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Ecosystem based adaptation in the wood energy sector of Burkina Faso

ECO Consult on behalf of PROFOR

Program on Forests (PROFOR) technical session

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1. Objectives of the study

Objectives of the study

Overall goal:

- Show (sub-)national decision-makers and development practitioners how forests can be of value to other sectors by enhancing social and environmental resilience to climate change
- Case of the wood-energy sub-sector in Burkina Faso

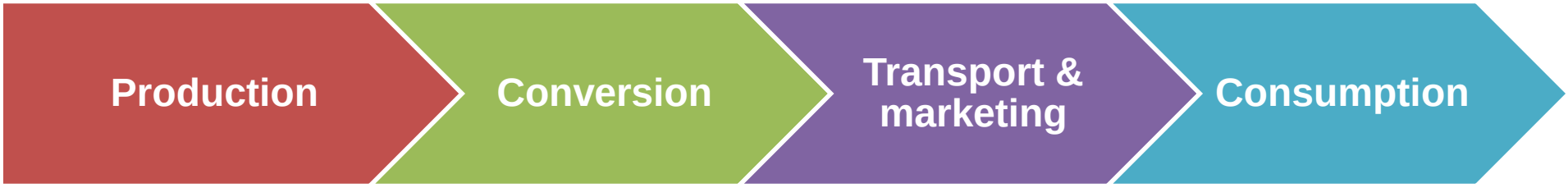
Planning and policy making processes – e.g., National Adaptation Programs of Action (NAPAs) and the Forest Investment Program (FIP)

2. Methodology

Methodology

1. Analysis of the current situation (value chain approach)
2. Vulnerability assessment
3. Modelling of future situation (3 scenarios)
4. Identification of adaptation strategies: focus on forest based solutions
5. Evaluation of economic implications of the identified adaptation strategies
6. Identification of associated policy measures and institutional arrangements that would facilitate the use of forests for climate change resilience

Wood energy value chain

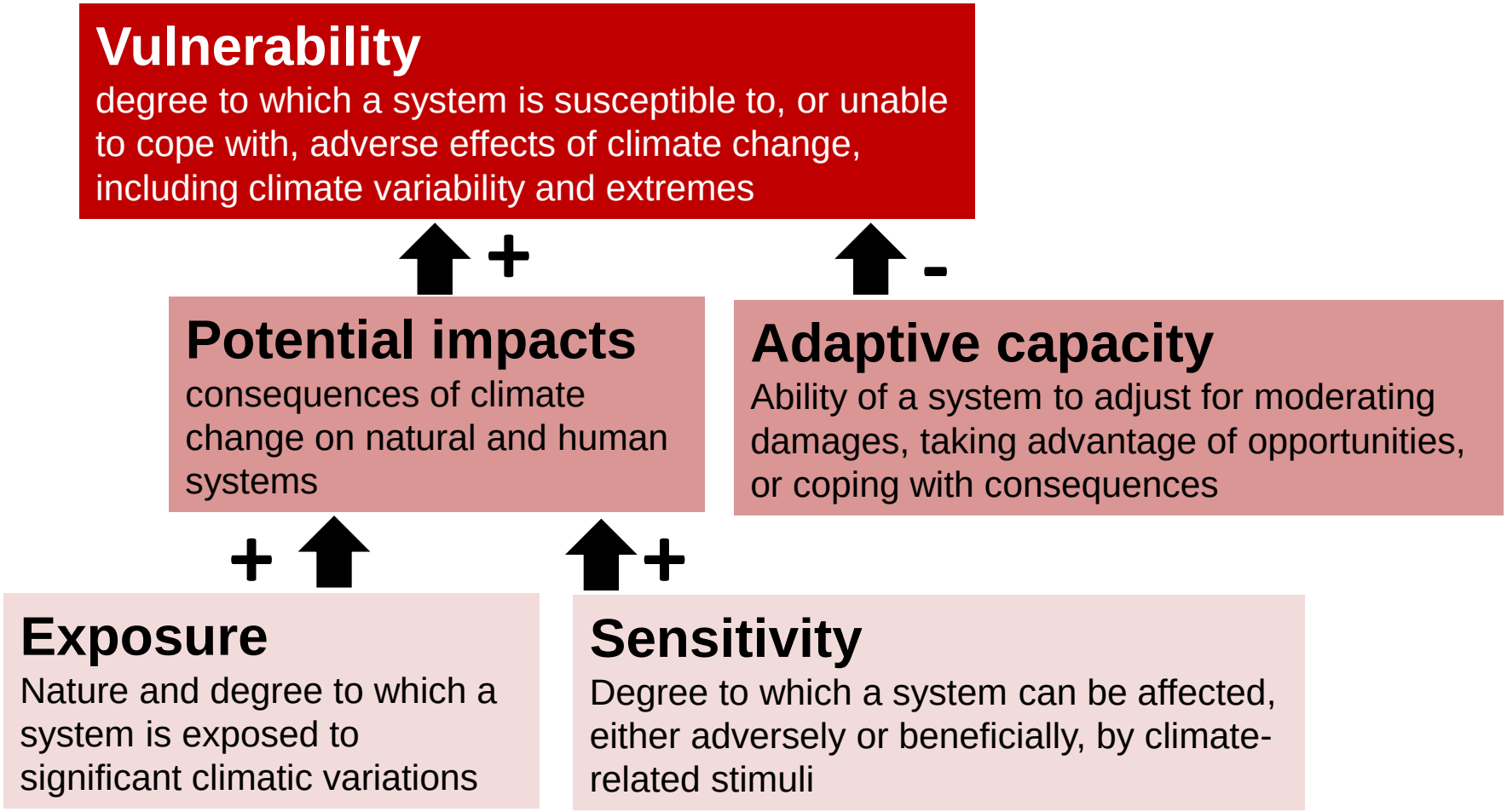


Analytical framework

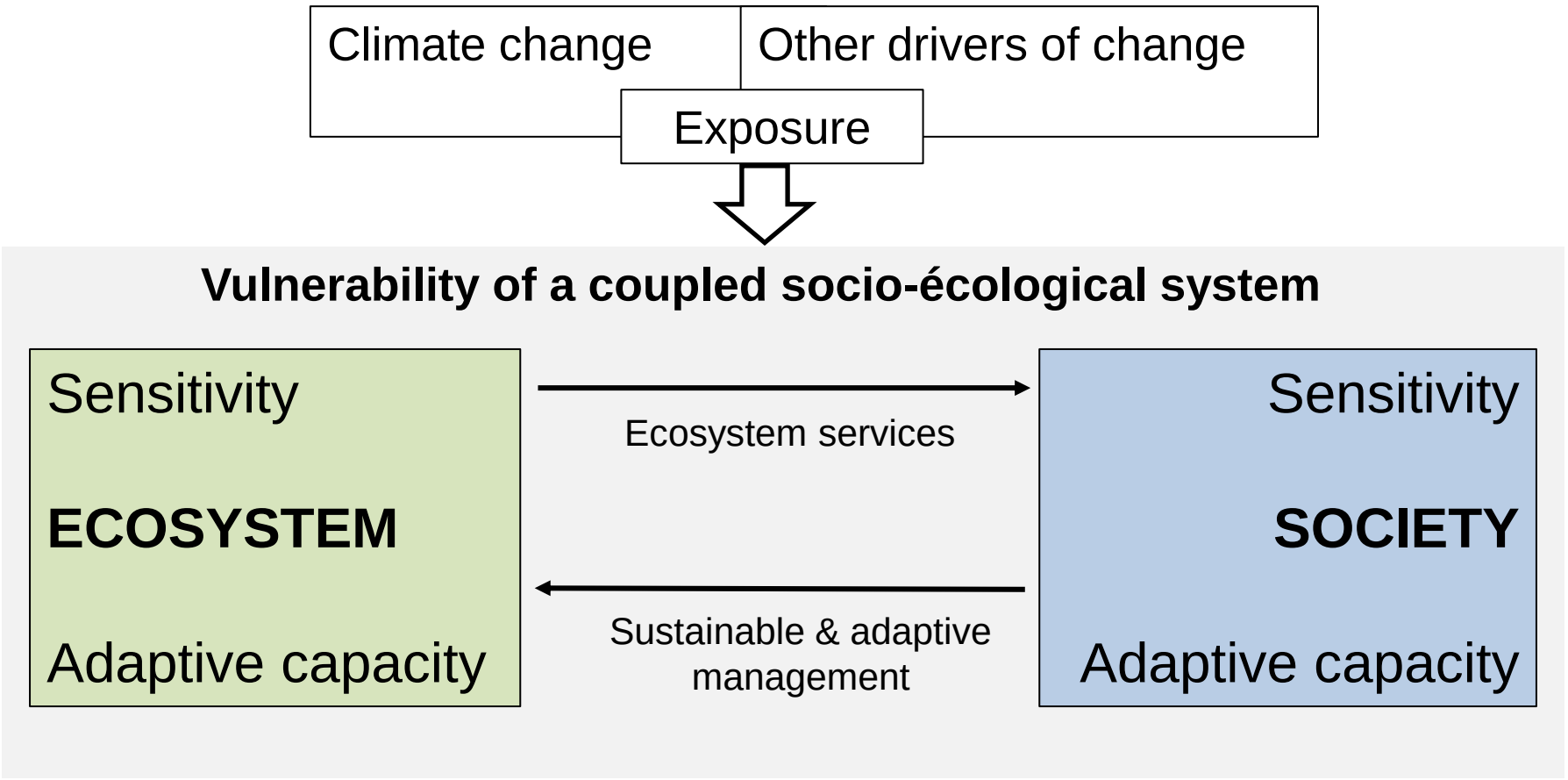
- Promoting resilience:
  - *"Resilience is characterized by the amount of change that the system can undergo and still retain a desired function and structure; the degree to which the system is capable of self-organization; and the system's ability to build and increase its capacity for learning and adaptation"*
- Proxy: reducing vulnerability

Analytical framework

Components of vulnerability



Analytical framework



3. Vulnerability of the wood energy sub-sector

Current wood demand and supply balance

- Balance of potential sustainable supply and consumption of wood (fuel and lumber) in Burkina Faso for the year 2013

Demande			Offre		
Catégorie	**(m³/an)**	**(%)**	**Catégorie**	**(m³/an)**	**(%)**
Ménages urbains et ruraux en BE [1)]	7.945.710	82	Production des forêts naturelles [2)]	5.295.711	58
Professionnelles en BE [1)]	1.728.202	18	Productions des plantations forestières 3)	553.224	6
Exportations de BE [1)]	19.220	0	Arbres hors forêts	3.307.774	36
		0	Importations de BE	9.610	0
Total	**9.693.131**	**100**	**Total**	**9.166.319**	**100**
Bilan		**-5**		**-526.812**	

Exposure: climate projections

Temperatures:

- Increase in mean annual temperature of 0,8°C by 2025 and of 1,7°C by 2050

Precipitation: high degree of uncertainty

- PANA: decrease of -3,4% by 2025 and of -7,3% by 2050
- Other sources: slight humidification, probably not very robust in the long run (influence of atmospheric CO_2 concentrations)
- Very high inter-annual and seasonal variability

Sensitivity of the value chain

Weaknesses:

- Low biomass productivity linked to temperature, precipitation and atmospheric CO_2 concentration
- Predominance of inefficient transformation (carbonization) technologies
- Insufficient forest and wood circulation control
- Low commercial value of forests -> few incentives for investments
- High population growth and urbanization rates -> increase in the demand for wood energy
- Dependency of households on wood fuels
- Low penetration rate of fuel efficient cooking equipment

- High pressure on forest resources leading to degradation

Sensitivity of the value chain

- Institutional challenges:
  - Management and securing of rural land tenure (p.ex. at community level)
  - Development of adapted fiscal policies (incentives)
  - Lack of structured and effective marketing networks

Strengths:

- Existence of wood resources other than natural forests (plantations, ToF)
- Substantial forest area under/on the way to sustainable management

Adaptive capacity

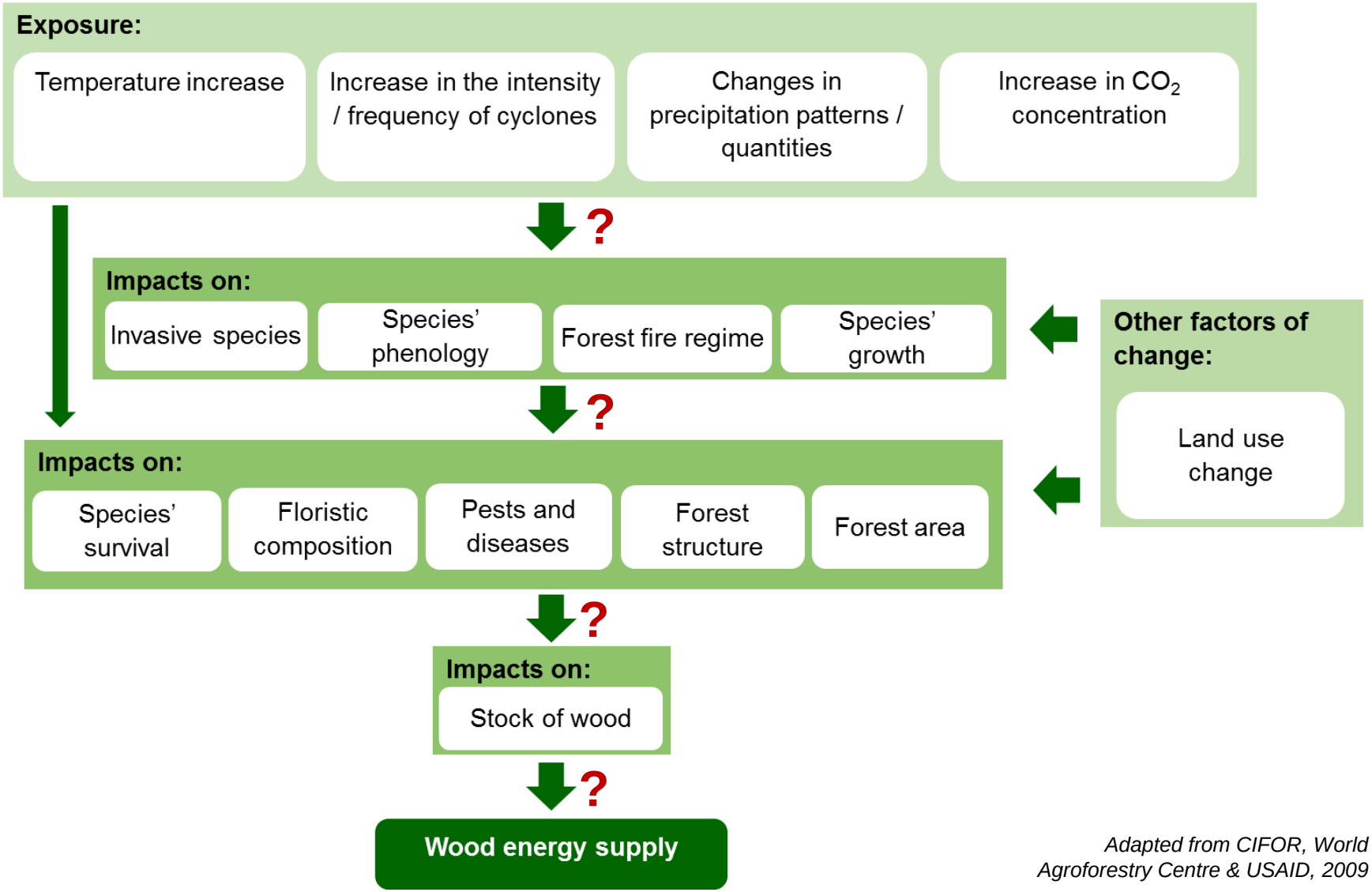
Weaknesses:

- Low level of involvement of territorial authorities in forest management
- Low level of organization and skills of charcoal producers
- Low level of organization of retailers
- Limited access to alternative sources of fuel

Strengths:

- Political will to secure access to wood fuel
- Certain level of organization of forest management stakeholders and transporters
- Local population's capacities in the field of assisted natural regeneration
- Existence of research centers in the sector (e.g. IRSAT)
- Availability of new technologies (e.g. biodigestors)

Potential impacts on wood energy supply



Adapted from CIFOR, World Agroforestry Centre & USAID, 2009

Overall vulnerability

- Impacts on forest productivity -> high degree of uncertainty
- Climatic stress factors exacerbate already existing (anthropogenic) pressures on forest resources -> threat from land use change more imminent in the next 20-50 years
- Insufficient legal frameworks and policies resulting in participation, access and tenure issues at the bottom of those pressures
- Forest resource degradation -> impact on energy supply security in Burkina Faso

4. Adaptation of the wood energy sector: a modernization strategy

Modernization strategy

Vision 2030

- Based on the sustainable management of forest resources in combination with measures aiming at optimizing the entire value chain
- Diversification of sources of energy and promotion of LPG as a complementary measure
- Objective: covering 90% of rural and 60% of urban households' demand with wood energy

Changing the "business as usual"

Framework conditions

gies, awareness
raising and promotion

Lobbying, best practices, sectoral information system, national coordination, regional strategies & wood fuel master plans, fiscal reforms, law enforcement

Consumption

Formalization, commercial networking, market information system

Transport & marketing

Capacity building, production and conversion efficiency

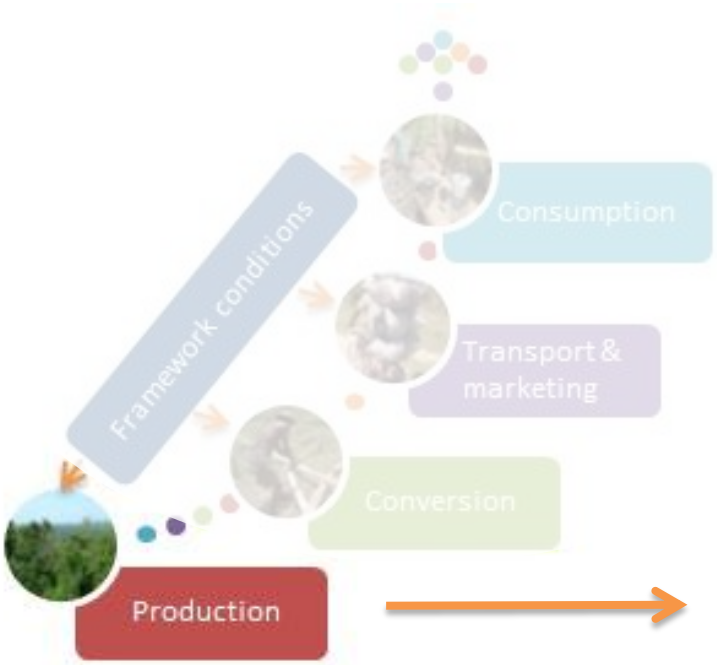
Conversion

Sustainable Forest Management, plantations, ToFs

Production

Forest ecosystem-based adaptation

Climate change adaptation: examples



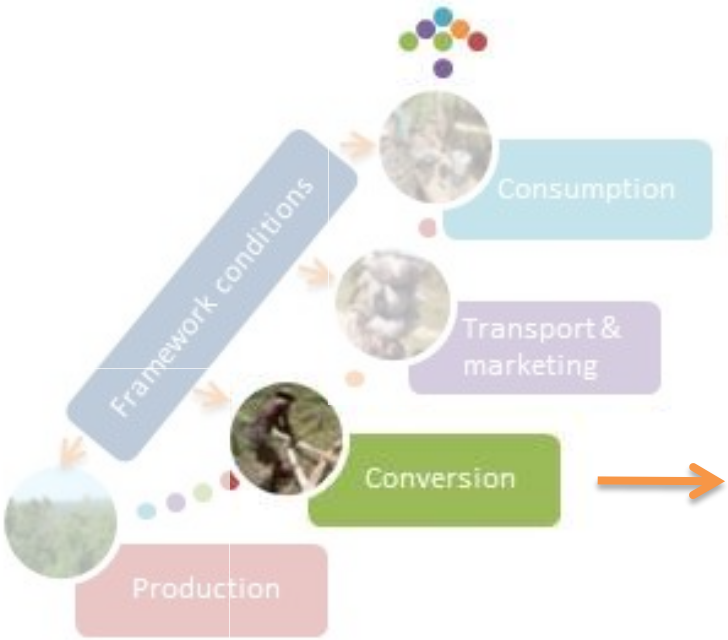
Reducing ecological vulnerability:

Sustainable management reduces pressure on forest resources

↓ **sensitivity of forests**

↓ **CO_2 emissions linked to deforestation and degradation**

Climate change adaptation: examples



Reducing social vulnerability:

Organisational development and training of local stakeholders

↑ **adaptive capacity of stakeholders**

Climate change adaptation: examples

Reducing social vulnerability:

Establishment of urban wood fuel markets contributes to guarantee a certain supply stability

↑ **adaptive capacity of stakeholders**

Climate change adaptation: examples

Reducing ecological vulnerability:

Introduction of more efficient combustion technologies reduces wood demand and thus the pressure on forest resources.

↓ sensitivity of forests

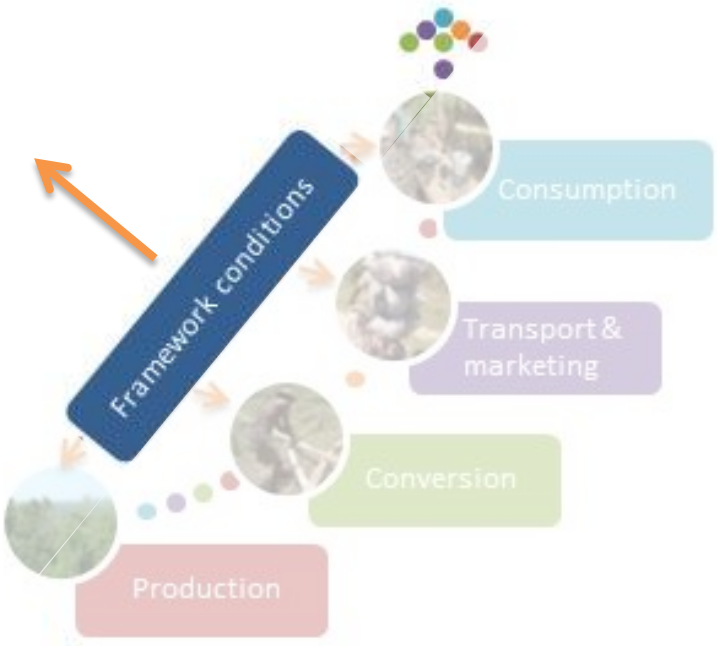
↓ CO2 emissions linked to deforestation and degradation

Climate change adaptation: examples

Reducing social vulnerability:

Establishment of national and regional coordination mecansims improves collaboration between stakeholders

↑ **adaptive capacity**



Evaluation of adaptation options

Costs of modernization strategy (wood energy)

- 533 million US$ by 2030 (BAU scenario)

Costs of LPG based strategy

- 380 million US$ by 2030 (BAU scenario)

Ecological, social and economic co-benefits!

Arguments for modernizing the value chain

Ecological co-benefits:

- Incentive for better managing forest areas and invest in tree plantations
- Conservation of forest and tree resources and the ecosystem services they provide
- “Carbon neutral” energy supply

Social co-benefits:

- Local availability of forest resources: decentralized production and transformation
- Reduction of health problems associated with indoor air pollution

Arguments for modernizing the value chain

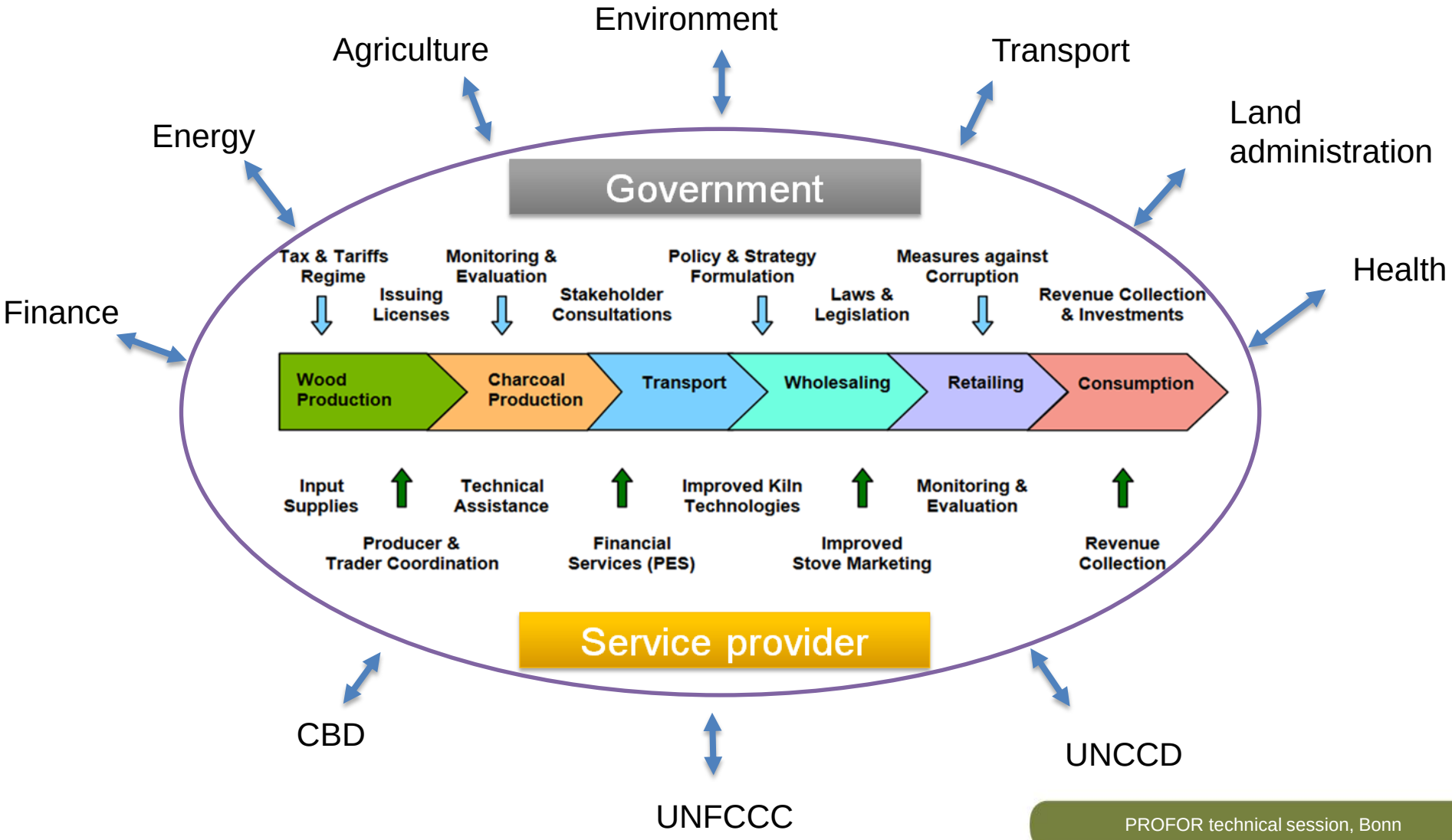
Economic co-benefits:

- Job and income creation at local level
- High potential of technical innovation (conversion and combustion)
- Business opportunities for a large variety of entrepreneurs and service providers
- Reduced dependence on fossil fuels and as a consequence reduced economic dependence (fuel imports)

Quantification / economic valuation of co-benefits needed

5. Recommendations

Wood energy value chain – highly interlinked



Recommendations for action

- Develop an overall energy strategy, including wood energy, and associated sectoral planning frameworks (e.g. forestry)
- Mainstream climate change adaptation into energy planning
- Tap the potential of (forest) ecosystem-based adaptation measures
  - as part of an holistic adaptation strategy
  - no-regret measure
  - ecological and socio-economic co-benefits -> data / economic valuation
- Promote favorable framework conditions, e.g.:
  - sectoral information system
  - cooperation between stakeholders of different sectors / levels
  - strategic and planning frameworks
  - fiscal reforms and law enforcement

Thank you very much