Stockholm Resilience Centre

Dialogue Workshop Report

Kigali, Rwanda – 28–29 August 2017



The African Dialogue on The World In 2050

How can agriculture contribute to meeting the SDGs?









THE SUSTAINABLE DEVELOPMENT GOALS CENTER FOR AFRICA



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THE AFRICAN DIALOGUE ON THE WORLD IN 2050

Summary and key messages

The world of 2050 is being shaped by today's decisions. Globally systemic, long-term perspectives are needed to meet the challenge of eradicating hunger and ensuring that Sustainable Development Goals are met within the planetary boundaries.

THE AFRICAN DIALOGUE for The World In 2050 was held on the 28–29 August 2017 in Kigali, Rwanda. It brought together a wide variety of participants including policy makers, academics, business leaders and civil society, invited from diverse organisations across Africa, to discuss how agriculture can contribute to meeting the SDGs. The Dialogue was hosted by the SDG Center for Africa, jointly organised with SwedBio at Stockholm Resilience Centre, with financial support from the Swedish International Development Cooperation Agency (Sida) through SwedBio. The Co-Chairs' Summary Report has been published (available online at http://swed.bio/ reports/the-african-dialogue-on-the-world-in-2050).

This document provides a full reporting of the Dialogue and gives an introduction to SwedBio's Multi-Actor Dialogue methodology that can be used for future sustainability deliberations.

The expert contributors involved in the Dialogue agreed on several overarching messages:

- Africa plays a key role in shaping the world's sustainable development to 2050 and beyond. The SDGs do indeed provide a new impetus for internationally coordinated action, learning lessons from the Millennium Development Goals and from Africa's complex past. African experts in academia, policy and practice have new opportunities to influence and engage in global sustainability science and policy platforms and should network together so that these opportunities are realised.
- The urgent task of sustainably eradicating hunger in Africa depends on a flourishing natural environment. Maintaining the quality of soils and the variety of life everywhere, not only on farms underpins the agricultural sector for the longer term, which in turn supports people's health and well-being.
- Policies need to recognise and navigate cross-scale socialecological complexity. National policies focused on global priorities, such as climate, need to consider effects on local realities in order not to jeopardise implementation of other SDGs.
- Empowering women farmers yields benefits for food security and sustainable livelihoods. Policies to close the

gender gap in rights, political participation, and ownership of land and other assets bring benefits to countries, communities and households.

• Insights from science and technology should be combined with traditional, indigenous and local knowledge. This knowledge enriches agricultural planning and practices by providing place-specific knowledge and insight into the diversity of local circumstances.

Key messages from the sub-theme discussions include:

- Sustainable development pathways must acknowledge the multiple roles, functions and impacts of agriculture for social-ecological resilience and well-being.
- Food is much more than a commodity. Africa's agricultural landscapes and food systems have been shaped and sustained by deep social, traditional and cultural values, but many of these have been eroded through demographic and economic pressures. African cultural values for food and agriculture need reviving in many places and need recognition and protection in policy.
- Rural and agricultural livelihoods need to be seen as attractive. The current waves of urbanisation compound the problems of degradation of natural resources and fragmentation of rural communities. The view that only cities provide opportunities is particularly prevalent among the youth, driving a sector-specific brain drain that harms the sustainability and effectiveness of the agricultural sector at large. Incentives and policies to retain youth and increase women's participation in agribusiness may counteract this trend.
- Agricultural practices are compatible with the regenerative capacity of the biosphere, if Africa's rich agro-biodiversity is valued and maintained.
- Governments should formulate and operationalise land planning and other agri-policies that support ecosystem services. The prevailing input-dependent monocrop model should be balanced with policies that support seed and livestock diversification and organic farming methods.



- Diversification of crops and foods is a culturally-rooted and cost-effective way to deliver nutritious diets. A crucial step on this pathway is to support rural women, who make a critical but under-recognised contribution to Africa's agriculture.
- Successfully achieving the SDGs hinges on strong and accountable institutions at all levels from local to international; inclusive and effective decision-making processes; and societal equality and equity.
- Ensuring resilient agriculture and agro-biodiversity in Africa both builds up and depends on stronger communities that can participate more actively in sustainable development.
- To nurture and utilize the knowledge about resilient agriculture and agro-biodiversity that African people hold, policies and governance systems need to be formulated in a manner that remains aware of the varied context.

THE AFRICAN DIALOGUE ON THE WORLD IN 2050

These insights and the detailed and diverse perspectives expressed will be applied in TWI2050's development and analysis of a global Sustainable Development Pathway where all SDGs are met, and the long-term resilience of Earth's life-supporting environmental processes is also maintained.

The Dialogue opened new opportunities for international research collaborations, networking that links grass-roots efforts with global policy processes, and pan-Africa knowledge exchange for sustainability.

The organisers and participants hope that this document will add value to the overarching TWI2050 narrative and future Sustainable Development Pathways analysis, and that it provides insights about Agenda 2030 that are applicable in national and regional policy contexts across the African continent.

Introduction: The Dialogue Workshop

Context and purpose

The United Nations 2030 Agenda for Sustainable Development¹, agreed in 2015, is a commitment to eradicate poverty and achieve sustainable development by 2030 world-wide, ensuring that no one is left behind.

The multi-actor African Dialogue for The World In 2050 brought together African perspectives on pathways to achieve this shared global vision of sustainable development. It was the first Dialogue event of The World in 2050 (TWI2050)², an international research initiative supporting the successful implementation of Agenda 2030.

The very ambitious global vision of Agenda 2030, with its 17 Sustainable Development Goals (SDGs) and 169 Targets, may be technically feasible, but there is still not yet any evidence-based integrated pathway in which all of its goals are reached.

The TWI2050 initiative aims to provide scientifically assessed equitable pathways to sustainable development within safe planetary boundaries (Box 1). TWI2050 uses world-class models to advance new quantitative analysis of key sectors such as energy, food, population, education, macroeconomics, biodiversity and climate. Its model-based analysis is being combined with qualitative and quantitative information from global assessments and national scenarios, to inform decisionmakers about options for action, the potential benefits of achieving the goals together, and the potential trade-offs that may be encountered. Regional and sectoral perspectives provide the necessary rich detail to these broad pathway analyses, giving multiple actionable routes to arrive at a sustainable development.

The ultimate objective of TWI2050's pathway analysis is to identify a portfolio of measures that are needed to achieve all SDGs jointly, accounting for synergies and trade-offs across the goals. These Sustainable Development Pathways (Figure 1) are societal development trajectories that meet the SDGs within the planetary boundaries for all regions of the world. The initiative's analyses go beyond 2030, the target



Figure 1: Sustainable Development Pathways are pathways that achieve the 17 SDGs by their target date 2030, and continue within planetary boundaries to 2050 and beyond, ensuring that development takes place within Earth's "safe operating space" for humanity. An overarching narrative (grey) on sustainability transformation motivates the TWI2050 framework.

Box 1: The Planetary Boundaries framework: a safe operating space for humanity



The Planetary Boundaries framework for global sustainability changes also increase. Several of the planetary boundaries are defines a resilient "safe operating space" for humanity. It already exceeded, pushing the Earth system beyond the safe proposes precautionary boundaries or constraints on global operating space for the world's societies (Figure B1, see also environmental processes that are critically affected by the Box 4). activities of the world's societies. In addition to global-level boundaries for climate change and biodiversity loss, corner-More information is available in the scientific publications: stone issues in international sustainability policy, the plane-• Planetary Boundaries: Guiding human development on a tary boundaries framework includes biogeochemical flows changing planet. W. Steffen et al. 2015, Science 347:6223 (altered nitrogen and phosphorus cycles), chemical pollution, http://science.sciencemag.org/content/early/2015/01/14/ freshwater consumption, land-use change, ocean acidification, science.1259855 stratospheric ozone depletion, and atmospheric aerosol load-• Planetary boundaries: exploring the safe operating space for humanity. J. Rockström et al. 2009, Ecology and Society 14(2): ing. As pressure increases globally on these environmental processes, risks of large-scale, possibly abrupt and irreversible 32. http://www.ecologyandsociety.org/vol14/iss2/art32

date for achievement of most of the SDGs, towards 2050. This allows analysis of the longer-term effects of slow environmental processes, such as climate change, as well as of deeper societal transitions, where actions starting now have consequences that play out over longer time frames. More importantly, it establishes pathways where short-term gains do not come at the cost of long-term sustainability.

The purpose of the African Dialogue was to explore pathways for how agriculture can contribute to meeting the SDGs, in the context of social-ecological resilience and the

Figure B1: The planetary boundaries framework highlights global environmental changes where escalating human pressures are increasing risks of largescale, even irreversible, shifts in Earth's fundamental dynamics. Image: Azote Images/Stockholm Resilience Centre, adapted from the graphic published in Steffen et al. Planetary Boundaries: guiding human development on a changing planet. Science, 16 January 2015.

conservation, and sustainable use, of agro-biodiversity in Africa.

The Dialogue gave African perspectives on pathways within the TWI2050 framework and provided foundations for targeted research agendas for TWI2050. Through the interactions between participants, understanding of the concept of Planetary Boundaries was enhanced. The Dialogue also provided participants from agriculture and various parts of the food supply chain the opportunity to interact and network with each other.

https://sustainabledevelopment.un.org/post2015/transformingour-1 world/publication

http://twi2050.org. All the information, assumptions and models behind 2 the target spaces and sustainable development pathways will become available in public domain at this website.

Box 2: Social-ecological resilience within Earth's safe operating space

Resilience is the long-term capacity of a system to deal with change and continue to develop. For an ecosystem such as a forest, this can involve dealing with storms, fires and pollution, while for a society it involves an ability to deal with political uncertainty or natural disasters in a way that is sustainable in the long-term. "Social-ecological resilience" emphasises the perspective of complex, integrated systems in which humans are part of nature.



Figure B2: Tightly coupled social-ecological systems interact across scales. Image from Berkes et al. 2003. Navigating social-ecological systems, chapter 1, Cambridge University Press.

Resilience has become an important bridging concept between social and ecological domains, in policy and research. Resilience thinking provides ways to understand and manage change – and also understand why some systems remain stable when everything else is changing. It informs intentional change, rather than simply coping with crisis and disturbance from outside the system.

For more information: What is Resilience? www.stockholmresilience.org/research/researchnews/2015-02-19-what-is-resilience.html

The Theme: How can agriculture contribute to meeting the SDGs?

The two-day Dialogue's central theme was how agriculture can contribute to meeting the SDGs, in the context of socialecological resilience (Box 2) and the conservation and sustainable use of agro-biodiversity in Africa. Discussions focused on the the role of farming systems for maintaining and improving agro-biodiversity, and for transformations to sustainable development.

This theme was chosen because agriculture is a crosscutting issue that spans over all SDGs. Any Sustainable Development Pathway for agriculture needs to consider the links between SDGs, and acknowledge the multiple roles and functions of agriculture, linked to social-ecological resilience and human well-being. For example, agriculture employs 60% of the African workforce (with implications for SDGs 1, 2, 8 and 12), and over 60% of the African population live in rural areas (SDGs 3, 5, 10). Furthermore, agriculture, land use change and deforestation are the largest sources of Africa's combined emissions of greenhouse gases (SDGs 13, 15) (Brahmbhatt et al 2016).

For the Dialogue, the 17 SDGs were clustered into three sub-themes (Figure 2):

- 1. Values and social-ecological resilience
- 2. The resilience of Africa's life-support systems and
- 3. Governance of socially inclusive, resilient agriculture.

Jointly, these sub-themes shed light on different aspects and roles of agriculture for pathways to sustainable development. The three clusters also have many links and cross-cutting issues, so all participants had the opportunity to discuss all three sub-themes.



Figure 2: The Dialogue was structured around three sub-themes: (1) Values and social-ecological resilience (clusters of SDGs in the middle and to the right, outside the dashed boxes); (2) The resilience of Africa's life-support systems (in the dashed area left and at the bottom); and (3) Governance of socially inclusive, resilient agriculture (the dashed area at the top).

The Dialogue Organisers

The African Dialogue was co-chaired by Dr. Belay Begashaw, Director of the Sustainable Development Goals Center for Africa (SDGClA), and Prof. Johan Rockström, Director of Stockholm Resilience Centre at Stockholm University. It was held at the Park Inn by Radisson in Kigali, Rwanda, on 28– 29 August 2017.

The SDGClA, headquartered in Kigali, Rwanda, is part of the research team involved in TWI2050. The Center is an international organisation whose mandate is to support African governments, civil society, businesses and academic institutions in achieving the SDGs. The Center focuses on (1) research and policy advice on the SDGs; (2) education and capacity building to strengthen national institutions; (3) support in spurring of technology and innovation for the SDGs, including ICT; and (4) establishing platforms to engage academics, citizens and communities with the SDGs. The Center's activities are aligned to the 2030 Agenda for Sustainable Development and the Paris Climate Agreement, as well as the African Union Agenda 2063, all of which require more expansive and complex solutions. SDGCIA is also the regional node of SDSN in Africa.

The Stockholm Resilience Centre is an international centre that advances transdisciplinary research for governance of social-ecological systems with a special emphasis on resilience. SwedBio, that financed the African Dialogue, is a knowledge interface at Stockholm Resilience Centre contributing to poverty alleviation, equity, sustainable livelihoods and socialecological systems rich in biodiversity that persist, adapt and transform under global change such as climate change. SwedBio enables knowledge generation, dialogue and exchange between practitioners, policy makers and scientists for development and implementation of policies and methods at multiple scales.

Participants

Over 60 participants from 12 countries took part in the African Dialogue. Dialogue participants included representatives of national governments, UN organisations, civil society including indigenous peoples and local communities, business, and academia/research, invited from diverse organisations across Africa.

The criteria for selecting participants were that they provided expertise and experience relevant to African agriculture and agro-biodiversity; and understanding and influence over related policy processes (e.g., social and economic development strategies, spatial planning, research/development/innovation, conservation and resource management, etc.), and implementation method developments. Pan-Africa perspectives were balanced with regional representation. The gender ratio of the event was 24 women : 40 men (38%).

The conveners identified resource persons who served as session chairs, liaisons with the TWI2050 core team, and discussion rapporteurs. The following people steered the sub-theme discussion groups:

Sub-theme Discussion Group	1: Values and social-ecological resilience	2: The resilience of Africa's life support systems	3: Governance of socially inclusive, resilient agriculture
Chair	Siraje Kaaya (University of Technology and Arts Byumba)	Amadou Kanouté (CICODEV)	George Oduor (Centre for Biosciences International – CABI)
Resource person	Sarah Cornell (SRC)	Philip Osano (African Centre for Technology Studies)	Julia Leininger (Deutsches Institut für Entwicklungspolitik)
Rapporteurs	Charles Karangwa (IUCN) Maylat Mesfin (SDGC/A)	Thomas Dubois (World Vegetable Centre) Lina Henao (SDGC/A)	Jane Mutune (Wangari Maathai Institute, University of Nairobi) Donald Ndahiro (SDGC/A).

The participant list is provided in Annex 1.

The Methodology: SwedBio's Multi-actor Dialogue Framework

Improving the culture of dialogue may be the biggest single opportunity we have to identify genuine solutions for a sustainable future.

The African Dialogue for TWI2050 was inspired by the methodology of SwedBio's Multi-Actor Dialogue Seminars³, based on experience gained over the past decade by SwedBio and a broad worldwide network of collaborators. The methodology draws upon a diverse literature on social learning, particularly on perspectives that view dialogue processes as a means for both personal and systemic transformation for better environmental governance. The methodology is presented in the SwedBio/SRC report The biggest single opportunity we have is dialogue (Schultz et al 2016).

The African Dialogue included a mix of keynote presentations, group discussions, and panel conversations (see the agenda, Annex 2). The language of the event was English. The Dialogue was based on the Chatham House Rule. Under the Chatham House Rule, participants are free to use the information received during the meeting, but may not reveal the identity nor the affiliation of participants expressing a view. This rule allows people to speak as individuals and to express views that may not be those of their organisations. It enables free discussion because speakers are free to voice their own opinions, without concern for their personal or institutional reputation or their official duties. In SwedBio's Dialogue Seminars, this implies that plenary presentations are public information, but what the presenters themselves express in discussions is not.

The participants were able to select their preferred main sub-themes, reflecting their own expertise and capacity to make the best contribution. A major part of the participants' discussion time would be allocated to that selected subtheme. During the course of the Dialogue, groups would rotate through all three sub-themes, ensuring that all participants contributed to the discussion of all the SDGs and sub-themes, giving multidisciplinary, inter-professional and international perspectives on the issues.

3 http://swed.bio/focal-areas/approaches/dialogues-learning

The Dialogue Plan



Setting the scene: science, policy and society dialogue

Opening Presentations

The Opening Plenary session was co-chaired by Belay Begashaw (SDGClA) and Johan Rockström (SRC), moderated by event co-convener Maria Schultz (SwedBio/SRC), and facilitated by Million Belay Ali (SRC) and George Sempeho (SDGClA). The speakers' presentation slides for this session are available at http://swed.bio/reports/report/dialogueworkshop-report-african-dialogue-twi2050/.

"The biggest opportunity we have is dialogue"

MARIA SCHULTZ, Director, SwedBio at SRC, thanked the hosts, funders, and organisers and also thanked all participants for their presence. She outlined the purpose of the African Dialogue, and explained the organisational arrangements of the partnership between SwedBio/SRC and the SDGCIA. Highlighting the important role of the SDGCIA as a partner representing the African continent, she further outlined the expected outcomes of the Dialogue.

The main objectives of the organisers were to: (i) obtain input into the global sustainability narrative of TWI2050, acquiring African perspectives; (ii) gather sufficient information to develop a sustainable development pathway, or a diversity of pathways, within the TWI2050 Framework (ii) identify possible future African and internationally collaborative research agendas under the TWI2050 umbrella. The Dialogue was also expected to provide the participants with improved understanding of the role of biodiversity in underpinning sustainable food systems in Africa, and of the need to respect planetary boundaries in all future development efforts. The Dialogue also gave an opportunity for enhanced information sharing and networking amongst participants themselves and other stakeholders.

Maria Schultz then explained how the Dialogue would cover the scope of all 17 SDGs, through structured, facilitated rotating group discussions focused on the three sub-themes (see Dialogue plan above, and Agenda in Annex 2). She described previous experiences of SwedBio/SRC dialogue seminars, conducted in different parts of the world, and underscored the fact that different people (i.e., practitioners, scientists and policy makers) all have pieces of the answer to complex questions. Bringing multi-actor expertise together in dialogue can, in turn, lead to more robust insights and solutions. Lessons learned from many previous experiences have informed SwedBio's methodology of conducting successful dialogues (Box 3).

She concluded by noting that any successful dialogue must adhere to three key principles: equality among partici-

pants, listening to each other with empathy, and bringing underlying assumptions up into the open. She expressed her optimism that the multi-actor African Dialogue will meet all these expectations.

Box 3: Twenty vital features for successful Multi-actor Dialogue Seminars

Source: Maria Schultz/SwedBio at SRC

- 1. Trust
- 2. Right timing
- 3. An inclusive planning process
- 4. A thorough selection of participants
- 5. A clear "road map" of activities and expected outcomes
- 6. An agenda that brings up both convergences and divergences
- 7. Supporting literature and background report
- 8. Teamwork and flexibility
- 9. Facilitator/s and role of co-chairs
- 10. A local host, with good insights on the topic, who can also handle practical details
- 11. A beautiful, calm, peaceful, functional venue
- 12. Working groups and round table buzzes
- 13. Language and interpretation
- 14. Chatham House Rule and other agreed house rules
- 15. A field trip so participants can fully experience the place they are in
- 16. A cultural evening and attention to participants' wellbeing
- 17. An Open Space session
- 18. A final report
- 19. Outreach planned from the beginning
- 20. Evaluation and follow up

Reports of previous SwedBio Dialogue events are a useful resource for anyone engaged in implementing Agenda 2030 and other sustainability-related policies:

- Multi-actor Dialogue on Resilience Thinking, Assessment and Mainstreaming, 12-14 November 2015, Addis Ababa, Ethiopia http://swed.bio/reports/report/multi-actor-dialogue-on-resilience-thinking-assessments-and-mainstreaming
- Scaling up Biodiversity Finance: Dialogue Seminars 2012 and 2014, Quito, Ecuador, http://swed.bio/reports/ report/quito-co-chairs-report
- SDG Dialogue: Integrating Social-ecological Resilience in the New Development Agenda, Medellín, Colombia, http://swed.bio/multiactor-dialogues/medellin-dialogue

The World In 2050: Agriculture systems in Africa

BELAY BEGASHAW, Director General, Sustainable Development Goals Center for Africa, summarised the challenge facing Africa – and the world: to produce, protect and prosper within the targets of the SDGs and the Paris climate agreement. Achieving these goals and targets within planetary boundaries by 2050 is technically feasible, and multiple development pathways are possible. However, a much clearer narrative is needed that outlines how the activities of business, technology and markets can be aligned.

The SDGCIA is poised to play a key role in such concerted efforts in planning, management and multi-disciplinary research for SDGs implementation. Indeed, the African Dialogue is an example of how SDGCIA supports the domestication of SDG indicators into the Africa context, expanding citizen engagement and enabling polycentric governance of sustainability issues. The SDGCIA also plays a vital role in TWI2050. It provides a hub through which African researchers and others operating at the science-policy interface can channel insights, priority concerns, and regional perspectives into the global analysis that is being developed.

Looking towards 2050, Belay Begashaw noted the immense sustainability challenge facing African agriculture. Africa's approximately 1.2 billion people include 600 million smallholders operating predominantly in rain-dependent production. Overharvesting and large-scale land conversion threaten many species of land animals, fish and plants. Declining biodiversity translates directly to a reduction of options for future agrodiversity and production.

Yet despite its importance, Africa's agriculture sector is predominantly a low investment, low-input/low output, undertaking. Low productivity leads to net imports of food, and concerns about national food security are compounded by the impacts of climate change, demographic pressures, and civil conflicts.

Across the continent, the triple challenge of raising production, protecting biodiversity – including the cultural diversity that is so closely linked to its conservation and sustainable use – and achieving prosperity is made yet more difficult by a mismatch of objectives between the macro levels of policy-making and government and the smallholder/ household level. National policy focuses on increased productivity to reduce food importation and ensure national food security at affordable prices, yet most smallholder farmers are risk-averse when it comes to agricultural innovation, concerned first about their family's food security and their household's asset base.

Belay Begashaw summed up by noting that pathways will consist of a mix of options, to be implemented by various different actors in society. Africa must consider the macro, micro and contextual consequences of interventions in the agricultural sector, to ensure that the diverse objectives of the various actors are adequately addressed and harmonised. Resilient and sustainable development pathways within the planetary boundaries must consider the consequences of interventions across these levels (Figure 2).



Figure 3 – Sustainable pathways to 2050 need to deal with multi-level challenges. Source: B. Begashaw/SDGC|A

How can agriculture contribute to meeting the SDGs?

PATRICK KORMAWA, FAO Sub-regional Coordinator for Eastern Africa, described the global role and division of work of the UN agencies in SDG implementation. Underscoring the importance of agriculture in Agenda 2030, he noted that the FAO serves as custodian for 21 indicators under SDGs 2, 5, 6, 12, 14, 15, also recognising the link to SDG 13 on climate change. This broad scope and large geographic range mean that partnership working is essential among governments, academia, and other information users and data providers.

Outlining the scale of the challenge, Patrick Kormawa observed that Sub-Saharan African countries made progress on the agriculture-related Millennium Development Goals, but just half achieved the target of halving the number of people suffering from hunger. Visions of "progress" in Africa have emphasised mineral/oil driven extractivist sectors, and failed to focus enough on the agricultural sector. Social concerns have tended to focus on employment rights, not seeing social-ecological dimensions. In this context, it is laudable that the international community has endorsed the ambitious Agenda 2030, and all of Africa is keen to implement it vigorously.

Major investment in statistics is therefore needed to support sustainable agriculture in Africa. Priorities for improvement are the harmonisation of national statistics on youth; improved data on the various components of the



agricultural sector; and the wider social, ecological and economic effects of agricultural development.

Economic changes are needed that create and expand livelihood opportunities for Africa's people. Economic diversification has long been the focus of policy, and many parts of Africa have seen a finance boom since the 2008 crisis, but the necessary structural change for wide-ranging livelihood improvements is not yet evidenced. Cycles of crisis remain a risk.

Contingency planning is needed. Projections indicate increases from today's ~1 billion people up to 2.5 billion people by 2050. These alarming projections, he noted, imply enormous increases in demand for agricultural production while severe constraints are already foreseen, with risks of severe food crisis and social conflicts if left unabated. An example is the prospect of conflict linked to climate change and drought.

Patrick Kormawa highlighted that TWI2050 should draw upon the African Union Agenda 2063 sustainable development frameworks for food security and nutrition⁴. The 2014 Malabo Declaration on accelerated growth and transformation for shared prosperity and improved livelihoods⁵ provides consultation-based targets and strategies. Further details on an agreed policy framework for agricultural transformation are in the Comprehensive Africa Agricultural Development Programme⁶.

In planning for future challenges, Patrick Kormawa concluded that very great care is needed. Agriculture will have a central role in ensuring food security and meeting people's basic needs; spurring economic growth through producing raw materials and income streams, and providing employment; and using raw materials and new technologies. Crucially, inputheavy production cannot be part of a sustainable pathway forward. Protecting diversity is important, but it should not lead to deepened divisions and fragmentation in Africa's societies. The role of the rural has generally been given less attention than urban needs, yet the connections between agriculture and city-dwellers are tight, complex and vitally important, and need to be better understood and managed.

The SDG policy challenge, and Rwanda's planning for 2050

MARK BAGABE, Director General, Rwanda Agricultural Board, marked the official opening of the Dialogue with his

⁴ http://www.un.org/en/africa/osaa/pdf/au/agenda2063-presentation. pdf

⁵ http://www.fao.org/food-loss-reduction/news/detail/en/c/250883

⁶ CAADP, http://www.un.org/en/africa/osaa/peace/caadp.shtml

welcoming remarks, representing the Hon. Minister for Agriculture and Animal Resources. He highlighted the commitment of the Government of Rwanda in the implementation of the SDGs, including the continued support to the SDG Center for Africa. He further informed the audience on the ongoing processes of domestication of the SDGs into the African context, to ensure that all sector strategies and development plans are aligned accordingly.

He noted that the SDGs are achievable - but the big question is about achieving the SDGs jointly, with synergies. This will require detailed and evidence-based sector strategies, and the careful alignment of national development plans to Agenda 2030. He reflected on the knowledge seminar, "Let's innovate for a productive, green and market-led agricultural sector", held in July 2017, where participants debated and enriched the Ministry's 4th Strategic Plan for Agriculture Transformation (PSTA4). National policy plays a critical role, setting and monitoring the standards that are the interface from Africa's production to the commercialisation of the produce and products. Coordination of policy is needed to enable Africa to graduate from subsistence to international commercial agriculturalist farming. And diverse stakeholders need to come together to support, promote and implement the aspirations of a market-led agriculture sector, aligned to national, continental and international objectives.

At the same time, the finite world calls for wisdom in resource use. Decisions being made now will affect and be affected by the planetary boundaries, and the issues are very interlined. In Rwanda, the targets of social, ecological and economic planning are being aligned, for Rwanda 2050, through policy integration in several processes, such as the Seven-year Government Program⁷, the Poverty and Development Strategy 2024⁸, and the renewal of the Irrigation Masterplan⁹. In this context, opportunities for close interaction among key stakeholders are vitally important. This is why the African Dialogue on The World In 2050, gathering diverse African perspectives, is very pertinent indeed. Mark Bagabe concluded by wishing all participants very fruitful discussions.

Keynote: The World in 2050, and the TWI2050 Initiative

JOHAN ROCKSTRÖM, Executive Director of SRC, Stockholm University, informed participants of the strategic and analytical objectives of the TWI2050 Initiative to which the Dialogue workshop contributes. (Details of the initiative, its leadership team and the growing network of partner organisations can be seen at http://twi2050.org.) TWI2050 is a global scientific platform, where leading knowledge partners on world development and Earth dynamics join forces to provide state-of the-art integrated analyses and assessments in support of the SDG process. TWI2050 will develop global back casting scenarios that achieve the SDGs by their target date of 2030, as well the 2050 Paris climate agreement, within planetary boundaries. These global analyses cover all regions of the world, including Africa.

Johan Rockström emphasised that planetary boundaries (Box 4) define the solution space within which the SDGs can be implemented. Planet Earth's intrinsic dynamics set preconditions for all human development. He explained how SDG implementation should use the best available scientific knowledge so the benefits of synergies can be exploited, and the pitfalls of problematic trade-offs among SDGs can be avoided. For example, agriculture that prioritises the maintenance of fertile soil can maximise the conditions for carbon storage, helping to mitigate climate change, optimising plant growth and productivity, and also contributing to maintenance of freshwater flows for drinking, agriculture and biodiversity.

World development hinges on maintaining the integrity of the biosphere. This means that in implementing Agenda 2030, the social and economic SDGs cannot be pursued separately from the environmental ones. The world must also look beyond 2030, so that short-term progress does not undermine long-term sustainability. The implications of trade-offs and multiple-benefit options must be analysed if there is to be a realistic chance of achieving the SDGs together, and establishing the radical transformative pathways that are needed to do so.

There are many possible pathways, so for the world's nations to move together, they must align within a shared narrative of sustainability and transformation. The SDGs and planetary boundaries provide the outline of that narrative, but the detail needs to be filled in, both for future analysis and for the widespread engagement that is needed by governments, business and civil society around the world.

Johan Rockström explained that TWI2050 has begun developing regional, national, sectoral and cultural narratives to inform and mobilise transformation to sustainable development. These will be the basis of the first global TWI2050 report, due to be delivered in two years' time. The Africa Dialogue in Kigali is the first event to provide input to this process, giving a much-needed expansion to the diversity of participants and perspectives in the TWI2050 initiative.

Box 4: What are the planetary boundaries?

Planetary boundaries demarcate the global "safe operating space" for humanity. Earth's environment is dynamic, with very large climate and ecosystem changes seen over geological time. In this context of change, the past 10,000 years have been relatively stable. All of the world's complex societies have developed during this period, relying on the stability for the establishment of agriculture and trade. Globalised industrial development has put this long-term environmental stability at risk.

In 2009, an international group of environmental experts identified a set of global processes where human perturbations are reaching levels so great that they risk triggering largescale disruption to the fundamental functioning of the Earth system. These are the processes of the planetary boundaries framework:

- Climate change atmospheric CO2 concentrations are currently over 400 parts per million, much higher than the concentration of ~280 ppm seen through most of the Holocene. The global climate is warming as a result, and climate change impacts are already evident.
- Biodiversity loss expanding human activities (including agriculture and urbanisation) have resulted in the destruction of habitats, collapses of populations, and increasing threats to other species. This worldwide erosion of biosphere integrity reduces nature's resilience to future disturbance and reduces its capacity to contribute to human wellbeing.
- Change in biogeochemical flows of nitrogen (N) and phosphorus (P) – land and aquatic ecosystems are sensitive to the supply of essential nutrient elements. Intensive industrialised agriculture tends to unbalance environmental flows of N and P, with serious consequences including poor soil and water quality, harmful algal blooms, and fish deaths.

Discussion points

In the questions-and-answers discussion at the end of the opening session, participants asked "*How do we speak one language?*" in today's conditions of geopolitical dynamism, especially regarding Africa's development. On one hand, the global agreement on Agenda 2030 and the SDGs marks the possible threshold of a shared era of sustainable development. An example of new signs of global unity is that city mayors around the world are rising as one voice¹⁰. On the other hand, a vital task for sustainability is actually to recognise the diversity of voices and the many different calls they are making, and just as in an orchestra, practice supporting processes that can harmonise them.

- Land use when land cover changes from one type to another, multiple ecological and climate-related processes also change. Current rates of deforestation are problematic, affecting the water cycle, CO2 emissions and long-term carbon storage, and biodiversity.
- Freshwater abstraction human pressure on worldwide water resources is becoming increasingly acute. High enough levels of environmental flows are needed to sustain aquatic ecosystems and the larger-scale hydrological cycle.
- Ocean acidification this process is tightly coupled to climate change, because it is caused when CO2 emitted into the atmosphere dissolves in seawater. This changes its chemical properties, with impacts on marine organisms, especially corals, plankton, and shellfish.
- Atmospheric aerosols industrial and agricultural processes, transport and urbanisation increase the amount of fine particulate material in the atmosphere, with effects on weather and climate, as well as an increased pollution burden on living organisms.
- Stratospheric ozone depletion in the 20th century, emissions of synthetic ozone-depleting CFCs led to the 'ozone hole' in the upper atmosphere, exposing ecosystems to greater risks from ultraviolet radiation. The Montreal Protocol phases out ozone depleting substances to protect the ozone layer.
- Chemical pollution and other novel entities some synthetic substances can be extremely harmful to organisms or (like the CFCs) trigger dangerous changes in physical systems. These effects are very hard to predict and quantify, so the release of novel entities should be controlled and avoided.

For more information, see: www.stockholmresilience.org/ research/planetary-boundaries.html, *The Nine Planetary Boundaries*

Participants also observed that the knowledge co-generation that underpins sustainable development requires careful attention. Education about the pressing challenges of responding to climate change and achieving the SDGs is needed across all levels of society – policy, management, science, and community. With the SDGs, there is no way to go ahead by moving in only one area, yet time and resource might be wasted by running back and forth between these levels. Mutual listening and learning are key to success.

⁷ http://www.minecofin.gov.rw/index.php?id=sevenyeargovernmentprograms;

⁸ http://www.rdb.rw/uploads/tx_sbdownloader/EDPRS_2_Main_ Document.pdf, http://panorama.rw/index.php/2017/01/29/conferenceabout-edprs-3-attracts-young-people-and-researchers

⁹ http://www.amis.minagri.gov.rw/documents/rwanda-irrigation policy-and-action-plan

¹⁰ For example the C40 Cities Climate Leadership Group www.c40.org, and the Global Covenant of Mayors, https://www.globalcovenantofmayors.org;

Group Discussions

THE EXPERT GROUP discussion sessions addressed the three Dialogue sub-themes:

- 1. Values and social-ecological resilience
- 2. The resilience of Africa's life-support systems
- 3. Governance of socially inclusive and resilient agriculture

The speakers' slides for the Sub-theme introduction presentations are available at http://swed.bio/reports/report/ dialogue-workshop-report-african-dialogue-twi2050.

The sub-theme group discussion sessions were closely moderated, to keep the focus of the discussion on African commonalities without losing sight of the bigger picture of the SDGs and planetary boundaries.

Discussion participants followed a back casting analysis method (Figure 4). Rather than starting from the present and imagining possible future scenarios, the starting point for TWI2050 is the internationally agreed desired future where all the SDGs are met. Participants outlined the possible outcomes of the expected trend, if today's policies are not strengthened and actions are not taken to move onto sustainable pathways. They then focused on identifying options for action that shift the world onto challenge pathways, which explore how to achieve the SDGs, continuing into the future within planetary boundaries.

All the discussion sessions explored the same broad questions, which structure the summaries in the remainder of this section:

• What are the past trends in the agricultural sector? What are the challenges and opportunities today?

- Where will we be by 2030, if we carry on with business as usual?
- What do the SDGs mean for Africa's agriculture and biodiversity? What do we desire to be by 2030 and beyond, in terms of achieving the SDGs within planetary boundaries?
- How do we get to this desired destination? What are the crunchpoints and short-term implications? What are the development pathways for agricultural transformation within planetary boundaries? Can we see commonalities, and critical divergences?

The discussions under the sub-themes focused on the respective clusters of SDGs, within the context of agriculture and biodiversity, but touched upon a much broader range of issues, indicating the complex and integrated nature of the subject and the interdependencies among the SDGs.

The discussion summaries in the following sections consist of the main points identified by the rapporteurs from their notes, and the group recollections of the conversation dynamics. Main points are those issues that were raised most often in conversation, talked about for longest, where most alternative perspectives were raised, or where there was the firmest agreement among participants. The summaries are not chronological reports or minutes. To ensure that the key inputs into the discussions have been captured, these sections were discussed among the Sub-theme core teams (chairs, resource persons, and rapporteurs).



Figure 4: The back casting approach: working back from the agreed goals of a sustainable future to identify actions that bend the curve from today's trajectory. Image and approach developed by PBL Netherlands Environmental Assessment Agency (PBL 2012).

Sub-theme 1: Values and Social-Ecological Resilience

The Discussion chair was Siraje Kaaya (University of Technology and Arts Byumba), supported by Sarah Cornell (Stockholm Resilience Centre) as the resource person. Rapporteurs were Charles Karangwa (The International Union for Conservation of Nature - IUCN) and Maylat Mesfin (SDGC|A).

The aim of Sub-theme 1 was to explore the broad range of views on universal values, human needs, and the place of agriculture and food systems in sustainable social and economic development. The theme's scope included many of the global goals: SDGs 1, 2, 3, 4, 5, 8, 9, 10, 11.

Table 1 provides a very brief summary of some key points agreed by participants.

Resilience perspectives on values and social-ecological resilience

SARAH CORNELL, sustainability researcher at SwedBio/SRC, served as the invited resource person for Sub-theme 1. In her introductory presentation, she emphasised how the SDGs both create and depend upon links between social concerns values, needs, and actions - and environmental ones, namely productive agriculture supported by healthy ecosystems. A resilience perspective recognises the dynamic and multi-scale interactions between social and environmental domains. Change in one of these domains plays out in the other.

The SDGs in Sub-theme 1 focus mainly on social issues. Although these are global goals, achieving them will require universal values that promote and support the resilience of being attentive to local dimensions: people's actual lived better functioning social ecological systems, for the benefit experiences, the well-being of their communities, and the living of all, presents a key goal to harness and unify everybody's nature in their localities. One simple but important observation input and participation. about society is that men and women often view the world Recognising the social dimensions of Africa's and experience it in different ways. If this most basic social distinction is held in mind in sustainable development pathecological issues: There was a strong shared view that the monocrop model way design and decision-making, then it is easier to recognise and respect many other kinds of differences within society, being pushed for all over Africa was not only degrading soil underpinning a more harmonious future. quality, contributing to deforestation, and reducing access to

Past	Present	Negative future	Positive future
Globalised context followed	Climate change impacts	Donor driven development,	Short cycle knowledge
on from colonialist context	already evident	including agricultural trans-	processes – responsive to
Loss of local knowledge, and	Rural community fragmen-	formation	changing pressures
traditional/indigenous	tation; vulnerable urban	Indexes, standards imposed from outside	Community engagement –
knowledge and lifeways	communities		land planning, production,
Cultural heritage under- valued by policy-makers, ambivalence by citizens	Food/farming knowledge and livestock/crop diversity at risk Africa does not control its financial circuits	Value extracted and exported; place-specific social and ecological realities worsened Technical exclusion	good practice transmission Local definitions of value and values Full fair participation in policy decisions, economic systems

Table 1: Perspectives on values and social ecological resilience in sustainable development pathways

Sarah Cornell also observed that the social SDGs and Targets embed many "hidden" ecological issues, which may be critically important for successful goal achievement. For example, a multi-dimensional view of poverty considers factors like people's access to nature's resources, and environmental vectors for disease. Place-based knowledge is key to the sustainable use of biodiversity, as well as conservation efforts. Because the places where people live are so important for their well-being, environmental justice is a vital part of sustainable social and economic development. Climate risks need to be factored into technology and infrastructure changes, migration policies, and other kinds of strategic planning.

Discussion summary

Opportunities arise from the diversity of values

Participants emphasised the extent to which the available opportunities for change are shaped by human values, ways of seeing and being in the world, and the actions these underpin. Participants observed that "the past remains with us", through the persistent divisions that many experience between the legacy of colonial power value systems and structures and the diversity of African visions of development.

Participants emphasised the importance of different and diverse sets of values brought to light possibilities to reconcile the urgent need for more productive agriculture to feed a growing population, with development that respects culture and, planetary boundaries. Identifying and defining a set of

water, but also being used as an excuse to undermine land tenure rights and traditional farming practices. Whilst initial yields are high, the resilience of crops to unexpected variations in rainfall and other climate events is hard to predict. An over-reliance on monocrop-based development has resulted in qualitatively less good foods for Africa's people (for example, bananas are produced in large quantities now, but they have lost their deliciousness), and could actually undermine food security. Furthermore, heavily industrialised inputdependent farming showcases the tension between the capacity of Earth system processes to maintain conditions under which all life can thrive and the immense capacity of human imagination to seek ways to outstrip all limitations to natural resource extraction.

Participants agreed on the value of research efforts that balance cultural values and traditional methods of farming with technologies and practices that promise higher yields. Using more evidence-based studies to inform development planning would strengthen the value of traditional agricultural knowledge and practices, and also undermine attempts to appropriate intellectual property rights of ancestral seed varieties.

Nutrition and health are tightly linked to women's empowerment:

Paradoxically, the drive to reduce global hunger coincides with a rise in poorer diets: half the world is hungry and the other half is trying to lose weight. The loss of seed varieties and a more monotonous diet have impacted on the nutritional values of Africa's food, and cases of under- and malnutrition are now more common in wealthy and poor communities alike. At the same time, men and women are exposed to different nutrition and health risks.

Where women farmers are empowered to increase agricultural production, they tend to use more of their net income for household needs than men do, spreading the economic benefit through their local community. Participants also observed that by addressing other aspects of gendered discrimination, for example by targeting improvements in women's access to healthcare, there would be improvements in nutrition and hygiene for the whole family. This better baseline in people's health could subsequently support more effective treatment of communicable and non-communicable diseases – with both local and global benefits.

Restoring the appeal of farming as a source of livelihood and a way of life:

Rural and urban problems are tightly linked, and pathways to sustainability need to acknowledge this much more than in present planning. Intergenerational traditional African values are eroding as people leave rural areas in search of jobs in urban centres, in part because of the diminishing appeal of farming as a source of livelihood. This is a common worldwide trend, evident since the end of World War II, in which mind tasks have been considered higher status than work involving physical labour.

Participants discussed the widely held view that farmers are poor, suggesting that it is now time to change from a narrow economic narrative to one that allows for finding satisfaction in one's life and living environment, and placing more value on skills, culture and social cohesion.

Recalibrating the values embedded in land and agricultural policy:

Although in many African countries, up to three-quarters of the workforce works in the agricultural sector, contributing ~35% to the region's economy, reinvestment in small scale farming is minimal (Agra 2016). The sector is too reliant on foreign funding. At the same time, some participants raised concerns that governments' support for commercial farming, especially where systems rely on the monocrop model and genetically modified organisms, is in conflict with multilateral agreements on biodiversity, and further weakens opportunities for resilient use of native agrobiodiversity and traditional seed varieties. Although there have been many wellintentioned efforts to support Africa's "green revolution" along more agrobiodiverse lines, whenever there is a change of government, these processes are derailed. There have been incidents of land-grabbing by the state, for urbanisation for example, resulting in displacement of communities and fragmentation of pastoral lands used by nomadic farming communities.

Participants advocated more domestic and pan-African investment in agriculture and risk reduction management, as an essential part of a sustainability transformation by 2050. Better checks and balances need to be kept in place, to track and measure political will and commitment to specific areas of development over the years.

Reviving knowledge and education:

Africa needs to be a leading voice for sustainable development in the world. A positive aspect of its population increase is that the large numbers of youth in African countries can be a resource and a powerful force for influencing and informing policy. However, participants questioned the kinds of knowledge and training that growing numbers of university students are acquiring. They observed that teaching focuses too narrowly on the values and knowledge systems of globalisation. Some types of education actually undermine the social fabric of traditional life and livelihoods, and are not accompanied by real opportunities for work and careers. Furthermore, the emphasis is on training and education provision in urban areas, rather than supporting education in rural and more remote locations. This leads to a serious loss of locally contextualised traditional knowledge. This knowledge is largely undocumented, but it has been acquired through generations of trial and error, giving invaluable knowledge resources for well-adapted agriculture and biodiversity management.

Positive examples exist that can readily be expanded across Africa. In Nigeria, agricultural knowledge is included in the curriculum, helping to change negative images of farmers. In Ethiopia, agro-ecology programmes support knowledge development and sharing. These could be models for learning and valuing many other aspects of Indigenous knowledge. Establishing a multinational institute that reflects cultural diversity and interprets the SDGs in the local language could be a way to understand and value local models, rather than depending on research and knowledge brought in from outside the African context.

Valuing Africa as a source of innovation:

Consumerism and an extractive mindset underpin too many development processes, and fail to acknowledge the wellbeing of people and nature. Participants noted how problematic it is that Africa's valuable commodities are extracted, processed, and resold back to Africa. This reinforces perceptions of the continent as a market, but one that cannot itself compete nor benefit from the addition of value along the supply chain. Modernity, often experienced as a result of economic growth, focuses on faster and bigger results, yet is creating bigger



risks when seen with a 2050 time horizon. For example, big monocrop farms conflict directly with the cultural richness and biodiversity of small land-holdings. Leading industries have reinforced old dependencies in labour and capital, and internationally-driven development efforts have too often created new ones.

Participants argued for Africa to take stronger control of its own circulation of money and trade, cycling value back within the region. Participants also provided many examples of innovative agricultural practices that have high added value, and that can also help to deal with climate-induced changes. For example, in Uganda and Kenya, traditional hybrid cattle cope better than animals bred outside Africa for higher productivity. Participants discussed how the value of cultural attachments to cattle, land and place raised the importance of identity in maintaining biocultural land and seascapes. In the face of widespread conflict in the continent and the depletion and degradation of resources and communities, some argued for more concerted efforts to implement SDG 16: innovation and development depend on peace, justice and strong institutions.

Past	Present	Negative future	Positive future
Pressure for profit – mono- crop production Extensive ecosystem and soil degradation, loss of bio- diversity (on and off-farm)	Soil quality poor, and worsening Outmigration and unsafe informal urbanisation Undernourishment and diet-related ill-health	Misdirected national invest- ments and perverse subsi- dies for agricultural develop- ment continue to drive ecosystem degradation Development and trade models maintain a situation of economic dependency, offsetting any production gains	Knowledge about ecosys- tems and their services in- cluded in development plan- ning Use of appropriate technol- ogies, including learning and teaching technologies Value of women's farm la- bour recognised, respected, rewarded and incentivised

Table 2: Perspectives on the resilience of Africa's life support systems in sustainable development pathways

Sub-theme 2: The Resilience of Africa's Life-Support Systems

The discussion was chaired by Amadou Kanouté (Citoyenneté, la Consommation et le Développement en Afrique – CICODEV), supported by Philip Osano (Stockholm Environment Institute and African Centre for Technology Studies) as the resource person. Rapporteurs were Thomas Dubois (World Vegetable Centre) and Lina Henao (SDGCIA).

The aim of this session was to explore perspectives on the challenges and opportunities of Africa's agriculture and food systems, including the energy-water-food nexus¹¹; and to explore agriculture development pathways that respect Earth preconditions and ensure sustainable resource use. It focused on SDGs 6, 7, 12, 13, 14 and 15.

Table 2 summarises some key points agreed by participants.

Agriculture development and ecosystems management in Africa: from a collision course to a coalition

PHILIP OSANO, Deputy Center Director of Stockholm Environment Institute (SEI) – Africa Center, served as the invited resource person for Sub-theme 2. He emphasised that the social-ecological resilience of Africa's life-support systems depends on the vitality of the biosphere and the diversity of knowledges of the people that are farming the land. Without acknowledging the benefits of biodiversity, social resilience may be lost. Without appreciating the knowledge of diverse stakeholders related to the farming, ecological resilience may be lost.

Philip Osano noted that biodiversity and agriculture are often seen as being on a collision course, but in reality, there is a very diverse relationship between agricultural development and biodiversity conservation. Agrobiodiversity underpins sustainable agriculture. Biodiversity conservation has been dominated by a focus on leaving land area untouched for "wild nature", but there are many opportunities for "land sharing", rather than just "land sparing". The problematic historic trend, where most of the increase in production arises from expanding the area of cultivated land, can be halted.

Africa's farming systems are diverse and complex, which presents challenges for reconciling agriculture and ecosystems management. The current yield gap is a system flaw (see page 17 in Philip Osano's presentation, available on http://swed.bio/reports/report/dialogue-workshop-reportafrican-dialogue-twi2050/). Increasing fertiliser use for enhanced crop productivity is obviously part of a systematic intervention, but misplaced policies and subsidies can lead to the worsening of problems (and costs) of excess nitrogen in the environment¹². Research shows clearly that better use of manures and

organic fertilisers offer high potential yield and labour-force benefits on short timeframes.

Tackling this issue takes a multisectoral approach, linking finance, agriculture and environment – with strong potential for private sector engagement. Resources for agricultural development have been promised, under the 2003 Maputo Declaration¹³ and the Comprehensive African Agricultural Development Programme (CAADP) provides a framework for National Agriculture Investment Plans. Integrated planning is a way to pay due attention to synergies and trade-offs in the water-energy-food nexus (see page 7 in Philip Osano's presentation, available on http://swed.bio/reports/report/ dialogue-workshop-report-african-dialogue-twi2050/), but a great deal more work is still needed to understand and navigate the many multi-directional interactions between the SDGs and their targets and indicators (Nilsson et al 2016).



Discussion summary

The challenge: resilient life-support systems require a flourishing biosphere

Flourishing, diverse ecosystems provide various forms of ecosystem services¹⁴ that underpin people's well-being. Biodiversity also plays a role in decreasing people's vulnerability to weather-related hazards, and are vital for future local adaptation to global warming. Many of these services are invisible or intangible – until they are lost. Participants argued that a greater awareness of the importance of biodiversity is essential, to meet today's needs and also because many African landscapes are ill-prepared to face the changing climate.

Participants reasoned that the threats to biodiversity and the failure to close the yield gap in agricultural production arise because current ecosystems are poorly conceptualised. The beneficial services that ecosystems offer are often neglected in policy considerations. Better approaches to landscape planning should include ecosystem mapping, for which many methods are already available. Without careful planning, important benefits provided by the ecosystems may be overlooked. Such planning and mapping can unveil synergies and trade-offs between different policy choices. It can also help to ensure that all relevant sectors of society are included in the policy formulation and implementation. For example, farmers could be rewarded for services they deliver to the ecosystems through targeted agri-environmental measures, not just for the market value of the foodstuffs they produce.

Participants also highlighted the risks of poor and decreasing soil quality. Soils have been maltreated by the rapid expansion of conventional monocrop farming practices. Depleted soils have severe long-term consequences including loss of livelihoods and risks being pull factors that cause outmigration. Current soil testing is often based on expensive techniques for chemical analysis optimised for large-scale plantation of single crops. Better approaches would involve using simple and cheap tools suitable for use with the mosaic of crops that is the norm in many African farming systems. Current efforts to improve production are focused on the application of synthetic fertilizers, which can be prohibitively expensive for most small-scale farmers. Better approaches would build sustainable practices through the "closed-loop" use of organic fertilizers, adapting the use of fertilizers to the specific needs of the various types of crops and the the qualities of soils. Whereas some landscapes may benefit from increased applications of fertilizers, others are over-fertilized. Sustainable practices also include reducing the use of finite resources when farming, both when it comes to fertilizers and fuels.

Participants noted that lost biodiversity translates directly into problems of poorer nutrition for many people now, as well as prospects of deep food insecurity in the future. They argued for the need to rethink nutrition by paying more attention to products that are consumed domestically rather than only for export markets. In particular, there is a need to increase production of foods that are beneficial to the local population – including traditional crops and trees. Biodiverse and well-functioning landscapes with a mosaic of crops may, moreover, promote much more diverse and nutritious diets. Furthermore, traditional crops and livestock need efficient

¹¹ As demand for water, energy and food are all rising, the complex environmental and societal links between these critical domains demand new approaches to integrated analysis, planning and management. See http://www.unwater.org/water-facts/water-food-and-energy.

¹² UNEP has identified excess nitrogen as an emerging issue in the global environment: https://wedocs.unep.org/bitstream/ handle/20.500.11822/9240/-UNEP%20Year%20Book%202014:%20 emerging%20issues%20in%20our%20global%20environment%20UNEP_ YearBook_2014.pdf

¹³ http://www.nepad.org/resource/au-2003-maputo-declarationagriculture-and-food-security

markets and distribution channels, in order to realise their benefits.

Given Africa's ecological diversity, one-size policies definitely do not fit all local realities, but the current experience is that many international development cooperation initiatives have been too broad-brushed and general in their application. Participants observed that they could sometimes detect a dichotomy between African and western concepts of knowledge, in sustainability discussions and policy implementation. This is a contributing factor to the deterioration of the social dimensions of agriculture and to the widespread rural exodus. Participants suggested that this is actually a false dichotomy: locally situated knowledge is essential for understanding local circumstances. More fundamentally, the value of African perspectives and knowledge, especially traditional and indigenous knowledge, is often not sufficiently acknowledged because of the legacy of colonialism and today's neo-colonial power structures.

Steps on a transformation pathway: aligning people's knowledge, skills and attitudes with the flourishing biosphere

Maintaining the resilience of Africa's ecological life-support systems depends on acknowledging the multiple "human dimensions" of agriculture. The sustainability transformation should be based on what is beneficial for Africa's millions of smallholders, and not merely the big-business interests in crops and products that can be traded or exported. Transformational agribusiness models that include farmers' cooperatives are needed.

Sustainable practices concerning the cultivation of land and the processes that maintain the food system already exist. These are upheld by a diversity of knowledges related to farming, soils, land and livelihoods. African/traditional and western/scientific concepts of knowledge need to be brought together much more closely, because both are needed. Indigenous farmers' detailed knowledge about agrobiodiversity needs to be valued, particularly the knowledge and practices of women farmers, as they often provide most of the farm labour and play a vital role in household food security.

There was strong agreement that agricultural extension services can play a pivotal role in agricultural development that also protects biodiversity and improves people's living conditions. Programmes should include the provision of practical, vocational training. However, to be able to play this more important role in agricultural development, extension services need to be adequately funded, and employ many more well-skilled trainers.

There is a need for countries to embrace a culture of learning within Africa, rather than viewing expertise as something that comes from outside. This entails investing in the integration of knowledge, knowledge sharing and the sharing of best practices.

Mechanisms and tools to share best practices may be assisted by the use of appropriate technologies, such as learning and teaching technologies. These technological solutions can promote people's access to information and expand the outreach and impact of the extension services.

Sub-theme 3: Policy and Governance of Socially Inclusive and Resilient Agriculture

The sub-theme discussion chair was George Oduor (Centre for Biosciences International – CABI), supported by Julia Leininger (German Development Institute) as the resource person. Rapporteurs were Jane Mutune (Wangari Maathai Institute for Peace & Environmental Studies, University of Nairobi) and Donald Ndahiro (SDGCIA).

This Sub-theme focused on SDGs 16 and 17. The expected outcomes of this discussion were: (i) to understand how

Past	Present	Negative future	Positive future
Colonial legacy seen in dominance of industrial farming/commercial crops Skewed subsidies, poorly accountable PPPs Corruption, widening societal divisions and obstructing regional development	Place-adapted crops at risk Traditional agriculture not recognised in national economies Poor land tenure systems Inconsistent technical development with very limited extension services	Power holders pursue selected SDGs in ways that create (or worsen) social conflict Counterproductive policy implementation Agriculture continues to be low priority, vulnerabilities (health, social fragmenta- tion) and food security worsen	Investment in local agricul- tural improvement support- ing nutrition, culture and biodiversity (subsidies, accessible financial instru- ments) Rights protected – land tenure, youth and women's emancipation Education and knowledge system integration 'Good governance': dealing with corruption; engaging citizens; accountable deci- sion-makers; coherence in policy implementation

Table 3: Perspectives on policy and governance of resilient agriculture in sustainable development pathways

international cooperation can support synergies and trade-offs between food systems and the sustainable use, and conservation of biodiversity; (ii) to identify opportunities in the policy arena for synergising conservation and sustainable use of biodiversity and agriculture with meeting the SDGs; and (iii) to develop messages with an African perspective for the global TWI2050 narrative.

Table 3 summarises key points discussed by participants:

Governing the SDGs – Societies transforming to sustainability

JULIA LEININGER, Chair of the Research Programme on Political Order, Values and Peace at the German Development Institute, served as the invited resource person for Sub-theme 3. She opened by asking "What is social transformation?" There are several ways for it to take place. For instance, change through collective action involves a critical mass of citizens who share attitudes and values. Generational change involves the engagement and education of youth, who may hold very different views from elders in society. SDG 16 points to the importance of peace – history shows that many social shifts have been linked to war and conflict. The SDG challenge is to achieve transformation with a peace agenda.

Like previous presenters, Julia Leininger observed the complexity of linked goals, especially in situations where gains in one area may tend to lead to losses in another. The universal and global nature of the SDGs require any desired transformation to take political processes into account. Links between SDGs (their causal relationships) and transformation knowledge (the application of theories of social and



political change) have to be brought into play. Governancerelated targets for transparency and those for security might be in tension or conflict with each other. Different countries will prioritise these issues differently. Considerations of trade-offs among different SDGs are never purely economic or environmental. Considerations cover aspects of nationalism/ regionalism, different cultures, and different political systems. There is no commitment to "good governance" in the SDGs – they just specify inclusive governance. This is an important conceptual gap that needs to be explored. Specifically, who is to be included? How can their views be integrated into effective decisions? And how can inclusive governance improve an agricultural agenda?

Integrated policy must be able to deal with the transformative vision of Agenda 2030, which means that it relies on balancing mechanisms for procedural versus substantive changes. It must also be able to deal with the complexity of the Agenda 2030 goals. Integrated policy relies on balancing intersectoral versus multisectoral action. For example, improvements in water and sanitation (SDG 6) can reduce child mortality (SDG 3) and also contribute to improved equality (SDG 5 and 10) – yielding positive environmental, social and economic sustainability outcomes, without necessarily involving collaboration across the respective sectors. Should this kind of intersectoral intervention be favoured over multisectoral coordination? Should multisectoral planning happen through one institution? Intuitively it looks likely that coordination is needed, but it is not always the case.

There are no clear examples yet for the full suite of SDGs. Intersectoral action can work if people can find space to



compromise in their sector mentality in favour of intentionality, moving towards a goal. Integration is appropriate as a goal in itself. One example is Sweden's politics for global development, aiming for coherence across sector policies, where trade, aid and environment should not be counterproductive. Another example is the CBD's efforts to bring in Indigenous Peoples' rights, an agenda driven by the coherence of environmental and self-determination politics.

Julia Leininger's clear conclusion was that agriculture is key to achieving SDG 16 – and vice versa: peace, justice and strong institutions are key to achieving sustainable agriculture in Africa. Any one country can influence policies, and hopefully also implementation.

Discussion summary

Participants identified several policy and governance challenges for Africa's agriculture. As in the other sub-themes, they observed that the colonial legacy across the continent has left strong influences on current farming systems. Africa has long been seen as a source of raw materials for other countries, without value addition within Africa's countries themselves. The emphasis of "development" has largely been limited to industrial production and commercial crops. Traditional food crops were – and still often are – left untouched, in terms of breeding and genetic improvements and productive farming practices.

Agriculture as a sector is subject to poor governance. Traditional African agriculture is not defined as a business, and therefore many policies refer to it as a social enterprise, which means a large part of its value is not visible in national accounting of wealth and productivity. Poor land tenure systems do not offer ownership security to farmers, particularly women and youth. Many well-intentioned agricultural policies are inadequately implemented and enforced.

Agriculture is also vulnerable to relatively poor economic governance in general. Rampant corruption is incompatible with inclusive growth and development. Public-private partnerships (PPPs) are very weak in agriculture compared to other sectors. Low budget allocations from governments are coupled with a lack of credit facilitation from commercial institutions. There is a lack of supportive farm subsidies, which were influenced by the skewed structural adjustment programs of the 1980s.

Agricultural modernisation has been problematic, with inconsistent technological development coupled with poor extension/advisory services. Modernisation models are often incompatible with African rural realities, often benefiting the already powerful at the cost of the already vulnerable.

Participants identified several opportunities for a transformation to sustainable agriculture. The SDGs mark a period where there is plenty of political will for agricultural development, both nationally and internationally, and lessons have been learned from experiences of the past. International protocols (e.g. Nagoya¹⁵ and Kyoto¹⁶) provide guidance for the protection of African environment/agriculture policies. Pan-African/regional economic blocks (African Union, COMESA, etc.) initiate transboundary policies, which could influence national policies. For example, the Maputo Declaration presses for national budget allocations to agriculture and food security. Politically, there is an upswell in civil society organisations, farmer organisations, etc. that can play a stronger advocacy role, and influence appropriate policy formulation. Stronger partnership working between public and private sectors is very feasible. There are ample resources, including land and human capacity (a benefit of the 'youth bulge'). Citizens in Africa's diaspora can offer knowledge inputs, helping accelerate innovations.

Participants brainstormed on the business-as-usual scenario, where no action to change from current trends is taken. They noted the following likely outcomes:

- Weak sector governance means agricultural productivity remains low, and food imports increase. This situation leads to low national economic (GDP) growth and rising food prices.
- Communities experience continued food insecurity, malnutrition, and deterioration of health, especially for women, children and other vulnerable groups in society.
- Pressure to intensify farm production in the short-term increases environmental pollution by pesticides, herbicides and the misuse of synthetic fertilizers, as well as increased greenhouse gas emissions from deforestation and land-cover change. Human and ecological health are compromised.
- Biodiversity losses, due to deforestation, urbanisation, and other human activities, worsen the degradation of ecosystem services.
- As climate change manifests itself more strongly, it impacts on transhumance and pastoralism, and natural resourcesbased conflicts. Pests and diseases increase. People are increasingly vulnerable to disasters.

Box 5: A "business-unusual" scenario of transformation to sustainability

Africa's agriculture is transformed to a thriving business, and biodiversity and ecosystem services are used in a sustainable way. This provides people with an important basis for increased incomes and greatly reduces poverty. SDG 16 is fully achieved, with strong, forward-looking institutions in democratic systems where the voices of the people are heard. Inclusive policies see an increase in numbers of youth and women involved in productive, economically beneficial agriculture. Gender equality and equity result in stronger communities that participate more actively in their own and their country's development.

There is a widespread re-establishment of trust across society. Traditional life-ways are integrated into social conventions and socially accepted ways of doing things, bringing improved land rights and transparent tenure systems. There is a favourable institutional environment that encourages the widespread use of available technologies and information. Farmers' access to agricultural credit improves, as does overall national investment in agriculture. This includes increased

- Rural-urban and transboundary migration continue, compounding inequalities and increasing unemployment. Population pressures worsen land degradation, and lead to uneconomical farm sizes.
- Traditional social structures collapse, along with loss of culture, self-identity, and locally adapted farming practices and knowledge. The tight links between culture and agrobiodiversity are broken. Human rights are further eroded.

Participants also outlined the key features of a desired scenario by 2030 (Box 5). By doing things in a "business-unusual" way for agriculture, they envisaged achieving transformation to a much more sustainable world.

Participants proposed several concrete actions that would be needed in order to move onto pathways to sustainability, and achieve the desired transformation.

Review current policies relating to Africa's agricultural development, and inject them with the reality of the current social and ecological situation

- Allocate adequate resources to the agriculture sector, including research and development, in line with the African Union's Maputo Declaration.
- Ensure interventions in agricultural development are location- and context-specific. A "one size fits all" model creates more problems that in resolves.
- Assess agriculture as a complete value chain system, giving appropriate consideration to multisectoral policies and actions.
- Conserve the indigenous biogenetic pool and associated cultural practices.

resource flows for agrobiodiversity and technical research and development, as well as advisory/extension services – not only oriented towards commercial purposes and export markets, but also oriented towards family farmers within thriving local agricultural landscapes.

Well-coordinated, enforceable policies at national and local levels work together to improve food systems, ensuring the efficient use of water, green energy, and other inputs. They support policies that lead to sustainable systems for production and farming intensification, such as organic farming which meets high food quality standards without harming the health of farming communities, and without degrading ecosystems.

2025 is a milestone on the pathway to this transformation. The Malabo Declaration of 2014 promised increased agricultural productivity by this date, ensuring that African countries are able to feed the continent's people.

¹⁵ https://www.cbd.int/abs/about

¹⁶ http://unfccc.int/kyoto_protocol/items/2830.php



Improve knowledge management that supports agriculture as a resilient system

- Support the combination of traditional knowledge and practices with modern scientific knowledge and techniques. Ensuring that successful small scale farming can continue into the future depends on both kinds of knowledge resources.
- Assess data needs for evidence-based policy making for various agricultural interventions, such as production, protection of the agricultural natural resource base, food security, employment, and wealth creation.
- Develop distributed real-time surveillance and information management systems that collate agriculture and environmental data and make it easily accessible to users.

Invest in research and education

- Enact and implement policies on education at all levels that introduce current needs, African culture, environment and identity in the curriculum.
- Carry out participatory farming systems research, working directly with farmers so that context-specific solutions can be developed. A farming systems approach allows particular attention to be focused on women and youth, yielding relevant information to improve their nutrition and economic needs.
- Review, customise and expand agricultural extension/ advisory systems.

Create fair and inclusive governance systems

- Implement current commitments for "good governance", particularly on managing and dealing with corruption.
- Devolve more responsibilities for agricultural development decision-making to the public, including to farmers and specific geographic regions.
- Empower citizens to hold their leaders accountable; strong leadership depends on accountability.

Give agriculture the place it deserves in political discussion, in relation to its vital importance to sustainability

- Approach agriculture as a sector and make it an election agenda, included in all party manifestos, in order to ensure accountability.
- Address the real economic, social and political constraints of women and youth, including in government-initiated opportunities.

Make markets work for the farmers

- Adhere to the Comprehensive Africa Agricultural Development Program (CAADP).
- Strengthen agricultural production systems and facilitate access to markets for targeted value chains among small and medium scale farmers in Africa.
- Enact and implement appropriate and well administered agriculture subsidy policies (similar to USA and EU, where running subsidy programs cover 30-40% of farmers).

Establish stronger partnerships regionally and internationally

- Develop appropriate legal systems at regional (pan-Africa) and national levels, that ensure effective participation in international trade negotiations.
- Focus on resource endowment, financing and technology for low-input high-production systems (e.g. greenhouses, hydroponic farming).

Build foresight and cross-sector integration into governance

- Enact and implement climate change risk policies.
- · Develop inter-ministerial and multi-stakeholder strategic plans from planning to implementation phase; and develop joint performance contracts.
- · Develop much-needed sustainable urbanisation models.

Steps towards Sustainable **Development Pathways**

In the final sessions of the Dialogue, panellists and participants discussed several cross-cutting issues arising from the Cross-scale connectivity also plays an important role in Sub-theme discussions. These issues start to point towards shaping outcomes. Food distribution requires physical infrastructure and market operations linking local, national and essential characteristics of the steps that shape Sustainable Development Pathways. Participants observed that both international levels. Currently, limitations in both kinds of Agenda 2030 and the Dialogue itself are a novel process to links are barriers blocking inter-African trade.

Managing connectivities

promote and mobilise action.

All steps towards Sustainable Development Pathways must retain the awareness that societies are tightly connected parts of living ecosystems. For instance, sustainable food production depends on the care and maintenance of soil as a living thing, not just as a "resource".

Urban/rural connectivity cannot be ignored. Infrastructural development can enhance urban to rural connectivity, rather than deepening splits in society. Responsibility and resources can be devolved to rural communities. Industrialisation does not need to be so concentrated in major cities, just as agricultural activities need not be kept away from cities. Agroindustry may provide opportunities for jobs, growth, and



improvement in life conditions for women.

Connectivity means that when shifts happen, they can happen fast. And signs of change for sustainable agricultural development in Africa are already present. Consumers (local and worldwide) increasingly drive the agenda. Banks and subsidies now support organic farming. The bigger framing of agriculture in the context of the whole biosphere gives a paradigm change.

Better measurement, including quantification of the quantifiable

Data and statistics can both illuminate and hide important aspects of development, so choices about what is to be measured – and how – play a powerful role in pathways to sustainable development. Participants observed that there are problematic measurement issues in agriculture.

Values of ecosystems are often seen as zero in a money-led world, but ecosystem losses account for a large part of the persistence of Africa's yield gap. Instruments for national ecosystem accounting are ready for action (e.g., through the Matabo Declaration, which has a results framework, indicators and annual review process, similarly the system in place for water and sanitation commitments); but require both political will and accountability. Assessing national commitment for agricultural development, and for Agenda 2030 more generally, should not just be a tick-box action.

Measuring prosperity and poverty involves much more than accounting for people's access to money. Future projections of climate change, droughts and ecological change make the assessment of people's vulnerability a pressing priority. Qualitative losses have been experienced with monocrops and mass markets. Examples include reductions in nutrition, "deliciousness", and food composition. Multidimensional poverty measures can be better mainstreamed.

National statistics can be part of shifts to sustainable pathways. For example, many smallholder farmers appear in national statistics as "unemployed" and "unproductive" members of society. The invisibility of their role compounds problems of rural fragmentation. Reframing the statistics would be part of a shift towards increasing incentives to work in agriculture, including youth engagement. Similarly, gender sensitivity of policies and empowerment need to be supported by gender-segregated data.

Finally, participants argued that global modellers seeking and applying large-scale generalisations must recognise the challenge of compatibility of their approaches with local social-ecological diversity. Such model analysis has previously been used to justify large-scale temperate monoculture. Future model analyses must support a better understanding of regional implications. Resilience must be at the heart of an agricultural agenda, anchored in the local context.

Knowledge for navigating complexity

Knowledge plays an important role in accountability of development decision-making. Participants called for attention to smaller knowledge cycles, linked to shorter value chains. Keeping people ill-informed, with long, complex, untraceable value chains are features of the history of extractive wealth. Steps for Sustainable Development Pathways must recognise that farmers themselves are vital contributors to the sources, uses and reuse of farming knowledge.

Current rates of global social and ecological change will bring surprises that will hit agriculture: new pests, droughts and flooding, and more. Participants highlighted the need for knowledge intensive agricultural systems and risk management systems. These must do better at meeting local needs, which entails targeted research and interventions with domestic funding. A dependency on external funding means that priorities are set externally, with a risk of seismic shifts or even removal when the politics change.

Research questions to develop sustainable development pathways should be devised with local groups, and the results analysed together. All different kinds of knowledge systems should be respected¹⁷. Traditional, Indigenous and local knowledge are under-documented – it is important to understand what has happened with that knowledge and its use, if the future education model and curriculum are to be related adequately to situation geographies and cultures. Bringing the grassroots effectively into global Agenda 2030 involves the continuous provision of training to multiple actors in farming systems and wider society.

Governance: participation and polycentricity

The SDGs need action, especially from governments – and that means a need for political will. Participants wished for a political-will-ometer, observing that nice words articulated in international platforms are not carried through to action in Africa. They noted that politically, it is perfectly possible to want (or promise) more than one thing at a time – negotiations are words. But action involves real resources. It is not always possible to do everything at the same time, and contradictions must be faced up to.

Participants observed that to a large extent, Africa's land is an uncontrolled factor, so it has long been used as a tool of suppression. Land-grab is a depressingly familiar aspect of new colonialism, and a major cause of migration and social disempowerment. Peaceful transformation to sustainable agricultural development will involve a major shift in the role of land rights and the law.

The separation of political and business interests was raised as an issue. International pressure on trade and subsidies create distortions, although in the rest of world, countries use subsidies positively to steer their national development choices all the time. What is needed is clear, socially-framed paths, targeting particular aspects of agricultural production and trade, and carried through to effective delivery. For such green subsidies, financial needs must be openly assessed, if the money is to go where it is needed.

Participants raised many open questions. Are governments doing enough for sustainable development – or is Agenda 2030's emphasis on "co-delivery" a get-out clause? How much do we need to focus on international coordination, with features like large-scale technology, and trade liberalisation? On supporting national priorities and decentralised responses for local energy security and agriculture? Or on individualised behaviours, such as consumption choices that minimise energy use and waste? There is a clear role for SDGClA in engagement with national leaders, giving both process and platform that can bridge these various decision levels.

Dealing with diversity

The pathways to 2050 must not be utopian, but they must do a good-enough job at dealing with diverse demands and needs. From a policy perspective, this means that agriculture can't be singled out from economic transformation. Governance of diverse sectors implies better approaches to multi-sectoral governance, and to implementation across gaps and sector interfaces.

Peace, strong and just institutions, and partnerships (SDGs 16 and 17) are cross-cutting issues. Participants were concerned that this may mean they risk not being pursued with as much determination as more concrete goals. How can SDG2 – the strong shared agreement to end hunger – help to bring a united global perspective and joint impetus to these goals?

There is culture within agriculture. Facing Africa's triple challenge of ecological protection, societal prosperity and agro-economic production involves recognising the diversity and divides in the benefits (and the pains) from globalised development. Without this awareness, inherently good ideas fail at implementation, or are simply recast as bad. Respect for cultures links tightly to biocultural diversity, much improved in-situ conservation assessment and communitybased management of ecosystems and biodiversity.

Here too, open questions remain. Who makes the choices that lead to a shift from the business-as-usual trajectory to a Sustainable Development Pathway? It will take immense human ingenuity, engaging people's diversity and creativity, to find a way of working with the available resources in order to ensure well-being for everyone, as Agenda 2030 sets out. What kind of infrastructure allows for the engagement and integration of such diversity to take place?

Participants noted that Africa's academics play a vital role at the interface between society and policy. They bring relevant knowledge and they have long "terms of office" compared with politicians. Scientists play a unique role to convince politicians of the need to act. They can help to de-risk the politician's constituency – smart science helps to smooth the process of SDG implementation. This will take bold, clear ideas and messages to replace old ways of working.

Concluding Remarks

The African Dialogue has started to explore ways in which a biosphere-based approach to sustainable development, viewed from a social-ecological systems perspective, opens up possibilities to bridge across diverse worldviews and knowledge systems, and counter the current focus on narrowly defined economic growth. Africa's agricultural development has been part of a much wider globalisation process, which has transformed the world both socially and ecologically, especially since ~1950. This is now being called the "Anthropocene era": the age where human activities are the dominant influence on Earth's climate and environment.

As the world looks to 2050, it must face up to the positives and negatives of globalisation. Social and economic development, advances in science and technology, and urbanisation have contributed to progress in well-being in many parts of the world but are less certain to continue into the future. These developments have created both enormous opportunities and severe limitations for future human well-being.

The challenge tackled in the African Dialogue for TWI2050 was about navigating forward in a desired direction – a sustainable world in 2050, where SDGs are met and societies prosper within planetary boundaries. The network of participants at the event, and the organisations they represent, provide vital opportunities for amplification of action throughout the respective communities. The event's resilience perspective illuminated many issues along the possible pathways to 2050. Resilience helps to understand both change processes and stability, in social and ecological systems ranging from communities up to the global scale. Managing change in either social or ecological systems depends on understanding how these systems interact, because actions in one domain often have unintended and sometimes unexpected consequences in the other. Agriculture, and the conservation and sustainable use of agrobiodiversity, demonstrate this interdependency very clearly, and play a vital role in the future sustainable development of Africa - and the whole world.

The discussions in Kigali highlighted many tensions and contradictions that arise when the world is seen from different perspectives: global/local, urban/rural, wealthy/ poor, science/tradition, men/women, youth/elders, and more. These important differences do not disappear in the global sustainability narrative of TWI2050; they just slip out of view when the focus shifts to the analytical, quantified world of integrated global modelling. They need to be brought back into focus when science-informed policies are put into practice. This is why multi-actor, multi-cultural, multidisciplinary dialogue continues to be so important as steps are taken along the pathway to 2030 and beyond.

¹⁷ http://swed.bio/focal-areas/themes/biocultural-diversity/a-multipleevidence-base-approach-for-equity-across-knowledge-systems

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List of Annexes

Annex 1: African Dialogue Participants Annex 2: The Dialogue Agenda

ANNEX 1: African Dialogue Participants

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Mr. Alexis Ruzigawa Ms. Maria Schultz Dr. George Sempeho Dr. Octave Semwaga Mr. Gordon Shaw Mr. Silas Sinyigaya Prof. Kaaya Siraje Dr. Celine Termote Ms. Ahadu Tekle Mr. Misikire Tessema Lemma Ms. Ritha Tumukunde Ms. Sandrine Urenji Prof. Sander Van Der Leeuw Mr. Otto Vianney	Livestock Development FAO Director SDG Advisor Director General in charge of Strategic Planning and Program Coordination SDG Advisor Executive Secretary Deputy Vice Chancelor – Academics and Research Associate Scientist, Agricultural biodiversity and dietary diversity M&E Officer National Coordinator for the NBSAP Project Agriculture Economist Deputy Chief Executive Officer Director Assistant FAOR/Programme	MINAGRI SwedBio at SRC, Stockholm University SDGC A MINAGRI SDGC A Rwanda Civil Society Platform University of Technology and Arts – Byumba Bioversity International FAO Ethiopian Biodiversity Institute Ministry of Agriculture / Planning Department NAEB ASU-SFI Center for Biosocial Complex Systems FAO	Rwanda Rwanda Sweden Rwanda Rwanda Rwanda Rwanda Ethiopia Rwanda Rwanda USA Rwanda
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ANNEX 2: The Dialogue Agenda

Day 1 - Mor	nday 28th Au	igust
<i>Start time</i> 08:45 09:45	End time 09:45 11:20	<i>Topic</i> Arrival & Registration Event Opening Facilitator: Dr. George Sempeho , SDGC/A
		Presentation of Conveners: Ms. Maria Schult SwedBio Dialogues and the Collaboration be Dr. Belay Begashaw , Director General, SDGC/ Presentation on of the Purpose of the Dialog
		Introductory Remarks by FAO Representative Dr. Patrick Kormawa , Subregional Coordinate
		Official Opening: Mr. Mark Cyubahiro Bagabe , Director Genera
		Keynote Speech on the World In 2050 and th Prof. Johan Rockström , Director, SRC
11:20	12:50	Introducing the program, participants and su Facilitator: Dr. Million Belay Ali, SRC Co-facilitator: Ms. Maria Schultz, SwedBio at
		Sub-theme 1: Values and Social-Ecological Re Resource person: Dr. Sarah Cornell , SwedBio Aim: To explore the broad range of views on u agriculture and food systems in sustainable so
		Sub-theme 2: The Resilience of Africa's Life-S Resource person: Dr. Philip Osano, Stockholm Technology Studies Aim: To explore perspectives on the challenges
		systems – including the energy-water food ne preconditions and ensure sustainable resource
		Sub-theme 3: Policy and Governance of Socia Resource person: Dr. Julia Leininger , German Aim: To understand how international cooper between food systems and the sustainable us opportunities in the policy arena for synergizi and agriculture with meeting the SDGs; to de
<i>Start time</i> 12:50	End time 13:00	<i>Topic</i> Introduction to the afternoon's break-out set Facilitator: Dr. Million Belay Ali, SRC
13:00	14:30	Lunch
14:30	17:30	Break-out session: Thematic discussions
		Sub-theme 1: Values and Social-Ecological Re Resource person: Dr. Sarah Cornell, SwedBio Chairperson: Prof. Dr. Siraje Kaaya, Deputy Vi of Technology and Arts Byumba Rapporteurs:
		Mr. Charles Karangwa, The International Uni Maylat Mesfin, SDGC/A

THE AFRICAN DIALOGUE ON THE WORLD IN 2050

tz, Director, SwedBio at SRC etween SRC & SDGC/A :/A gue: SDGs, Agriculture and Food Systems

or for Eastern Africa

al, Rwanda Agricultural Board

he African Dialogue:

sub-themes for break-out sessions

t SRC

Resilience at SRC universal values, human needs, and the place of social and economic development

Support Systems m Environment Institute and African Centre for

es and opportunities of Africa's agriculture and food exus; to explore pathways that respect Earth ce use

ially Inclusive and Resilient Agriculture n Development Institute ration can support synergies and trade-offs se, and conservation, of biodiversity. To identify ing conservation and sustainable use of biodiversity evelop messages for TWI2050

essions

Resilience at SRC /ice Chancelor of Academics and Research, University

ion for Conservation of Nature – IUCN

Sub-theme 2: The Resilience of Africa's Life-Support Systems

Resource person: Dr. Philip Osano, Stockholm Environment Institute and African Centre for Technology Studies Chairperson: Mr. Amadou Kanouté, Executive Director, Citoyenneté, la Consommation et le Développement en Afrique (CICODEV) Rapporteurs: Dr. Thomas Dubois, World Vegetable Centre Lina Henao, SDGC/A

Sub-theme 3: Policy and Governance of Socially Inclusive and Resilient Agriculture Resource person: Dr. Julia Leininger, German Development Institute Chairperson: Dr. George Oduor, Centre for Biosciences International (CABI) Rapporteurs: Dr. Jane Mutune, Wangari Maathai Institute for Peace & Environ. Studies, University of Nairobi Donald Ndahiro, SDGC/A

- 17:30 17:45 Closing Day 1 Facilitator: Dr. Million Belay Ali
- 19:00 21:00 Dinner

Day 2 - Tuesday 29th August

Start time	End time	
08:00	08:30	Arrival & Opening
		Facilitator: Dr. Million Belay Ali
08:30	10:45	Breakout sessions: Presentations rotating between sub-themes
		In this session, participants will rotate between the three sub-themes.
10:45	11:00	Coffee Break
11:00	13:00	Panel discussions and way forward
		Dr. Belay Begashaw, Director General, SDGC/A
		Prof. Johan Rockström, Executive Director, SRC
		Prof. Sander van der Leeuw, Arizona State University
		Dr. Sarah Cornell, SwedBio at SRC
		Dr. Philip Osano, Stockholm Environment Institute and African Centre for Technology Studies
		Dr. Julia Leininger, German Development Institute
		Rotating between chairpersons for the respective sub-themes:
		Sub-theme 1: Prof. Dr. Siraje Kaaya
		Sub-theme 2: Mr. Amadou Kanouté
		Sub-theme 3: Dr. George Oduor
13:00	13:30	Closing Remarks:
		Co-chairs: Dr. Belay Begashaw and Prof. Johan Rockström
13:30	15:00	Lunch
15:00	16:30	Visit to Kigali Genocide Memorial







THE AFRICAN DIALOGUE ON THE WORLD IN 2050

About the report

This report provides a full reporting of the African Dialogue on The World In 2050, and gives an introduction to SwedBio's Multi-Actor Dialogue methodology that can be used for future sustainability deliberations.

The African Dialogue for The World In 2050 was held on the 28-29 of August 2017 in Kigali, Rwanda. The Dialogue gave input on how African agriculture can contribute to meeting the UN Sustainable Development Goals within the Planetary Boundaries. It also provided a platform to discuss and exchange views on the place of African agriculture and biodiversity and the importance of social-ecological resilience in future development. It brought a unique richness of perspectives and deep expertise across the domains of agriculture, agro-industry, food security and well-being, and the sustainable use and conservation of biodiversity.

The Dialogue was hosted by the SDG Center for Africa, jointly organised with SwedBio at Stockholm Resilience Centre, with financial support from the Swedish International Development Cooperation Agency (Sida).

The Dialogue brought together 60 participants from across Africa with a wide variety of backgrounds, including policy makers, academics, business leaders and civil society.

SwedBio

is a knowledge interface at Stockholm Resilience Centre contributing to poverty alleviation, equity, sustainable livelihoods and social¬ecological systems rich in biodiversity that persist, adapt and transform under global change such as climate change. SwedBio enables knowledge generation, dialogue and exchange between practitioners, policy makers and scientists for development and implementation of policies and methods at multiple scales.

The Sustainable Development Goals Center for Africa (SDGC/A)

is an international organisation that supports governments, civil society, businesses and academic institutions to accelerate progress towards the achievement of the Sustainable Development Goals (SDGs) in Africa.

The purpose of the Center is to provide technical support, neutral advice and expertise as input to national governments, private sector, civil society, academic institutions to accelerate the implementation of the SDG agenda across Africa.

The World In 2050 (TWI2050)

is a global research initiative in support of a successful implementation of the United Nations' 2030 Agenda. The goal of TWI2050 is to provide the fact-based knowledge to support the policy process and implementation of the SDGs.



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SwedBio is funded by the Swedish International Development Cooperation Agency (Sida)