this issue, as limited access to opportunities and support systems restricts their participation in STEM fields.

The scarcity of AI expertise in Africa presents a critical barrier to the adoption and application of AI for climate resilience. Governments and stakeholders across the continent struggle to establish inclusive and effective climate action reporting frameworks due to a lack of comprehensive data and technical capacity. Moreover, the absence of local expertise in AI hinders the development of models tailored to Africa's unique climate challenges and socio-economic contexts. Consequently, Africa risks falling behind in the global efforts to leverage AI for climate change mitigation and adaptation.

Building AI capacity among early-career researchers and policymakers is therefore essential. Expanding AI training opportunities, particularly for professionals in climate science and policy, will enhance decision-making and planning for climate resilience. Additionally, addressing gender disparities in AI is crucial to ensuring that women are adequately represented in the development and application of AI technologies for climate action. Gender-inclusive policies and targeted initiatives can help bridge this gap, empowering women to play a more active role in the AI and climate sectors.

1.4 The Leveraging Artificial Intelligence for Climate Resilience in Africa Project

To address the challenges associated with AI adoption in climate resilience, the Leveraging Artificial Intelligence for Climate Resilience in Africa project, being implemented by Africa Research and Impact Network (ARIN) and the University of Nairobi (UoN) is both crucial and timely. This initiative aims to harness the potential of AI to build adaptive capacities and mitigate climate-related risks across the continent.

1.5 Aim and Objectives of the Project

1.5.1 Project Aim

The project aims to establish a strong foundation for AI-driven climate resilience in Africa. Through strategic partnerships and collaborative efforts, it seeks to bridge the skills gap, foster AI innovation, and ensure that AI solutions are tailored to address Africa's unique climate challenges.

1.5.2 Specific Objectives

1.Enhance the capacities of early-career researchers in applying mathematical sciences and AI for climate action: The project will focus on capacity building by equipping researchers with the necessary tools and expertise to leverage AI in tackling climate challenges. This includes training and mentorship in AI, climate modelling, and data science.

2. Promote the institutionalisation of mathematical sciences and AI expertise for climate action: By integrating AI and mathematical sciences into national institutions, universities, and research centres, the project aims to embed AI expertise within Africa's climate adaptation and resilience frameworks, ensuring sustainable long-term support for climate action.

3. Develop a network of AI specialists and champions proficient in applying AI and mathematical sciences to climate change: The initiative will cultivate a cohort of AI professionals capable of advancing AI-driven climate solutions. These specialists will contribute to policy development and the formulation of strategies to address Africa's climate vulnerabilities effectively.

1.6 Objectives of the Inception Workshop

The Leveraging AI for Climate Resilience Solutions in Africa Project Inception Workshop, organized by the Africa Research and Impact Network (ARIN) in collaboration with the University of Nairobi (UoN) and other partners, aimed to advance the integration of artificial intelligence (AI) in climate resilience efforts across Africa. The workshop took place on Thursday, 30th January 2025, at the Sarova Panafric Hotel, Nairobi, and was conducted in a hybrid format, allowing for both in-person and virtual participation to accommodate a diverse range of stakeholders.

This report provides a summary of the key discussions, presentations, and insights shared during the workshop.

The workshop was guided by the following objectives:
1. Introduce and present the project's vision, objectives, scope, and anticipated outcomes to stakeholders.
2. Present the findings of the scoping and capacity needs assessment phase to stakeholders.
3. Gather feedback and validate the findings from the scoping analysis and needs assessment.
4. Foster a deeper understanding of how AI can be effectively leveraged to address climate change challenges across the continent.

1.7 Expected Outcomes of the Inception Workshop

1. Enhanced stakeholder understanding of the project's vision, objectives, scope, and goals.
2. Increased awareness of capacity needs and gaps in applying AI for climate action.
3. Prioritisation of critical capacity-building needs, including technical skills, infrastructure, and interdisciplinary collaboration.
4. Strengthened stakeholder commitment to supporting and participating in capacity-building initiatives

1.8 Expected Outputs of the Inception Workshop

1. Comprehensive inception workshop report documenting key discussions, decisions, and insights shared during the event.
2. A structured action plan outlining the next steps, including specific tasks, timelines, and a clear roadmap for implementation.

1.9 Inception Workshop Participants

The workshop convened a diverse group of stakeholders and partners, representing key sectors essential for advancing AI-driven climate resilience in Africa. The participants included (see full list in the appendix):

1. Policymakers and government representatives – Engaging decision-makers to align AI solutions with national and regional climate policies.
2. Researchers (advanced and early-career) and academicians – Bringing expertise in climate science, AI, and mathematical modeling.
3. Private sector innovators and tech companies – Showcasing AI-driven climate solutions and fostering industry collaborations.
4. Civil society organizations and community leaders – Ensuring community perspectives and locally relevant solutions are considered.
5. International development partners – Strengthening global partnerships for funding, capacity building, and knowledge sharing.
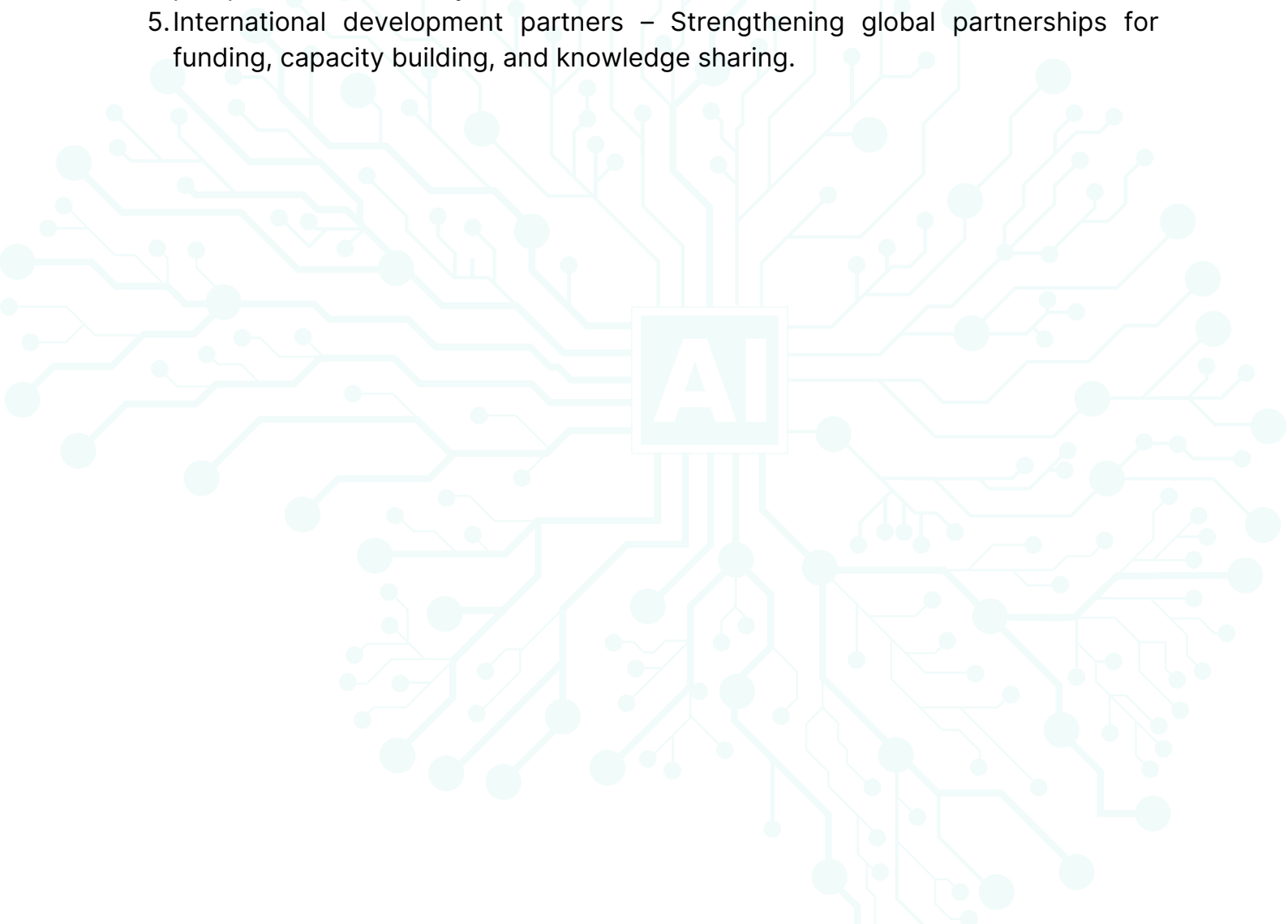
2.0 Opening Session

2.1 Opening Remarks

Dr. Joanes Atela, Executive Director of the Africa Research and Impact Network (ARIN), warmly welcomed participants to the inception workshop, emphasising the transformative role of Artificial Intelligence (AI) in addressing climate change challenges. He underscored the urgency of leveraging AI-driven solutions to enhance climate resilience, particularly in Africa, where climate-related impacts are increasingly severe. Dr. Atela highlighted AI's potential in analysing vast climate datasets, forecasting trends, and developing adaptive strategies to mitigate climate risks across the continent.

In his remarks, Dr. Atela elaborated on ARIN's mandate to consolidate evidence on effective climate adaptation strategies and facilitate the widespread implementation of best practices. He emphasised ARIN's role in bridging the gap between research and policy, ensuring that scientific findings inform decision-making at national and regional levels. Such evidence-driven approaches, he noted, are crucial for scaling practical solutions tailored to Africa's diverse contexts.

Dr. Atela also acknowledged the African Union's efforts in advancing the Science, Technology, and Innovation Strategy for Africa (STISA 2034)—a key framework for fostering impactful research and innovation to address the continent's climate challenges. He highlighted that the University of Nairobi and Makerere University have been identified as key institutions for AI curriculum development and research, making them pivotal in piloting this project.

Furthermore, he stressed the importance of integrating AI into national climate policies, particularly through Nationally Determined Contributions (NDCs), to ensure that AI-driven climate solutions are embedded in Africa's policy frameworks. Dr. Atela commended the collaboration between ARIN and its partners, calling for collective action to achieve these ambitious goals.

2.2 Keynote Address

Loise Ochanda, representing the International Development Research Centre (IDRC), delivered a compelling keynote address on the transformative role of Artificial Intelligence (AI) in Africa's development. She began by acknowledging that AI is already deeply integrated into daily life and holds the potential to revolutionise multiple sectors. Given this reality, she stressed the importance of equipping researchers with the necessary skills to contribute meaningfully to AI discourse, innovation, and policy shaping

However, Ochanda posed critical questions on how Africa can effectively harness AI for sustainable development. She emphasised the need to assess the continent's unique development challenges, explore AI-driven opportunities, and address the associated risks to ensure AI adoption aligns with Africa's socio-economic and environmental priorities.

To illustrate AI's transformative potential, she highlighted its growing impact across key sectors. In agriculture, AI-driven sensor networks facilitate smart farming, enabling real-time crop monitoring and early detection of plant diseases. In healthcare, AI-powered diagnostics, telemedicine, and chatbots have expanded access to medical services, particularly in remote areas with limited healthcare infrastructure. AI is also enhancing governance and financial inclusion through data analytics, which inform policy decisions, improve access to financial services, and strengthen transparency, playing a crucial role in anti-corruption efforts. In climate action, AI is being used to drive solutions such as predictive modelling for climate adaptation, biodiversity conservation, and the development of smart energy grids that improve sustainability.

Despite these advancements, Ochanda cautioned against several challenges that must be addressed to ensure AI's responsible and equitable integration in Africa. Ethical concerns and data privacy risks, particularly in AI-driven decision-making, remain critical issues. Algorithmic bias has the potential to exacerbate discrimination and exclusion if not carefully managed. Digital divides persist, with disparities in access to AI tools and technical literacy limiting participation from marginalised communities. The potential for job displacement also raises concerns in a region already grappling with employment insecurity.

Ochanda underscored the need for inclusive AI policies that balance technological advancement with workforce protection and fairness. She highlighted Kenya's AI Strategy for 2025–2030, which is currently open for public input, and urged African nations to actively participate in global AI policy discussions to shape governance frameworks that reflect the continent's priorities.

To maximise the impact of AI in Africa, she called for increased investment in AI research and innovation, improved AI literacy, and enhanced infrastructure to support AI adoption and scalability. She also stressed the importance of establishing a Community of Practice (CoP) to ensure AI solutions are ethical, contextually relevant, and aligned with institutional goals. The CoP, she noted, will facilitate collaboration among key institutions such as ARIN and the University of Nairobi while integrating local communities in the co-creation of AI-driven solutions tailored to Africa's development needs.

2.3 Reactions from the Keynote Address

The workshop discussions, building on the keynote address, underscored AI's potential to enhance climate resilience through improved data collection, predictive modelling, and decision-support tools. Participants explored AI applications in climate modelling, biodiversity conservation, and smart energy grid management, recognising its transformative role in climate adaptation. There was a strong emphasis on the need to strengthen AI capacity among African researchers and policymakers to ensure its effective integration into climate adaptation strategies.

Key ethical concerns, including data privacy, algorithmic bias, and the digital divide, were addressed, highlighting the necessity of a multidisciplinary approach that fosters collaboration between policymakers, social scientists, and technologists. The AI4D programme was presented as a model initiative demonstrating successful AI integration across various sectors. Discussions also examined AI development in Africa, climate finance distribution, and the role of contextual awareness in shaping sustainable solutions.

Experts provided insights into the current state of AI in Africa, its applications in research and climate adaptation, and the challenges related to infrastructure, funding, and policy implementation. Participants also deliberated on the limitations of existing AI models, the effectiveness of climate finance allocation, and the influence of global AI trends on Africa's technological landscape. A key recommendation was the need to engage policymakers more effectively to enhance their understanding of AI's role in climate adaptation. Ensuring the long-term sustainability of AI initiatives was also discussed, with suggestions including institutional partnerships, diversified funding mechanisms, and accessible educational resources such as recorded sessions for wider dissemination.

A recurring theme throughout the discussions was the importance of context in AI development. Many AI models rely on Western-centric datasets that often fail to capture the complexities of African languages, cultures, and socio-economic conditions. Participants stressed the need for Africa to develop its own AI models tailored to local needs rather than depending on imported technologies. Language processing was cited as a key example, with AI translation tools frequently struggling with African languages due to their tonal nature and complex grammatical structures. Without localised data, AI tools risk misinterpreting key phrases, leading to critical errors in sectors such as healthcare and governance.

Similarly, many existing AI tools assume uniform infrastructure and digital literacy levels across regions, making them less effective in African contexts. Concerns were raised about Africa's reliance on external policies and best practices, with participants cautioning against "outsourcing ambition" by adopting external AI models without sufficiently adapting them to local realities. Examples were given of AI strategies implemented without considering infrastructure limitations, resulting in policies that were difficult to enforce or operationalise effectively.

3.0 African Perspectives on Artificial Intelligence (AI)

3.1 Overview of AI advancement in Africa

Dr. Isaac Rutenberg, a keynote presenter at the workshop, provided an overview of AI advancements in Africa, emphasising that while AI development is progressing, it remains largely overlooked in global discussions. He highlighted several initiatives across the continent, showcasing emerging research and the establishment of AI research centres focused on responsible and inclusive AI development. Among these are the African Observatory on Responsible AI and the AI4D Africa Just AI Centre, both dedicated to ethical AI governance. He also discussed the African Research Center for Artificial Intelligence (ARCAI) in Congo Brazzaville and the Centre for AI Research (CAIR) in Pretoria, which focus on advancing AI innovations. In Nairobi, institutions such as the African Centre for Technology Studies (ACTS), the Centre for Intellectual Property and Information Technology Law (CIPIT), and the Lawyer's Hub play a crucial role in AI policy, legal frameworks, and technology governance.

These centres collectively aim to drive AI research, shape regulatory policies, and ensure AI contributes to Africa's sustainable development. Dr. Rutenberg also highlighted AI's applications in research, including drug discovery, data analysis, and climate adaptation, while acknowledging the challenges faced by African AI developers, such as limited computing resources, small datasets, and a lack of financial support. Despite these obstacles, local developers have adapted by working with smaller datasets—a trend now gaining global recognition.

Reflecting on his experiences in San Francisco, where AI innovations such as self-driving cars are already operational, he underscored the rapid global progress in AI while stressing that Africa remains underrepresented in these discussions. He emphasised the need for greater visibility and inclusion of African AI developments in the global AI landscape.

3.2 Benefits of AI to Research in Africa

Dr. Isaac Rutenberg's presentation highlighted the significant benefits of AI in advancing research across various sectors. He discussed how AI is automating administrative tasks, identifying biases in peer reviews, uncovering emerging research areas, and facilitating international collaboration. In agriculture, AI is being used to maximise crop yields while minimising environmental impact, with examples such as NjodFrey in Rwanda and Vaxus in Ghana leading the way.

He also highlighted how the private sector is leveraging AI, citing KoBold Metals, a Silicon Valley-backed company in Zambia, which uses AI to analyse geological data and locate valuable metals such as lithium and copper—key resources for Africa's role in the global green energy transition. In telecommunications, companies such as Safaricom are investing in AI to enhance customer experience and optimise network operations, employing AI-powered chatbots, predictive analytics for services such as M-Pesa, and automating network management.

Furthermore, Dr. Rutenberg noted the impact of DeepSeek, a Global South development backed by High-Flyer, a Chinese hedge fund, which has revolutionised AI with high performance and efficiency at lower costs. He emphasised that AI is transforming research, enhancing efficiency, and contributing to sustainable solutions across Africa and beyond.

3.3 The risks of AI in research management

Dr Rutenberg outlined the risks associated with AI in research, highlighting biases in algorithmic evaluation, the oversimplification of complex research proposals, and the tendency to favour popular topics over novel ideas. These issues can result in misaligned evaluation criteria and a lack of contextual understanding. Additionally, there is a risk of compromised transparency in decision-making processes, as well as the potential for manipulation, inadequate consideration of ethical implications, and the neglect of early-career researchers.

AI models also struggle to account for field-specific nuances, which can hinder their effectiveness in evaluating research across diverse disciplines. In the context of North-South AI collaborations, co-creation plays a crucial role in bringing together diverse stakeholders to develop innovative solutions collectively. This approach should be inclusive, drawing on the unique perspectives and expertise of participants from both developing and developed economies to ensure that solutions are holistic, sustainable, and responsive to the varied challenges faced across regions

3.4 Reactions to Dr Isaac Rutenberg's Presentation

Dr Isaac Rutenberg's presentation sparked an in-depth discussion on the intersection of climate finance, AI development, and ethical considerations. Participants highlighted the uneven distribution of climate finance, particularly in conflict-prone regions, and explored AI's potential as a tool for tracking funds. However, concerns were raised about data governance and privacy, especially regarding the risks of financial surveillance. It was noted that donors' risk aversion often leads to funding shortages in the most vulnerable areas, further exacerbating climate injustices.

The ethical challenges of AI were also examined, particularly its regulation in sectors such as social media and climate finance. Some participants observed that AI development has slowed in regions where social media platforms are subject to stricter regulations, raising questions about the balance between governance and innovation. The conversation expanded to AI's potential role in safeguarding workers' rights and job security in the face of increasing automation.

Reflecting on global AI trends, the workshop explored the case of DeepSeek, a disruptive AI startup that thrived despite limited resources. This example provided insights into how African AI developers could adopt similar strategies to build competitive models without relying on massive datasets. Additionally, concerns were raised about AI's environmental impact, particularly its high electricity and water demands, which could strain resource-scarce regions.

A key question emerged: should Africa prioritise AI development amidst ongoing energy challenges, or should it seek less resource-intensive approaches?

Ultimately, there was a strong consensus on the need for African-led AI research, policy development, and capacity building. Participants stressed the importance of ensuring AI is tailored to the continent's unique challenges and opportunities while remaining aligned with its available resources.
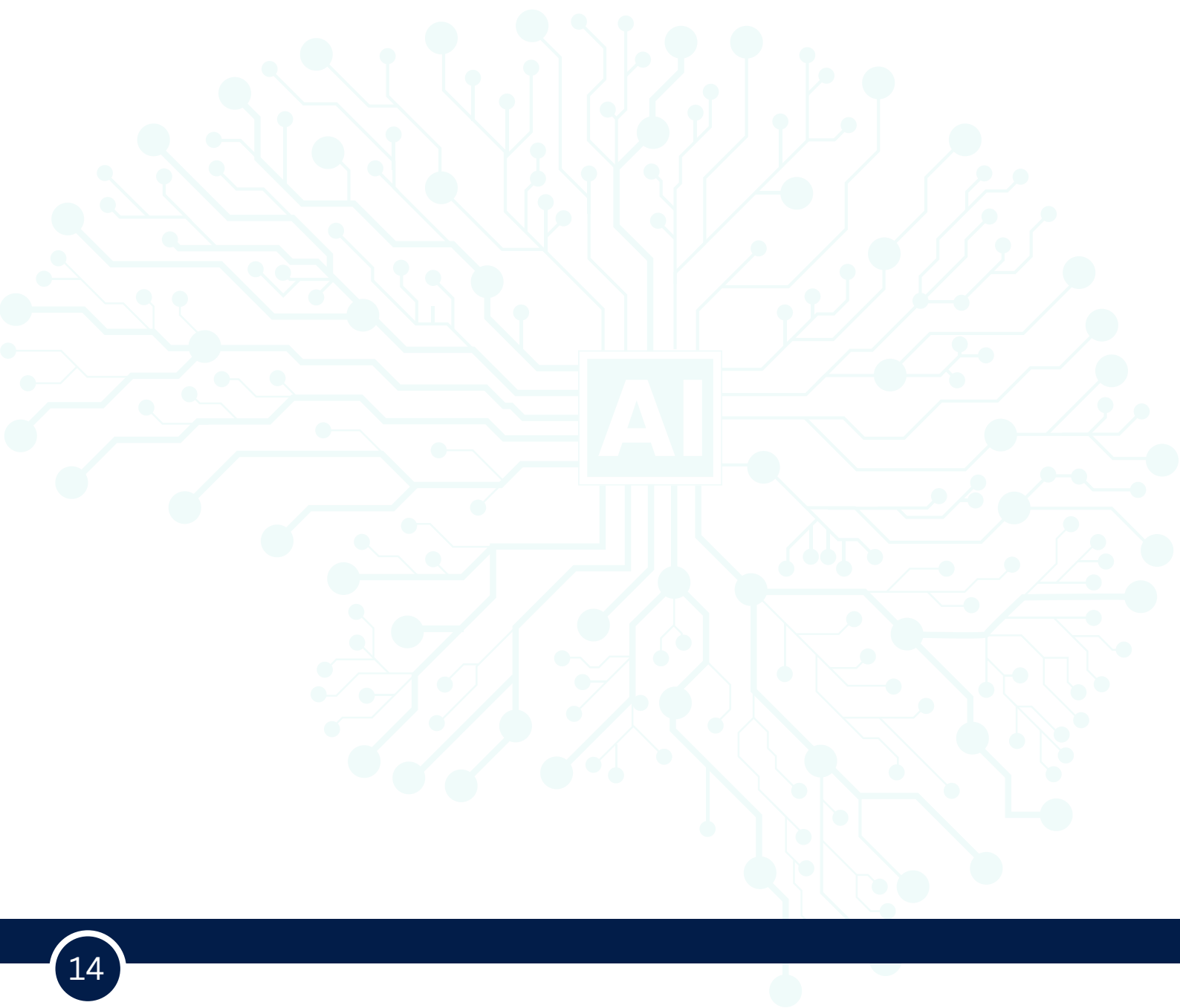
4.0 Findings from the Scoping and Evidence Synthesis Phase of the Project

4.1 AI Institutions Mapped

The initial mapping of AI institutions across 28 African countries identified a total of 307 institutions, with regional distributions as follows: West Africa (92), Central Africa (30), Southern Africa (55), East Africa (48), and North Africa (82). This exercise also provided insights into the scope of AI training offered, revealing a total of 1,394 AI-related courses across various academic levels:

Certificate level – 30 courses
Diploma level – 40 courses
Bachelor's degree level – 711 courses
Master's degree level – 456 courses
PhD level – 159 courses

The distribution of AI programs across Africa highlights regional variations in AI education and research:
West Africa – 459 programs
North Africa – 416 programs
Southern Africa – 261 programs
East Africa – 157 programs
Central Africa – 101 programs

The top five countries with the highest concentration of AI institutions were Egypt, Nigeria, Ghana, South Africa, and Zimbabwe, underscoring their pivotal role in advancing AI education and research on the continent. This mapping provides a critical foundation for understanding Africa's AI training and research landscape, identifying regional strengths, and pinpointing areas for further development.

The top five countries with the highest concentration of AI institutions in Africa
- Egypt
- Nigeria
- Ghana
- South Africa
- Zimbabwe

4.2 Capacity Building Initiatives in Africa

Several capacity-building initiatives across Africa are fostering AI talent and strengthening the continent's AI ecosystem:

- AI4D Africa provides grants, networking opportunities, and mentorship to support researchers and institutions, driving AI innovation across the continent.
- Deep Learning Indaba organizes workshops, lectures, and community-building events to strengthen AI networks and promote collaboration.
- Nigeria's "Data Science" Initiative aims to train one million AI professionals by 2030, addressing the growing demand for skilled talent.
- The African Institute for Mathematical Sciences (AIMS), backed by the Next Einstein Initiative, offers specialized training in machine learning to cultivate the next generation of African AI experts.
- Google AI Research Center in Ghana focuses on training local AI talent, fostering academic and research collaborations, and hosting community events.
- IBM Research Africa runs internship and fellowship programmes to nurture talent and stimulate innovation in AI research.
- UNICEF's Data Science and AI initiatives provide training and support for local governments and NGOs to ensure AI is leveraged for social good.
- The African Data Science Academy equips students and professionals with practical AI skills to address real-world challenges.
- The Alliance for AI (AI4Afrika) organizes workshops, develops learning resources, and connects stakeholders to build a more inclusive and collaborative AI ecosystem.

These initiatives collectively contribute to positioning Africa as an emerging hub for AI research, training, and innovation, ensuring that the continent actively shapes the global AI landscape.

4.3 Modes of Capacity Building

There are several modes of capacity building for AI development in Africa, focusing on education, skill development, collaboration, and awareness:

a.) Education and Skill Development
- University partnerships and curriculum development play a crucial role in integrating AI into academic programmes. Examples include AIMS and Google AI, University of Cape Town (UCT) Data Science Nigeria (DSN), and Makerere AI, which collaborate to enhance AI education.
- Online platforms such as Coursera, edX, and DataCamp provide open-access AI and data science courses, complemented by African-specific initiatives like Data Science Nigeria and Zindi.
- Professional AI and machine learning (ML) certifications from IBM, Microsoft, and Google further strengthen individual expertise.

b.) Hands-on Learning and Competitions

- AI competitions and challenges hosted on Zindi, Kaggle, and AI4D offer practical learning opportunities.
- Regional and national hackathons, such as Deep Learning Indaba and IndabaX, foster hands-on experience and community engagement.

c.) Collaborative projects with Industry

- AI research centres and innovation hubs play a pivotal role in advancing AI development. Leading research labs, such as Google AI Ghana, IBM Research Africa, and AIMS, contribute to cutting-edge innovation.
- Incubators and innovation hubs like Nairobi's iHub and South Africa's Tshimologong Precinct provide mentorship and support for AI-driven solutions.
- National AI research centres, including the Kenya AI and Data Science Consortium (KADSC), the Centre for Artificial Intelligence and Robotics (CAIR) in South Africa, and the Centre for Data Science and Artificial Intelligence Research (DSAIR) in Ghana, are instrumental in fostering AI research.

d.) AI Awareness and Literacy
- Workshops and community events, such as regional AI4D workshops and data science training at Strathmore University, introduce AI concepts to non-specialists.
- Public awareness campaigns, such as AI Awareness Month by iHub in Kenya, leverage media and community outreach to promote AI literacy.
- Inclusive AI literacy programmes aim to ensure broad participation in the AI workforce, making AI development accessible to all.

4.4 Barriers to Capacity Building Initiatives in Africa

Africa faces several challenges in advancing AI, including:

a.) Insufficient Funding and Investment
- Limited financial support hinders the growth and sustainability of AI initiatives.

b.) Shortage of Skilled AI Professionals and Educators
- The lack of AI expertise contributes to brain drain, as talent migrates to other regions in search of better opportunities.

c.) Inadequate Infrastructure and Training Programmes
- Poor infrastructure for AI research and the absence of locally relevant AI curricula further exacerbate capacity-building challenges.

d.) Weak Policy and Regulatory Support
- Fragmented policies and a lack of regional collaboration prevent the development of a cohesive AI ecosystem.

e.) Limited Awareness and Inclusion
- Underrepresented communities face barriers to AI adoption due to low awareness and accessibility issues.

f.) Challenges in Data Access and Governance
- Inconsistent data policies and governance frameworks hinder the development of effective AI models tailored to Africa's unique needs.
- Examples include underfunded AI research centres and gaps in training programmes in Nigeria and South Africa, which struggle to meet the growing demand for AI expertise.

4.5 Artificial Intelligence (AI) Policy and Regulatory Policy Framework

4.5.1 Regional Strategies

AI regional strategies in Africa aim to create a unified approach to AI development and deployment across the continent. **The AU Continental Strategy for AI** seeks to enhance Africa's global competitiveness by fostering AI innovation, ensuring ethical governance, and building sustainable AI infrastructure. Similarly, the **Bletchley Declaration** underscores AI's potential in addressing Africa's socio-economic challenges while promoting collaboration between governments, the private sector, and research institutions. The **AU Digital Transformation Strategy** provides a roadmap for leveraging digital technologies, including AI, to drive economic growth, improve public service delivery, and enhance key sectors such as health, education, and infrastructure. Additionally, the **Smart Africa Initiative** is a pan-African programme focused on using ICT and AI to advance socio-economic development. *Notably, the initiative implements projects such as the* Smart Africa Digital Agenda, which promotes digital inclusivity, innovation, and the integration of AI technologies across member countries.

4.5.2. National AI Strategies

Around ten (10) African nations have developed national AI strategies to drive technological advancement and economic growth. For instance, Rwanda's AI Policy 2023 aims to position the country as a leader in AI adoption, while Benin's AI and Big Data Strategy (2023-2027) focuses on harnessing data for socio-economic development. Egypt's AI National Strategy (2021) and Morocco's Digital AI Strategy emphasize AI in governance, health, and industry. Mauritius introduced its AI Strategy in 2023 to foster digital innovation, and Sierra Leone's National Innovation & Digital Strategy prioritizes AI for sustainable growth. Senegal and Ghana, with their respective AI strategies, seek to enhance local AI capabilities and innovation, while Algeria's AI Strategy (2020-2030) focuses on advancing AI in public services. Kenya's Robotics & AI Strategy Bill 2023, along with the National Draft Strategy (2023-2025), targets responsible AI development and integration into national policies. While only six African countries have made AI a national priority, there is a growing push for greater regional collaboration and integration of AI into broader development strategies.

4.5.3 Other Regulatory Frameworks and Strategies

Several African countries are implementing strategic frameworks to advance AI and digital technologies. Notable examples presented in the workshop include Kenya's National Digital Master Plan (2022-2032), which aims to foster a thriving digital economy with a strong emphasis on AI and robotics. Nigeria has established the National Centre for AI and Robotics to lead research and innovation in these fields. Egypt introduced its Charter for AI (2023), alongside the National Council for AI (2019), to guide AI development and ensure ethical applications. Rwanda's Centre for the 4th Industrial Revolution supports the growth of emerging technologies, including AI, while Senegal's Data Protection Commission oversees AI regulation to safeguard privacy and data security. Ghana has developed a Readiness Assessment for the Ethical Use of AI, focusing on AI ethics and governance. Additionally, Kenya's National Robotics and AI Commission promotes the responsible development of AI technologies to drive national innovation and economic growth.

4.5.4 Challenges in AI Regulatory Frameworks Development

The advancement of artificial intelligence in Africa faces several challenges, including limited infrastructure, unreliable internet, and low computational capacity that hinder AI development and adoption. A significant skill gap exists due to a shortage of AI-trained professionals and technical expertise. Data-related challenges, such as poor-quality local data, weak governance structures, and concerns over privacy and security, further impede progress. Funding constraints limit AI innovation, while policy fragmentation results in inconsistent regulations across different countries, preventing a unified AI governance approach. Ethical and cultural concerns, including bias in AI systems and a lack of inclusivity, present additional barriers.

Moreover, dependence on foreign technology restricts local innovation, and slow policy development means regulatory frameworks often fail to keep pace with the rapid evolution of AI. Addressing these challenges requires targeted discussions, stronger regional collaboration, and comprehensive strategies to ensure the sustainable and ethical integration of AI.

4.6 AI Research Funding Landscape in Africa

The AI research funding landscape in Africa is evolving, with 38 funders supporting 275 AI research initiatives across the continent. Kenya leads with 33 initiatives, followed by South Africa and Nigeria, each with 26 projects. Major funders, including the International Development Research Centre (IDRC), Microsoft, and Google, are investing in AI-driven solutions in key sectors such as climate change, health, and education. IDRC stands out as a leading funder, supporting numerous projects that leverage AI for sustainable development.

Funding initiatives have been mapped by region and country, covering both completed and ongoing projects, reflecting AI's growing role in tackling Africa's challenges. While a portion of funding is allocated to capacity building and infrastructure, a significant share supports applied research and innovation. However, disparities in funding distribution persist, with some regions receiving limited investment. Strengthening collaborations between local institutions, governments, and global tech firms is vital to expanding funding opportunities and ensuring impactful AI research across Africa

The Science Granting Councils Initiative (SGCI) plays a critical role in enhancing AI research funding in sub-Saharan Africa by strengthening national research councils. It supports research funding, policy shaping, and cross-border collaboration. Notable AI projects funded by SGCI include precision farming and food security research in South Africa, AI applications in climate resilience in Kenya, and predictive disease modeling in Nigeria.

Additionally, SGCI fosters collaborations among African universities and research institutions, ensuring that AI solutions are tailored to local needs. Through knowledge-sharing and capacity-building, SGCI equips African researchers with the necessary resources to drive AI innovation and strengthen national science systems, contributing to sustainable development across the continent.

4.7 Capacity Needs Assessment Findings on the Status of AI in Africa

The capacity needs assessment on AI in Africa highlights significant gaps in expertise, particularly in climate change and AI integration. While many researchers possess advanced climate resilience knowledge, 70% have not received formal AI training, with only 30% having undergone AI-specific training. This underscores a critical need for capacity building in machine learning, data analytics, mathematical modeling, deep learning, climate science, and statistical modeling.

The application of AI in climate resilience remains limited, with only 19% of projects incorporating AI techniques.

Researchers expressed a strong demand for training in climate modelling, machine learning, advanced statistical methods, and data visualisation, alongside AI programming, ethics, and responsible AI. Institutional capacity is also insufficient, as 71% of respondents reported that their institutions do not offer AI programmes, while only 22% confirmed the existence of a dedicated AI research and training centre. Leading institutions driving AI research in Africa include the African Institute for Mathematical Sciences (AIMS) in Rwanda and South Africa, which specialises in machine learning through its Next Einstein Initiative; Makerere University AI & Data Science Research Lab (Uganda), which focuses on healthcare, agriculture, and climate resilience applications; and the University of Cape Town AI Research Unit (South Africa), which conducts AI and data science research in finance, health, and sustainability.

Among institutions offering AI programmes, 25% reported embedding AI within existing courses, while 33% have an AI training strategy for staff, and 22% are in the process of developing one. Researchers identified a strong need for practical AI training, including research projects, workshops, fieldwork, case studies, and internships. However, 35% of institutions lack the necessary infrastructure for AI research in climate resilience, citing major challenges such as funding constraints, shortages of faculty expertise, weak collaboration between universities and industry, inadequate infrastructure, and limited access to high-quality data. To address these challenges, partnerships with NGOs, community-based organisations (CBOs), the private sector, and government agencies were recognised as crucial in strengthening AI capacity and innovation across Africa.

4.8 Barriers to AI for Climate Resilience Research

AI research in climate resilience faces several challenges, including insufficient funding, technological limitations, a shortage of expertise, and stakeholder resistance. Overcoming these barriers requires targeted training programmes, collaboration with the private sector, and increased investment in AI infrastructure to strengthen Africa's AI research capabilities.

Findings from the scoping process indicate that while AI capacity-building initiatives are emerging across Africa, they are hindered by infrastructure gaps, limited data accessibility, and a shortage of skilled professionals. Addressing these obstacles necessitates the establishment of strong partnerships that promote AI mentorship programmes, enhance research opportunities, and drive innovation, ensuring the sustainable growth of AI for climate resilience across the continent.

4.9 Discussions from the Scoping and Capacity Needs Assessment

4.9.1 Domestic Investments in AI

Some science granting councils in Africa have started funding AI research, demonstrating a growing recognition of its potential. However, scaling up these investments remains a challenge, limiting the ability to drive innovation, local AI development, and sustainable integration into key sectors. Expanding domestic funding requires stronger policy frameworks, increased government support, and private-sector engagement to ensure AI contributes effectively to Africa's development priorities.

4.9.2 Distribution of AI Programs and Brain Drain

Despite the presence of numerous AI programmes across Africa, brain drain remains a significant challenge, as many graduates seek opportunities abroad due to better funding, infrastructure, and career prospects. While some institutions are integrating AI into existing curricula, it is not always a standalone focus, underscoring the need for more specialised training and dedicated AI research centres. Strengthening local AI ecosystems through targeted investments, improved infrastructure, and enhanced career opportunities is crucial to retaining talent and advancing AI innovation within the continent.

4.9.3 Integration of AI into Curricula

AI education should be introduced at primary and secondary levels to equip future generations with essential technological skills from an early age. Additionally, AI training at higher education institutions must be aligned with industry needs, ensuring that graduates acquire practical, job-ready skills in areas such as machine learning, data science, and AI ethics. Strengthening partnerships between academia, industry, and policymakers will be key to developing comprehensive AI curricula that support Africa's digital transformation and economic growth.

4.9.4 Concerns About AI and Innovation

There are growing concerns that AI tools, such as GPT, could hinder innovation by fostering over-reliance on automated responses rather than encouraging critical thinking and problem-solving skills among students. As AI becomes more integrated into education, it is crucial to adapt teaching methodologies to promote deep learning, analytical reasoning, and creativity. Educators must balance leveraging AI for efficiency and ensuring that students develop the ability to think independently and innovate in their respective fields.

4.9.5 The Four Lenses of AI

Artificial Intelligence operates across four fundamental areas: problem-solving, decision-making, reasoning, and learning. While AI enhances decision-making and reasoning, human oversight remains crucial to ensure ethical and contextually appropriate applications. When integrating AI concepts into education, the emphasis should be on developing transferable skills that foster adaptability and critical thinking, rather than solely addressing immediate challenges.

This approach equips students with the foundational knowledge to navigate and contribute meaningfully to the evolving AI landscape.

4.9.6 The Need for Robust Structures and Ethical Considerations

Despite the growing enthusiasm for AI integration, Africa lacks robust structures and ethical frameworks to regulate its use effectively. The proliferation of AI-generated content on social media raises concerns about misinformation, bias, and data privacy, underscoring the urgent need for comprehensive regulations. Establishing clear governance structures and ethical guidelines is essential to ensure responsible AI deployment, protect users, and promote trust in AI-driven solutions across various sectors.

4.9.7 Technology and Critical Thinking in the Modern Era

The increasing reliance on technology raises concerns about its impact on critical thinking and cognitive development. Unlike previous generations, who engaged in activities that nurtured creativity, problem-solving, and social skills, excessive screen time today may lead to reduced emotional intelligence and critical reasoning abilities. While digital tools provide vast learning opportunities, balancing technology use with real-world interactions is essential to foster holistic intellectual growth. Encouraging active learning, face-to-face engagement, and hands-on problem-solving will help mitigate the potential downsides of digital dependence.

4.9.8 Bridging the Gap Between Academic Excellence and Practical Application

Despite achieving academic excellence, many university students struggle to apply their knowledge in real-world scenarios due to the dominance of rote learning. AI education must address this gap by integrating practical experience, hands-on projects, and industry collaboration into curricula. Encouraging problem-based learning, internships, and partnerships with the private sector will equip students with the critical thinking and technical skills needed to drive innovation and tackle real-world challenges effectively.

4.9.10 Protecting Intellectual Property in AI Research

Intellectual property (IP) protection is essential for safeguarding AI research and innovation in Africa. Without robust IP management, researchers risk losing ownership of their work, especially when projects are funded by external organisations. This challenge is further compounded by unclear legal frameworks governing AI-generated outputs. Strengthening IP policies and enforcement mechanisms will ensure that local innovators retain rights to their contributions, fostering a more sustainable and competitive AI ecosystem. Additionally, increasing awareness and providing legal support on patent rights, copyrights, and data ownership will empower researchers to commercialise and scale their innovations effectively.

5.0 Break-out Session Discussions

5.1 Group 1: Research and Academia- Capacity Development and Institutionalisation of AI Skills and Outcomes in Africa

5.1.1 Research Questions

1. What gaps exist in curricula, teaching capacity, and infrastructure to support AI education? How can the current project contribute to bridging these capacity gaps?

2. How can collaborations with international organisations, tech companies, and governments help close the skills gap and promote equitable access to AI knowledge and technology across institutions? How can the current project enhance these collaborations?

5.1.2 Gaps in Curricula, Teaching Capacity, and Infrastructure to Support AI Education

AI education in Africa faces several critical challenges, including outdated curricula, limited faculty awareness, and a shortage of AI expertise. Many institutions lack dedicated AI courses, and existing programmes fail to keep pace with the rapidly evolving industry demands.

A major gap exists in both curricula design and teaching capacity, as many lecturers lack AI training, limiting their ability to effectively educate and mentor students. Additionally, there is a disconnect between students' and teachers' understanding of AI, creating confusion about its purpose and practical applications.

Infrastructure deficits, such as insufficient access to advanced computational resources, further restrict opportunities for hands-on AI training and research. Addressing these challenges requires curriculum reforms, faculty capacity building, and significant investment in AI infrastructure to equip African institutions with the tools necessary to foster AI innovation and research.

5.1.3. Bridging the Capacity Gaps

The current project can help bridge AI capacity gaps in Africa through the following strategies:

1. *Co-developing Curricula:* Collaborating with industry partners to ensure AI programmes are aligned with market needs and technological advancements.
2. *Capacity-Building Initiatives:* Providing lecturer training, mentorship programmes, and workshops to enhance faculty members' AI expertise and teaching capabilities.
3. *Infrastructure Support:* Establishing AI labs and improving access to computational resources to enable hands-on learning and advanced research.
4. *Promoting South-South Collaboration:* Encouraging knowledge-sharing and resource exchange across African countries to reduce dependence on external funding and drive regional AI innovation.

5.1.4   Collaborations to Close the Skills Gap and Promote Equitable Access

Strategic collaborations with international organisations, tech companies, and governments can significantly contribute to closing the AI skills gap and ensuring equitable access to AI knowledge and technology by:

1. Providing Resources and Funding: Supporting AI research and education initiatives through financial investment, technical expertise, and access to cutting-edge tools.
2. Facilitating Knowledge Exchange: Organising joint research projects, workshops, and training programmes to enhance AI capacity-building efforts.
3. Ensuring Equitable Access: Expanding access to AI tools and platforms, particularly in under-resourced regions, to provide equal learning opportunities for students and researchers.
4. Shaping Policy and Regulatory Frameworks: Advocating for policies that prioritise AI development while ensuring ethical and responsible AI use.

5.2 Private Sector and Tech Companies: The Role of the Private Sector and Tech Companies

5.2.1 Research Questions

1. What are the key opportunities and frameworks for fostering long-term, mutually beneficial collaborations between the private sector and higher learning institutions to institutionalize AI skills?

2. How is the private sector currently contributing to AI capacity development in Africa, and what are some successful initiatives supporting AI education or research in African institutions? What challenges do private companies face when partnering with higher learning institutions for AI skill development? How can the current project address the challenges?

5.2.2 Opportunities and Frameworks for Fostering Long-Term Collaborations

Key opportunities for fostering long-term, mutually beneficial collaborations between the private sector and higher education institutions include:

1. Curriculum Development Partnerships – Collaborating to co-develop AI curricula that align with industry needs, ensuring that students acquire the skills and knowledge demanded by the job market.

2. Sponsorship of Research – Encouraging private sector companies to fund research initiatives within universities, particularly in AI applications related to climate change, health, and other critical sectors, to yield practical, real-world solutions.

3. Internship Programmes – Providing students with hands-on experience in AI through internships, exposing them to industry practices while helping companies identify and nurture emerging talent.

5.2.3 Private Sector Contributions to AI Capacity Development

The private sector is actively contributing to AI capacity development in Africa through various initiatives:

Providing training programmes focused on AI and software development,	Supporting data-driven journalism and the development of AI applications for social good, offering students opportunities to work on impactful projects.	Delivering AI and data science training to help build a skilled workforce capable of meeting the increasing demand for AI expertise.

5.2.4 Challenges Faced by Private Companies in Partnering with Higher Learning Institutions

Private companies encounter several challenges when collaborating with universities, including:

1. Slow Bureaucratic Processes - Lengthy and complex procedures for formalising partnerships with higher education institutions can delay collaboration efforts.
2. Misaligned Priorities - Discrepancies between the academic objectives of universities and the industry needs of private companies can hinder effective cooperation.
3. Limited Faculty Expertise - A shortage of faculty members with advanced AI expertise can affect the quality of AI education and limit the impact of industry collaborations.
4. Poor Data Accessibility and Quality – Insufficient access to high-quality data for AI model development can impede progress in both academic and industry-led AI initiatives.

5.2.5 Addressing the Challenges

The current project can address these challenges by:

1. *Advocating for Open Data Policies* – Promoting data-sharing agreements and open data policies to enhance access to high-quality datasets for AI research and development.
2. *Improving AI Literacy in Academia* – Supporting faculty development programmes to strengthen AI expertise among lecturers, enabling them to teach and conduct research more effectively.
3. *Facilitating Experiential Learning* – Integrating internships and research funding into AI education, allowing students to gain hands-on experience and contribute to industry-relevant projects.
4. *Streamlining Partnership Processes* – Assisting universities in simplifying bureaucratic procedures to foster more efficient and productive collaborations with the private sector.

5.3 Government and Supporting Agencies: Role of Government and Other Supporting Agencies in Policy Development and Application

5.3.1 Research Questions

1. What frameworks can governments adopt to develop AI-inclusive policies that address local and national needs while integrating AI into policymaking processes, such as data-driven decision-making and forecasting?

2. What strategies can governments implement to fund AI capacity-building programmes and infrastructure development? How can they leverage public-private partnerships and international funding mechanisms or development agencies to ensure sustainable financing for AI initiatives?

5.3.2 Frameworks for Governments to Create AI-Inclusive Policies

Governments can adopt several frameworks to ensure AI policies are inclusive and address local and national needs:

1. **Multi-Stakeholder Approach** – Engaging government, academia, and industry in the policymaking process ensures that AI policies reflect societal needs. This collaboration fosters innovation, growth, and the responsible use of AI.
2. **Ethical AI Governance** – Governments should prioritise ethical considerations, including human rights protections, to guide AI development. Ensuring AI systems are fair, transparent, and accountable will foster public trust.
3. **Public Participation** – Actively involving citizens and communities in AI policy discussions ensures that AI policies reflect diverse needs and concerns, making them more inclusive and responsive.
4. **Alignment with Global and Regional Frameworks** – Governments should align national AI policies with international standards, such as those set by the African Union or the European Union, to ensure cohesion and consistency in global AI governance.

5.3.3 Strategies for Funding AI Capacity-Building Programmes

To ensure sustainable financing for AI capacity-building and infrastructure development, governments can adopt the following strategies:

1. **Public-Private Partnerships (PPPs)** – Governments should encourage collaboration between the public and private sectors. Through PPPs, AI initiatives can be funded through a combination of government investment and private sector expertise, ensuring both financial support and practical applicability.

2. **International Funding Mechanisms** – Leveraging international development agencies, such as the World Bank, or regional initiatives, like the African Development Bank, can provide critical funding for AI capacity-building programmes. These funding sources can support the creation of AI research hubs, infrastructure development, and academic training programmes.

3. **Tax Incentives for AI Initiatives** – To support long-term AI integration, governments can offer tax waivers or deductions for AI-driven start-ups and initiatives. This would help incentivise private-sector investment in AI research, innovation, and education.

4. **Development of AI Innovation Hubs** – Governments can create innovation hubs that offer funding and resources for AI start-ups, fostering an environment of creativity and collaboration that can lead to sustainable AI solutions. These hubs can also serve as training and knowledge-sharing platforms for students and researchers.

6.0 Conclusion and Way Forward

6.1 Closing Remarks

Prof. Daniel Olago of the Institute of Climate Change Adaptation at the University of Nairobi underscored the critical need to integrate AI into diverse fields, particularly climate science and STEM education, to keep pace with the rapidly evolving AI landscape. He emphasised the importance of mentorship, collaboration, and teamwork in maximising AI's potential, as collective intelligence fosters innovation. Acknowledging the challenges AI adoption faces in African education systems—especially with subjects like mathematics and physics often perceived as difficult—he proposed innovative teaching methods to make these subjects more accessible and engaging, thereby fostering a deeper understanding of AI.

He also highlighted the transformative impact of recent advancements in generative AI and large language models, which have significantly expanded AI's possibilities. On climate change, Prof. Olago noted the complexity of the issue and stressed the necessity of integrating AI with scientific knowledge to develop innovative, sustainable solutions. He advocated for Africa to take a leadership role in AI development, emphasising South-South collaborations and the importance of African-led solutions, rather than merely adopting Western models.

Addressing innovation and patenting, Prof. Olago pointed out the high costs of patent registration as a barrier for African inventors and called for more accessible mechanisms to protect and commercialise innovations. He encouraged partnerships between the public and private sectors to ensure AI's benefits extend across the region.

In conclusion, Prof. Olago urged the creation of networks and collaborations among academia, government, and the private sector to institutionalise AI research and capacity-building, fostering a critical mass of AI-skilled professionals poised to drive Africa's technological advancement and global impact.

6.2 Next Steps

Following the AI inception workshop, the next steps will focus on strategic initiatives to advance AI education, research, and application across Africa.

Curriculum Development: Collaborative efforts will be made to co-develop AI curricula aligned with industry needs, ensuring that AI education is both practical and up-to-date. This will involve partnerships with industry experts and stakeholders. The University of Nairobi and Makerere University, alongside ARIN, will spearhead this initiative.

Call for fellows: A call for AI Fellows will be issued to attract talented individuals with expertise in AI, machine learning, data science, and related fields from both academia and the policymaking space. The fellowship programme will focus on building capacity in AI research and application, with an emphasis on addressing challenges in sectors such as climate change, healthcare, agriculture, and sustainable development. The programme aims to create a network of highly skilled AI professionals who will become leaders in AI research and capacity building, driving AI innovation across Africa.

The call for fellows will seek individuals passionate about using AI for social good and those interested in contributing to the development of AI policies and practices that align with ethical standards and local needs.

Module Development: ARIN, together with the University of Nairobi, will spearhead module development to enhance the capacities of the selected fellows. These modules will be designed to equip both current and future AI professionals with the necessary skills and knowledge to effectively apply AI in key sectors such as climate change, agriculture, healthcare, and sustainable development.

Capacity Building: A key focus will be on strengthening AI capacity among both faculty and students. This includes setting up mentorship programmes, offering specialised training, and establishing AI research units in institutions. These efforts aim to ensure a sustainable AI talent pipeline capable of addressing Africa's development challenges.

Public-Private Collaborations: Strengthening partnerships between the private sector, government, and academia will be critical in enhancing research, infrastructure, and access to AI technologies. The workshop underscored the importance of fostering long-term relationships with technology companies to build sustainable AI ecosystems. Such collaborations will support AI innovation, policy development, and real-world applications across various sectors.

6.3   Dissemination of the Inception Workshop

The proceedings of the Inception Workshop will be widely disseminated through the following channels:

- *Institutional and Project Websites:* A detailed summary of the workshop discussions, key outcomes, and next steps will be published on the websites of participating institutions, including ARIN, the University of Nairobi, and Makerere University.

- *Social Media Platforms*: Key highlights, will be shared on platforms such as Twitter, LinkedIn, and Bluesky.

- *Newsletters and Mailing Lists:* The workshop report and key findings will be distributed through institutional newsletters and mailing lists to reach policymakers, academia, private sector stakeholders, and AI practitioners.

- *Media Engagement (Op-Ed Articles):* Opinion editorials (Op-Eds) will be published in major news outlets to highlight key takeaways from the workshop, emphasizing AI's role in Africa's development. These Op-Eds will provide expert perspectives, policy recommendations, and practical insights for AI adoption and governance.

- *Conference and Academic Forums:* Workshop findings and recommendations will be presented at the 5th ARIN International Conference, providing an opportunity for deeper discussions and stakeholder engagement. ARIN staff will also disseminate insights from the workshop at other policy engagements and academic conferences they attend, ensuring broader outreach to relevant networks.
- *Policy Briefs and Reports:* A comprehensive workshop report, alongside concise policy briefs, will be developed and shared with policymakers, funding agencies, and industry leaders to inform future AI initiatives and decision-making.

Below are ARIN Social Media Details:

1. ARIN LinkedIn Page: https://www.linkedin.com/posts/arin-africa_ai-resilience-challenges-activity-7291081318367391744-sxig?utm_source=share&utm_medium=member_desktop&rcm=ACoAAAw1tAMBd8BWnaU_dQ4p3QUdsuVqjzv1lS0
2. ARIN YouTube Channel: https://youtu.be/TP1Z6C46J-8
3. The Dive: https://youtu.be/TP1Z6C46J-8
4. Africa Business News: https://youtu.be/TP1Z6C46J-8

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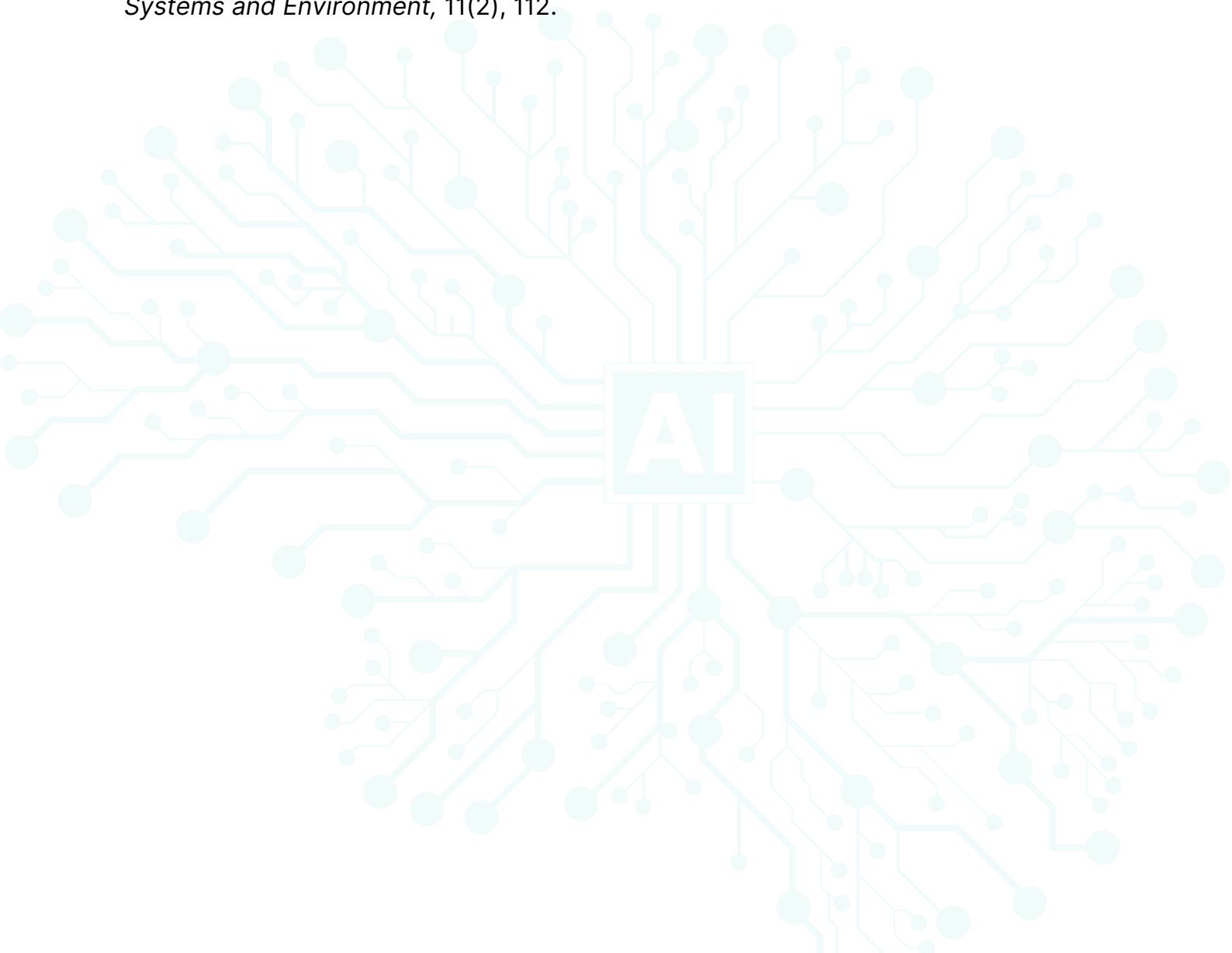
8.0 ANNEXES

8.1 Annex 1: Programme of the Inception Workshop

LEVERAGING ARTIFICIAL INTELLIGENCE FOR CLIMATE RESILIENCESOLUTIONS IN AFRICA PROJECT

Theme: Bridging AI Potential and Capacity Gaps for Climate Resilience in Africa

AGENDA FOR THE INCEPTION WORKSHOP

Date:30th January, 2025   **Venue: Sarova Panafric Hotel**

Time	Activities	In-Charge
08:30-09:00	Arrival and Registration	Nancy Mutwii-ARIN
09:00-09:05	Introduction of the Participants	Washington Kanyangi-ARIN
09:10- 09:20	Opening and Introductory Remarks	Dr. Joanes Atela-ARIN, Prof Daniel Olago-UoN
09:20-09:40	Keynote Address	Loise Ochanda-IDRC
09:40-10:00	Overview of the Project: Vision, Objectives, Scope, and Anticipated Outcomes to Stakeholders	Dr. Humphrey Agevi-ARIN
10:00-10:30	**Coffee Break**	
10:30-11:00	Status of AI Framework in Africa	Dr Isaac Rutenberg-ICRAF
11:00-11:30	Role of AI in Policy Development	Mr. Rajab I. Mbaruku-KNBS
11:30-12:00	Presentation of Key Findings: Scoping and Capacity Needs Assessment	Dr. Humphrey Agevi-ARIN
12:30-1:00	Q/A Session	Dr. Humphrey Agevi-ARIN
1:00-2:00	**Lunch Break**	
2:00-3:00	Break-Out Session	Washington Kanyangi-ARIN
3:00-3:30	Presentations from the Break-out Session	
3:30-3:40pm	Key insights and Next Steps	Dr. James Kaoga-UoN
Closing and Departure		

8.2 Annex 2: Concept Note for the Workshop

LEVERAGING ARTIFICIAL INTELLIGENCE FOR CLIMATE RESILIENCE IN AFRICA PROJECT

Concept Note for the Inception Workshop

Introduction and Rationale

Climate change continues to present significant challenges across Africa, impacting ecosystems, livelihoods, and economies. This has been attributed to over-dependence on climate-sensitive sectors and the lack of the necessary institutional, technological, and financial capacity by these countries to reduce emissions and build resilience against climate change. The urgency to address these impacts requires innovative, scalable, and data-driven solutions. Artificial Intelligence (AI) offers immense potential to enhance climate resilience through predictive analytics, real-time data processing, and informed decision-making.

However, the major challenge that hinders progress is the lack of adequate skills to deploy and interpret AI in climate modeling for resilience planning and resource allocation across contexts. This gap stems primarily from two factors: limited training opportunities in AI-related Science, Technology, Engineering, and Mathematics (STEM) subjects within Africa, and a persistent gender disparity within the AI field, reflected in the low number of women in academia and the AI workforce. The need to build capacity in AI for early career researchers and policymakers in Africa is particularly critical. Governments and stakeholders across the continent face challenges in adopting adequate and inclusive reporting frameworks for climate action due to a lack of crucial data to inform policy. AI expertise can significantly enhance Africa's ability to strengthen resilience, and effectively report on progress towards these goals.

The Leveraging Artificial Intelligence for Climate Resilience in Africa project aims to harness AI's potential to build adaptive capacities and mitigate climate-related risks. It seeks to achieve this through the following specific objectives,

1. Strengthen the capacities of early career researchers to apply mathematical Sciences and AI for Climate Action.
2. Foster the Institutionalization of Mathematical Sciences and AI skills and expertise for climate Action.
3. Cultivate a cohort of AI specialists/champions proficient in applying mathematical sciences and AI to address climate change.

Objectives of the Inception Workshop

1. Introduce and present the project's vision, objectives, scope, and anticipated outcomes to stakeholders.
2. Present findings of the scoping and capacity needs assessment phase to the stakeholders.
3. Gather feedback and validate the findings from the scoping analysis and needs assessment
4. Foster a deeper understanding of how AI can be effectively leveraged to address climate change issues on the continent.

Expected Outcomes of the Inception Workshop

1. Enhanced understanding of the project's vision, objectives, scope, and goals among stakeholders
2. Increased understanding and awareness of the current state of capacity needs and gaps in applying AI for climate action.
3. Prioritized Capacity building needs on most critical capacity gaps that need to be addressed, such as technical skills, infrastructure, or interdisciplinary collaboration.
4. Strengthened commitment from stakeholders to support and participate in capacity-building initiatives.

Expected Outputs of the Inception Workshop

- An inception workshop report outlining detailed discussions, decisions, and insights during the workshop.
- A concrete action plan for the next steps, including specific tasks, timelines, and a clear road map.

Participants

The workshop will bring together:

1. Policymakers and government representatives.
2. Researchers (advanced and ECRs) and academicians in climate science and AI space.
3. Private sector innovators and tech companies.
4. Civil society organizations and community leaders.
5. International development partners

Inception Workshop Format

The inception workshop will be a hybrid and online attendance consisting of physical to maximize inclusivity and accessibility, and will consist of:

1. *Opening remarks:* This will be done by the project funder representative, International Development Research Centre (IDRC).
2. *Overview of the Project:* This will be presented by both ARIN and UoN
3. *Presentation of the Key Findings:* The key findings of the scoping phase together with capacity needs assessment will be done.
4. *Breakout Groups:* Thematic discussions and co-creation exercises in smaller groups for targeted engagement.

8.3 Annex 3: Photos from the Workshop Session

Dr. Joanes Atela ,Executive Director ARIN offering the session's opening remarks

Ms. Loise Ochanda ,Program Officer Artificial Intelligence for Development-Africa delivering a keynote speech

Dr Isaac Rutenberg-ICRAF presenting on Status of AI Framework in Africa

Workshop session in progress

Dr. Humphrey Agevi ,Director Programme Development and Delivery ARIN presenting on the scopedwork under the project

8.3 Annex 3: Photos from the Workshop Session

Group photo including the workshop participants

Workshop participants during a breakout group discussion ;group 2

Workshop participants during a breakout group discussion ;group 1

ARIN

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