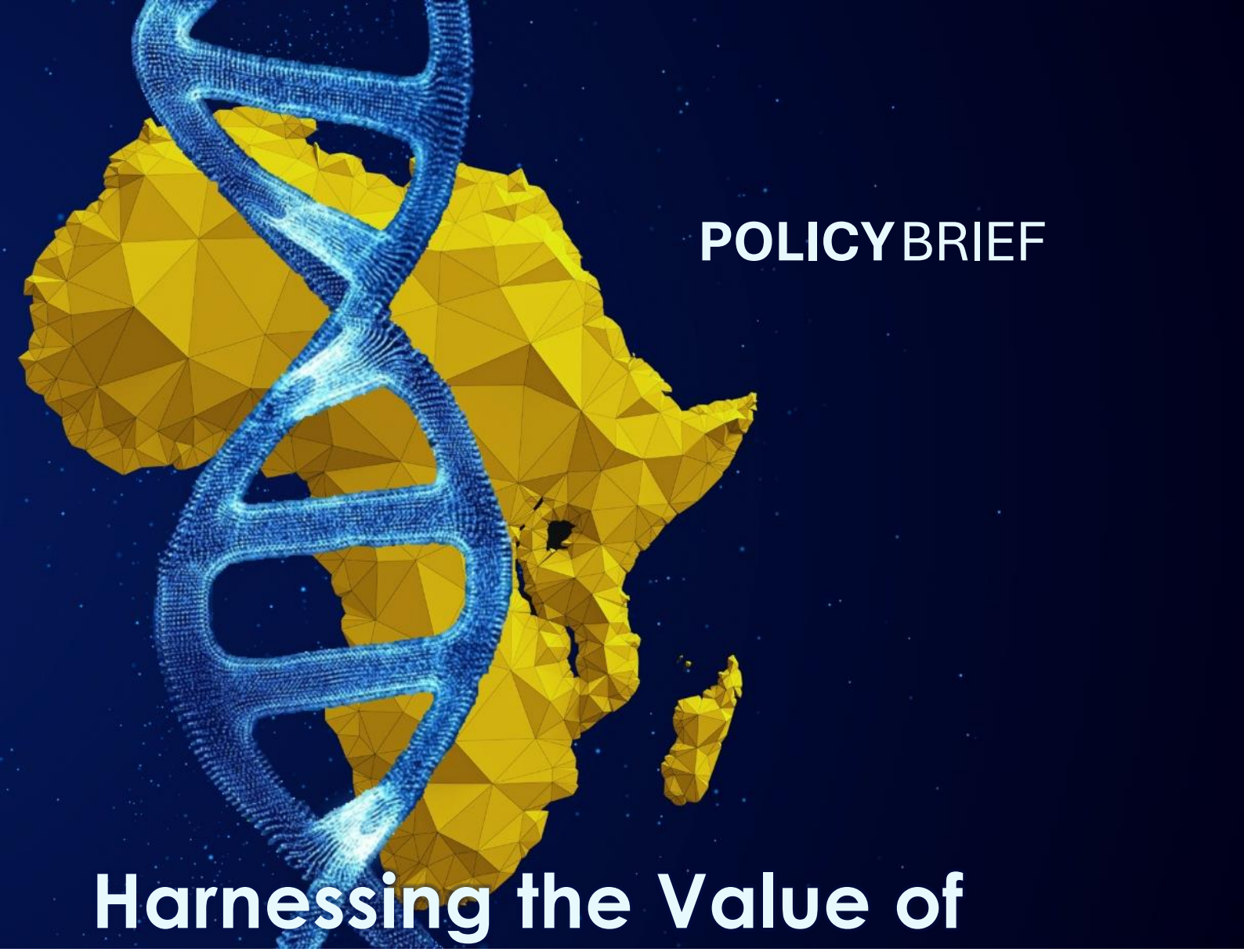

POLICY BRIEF

Harnessing the Value of Genome Editing for Africa

Executive Summary

Genome editing offers immense potential to revolutionise agriculture, improve public health, and contribute to environmental sustainability in Africa. This brief provides a non-technical explanation of genome editing and its applications. It emphasises the importance of a responsible governance framework aligned with international best practices to ensure this powerful technology's safe and ethical development and application. The brief outlines key considerations for maximising the benefits of genome editing for Africa and proposes policy recommendations to navigate these considerations effectively.

Content

POLICY RECOMMENDATIONS

Based on the considerations outlined below, the following policy recommendations are proposed:

SHORT TO MEDIUM-TERM

- **Invest in capacity building**: Allocate resources to build and strengthen scientific research infrastructure, for training African scientists, regulators, medical doctors, genetic counsellors and extension workers in genome editing technologies and biosafety risk analysis.
- **Promote regional and international collaboration**: Encourage collaboration between African countries and global centres of excellence through joint research initiatives, knowledge-sharing platforms, and technology transfer mechanisms.
- **Support public engagement**: Develop communication strategies to raise public awareness of genome editing, address concerns, and foster trust.
- **Implement appropriate regulation**: Develop fit-for-purpose regulatory frameworks that draw on international best practices, particularly those on the continent, and align with regional and national developmental goals.

LONG-TERM

- **Harmonise regulatory frameworks across Africa**: Align national regulatory requirements as far as possible to enable regional collaboration and trade. Facilitated through regional organisations such as the East African Community (EAC), the Economic Community of West African States (ECOWAS), the Southern African Developing Community (SADC) and key organisations like the Africa Union Development Agency's New Partnership for Africa's Development (AUDA-NEPAD).
- **Establish a continental task force**: Create a pan-African task force to coordinate efforts, develop best practices, and advise policymakers on genome editing regulations.
- **Create an enabling environment**: Establish centres of excellence for genetics-based research, training and innovation.
- **Advocate for fair intellectual property rights frameworks**: Negotiate international agreements that ensure African countries have access to affordable genome editing technologies.

WHAT IS GENOME EDITING AND HOW CAN IT BENEFIT AFRICA?

Genome editing is a precision genetics technique that allows scientists to modify an organism's DNA sequence. In agriculture, conventional breeding methods rely on chance mutations, however, genome editing can introduce specific targeted changes within an organism's genetic code. This enables the development of crops and livestock with enhanced characteristics, such as resistance to pests and diseases, improved nutritional content, or higher yields. In public health, genome editing helps to investigate disease mechanisms and develop therapies and diagnostic approaches. In the African context, genome editing holds promise for:

- **Enhanced food security**: Developing crops that are more resistant to drought, heat, and pests can significantly improve food security and reduce reliance on food imports.
- **Improved nutrition**: Crops with increased vitamin and mineral content can address malnutrition, a widespread challenge in Africa.
- **Increased agricultural productivity**: Higher-yielding crops can contribute to economic growth and poverty reduction in rural areas.
- **Improved livestock health**: Genome editing can be used to develop disease-resistant livestock breeds, leading to increased livestock production and economic benefits for farmers.
- **Improved human health**: Genome editing techniques can be used to elucidate pathogen and insect vector resistance mechanisms, study the role of disease-causing gene variants, or develop novel cell-based therapies, vaccines, biological medicines and diagnostics for disease detection.
- **Increased opportunities for bio-innovation and regional development**: As exemplified above, genome editing can accelerate scientific research, create opportunities for intellectual property generation, enhance the competitiveness of African countries in biotechnology on the global level and attract investment.

GENOME EDITING vs. CONVENTIONAL GMO TECHNOLOGY

While both techniques involve modifying an organism's genetic makeup, there are key differences between genome editing and conventional GMO (Genetically Modified Organism) technology:

- **Precision**: Genome editing enables targeted and precise changes to the genome, minimising unintended effects and aimed at modifying endogenous traits rather than introducing new ones.
- **Natural equivalence**: Genome editing mostly introduces changes that can occur naturally through breeding and do not necessarily introduce foreign DNA sequences. Some genome-edited organisms may therefore be classified as non-GMOs.
- **Regulatory landscape**: The regulatory frameworks for genome-edited organisms are still evolving and may differ from those for conventional GMOs. At this stage, most countries which have finalised their genome editing frameworks, including Nigeria, Kenya, Malawi, and Ghana, introduced a pre-evaluation or consultation step to determine whether a given genome-edited organism should be regulated as a GMO or conventional.

A GOVERNANCE FRAMEWORK FOR RESPONSIBLE DEVELOPMENT

A well-defined governance framework is essential to ensure the safe, ethical, and responsible development and application of genome editing in Africa. This framework should consider:

- **Biosafety regulations**: Clear, fit-for-purpose regulations are needed to guide the research, development, and commercialisation of genome-edited organisms and genome-edited based therapies, including risk assessment and defined mitigation strategies when relevant.
- **Public engagement**: Open communication, increased public awareness and public participation in decision-making processes are crucial for building trust and addressing concerns.
- **Capacity building**: African countries need to invest in scientific expertise and infrastructure to participate effectively in genome editing research and development.
- **Intellectual property**: Access to and affordability of genome editing technologies and its products for African researchers and farmers need to be addressed through fair intellectual property frameworks.

ENSURING AFRICA BENEFITS FROM GENOME EDITING

To maximise the benefits of genome editing for Africa, several key considerations are necessary:

- **Prioritisation**: African countries should identify priority applications of genome editing that address their specific needs and challenges.
- **Regional collaboration**: Collaboration among African countries can facilitate knowledge sharing, resource pooling, and joint research efforts.
- **Infrastructure development**: Investments in research facilities, supply chains for lab material, local manufacturing, training programs, and regulatory frameworks are essential to create an enabling environment for genome editing in Africa.
- **Public-private partnerships**: Partnerships between governments, research institutions, and the private sector can accelerate innovation and ensure the development of genome-edited products that are accessible and affordable for Africans.

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