Discussion about convergences and divergences

IN THIS SECTION, we discuss the commonalities and differences inside each group, across the results of the four groups, and in relation to the global perspectives. We first compare the core concerns and their root causes as discussed in each group, followed by a comparative analysis of desired futures and the measures to get from the present to these futures. Then we close this section with an analysis about how the results of the four groups differ or converge in relation to the global perspectives. Global perspectives about how to reach multiple goals were summarized by Dr. Ana Paula Aguiar from Stockholm Resilience Centre and presented during the second day of the Dialogue as inputs to the breakout group discussions.

Present concerns and root causes

In relation to the core present concerns, the results from the different groups present several overlaps (coloured items in Table 12), namely: climate change, land degradation, food insecurity, inadequate governance, inadequate infrastructure, low level of financing and issues related to technology (including the dichotomy between modern and indigenous knowledge). Three of the groups also made an analysis of root causes related to these present concerns (see Table 5, Box 9 and Table 11). Some of the present concerns are identified as root causes of other concerns (lack of education and skills, climate change, for instance). One of the groups represented such links with a causal loop diagram[20] (see Box 9).

Table 12: Comparative table of core challenges as synthesized by the different groups.
Colours follow the same convention as in the previous section (pink – society concerns, blue – economy/infra-structure concerns, green – environmental concerns, orange – governance or overarching concerns).

Ubuntu	Peaceful and Prosperous East Africa	Urugendo	Rainbow
Disconnect between technology and indigenous knowledge Land degradation Climate change Failing crops/less yield Collapse of social values of communities Growing inequalities	Gender imbalances Conflicts between agriculture and urbanisation Low adoption of technology Inadequate infrastructure for market access Inadequate funding/ financing Weak research and extension linkages Environmental degradation Food insecurity Inadequate sectorial coordination	Low uptake of ICT Low inappropriate techniques +skills Inadequate infrastructure Inefficient market system which does not support farmers Lack of appropriate financing Environmental degradation Lack of multi-sector approach (planning) Lack of enabling policies & legal frameworks Institutional weaknesses	Poor quality of education Lack of universal health and education High population growth* Low human capital Migration/brain drain Ignoring indigenous knowledge Lack of access to infrastructure (roads, IT, energy) Limited access to finance Land/forest degradation Idle/unused local resources Climate change Power inequality Corruption/ abuse of power

In relation to the core present concerns, although there was large degree of convergences across the groups, some divergences emerged inside the groups:

– The Rainbow pathway discussed if population growth or consumption is the core problem.
– In the *Peaceful and Prosperous East Africa (PPEA)* pathway, the participants discussed if land is scarce or if actually there is enough agricultural land, but its use is hampered by various factors, e.g. aridity.
– In the Rainbow group there was a discussion about the root causes of the migration and brain drain from Africa to Europe (lack of nationalism or of opportunities and trust).

The futures

Combining the analysis of the desired futures and measures to achieve them (STEPS 1 and 3), we here discuss the "solution space" emerging from the groups. We start by highlighting the five key points of **divergences identified inside and among the groups**, as they can be used to indicate main branching points among alternative pathways for Africa[21]:

1. The issue of population growth and measures to control it caused divergences in all the groups. As mentioned above, there is the view of population growth as a threat to the natural resources and food security, but also as an opportunity to create new markets, work force and innovative youths. The PPEA pathway story mentions this as an open issue: *"Also, whether we should limit population or to find ways to see it as an asset"*. In spite of this, all groups integrated some level of family planning in their pathways. We further discuss these issues the following section about the global perspectives.

2. Across the groups, we identified different perspectives in relation to the types of actors involved in the agriculture in the future. The Ubuntu pathway, for instance, tells a story of small-scale farmers organised in well-structured cooperatives or "farmers' associations", providing enough food for themselves, for the local markets, but also exporting for the continent and the world (and oriented towards agroecology, see next point). Although there seems to be a consensus that subsistence agriculture needs to be transformed and a general expectation about agriculture becoming an important economic sector in Africa, the role of the small-scale agriculture (even a "commercial" one) in the future was also discussed by this group. The East Africa group writes in one of their stories: *"there have been many debates about whether small-scale agriculture is viable or we should encourage large-scale commercial farming. Whether agriculture*

should be commercial/market-oriented, or community-oriented". There was also a discussion about agribusiness being (or not) a source of more income for the small farmers, since higher volumes (of production) leads to lower prices and less for farmers. Along these lines, all groups emphasized the importance of cooperatives. The Land Consolidation program in Rwanda was mentioned as a good example (See Table 13). Diversification of products and use of modern techniques, combined with indigenous knowledge, is also necessary along this pathway, although the challenges are enormous, as the example of the RYTI (Young Farmers Initiative Rwanda) shows (see Box 19). In the final debate, all these issues were discussed, while also considering the power of large agribusiness corporations and the history of land concentration in other parts of the world, such as Brazil. This debate also links to the urbanisation prospects for Africa.

3. Although increasing productivity and climate adaptation are common concerns, a core divergence that emerged from the comparison across groups relates to the debate around agroecology or sustainable agricultural intensification (SAI), as pathways to a sustainable agriculture[22]. For instance, the Ubuntu pathway aligns with the agroecological solution (*"agroecology fully embraced", "a farming system free from poisonous pesticide use", "balance in use of organic and inorganic inputs"*), while the PPEA group aligns more with the SAI pathway (mentioning *"Climate smart agricultural practices", "Environmentally friendly green revolution", "Less inputs (mineral) in agricultural production"*). The other two groups are less specific, mentioning the use of *"organic fertilizers and pesticides not harmful to the environment"*, *"Climate resilient sustainable food production", "agroforestry" and "Good quality and resilient crop varieties with high level of productivity are cultivated"*. The use (or not) of Genetic Modified Crops (GMOs) was also discussed in the groups. The Ubuntu group discussed if GMOs have a role in their future or if the future is organic without GMO use. In the Rainbow group/pathway, there was a suggestion on the use of biofortified seeds, followed by a discussion on their actual need – when compared to improved diets and crop varieties. There was also a discussion about the difference between biofortified seeds and GMO (Genetically Modified Organisms). This group has no GMO in their future.

4. In the Rainbow pathway, participants disagreed about the adoption of meat free diets (due to its potential negative consequences to the environment, such as greenhouse gas emissions, land consumption, etc.) versus the need for meat protein, the importance of herds in the livelihoods for pastoralists and cultural attachments. The group opted for a future with "Diversified diets (e.g. fish, aquaculture, meat, etc.)". The other groups did not include change in diets in the diagrams.

5. Finally, the last core point of divergence relates to the role of state and private sector in promoting agriculture and human well-being. One of the groups wrote in their synthesis letter: "We still debate about whether to continue or discontinue subsidies and the role of government in supporting agriculture". As a related issue, the Rainbow group discussed the adequacy of having social democracy as the political ideology governing Africa. They solved this with a more general formulation "priority for social programs".

When analysing the divergences, we noted that no clear region-specific aspects emerged (when comparing the Eastern Africa, Western and Central Africa and Southern Africa groups) – except in the names, languages and places chosen to synthesize the work in letters. Maybe this reflects the choice of participants (see Recommendation for future Dialogues). Nevertheless, the African Continent group, when compared to the sub-regional groups, emphasized more aspects related to regional cooperation, including data generation/sharing and the importance of alliances for change (across Africa and with the other continents). The African continent group also brought some concerns usually expressed in global scenarios (such as changes in meat consumption) not addressed by the other groups.

In spite of these points, several other aspects were **common or complementary** across the four pathways. Throughout all the groups, *a vision emerges of peaceful and prosperous rural and urban Africa, capable of feeding itself and world – although the actors and agricultural practices in such visions may vary as discussed above*. Table 13 presents core actions that are grouped into three large interdependent categories: **Empowerment, Partnerships for change and Knowledge sharing.** Such actions can be understood as the backbone for the necessary transformation, over and beyond the divergent aspects. And, through this transformation, to the achievement of several SDGs in a holistic way. Table 13 also brings examples of existing 'seed' initiatives discussed in the groups.

Table 13: Synthesis elaborated by the facilitators about necessary actions as a support to multiple pathways. The examples of initiatives are not exhaustive.

	Common elements across pathways	Some examples of good seeds
Empowerment (youth, women and population)	Investment in education and adequate skills for agriculture – essential for the population empowerment and transformation of the sector – that combine traditional and innovative knowledge. Mechanisms for guaranteeing youth participation in politics. Involvement of communities in decisions: bottom-up and top-down balance. Addressing gender issues (a constant theme in all pathways) including land tenure, finance access and political representativeness for women. Structured markets and incentives to transform agriculture in an attractive sector for the youth (addressing the concern of out-migration).	RWEE (Rural Women Economic Empowerment) Joint Program UN-Women, WFP, IFAD and FAO. Mastercard Foundation: Youth Africa works initiative In Rwanda: young people (engaging) in the political system.
Partnerships for change	Political will at different levels. Pro-active approach to change among all actors and parts of the society, not relying solely at governments to initiate changes. Consolidation of small farmers' cooperatives (from production to markets). Investments in physical infrastructure (roads, energy, irrigation, agro-processing, climate resilient solutions, etc.) and finance infrastructure (easy access to credit and insurance for farmers). Adequate trade agreements and development of local to global markets. Regional and Continental cooperation and planning (markets, governance, infrastructure, technology), including environmental concerns (conservation, climate change adaptation/mitigation). International compromise (aligned to regional plans, alliance against corruption, aiming at independence from donors).	Land consolidation and crop intensification program in Rwanda. Government of Uganda has initiated E-voucher system invested in agro-processing facilities and distribution of inputs to farmers for increased production. Kenyan government invests in large- and small-scale irrigation systems to reduce dependence on raid fed agriculture (1.2 million acres to date).
Knowledge, technology and data sharing	Data collection for natural resources monitoring, (agroecological) spatial zoning and regional planning. Creation of collaboration platforms/hub for sharing best-practices. Improvement of extension systems focusing on Context-specific solutions embedded in collaboration networks. Research and development combining traditional values and modern techniques (seeds, climate resilient practices).	Mobile tech-based payment/ transfer systems (similar to Kenya's MPESA*) applied to agricultural production may help farmers attain higher shared values.

Box 19: An example of the potential and challenges faced by cooperatives in Africa: Young Farmers Initiative in Rwanda (YFIR)

One of the participants of the Dialogue – Gustave Manishimwe – invited the facilitators to visit a cooperative he co-founded and currently leads as a CEO[23]. This box was written by SRC researchers based on Gustave's input via e-mail.

The Young Farmers Initiative Rwanda (YFIR) was established in 2014, with the objective of introducing and implementing modern agricultural practices in a cooperative of around 40 small farmers at the edge of Kigali (see picture A), aiming at producing vegetables through urban agriculture. According to Gustave Manishimwe: "*We are a cooperative of young farmers working together to create handcrafted, thoughtful and delicious food for the community. We see ourselves as a model for young farmers that want to create shared value through all stages of food growth and production*".

The cooperative adopts the paradigm **of a more localized food system based on a new form of agriculture that blends the wisdom of the past with the science of the present, making agriculture attractive to the youth.** *"As you know, vibrant innovations are driven by young people, and we try to overcome the many challenges faced by traditional farming. We know traditional farmers were in recent years not successful because of poor soil, limited rain, poor crop management. All this made intensive farming impossible. Their crops were also not ideal, as they produced fewer calories than those of today. All these factors limited surpluses and kept populations sparse and scattered. That's why we started our cooperative: to face these challenges and create a new farmers generation"*, adds Gustave.

The strategic vision of YFRI is to: (a) create sustainable employment opportunities through agri-business, making agriculture attractive for youth; (b) position Rwanda as the food basket of East Africa, and (c) promote environmentally and socially responsible agri-business practices. Their mission is to build a society without hunger, promote urban agriculture, implement Sustainable Agriculture and promote youth employment.

One of their first actions towards increasing productivity was to build a nursery greenhouse. Currently, it is still a small greenhouse, built with simple materials and not fully covered, but according to them, it already improves quality and productivity (picture B). They improved the quality of the soil, apply external inputs with care and test alternative crop management techniques (picture C). They also invested in simple irrigation systems, combining traditional and modern techniques (picture D). The cooperative has cows, produces milk and uses the manure as fertilizer (picture E). They have help of a technician trained in Israel, responsible for the innovations (also in Picture D). Gustave Manishimwe sees this as a dream, but also as a profitable business. His intention is to dedicate himself fully to the cooperative for some years. However, they still face many **challenges**, all interlinked:

1. **Lack of scale**, as they need to increase production to guarantee delivery.
2. **Lack of better irrigation systems**, as the systems they have now are incipient.
3. **Lack of a larger and better greenhouse**, crucial for increasing the production.
4. **Lack of enough capital for investment and expansion** as it is still difficult to access loans easily for agriculture in Africa.
5. **Lack of a structured market** for their products, even in Kigali.

Figure 9: (A) Arriving at the cooperative, still in the urban area; (B) the nursery greenhouse producing; (C) multiple techniques for crop management; (D) a simple and efficient traditional irrigation system (buried clay pot or pitcher method) and the technician Nsanzimana Ignace, explaining the system and future plans; (E) milk cows with feed complement; (F) from left to right: David Collste, Nsanzimana Ignace,, Tsimbura Valens, Ana Paula Aguiar, Gustave Manishimwe and Diego Galafassi in the end of the visit.

"It was a gift to be able to visit the cooperative that represents so well the present concerns and aspirations discussed in the Dialogue. We are very grateful to Gustave. We do hope this type of initiative will foster similar ones, and that a "partnership for change" at multiple levels (Table 13) removes all the problems blocking their way to success" – Ana Paula, David and Diego.

Global perspectives: How do they differ from the African pathways?

Global perspectives about how to reach multiple goals were summarized by Dr. Ana Paula Aguiar from Stockholm Resilience Centre, based on the TWI2050 report[24]. This synthesis was presented during the second morning of the dialogue as inputs to the breakout group discussions. In this section, we discuss how the vision of the future reflected in these global scenario conflict or align to the Dialogue results.

The TWI2050 report, launched in July 2018, discusses six domains that need to be jointly transformed in order to achieve the SDGs within the planetary boundaries (Figure 4). One of such transformations relates to **food systems and land use**. The report argues that the current patterns of land use, mainly related to the production of food, biofuels, and fibre, are unsustainable in three ways:

> *"First, today's agricultural systems (including livestock and aquaculture) are* **major contributors to human-induced climate change**, *unsustainable water use, poor health through inadequate nutrition, eutrophication through nutrient overload, air and water pollution, deforestation, and the loss of biodiversity. At the same time, agricultural systems and other forms of land use are* **vulnerable to the environmental changes now underway,** *through the increasing severity of droughts, floods, diseases, and land degradation caused, in part, by climate change. Similarly, most ocean and freshwater fisheries are overexploited, and oceans are exposed to high levels of pollution, including acidification from CO_2 in the atmosphere. Third, today's* **food systems do not deliver healthy diets** *with some 800 million people undernourished (FAO et al., 2017)[25] and nearly 2 billion overweight (WHO, 2015)[26]. Taken together, transformations of land use and ocean management must reduce the human-induced damages caused by agriculture and the food system while also making agriculture more resilient to environmental changes now underway and ensuring healthy diets."*

The report reviews key global scenario studies on pathways to reach multiple sustainable goals, based on Integrated Assessment Models[27] (IAM's), the core type of model used in TWI2050 and IPCC (Intergovernmental Panel on Climate Change). These include, the "integrated SDGs" scenario from Parkinson et al. (2018)[28], "lifestyle change" from van Vuuren et al. (2018)[29], and SSP1–1.9 from Rogelj et al. (2018)[30]. One of the key foci of such studies is to explore how to reconcile climate change mitigation options (for keeping the average increase in temperature below 1.5 or 2 degree Celsius) with other goals, such as producing enough food for a growing population. Although currently these global IAMs do not represent all the SDGs, they are able to capture some of the key trade-offs and synergies in relation to the food-water-energy nexus.

In general lines, such scenarios follow a narrative of a **globalized, low population, highly urbanised, low consumption, nature restored in a world with highly concentrated and technological food production, including in Africa, to reach the goals** schematically represented in Figure 10.

For the agriculture and food system this implies:

1. From the consumer side: transition towards healthier end environment friendly **diets** (less red meat, for instance).
2. For food production: **limited land for agriculture** (for crops and herding) due to large-scale restoration to mitigate climate change and emphasis on **biofuels for energy.** Strong emphasis on **intensification** and better management practices (land sharing).
3. Such pathways also imply less waste, **coordinated governance across scales**, certification processes and emphasis on education and slowing **down population growth**.

Some of the assumptions of these global perspectives were discussed (and challenged) by the participants:

1. **High urbanisation levels.** The assumptions underlying the reviewed scenario align with the IPCC SSP1 (Sustainability Shared Socio-economic Pathway 1[31]) premises. According to them, in Sub-Saharan low-income countries, the urban to rural ratio would increase from 37% to 43% in 2020, to 68% in 2050 and 90% in 2100. In medium-income countries, it would increase from 66% in 2020, to 84% in 2050 and 96% in 2100 (Figure 11a). Such assumptions evoke a vision of a highly urbanised world that might be in conflict with the vision that emerged from the groups, most of them relying on strong rural communities in the future. Related to this, the PPEA group wrote: *"Urbanised world: There might be alternative ways of living rurally: "Are global models thinking we will all be [living in] Shanghai or New York?"*.

2. **Low population growth.** As mentioned before, population growth was a theme that raised several divergences inside the groups and across them (see previous section). The assumptions underlying the reviewed scenarios also refer to the SSP1 demographic projections. Population growth in SSP1 is considerably lower than in the other scenarios, as Figure 11b illustrates. SSP1 projections are based on **Abel et al. (2016)**, and rely on high levels of urbanization and women's education as key measures to reduce natality rates, invoking historical trends. About this, one of the groups wrote in their synthesis letter: "As you know from your time, some of the assumptions were that change was not going to happen without considering high levels of urbanization and to this we have applied drastic family

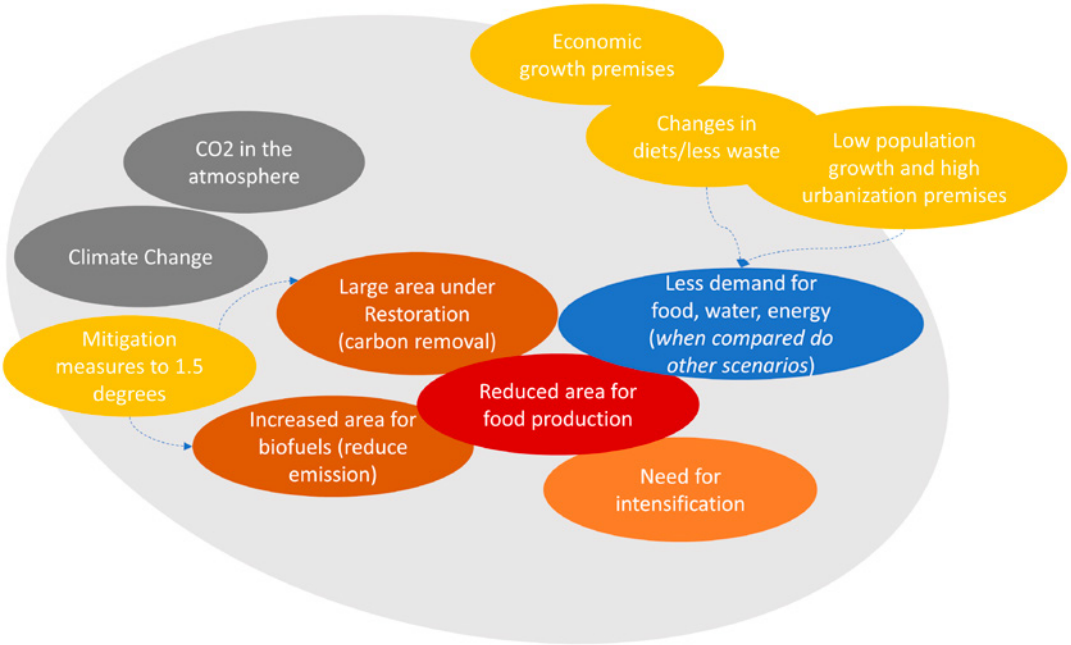

Figure 10: Figure 10: Schematic representation of how the assumptions underlying the current 1.5º C. mitigation scenarios affect land availability for food production (red). There is still a need to double current agricultural productivity indices – although such scenarios assume lower population growth than other scenarios that are more pessimist – as land for food production is restricted due to competing large scale restoration and biofuels expansion inherent in climate mitigation (source: prepared by SRC researchers).

Figure 11: Urbanisation and Population projections underlying the SSP1 (Sustainability) and SSP2 (Middle of the Road) scenarios. Source: SSP database.

planning measures which reasonably limited population growth", using strong family planning as a counterargument to urbanisation. And another group wrote in relation to the global models: *"Think of population not only as consumers, but as people that add value to the world. There are important nuances and qualitative aspects."*

3. **Changes in consumption patterns toward healthier and environmentally friendly diets,** are one of the key premises of the sustainability-oriented scenarios. The rationale is that a decrease in the "demand" side (from Europe or China, for instance) will decrease pressure on natural resources (in Africa, for instance). A considerable reduction in the consumption of meat is part of the premises of several of these scenarios. This topic did not emerge in most discussions, except in the "African Continent" group. However, the group had a divergence about this, as some of the participants proposed a "meat-free" diet in the desired future for Africa, while the others argued that meat herding is an important for the livelihood and culture of many local populations (and the economy of certain countries). The group proposed: *"diversified diets (e.g. fish, aquaculture, red-meat, etc.) adapted to different contexts"*.

4. **Technology-based sustainable intensification, global markets and mitigation.** The reviewed global scenarios rely in general on a global land sparing pathway, in which food is produced in the more suitable lands over the world through highly technological and intensive production. This would also free land for restoration and biofuel production (both necessary to mitigate global emissions). Several aspects of this premise diverge, or reflect some of the internal divergences, inside and across groups:
   1) besides the conventional "sustainable agriculture intensification" pathway, agroecology intensification pathways were also discussed;
   2) the global market/land-sharing conflicts view needs to be enhanced with the perspective of producing food for local markets, ensuring local food security, and having an excess to be commercialized regionally and then globally;
   3) the reduction in area for food production resulting from mitigating global emissions was not considered in the discussions[32] and
   4) there was a discussion about actors. For example, what are the implications of such land sparing vision for small actors? Which actors would be producing food in the future? Large companies or cooperatives of small farmers? How does this relate to urbanisation? In relation to these issues, one of the groups wrote: *"Tech-based production: What about putting people at the centre rather than technology at the centre?"*

All these aspects are interlinked and challenge some of the basic assumptions of the existing scenarios, indicating the importance of these type of cross-scale dialogue for improving the design of future scenarios. In the next section, we recommend that future sustainability-oriented scenarios should consider the insights from the discussions in a broader combination of premises and measures to be explored for Africa.

Final remarks: synthesis of the Dialogue's recommendations

THIS SECTION presents recommendations derived from results of the Dialogue, related to its core goal of giving voice to regional African aspirations related to pathways to sustainable futures. It provides relevant insights to: (1) **practitioners/policy makers involved in SDG implementation processes**, shedding light on the option space (including tensions) around alternative pathways; (2) **modelers and scenario builders involved in the design of alternative (sustainability) scenarios for Africa**, in the context of TWI2050 and other such initiatives. We conclude with some recommendations for future Dialogues, drawing on what was learned about the process used, based on the 3Horizons framework, and on participants' evaluations.

Recommendations for the implementation of the SDGs

Figure 12 schematically represents how we envision the core convergences (and divergences) identified within and across groups' discussions and how they can be used in the decision-making context in relation to the global perspectives.

In general, all pathways discussed during the Dialogue have in common the vision of agriculture as an important economic sector ensuring food security for the future African population, both in rural and urban areas. Several themes are common across the pathways, including the improvements in education/skills, youth, women and population empowerment, the consolidation of cooperatives and cooperation between farmers, the need for infrastructure, generation and sharing of reliable data, structuring of local to global markets, financing and insurance for agriculture, independence from foreign donors, political will, regional cooperation, transparency and accountability of governments and others governance issues. **These common themes are grouped in Table 13 under three interlinked categories (Empowerment, Partnerships for change and Knowledge sharing) which can be understood as the backbone common actions in all pathways.**

On the other hand, the divergences identified – inside the groups and across them – relate to different perspectives concerning, for instance, urbanisation, population growth, consumption changes, agricultural practices (sustainable intensification, agroecological practices), the role of different actors and agricultural systems in the agricultural sector of the future (community-oriented farming, market-oriented small-holder farming, large-scale industrial agriculture) and the role of the agriculture sector in the African Economy (see Table 2 in the Executive Summary). **Such branching**

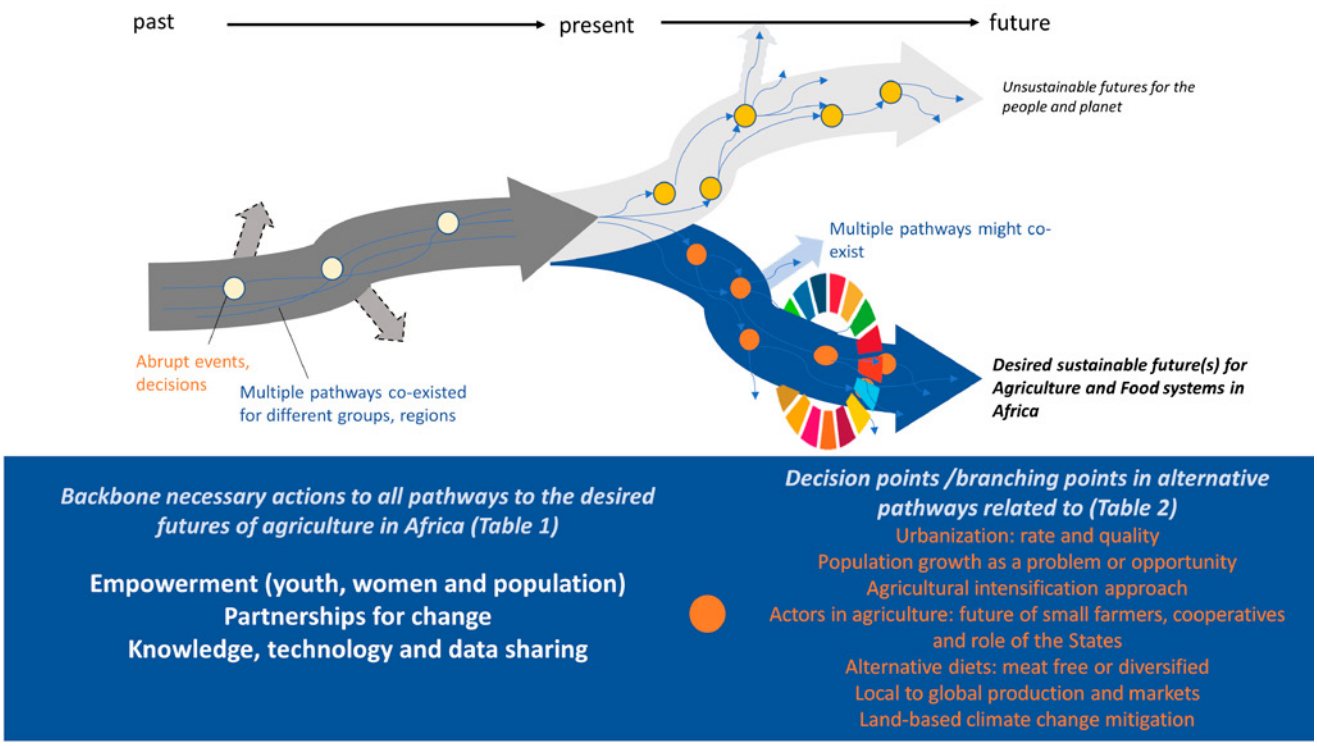

Figure 12: Schematic representation of our synthesis based on the analysis of convergences and divergences inside and across the pathways. From the convergence analysis we derive insights about actions considered necessary (backbone) in all pathways (Table 1 and 13). From the Divergence analysis we derived branching points (Table 2 and Table 14). Branching points can be understood issues to be discussed and deliberated about at different levels and geographic contexts by society and decision makers, according to their socioeconomic, institutional and cultural characteristics. They can also provide insights for the designing of alternative scenarios representing pathways to sustainability. The idea of the pathways representation was adapted from the IPCC Special Report on Global Warming of 1.5°C (Chapter 5) and Fazey et al. (2016).

points can be understood points to be discussed and deliberated about at different levels and geographic contexts by society and decision makers, according to their socioeconomic, institutional and cultural characteristics.

The participants acknowledge, and as they explicitly discussed in the final plenary, the enormous challenges for implementing the African agriculture transformation, considering current societal and power structures – vested Interests, power of elites, raising inequalities, etc. Another key aspect, also highlighted in Dr. Sander van der Leeuw presentation (see agenda in Appendix A), are the multiple uncertainties related to the impacts of disruptive technological changes in the near future, including in relation to democracy (see TWI2050 Chapter 2 for a broad discussion on this topic). As Dr. Sander pointed out, we need to learn to "design for change". For this, multi-stakeholder dialogues are essential. We hope this Dialogue can inspire similar one in different levels and geographic contexts.

Recommendations for future scenarios

Although global models are hardly fit for representing many aspects of the pathways discussed during the Dialogue, we consider it important to embed and link them to discussions with civil society and policy makers about pathways to sustainable futures in different regions, as we proposed in this Dialogue. Global scenarios can provide an overall framing for placing a given region in the global context, while also bringing forth information about global concerns, not necessarily seen as a priority in that context (mitigating carbon emissions, for instance). For this however, it is important that global scenarios articulate very clearly their underlying narratives and assumptions. Different premises can have extremely different outcomes for the same region, as Figure 13 illustrates.

It is also important that future global scenario design "opens up" to multiple and contrasting views about the future, in order not to represent and promote only selected dominant voices. In this context, Table 14 syntheses some branching/decision points that could be considered in the design of future global scenarios. Such suggestions are based on the divergence analysis discussed in the previous section, related to the population growth, urbanisation, agriculture intensification, landscape planning and meat consumption premises. Our recommendation is to broaden and diversify such assumptions in order to better capture alternative perspectives about Africa, potentially considering them as branching points.

	Implications for alternative scenario design
Urbanisation	Alternative scenarios representing multiple urban/rural relations, including strong rural communities and high quality of life, providing food first to local markets then to distant markets. Scenarios should address with the quality of urbanisation too (prosperity and services for all versus a chaotic urbanisation in the South) and its SDG implications.
Population growth	Alternative sustainability scenarios beyond current assumptions of very low population growth and massive urbanisation. Participants argued for seeing people as an opportunity (innovation, local markets) and excessive consumption the problem.
Agricultural intensification and practices	Current global models adopt a land sparing narrative, basically relying on the "Sustainable intensification" proposal. New scenarios could allow for a broader range of options, including agroecology, or mixture of both these approaches in different contexts. Also allow for a combination of land sharing and land sparing at different scales and contexts.
Actors in agriculture	Future models/scenarios should be able to represent land tenure issues which are strongly linked to rural/urban well-being and urbanisation. Alternative scenarios could represent a range from an extremely land concentrated landscape (in a highly urbanised world, with very few actors producing food) to a more balanced mix of types of actors and agricultural systems. Models should also represent cooperatives as economic actors.
Alternative diets	Scenarios should explore multiple combinations of diets depending on context and cultural background, beyond the meat-free narrative. Better practices for herding could also be included to explore the detrimental environmental impacts.
Markets	Current sustainability scenarios rely mainly on a global sustainability archetype which assumes a global market for food production. Future scenarios could explore a broader range of narratives, including regional cooperation/local markets. Besides, more sophisticated models could explore the role of a few global corporations controlling the food system versus a more decentralized system.
Land-based climate change mitigation	Global scenarios could explore a broader range of land-based mitigation options, from the current globalized (based on land adequacy and economic compensation through REDD) to a more distributed (each continent mitigates its own historic emissions, for instance) or even mixed options.

Table 14: Branching points and implications for society decisions and scenario design (see Figure 12).

It is also important that scenario building processes convey very clearly what is and what is not represented in the models, for instance in relation to governance, inequalities and social structures. This can also foster important derived discussions, such as: *what type of cities could be envisioned in a totally "urbanised Africa" pathway aligned to SSP1?*

Finally, models of sustainability pathways can assist policy makers in system-wide policy planning if they relevantly capture dynamic behaviour. Global models can assist in pointing out global concerns and issues related to the management of global commons. However, they may be too general when it comes to giving specific policy recommendations on regional, national or sub-national levels, as they do not sufficiently match the policy makers' geographical scope and level of direct influence (Collste et al., 2017)[33]. There are nevertheless different types of models that can offer complementary views and insights related to different levels of influence and scales of interest. If, for example, global models point to some relevant concerns, more regional or national level models can point out policies relevant to the scale of influence of relevant stakeholders. In turn, these can be complemented by narratives and stories that make sense to stakeholders. The stories can enrich the picture by adding qualitative aspects that may not be included in the modelers' perspectives on the world. Together, the tools can offer well-grounded, practically useful advice on how to achieve the Sustainable Development Goals in an integrated way – taking into consideration trade-offs as well as synergies, cross-scale interactions and the complexity of policy making and transformations.

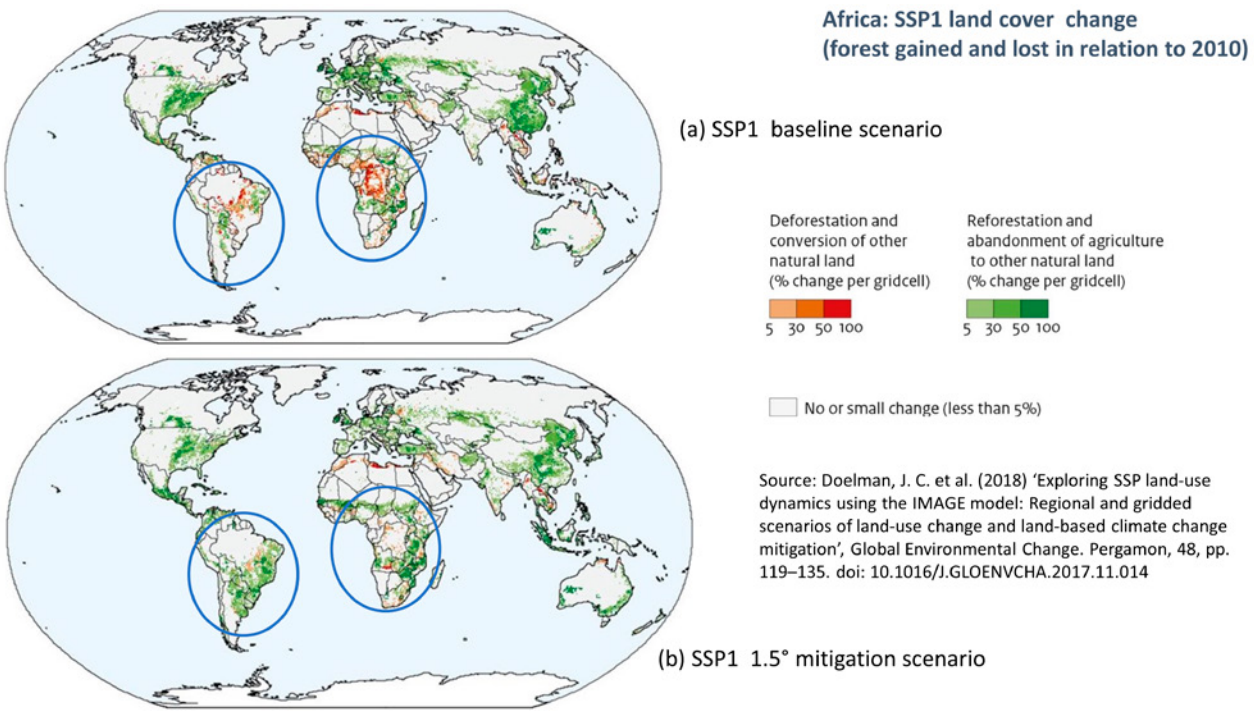

Figure 13: Example of how assumptions in the scenarios influence spatial patterns and may influence decisions in heterogeneous ways.

Recommendations for future Dialogues

Our intention is to replicate this Dialogue process in other contexts, and thus gain multiple perspectives to the global pathways applied in global models. The approach applied has proven to be easy-to-understand for the participants and efficient to elicit pathway option spaces, and evaluation from the participants was very positive. We consider the method worked well by providing enough structure to guide the discussions and allowing inter-comparison across groups. It also provided enough freedom to allow creativity (drawings, letters, hashtags, etc.) and self-facilitation, as in the case of the East Africa group proposing the use of causal loop diagrams to better represent the present core concerns and their deep causes. Or the Pan-African (Rainbow) group who chose not to write stories but systematically group and review the content of the diagram, representing it in tables. In this sense, the 3H/SDG method we developed can be seen as building up a toolbox to be used where appropriate by the different groups in different regions.

However, there are also aspects to be improved:

- Have more time for the group synthesis of each step, not necessarily as stories, but as actions organised in time (based on the Rainbow pathway).
- Better explore system thinking, especially causal loop diagrams in STEP 2. The discussion of root causes is important as a preparation for the discussion of the actual pathways in STEP 3.
- Although the discussions were very rich and several recommendations could be derived, one might argue that the desired futures are not very different than a positive view of our present problems. Methods for unleashing the imagination when drawing the futures (especially when thinking about 2050) could be better explored.
- Have a dedicated time to discuss divergences and convergences across scales, and rethink the final plenary format to allow for exchanges and comparisons (maybe by repeating the World Café, but in different groups so that participants mingle more with other group members).
- Link back the results to the SDGs (which ones were covered, where there were tensions and which ones were not mentioned).
- Improve the process of stakeholder invitation to match the criteria chosen for maximizing the diversity of pathways[34].
- Bring everyone to a more remote location so that there is no distraction, and there is more time for informal interaction and group coherence.

We also hope other groups can take up the ideas and approach presented in this report to discuss pathways for the SDGs in different settings[35]. Appendix C of this report provides guidance on potential further applications of the approach.

We see the 2030 Agenda, in spite or perhaps because of the challenges that its implementation in 12 years involves, as a powerful mechanism for fostering the discussion about multiple perspectives about the future at different levels.

"The biggest single opportunity we have is dialogue"
– Schultz et al., 2016[36]

References and notes

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17. One of the participants added some comments after the workshop. Because these comments changed the content of the report, we do not include them in the tables. These comments related to Table 3:
    - Affordable locally produced food crops are accessible to all.
    - Easily accessible markets (for agricultural products and for farmers to purchase farm inputs)
    - Economy at service of society (not other way around)
    - Subsistence agriculture will completely transform (increase productivity and crop quality)
    - Reinforcing intra-African markets.

    The same participant also noted that subsistence farmers are not a feature of this future. The participant also commented on the zero CO2 emissions: "we need to be realistic: Energy for food production is clean with reasonable CO2 emissions (not zero)". To the point "A farming system fully organic", the participant added: An integrated farming system that includes organic and reasonable use of chemical inputs.
18. One of the participants added some comments after the workshop. Because these comments changed the content of the report, we do not include them in the tables. This comment related to Table 4:
    - The participant suggested the following point: Old-fashioned education to be replaced by to Old-fashioned agricultural extension method
19. The original one was "Towards a Food Secure, Peaceful and Prosperous East Africa"
20. This step of the exercise is important as a preparation for discussing the actual pathways (and eventually to inform future quantitative/modeling analysis). In future dialogues, we will explicitly include the development of causal diagrams in the process (see Conclusion section – Recommendations for future dialogues).
21. Following the STEPS centre paradigm of first "opening up" to multiple perspectives, appreciating the existing pathways: https://stepscentre.org/wp-content/uploads/STEPS_Pathways_online1.pdf
22. For further information about this topic, see the DIE report: "Beyond the Agroecological and Sustainable Agricultural Intensification Debate: Is Blended Sustainability the Way Forward?", Jonathan Mockshell and Josey Kamanda, Discussion Paper / Deutsches Institut für Entwicklungspolitik ISSN 1860-0441, Bonn, 2018.
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34. A significant point in the design of the Second Dialogue was that funding was not provided for the invited stakeholders to travel to Kigali, so most of the accepted invitations came from Eastern Africa (although many were born or experts in the other regions). Maybe as a result of this, the division of groups according to a geographic criteria proved useful for fostering the emergence of diversity between the pathways, but it did not lead to regional specificities in general. The gender ratio of the event was not balanced – 7 women: 24 men (23%).

35. In fact, during the last phase of preparation of this report, we learned one of the participants actually applied the method to discuss pathways to the SDGs in an Italian city. See: https://twitter.com/JacopoBencini/status/1096833769301032960 and https://twitter.com/GiovaGraziani/status/1096728194739290112

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37. Such divergences and branching points could for instance be a rural versus a total urban future; industrial versus agroecology; large scale versus small farms, land sharing versus land sparing; farmers subsidies like in the US and EU or not.

38. At the beginning of the third step of the Second African Dialogue, the break-out groups compared the content of their diagrams with the global scenarios that had been presented. They were asked to consider what was common and what was different between the global model scenarios and the pathways discussed by the participants. The facilitators noted the divergences on a flip chart. Also, the groups went back to consider the root causes that had been noted down during Step 2.