BIOHUBS for social impact

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FOOD NOT FUEL

Perceptions: Biofuels causing hunger?


We are all very concerned!

How do we know what are **better solutions**?

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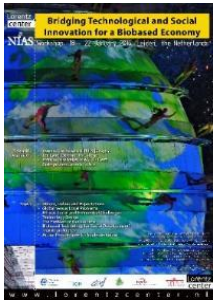
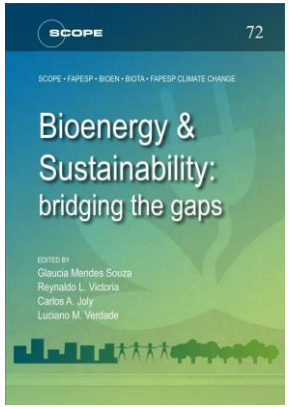
major assumptions

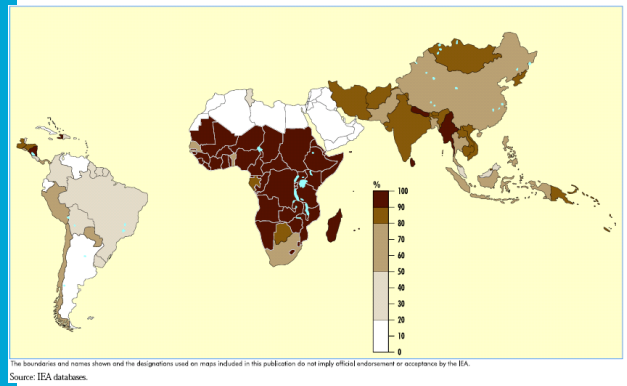




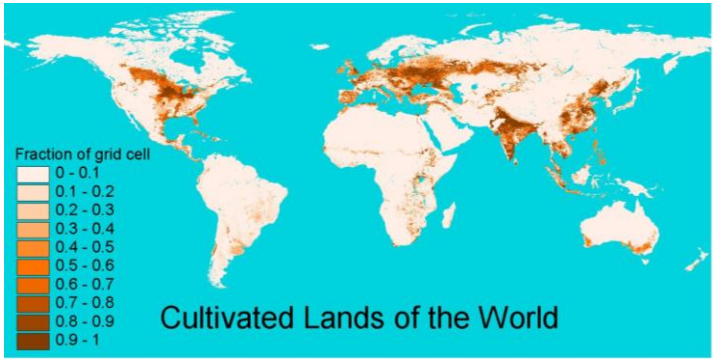
- There is not enough land available
- Food prices related to biofuel production
- Biofuels do not contribute to less GHG emissions
- The ‘cleanest’ production technology is the best solution

- food and energy insecurities still affect nearly one billion people
- 75 % live in rural areas, where fertile land is available
- Coincides with unsustainable traditional use of biomass

Majority available land in areas where technology can improve sustainable practices



Traditional use of biomass



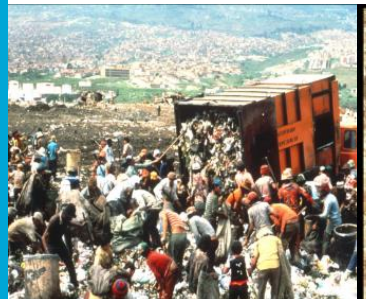
Food *in*security is directly related to poverty

- **One out of two** children live in poverty -> growing population

Eradication of ***poverty is key for sustainability***

This requires *science, technology, investment* and *equal distribution*

Sustainable bioenergy production can stimulate rural development; provide employment, infrastructure, energy security and social development




Inaction is not an option

Going on as we do will

- Deteriorate our environment
- Increase north-south divide
- Increase natural disasters
- Increase Food *in*security

People with this viewpoint are enthused, happy and optimistic about the production of bio-energy, -fuels and –plastics.

Gives a positive emotion

Gives a negative emotion

They are concerned, frustrated and angry about the idea that humanity will go bio-based at all costs.

AND: **technology** alone is not enough…..

- A sustainable world depends on **social development**
- The precautionary principle is not always a valid **nor an ethical choice**
- We need better **communication** to avoid misperceptions
- We need new **governance**, policies and business models that stimulate integral sustainable agriculture for food and energy

Trends…

- Growing world population
- Growing consumerism
- Youth peak – 1,8 B people under 18 in SSA
- 15 M entering workforce every year – 33.000/day!
- Less developed countries: 80% unemployed

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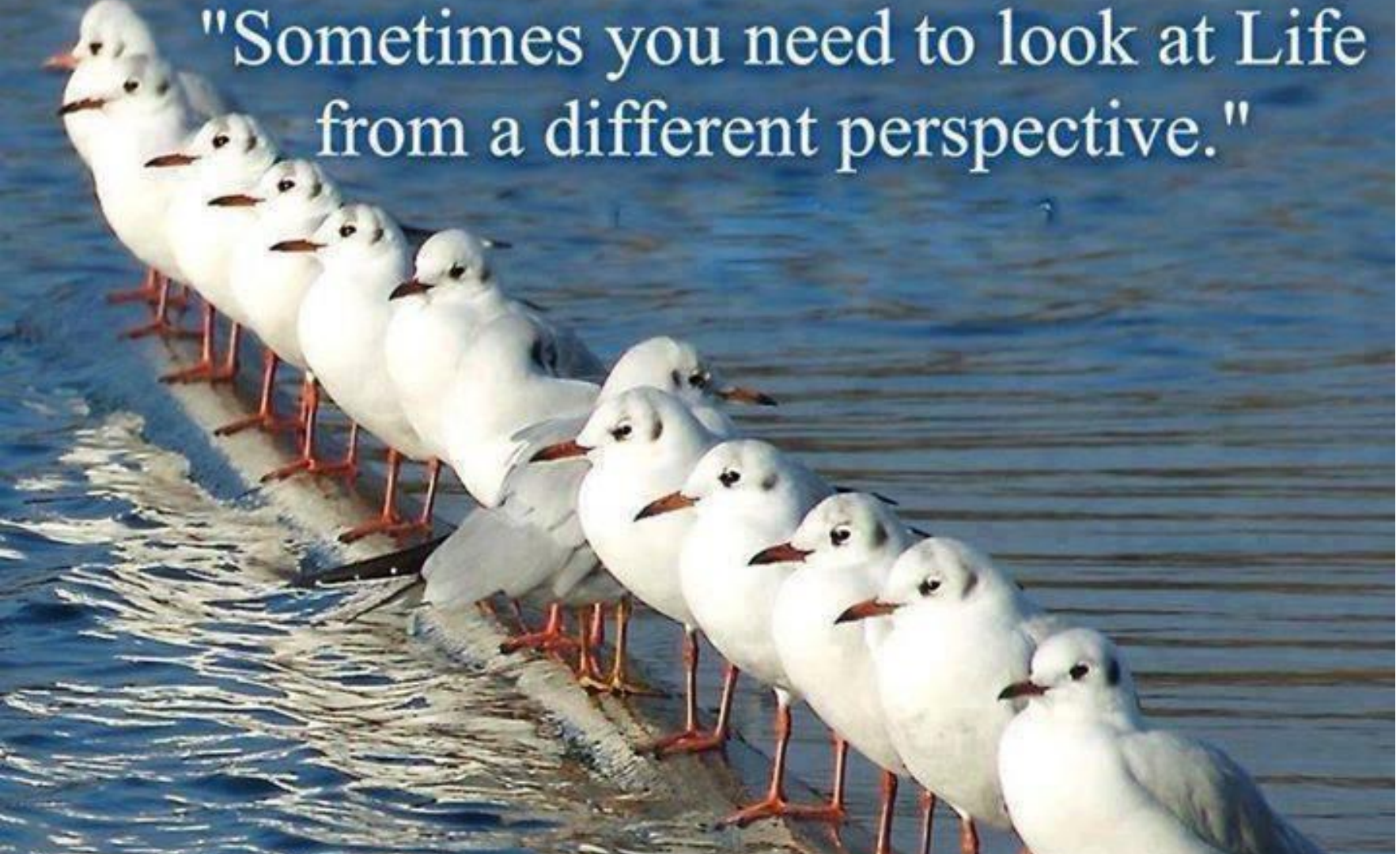
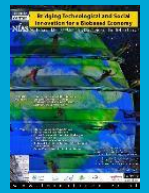
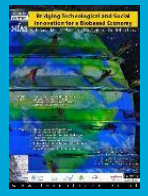

"Sometimes you need to look at Life
from a different perspective."



- 1. What is 'good'? – moral aspects
  - Scientific uncertainty, trust, values, just distribution, perceptions, interests

FOCUS

- 2. How do we get there? – perspectives for action
  - What do we need? Technology, infrastructure
  - Who needs to do what? Incentives, support
- 3. How to make choices? – political arena



FOCUS

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Cost economy to **value** economy

Problem is

- Energy security
- Climate change
- Food security
- Sustainable environment
- Urbanisation
- Social development
- Health
- Well being
- ……..

Need a different, circular business model

Integral solution for water, energy and food nexus

As a part of an Academic Consultancy Training (ACT) project
Project members: Carolina Muratori, Jaqueline Gama de Souza, Leandro Barbieri, Peter te Marvelde, Rifat Aldina, Robin van der Bles and Silvia Peirolo (Wageningen University & Research)
Commissioned by: Federatie Bio-economie Nederland (FBN)

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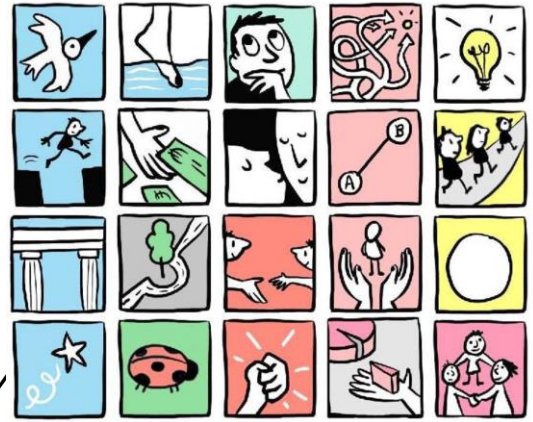
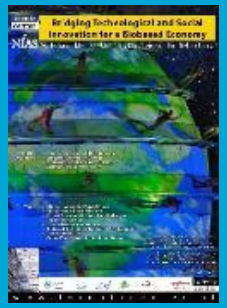
Need for multidisciplinary approach

- Not only focus on what and how, but also on the underlying moral values
  - Just distribution
  - Trust
  - Sustainability



This requires integration of
- *social science and technology*



* Figure from Report MVI project *Deugden in de Energie transitie 2018,* Tertium en VU

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How to implement?

- Transitioning to the Circular BioEconomy entails more than solely technical matters
  - Inclusive Value chains
  - Responsible Research Innovation
  - Sustainability Assessment
  - Techno-economic Assessment
  - Stakeholder Engagement

BIOHUBS
as a win-win collaboration

Local communities:
sustainable socio-economic development

Biofuel producers:
secure, continuous supply of high-quality, sustainable biomass

Impulse for regional development

Stakeholders collaborate to make improvements in areas like:

- Soil management
- Water & energy technology
- Farming equipment
- Infrastructure
- Employment
- Education

CLEANSHIPPING project

How to design an inclusive and sustainable marine biofuel value chain?

Spain
1. Olive pomace
2. Olive pruning residues

Eliminated Countries
Final Countries

Colombia
1. Cocoa pod husks
2. Coffee husks

Namibia
1. Encroacher bush

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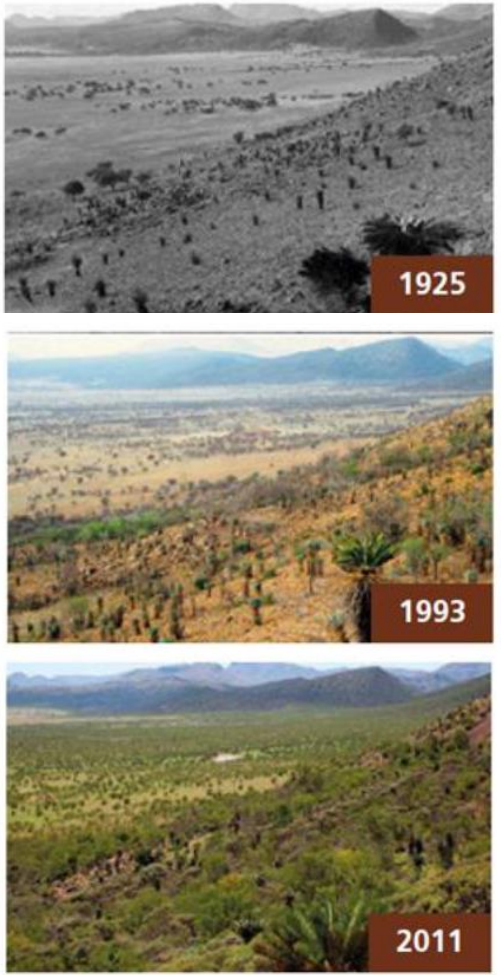
https://www.cleanshipping.nl/

Bush encroachment

- Excessive spreading of indigenous woody plants in savannah ecosystems
- Mainly: Acacia mellifera
- Estimated 45 million hectares affected



Source: IfaS 2021

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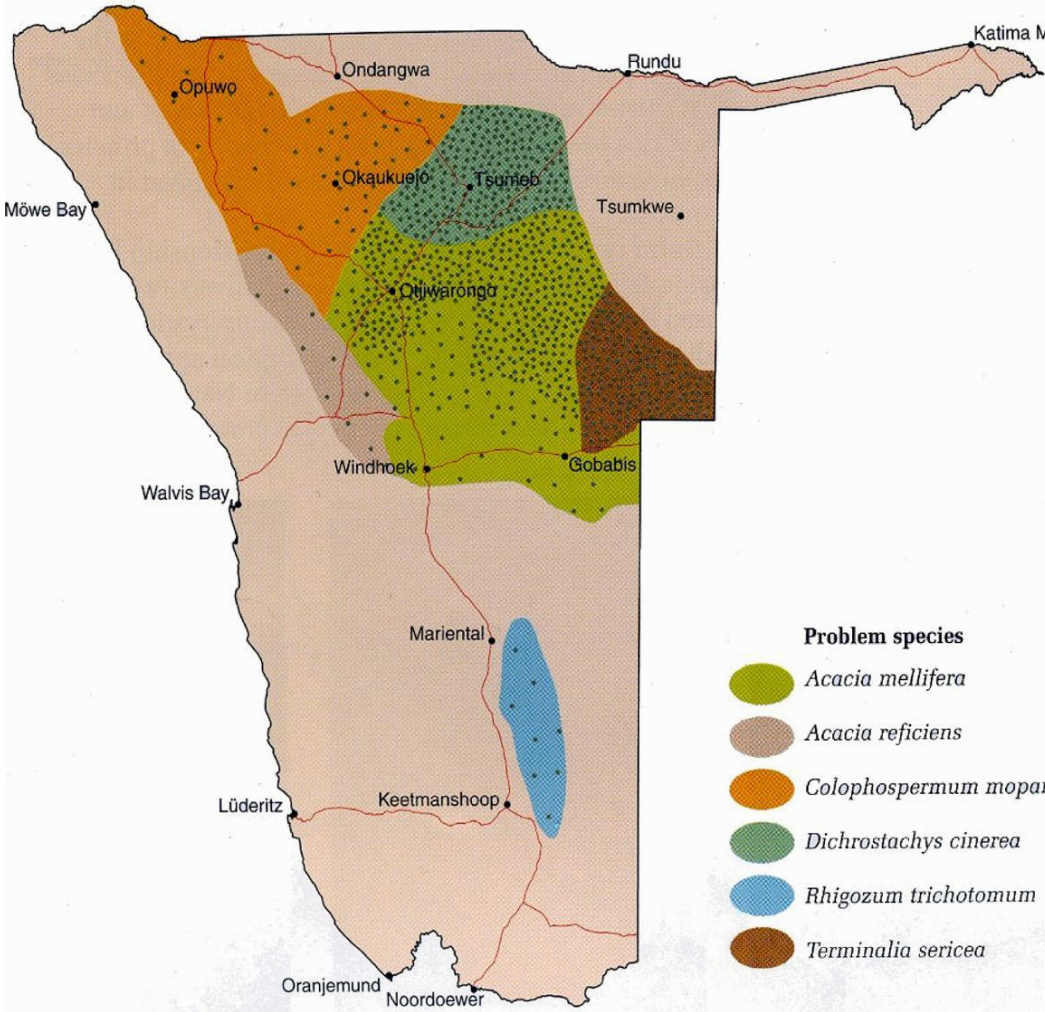
Negative impacts

- Changing biodiversity & soil
- Poor groundwater replenishment
- Decreased agricultural productivity/grazing capacity
- Economic losses
- **Reduction in rangelands**



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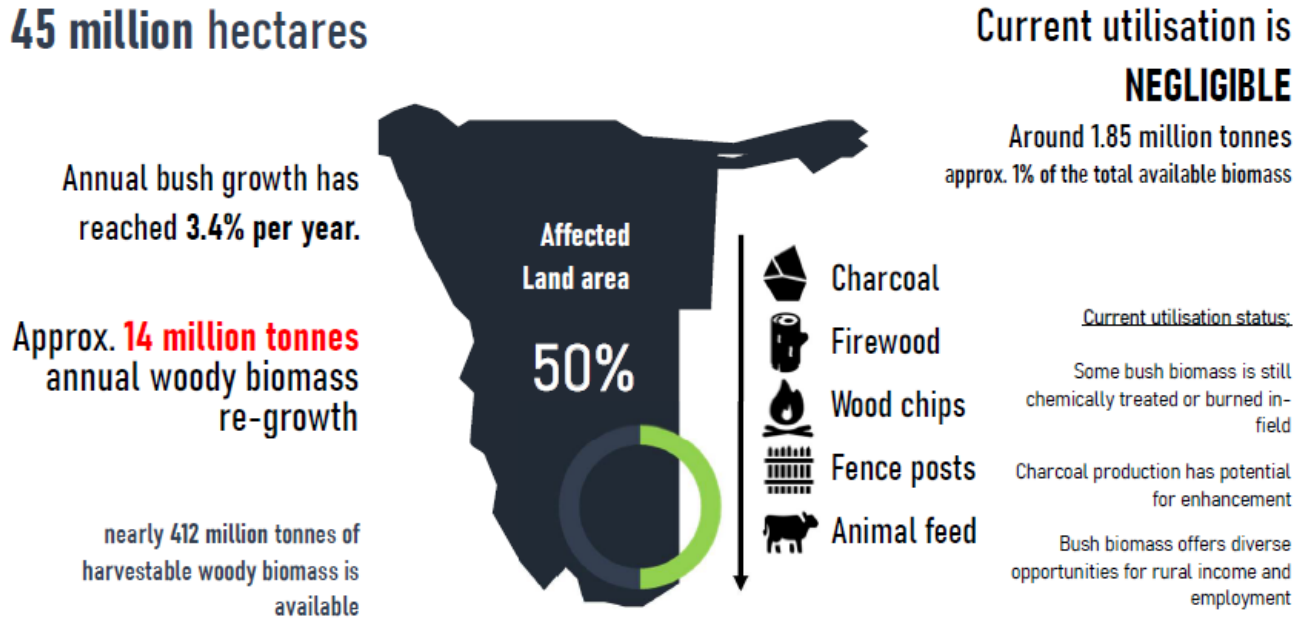
Current utilization



Source: BIP Brochure, 2020

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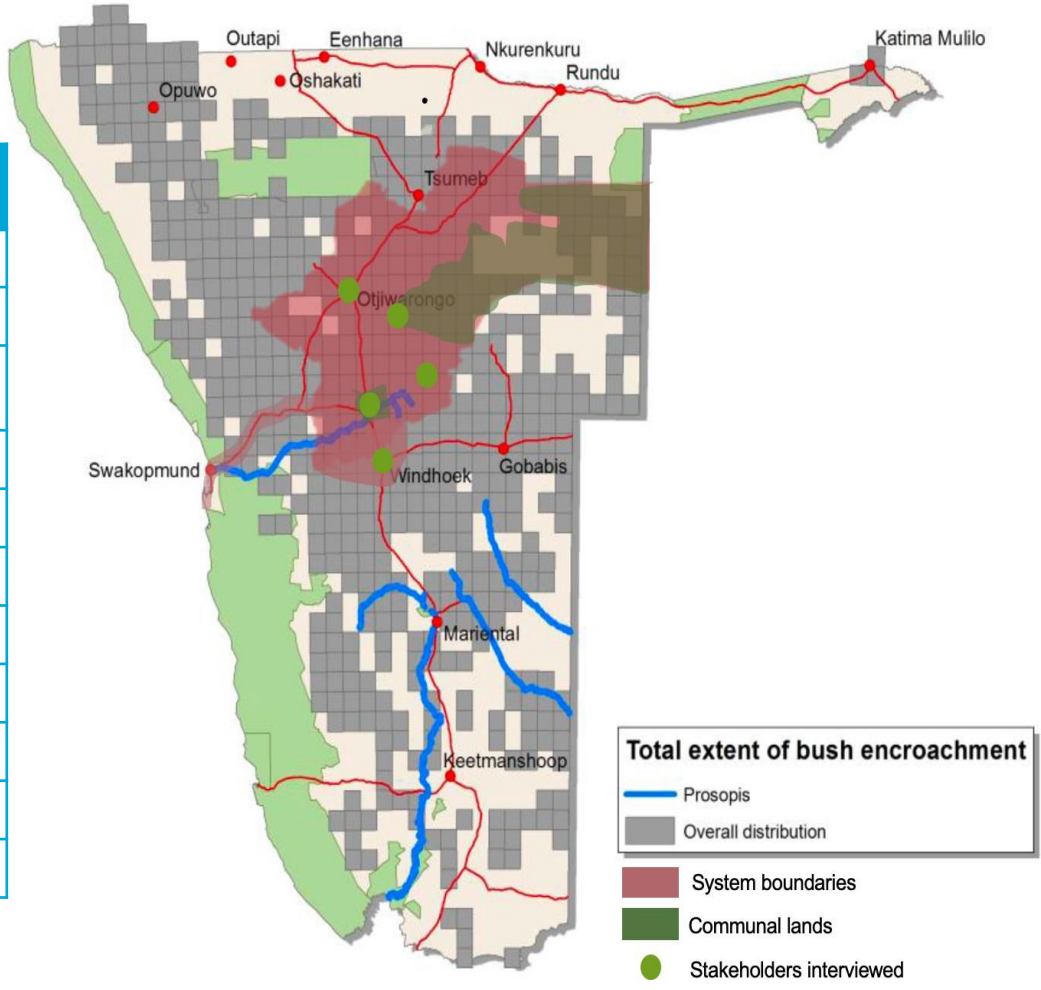
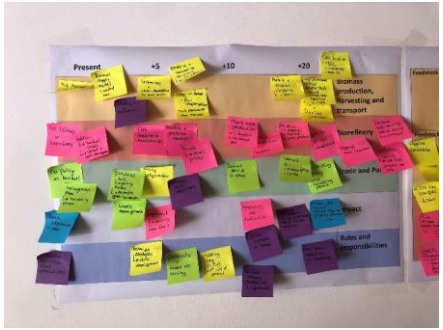
Case study - Interviews

Stakeholder group	Type of stakeholder	Nr.
Workers	Bush workers	8
	Farm workers	2
Value chain actors	Farmers	6
	Farmers unions	3
	Biomass processors	3
	Transport companies	1
	Conservancies	3
Local community	Communal farmers/leaders	6
Society	Government	4
	Civil society	2
	Investors	2



Multi-stakeholder workshop



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N-BiG
Namibia-Biomass industry Group

Context

- Total population: 2,5 million
- +/- 70% dependent on agriculture for livelihood
- High unemployment: 21,27%
- 43.3% lives in poverty
- Electricity access: 56% of population (less than 10% of rural households)
- High inequality (Gini coefficient of 59,1)

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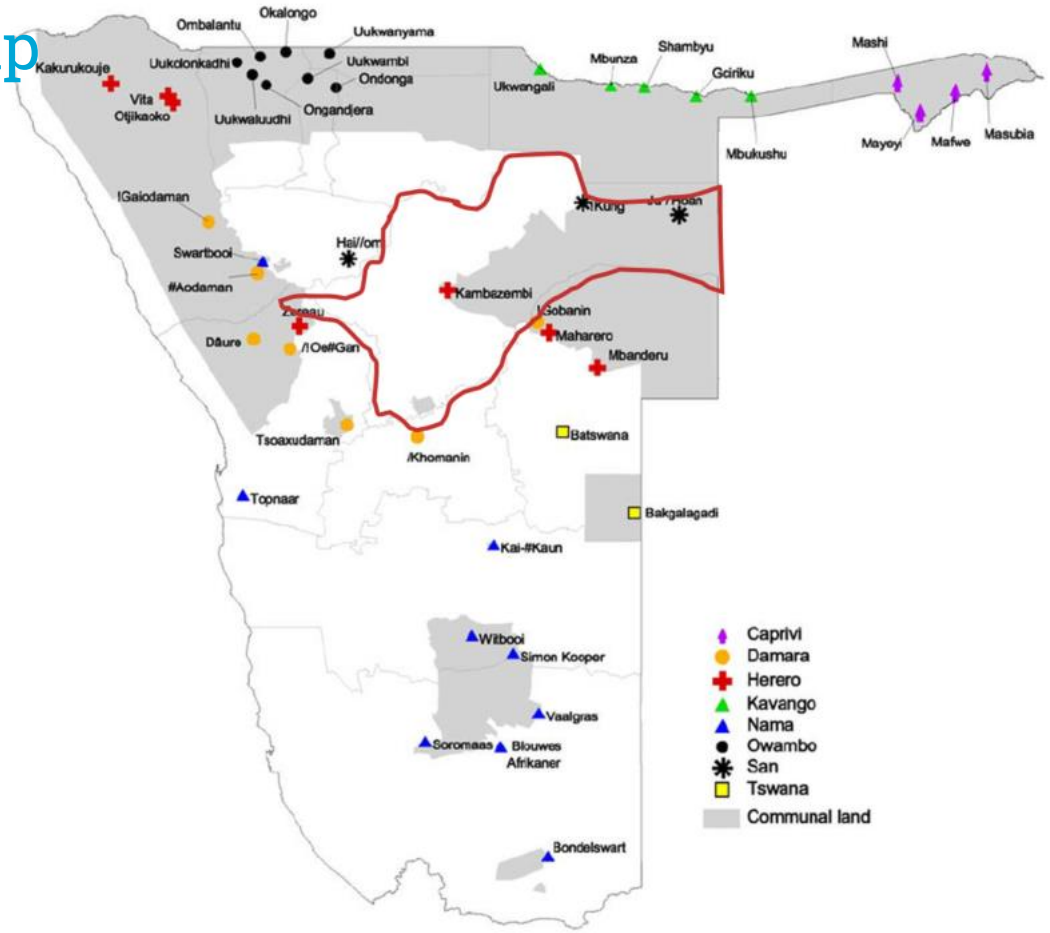
Context – land ownership

- Commercial farms
- Communal farms
- Resettlement farms

→ Different needs and capacities



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SWOT analysis

Strengths:

- Existing interest in the bush valorization
- Experience
- Quantity
- Stakeholders well-connected

Weaknesses:

- Harvesting techniques
- Road infrastructure
- Only small-scale value chain
- Communal farmers prohibited
- Majorly exports

Opportunities:

- Stable income
- Reduction of (fuel) imports
- SME job opportunities
- Reclamation of pasture/Rangeland
- Technological development

Threats:

- Investments
- Laid back attitude
- Skilled labor (Education)
- Trust in Namibian Farmworkers
- Lack of monitoring or organizing structure

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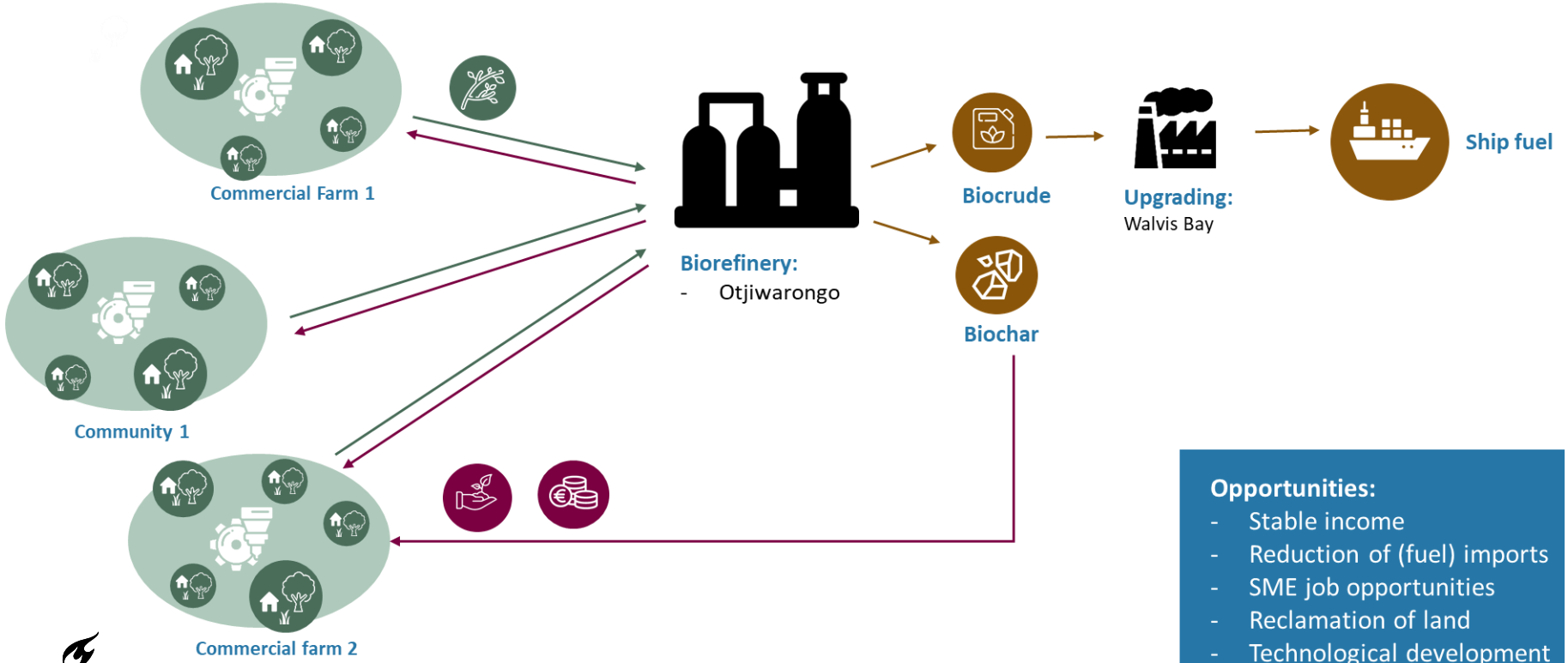
Biohub scenario



Opportunities:
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Outcome: A Roadmap for a Sustainable and Inclusive future

- Experience on small to medium scale
- No (bio)refinery
- No policy on biofuels
- Management plan + harvesting permit policy in place
- Basic infrastructure in place
- No local market
- No investors
- No sustainability goals for existing industries

Now

+5

- Biomass supply model
- Proof of concept whole value chain
- Technology + skills development
- Processing + harvesting equipment (cost efficient)

- Test feedstock characteristics (mix of species)
- Market + product research
- Trials (small pilots)
- Create political will
- Policies enabling anchor product

+10

- Start with production on 1 location (Otjiwarongo)

- Pilot investigates more details (e.g. by-product valorization)
- Expand policies to other products similar to anchor product

+20

- Mix of problematic species
- Inclusive: everybody opportunity to supply biomass
- Combi of long term + flexible contracts
- Combi of central hub+ mobile chipping units
- Harvest, chipping, transport: SME's/associations
- Biofuel = key anchor
- Process + production in Namibia (maximum value addition)
- Policy alignment between relevant ministries
- Impact: rangeland restoration, job creation

Conclusion

- Lot of potential
- Design needs to respond to different needs of different biomass suppliers
- Risks: working conditions, fair salary, wealth distribution, sustainable harvesting

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Spain

- Many conditions needed for biohub already present
- Goal: Increased income for farmers, preservation of traditional system, improved sustainability
- Design: Close to current situation
- Choice of feedstock: COP

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Colombia

- More complex: many conditions not yet present (infrastructure, technology, knowledge, awareness)
- Goal: diversifying income, improve resource management, increase opportunities for youth
- Design: smaller hubs, multiple residues, flexible supply methods, shipping fuels most suitable end product?
- Also: investments needed in institutional development, knowledge transfer, and farmers organizations

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Stakeholder interviews

Workshop

Forecasting - Backcasting

SWOT insights

Decision making

- >887.000 ha (~5 billion trees)
- Production: 846.000 tn/y
- 96% family farms (< 5 ha)
- Farm holder range: <1 ~ 100 ha
- Traditional practices
- Altitude: between 900 and 2100 meters
- Institutions:
  - Fedecafe → Cooperatives
  - Associations

Lessons

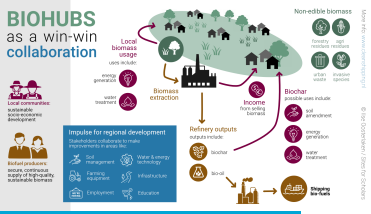
- Differences in context: motivations, resources, knowledge, infrastructure: **Never assume**
- Adapt technical design + invest in necessary conditions such as infrastructure, machinery development, but also institutional development and knowledge transfer: **Co-create**
- Strengthening farmers organizations especially necessary when working with smaller scale farmers: **Build resilience**
- Contexts where these institutions are lacking: more risky, but also more impact: **think out of the box**
- **Link to international policy – maximise in scope 4**
- **Communicate together!**

In public debates:

Rational quantified data on impact
≠ answer emotional concerns

What is good?

- **Moral concepts**
- **Cultural differences**
- **Public emotions**



In summary…

- **Implement Systems approach**
- Not only focus on **what** and **how**, but address **underlying moral values**
  - Just distribution
  - Trust
  - Sustainability
- **Use Co-creation** using VSD, SSbD, RRI for Inclusive Design
- **Large scale is not always best**!

From **social licence** to **shared responsibility**

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Design for sustainable futures

Design to meet the needs of the present without compromising the ability of future generations to meet their own needs (Brundlandt, 1987)

Sustainable design is also design for global justice

Thank you all

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We work with data safety through Quodari:

Acknowledgments

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Project website: https://www.cleanshipping.nl/

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Backup slides and references

https://www.cleanshipping.nl/

Water Mining: https://www.youtube.com/channel/UCG_e05zxRk_oTlnfHKaNDuA

https://www.watermining.eu

https://bioenfapesp.org/scopebioenergy/

https://sdgs.un.org/partnerships/
circular-wastewater-treatment-extracting-biopolymers-wastewater-sludge-campinas-braz

ACTION for development

- Combine local stakeholder involvement with technological innovation
- Design (circular) value chains & new business models
- Focus on durable agricultural development
- And learning for further local innovation and linked social development