

Foresight as a complementary approach to planning

Futures of Forests as a resource: Combining Delphi to Backcasting Scenario Workshop in Tanzania

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ABOUT THE PROJECT

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BACKGROUND

Demos Helsinki conducted a foresight project in collaboration with COSTECH (Tanzania Commission for Science and Technology). The objective of the project was to plan and implement a pilot for foresight exercise and to assess its potential impact on the planning processes in Tanzania. This objective was achieved by focusing on three things:

1. Further developing foresight capacity for national planning in Tanzania, in collaboration with national stakeholders. This was done by building capacity of the local actors during a workshop 26th–27th of August and by training them on the methodologies used in foresight in a special Methodology Training Day on 28th of August 2015 in Bagamoyo, Tanzania.

2. Strengthening capacities for planning and conducting of foresight processes for Tanzanian key sectors by conducting a foresight exercise, which consisted of an eDelphi study (5 July – 21 August) about forest as a resource for Tanzania and megatrends such as digitalization; a two-day Counting Backwards workshop (26–27 August) and an analysis of the project results in the Final Seminar in Dar Es Salaam (31 August 2015) i.

3. Strengthening government organizations to enable integration of foresight processes into development planning. This was done by including the local government organizations closely in the process during the Counting Backwards workshop, the Methodology Training Day and the Final Seminar.

After the project, the participants should be able to integrate project results to their planning and futures work. In addition, they have the capacity to conduct their own foresight exercises using eDelphi, Environmental Scanning, Futures Table, and scenarios from the intensive Counting Backwards workshop.

The goal of this Final Report is to explain the process and assess its impact on planning processes. The final report includes

- the methodologies used during the foresight and co-creation processes
- the results of the Delphi study
- the results of the Counting Backwards workshop (i.e. Scenarios)
- the analysis of scenarios conducted by Demos Helsinki and by the participants of the Final Seminar,
- the policy recommendations in regards to the position of foresight in Tanzanian strategic planning
- the recommendations from the foresight exercise

This final report is shared as a PDF file to the participants of the Delphi study, Counting Backwards Workshops, Methodology Training Day and the Final Seminar. It is licensed under Creative Commons and can be shared by the participants further on.

Objectives defined by the Counting Backwards Workshop participants in Bagamoyo

1. Learn foresight and apply it in my work
2. Find new opportunities and paths for sustainable use of forests.
3. Find new opportunities and paths for strengthening the economy and well-being of Tanzanians.
4. Identify strategic points of using ICT in order to facilitate development.
5. Build a network of forward-thinking actors.

CO-CREATIONAL FORESIGHT FOR TANZANIA

These quotes from participants crystallise the purpose, the core and the outcomes of the joint foresight exercise for Tanzania led by the Nordic think tank Demos Helsinki and Tanzania Commission for Science and Technology in August 2015.

"I now have different views on what has to happen between now and the future."

- a Bagamoyo Backcasting Workshop participant

"What we want to do is to have a clear plan and that can't be done without understanding the future."

- a Bagamoyo Backcasting Workshop participant

"I realised this really needs team work. You can't do this alone."

- a Bagamoyo Backcasting Workshop participant

"Tanzania has basically been operating in silos for a long time, with this strategy, foresight can be one of our rescuers out of the problem."

- a Final Seminar participant

Nordic countries have been extremely successful societies with a model that combines foresight with working together across organisations – a long sight, which thrives from the inclusion of human capabilities in the widest possible setting. In this Nordic spirit Demos Helsinki brings people, teams and organizations together to work out how to take on the grand challenges shaping the future of our societies. In 2015, Demos Helsinki had the pleasure of working with Tanzanian officials and researchers.

Foresight is conducted to reveal alternative possibilities and the systemic interactions within each possibility. The first goal of this foresight process was to reveal possible, probable and desirable futures for the forests as resource for Tanzania.

The second goal was to give COSTECH as well as the National and Zanzibar's Planning Commissions tools and means to conduct similar exercises to other sectors as well and compliment their already existing capabilities. Demos Helsinki combines foresight and expert knowledge with participatory co-creation. It is an approach which involves gatekeepers and decision-makers to redefine problems and possibilities and to seek for solutions, which will work in their own contexts. No exception was made with this foresight exercise in Tanzania. The project run from July until mid-September with its core being a co-creation foresight workshop of 26 participants from different organisations, based on the results of an expert survey conducted before it. The list of participating organisations and people can be found in the annexes. This way the best of both worlds of foresight and co-creation were combined to create capabilities for strategic foresight and future-proof planning.

In this publication, we reveal you the secrets of the process and methods used. We also have in-depth look at the insights the process gave both on the future of sustainable and profitable use of forests and the future use of foresight in Tanzania. We hope this publication to be a practical guidebook for taking brave future steps in foresight in Tanzania, and elsewhere.

*– The Authors Johannes Koponen, Outi Kuittinen,
Johannes Nuutinen & Risto Lätti*

PART I: WHY FORESIGHT

IMAGINE TANZANIA IN 2035

Our societies, Tanzania included, are pushed and pulled by megatrends, and ridden with wicked problems. **Megatrends** are the major forces that push the current development towards the futures. Like population growth, urbanization, digitalization and globalization of economy, megatrends can be affected, but it takes a long time. They are also systemic in their nature, so a single leverage point won't change them much. For example, tackling urbanization in some area with regulation will just make the problems caused by urbanization appear somewhere else, or the regulation proves to be simply inefficient.

Wicked problems are problems that have a systemic and complex nature. A typical example would be climate change. This means that wicked problems cannot be solved with just one solution: a multitude of actions from holistic point of view is needed to solve them.

Megatrends and Tanzania

There will be approximately 100 million people in Tanzania in 2035. Large cities, especially Dar Es Salaam, will grow significantly. The impact of such a population growth is significant to many sectors, including the wellbeing of forests. If the current rate of deforestation in natural forests (3,32%/year) continues, the natural forest cover will be cut in half in 21 years.

Digitalization and ICT are one way to tackle some of the wicked problems caused by the megatrends. Mobile phones, decentralized big data, better information, new and cheap tools for surveillance and energy innovations such as solar plants and other renewables can help cutting the charcoal and firewood usage and automated cars or mobile phone based traffic anticipation systems help to reduce traffic.



Urbanization and population growth increase e.g. traffic problems.



If the current rate of deforestation in natural forests (3,32%/year) continues, the natural forest cover will be cut in half in 21 years.

Digitalization

There is so much technology in one smart phone that in 1995 it would have cost 250 million Tanzanian shillings (currently about 1 million) to buy all its parts: Calculators, cameras, games, music and video players. All of these at the date of release cost more than the smart phones themselves. The smart phone also contains memory that would have weighted tons just a while ago. And the technology today is magnitudes faster and better than 20 years ago - we talk about gigabytes and gigahertz instead of megabytes and megahertz.

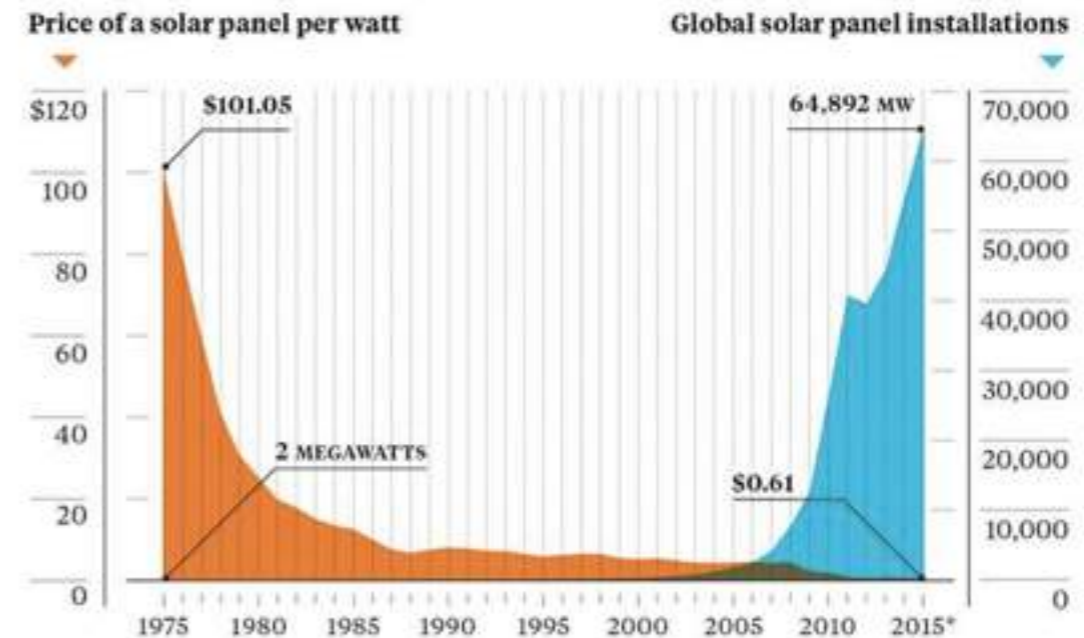
Now imagine the smart phones getting smaller and smaller and cheaper and cheaper, and incorporating more and more things, before becoming so small and cheap that it ceases to exist. It becomes part of the environment.

What we have to understand is that when technology gets developed enough it disappears, it ceases to be understood as technology; it becomes part of the general man-made ambience of our life. Around us, there are amazing technologies already around us that we don't think of as technologies: they have vanished. A house is a very typical example of disruptive technology, not to mention this collection of houses and streets and other infrastructure, know as the city, invented some thousands of years ago around where today's Iran is, and scaled from there globally. Houses and cities are technologies. Our clothing is a technology, the food on the tables is the end product of masses of technologies, from fire to other means of cooking. These are all technologies that have in practice disappeared: they are on the background and nobody (outside of dedicated professionals) thinks of them as technologies. Similarly digital technology will be immersed into the environment.

One core technology segment which follows the similar law is energy technology. There are lots of uncertainties in solar power price and availability in the future, but decentralized solar might prove to be a 'killer app' in energy technology, providing individuals means to produce their own energy sustainably.

The automation of labour

Automation, augmentation and globalization of production and trade are reasons why many societies cannot rely on the fact that there is work for everyone. As people are currently attached to societies for a major part via the work they do, there needs to be bright ideas about why would people collaborate together in different nations.



Solar panel price and total global installations 1975-2015

More accessible information

When the Fukushima nuclear plant exploded in Japan, Japanese people were not satisfied with the information their government provided them. So they figured out a way to build cheap Geiger counters to measure the radiation levels themselves and published the data as open data online. The end result is a network of sensors covering all of Japan, without any government intervention. We used to rely on the governments in providing us information, but that has now changed. What follows is still unclear.

Resource scarcity

The "western" style societies are built on a wrong premise of abundant natural resources, a belief that was not questioned for a long time. Now when it has become obvious that the natural resources are not abundant but actually very scarce, a lot of things will have to change.

WHY FORESIGHT

In broad terms, there are three reasons why foresight is needed.

1. Foresight helps us to focus on alternative futures instead of just the most obvious one.
2. Foresight forces us to take a holistic and systemic perspective. This perspective is crucial in planning and in acting effectively.
3. Foresight makes us realize that every possible future is created by the decisions we make now.

When researching futures it is good to understand that all useful knowledge has implications towards the future. However, there is no knowledge about the future, because the future does not (yet) exist; there cannot be knowledge about something that does not exist. Instead, insights, desires and beliefs are what the futures are built on and there is knowledge about them. In futures studies, the research targets are models - representations of systems that are, have been or could be (imagined).

It is good to notice that albeit this report focuses on some core methodologies such as the Delphi method and scenarios, alternative futures can be created by using different methods. Some typical methods used in national or regional foresight are:

- Simulations and games
- Prediction markets
- Expert interviews
- Statistical analyses
- Strategic futures workshops
- Field anomaly relaxation
- Trend Impact analysis
- Causal layered analysis
- Soft systems methodology
- Patent landscape analysis
- Decision modeling
- Relevance trees

If no such representations exist, there would be no actions, just reactions. What follows is that “man acts, not ‘because...’ but ‘in order to...’”. Similarly, assertion about the future does not indicate fact, but an intention, and a man who acts with sustained intention to carry out a project is a creator of future.

This advocacy and empowerment towards actually shaping the futures ourselves is a core premise of foresight. In practice, there are several aspects of the future the researcher can rely on despite the fact that world is a random place with truly chaotic and unpredictable events, new information - which is often generated by foresight! - shapes people’s behaviour and attitudes and technological innovations shape practices which the previous foresight work often relies on. These aspects that can be used to generate more reliable foresight work are at least

1. What people plan and desire

We can ask about the desires and plans of those who have power or knowledge.

2. How population dynamics change

Many population dynamics, including e.g. education and birth rates, have systemic delays we can anticipate,

3. Investments that we have agreed on

It is often reasonable to agree that if a bridge is planned, it is likely to be built.

4. Important habits and traditions

It takes at least a generation, often much longer, before habits, traditions and cultures change.

5. Cyclical natural processes

Some natural processes, like annual cycles, many climate variations and many astronomical events are predictable.

WHERE TO LEARN MORE?

A good source for foresight information is the Millennium project (<http://www.millennium-project.org/>). For foresight studies, we encourage to look at the 2015-2016 State of the Future report by the Millennium project in addition to several recent foresight processes by leading global actors mentioned in the next page.

There are many good sources to learn more about foresight methodologies. The most comprehensive package about foresight methodologies is likely the Futures Research Methodology report 3.0 by the aforementioned Millennium project (<http://www.millennium-project.org/millennium/FRM-V3.html>). This report consists of 37 chapters each of which cover one specific method (e.g. Futures Wheel, Scenarios) or category of methods (e.g. Systems Perspectives, Normative Forecasting).

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- Patent landscape analysis
- Decision modeling
- Relevance trees



Recent foresight processes by leading global actors

Shell Corporation

E.g. New Lens Scenarios

<http://www.shell.com/global/future-energy/scenarios/new-lens-scenarios.html>

EU Commission

Industrial landscape vision

<https://ec.europa.eu/jrc/en/research/crosscutting-activities/foresight>

Foresight Canada

Strategic foresight workshops

<http://www.foresightcanada.ca/systems-mapping-wicked-problems>

UK Government Office for Science

Future of Cities project

<https://www.gov.uk/government/collections/future-of-cities>

European Foresight

Many projects

<http://foresight.jrc.ec.europa.eu/>

Institute for the Future

Government Futures Lab Toolkit

http://www.iftf.org/uploads/media/GovFuturesLab_Toolkit.pdf

United Nations

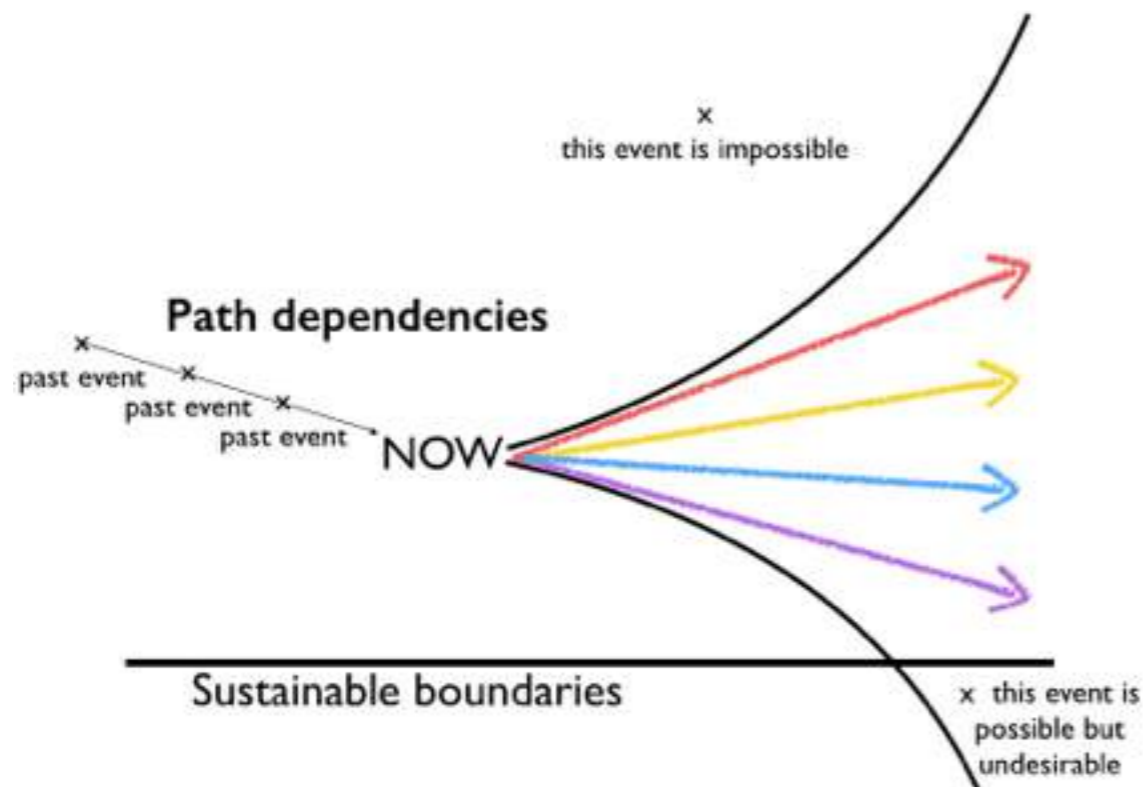
Global Pulse: Big data in development and humanitarian action

<http://www.unglobalpulse.org/>



Shell Corporation investigates e.g. future of cities in their New Lens scenarios

WHAT FUTURES LOOK LIKE



How futures are considered in foresight.

We often imagine a path through relevant past events that we call “history”. These past events shape our present and formulate our future because of so called path dependencies. An example of a path dependency is a new apartment building: it is likely to remain where it is built for at least 70 years, despite even radical changes in its environment. In science fiction, future is often described as ultra-modern. But this is not likely to be true: there will be old constructions, rules and practices in the future as there are now in the present.

Due to the path dependencies shaping the future radically really close to the current moment is difficult: the realm of possibilities is not very wide. But given enough time, anything can change. This is one of the reasons why foresight is an empowering and motivational approach.

Another important aspect to notice in the picture is that there might exist several boundaries for sustainable futures. There are possible events which are very undesirable, for example a depletion of a local fishery or a point where deforestation is unstoppable.

Lastly, when drafting scenarios in a foresight process, they can be considered as plausible paths from the current moment to different futures. *You can find more information about scenario building and scenarios later in this report.*

THE THREE CORE QUESTIONS IN FORESIGHT



Workshop participants backcasting a scenario

Three main questions in any foresight process described by Roy Amara are “what is possible?”, “what is probable?” and “what is desirable?”. These premises closely resemble three core actions of any respectful manager dictated by Mintzberg (1994). He writes that any manager should a) prepare for the inevitable, b) preempt the undesirable and c) control the controllable.

Let’s take a closer look at what those three premises of foresight mean:

What is possible?

Because we cannot know what the future will bring, we need to map different **possible** paths. In other words, we should never be certain about a specific future, but to consider alternatives by speculating and ideating them. Scenarios are a great tool for this speculation, as they enable plausible storylines for alternative future developments. *You can find more information about scenarios later in this report.*

What is probable?

Is not predetermined. We have to look at what paths are more **probable** to understand “what winds we are sailing”. A Delphi study might be useful for understanding probabilities of various future developments. *You can find more information about Delphi process later in this report.*

What is desirable?

We have to make choices between alternatives. Thus, we need to know what we desire to achieve. A Delphi study can be useful for understanding what the powerful desire is. Even more interestingly, doing scenarios with backcasting methodology can help the participants to collectively understand **what are the good choices** to reach a certain goal. *You can find more information about Backcasting later in this report.*

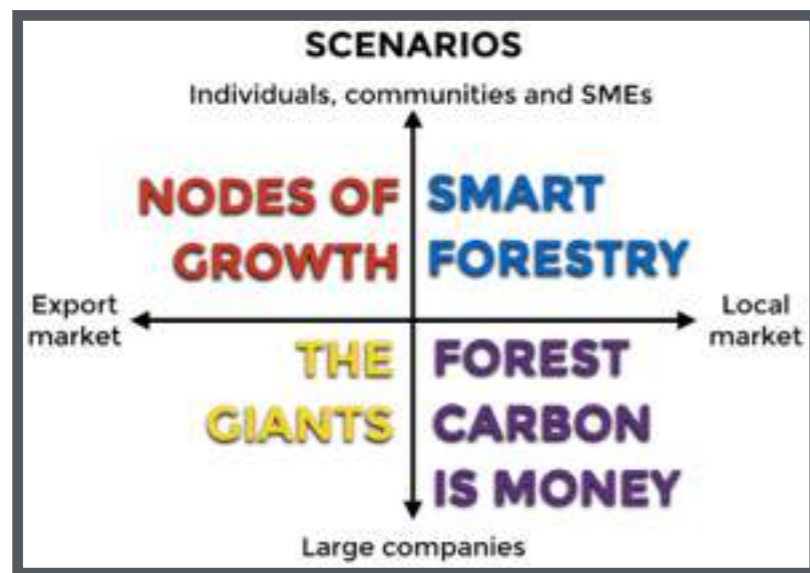
PART II:
4 SCENARIOS OF
FOREST AS A
RESOURCE

INTRODUCTION TO "FOREST AS A RESOURCE IN TANZANIA 2035" SCENARIOS

In the foresight project conducted in collaboration with Demos Helsinki and COSTECH, the aim was to investigate the futures of Tanzanian forests as a resource, considering both the natural forests and plantations and taking especially the megatrend of digitalization into account.

The co-creational scenario workshop, which used backcasting approach, focused on two key questions, which came up during the environmental scanning phase:

- What is the secret in significantly reducing the use of charcoal and firewood?
- What is the secret in making forests a very profitable resource?



Very first step for differentiating the scenarios was to lock whether the main private beneficiaries are large companies or individuals, communities and SMEs, and if they answer the demand in the local or export market.

In the future shaped by the megatrends, these four scenarios depict paths towards sustainable and prosperous forest use in Tanzania. Using backcasting, all the workshop teams followed a shared vision "In 2035, there is little or no deforestation in any scenario and forest is a profitable resource." in their respective scenario groups.

"In 2035, there is little or no deforestation in any scenario and forest is a profitable resource."

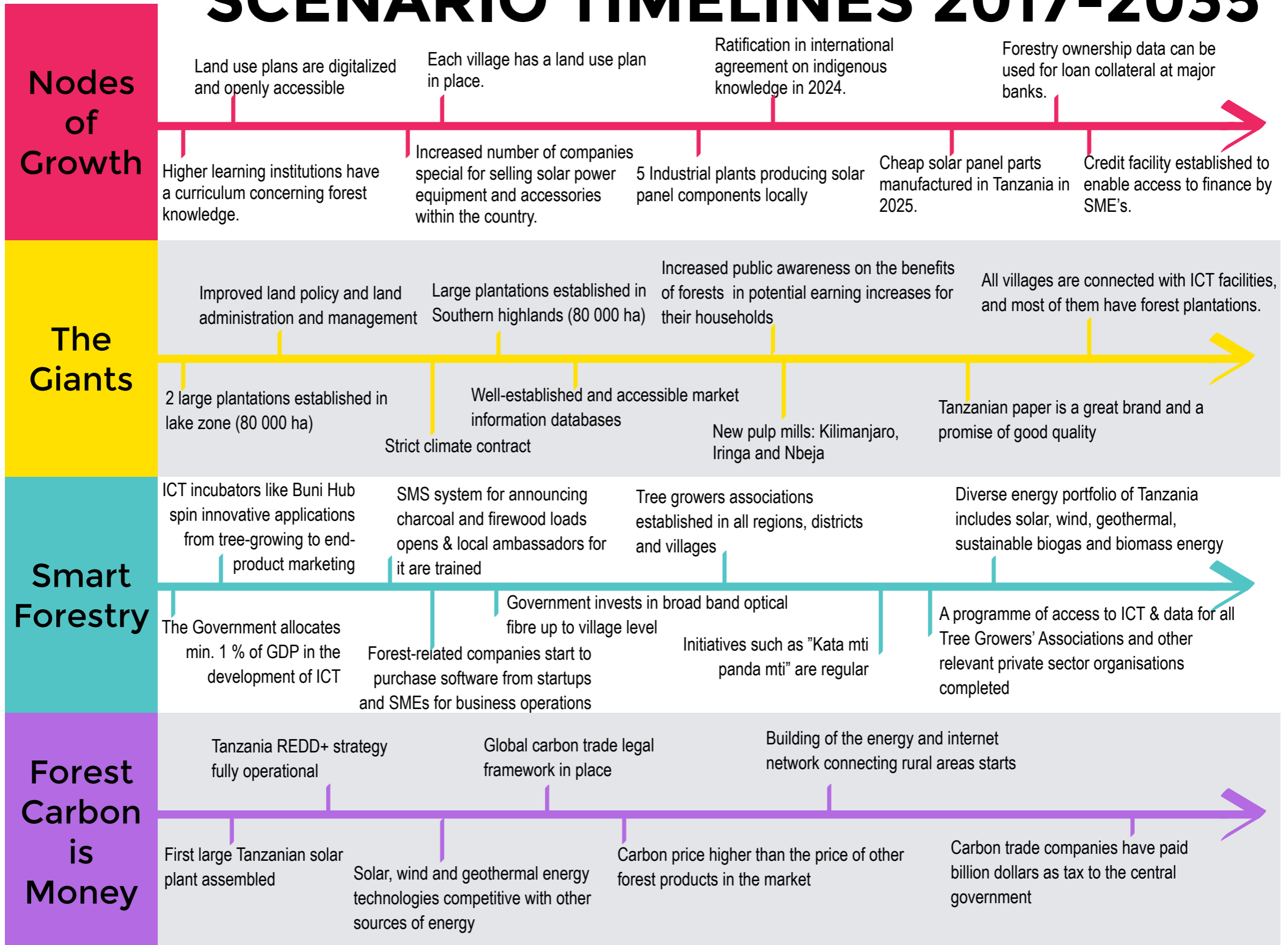
The aim for the scenario workshop using backcasting with various co-creation tasks was to create scenario timelines, that is four different ways to reach the vision.

The summarizing stories of the rich material created by the teams in the two-day workshop are presented in the following pages. The scenarios named by the teams are "Nodes of Growth", "The Giants", "The Smart Forestry" and "Forest Carbon is Money", each telling a coherent and plausible story of future developments between the years 2017 and 2035 but having different solutions to the key questions.

SUMMARY OF THE SCENARIOS

	How forests are a profitable resource?	What reduces firewood and charcoal use	Education	Land ownership	Energy portfolio	ICT
Nodes of Growth	High added value in various industries, including especially woodwork	Introduction of decentralized solar and solar energy repair services. Solar panels are easily available for every household and small company.	Educational institutes giving training on local knowledge are strengthened considerably. Also, the government's role in forestry is focused on educating and training different people in the woodworks value chain.	Private ownership of forests is increased. This is done by promoting the making and implementing of land use plans.	Energy is mostly made by solar panels that are easily available for every household and small company.	In 2017, an open data management system is used to gather data on forests, land use in villages etc., and this data of ownership can be used as collateral for the credit institutions by 2025, so SME's can get loans. And by 2035, the training received by craftsmen enables them to use ICT solutions also for their craft.
The Giants	Large pulp and paper mill industry that uses large plantations sustainably to cause carbon surplus.	Natural gas in cooking and as the main source of centralized energy production, with significant increase in electric lines.	Education focuses especially on use of machinery. This means using machines to harvest trees, process them properly and also use of pulp mill factories.	Plantations are mostly owned by local communities who make deals with large corporations. Pulp mill factories are partly owned by government that funded them in the beginning and partly by local investors.	Energy sector is an important player in this scenario: the use of natural gas despite the carbon limitations is a tough nut to crack, and in this scenario it is done successfully with the help of micro-use and expanding the grid.	The role of the ICT focuses on how large pulp companies are able to use it to anticipate demand and supply, and also to efficiently market their products globally.
Smart Forestry	ICT & data driven supersmart, and thus very efficient and profitable, value chain from forest to end-user especially in forestry, construction, timber and energy industries.	Centralized renewables including solar, wind, geothermal and industry byproduct bio gas and bio mass. Sensor monitoring in forests to curb illegal logging.	Education focuses especially on ICT, data management and open data systems and utilisation.	The state has sold land to private people and communities for plantations. They are managed by tree-growers' associations obliged to take into consideration the interests of the local community in question. The government supports them with know-how and education. Natural forests are owned by the state and managed partly through public-private partnerships.	Energy is produced with centralized sustainable renewables including solar, wind and geothermal energy as well as sustainable biogas and biomass, which are by-products of forest related industries.	The role of the ICT and open data is central across value chain from forest management and conservation to sales and marketing. E.g. inventory of forest growth is enabled by sensors in trees and incubation hubs continuously develop new applications for business to be used by communities and SMEs.
Forest Carbon is Money	Forest is used as a carbon trade resource.	Development of the centralised energy grid relying on solar is a key factor in supplementing firewood and charcoal use. Companies monitor illegal cutting.	Education focuses especially on the use of ICT and data management as well as forest conservation and protection. The management is done with the help of ICT, which makes it essential that even the Forest Protection Officers use ICT tools to collect data.	Plantations are mostly owned by government and operated by large companies. Government kept the ownership of the land and distributed it to some individuals and communities especially in rural areas, whereas large companies only have the right to manage the forests.	Development of the centralised energy grid relying on solar was a key factor in this scenario. The technological advancement hurried the change from firewood and charcoal use to alternative energy sources.	ICT is used as a tool to manage and operate the forest carbon trade. It serves an important purpose in collecting data and gathering information.

SCENARIO TIMELINES 2017-2035



Some of the events which build up to the major change of the use of forests in sustainable and profitable way in Tanzania.

POLICY RECOMMENDATIONS BASED ON THE SCENARIOS

Education

Human resource development. The Ministry of Natural Resources and Tourism should ensure adequate and competent personnel along the value chain of forestry products.

Provision of skills. The Ministry of Natural Resources and Tourism should promote forestry knowledge to SME's and rural individuals by increasing the number of institutions and programmes offering forestry knowledge.

Education in renewable energies. Revise curricula for all educational levels (focus on first level) on renewable energies in order to build awareness and skills.

” After the whole exercise I realized that the purpose is not to read from one scenario, but to incorporate learning from all to one.”
- Bagamoyo Counting Backwards workshop participant

Energy portfolio

Investment in solar panel manufacturing. Enabling investment in solar panel manufacturing with a special focus on panel parts for repair.

Incentives for solar equipment. Create incentives and financing mechanisms for communities for use of solar equipment.

ICT

Centralized database. There is no centralized database where forestry and forestry products information can be accessed. The research and training institutions own a wide range of information that is not being used by entrepreneurs and other stakeholders in improving productivity of the sector. The government should create a forestry information center for this information.

Last mile connectivity. Currently, there are very few institutions, industries and individuals in the community who are connected to the National ICT broadband. The government should subsidize the last mile connectivity cost and remove any related taxes to ICT equipment and material.

Ambassadors for data management. Recruit and train ambassadors, who are responsible on the *regional level* on gathering data and training relevant stakeholders on supplying and using forestry data.

Forestry incubator. Establish a forestry incubator, which will be integrated with ICT facility in order to ensure building of forestry data systems and its applications.

Other

Monitoring mechanisms for demand of pulp and paper. Establish a monitoring mechanism for the demand of pulp and paper, because the global demand for paper might drop significantly because of digitalization.

Ensuring private ownership of land. Pushing and implementing legislation on privatizing and establishing private ownership of lands.

Identify indicators on the realization of different scenario alternatives. Build indicators that can be monitored in order to understand, whether some aspects of the scenarios will realize. This will help in reacting to possible futures.

NODES OF GROWTH

LOCAL DESIGN DRIVES A THRIVING EXPORT SECTOR

In Nodes of Growth, a vibrant and broad group of SME's are responsible for developing various woodworks and design-based products for export. This export industry preserves and builds on Tanzanian local knowledge and craftsmanship, and brings foreign currency into the economy developing the general wellbeing of the society.

In order to achieve a booming woodworks sector, a strong educational system with a focus on forest knowledge is built: education guarantees appreciation for the traditional skills, but makes it possible to build on these crafts and not only preserve them. As production is decentralized and numerous small companies are involved, a decentralized energy infrastructure based on cheap solar panels and batteries is key. A decentralized and open ICT system helps in monitoring the forest resources, and ultimately helps in obtaining credit for SME's.

Natural forests are used as the material for woodworks. This is required, because globally a strict climate contract using market mechanisms is in place: products made out of the forest must have a high added value to be financially sustainable. In effect, plantations are commonly used as carbon throats.

NODES OF GROWTH – HOW DID IT ALL HAPPEN?

- Open forestry data system was built to use forest ownership as loan collateral – this eased loaning for SME's
- Higher education institutions focus on local knowledge were built in order to develop the woodworks sector.
- Cheap solar energy was made available to individuals communities and SME's through legislation and investments.
- Private ownership of lands is the backbone of Nodes of Growth – it enables them to be used as loan collateral.

THE MAIN GATEKEEPERS IN THE SCENARIO

Higher education institutions, FBD, solar energy companies, SME's in woodworks, private individuals in the craft.



NODES OF GROWTH IN DETAIL

In Nodes of Growth, a vibrant and broad group of SME's are responsible for developing various woodworks and design-based products for export. This export industry preserves and builds on Tanzanian local knowledge and craftsmanship, and brings foreign currency into the economy developing the general wellbeing of the society.

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Natural forests are used, sustainably, as the material for woodworks. This is required, because globally a strict climate contract using market mechanisms is in place: products made out of the forest must have a high added value to be financially sustainable. In effect, plantations are commonly used as carbon throats.

The Nodes of Growth scenario relies on the established private ownership of forests. Land use plans are established and guarantee a solid long-term right for forests, enabling long-term planning of natural forest use.

After land-use plans have been digitalized and made openly accessible, it is possible to build an open access forest data management system. When this is in place, the forestry land use rights can be used as credit collateral. This credit fuels the development of the SME sector: new types of actors matching wood carvers with larger markets are established.

In addition, long-term investment in the training and education of local knowledge forms the building blocks for developing the woodworks and design sectors. Although education investments have a long return rate of investment, it pays off to build the general understanding of the possibilities of locally-based woodworks and design.

To make the widespread development of the sector possible, cheap solar panels and batteries are made available throughout Tanzania. This is done by investing in Tanzanian production of panel parts and maintenance. The panels make possible to form small companies throughout the country, and villages can participate in the growing sector and its employment.

In 2035, the possibilities of woodworks are large. A possibility is that local carvers in villages can carve their designs, but the designs can be scanned and sent through 3D-printers to the companies exporting them. This enables scaling benefits beyond the traditional manual labour. In this scenario, the local woodcarvers/designers are the superstars and their work is enabled by growing SME's.

LIFE IN THE NODES OF GROWTH IN 2035

Responsibilities of an authority

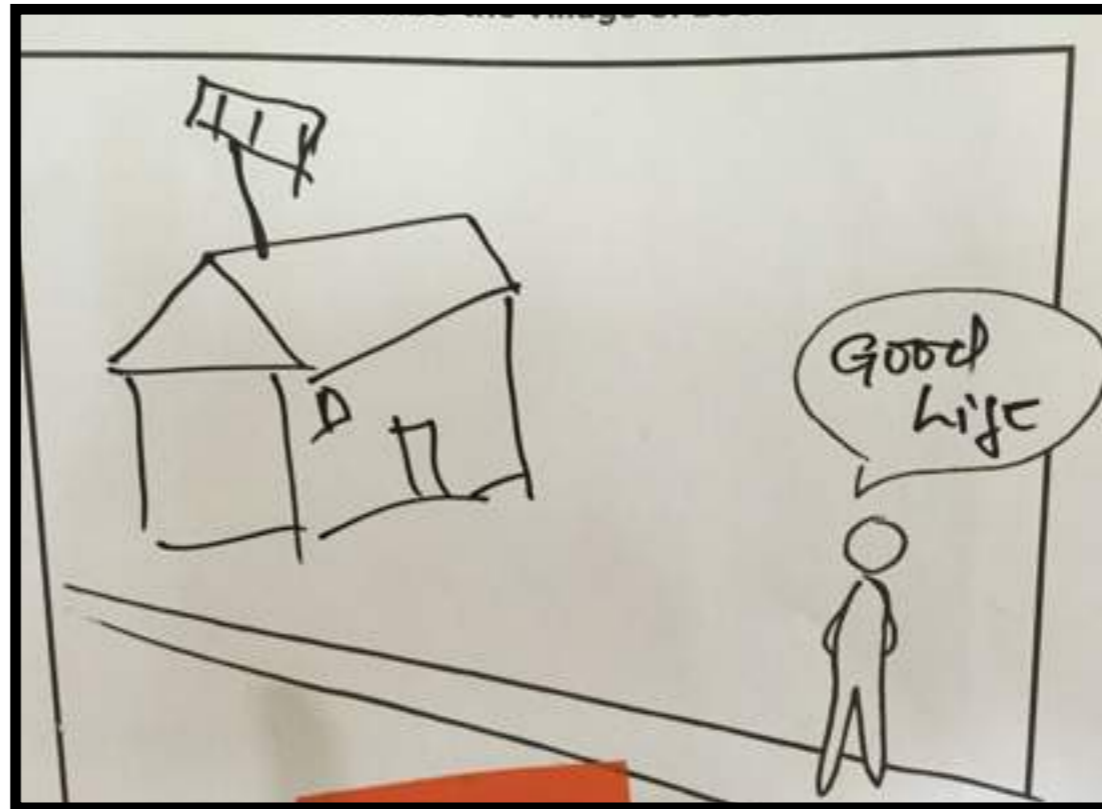
In 2035, the public officials are not anymore major actors directly with forestry related issues, but their efforts are geared towards **empowering and training the main actors of the sector**: SME's, communities, and private individuals.

As long-term education and awareness building have bared fruit, the officials concerned with conserving natural forests **work as partners with local communities**, who use modest and sustainable amounts of natural forests in order to build their woodworks businesses.

Complementing their woodworking, **they assist the authorities in monitoring forest use** and combatting illegal harvesters.

The training of public officials is broad and especially focused on sustainable forestry and the possibilities in design and woodcarving related activities. In addition, the government is a key actor in maintaining the **forestry data system**, but not the sole owner of the system.

The authorities are **the main partner of the thriving and sustainable sector**, leading to a positive cycle of trust and profit, both for local communities, SME's and the government.



A drawing from the workshop, illustrating village life

The Village of 2035

The lifestyle in the village has improved significantly after cheap solar panels have been bought by every household. This has reduced the need for charcoal to a minimum.

The reduced charcoal usage has made more wood material available in the village, and new business opportunities have arisen in the village. A woodworks exporting company was founded by a person graduated from a Local Knowledge Programme from the nearby college, it provides employment for 200 carvers and support in the design of the products. The company is reliant on access to the forest data to control the demand of their product.

THE NODES OF GROWTH 2025

A REVIEW OF POLITICAL, ECONOMIC, SOCIAL, TECHNOLOGICAL AND CULTURAL EVENTS, WHICH HAVE HAPPENED BY THE YEAR 2025 IN THE SCENARIO

Political

Importation tax for solar equipment and batteries is removed in 2022. By 2025, global carbon trade frameworks drive the development of the whole sector.

Ratification in international agreement on indigenous knowledge in 2024

Social

Higher learning institutions have a curriculum concerning forest knowledge.

Training to local and private tree growers is strengthened.

Economic

Management and harvesting plans are in place and strengthened for natural forests nation wide.

Each village has a land use plan in place.

Technological

Cheap solar panel parts manufactured in Tanzania in 2025

Credit facility established to enable access to finance by SME's

THE NODES OF GROWTH 2017

Megatrends

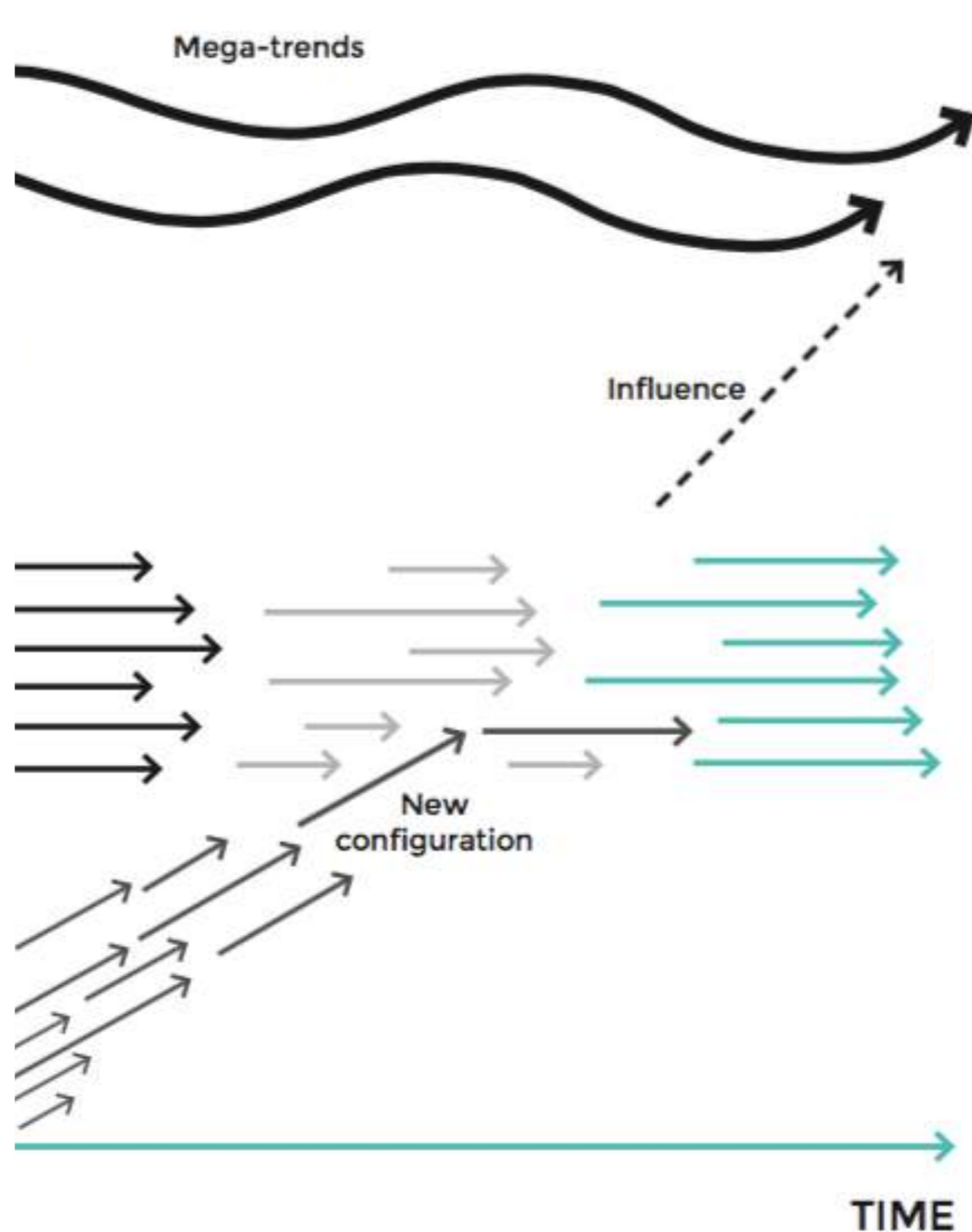
- Appropriate strategies and technologies designed and implemented for local energy demand
- Land use plans are digitalized and openly accessible
- Solar production technologies reduced and available
- Sustainable rural energy for all
- New breeding technologies enable production of select species in two years

Regime

- Land use plan+titles facilitate loan/access to credit
- 5 Industrial plants producing solar panel components locally
- Growth in private sector owned natural forests
- Reliable access to solar energy technologies
- Several management plans beset by FBD
- Plant genetic resource institution in place to regulate breeder rights
- Increased number of companies special for selling solar power equipment and accessories within the country.

Niche

- Ten institutions on managing and harvesting plans established in the country
- Effective law enforcement at all levels necessary for for implementation of strategies
- Forest training curriculum designed to integrate participatory forest management
- Innovations in solar technology from Tanzania.



THE GIANTS

HUGE PULP AND PAPER COMPANIES SELLING WORLD FAMOUS TANZANIAN PAPER IN GLOBAL MARKETS

As the result of forward thinking moves early on, Tanzania was able to significantly benefit from a strict global carbon deal and still use its native natural gas resources to create a successful pulp and paper industry. The leaders of the industry were smart enough to provide prosperity and fortune to all Tanzanian, from a city dweller to village peasant, with a win-win deal of protecting natural forests for carbon credit, establishing over-sized plantations early on to be able to use natural gas for energy despite the carbon limitations, and then selling the trees from the plantations in a sustainable way later on.

THE GIANTS - HOW DID IT ALL HAPPEN?

- Oversized profits from one export sector - pulp and paper - using open demand data and smart marketing enable using foreign funds for improving life quality in Tanzania
- Surprising collaboration between pulp and paper and tourism industry to protect large natural areas for carbon credit and tourism income
- Using natural gas economy as a leverage to supplement charcoal use by offering natural gas stoves to areas lacking the grid.

THE MAIN GATEKEEPERS IN THE SCENARIO

ICT specialists, local investors, village communities and small plantations, natural gas specialists



THE GIANTS IN DETAIL

Most important private beneficator of the forest will be **Large Companies**, fulfilling demand **outside Tanzania**, with education and dissemination focusing on **use of machinery**; **Natural gas and oil** as energy source and role of natural forest will be environmental conservation and tourism. Key industrial sector using forest resources will be **Pulp and Paper**, data management paradigm shall be **centralized and open data** and **strict climate contract forbidding many CO2 related activities** will be used as global; climate contract.

The Giants mean the three pulp and paper companies that form between the years 2015 and 2035 and are a big reason for prosperous Tanzania in 2035. They are the key players in making the Tanzanian green gold – the forests – a profitable and sustainable resource. Launching with public-private partnership and funded by ministries of finance and industry, the three companies start with one factory each in Kilimanjaro, Iringa and Nbeja around 2020.



A drawing from the worksop: global exports

At the same time, two major 80 000 ha plantations are established in Southern highlands and lake zone. They will later play a very important role in carbon offsetting and material for industry. During their first years, they mostly provide toilet paper and printer paper for East Africa and Southern Africa. Later the companies are able to provide the cheapest quality papers all over the world and Tanzanian paper is a great brand and a promise of good quality.

During the last years of this decade, Tanzania smartly prepares for natural gas based economy. Individual families living outside the grid are encouraged to purchase natural gas based stoves and a new natural gas power plant is planned, even though the native natural gas drilling has not started yet. This makes it possible later to offer good incentives for people to supplement charcoal use, which then helps the pulp mill industry to operate in strict carbon conditions.

ICT plays a major role in the scenario. In the early years of the scenario development, it is used mostly for marketing. Centralized marketing systems are built by all the Tanzanian companies. Later, open and data is used by the companies to anticipate global demand and adjust their production accordingly, enabling supersized profits.

Because the pulp mill companies want information about the tree supply, they demand the government and help themselves to improve electrical lines, roads and internet connections to many villages. By 2035, all villages are connected with ICT facilities, and most of them have forest plantations.

The villagers benefit from the big companies, because they can form rooftop organizations – tree associations - to negotiate good deals with the pulp mills for their forest plantation resources.

LIFE IN THE GIANTS IN 2035

Dar Es Salaam 2035

Because the large export sector of quality paper for sanitary and business use, Tanzania has a lot of foreign currency that can be spend on imports. This significantly raises the living standards in cities. For example, traffic system is completely redesigned to fit the growing needs of the urbanists, consisting of flyover bridges and speed lanes. There are natural gas based express trains that form the backbone of the modern public transportation system. Around 2030, the second international airport is opened, where mostly the planes from Asia and America will land. Internet is accessible everywhere and it is fast that it feels like it works instantly. The headquarters of the three largest pulp and paper companies are famous skyscrapers, recognizable landmarks that Dar Es Salaam is known for.

Village 2035

A milestone is reached in 2035, when the last house in the last village in the countryside is electrified. For an almost a decade, people had been using natural gas in stoves if they had now centralized electricity grid available, and charcoal is reserved only for luxury cooking to make a distinct taste. Schools and dispensaries are all connected to electricity and water systems. Village are connected via express train system that facilitater smooth transportation to towns and other regions.

Employment is on the rise as the better infrastructure needs builders. Electricity and internet enables working in the global e-market and new roads and railways make it possible to travel further for good work.

Responsibilities of employees

An employee who is a supervisor in a pulp and paper industry in 2035 is responsible for:

- overseeing quality in production
- marketing of products and export
- overseeing environmental conservation issues

An employee who is responsible for managing the data for the pulp and paper industry

- accessing and entering open data for pulp and paper industry focusing on level of production and available resources.
- Using a centralized company system

An employee of a plant

- making decisions based on big data and constantly updated information
- managing the plant with a special focus on risks, opportunities, and assurances for the product
- the main task he does using the open data is looking for global opportunities and challenges.

The responsibilities of an authority

Creates policies, laws and strategies

Regulates policies and laws

Evaluates and monitors forests

Institutes and collects taxes

Takes care of forest resources so that no over consumption happens

Regulates working conditions

Takes care of fair competition

Regulates trade

Assess the environmental impact

Develops tourism destinations

THE GIANTS 2025

A REVIEW OF POLITICAL, ECONOMIC, SOCIAL, TECHNOLOGICAL AND CULTURAL EVENTS, WHICH HAVE HAPPENED BY THE YEAR 2025 IN THE SCENARIO

Political

Enabling environment for the private sector forest development.

Available land granted for the sector

By 2025, the anti corruption act has been heavily strengthened and enforced by reviewing institutional frameworks.

Use of national ICT backbone is widespread.

Increased information sharing for the public via open government data has significantly increased transparency.

Social

Better sanitation in terms of health, education, water

Increased public awareness on the benefits of forests in potential earning increases for their households

Public awareness of environmental issues increases

Better service delivery

Economic

Infrastructure development

Private sector developed

Stable economy with the use of inflowing foreign currencies

Policies and legal environment in forest sector has been reviewed

Institutional frameworks to address challenges and maximize potential opportunities

Good environment for investors in pulp and paper industry, also because of good work done in carbon offsetting in Tanzania.

Environmental impact assessment has been carried out.

Awareness of environmental conservation has increased

There is a lot of green economy activities

A program on climate adaptation has been implemented

There is some trade with carbon credits

Environmental protection projects have been widely adopted in collaboration of pulp mill industry to increase carbon credits and tourism industry to increase tourism revenues.

Supportive banking regimes to private sector have been developed

There exists a well developed railway line to transport timber.

Natural forests in the Giants scenario by 2035?

We anticipate that forests of 2035 will have better conditions with wildlife finding it a conclusive habitat for them. Forest-based raw materials will find their way to pulp and paper industry that will process products for export. Rain pattern is also expected to change since we have more forests in place. Well-managed forests will definitely produce high quality products.

Technological

Use of modern and efficient technology in pulp and paper production begins

Use of gas and oil as a resource of energy significant

Use of ICT in production, distribution and marketing is common.

Cultural

A society that values forests and improved attitude towards plants and trees.

Train in use that uses natural gas.

Entrepreneurship in forest sector

THE GIANTS 2017

Megatrends

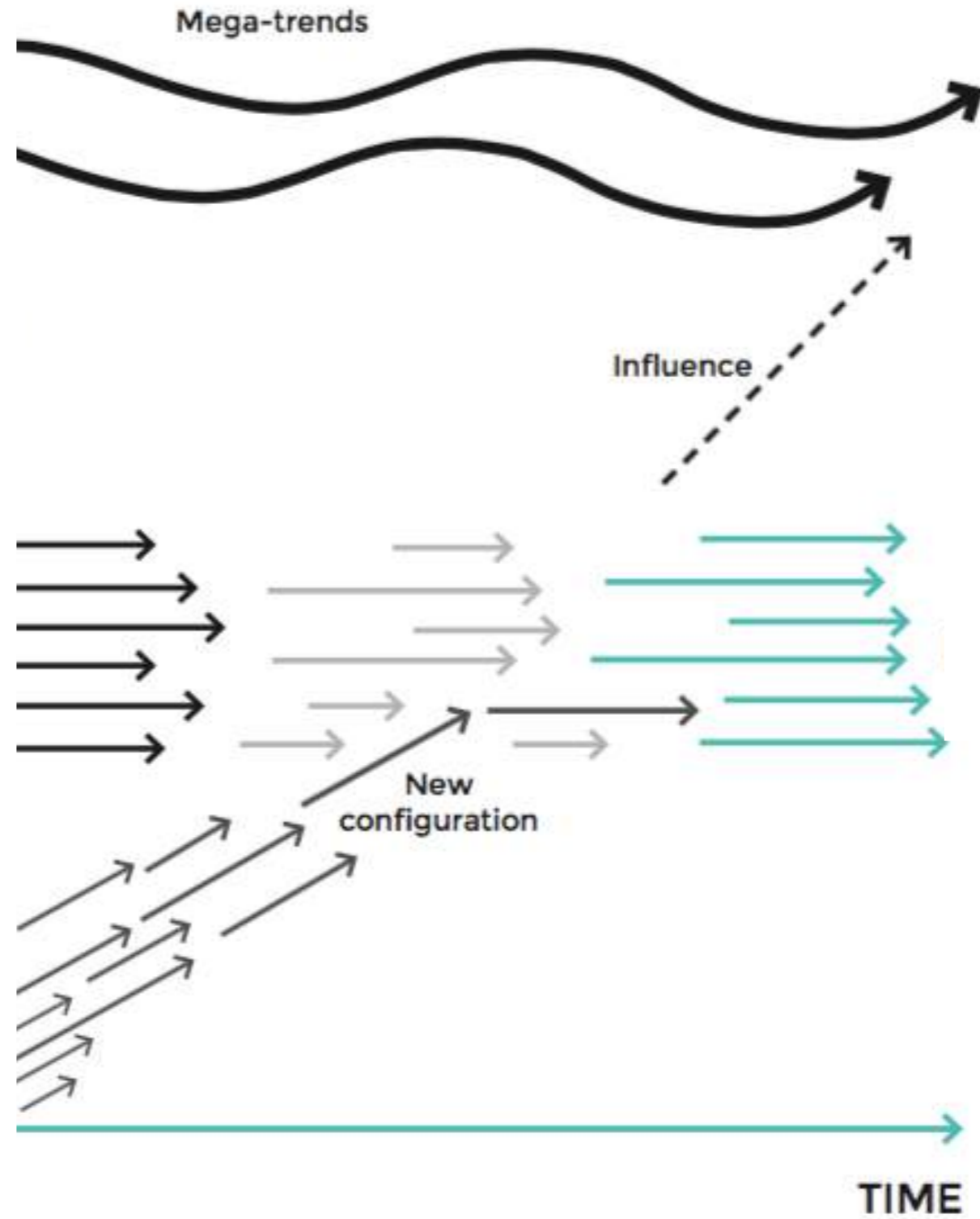
- Increased incorporation of business establishments
- Tanzanians are aware and able to use the national ICT backbone effectively
- Stable, reliable and cost effective power supply
- Well-established international markets for pulp and paper
- Sufficient supply of raw materials for the pulp and paper industry

Regime

- Streamlined business incorporation and licensing
- Improved land policy and land administration and management
- Establishing large private forests plantation
- Well-established and accessible market information databases
- Increase power generation from natural gas
- National ICT backbone connected to all districts; well-maintained and managed

Niche

- New pulp mills: Kilimanjaro, Iringa and Nbeja
- Large plantations established in Southern highlands (80 000 ha)
- 2 large plantations established in lake zone (80 000 ha)
- One big market point in each East African country supply pulp & papers in the region: Ministry of Industries and Trade
- Adoption of energy-efficient power generation technologies e.g. combine cycle gas power plant.
- Importing gas engines from countries that are moving towards electric engines.
- All villages each district are connected to national ICT backbone.



FOREST CARBON IS MONEY

LARGE TANZANIAN COMPANIES DIRECTING THE DEVELOPMENT OF THE NATION BY SELLING FOREST CARBON AT THE GLOBAL CARBON MARKETS

With climate change posing a challenge to the global society, strict climate contract forbidding many carbon related activities was made. Tanzania has been able to prepare for this development, ready to reap the benefits of global carbon trade by allowing large companies to manage, protect and sell the vast amounts of carbon stocks to buyers around the world. In collaboration with the government, large companies formed in the late 2010's, use the carbon trade profits to build centralised alternative energy grid that fastened the transition out of charcoal and firewood use. This in turn helped to spread welfare to the individuals and communities, which then had the possibility to start to create more profits by selling their carbon stock with the help of larger players operating on global carbon markets

FOREST CARBON IS MONEY- HOW DID IT ALL HAPPEN?

- Strict and enforced climate contract creating markets for carbon trade
- Deforestation was realised to be a big problem that the government decided to combat by giving the management of the land to large, newly formed private companies
- Technological development in alternative energy sector - especially solar energy technologies - allowed the transition from charcoal and firewood use to centralised energy grid

THE MAIN GATEKEEPERS IN THE SCENARIO

Carbon trade regulators, Forest Protection officers, Data management specialists, ICT operators, Ministry of Forestry



FOREST CARBON IS MONEY IN DETAIL

Most important private beneficator of the forest will be **Large Companies**, filling the demand posed on the companies in **Tanzania**. Education focus is on **ICT and data management** to be able to manage the forests efficiently and trade in the global carbon markets. Energy source is mainly provided by **centralised solar energy plants**, with smaller **wind and geothermal** plants supporting the energy grid. Natural forest are seen as a place for tourism and conservation of them is important. Key industrial sector using forest resources will be **Carbon Trade**, data management paradigm is **centralized and closed** with the large companies holding the data. **Strict climate contract forbidding many CO2 related activities** will be used as global climate contract.

Forest Carbon is Money pictures the development around the world that transforms the global market around carbon. Tanzania is able to benefit from this change by being the frontrunner of the development and realising its potential early on. Legal carbon trade framework put in place in 2022 is the key point of development of the successfulness of Tanzanian carbon trade sector. In the years leading to 2020, the government was forced to act on growing deforestation problem by allowing large companies to manage the forest resources. These companies realised the potential of future carbon trade by applying REDD+ programs around the country despite it's future being questioned around the global markets. Realisation of planting trees and generating new industrial sector being beneficial either way, the risk seemed quite small and by 2020, Tanzanian REDD+ programs very fully operational. The development early on proved to be a smart move, as in 2022 global carbon trade framework was put in place and by 2023 the price of selling carbon was higher than other forestry products.

The development of moving away from charcoal was supported by development in the energy sector, where centralised energy grid was built focusing on solar energy. By 2020, solar technologies started being competitive against all other energy sources. The first Tanzanian large solar plant was already established in 2017, which was a clear weak signal of the change coming.

After 2025, the collaboration of large companies and the government started to increase, when the development was taken into all areas of the country. Centralised energy network and internet connections around the country were the main focus in the coming years, and allowed the carbon trade money to flow even to the most remote areas and villages. Network of 1025 larger villages was created to serve other smaller communities in their needs for electricity, internet and other ICT tools. ICT in general has a major role in the management and protection of the forests in this scenario being the tools which control and regulate the carbon trade market.

In 2033, it was announced that the large carbon trade companies had paid in total billion dollars as taxes for the government - a proof that the market really had transformed the country and spread welfare everywhere.

LIFE IN FOREST CARBON IS MONEY 2035

TANZANIAN VILLAGE 2035

The carbon trade money also flows into the villages from the large companies wanting to expand their possibilities. The collaboration between the companies and government has led to spreading the centralised energy network even to remote villages in the countryside and with this network, also internet and ICT use are becoming a norm around the country. Villages combine carbon trading with agriculture and with the new, efficient solar vehicles, their agricultural products can reach the larger markets in the cities with low-cost and ease. The villages near natural parks and forests also derive extra income from ecotourism services. In general, life standard is much improved from the early 2000's, because of the carbon trade, which resulted in especially fast development between 2025 and 2035. In the countryside, around the country 1025 villages serve as the key points for other communities in providing electricity and other services for them.

Dar Es Salaam IN 2035

Dar Es Salaam in 2035 will have a high population, just like the trends of urbanisation predict. The needs of the urban population are filled with the use of centralised electric network using mainly solar, wind and geothermal energy. Solar cars and buses are main form of transportation, with walking and the use of bikes also dominant. There is no development in train network because of the prevalent use of solar vehicles. Recycling of liquid and solid waste is common and what can't be recycled in the city is transported to treatment facilities far away to lessen the pollution in the city. Buildings are built using non-timber materials.

NATURAL FORESTS 2035

The natural forests in 2035 are well-stocked, with high biodiversity. No deforestation happens because of the well enforced and regulated carbon trade. Thus, natural forests are left for ecotourism and conservation in support with the carbon trade. Natural forests are understood to play a key role in the environment and for example regular weather patterns, thus creating more incentive to protect and conserve them. On the other hand, carbon trade plantations are monocultural in some areas, where the large companies use species that grow fast to tie as much carbon as they can as fast as possible.



Solar-powered cars in Dar Es Salaam drive past the efficient recycling plants.

FOREST CARBON IS MONEY 2025

A REVIEW OF POLITICAL, ECONOMIC, SOCIAL, TECHNOLOGICAL AND CULTURAL EVENTS, WHICH HAVE HAPPENED BY THE YEAR 2025 IN THE SCENARIO

Political

The key driver for the development has been global carbon trade legal framework in place

By 2025, global carbon trade frameworks drive the development of the whole sector.

Social

About 40-50% of the population will live in urban areas

Curricula related to carbon trading and climate change in all levels of training and research institutes

Understanding of the importance of education and creating possibilities for needed education.

Public awareness of environmental issues.

Economic

Tanzania REDD+ strategy fully operational

Households less dependent on forest resources because of the development of alternative energy sources

Carbon price in the world market will be higher than other forestry products

Global carbon trade legal framework in place

Competition between large companies about the carbon stock rights drive faster development.

Technological

Technologies of solar, wind and geothermal are improved

High technology tools used in the management and carbon trade

Information carbon trade and forests easily accessible for companies

Use of ICT in protection of forests, management and trading of carbon.

Environmental

Climate change mitigation and adaption measures are in place

Improved state of natural forests with the help of ICT management systems

The government has set aside land for carbon trading

Global contracts drive the development of environmental legislation.

Cultural

Communities aware of carbon market and value

Cultural and historical knowledge of the value of forests are widespread and fully understood.

Entrepreneurship in forest sector in collaboration with large companies.

FOREST CARBON IS MONEY YEAR 2017

Megatrends

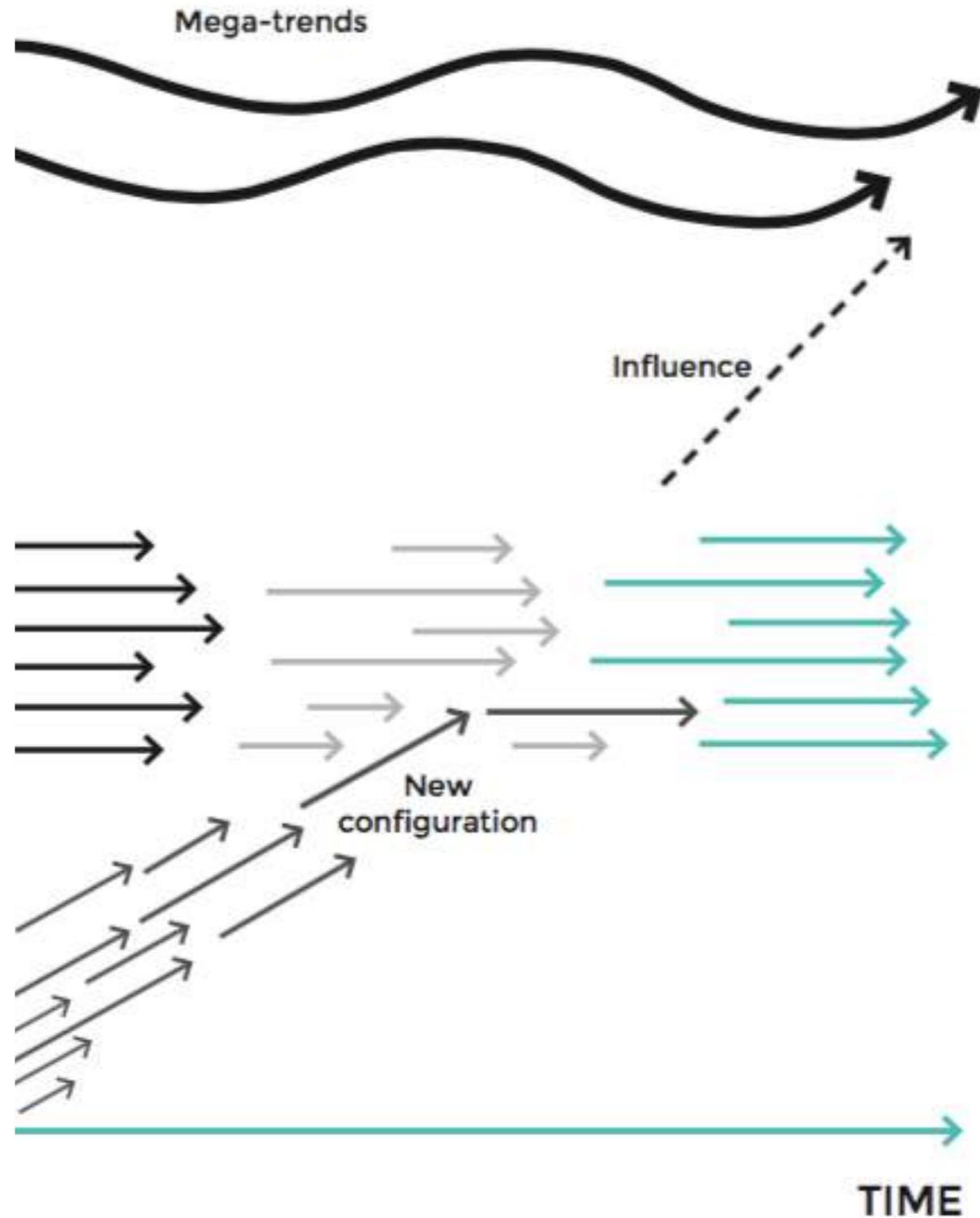
- Technology on the use of renewable energy easily accessed
- Monoculture forests are well maintained
- Increased market for forest products (carbon)
- Capacity of management of natural resources
- Climate change contact provides incentives for development in the energy and forest sectors

Regime

- Reduced taxation on clean industries and solar
- Supply of data for the companies
- Loan facilities to companies investing in carbon trade in place
- New incentives for planting and protecting trees with the new contracts
- Enforcement of policies and laws stricting the entry of wood products in cities
- Preparations of infrastructure development

Niche

- First large Tanzanian solar energy plant established
- Basic applications of ICT widespread and easily accessible almost everywhere
- Tax exemptions to companies investing in carbon trade introduced
- Large companies encouraged by government to invest in carbon trade
- Research and training institutes offering courses related to carbon trade established
- Protection of water catchment areas started by local authorities



THE SMART FORESTRY

ICT & OPEN DATA SAVVY COMMUNITIES AND SMES DRIVING SUPERSMART VALUE CHAINS FROM FORESTS TO END-USERS IN TANZANIA

Tanzania has been able to build smart value chain of forest-related industries from timber and construction to energy. This has been achieved by efforts and investments in building centralized open data collection systems and supporting applications of ICT in forest management at the community level, in SMEs' production, sales and marketing as well as in regional and local level government. The education focus has been on ICT and data management professional as well, supporting the overall development, This also enabled championing natural forest conservation and has led to almost no deforestation.



The picture of city of 2035 of the Smart Forestry scenario was drawn in the Backcasting Workshop in Bagamoyo.

THE SMART FORESTRY – HOW DID IT ALL HAPPEN?

- Investments and efforts to centralise data banks, building light systems for crowdsourcing of data and providing and promoting open access to data on all levels of government, private organisations, communities and individuals
- Focus of education on ICT and data management
- Active connections between ICT hubs and forest-related businesses and organisations to advance development of ICT solutions answering to real needs and their dissemination to businesses and communities
- Diversifying energy portfolio to include centralized solar, wind and geothermal energy as well as sustainable biogas and biomass energy produced as by-products of industries

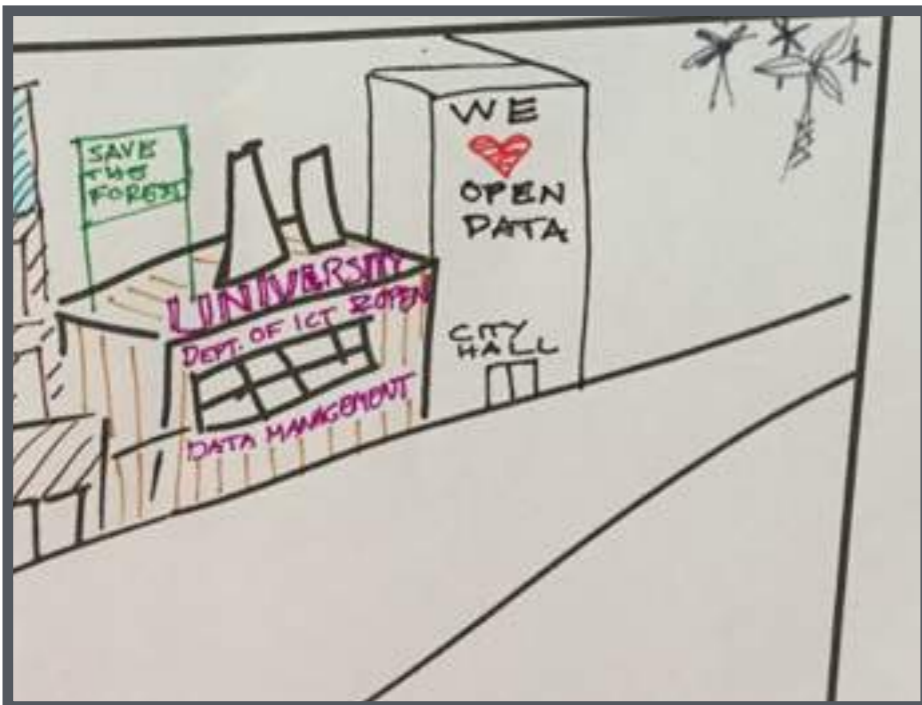
THE MAIN GATEKEEPERS IN THE SCENARIO

ICT & data specialists, ICT Hubs, villages and communities, grass-roots level open forest data ambassadors, Tree Growers' Associations and other forest-related organisations, SMEs, renewable energy solution providers & experts,

THE SMART FORESTRY IN DETAIL

Most important private beneficiaries of the forest are **small and medium sized enterprises, communities and individuals** fulfilling demand **inside Tanzania**. The key industrial sectors using forest as a resource are **construction, timber and energy sectors** driven by data management paradigm of centralized and open data. Education and dissemination focuses on **ICT and data management. Centralized solar, wind and geothermal energy with use of sustainable biogas and biomass**, produced as a by product of forest related industries, dominate as energy sources. Natural forests are reserved for **environmental conservation and eco-tourism**.

There is a **global climate contract, which uses market mechanism for supporting carbon capture**, thus providing possibility for forest related companies for additional revenue from carbon trade.



A Tanzanian city in 2035 in the Smart Forestry scenario. The picture was drawn in the Backcasting Workshop in Bagamoyo.

The core of The Smart Forestry is ICT & data-driven supersmart value chain from forest management and conservation to sales and marketing of forest-based products to end-users. For example inventory of forest growth and quality control is enabled by sensors in trees and SMEs use reserve and demand data to optimise production and develop and market new products. This has led to a very efficient and profitable value chain, especially in forestry, construction, timber and energy industries.

An important reason for this was that in the early years of the scenario, the government started to put strong effort in building centralized data reserves, which are open for use by anyone from individuals to companies. What is special in Tanzania's centralised data reserves, is that the collection is based to a large extent on crowdsourcing. Contributions by research institutes, forest-related companies, individual citizens and officials create accurate, up-to-date data banks on almost any information related to forests and forest products. Open data principle has led to high use-rate of the data and to many applications built on it. One of the early solutions launched in 2017 was a SMS-based announcing system for charcoal and firewood loads and thus mapping this largely unofficial trading. MNRT trained local ambassadors in villages to promote the SMS announcement.

Driven by the increasingly abundant data, incubation hubs, like Bunihub, became sources of new forest-related applications. The interaction between incubators, industries and authorities grew little by little, ensuring solutions, which answered real needs and were also disseminated to the field to be used by SMEs, communities, wood growers, environmental conservationists, forest guards, national and local authorities etc. This has led to real change in the fields – and real business for the developers.

Just a little later, in many universities of the country new departments of ICT, data management and open data were established. They offer quality programmes on different degree levels producing highly skilled professionals, who are able to work in many sectors.

Forest sector contribution to GDP has doubled since 2010's. Forest & timber industry has a good linkage to the expanding construction sector due to good ICT usage in both sector and increased quality, thanks to widely shared best practices. Because the ICT & data based production lines and their agility, SMEs are able to deliver on-demand custom solutions on a short-notice, providing them competitive advantage in the market also outside Tanzania, even when the local market, rapidly expanding due to population growth and urbanisation, is their primary market. Increased carbon capture demand caused by the global climate contract in 2017, generated incentives for businesses to offer such. Hybrid business models are seen in forest-related industries, such as wood product trade combined with carbon trade, further strengthening the resilience of the industries.



A Tanzanian village in 2035 in the Smart Forestry scenario. The picture has been drawn in the Backcasting Workshop in Bagamoyo.

LIFE IN THE SMART FORESTRY 2035

TANZANIAN VILLAGE 2035

In 2035 Tanzania's villages differ greatly from the villages of 2015. They have grown due to population growth but are well planned and organized with good local amenities. The quality of life and satisfaction of people has increased highly. Energy supply is reliable and sustainable thanks to centralized solar, wind and geothermal energy production as well as sustainable biogas and biomass energy. Air in villages is clean as charcoal use has vanished, except during festive and free-time barbecues.

There is easy access to residential and industrial areas, as well as forestry areas surrounding the villages. This is due to improved road infrastructure but also due to smart public transport based. The people don't wait for buses on bus stops according to bus timetable, but on-demand buses ordered by smart phones calculate best routes for picking up customers and arrive at the door in a few minutes. Local public administration and service provision are based on reliable ICT and intelligent data use. Also local SMEs use ICT and open data in all parts of the production and value chain from wood growing and quality control to sales and marketing.

The results of innovative construction and timber sectors of Tanzania investing in product development are seen in Tanzanian villages: the quality buildings in villages are made of wood as well as the most valued furniture.

The wealth of people in the communities has increased thanks to income generated by community forestry and prolific SMEs in wood related industries, but also from carbon trade revenues.

ARUSHA IN 2035

By the 2035 utilization of electricity in the cities of Tanzania has increased significantly. The use of charcoal has been substituted by electricity and energy from solar, wind and geothermal, biogas and biomass energy production.

The skyline of the city has risen, with skyscrapers in many parts of the town. High-quality timber is used especially for the higher class buildings, as well as for furniture.

There is large mobilisation and usage of centralized data collection and open data by city dwellers, decision makers, planners, scientists, scholars and businesses.

There is good awareness of environmental conservation. Interest towards natural tourist attractions around some cities like Arusha has grown. At the same time, levels of pollution have increased because industrialisation. Due to pollution, emissions and following carbon capture demand, there is increasing need to establish more forests around the cities. Tree-planting campaign ads are a regular sight in the cities.

FORESTS 2035

In the forests of 2035 you see trees dotted with small sensors – both natural forests and plantations are managed with intensive use of ICT. This enables e.g. ICT-based inventories easy monitoring of growth and quality of wood, collection of harvesting data and control of illegal logging as well as poaching. Illegal logging and trading is almost non-existent. Transformation to use alternative sustainable renewable energy sources and planting of forest plantations have been keys to decreased deforestation.

Environmental conservation has become the norm in the last decade: it has reduced deforestation of natural forests, promoted forest cover, restored flora and fauna, contributed to water outflows and significantly supported development of ecotourism.

THE SMART FORESTRY 2025

A REVIEW OF POLITICAL, ECONOMIC, SOCIAL, TECHNOLOGICAL AND CULTURAL EVENTS, WHICH HAVE HAPPENED BY THE YEAR 2025 IN THE SCENARIO

Political

Political stability and harmony will continue to exist in Tanzania.

Issues of good governance and transparency are enhanced by applying ICT & Data management in all levels of government and private sector.

Social

A well educated society with high level of technology in their socio-economic activities.

Free education at all levels

Land ownership of plantation forests has shifted from state to private. Natural forests are government-owned.

Economic

Construction and energy sector increase in respect to population and economic wealth of the population.

National ICT based forest management and trade programme has been established

A programme for commercial distribution of good quality tree seedlings runs efficiently

Technological

Diverse energy portfolio of Tanzania includes solar, wind and geothermal, sustainable biogas and biomass energy.

Strong policy, legal and regulatory frameworks, which control energy mix and encourage use of renewable, sustainable sources of energy

Completion of gas and electricity infrastructures to allow for use of electricity and bio gas in domestic requirements, reducing use of charcoal and firewood

Strong ICT commission to promote ICT and open data development

Financial support to institutions and organisations related to data collection, processing and dissemination to pave a way for data use and its proper management

Establishment of a programme of access to ICT for all villages, districts and regions based Tree Growers' Associations

High penetration of smart phones, affordable due to TCRA policy change and import of cheap phones from China

Environmental

Environmental extension officers involvement in land use management plans

Sensor monitoring of trees to control tree growth and illegal logging

Cultural

Contributing to crowdsourcing of data is mainstream habit among citizens and organisations. This has been promoted by grass-roots level ambassadors.

Initiatives such as "Panda mti kata mti" and various annual demonstrations are regular

Communities and individuals are champions in advocating issues related to habit changes such as cutting of trees and control of using pollutant technologies in factories.

Tree-growing, forest management and forest-related professions are valued

THE SMART FORESTRY 2017

Megatrends

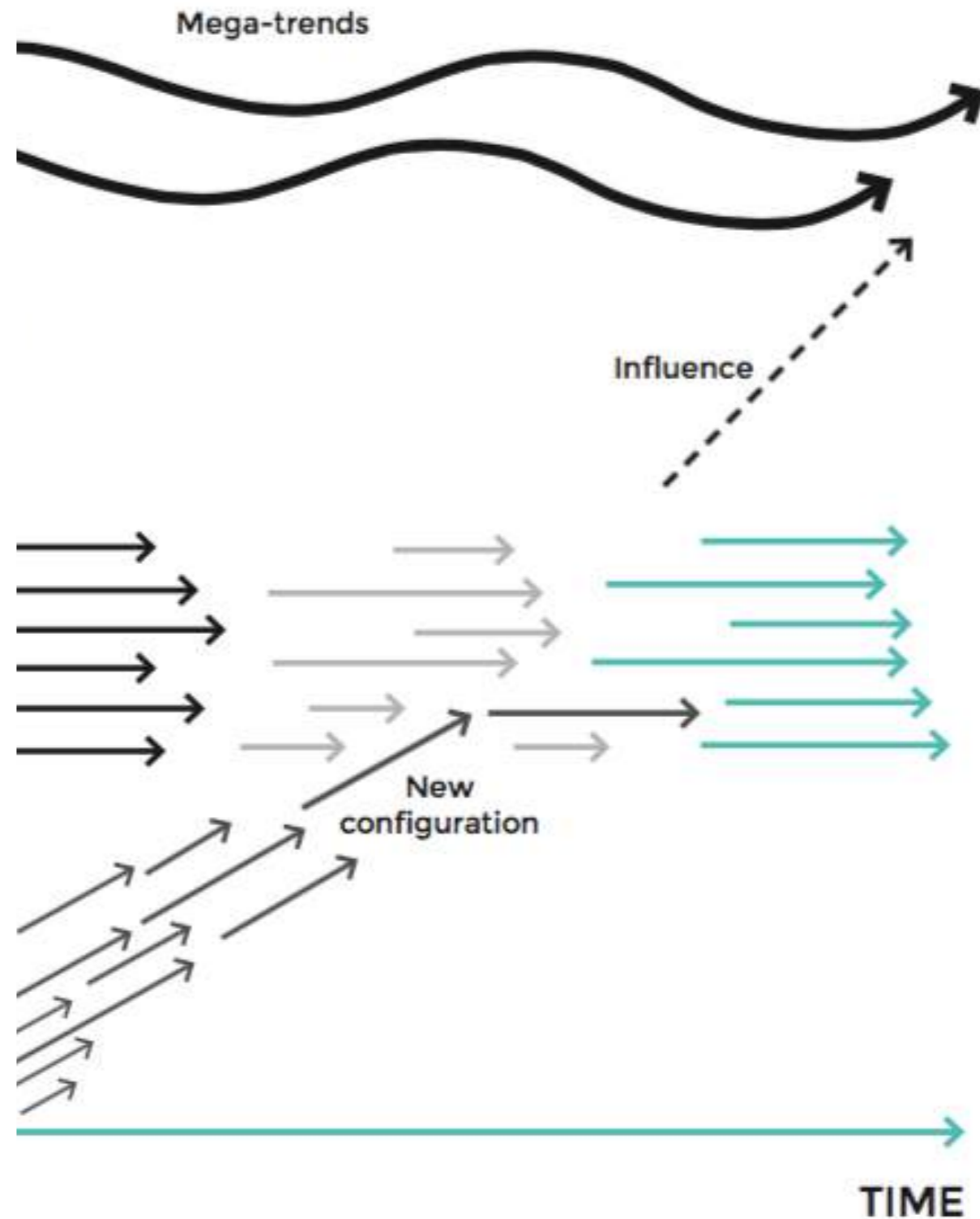
Tanzanian society is becoming technologically savvy
 Tanzania's economy is becoming a digitalized e-economy
 Rising environmental awareness

Regime

A good environment and policy for investment, enhanced by provision of centralised renewable energy, enables industrial growth
 The Government allocates min. 1 % of GDP in the development of ICT
 Government invests in broad band optical fibre up to village level
 Equal stakeholder participation replaces government officials predominance in forest sector policy, legal & regulatory processes
 Creativity and innovation are supported in education system and there is a new emphasize on ICT, data management, forestry and environmental conservation , as well as on entrepreneurship
 Tree growers associations established in all regions, districts and villages

Niche

MNRT in collaboration with COSTECH starts an SMS-based system for announcing charcoal & firewood loads and trains village-level ambassadors promoting its use in villages
 ICT incubators like Buni Hub become a source of innovative applications for forestry management, business applications and forms of data collection, management and utilization.
 First forest-related companies purchase afore mentioned software from startups and SMEs for business operations
 Nationwide entrepreneurship development programme for Tree Growers & Forest industry practitioners is established for mindset change
 Tanzania Forestry Research Institute (TAFORI) trains local people in Kilombero in the use of renewable energy (e.g. saw dust & husks) in brick curing.





An original scenario timeline on the wall in the Counting Backwards Workshop in Bagamoyo.

ANNEXES & REFERENCES

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DEMOS HELSINKI

conducted this project together with the key partners mentioned on this page and in collaboration with the participants and organizations on the process (participant list on the next page).

TANZANIA COMMISSION FOR SCIENCE AND TECHNOLOGY

TANZICT - INFORMATION SOCIETY, ICT, INNOVATION

TANZANIA PLANNING COMMISSION

ZANZIBAR PLANNING COMMISSION

The project was conducted as a bilateral collaboration project between

**MINISTRY OF COMMUNICATIONS, SCIENCE AND TECHNOLOGY OF TANZANIA (MCST), and
MINISTRY FOR FOREIGN AFFAIRS OF FINLAND.**

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List of organisations represented in the Delphi panel

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Airtel Tanzania Limited
ARU
Bunihub
Dar Teknohama Business Incbator (DTBi)
DTBi
Embassy of Finland, Dar Es Salaam
Foresight Research Centre Finland
Forest Conservation
Forestry Development Trust
Forestry Training Institute Olmotonyi
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Metsähallitus, Finland
Ministry of Natural Resources and Tourism
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Tanzania Botanical Research and Conservation Programme Limited
Tanzania Commission for Science and Technology (COSTECH)
Tanzania Forestry Research Institute
Tanzania Planning Commission
Tanzania Wildlife Research Institute
TCRA
University of Dar Es Salaam
University of Helsinki
University of York
Vodacom Tanzania Limited
VPO
World Bank / COSTECH / Uhurunet
Zanzibar Planning Commission

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