



# Basic requirements for a successful pellet project development in Africa

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World Biomass Association webinar April 12<sup>th</sup> 2022:

"Pellet plants in developing economies - a prerequisite for advanced biomass cooking. Experiences of project developers"



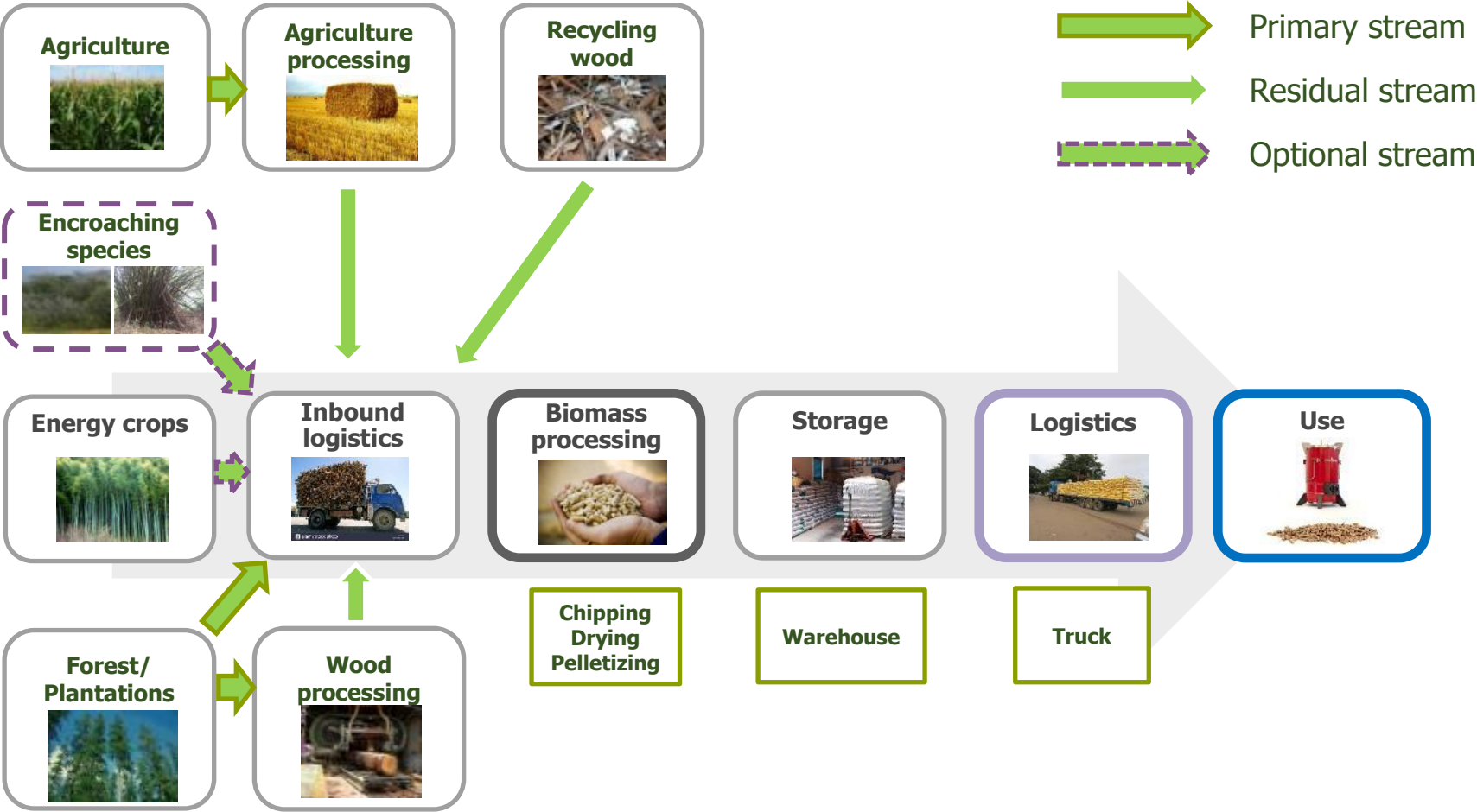
Hinterland

- Feedstock, feedstock, feedstock !!!
- Biomass supply chain structuring and Biomass supply assessment
- Wood pellet production and Health & Safety
- Risk based business development and pellet plant structuring
- Risk management



# The various steps in the biomass supply chain

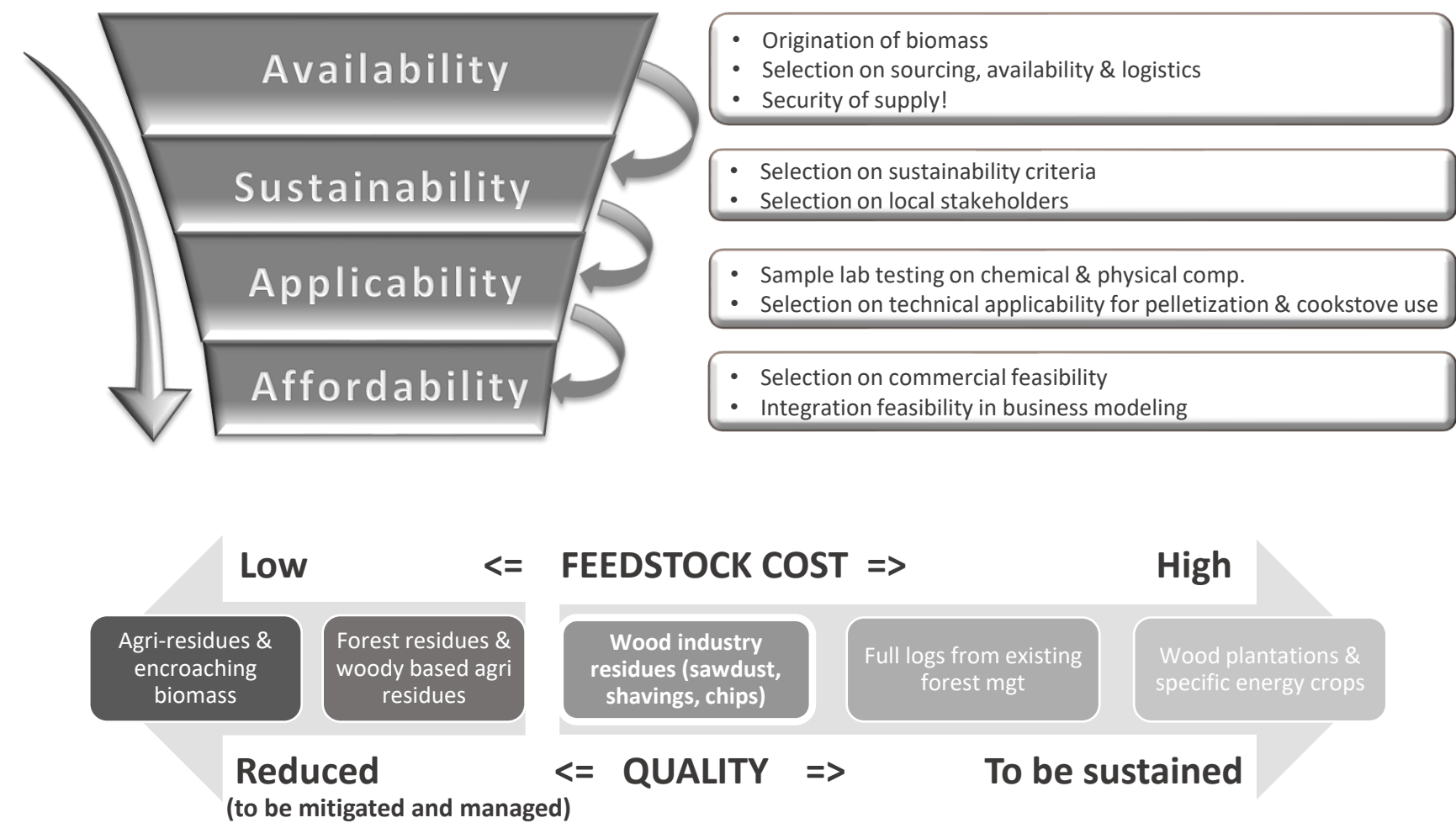
Perspective : African all-inclusive clean cooking and biomass fuel





# My mantra for biomass assessments

## Funnel and exclusion approach to identify sustainable feedstock opportunities



# The art of pellet production for biomass cookstoves fuels Hinterland

## Set up of pellet production related to type of feedstock and associated risks:

	Type of feedstock	Investment in pellet production	Supply risk of feedstock	Price risk of feedstock
<b>No pellet production</b>	Dry shells (Palm Kernel and Macadamia)	No	High, as limited availability	High as low supply and high demand
<b>Simple pellet production</b>	Only dry and small size (dry saw dust, rice husk)	Low	Medium to high, as depending on sawmills and rice husk	Medium to high
<b>Advanced pellet production</b>	All and wet biomass including agri-residues and energy grasses	Medium to high	Low to medium, as wide range of acceptability	Low to medium as unlocked potential can be tapped into

### No pellet production:

- Dry shells directly to be used as cooking fuel.
- Decent cooking results and positive customer experience\*
- Focus on purchase, logistics and packaging
- Securing sufficient continuous supply is difficult, pricing cannot be locked

### Simple pellet production:

- Dry and small size biomass can directly be pressed into pellets.
- No drying and milling needed
- Simple and low cost equipment
- Industrial scale: robust pellet equipment needed
- Challenge on continuous same quality feedstock intake to produce pellets consistently

### Advanced pellet production:

- Basically all type of feedstock can be accepted
- Drying and milling needed
- More complex equipment set up
- Best to use industrial scale equipment for cost efficiency and reliability (towards 10.000 stoves)
- Higher investment, but lower supply and pricing risk



\* SEI Nov 2019 Opening the black box: A service-design driven approach to understanding use and adoption of clean-burning cookstoves in peri-urban Kenya. (mimi-moto cookstove with wood pellets and macadamia shells tested)



## Developing towards bankability and Financial Close: RISK ELIMINATION

Risks for pellet plant projects to be structured and mitigated during business development towards FC:

1. Feedstock risks
2. Biomass supply chain risks
3. Sustainability risks
4. Stakeholder risks including JV partner risks
5. Design & Construction risks
6. Safety risks
7. Permitting risks
8. Contracting risks
9. Funding risks
10. .... (many other sections also depending on project specifics)



Every section is having its own dynamics for perceived and real risks, which are to meticulously explored and assessed on likelihood and impact and the multiplier of these elements will drive risk severity and risk management.

Wood pellet plant fire & explosion ALWAYS an imminent risk element

(airborne) wooddust + oxygen + ignition (spark) = 

## Safety

- Wood dust explosion and fire risk + feedstock & pellet safety
- Operators machine safety (rotating and noisy equipment)

## Health

- Wooddust (especially airborne) operators respiration
- PPE (noise, dust)

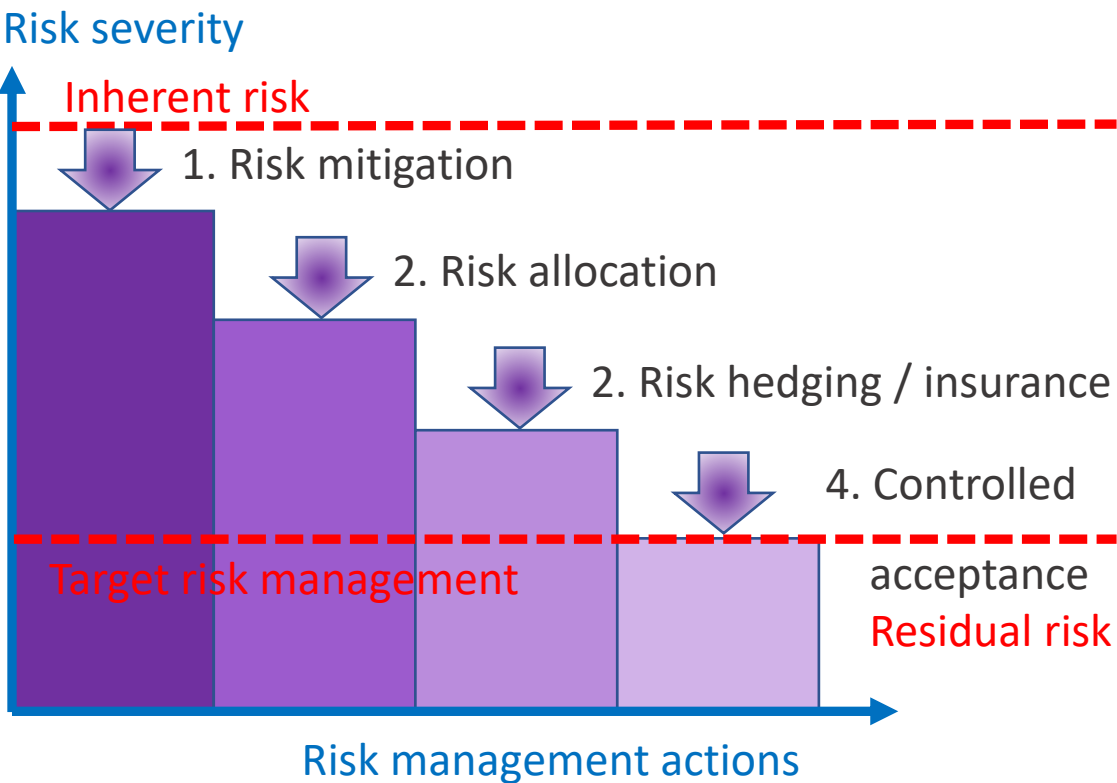
## Risk mitigation (non-exclusive):

- Dust management (both airborne and settled)
- Fire and explosion detection systems
- Fire and incident protocols
- “What if” study & anticipation beyond Dust Hazard Analysis
- Clear operating protocols and procedures to adhere to
- Personnel safety awareness training



*Example: Corinth Wood Pellets plant USA: Manufacturing hall destroyed in 2018 by malfunctioning of pellet cooling machine*

Risk management as existential differentiator:



For bioenergy projects in Africa, many risks ultimately leading to failure have been in feedstock and biomass supply chain, but also related to stakeholders and sustainability.

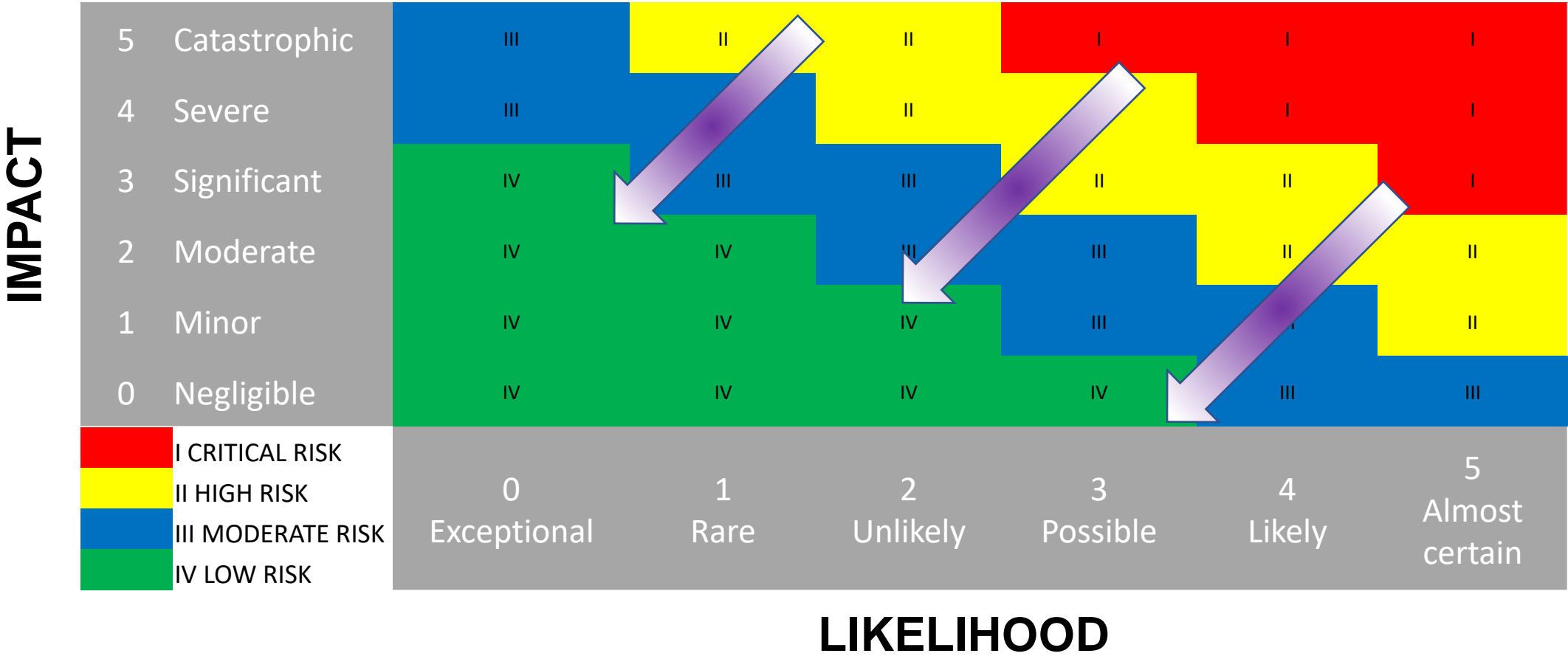


These might very well have been avoidable when identified, assessed and meticulously managed upfront in the business development of the respective project.



# Example high level risk assessment & mitigation

Risk heat map:



# Example high level risk assessment & mitigation

## Pellet production for biomass cookstoves supply:

Risk	Severity	Mitigation
Insufficient biomass feedstock available for pellet production	Critical	Portfolio approach: multiple suppliers, term and spot, lock in fixed volumes, widen feedstock quality intake, buffering
Biomass feedstock price increase	Critical	Focus on biomass feedstock / agri-residues with limited applications and competitive market value
Pellet production unreliable	High	Invest in reliable and established industrial pellet production (new or refurbished) and proper plant design
Unreliable and too expensive supply chain	Moderate	Upfront fuel supply chain assessment to identify best supply chain concept and related logistics
Inefficient management	High	Invest in hiring competent local management with governance and senior expertise oversight or by expatriate management.
Charcoal sector jeopardizing enterprise expansion and operation	Moderate	Get current charcoal sector involved in distribution of biomass pellets



# Take away:





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