

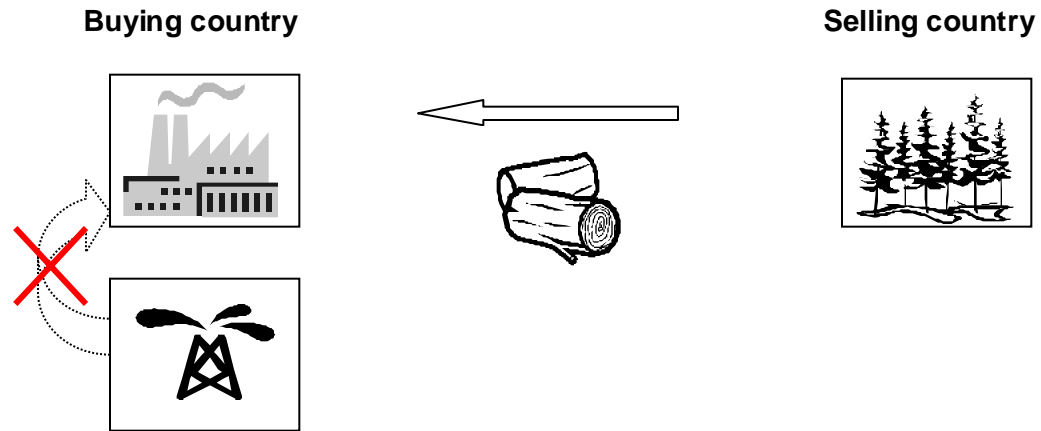
Trading biomass or GHG emission credits?

Jobien Laurijssen MSc

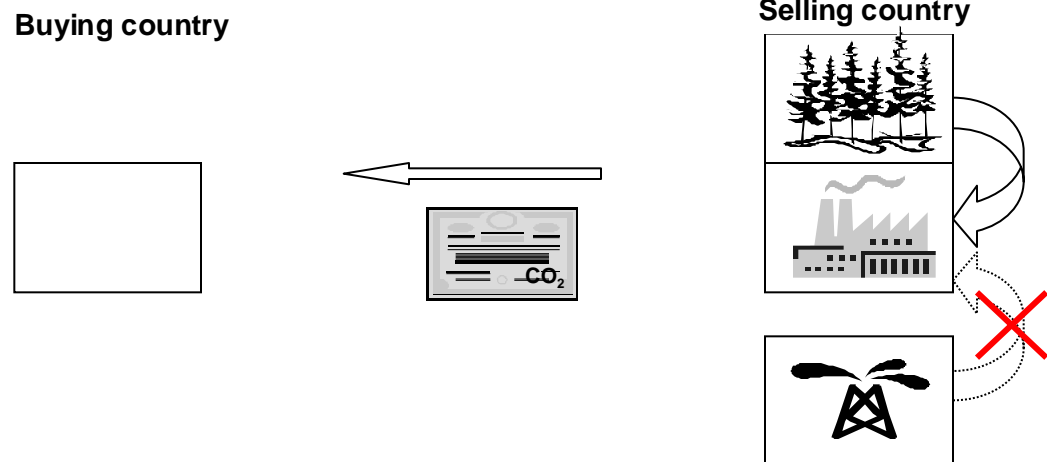
Supervision: Dr. André Faaij
Copernicus Institute
Utrecht University

Should we carry biomass(fuels) around the world?

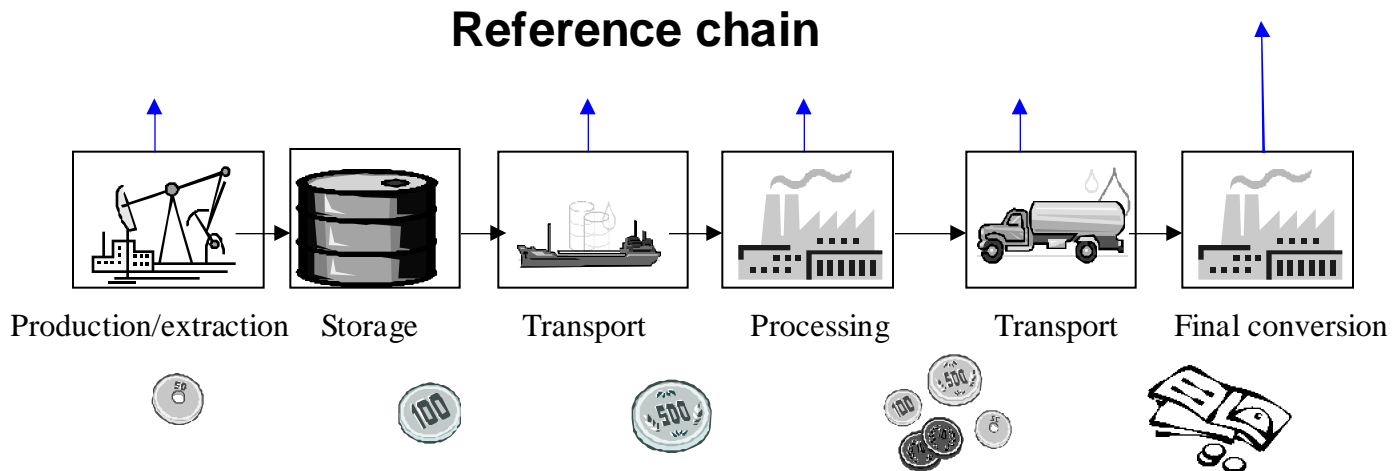
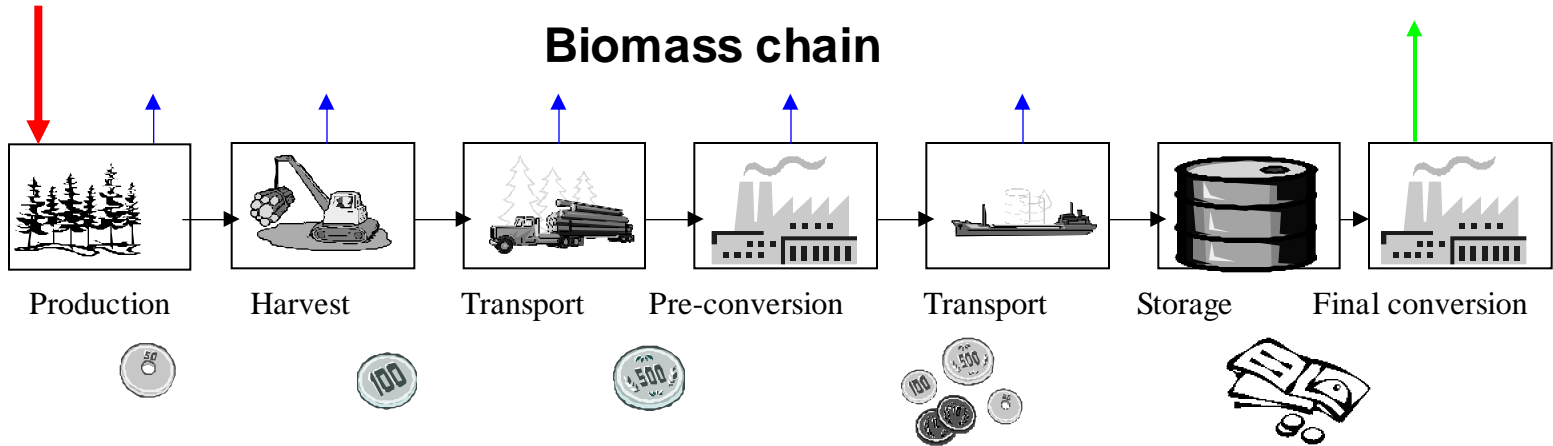
Physical trade



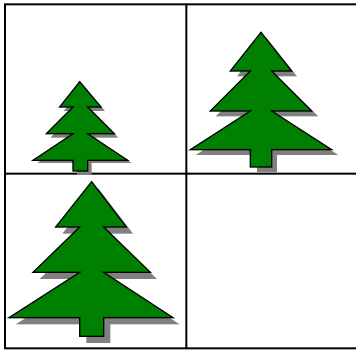
Emission credit trade



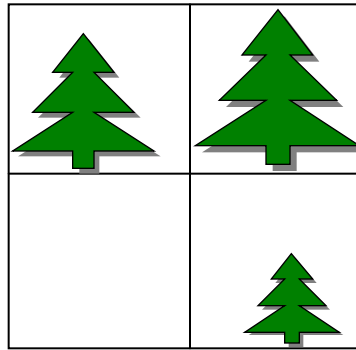
How to calculate emission reductions and costs?



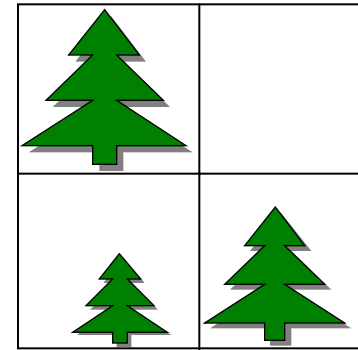
Land-use change



Timestep 1



Timestep 2

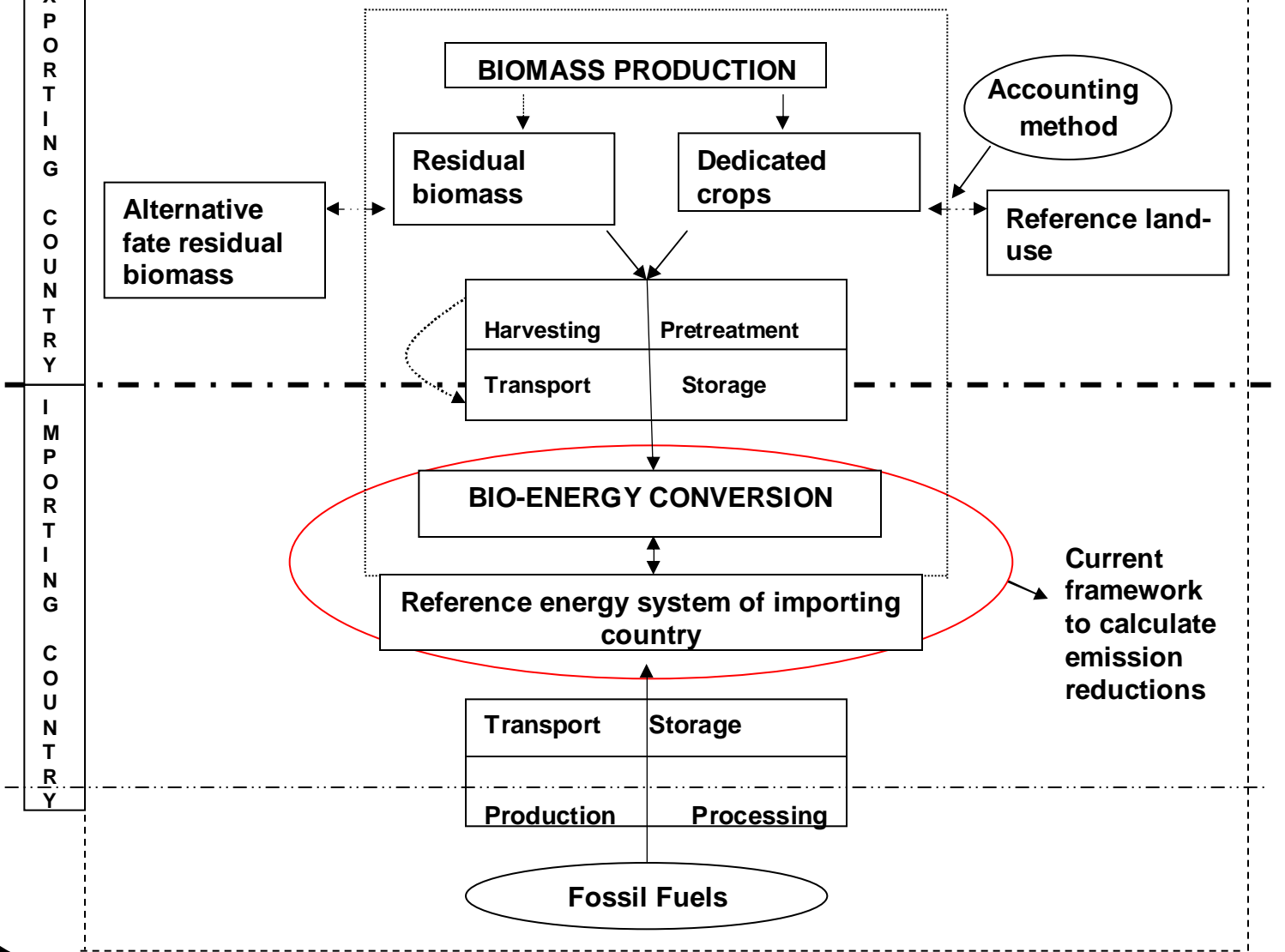


Timestep 3

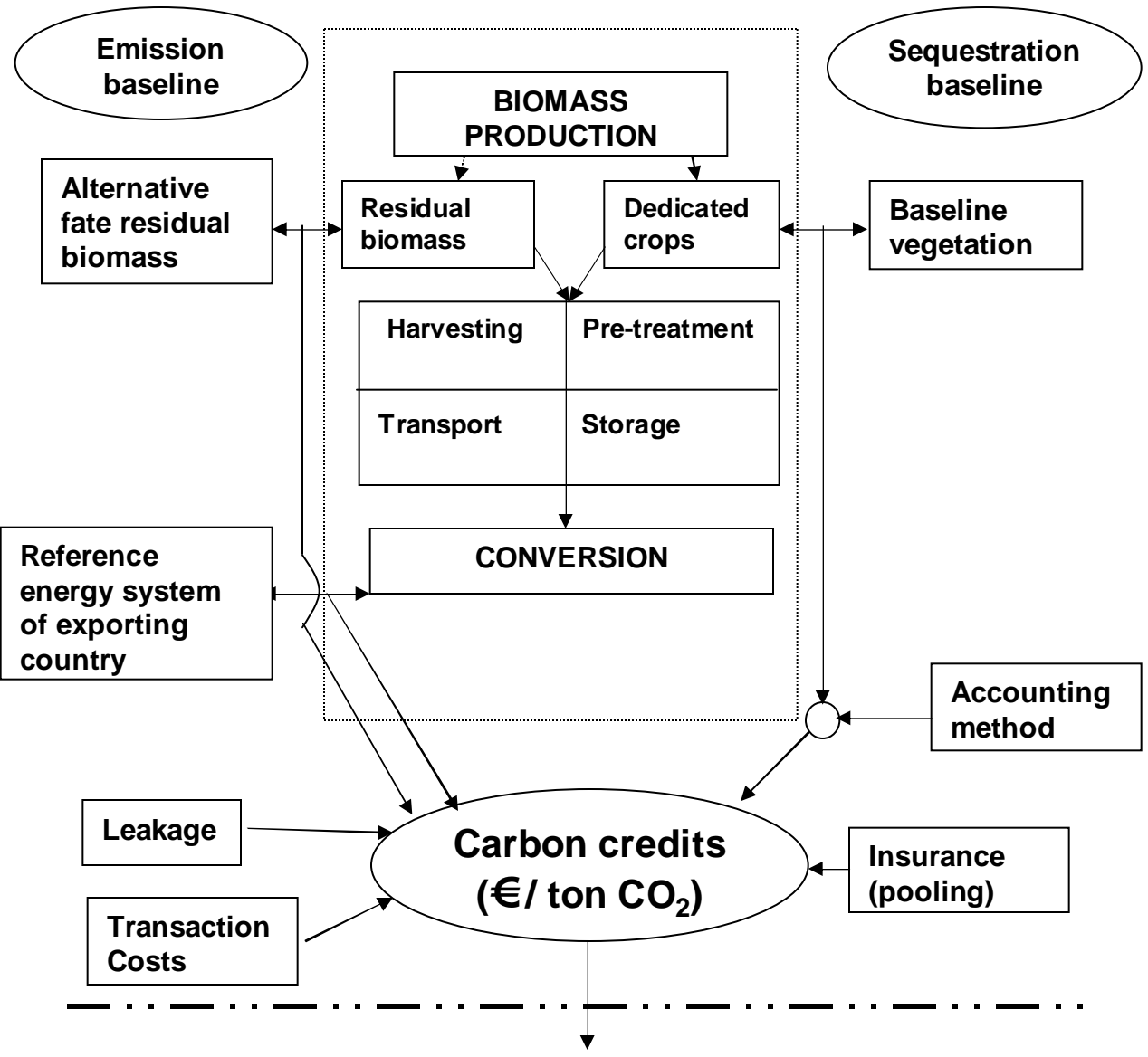
ACCOUNTING RULES:

- Stock Change
- Average Storage
- Ton-Year
- Temporary Crediting

Reference systems



PHYSICAL BIOMASS TRADE



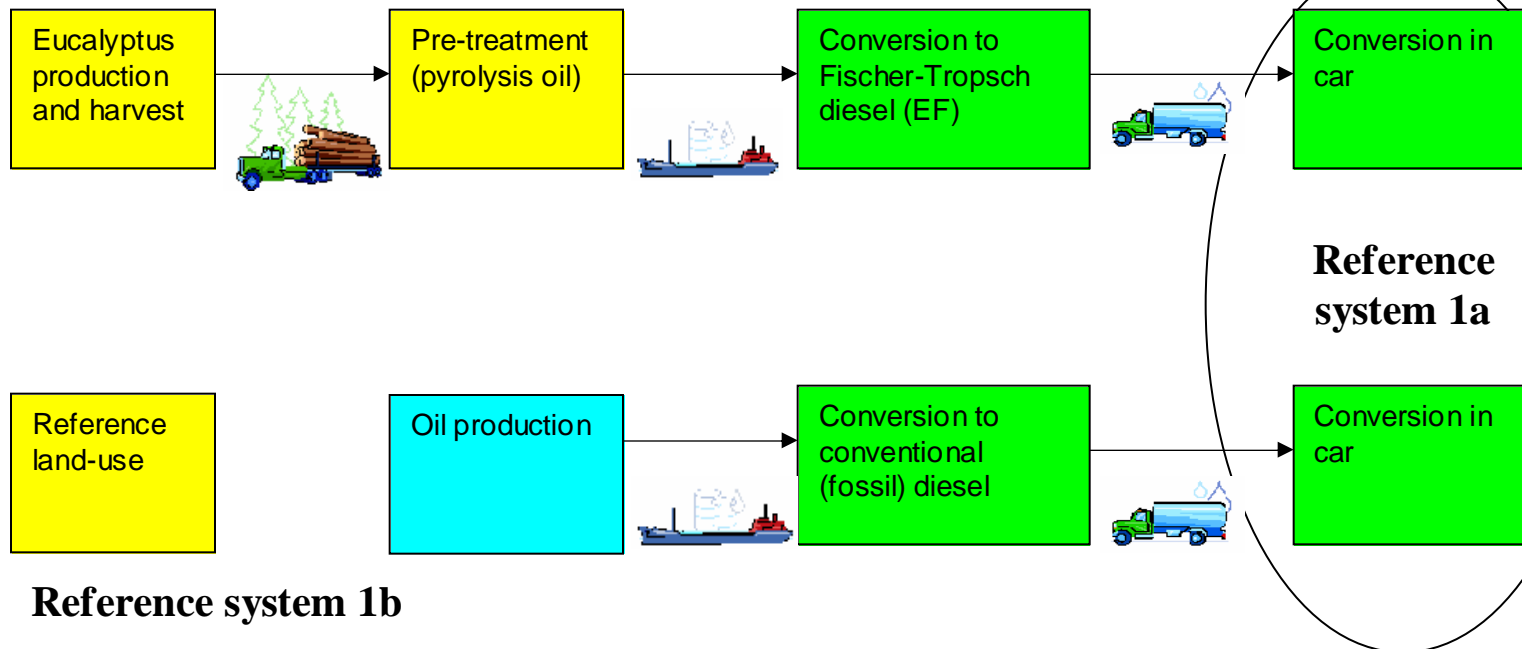
EMISSION CREDIT TRADE

Case studies:




- Mozambique & Brazil
- Transportation fuels
- Different vegetation baselines
- Different accounting rules
- Different reference energy systems (selling or buying country) and different biomass chains

Mozambique (I)

System 1 physical trading

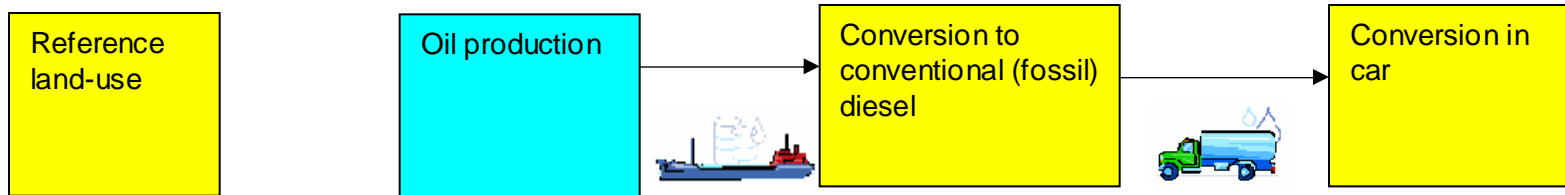
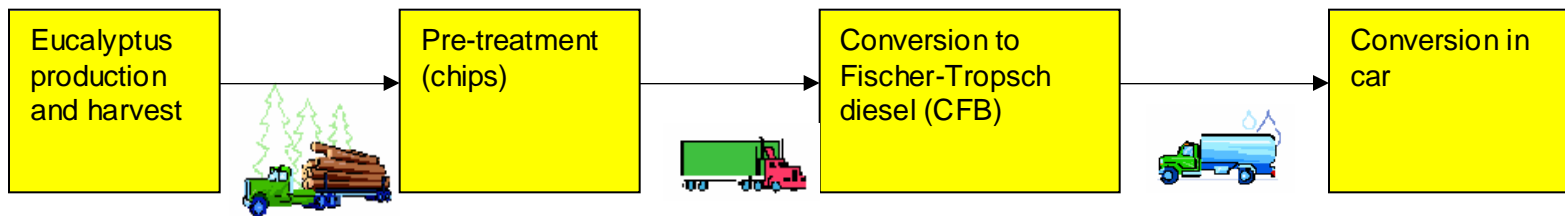


Reference system 1b



-  Mozambique
-  The Netherlands
-  Oil producing country

Mozambique (II)

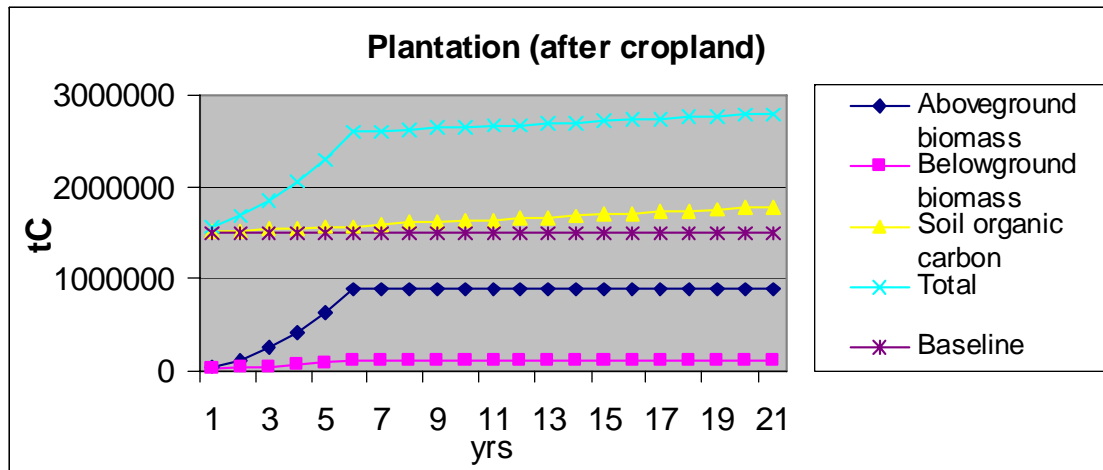
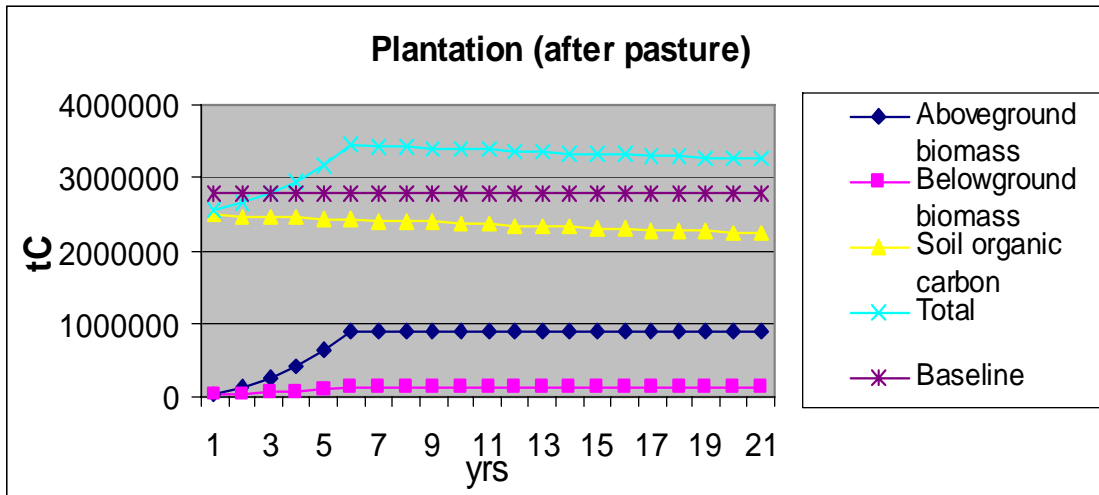
System 2: emission credit trading



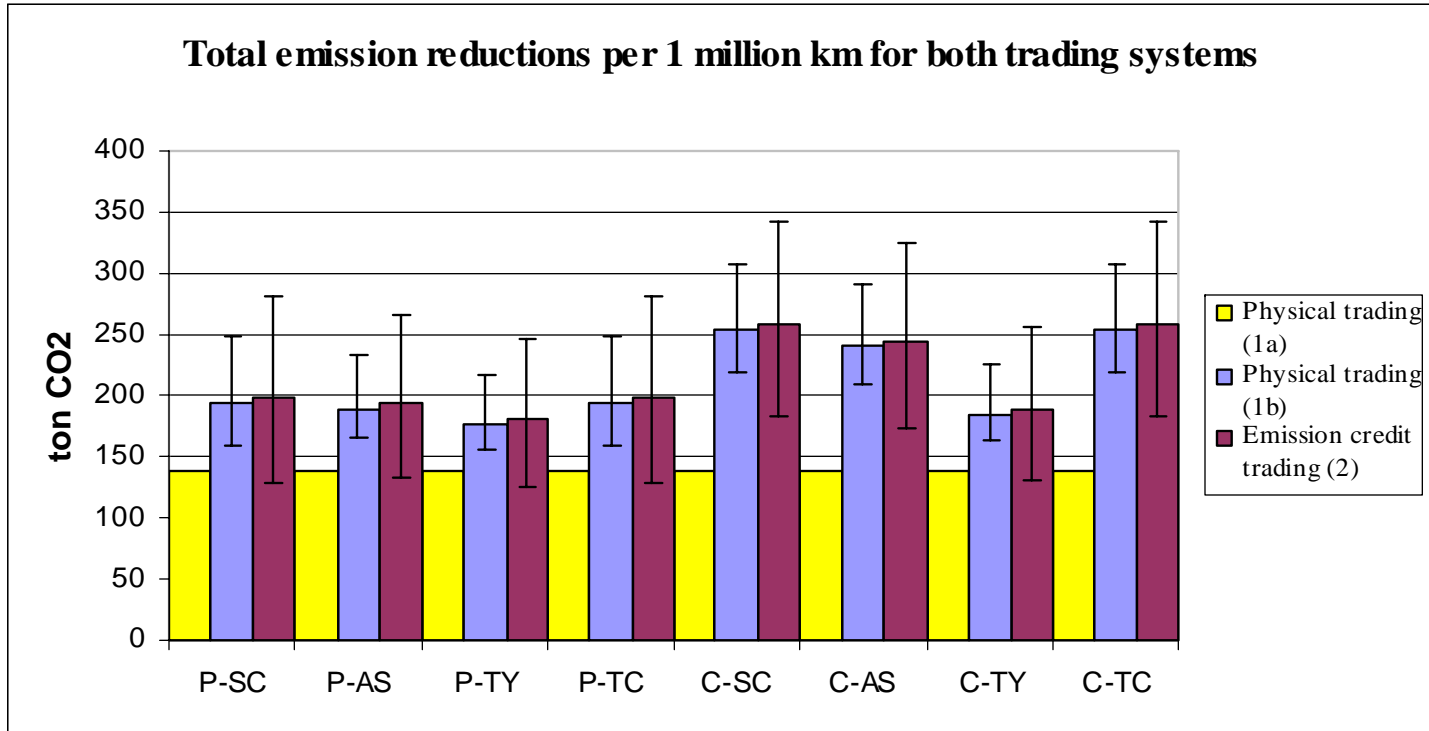
Reference system 2a

-  Mozambique
-  Oil producing country

Mozambique (results I)

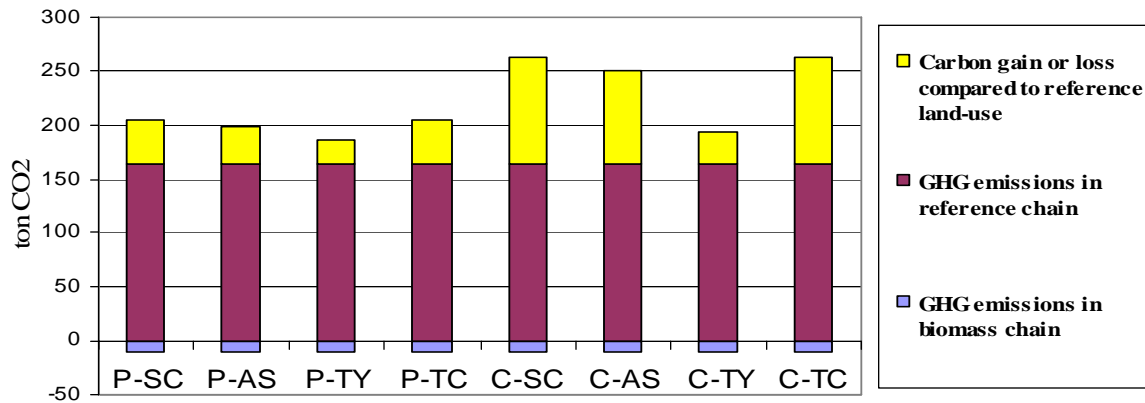


Mozambique (results II)

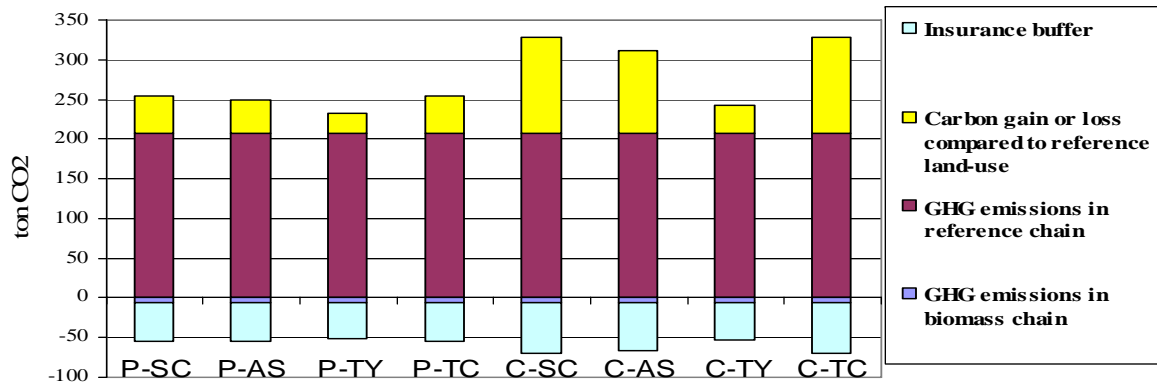


Mozambique results (III)

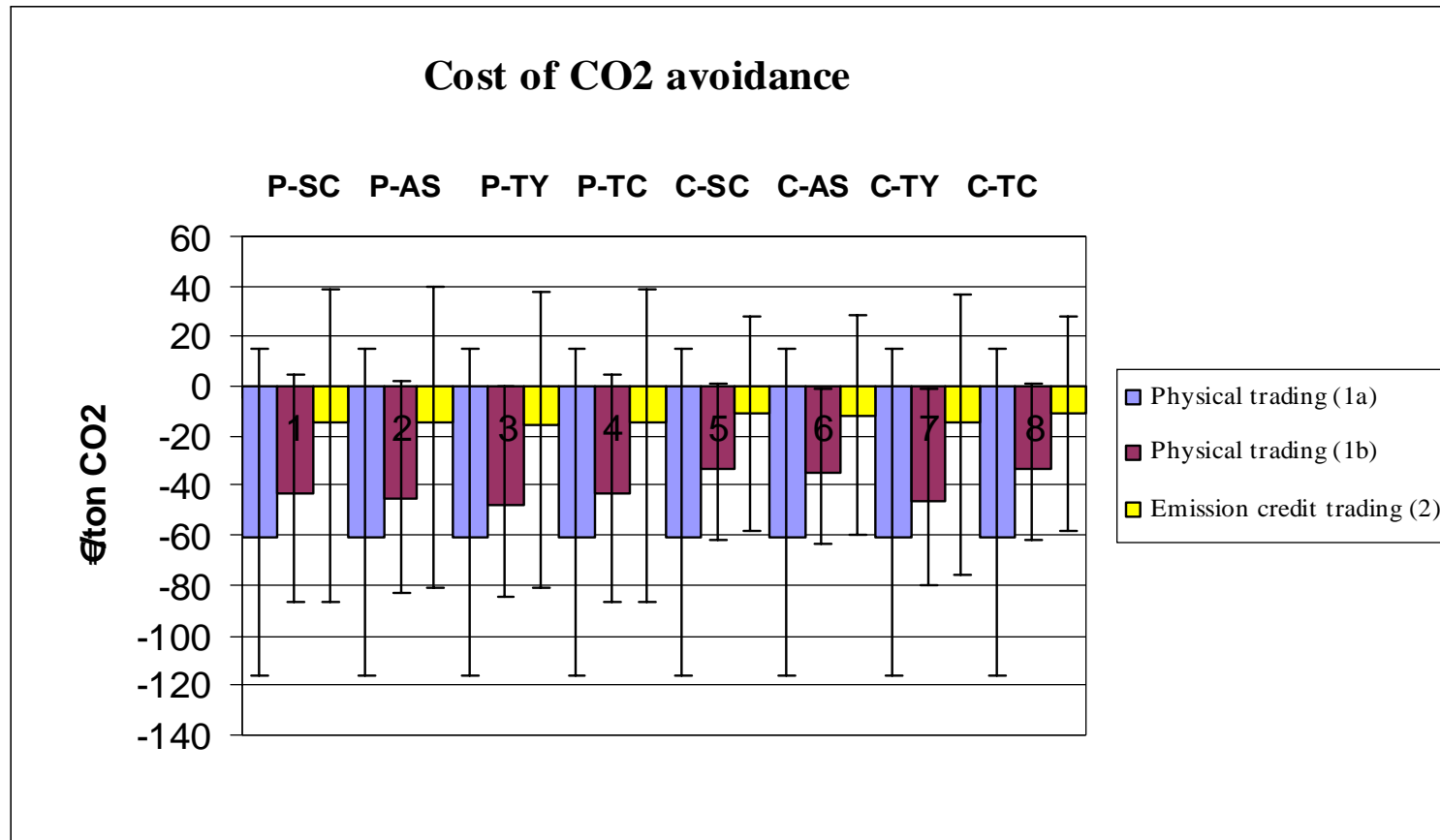
Breakdown of emission reductions for physical trading (1b)



Breakdown of emission reductions for emission credit trading (2)

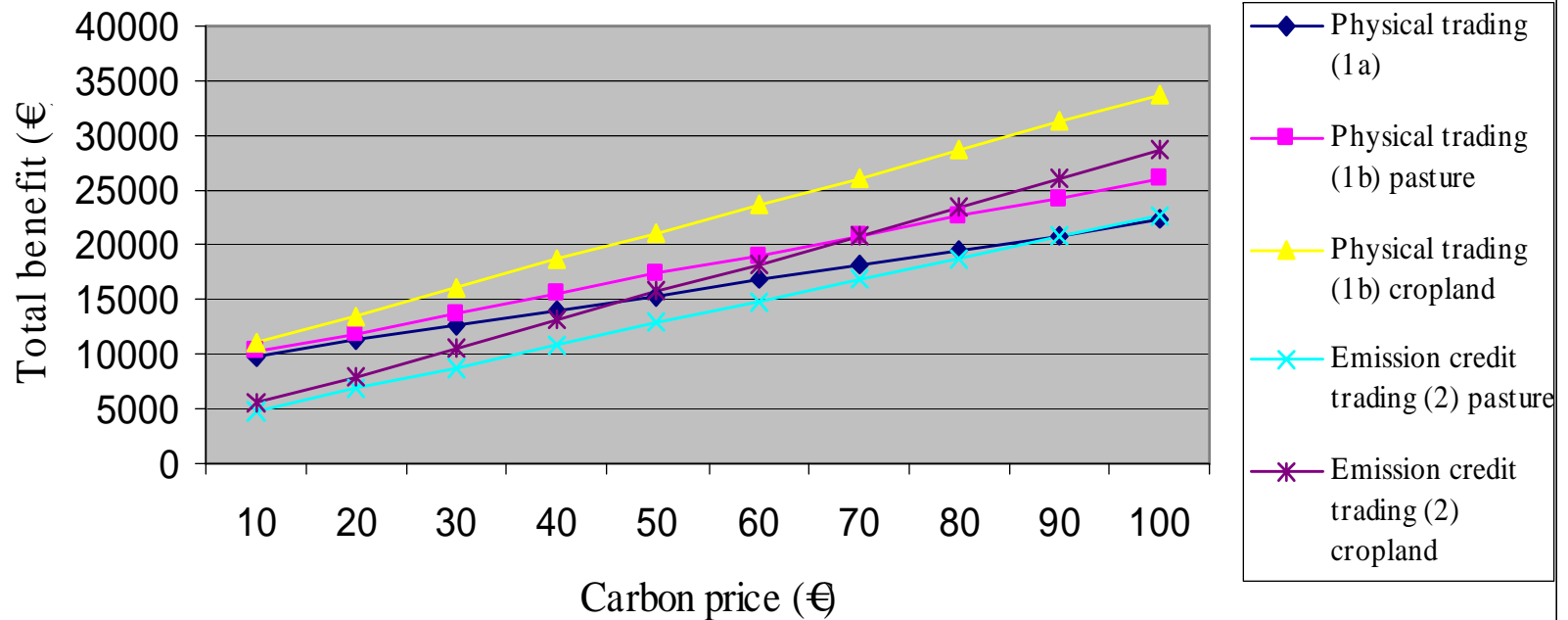


Mozambique (results IV)



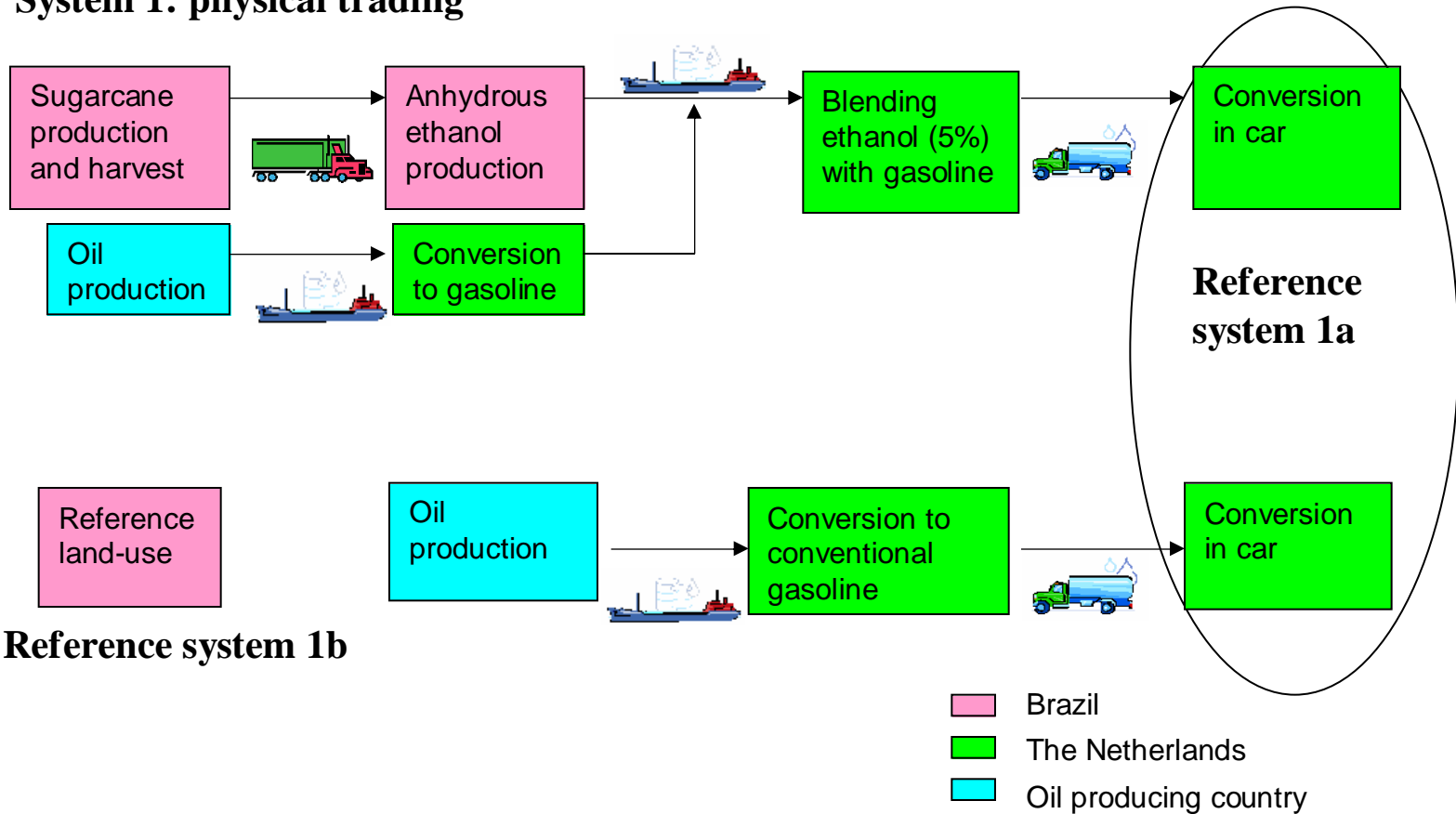
Mozambique (results V)

Financial returns (per 1 million km) for different carbon prices (TC)



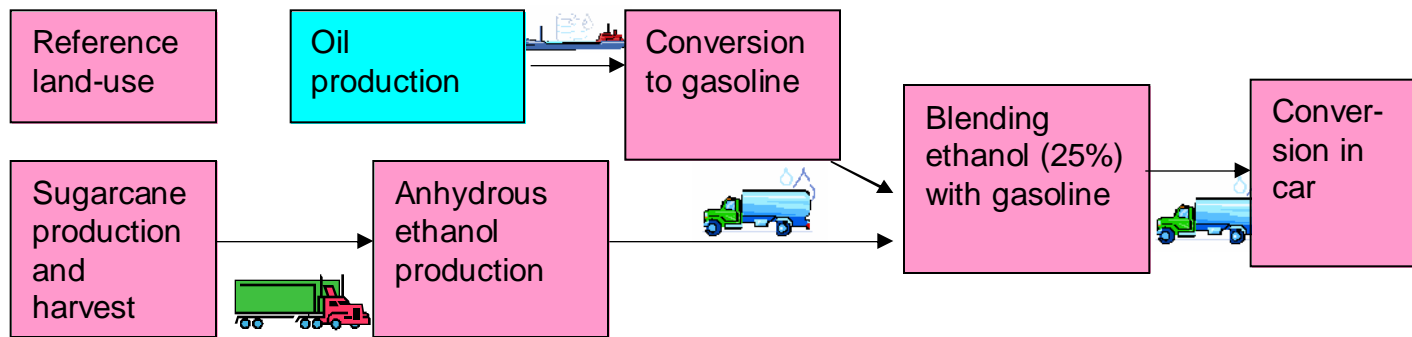
Brazil (case description I)

System 1: physical trading





Brazil (case description II)

System 2: Emission credit trading

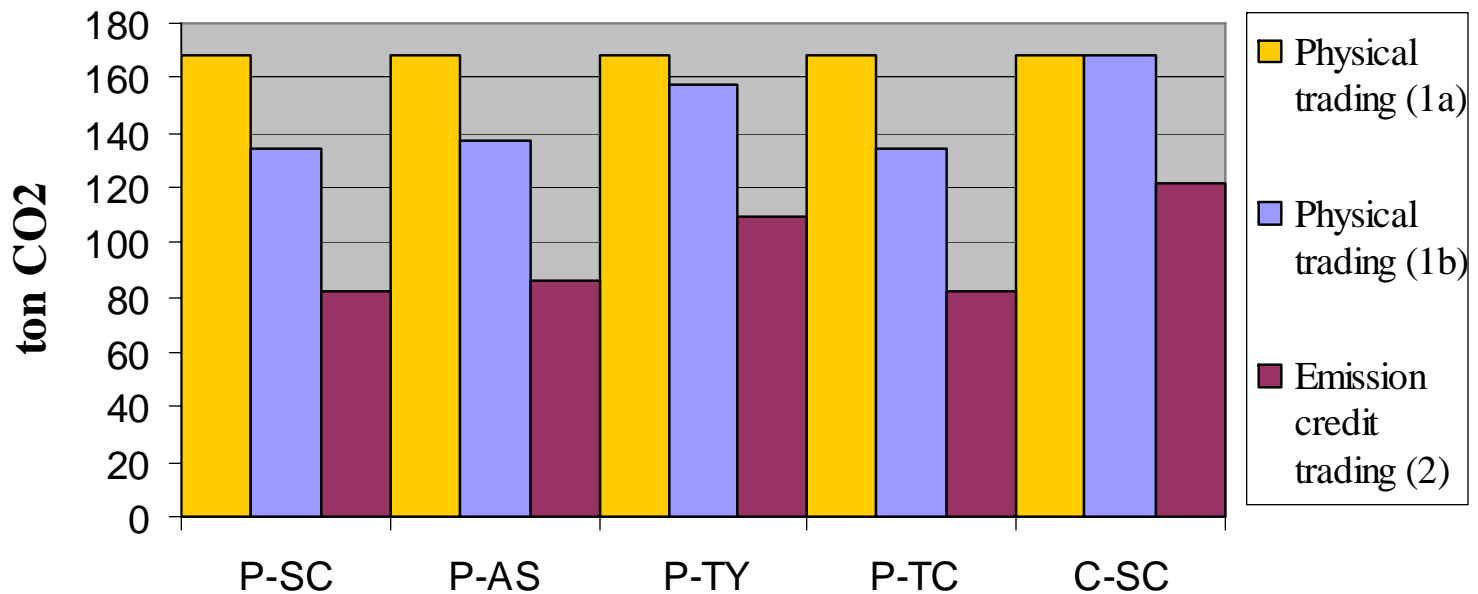


Reference system 2a

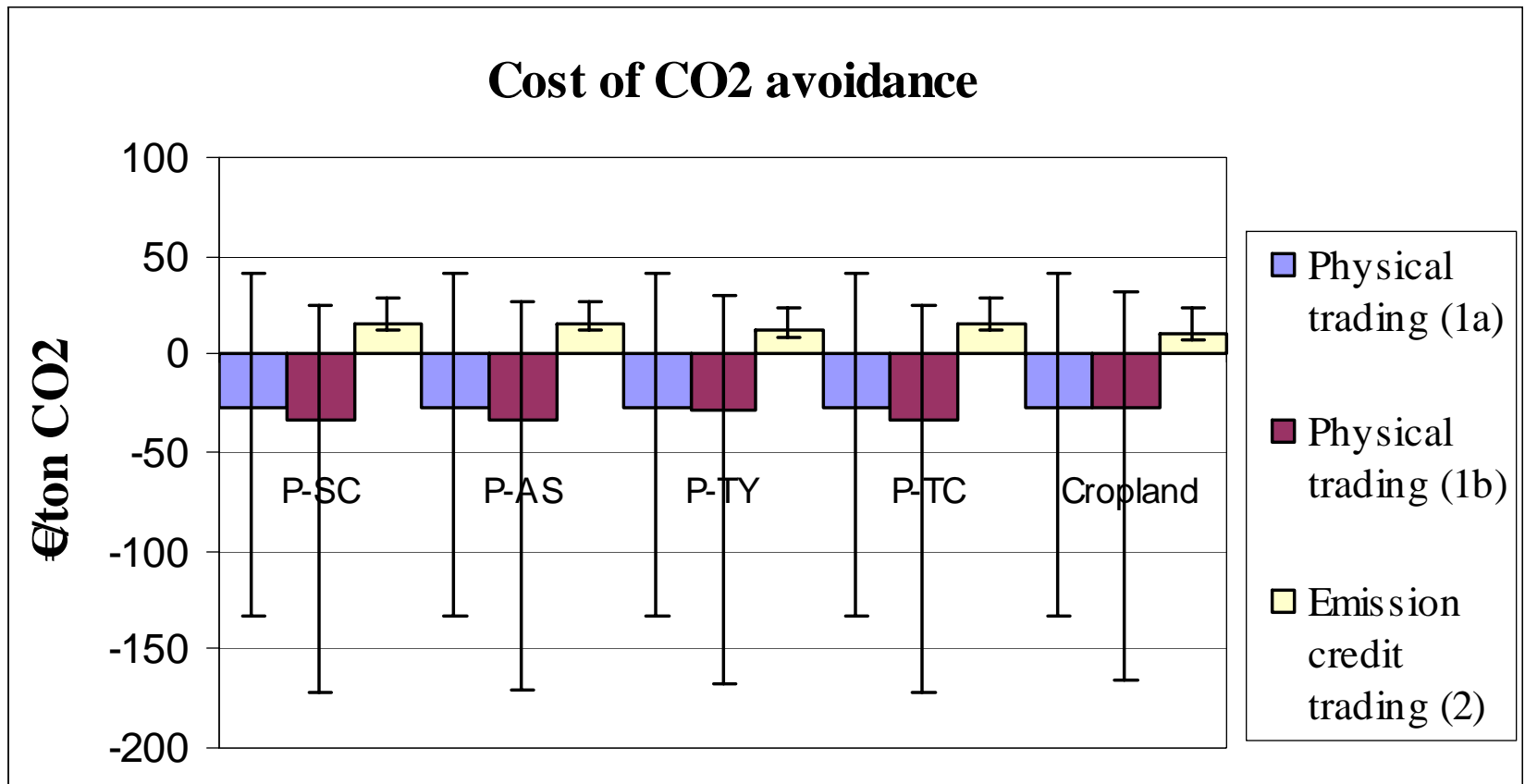
-  Brazil
-  Oil producing country

Brazil (results I)

Total emission reductions per 1 million EtOH-km for both trading systems

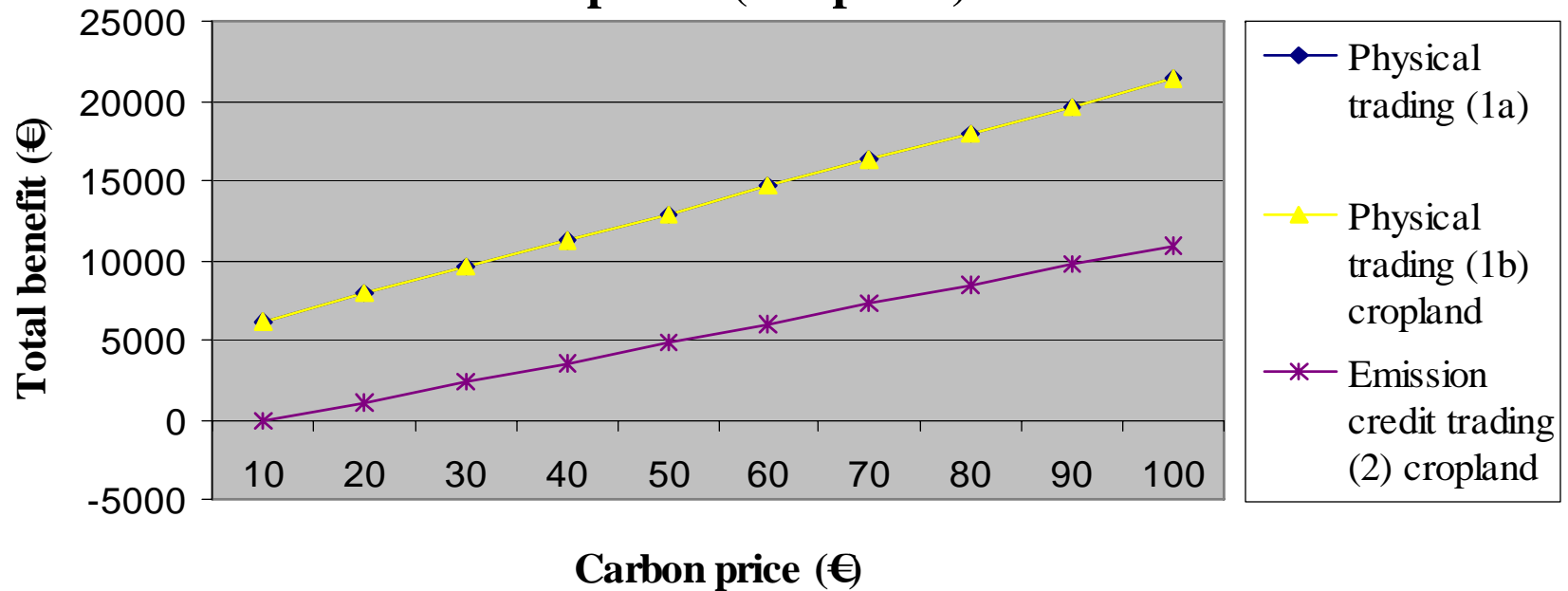


Brazil (results II)



Brazil (results III)

Financial returns (per 1Mkm EtOH) for different carbon prices (Cropland)



Optimization method

- Total tons avoided (tonCO₂ / yr)
- Cost of avoidance (€ / tonCO₂)
- Total benefits/cost (€ /yr)
- Footprint (tonCO₂/ha)

Results can vary per optimization method,
depends on individual preferences

Conclusion (I)

- Land use change (included in CDM, excluded in physical trading) makes a difference (aboveground, SOC)
- Accounting rules
- Timeframe

Conclusion (II)

- Large scales decreases influence of:
 - Transaction costs (ECT)
 - Transportation costs and emissions (PT)
- With decreasing transportation costs, fuel prices (both fossil and biofuels) become world market prices >> Ignoring taxes, subsidies import tariffs and other trade barriers....

Emission reference system – emission biomass system

Conclusion (III)

Unless emission reductions can be much higher in the country of biomass origin, PT seems to be the best option:

- **Diversification of energy sources**
- **Job creation**
- **Biofuel targets (policies and regulations)**
- **Sustainable development in developing countries (global biomass markets)**

Thank you for your attention!

Questions?

