

Scenario Development Report on The Future of Sustainable Biofuels in Ethiopia

Disclaimer: This report serves as a working document that can be used on its own or incorporated into other relevant materials. All views expressed in the document are of those of workshop participants (see list in Annex A) working in mixed breakout groups, and/or participants in their individual capacities, not necessarily that of their institutions. The workshop was organised by the RSB and facilitated by Hichert & Associates (Pty) Ltd, and took place at the Kuriftu Resort and Spa, Bishoftu, Ethiopia, on 22-24 January 2020.

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FUELLING THE SUSTAINABLE BIOECONOMY

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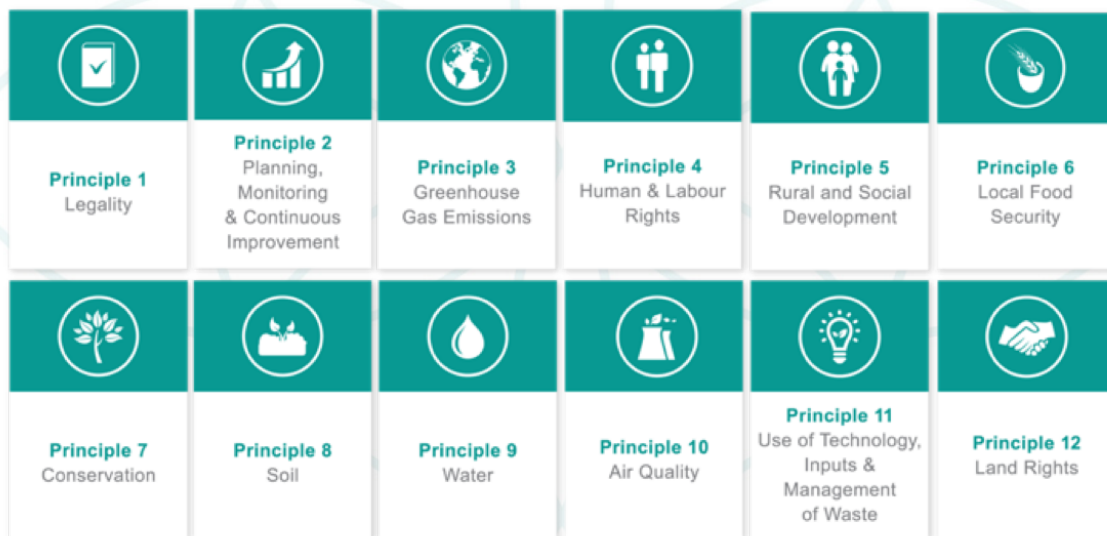
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About the RSB

The Roundtable on Sustainable Biomaterials (RSB) is a global, multi-stakeholder independent organisation that drives the development of the bioeconomy through sustainability solutions, certification, and collaborative partnerships. It provides tools and solutions that mitigate business risk and contribute to achieving the United Nation’s Sustainable Development Goals and has the world’s most trusted, peer-reviewed, global certification standard for sustainable bio-based and advanced materials & fuels and biomass production.

The RSB Principles & Criteria are based on a management and risk-oriented approach. Together with RSB’s online tools and related guidance documents, the RSB Principles & Criteria help operators to identify and manage sustainability issues in a specific context and therefore reduce risks for operators, brand owners and investors.



Producers and processors of biofuels, biomaterials, as well as advanced fuels and advanced products, and their supply chains can become certified to the RSB Standard. RSB certification is recognised by WWF, IUCN and the Natural Resources Defense Council (NRDC) as the strongest and the most trusted of its kind. It has been endorsed by the Sustainable Aviation Fuel Users Group (SAFUG) for its high level of sustainability assurance and it is increasingly being requested by airlines as an essential part of their alternative fuel procurement policy.

In collaboration with the Ethiopian government, industry and civil society, the RSB is coordinating a project to support the development of sustainable biofuels in Ethiopia, in so doing supporting the efforts of government and key stakeholders to mitigate the impacts of the climate crisis while promoting economic growth.

Executive Summary

A group of stakeholder participants (see Appendix A for a list of attendees and their affiliations) gathered on 22 -24 January 2020 at Kuriftu Resort and Spa (Bishoftu) near Addis Ababa, Ethiopia, to develop a set of scenarios for the sustainable biofuels sector in Ethiopia. The stated overall objective of this scenario development workshop is “to understand the dynamics of the biofuel sector in Ethiopia and devise possible ways in achieving the targets set by the key stakeholders.” The scenarios workshop was specifically designed to be a collective participatory process attended by some of these stakeholders, as opposed to generating expert-led scenarios.

Four scenarios were generated using a 2x2 uncertainty matrix methodology with the key, high impact uncertainties relating to **political (in)stability** and (lack of) conflict, which will have a direct effect on access to finance/funding/investment for the sustainable biofuels sector, and **price volatility** in feedstock and commodity prices, which goes to the heart of long-term feasibility and viability. These provided four plausible futures, namely:

1. **TIMECHIGNALESH (a song: *I am comfortable / happy with you*)**, this is where the political situation in Ethiopia is stable and there is no conflict, and policies and government decisions are predictable. Prices and pricing for biofuels feedstock and products, as well as competing commodities, such as oil, are stable and predictable enough for relatively risk-free long-term planning purposes.
2. **LIBEN GIRA GEBAW (a saying: *I am confused, directly translated as: My heart is confused*)**, where there is political instability and conflict in Ethiopia, however prices and pricing for biofuels feedstock and products, as well as competing commodities, such as oil, are quite stable and predictable.
3. **BE ENKIRT LAY JORO DEGIF, (a proverb: describing a situation whereby a problem is added to an already problematic situation to make things even worse – similar to the English saying: “*Adding salt to a wound*”)**, in this future there are very high levels of political instability and conflict in Ethiopia, and at the same time there is extreme price volatility for both biofuels feedstocks and products as well as competing commodities, such as oil.
4. **YEBET SIRA (a song: direct translation is ‘*Homework*’: but it implies a partner who is unpredictable, and it is difficult to know their next move despite them having been provided with everything)**, here the political situation in Ethiopia is stable and there is no conflict, however, there is extreme price volatility for both biofuels feedstocks and products as well as competing commodities, such as oil.

It is important to keep in mind that scenarios never predict the future. Rather they provide the means to consider today’s policies, plans and decision-making processes in light of potential future developments.

These scenarios were then used to “stress test” existing priorities, strategies, plans and approaches, as well as identify risks and opportunities in each of the alternative futures, plus generate actions, recommendations and options of how to make a preferred future for sustainable biofuels in Ethiopia more feasible and likely. At the end of the workshop, stakeholders agreed that the best next steps to achieve the preferred scenario – TIMECHIGNALESH – consisted of a set of actions, recommendations and options that perform well in more than one scenario – in other words those that are robust, regardless of how the future turns out.

This includes:

- Raise awareness to all stakeholders, focussing on the benefits of biofuels, e.g. energy access, land rehabilitation, climate change mitigation, and the substitution of petroleum products (for transport including aviation)
- Create partnerships
- Support research and development
- Expand into second generation production
- Ensure product diversification
- Ensure biofuels mandate and policies
- Open invitation for partnerships and investment based on sustainable criteria
- Bring in carbon finance program to incentivise community stakeholders
- Benefiting the community by providing access to products for cooking, lighting, etc.
- Push for the setting, and approval, of standards
- Off-take agreement with Ethiopian Airlines
- Tap into Corporate Social Responsibility (CSR) programs
- Legal and policy framework development and enforcement, including standardisation and certification schemes.
- Revise the land use policy
- Create job opportunities for (local area) youths

This report serves as a working document that can be used on its own or incorporated into other relevant material such as feasibility studies, roadmaps, short-, medium- and long-term policy strategy documents, advocacy communique, and more.

1. BACKGROUND AND INTRODUCTION

Like many other emerging sectors in Ethiopia, the sustainable biofuels sector faces multiple complex uncertainties that could negatively impact existing plans, forecasts and the “projected” future. These uncertainties, together with possible disruptions in its external environment, e.g., climate change and substantial political, technological, and economic changes, provide the rationale for a scenario planning approach – generating views of alternative futures -- so that one can strategically ‘use’ the future, and ‘learn’ from the future to make better decisions and choices today.

This report is a write-up of the participants’ strategic conversation using scenarios they generated themselves. Developing and using scenarios -- for planning and other purposes -- is about collectively creating plausible future stories that will help stakeholders prepare for, and cope with, the uncertain present and future. Through discussion, participants, experts and decision-makers can explore what they would do differently in each scenario. They can identify success criteria, suggest new ways of working and define new relationships. Generally, these differ in each scenario, and the discussion helps participants build a shared understanding of how the increasingly complex changes taking place in their contextual environment are likely to affect their activities and decisions

The workshop kicked off with participants introducing themselves to one another and being welcomed by Mr Michael Gessese of the Biofuel Development Directorate in Ethiopia’s Ministry of Mines and Petroleum. Thereafter, Mr. Stephen Wetmore, Director of Business Development for Roundtable on Sustainable Biomaterials (RSB)¹ – the convenor of the gathering – introduced the RSB and its projects.

Dr Abubeker Yimam of Addis Ababa University presented his research on the biofuels sector in Ethiopia, which served as a contextual analysis preceding the scenarios development exercise.

Issues and questions raised by the contextual analysis included the following:

- It was agreed that demand for biofuels in Ethiopia will increase going into the future
- There will be competition for fertile, productive, irrigated land on which to grow biofuels –this is due to numerous forces amongst which population growth and deforestation.
- A question was raised around potential demand for biofuels from the beverage industry². This unlocked conversation around competing industries and markets vis-à-vis partnering industries and markets.

¹ <https://rsb.org/>

² This is as a result of the sugar factory not producing to its ‘minimum capacity’ of 20million litres per year (due to technical and regional peace problems). The two sugar factories maximum capacity is 30million litres per year.

- Ethanol demand is currently 1.8 million³ litres per month; this is more than current annual production.
- It is important to differentiate between government and private sector pricing with regard to feedstocks and biofuels products.
- Timing is important as standards and certificates can take up to 2 years – the (slow) speed of governance and bureaucracy is a risk to the sector.
- The role of government should be to trigger the market.
- When it comes to climate change, extreme weather and resilience to climatic conditions it is important to take “tipping points”⁴ into consideration. It is (somewhat) likely that changes in growing conditions for feedstocks could happen suddenly and in a non-linear manner.

The remainder of the two-and-a-half-day programme (see Appendix B) consisted of developing scenarios and using these for strategic conversation about the biofuels sector. See Appendix C for an explanation of the process.

2. SCENARIO PLANNING UNIT OF ANALYSIS AND TIMEFRAME

For scenarios to best serve a purpose and be useful for a client and/or interest- and advocacy groups, it is important to clarify the ‘unit of analysis’ (the so-called scenarios question) and the timeframe over which futures changes are considered. The unit of analysis must be broad enough to encompass important external aspects (in this case the context of Ethiopia), but focused enough for use as a decision-making tool. Similarly, the chosen futures timeframe must make intuitive sense; it should not project too far into the future, as this can be unrealistic, especially in contexts that are volatile and undergo a lot of change, whilst too short a period of time will result in extrapolations and best guesses instead of fundamentally different futures.

Participants decided that the unit of analysis and its timeframe would be:

The Future of the Sustainable Biofuels Sector in Ethiopia
projecting forward 15 years to 2035

Throughout the report it will be clearly stated how different aspects of the unit of analysis apply, e.g. there are key driving forces that impact the sustainable biofuels sector, and, importantly, the scenarios are of different futures for the sector. However, when it comes to

³ For the transport sector and only in Addis Ababa. If the demand were to include the other sectors, like the cooking, it will be very high.

⁴ See here <https://www.carbonbrief.org/explainer-nine-tipping-points-that-could-be-triggered-by-climate-change> for an explainer.

'using' the scenarios to strategise, participants were asked to brainstorm risks and opportunities of an imaginary sustainable biofuels company within the sector.

Similarly, for the sake of brevity and ease-of-reading, the abbreviation 'SB sector' will be used in place of 'the sustainable biofuels sector in Ethiopia', but in instances where specific clarity is needed the words will be fully spelled out.

Participants' discussion around the unit of analysis and its timing included the following important points:

- The future of the SB sector is highly dependent on the future of the Ethiopian state.
- The SB sector consists of non-fossil based "green" fuels, and for the purposes of this workshop includes liquid form only – not solid, e.g. charcoal.
- This includes bioethanol and biodiesel that serve as transport and household fuel, but not the various other products that refineries are capable of producing.
- End use technologies of SB can include:
 - Cooking stoves
 - Public and private transport, e.g. tuk-tuk's, cars
 - Railway transport
 - Agricultural machinery
 - Aircraft
 - Generators
 - Electricity generation and industrial plants
- For planning purposes, the same definition of SB that appears in the Ministry of Mines and Petroleum's proclamation can be used.
- Strategic conversation about the SB sector is feedstock 'agnostic', meaning that what matters is the availability of raw material, and not specific criteria, i.e. the EU that differentiates between corn stalks for biofuel vs. corn for food.
- It was emphasised that only sustainable biofuels are under consideration. Sustainable biofuels and biofuel production is meant, in its broadest sense, to encompass:
 - Rehabilitating degraded land
 - Producing affordably and only where viable and feasible
 - Promoting job creation and secure livelihoods
 - Ensuring ongoing, production – continuity
 - Producing legally under the auspices of good governance, especially where it concerns access to land
 - Respecting labour and human rights
 - Not threatening water security
 - Not threatening food security
 - Utilising 'Climate Smart' agricultural practices, i.e. crop rotation and fixing carbon
 - Not threatening biodiversity
 - Making use of diverse feedstocks – not monoculture

- Producing only where greenhouse gas emissions are 60% less than fossil fuels over the full production lifecycle – this includes nitrogen emissions
- Producing in such a way that all by-products are used and there is no waste – this would imply no restrictions on use, as well as ‘market making’.
- Meeting the sustainability criteria of the list above, means refinery placement will be a critical factor.

With regard to the timeframe – the year 2035, fifteen years into the future -- it was noted that:

- Not much has happened over the last 15 years – biofuels production capacity has remained the same – it has not increased
- It takes 3 to 6 years to get a biofuels operation up and running
- The Ethiopian government’s new economic strategy covers the next 10 years
- Legal frameworks and standards can take up to 5 years to develop

3. LAYING THE GROUNDWORK

After clarity about the unit of analysis and timeframe, it is imperative to lay the ‘groundwork’ for scenarios so that they are rich narratives that contain nuances, and not just ‘best case’, ‘worst case’ and ‘middle of the road business as usual’ projections. It is also in this way that each participant begins to contribute to building a shared context within which the strategic conversation takes place.

In self-selected groups the participants collectively identified and engaged around the SB sector’s stakeholders, its key challenges, the external megatrends affecting it, its history, as well as engaged in an exploration of key issues related to the SB sector using the Three Horizons Framework. The aim is to include the following into the strategic conversation:

- The **stakeholders** and actors that currently interact with SB in Ethiopia, and who are impacted by its future, and who may also impact the sector’s future.
- **Challenges** – not just those that need to be addressed, but also those which could become obstacles to possible future options and choices. They fall into STEEP categories: Social, Technological, Economic, Environmental, and Political
- The **megatrends** and driving forces beyond SB in Ethiopia’s control - those global external factors that shape the future regardless of what is being planned locally.
- Lessons from **history**, where SB in Ethiopia has legacy issues that might impact the future, but also patterns and systems that may repeat.
- Patterns of deep **systemic change** and transition in key issues related to the SB sector, e.g. energy, food, socio-political change and industrial/manufacturing development.

The groups presented content as follows:

Key stakeholders:

1. Smallholder farmers
2. Co-operatives
3. Government (regional), including regional, woreda and in some cases kebele offices (energy, environment, agriculture, industry offices)
4. Ministry of Finance
5. Ministry of Mines and Petroleum
6. Ministry of Agriculture
7. Ministry of Transport
8. Environment, Forest and Climate Change Commission
9. Ministry of Science and Higher Education (MoSHE)
10. Ministry of Innovation and Technology (MINT)
11. Ministry of Trade and Industry
12. Sugar Corporation
13. Ethiopian petroleum supply enterprises
14. Oil companies
15. Ethiopian Airlines
16. Private companies related to biofuels (local and international)
17. NGOs, such as GiZ
18. Ethiopian Civil Aviation
19. Ethiopian Development Bank
20. Ethiopian Standards Agency
21. Ethiopian Mineral Petroleum and Biofuel Corporation
22. Ministry of Labour and Social Affairs
23. RSB
24. Ethiopian Investment Commission
25. Private commercial banks
26. National Planning Commission
27. Ministry of Water Irrigation and Energy
28. Public enterprises administration and holding agency
29. Petroleum, Mines and Biofuel Corporation

Stakeholders that could compete with, or be positioned against a future sustainable biofuels company include:

- Petroleum suppliers
- Liquor factories

- Landholders
- The animal feed sector as a competing sector.

Key Challenges:

- **SOCIAL**
 - Displacement (disruption, social cohesion, livelihood, etc. e.g. south Omo case⁵, water system)
 - Social tension (community versus private sector) Labour rights (health, housing, etc.)
 - Food security
- **TECHNOLOGICAL**
 - Lack of capacity (poor management skills, technological expertise, research and development)
 - Infrastructure
 - Cost of technology
- **ENVIRONMENT**
 - Environmental disruption (reduced vegetation, degradation)
 - Ecosystem effects – on water, soil, and increased waste
 - Depletion of water resources
- **ECONOMIC**
 - Financing (mega and micro)
 - Inefficiency (management, products, etc.)
 - Lack of incentives
 - Viability
- **POLITICAL**
 - Land rights (community rights)
 - Relevant policies/ strategies/application/implementation/commitment
 - Conflict of interest of policies – synergy!
 - Legal enforcement

⁵ <https://borgenproject.org/displacement-in-ethiopia/>

Megatrends

1. Diversification in:
 - Technology
 - Regional sourcing
 - Feedstocks
2. Technological advancement and cost reduction, (i.e. solar, EV, storage) might help release demand for biofuels from some end users.
3. Change in human diet – less meat for protein intake
4. Electric power (electricity generation) switches to carbon neutral fuel (liquid fuels)
5. Hydrogen for public transport (hydrogen as a component of biofuels)
6. Legislation for diversification of fuels
 - Legislation on CO₂ generation to production (incentives and disincentives)
7. Shift away from use of products (i.e. chemicals, plastics, etc.) to environmentally sound materials
8. Circular economy
9. A sustainable choice for products with the lowest carbon footprint
10. Countries' policies shift in favour of biofuels
11. Change in global market trend which might favour bilateral relationships
12. Migration /immigration
13. Water as a 'vehicle' for trade or conflict
14. Gene editing/modification (CRISPR technology) for feedstocks
15. Increased woody biomass production
16. Climate change
17. Artificial intelligence

History timeline:

After a group of participants built a historic timeline of biofuels in Ethiopia going back 30 years (see graphic on page 9), the lessons extracted from history, as well as patterns and systems that may repeat going into the future, included the following:

- Not much has changed in the biofuels sector over the last 15 years, but this is due to change now because of the draft biofuels proclamation, and the Ethiopian government structures that have been put in place recently.
- This does not guarantee success because, as can be seen from history, there are conflicting roles for managing energy in Ethiopia.
- Throughout history there has been a strong trend of energy scarcity and price increases – this is not bound to change easily.
- A crisis (the need in refugee camps in the early 2000's) triggered innovation in the sector. A 'crisis' in the future may also spur innovation and development in the sector.

- The ongoing energy supply constraints and issues, e.g. need for forex, will not be solved easily.
- Public unrest and political conflict have a direct negative impact on the biofuels sector and its productivity.

Three Horizons Frameworks on key issues:

Another element to laying the groundwork for good scenarios is to identify patterns of change and identify change that matters – especially deep systemic change – in issues closely related to the SB sector. This is where Three Horizons Framework comes in to support the development of robust scenarios.

Three Horizons Framework⁶ is a widely used (in the futures/foresight field), proven, conceptual model to aid peoples' thinking about current assumptions, emerging changes, and possible and desired futures. It is especially useful for exploring the uncertainties and challenges relating to key issues that will affect the sustainable biofuels sector in the future. The Three Horizons exercise encourages broader thinking, helps sensitise people to the turbulence of change and challenges existing presumptions about Ethiopia and the SB sector.

Participants elected to populate four Three Horizon Framework templates about the following key issues:

1. Energy system in Ethiopia
2. Food system in Ethiopia
3. Socio-political system in Ethiopia
4. Industrialisation and Manufacturing in Ethiopia

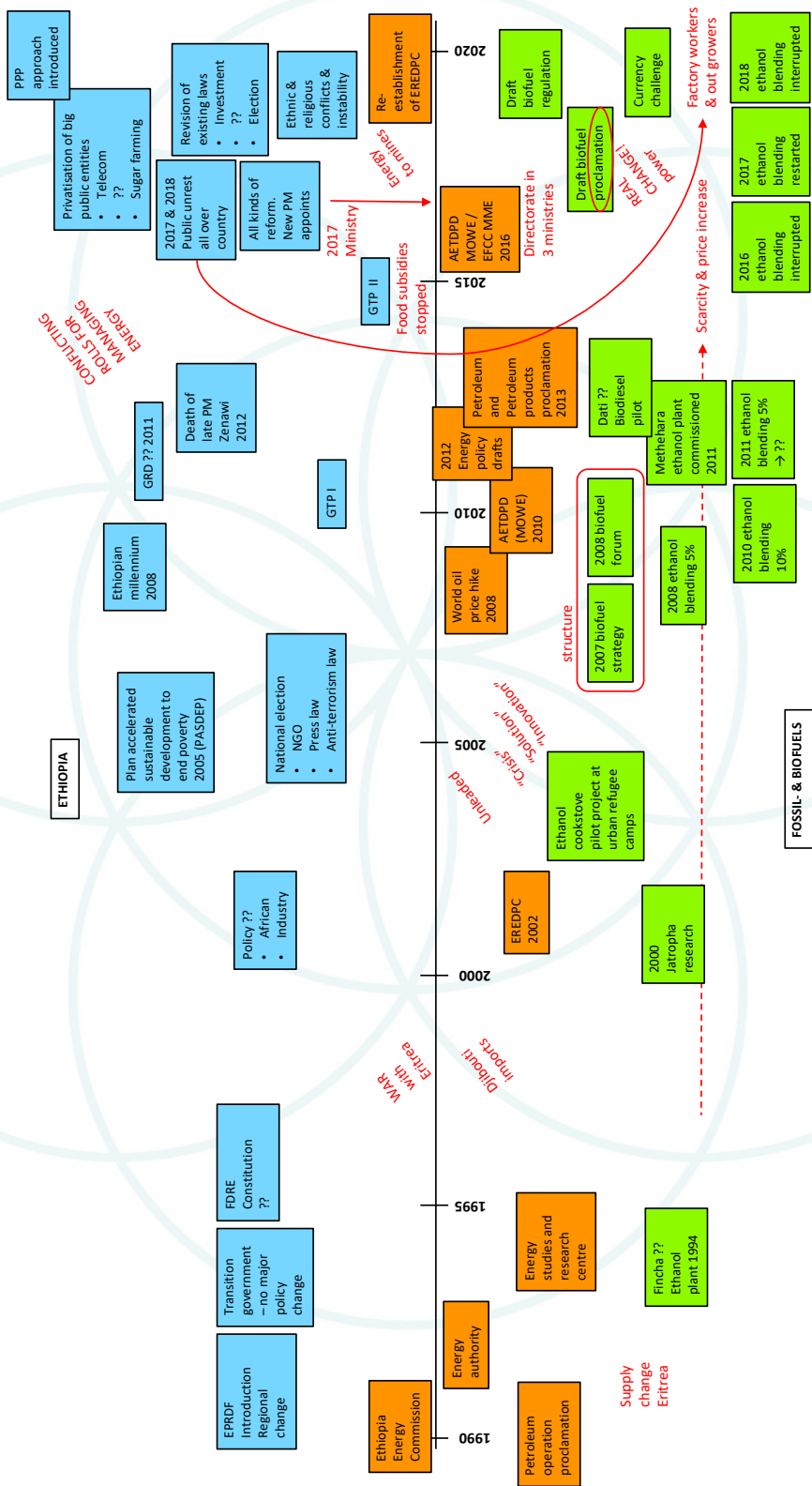
See Appendix D for the content of the Three Horizons Frameworks as well as guidelines of how to populate the templates.

The learnings, insights and conclusions drawn from the Three Horizons exercise were incorporated in the next phase of the scenarios exercise, which is to identify key 'knowns' and 'unknowns.' Some commonalities and overlaps that surfaced, despite the differences in key issue subject matter, included;

- The importance of capacity and 'competency' – the ability to manage and to have the skills in everything from finance to technology – during transition
- The importance of appropriate and supportive policies / regulatory framework
- The role of, and need for, foreign currency

⁶ Three Horizons Framework is a graphical approach developed to explore the change in importance of issues over time, and connect the future to the present. It is an adaptable futures tool, and is often used as an intuitive, accessible introduction to futures thinking, as well as to make sense of emerging changes. At its most basic it is a systems model about the way things change over time.

GRAPHIC OF HISTORIC TIMELINE



4. KEY CERTAINTIES, “KNOWNs”

After laying the groundwork for scenarios and exploring systemic change in key issues that may affect SB in Ethiopia, participants were asked to individually brainstorm key certainties; the 'knowns' going forward.

These “knowns” - the key certainties - also called ‘rules’, are those underlying and impacting factors that set the pattern of events and determine outcomes for SB in Ethiopia. They are the agreed upon forces or situations that make things happen. They can be ‘megatrends’, physical states of being, the regulatory environment, the current economic environment, etc. Ultimately, they are the factors that ‘shape the future’ of SB that participants agreed are ‘known’. Importantly they also contain ‘unknown’ elements within them, but it is important to figure out, and agree about, the ‘known’ elements first.

They can be descriptive (the way the sector and country currently work), normative (ethical, governance and regulatory rules) as well as aspirational (the goals needed to be successful). These knowns can change over time and sometimes the ‘rules can be rewritten’ to gain competitive advantage in order to reach a preferred future.

All the individual contributions (on sticky notes) were clustered and agreed as follows:

- Population growth in Ethiopia will increase, this means consumption will increase – there will be more ‘customers.’ (*High levels of demand imply that a SB company will be able to have more control over prices and pricing – see Key Uncertainties*).
- Energy demand will increase; in future energy supply will be more clean, efficient and affordable, but energy supply in Ethiopia will not be able to meet all of the demand. (Currently 80% of energy goes to households.)
- A legal framework for SB production will be in place in Ethiopia – this could consist of government commitment, reforms, suitable policies and structural transformation necessary for SB production.
- There will be environmental and climatic condition challenges, e.g. drought, weather variability, water scarcity, etc.
- There will be technological advancement and progress in the SB sector. Key players must keep abreast of these, e.g. 2nd generation bioethanol production, hydrogen, algae, AI etc.

5. KEY UNCERTAINTIES, “UNKNOWNs”

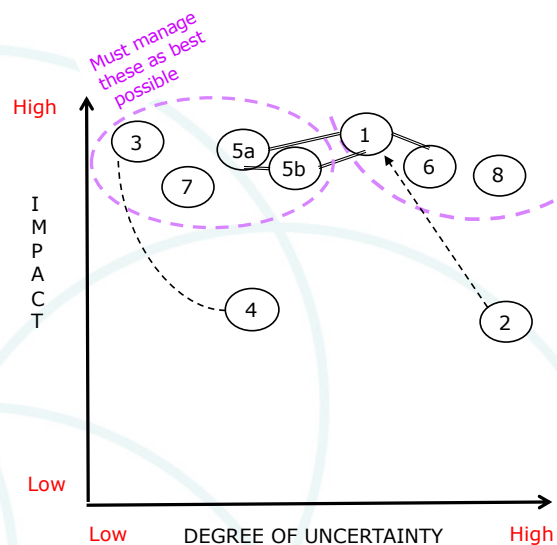
Key uncertainties – the ‘unknowns’ were also individually brainstormed and listed before being clustered. Key uncertainties and ‘unknowns’ are literally that - the driving forces and factors that shape the unfolding future of the SB sector are uncertain. They can include the so-called ‘known unknowns’, risks where it is impossible to establish probability, possible

trend breaks and wild cards (black swans).

Major disagreements of opinion in the collective conversation of the participants also falls into this category. It is the impact and lack of knowledge about the unknowns that are vital for developing a better understanding of how the future for the SB sector might play out.

The key uncertainties are:

1. Political (in)stability
2. The capacity to cope with climatic conditions (*this uncertainty can be 'managed' and/or 'mitigated' somewhat by utilising resilient and climate adaptable feedstocks*)
3. Water availability – quantity and quality
4. Environmental degradation, including the impact on biodiversity (alien plant species invasion), as well as social-and land use change
5. Access to land
 - a) Security of tenure
 - b) Competing land use by other sectors
6. Ongoing access to reliable finance/funding/investment
7. The capacity and skills to operate and manage over the long term as a mega project – COMPETENCY
8. Price volatility - in feedstock and commodity prices (*this uncertainty can be 'managed' and/or 'mitigated' somewhat by applying portfolio management and diversification of feedstocks – different prices for different feedstocks*)



All the key uncertainties were plotted on an 'Impact / Uncertainty chart' (refer to diagram) in order to prioritise those uncertainties about which least is known and have the highest impact on the SB sector. It is important to remember that 'high' uncertainty does not mean 'high improbability'; high uncertainty means having little knowledge of how something may pan out -- it means 'a great lack of knowledge' / 'haven't got a clue'.

The key uncertainties on the top left-hand side of the Impact/Uncertainty chart:

- No. 3. - water availability,
- No. 7. - competency, and
- No's. 5a & 5b. access to land (security of tenure and competing land use)

are those issues that are high impact, but more certain. Issues that we 'can see coming' and/or which have a strong enough momentum from history and the present that their future is to an extent 'locked in' and 'made' already. We must 'manage' these as best possible.

Very importantly, this does not imply that these uncertainties cannot change. Sometimes they can, and do so dramatically, due to the nature of volatile sudden change, shocks and

tipping points. The point is that -- especially if you have some measure of know-ability (even better control) -- to manage these issues (to the extent that they are manageable) as best as possible.

The Impact/Uncertainty chart also acts as a radar screen on which key uncertainties for the SB sector in Ethiopia can be monitored over time in order to get a better idea of the unfolding future. This can enable a more strategic and proactive response to uncertainties.

From the diagram it can also clearly be seen that the uncertainties are related to one another, and affect one another, e.g. not managing land issues properly may contribute to political instability, and vice versa; political instability may make it more difficult to access land. In particular uncertainties 1 and 6 are tightly coupled in that political (in)stability will fundamentally affect the sector's ability to access reliable finance/funding/investment.

The uncertainties in the top right-hand side of the chart (no's. 1 – political instability, 6 – access to finance and 8 – feedstock price volatility) are those with the highest levels of uncertainty and impact, and they, or some combination of them are typically used to create scenarios.

6. THE SCENARIO MATRIX (GAMEBOARD) AND SCENARIOS

In the case of the SB sector in Ethiopia, the chosen uncertainties to extrapolate to their extremes to form a scenario matrix are;

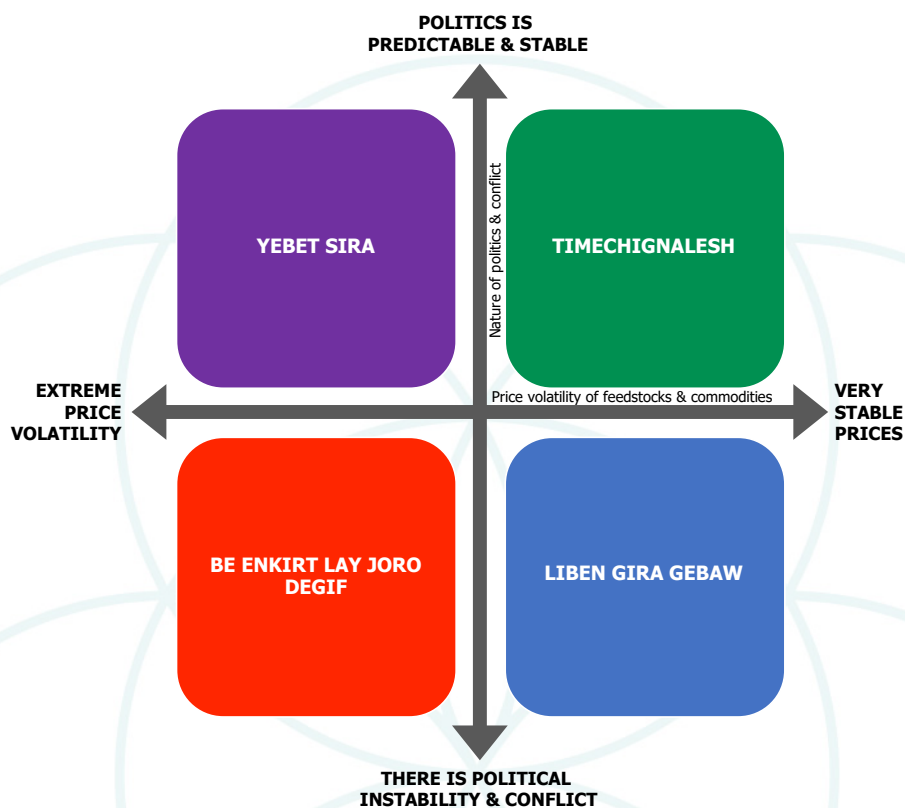
- No. 1 and 6 combined, relating to political (in)stability and (lack of) conflict, which will have a direct effect on access to finance/funding/investment, and
- No. 8, price volatility in feedstock and commodity prices, which goes to the heart of long-term feasibility and viability.

The axis extremes were labelled as:

Politics is predictable and stable vs. There is political instability and conflict

and

Very stable prices vs. Extreme price volatility



The two axes provide a framework for four plausible futures and their descriptive titles with short summary stories, as follows: (The original stories presented at the workshop – some by means of role play – can be found in Appendix E.)

TIMECHIGNALESH (a song: *I am comfortable / happy with you*)

In this scenario, the political situation in Ethiopia is stable and there is no conflict – policies and government decisions are predictable. Prices and pricing for biofuels feedstock and products, as well as competing commodities, such as oil, are stable and predictable enough for relatively risk-free long-term planning purposes.

Strong government support is the main driving force for the success in sustainable biofuel development. Other driving force and key issues, that play out include environmental and water issues and the capacity to cope with these, the energy gap and demand. Food security is an issue, like many other but it is managed very well. Industries are performing well and are growing. The biofuel sector does not contribute to environmental degradation, as it is sustainably handled. Attitude and awareness around biofuels have been increasing. Public-private-partnership (PPP) in the sector has been growing. A variety of biofuel feedstock including lignocellulosic crops are grown throughout the country. Biofuel production greatly provides a reliable livelihood source for a large number of small-scale farmers, and most of

them received sustainability certification. The biofuel sector also creates a lot of employment opportunities for the youth and landless.

Ethiopia produces sufficient biofuel to the extent that biofuel makes up a 50% share of the total fuel consumption in 2035. The sustainable biofuel sector creates more than 5 million direct and indirect jobs. Jobs and benefits accrue from better energy access, due to the change in energy mix, and the elimination of fuels such as wood and/or kerosene, the land rehabilitation that occurs where *Jatropha* is planted, as well as due to the reduction of indoor house pollution.

When it comes to meeting the basic energy need in rural areas, biofuels cover the transportation sector, including rural transportation like Bajaj⁷ and motorcycles, as well as trains, agricultural machinery such as hand operated tractors and water pumps, as well as supplying off grid electricity to critical items such as stationary motors.

Biofuel utilisation for cooking in urban area has been also growing and reaches about 40%. Ethiopian airlines is on the right track to satisfy the International Civil Aviation Organization's (ICAO) goal and targets where 20% of its fuel consumption is met by sustainable biofuel produced from within the country. By 2035, the biofuel sector is contributing 10% of the country GDP. Ethiopia gets the green award for its sustainable biofuel development and for providing safer cooking conditions for its large rural population.

LIBEN GIRA GEBAW (a saying: *I am confused, directly translated as: My heart is confused*),

There is political instability and conflict in Ethiopia, however prices and pricing for biofuels feedstock and products, as well as competing commodities such as oil are quite stable and predictable.

There is so much to benefit from sustainable biofuels, plus the investment money is available, if only the politicians and regional power brokers would get it. However, confusion reigns.

Looking back from 2035 it is clear that the regions began following their own agendas from the early 2020s, even while the biofuel deals, with their solid business plans – because there was hardly competition -- were being signed. Now it has become impossible to make any decisions, investment, or where to put up a factory, or otherwise... Everywhere is flaring up; it's such a wasted opportunity.

BE ENKIRT LAY JORO DEGIF (a proverb: describing a situation whereby a problem is added to an already problematic situation to make things even worse – similar to the English saying: "*Adding salt to a wound*"),

⁷ Three wheelers

There are very high levels of political instability and conflict in Ethiopia, and at the same time there is extreme price volatility for both biofuel feedstocks and products as well as competing commodities, such as oil.

And to think Ethiopians thought 2022 was bad... Now it's getting worse. 'Political conflict' turned to serious skirmishes causing the economy to collapse, which in turn has made the fighting fiercer. In 2035 it's a classical vicious cycle, plus the whole region is a mess as a result.

It's impossible for business, never mind an innovative, sustainable sector like biofuels, to plan, invest, or even begin to find the skills it needs. In this future Ethiopia's basic human development needs aren't being met, so the environment's needs are not even on the agenda. Ultimately it is impossible to establish a biofuels sector.

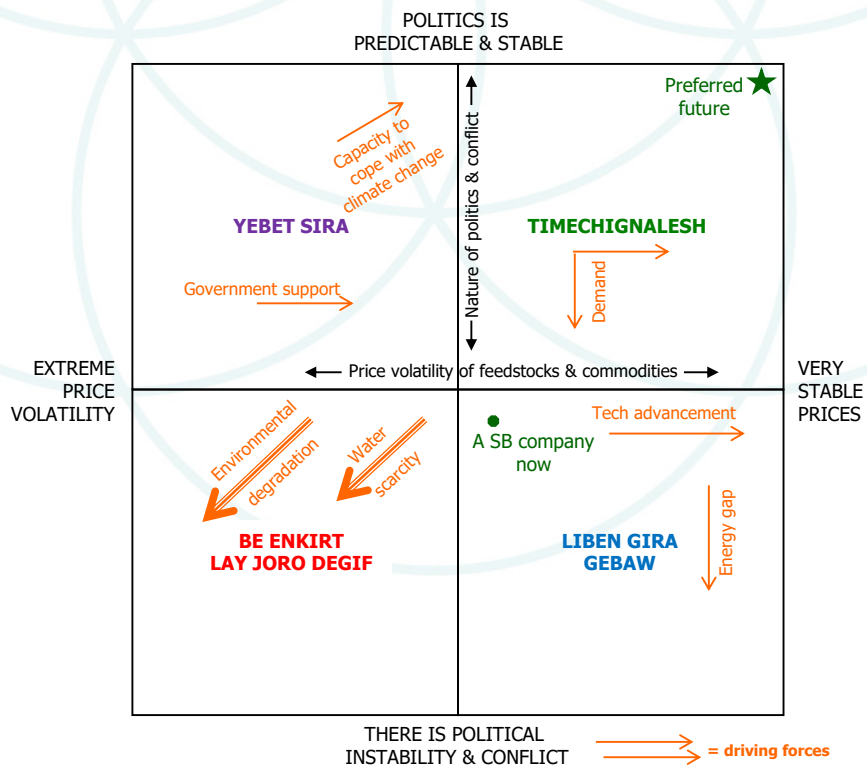
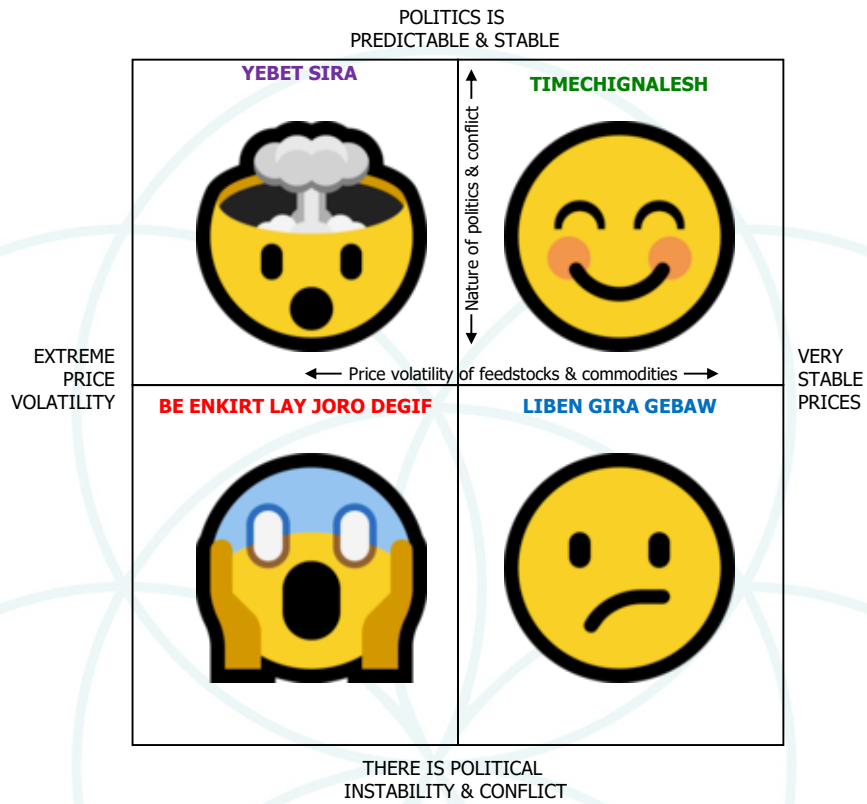
YEBET SIRA (a song: direct translation is 'Homework': but it implies a partner who is unpredictable, and it is difficult to know their next move despite them having been provided with everything),

The political situation in Ethiopia is stable and there is no conflict, however, there is extreme price volatility for both biofuel feedstocks and products as well as competing commodities, such as oil.

The Ethiopian governance system is the envy of the African continent – it is even held up as an example for some countries in Asia. Its success is entrenched. It wasn't always like this – it was hard work, not only to establish peace, justice and equity, but also to keep the economy flourishing.

But things aren't running as smoothly in some business sectors, and biofuels is one of them. It's a dog-eat-dog world as far as pricing is concerned, and those that can exploit a gap, do so. The biofuels infrastructure is all there in 2035, but due to pricing volatility on the input side, as well as for competing products, it becomes impossible to run a sustainable, profitable enterprise despite good government support.

The four scenarios showing where the SB sector in Ethiopia can plausibly find itself over the next 15 years (as well as the past and present) are shown graphically with emojis below, and in a scenarios 'gameboard' with driving forces thereafter.



7. STRATEGIC CONVERSATION USING THE SCENARIOS

In discussing the four alternative futures participants agreed that the SB sector in Ethiopia is currently situated in the **LIBEN GIRA GEBAW** quadrant, whilst the preferred future is very much the top right corner of the **TIMECHIGNALESH** quadrant.

TIMECHIGNALESH and **YEBET SIRA** are interesting because those high levels of political stability and lack of conflict can potentially result from different systems in the future; either a very democratic and open system where there is no (perceived) unfairness and injustice resulting in peace; or a very autocratic system where any and all opposition is repressed to the extent that the system is stable. Price stability in **TIMECHIGNALESH** could result from either an autocratic regime being able to set prices, or a situation where fossil fuel prices have stabilised due to a systemic change such as the ‘stranding’ of fossil fuel assets and products due to climate necessities and regulation.

Driving forces (the underlying forces that cause change to happen – they are either controllable or uncontrollable) and key issues, that play out include; government support, environmental and water issues, the capacity to cope with these, the energy gap and demand. The driving forces that help ‘create’ a preferred future are ‘receiving strong government support’, ‘developing the capacity to cope with climate shocks’ and ‘deploying/using technological advancements.’

‘Increasing demand’ for biofuels, which was seen as a key certainty does two things: it enables more control over pricing (because it is a scarce/needed product), but if there is lack of supply and significant scarcity, it could contribute to competition for resources and political conflict.

Key certainties around environmental and climatic condition challenges, e.g. drought, push strongly towards **BE ENKIRT LAY JORO DEGIF**. It is possible for the SB sector to respond to these driving forces with strategic options that can serve as vectors pushing in the opposite directions -- towards **TIMECHIGNALESH** -- by developing the capacity, in particular resilience and adaptability, to cope with climate change.

It was noted that each of the different scenarios will have different business models that are best suited to it. This means that some sort of monitoring, or early warning system, that is able to ‘sense’ which scenario is more likely, or dominant, as the future unfolds, could be very value adding indeed.

Participants also considered the SB sector’s transactional and contextual environments (as per the graphic⁸ below) realising that a SB company could control only very few aspects, such as where it locates itself, who it appoints, what feedstocks it uses. These must all work

⁸ The graphic is adapted from the work of Kees van der Heijden in *Scenarios. The art of strategic conversation*

very well for success. Thereafter it is a matter of being able to influence and co-design together with 'inter-actors' in the transactional environment where it is all about *PARTNERS*.

This makes relationship with some of the key stakeholders (listed in section 4 above) critical for feasibility and success. As for the contextual environment; a SB company can only survey (do horizon scanning) and adapt. Obviously the better it does this, the better its chances for success.







The strategic conversation following from the scenarios also highlighted the following important insights:

- Risk management at all stages, and communicating success during the early stages, will be key performance areas.
- Already highlighted as a 'must do' key issue above, the capacity and skills to operate and manage over the long term as a mega project – developing **COMPETENCY** – is a critical factor.
- Feasibility and viability – in other words the business planning – must be established beforehand. This is part of what a SB company can 'control', this must be done well.
- For 'license to operate' any biofuels project has to be "proven" in terms of community perspective, e.g. to have end-user benefits such as fuel for cooking stoves.
- The energy that it takes to produce biofuels will 'compete' with other demands, such as that of household use. Energy is scarce in Ethiopia and this must be managed.
- Public Private Partnerships (PPPs) will play a very important role from the beginning, as well as going into the future, regardless of how it plays out.





- It will be critically important to identify partners with whom to share mutual benefits, and who have the same goals and interests.
- Building partnerships for financing and investment purposes will be particularly important.
- It will be much 'easier' to set up a sustainable biofuel sector / company in TIMECHIGNALES. In the some of the other scenarios, the principle of sustainability can quickly become compromised.
- All role players and stakeholders need to realise that establishing a SB sector and companies in Ethiopia will take time. Least of all because it takes time to create a favourable regulatory context.

For the purposes of developing more detailed storylines/scenario narratives of how the future can play out, it is useful to refer to the table below where some of the key issues (from the Three Horizons exercise, certainties, uncertainties and driving forces) manifest differently in the different scenarios on both the SB sector and an imaginary SB company.

	TIMECHIGNALES 	LIBEN GIRA GEBAW 	BE ENKIRT LAY JORO DEGIF 	YEBET SIRA 
Government support	• High and ongoing	• Low and declining	• Absent or otherwise tinged by corruption	• High, but possibly ineffective
The capacity to cope with climate change and extreme weather	• Good, because other business critical issues under control	• Moderate	• Non-existent	• Moderate
Capability to manage long-term project – competency	• Good, because contextual environment supportive & positive	• Moderate and difficult to implement	• Impossible because constantly 'fighting fires' and fighting for survival	• Moderate because of government support, but price volatility takes up all the energy
Food security	• An issue, like many others that just needs to be managed. Not a threat.	• Takes precedence as a competing sector	• Becomes a critical issue	• Food price issues impact business

Energy gap	<ul style="list-style-type: none"> • Can be managed and SB sector makes contribution to energy supply 	<ul style="list-style-type: none"> • Perceptions need to be managed re what energy for who, where, why and for what. 	<ul style="list-style-type: none"> • Energy scarcity and crisis. 	<ul style="list-style-type: none"> • Competing sector and it becomes more difficult to justify SB
Industrialisation / manufacturing	<ul style="list-style-type: none"> • Performing well, growing 	<ul style="list-style-type: none"> • Under pressure due to political instability 	<ul style="list-style-type: none"> • A failed project 	<ul style="list-style-type: none"> • Progressing, but difficult to manage due to fluctuating prices and competing priorities
High demand	<ul style="list-style-type: none"> • This gives scope for managing prices and building barriers to trade. 	<ul style="list-style-type: none"> • Difficult to match with supply 	<ul style="list-style-type: none"> • Other sectors take over 	<ul style="list-style-type: none"> • Opportunities for arbitrage, but also to fall victim to other sectors' better offers
Technological advancement	<ul style="list-style-type: none"> • Ability to leverage and use as strategic advantage 	<ul style="list-style-type: none"> • Possible, but difficult to access 	<ul style="list-style-type: none"> • Impossible and any tech ability falls behind 	<ul style="list-style-type: none"> • Possible with government support, but otherwise unaffordable
Environmental degradation	<ul style="list-style-type: none"> • Sector does not contribute to this and it is well-managed in country 	<ul style="list-style-type: none"> • Getting worse and impacting because not managed by government 	<ul style="list-style-type: none"> • Bad and it affects everything making things worse 	<ul style="list-style-type: none"> • Good management practices but the temptation is there to exploit
Water availability	<ul style="list-style-type: none"> • Well managed as a resource and sector does not contribute to water scarcity 	<ul style="list-style-type: none"> • Getting worse and impacting because not managed by government 	<ul style="list-style-type: none"> • Water is scarce, and where it is available the quality is bad. Drinking water prioritised 	<ul style="list-style-type: none"> • Available, but water goes to the highest bidder
Access to land	<ul style="list-style-type: none"> • Works well, just, well-planned and mutually beneficial 	<ul style="list-style-type: none"> • Risk of land-grabbing in cahoots with government OR good business opportunities but unable to access land 	<ul style="list-style-type: none"> • Impossible and/or a mess characterised by criminal and corrupt practices 	<ul style="list-style-type: none"> • Able to access land, but location may not be profitable and/or suitable

8. RISKS AND OPPORTUNITIES FOR EACH SCENARIO

YEBET SIRA 		TIMECHIGNALESH 	
RISKS	OPPORTUNITIES	RISKS	OPPORTUNITIES
<ul style="list-style-type: none"> ▪ Soil & water resource scarcity or availability ▪ Other energy sources that are more affordable due to technology upgrades ▪ Access to loan / finance for the project ▪ Local currency instability 	<ul style="list-style-type: none"> ▪ Technological advancement within biofuels sector ▪ Rehabilitation of degraded land and access to environmental incentives from international agreements ▪ Skilled / unskilled labour availability ▪ Insurance availability ▪ Population growth creates demand 	<ul style="list-style-type: none"> ▪ More competition ▪ Access to finance decreases ▪ Access to resources decreases ▪ Price competition ▪ Environmental concerns ▪ Decrease of incentives for workers ▪ Displacement 	<ul style="list-style-type: none"> ▪ Expansion ▪ Partnership ▪ Export ▪ Diversification of products ▪ Enhanced production
BE ENKIRT LAY JORO DEGIF 		LIBEN GIRA GEBAW 	
RISKS	OPPORTUNITIES	RISKS	OPPORTUNITIES
<ul style="list-style-type: none"> ▪ Death of employees ▪ Robbery ▪ Inability to supply products ▪ Total loss 	<ul style="list-style-type: none"> ▪ Public Private Partnership (PPP) ▪ Social license ▪ Corrupt officials to get prime land ▪ Contraband / Black market 	<ul style="list-style-type: none"> ▪ Factory damage (attack) ▪ Unable to transport feedstock / product ▪ Lack of labour ▪ Human loss ▪ Property loss ▪ Power breakdown ▪ Lack of input ▪ Lack of services 	<ul style="list-style-type: none"> ▪ Market stability ▪ Cheap labour ▪ Less competition for resources

9. ACTIONS, RECOMMENDATIONS AND OPTIONS

Actions are strategic decisions or initiatives that help ‘make’ a preferred future, in this case **TIMECHIGNALESH**, and prevent slipping into **BE ENKIRT LAY JORO DEGIF**. Actions become the strategic plan / agenda / priorities of how to move forward to a goal and/or vision. Participants brainstormed this list of actions for each of the scenarios where they had direct experience of an issue in their group. Where they had no direct experience, it was phrased as ‘recommendation’ for stakeholders or role-players. In terms of going forward and implementing actions, it is very important to agree on how to make these implementable and measurable.

The options are some of the things that SB actors could do (either immediately, or over the longer term) to move towards **TIMECHIGNALESH**, and mitigate against less-preferred futures. Options can also serve as contingency plans. The table below contains a list of actions, recommendations and options for each scenario generated by the workshop participants. *Please add to the list, it is not exhaustive, and as far as options go, the more, the better.*

Actions, recommendations and options that perform well in more than one scenario – in other words those that are robust, regardless of how the future turns out – are marked with a purple asterisk in the table and are as follows:

- Raise awareness to all stakeholders, focussing on the benefits of biofuels, e.g. energy access, land rehabilitation, climate change mitigation, and the substitution of petroleum products (for transport including aviation)
- Create partnerships
- Support research and development
- Expand into second generation production
- Ensure product diversification
- Ensure biofuels mandate and policies
- Open invitation for partnerships and investment based on sustainable criteria
- Bring in carbon finance program to incentivise community stakeholders
- Benefiting the community by providing access to products for cooking, lighting, etc.
- Push for the setting, and approval, of standards
- Off-take agreement with Ethiopian Airlines
- Tap into Corporate Social Responsibility (CSR) programs
- Legal and policy framework development and enforcement, including standardisation and certification schemes.

- Revise the land use policy
- Create job opportunities for (local area) youths

<p><u>YEBET SIRA</u></p> <p><u>Actions:</u></p> <ul style="list-style-type: none"> • Support research and development on biofuels (Pilot initiatives, innovation, technology incubation, University research) • Put in place regulatory and legal framework for the development and use of biofuels (revise existing regulations) • Introduce and apply standards and environmental certification for sustainable biofuels • Ensure end-use products for household use, e.g. cooking stove, and transport fuel blending equipment – provide incentives for Flexi cars • Create awareness on the benefits of biofuel use (environmental, economic and social) • Create facility for biofuel standards test • Capacity building (skills, management, technology use) <p><u>Recommendations:</u></p> <ul style="list-style-type: none"> • Community is to benefit from the spill over of the sector • Link to investment of major infrastructures (Road, electricity, water) • Partnership with private sector, international organisations, bilateral relationships to enhance the development of biofuels incentives • Make pooled funds available for biofuel development • Provide appropriate compensation for land <p><u>Options:</u></p> <ul style="list-style-type: none"> • Capacity building <ul style="list-style-type: none"> - Design and management of biofuels facilities - Operational and technical capacity through advanced training (specialised on biofuels – TVET, University accreditation) - Introduction of advanced technology with applications - Create awareness with local banks so that they can provide loans to bankable biofuels projects • Finance <ul style="list-style-type: none"> - Together with international financial institutions pool funds for biofuel sector development for the private sector - Attract FDI, joint ventures, etc. - Encourage local investors to engage in biofuel development 	<p><u>TIMECHIGNALESH</u></p> <p><u>Actions:</u></p> <ul style="list-style-type: none"> • Promote the importance of the sector • Lobbying • Raise awareness * • Stakeholder mapping • Create partnerships * • Business modelling • Support research and development *** • Identify sources of funding • Support/facilitate government to government connections <p><u>Recommendations:</u></p> <ul style="list-style-type: none"> • Open new programs related to bio-refinery – universities • Expand into second generation production ** • Ensure product diversification * • Ensure biofuels mandate and policies covering incentives, price competitiveness, research, etc *** • Devise specific incentives for the sector • Support for research and development <p><u>Options:</u></p> <ul style="list-style-type: none"> • Identify sustainable and viable feedstock options (energy cane, crop rotation, cover crops) • Increasing the production of ethanol (upgrade existing plants, increase hectareage, build new plants) • Diversify into other markets, e.g. CO₂ production, pulp, food, feed • Technology upgrading * • Open invitation for partnerships and investment based on sustainable criteria **
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<ul style="list-style-type: none"> • Environmental <ul style="list-style-type: none"> - Encourage investors to protect against environmental degradation and resource depletion (soil, water, forest, etc.) • Job Creation <ul style="list-style-type: none"> - Create employment for local communities - Carry out CSR addressing community social problems 	
<p><u>BE ENKIRT LAY JORO DEGIF</u></p> <p><u>Actions:</u></p> <ol style="list-style-type: none"> 1. Promote peace and security (MOMP & Ministry of Peace – local) 2. Legal and policy framework development and enforcement * 3. Research and development <ul style="list-style-type: none"> - Feed stock/availability - Technology/production - End user technology and products, e.g. stove 4. Promote out growers’ scheme for feedstock supply 5. Capacity building for out growers and incentives 6. Create a conducive environment for the production of biofuels <ul style="list-style-type: none"> - Infrastructure - Finance - Incentive packages - Access to land 7. Create market access, product promotion price regulation for distributors 8. Facilitate carbon financing along the value chain → end users <p><u>Recommendations:</u></p> <ul style="list-style-type: none"> • Revise the land use policy * • Revise the incentives and subsidies package <p><u>Options:</u></p> <ol style="list-style-type: none"> 1. Establish strong Public Private Partnerships 2. Access Corporate Social Responsibility (CSR) 3. Establish out growers’ scheme 4. Create job opportunities for (local area) youths* 	<p><u>LIBEN GIRA GEBAW</u></p> <p><u>Actions:</u></p> <ol style="list-style-type: none"> 1. Bring in carbon finance program to Incentivise community stakeholders * 2. Continuous dialogue with community, regional government, federal government, etc. 3. Benefiting the community by providing access to products for cooking, lighting, etc. * 4. Push for the setting, and approval, of standards * <p><u>Options:</u></p> <ol style="list-style-type: none"> 1. Off take agreement with Ethiopian Airlines * 2. Feed stock purchase agreement with cooperatives 3. Research and development 4. Build circular economy <p><u>Recommendations:</u></p> <ol style="list-style-type: none"> 1. Federal and regional governments should be involved and take concrete actions (a stakeholder mapping exercise will be useful – see also stakeholder list in this document) * 2. Tap into Corporate Social Responsibility programs* 3. Feedstock and product diversification 4. Expansion / increase investment <p>Strengthen partnerships</p>

10. SUGGESTIONS ON HOW TO USE THE SCENARIOS

At the end of the scenarios development workshop participants took part in a quick brainstorming session on how best to use the scenarios and resultant strategic options either for their own, and/or for general purposes. Their suggestions and ideas included:

1. Build a Roadmap⁹ by back-casting¹⁰ from the preferred future - TIMECHIGNALESH.
2. Use the scenarios for more robust strategy development.
3. To help inform personal planning and projects.
4. Add value to the different stakeholder plans.
5. For lobbying, marketing and convincing purposes.
6. To help communicate the issues and importance of the biofuels sector in Ethiopia.
7. Refine and expand on the best-case scenarios so that it can serve as a vision.

⁹ Roadmaps show how a range of inputs – research, trends, policy interventions, for example – will combine over time to shape future development of the policy or strategy area of interest. It is a timeline that visually identifies when and how key exogenous events and decision points – technology adoption, drivers, policy announcements, changes of government and so on – might shape the policy area under consideration. A particularly useful aspect of Roadmapping is that it combines known (certain) developments with speculative (uncertain) developments. The roadmap does not need to be a single line or be restricted only to the core issue; it can be expanded to include developments in related policy areas that may impact on the central project question.

¹⁰ Back-casting is a method for determining the steps that need to be taken to deliver a preferred future - an effective way of connecting a given future to the present and identifying what needs to be done to deliver it.

APPENDIX A: WORKSHOP PARTICIPANTS AND AFFILIATIONS

Name	Institution	Position
Netsanet Abebe	Ministry of Trade and Industry	Director, Chemical and Construction input industries services and support directorate
Beamlak Alemayehu	Ministry of Mines and Petroleum	Legal services
Adanech Asegu	Ministry of Innovation and Technology	Expert
Komminist Asmamaw	Ethiopian Biotechnology Institute	Expert, Industrial Biotechnology Directorate
Abayeneh Bazezew	Ethiopian Sugar Corporation	Deputy Executive officer, factory operation
Fahamy Dawd	Ethiopian Sugar Corporation	Executive officer, factory operation
Sisay Feleke (PhD)	Ethiopian Agricultural Research Council Secretariat	Senior Researcher
Abera Geremew	Ministry of Trade and Industry	Expert
Mr. Michael Gessese	Ministry of Mines and Petroleum	Director, Biofuel Development Directorate
Dessalegn Getaneh	GAIA Project	Executive Director
Tadesse Girma	Ethiopian Oil companies Association	Secretary General
Anteneh Gulilat	GIZ	Energy Expert
Yonas Haelemariam	API Renewable Energy PLC	General Manager
Yitatek Kelemu	Roundtable on Sustainable Biomaterials	Project Manager
Hilawe Lakew	Ethio Resource Group	Director, Forest Resource Utilization Directorate
Wondimu Mathewos	Ethiopian Airlines	Project Engineer
Ayalneh Medagnaw	Ethiopian Petroleum supply enterprise (EPSE)	Head, Petroleum Quality Assurance Service
Abrham Melese	Civil Service	Expert
Wubishet T. Tsehayu	GAIA Project	Senior Program Manager
Stephen Wetmore	Roundtable on Sustainable Biomaterials	Director, Business Development
Abubeker Yimam (PhD)	Addis Ababa University	Dean, School of Chemical and Bio Engineering, AAiT, AAU
Tanja Hichert	Hichert and Associates	Scenario Planner and Facilitator

APPENDIX B: WORKSHOP PROGRAMME

Day 1 22 January 2020		
09:00 – 09:40	Welcome & introduction Michael Gessese , Biofuel Development Directorate (Ministry of Mines and Petroleum) Yitatek Kelemu , RSB Tanja Hichert , Facilitator (Hichert and Associates) Participants introduce themselves	Yitatek Yitbarek Tanja Hichert
09:40 – 10:00	Introduction to RSB and its project(s) Stephen Wetmore, Director Business Development (RSB)	Stephen Wetmore
10:00 – 10:30	Presentation :Contextual analysis on the biofuel sector of Ethiopia Abubeker Yimam (PhD) Addis Ababa University	Abubeker Yimam
10:30 – 11:00	Q & A, as well as general conversation around topic, with Dr Yimam	
11:00 – 11:30	<i>Tea/coffee & connectivity break</i>	
11:30 - 11:45	Short introduction and step-by-step explanation of scenarios methodology Tanja Hichert (TH)	Tanja Hichert
11:45 – 12:15	Engage around, and agree the unit of analysis, and its future timeframe, scope and context, as well as 'rules of engagement' for group dialogue.	Tanja Hichert
12:15 – 13:00	-Construct a historic timeline going back twice as long as wanting to look forward Identify key challenges	Breakouts Groups
13:00 – 14:00	<i>Lunch & connectivity break</i>	
14:00 – 14:30	Continue group breakout session to lay the groundwork for good scenarios by exploring	Breakout groups
14:30 – 15:30	<i>Report back to plenary</i>	
15:30 – 16:00	<i>Tea/coffee & connectivity break</i>	
16:00 – 16:20	Explanation of Three Horizons Framework exercise	Tanja Hichert

16:20 – 17:00	Agree key contextual issues, e.g. Energy, Environment, Food Security, Socio-economic systems, etc. for the Three Horizons Framework exercise on Day 2	Tanja Hichert
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Day 2 23 January 2020		
09:00 – 09:15	Recap of Three Horizons Framework exercise	Tanja Hichert
09:15 – 10:00	Use Three Horizons Framework to explore systemic change in key issues such as Energy, Environment, Food Security, Socio-economic systems, etc.	breakout groups
10:00 – 10:30	Report back to plenary and share key learnings and insights	Tanja Hichert
10:30 – 11:00	Collectively identify the ‘knowns’ -- the key certainties -- shaping the future of the biofuel sector in Ethiopia	Tanja Hichert
11:00 – 11:30	<i>Tea/coffee & connectivity break</i>	
11:30 - 12:30	Identify the key uncertainties – ‘the unknowns’	Tanja Hichert
12:30 – 13:30	<i>Lunch & connectivity break</i>	
13:30 – 15:00	Plot the uncertainties onto an impact/ uncertainty chart in order to generate a 2x2 matrix framework (also known as a scenarios gameboard) – this reveals the ‘skeleton’ scenarios	Tanja Hichert
15:00 – 15:30	Add narrative details to the scenarios using content generated on Day 1 and morning of Day 2	breakout groups
15:30 – 16:00	<i>Tea/coffee & connectivity break</i>	
16:00 – 17:00	Share narratives of alternative futures in plenary (the more experientially, the better)	Tanja Hichert

Day 3 24 January 2020		
09:00 – 09:30	Collectively plot key driving forces and outputs from Three Horizons as vectors onto the gameboard, and work dynamism into the gameboard As a group identify a preferred future	Tanja Hichert
09:30 – 11:30	Working with the key issues and future time intervals identify potential pathways, events and decision nodes -- also using back-casting -- to get to the preferred future,	Tanja Hichert

	whilst generating top-line option, and recommendations for how to get there.	
11:30 – 12:00	<i>Tea/coffee & connectivity break</i>	
12:00 – 13:00	Decide and agree on actions and recommendations Decide and agree on how best to use the scenarios	Tanja Hichert
13:00	Workshop close ‘thank you’s’ and next steps Michael Gessese (MoMP) and Stephen Wetmore (RSB)	Yitatek Yitbarek
13:00 – 14:00	<i>Lunch</i>	

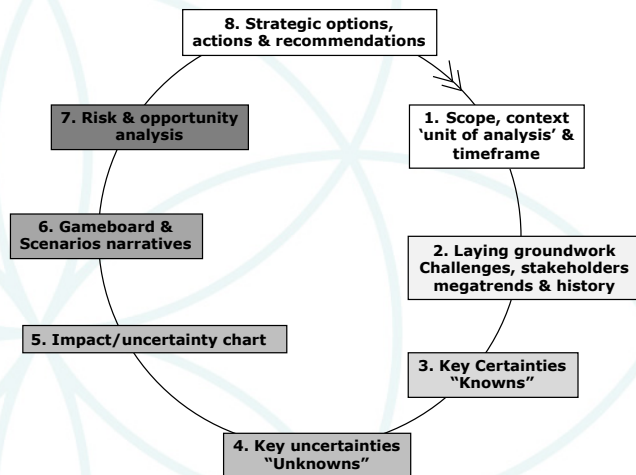
APPENDIX C: HISTORY TIMELINE OF SUSTAINABLE BIOFUELS IN ETHIOPIA

The facilitator, Tanja Hichert explained the process for scenarios development and planning as being that of a circular strategic conversation that is structured in such a way that one step, or phase, builds on the previous, but ultimately returns to being relevant for the unit of analysis – in this case the sustainable biofuels sector in Ethiopia.

The steps are listed below and graphically depicted next to that.

1. Engage around, and agree the unit of analysis, and its future timeframe, scope and context
2. In small breakout groups participants lay the groundwork for good scenarios by;

- constructing a historic timeline going back twice as long as wanting to look forward
- identify key challenges
- conduct a key stakeholder analysis
- brainstorm global level megatrends and driving forces shaping the future



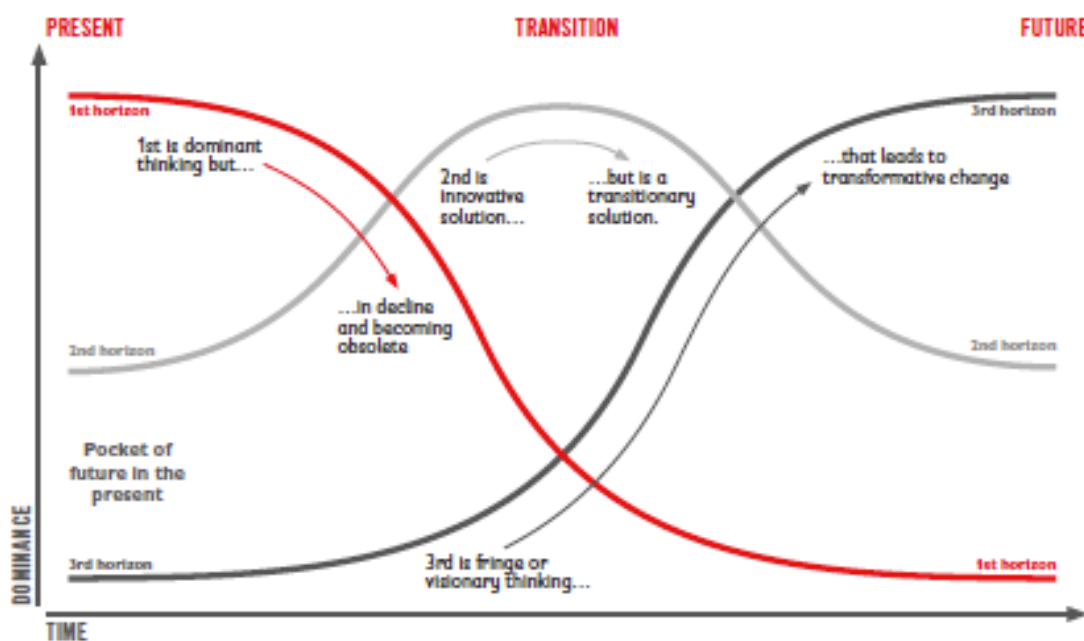
3. Collectively identify the 'knowns' -- the key certainties -- shaping the future of the biofuels sector in Ethiopia
4. Identify the key uncertainties – 'the unknowns'
5. Plot the uncertainties onto an impact/ uncertainty chart in order to generate a 2x2 matrix framework (also known as a scenarios gameboard) – this reveals the 'skeleton' scenarios
6. Share narratives in plenary and collectively plot key driving forces and insights from Three Horizons as vectors onto the gameboard to work dynamism into the gameboard
7. Identify risks and opportunities for a hypothetical sustainable biofuels company in each of the scenarios
8. Generate actions, recommendations and options for each of the scenarios whilst stress-testing current assumptions, plans, policies and forecasts

In between the scenarios building process participants also populated Three Horizons frameworks on key systemic issues affecting Ethiopia's future. This was so that they could make sense of, and better understand, some of the dynamics of change impacting the biofuel sector in Ethiopia.

The workshop ended with a quick brainstorm on how best to use the scenarios going forward.

APPENDIX D: THREE HORIZONS FRAMEWORKS

During the workshop participants divided into four self-selecting breakout groups to populate four Three Horizons Framework templates (refer to the graphic below) on key issues in Ethiopia undergoing major systemic change that also affects sustainable biofuels production.



Source: Adapted from Curry and Hudson (2008): 'Seeing in Multiple Horizons: Connecting Futures to Strategy'. *Journal of Futures Studies* 13 (1), pp. 1–20

The guidelines / instructions to each breakout group were as follows:

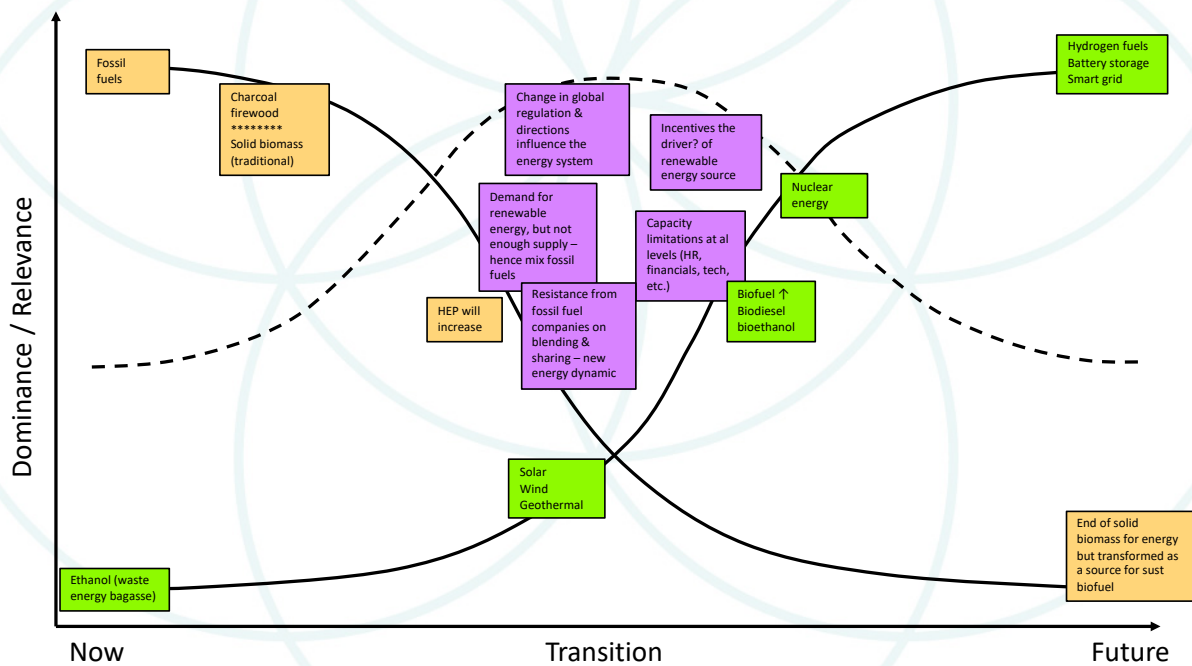
1. Write descriptions/statements (about your topic) on Post-it notes starting with the 1st horizon (H1). H1 is the dominant patterns and paradigms of how the world is now and how it works now. H1 can, and does, change, sometimes dramatically, and in the future could look very different because the current prevailing system as it continues into the future loses "fit" over time as its external environment changes.
2. Using a different colour Post-it start populating the top right of 3rd horizon 3 (H3) which is the desired future and future aspirations (of your topic). H3 is what could change, what the future could be like. It will not have a high degree of relevance /strategic fit with now. H3 emphasises the new, the transformative, the visionary, the break with past traditions and current assumptions.
3. Work backwards to the present on H3 still using the H3 coloured Post-its and ask if there are any "pockets of the desired future" in the present. These exist now, but they are

marginal or niche or an inspirational practice. They do not have a high degree of relevance or strategic fit. They are emergent.

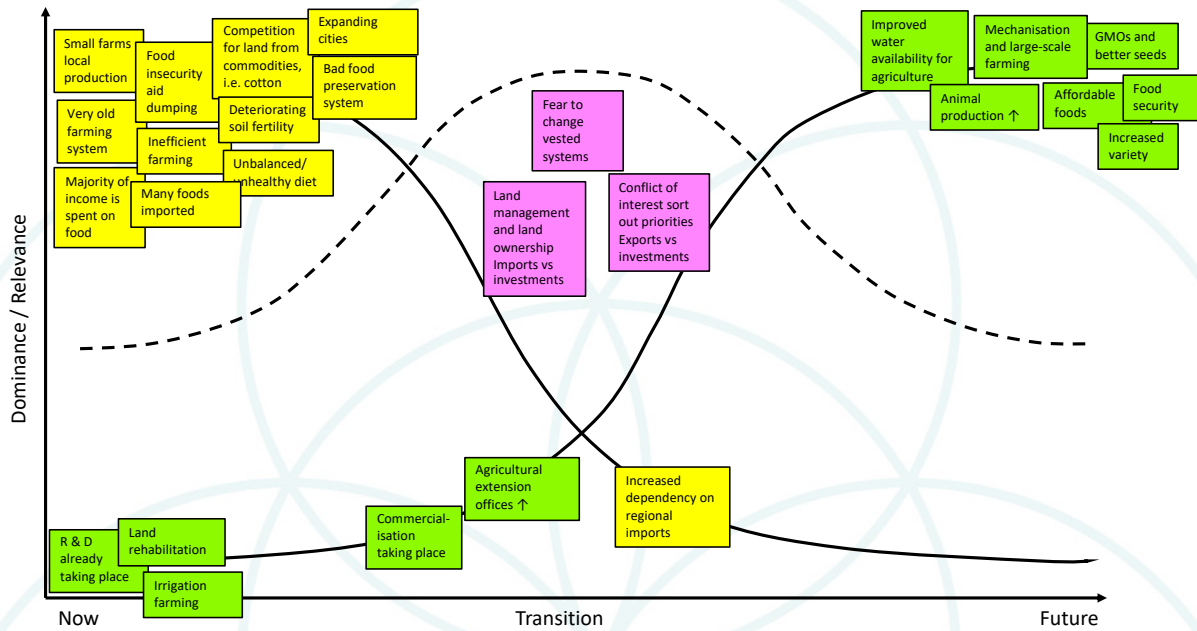
4. Staying with H1 and H3, ask what has to decline (sometimes dramatically) on H1, and what has to grow (sometime exponentially) on H3, for the desired future to realise. This will begin population in the 'transition' phase.
5. Now populate 2nd horizon 2 (H2) using a third colour of Post-its and describe the transition phase. What needs to happen in this space for fundamentally new patterns of H3 to occur? H2 then, is the medium term, and becomes a space of both conflicts and options. H2 is the intermediate space in which the first and third horizons collide. This is a space of transition which is typically unstable and messy. It is characterised by clashes of values in which competing alternative paths to the future are proposed. It is the space for identifying actions and options – the space where one can make change happen.

The groups' output is presented below:

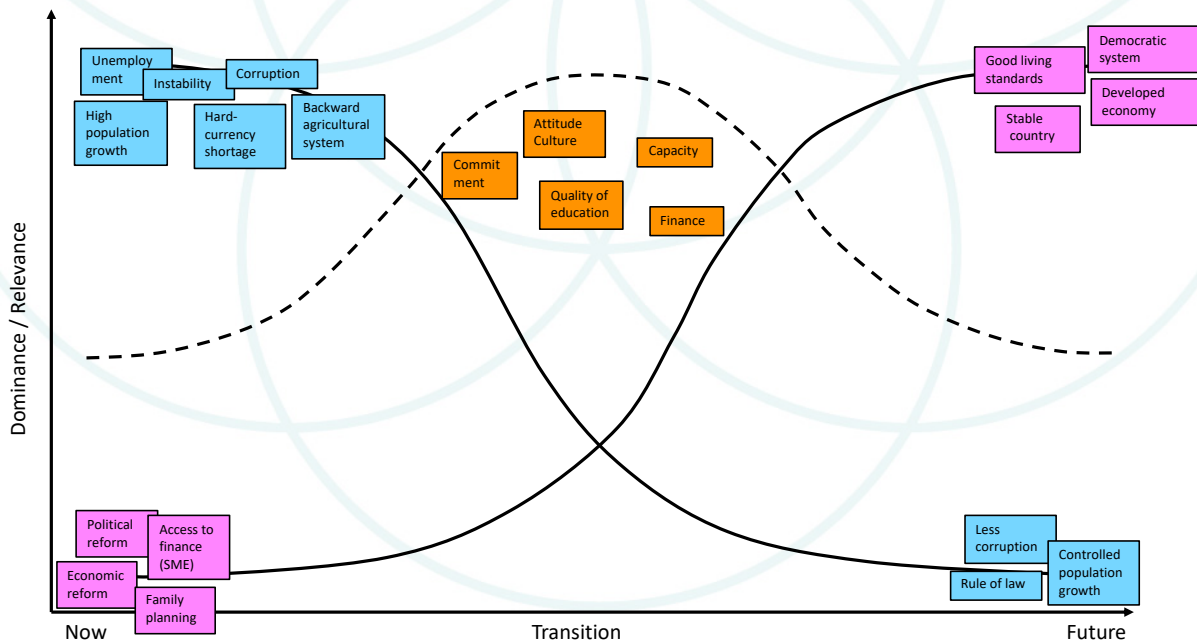
THE ENERGY SYSTEM IN ETHIOPIA



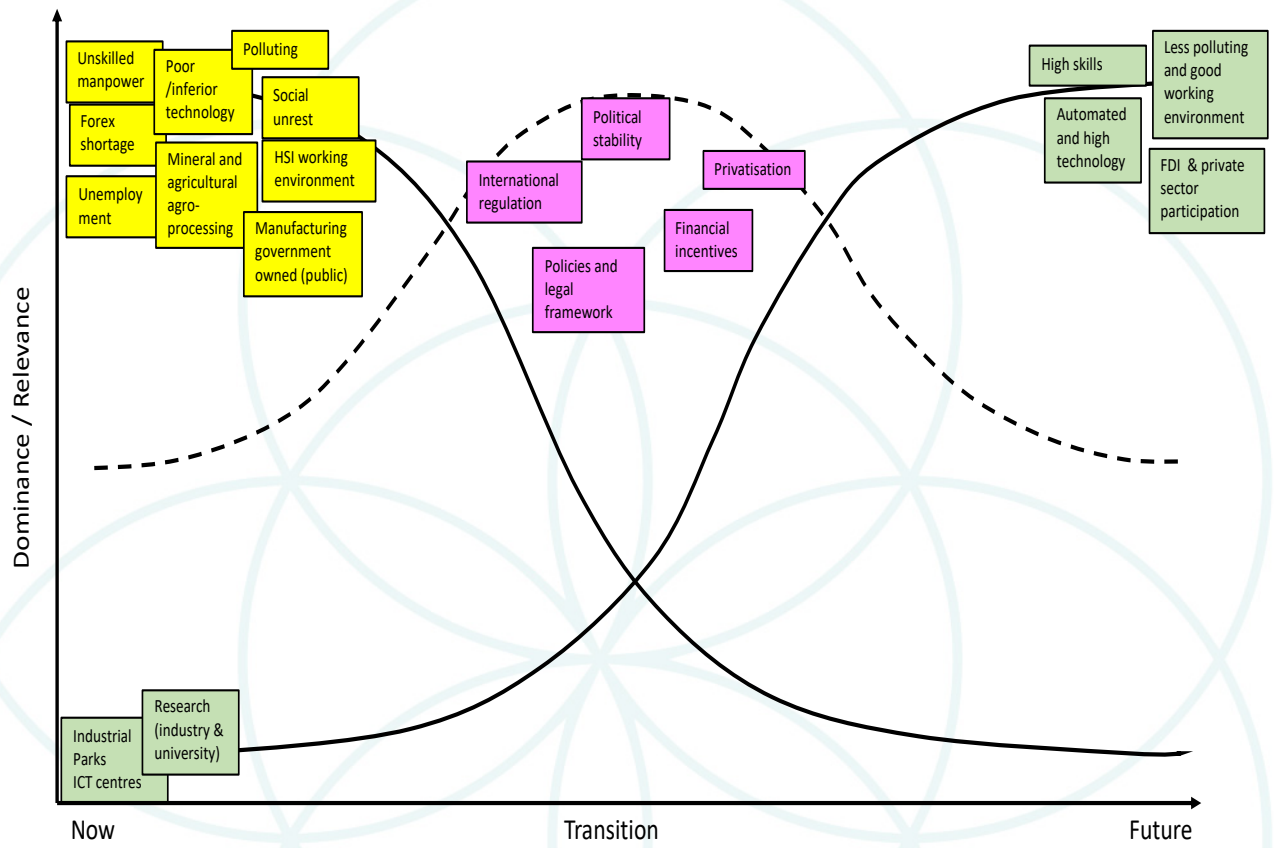
THE FOOD SYSTEM IN ETHIOPIA



THE SOCIO-POLITICAL SYSTEM IN ETHIOPIA



THE INDUSTRIAL / MANUFACTURING SYSTEM IN ETHIOPIA



APPENDIX E: ORIGINAL SCENARIOS STORIES FROM WORKSHOP

TIMECHIGNALESH

"We started to produce sufficient Biofuels that has a share of 50% of the total fuel consumption.

Sustainable biofuel sector creates 5 million jobs both direct and indirect

80% of the rural area using the biofuel for its energy need and about 40% of the urban population get their cooking energy for sustainable biofuels.

Ethiopian airlines is on right track to satisfy international Civil Aviation Organization's (ICAO) goal and targets where 20% of its fuel consumption is met by sustainable biofuel produced from within the country.

The biofuel sector contributing 10% of the country GDP.

Ethiopia gets the green award for its successful biofuel development of production of safe cooking conditions for the large rural population

LIBEN GIRA GEBAW

Headline of the news: Is stable price of biofuel attracting investors in to the country?

"Yes. Existing investors willing to continue in to the business. Reasons as follows:

1. *Globally prices are stable*
2. *Subsidies and/or incentives -- carbon market and/or carbon trade due to carbon offsetting (COP21 parties Agreement)*
3. *Feedstocks have better seeds yield (oil content)*
4. *Innovative way of tree plantations (seeds) has positive impact on the community by protecting the soil against erosion, increasing soil fertility , and supporting the existing ecosystem*
5. *Contribution made to mitigating climate change*

In spite of stable prices, conflict is a challenging issue for investors in the following ways:

- *Civil unrest, which hinders sustainable biofuel productions*
- *Shortage of labour*
- *Cutting down or damaging tree plantations*
- *Transportation is locked due to shortages of raw materials and biofuel*
- *Factories are damaged due to lack of security*
- *Absence of political will"*

BE ENKIRT LAY JORO DEGIF

Tuning into the evening television main story news broadcast:

"State Television reported that there is unrest public disobedience in many parts of the country and there is a fear that there will be a State of Emergency to be declared.

Roads connecting sugar factories and plantation were closed since last Friday. Witnesses confirmed that dozens of trucks transporting ethanol to fuel stations were burned down, while others cannot move and were kept along the road.

Out growers demanding payment siege Fincha Sugar Factory for six hours, the out growers demanded for unsettled payments to be paid and also demanded for price adjustments.

Chief Executive Officer of Metehara Sugar Factory confirmed that the factory can no longer pay salary to its employees. Following his statement, employees called for a five days strikeout to lobby the factory to pay them their salary. The employees also set on fire one of the ethanol distilleries, according to our reporter.

Ministry of Mines and Petroleum announced that it no longer subsidise biofuel operations due to shortage of foreign currency, according to the Sate Minster.

There has been a shortage of ethanol product in many fuel stations in the capital Addis and there is a long line to get the product.

Our reporter is joining us live from one of the fuel stations...

..... as you can see behind me there is a long line to get ethanol products”

YEBET SIRI

There will be competitive choices of technology for biofuel production.

There will be diversification of feedstock to ensure the sustainable supply of biofuels.

There will be space to lobby for good regulation for biofuel markets.

The concern for environment will be given high priority in mitigation actions such as sustainable conservation of water and soil.

Environmental degradation issues will be addressed through rehabilitation programs and through research and good and smart practices.

Access to land for biofuels will have clear directions with addressing the trade-offs on the competing land use challenges for the sector.

The government provides incentives to investors who are keen in the sector (mutual benefit: both for community and investor).

Biofuels for energy consumption is highly encouraged across the country.

The country's international commitment to reduce carbon emissions met and access to finance from International financial institutions trickle down to community-based initiatives.

Insurance industry will boom to the high risk of the price volatility.

Education and skills capacity enhanced because the government believes in quality and competency.

Workforce productivity increases and new jobs are created from the sector which in return addresses other social aspects of family planning intrinsically.

Brain drain to some extent reduces.

Technology transfer will be high both for efficiency and competitiveness.

Research on biodiesel and other forms of alternative energy sources will prevail.

The level of economic and social inequality reduces as the government focuses on balanced wealth distribution where middle-income families flourish.