New & improved options for carbon offsets

-- stimulating innovation in options & practice --

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[1] Motivation

Innovation will be crucial

- Rapidly growing scale of demand spurred by corporate decarbonisation goals (e.g. 'net-zero')
- Growing (demand-led) preference for 'high quality', is driving a shift away from low-cost *avoidance*, towards higher cost nature-based *removal* options
- Contraction (regulator-led) in 'low quality' supply
- Demand growth will rapidly outstrip supply (of 'good quality' options)
- Technology-based removal likely necessary to meet scale & pace of demand

Innovation is needed
(in options & practice)

new options · *larger scale* · *faster growth* · *lower cost* · *lower risk*

	Nature-based	Technology-based
Avoidance	Dominates Aus market Multiple major international schemes Can be excellent value, but quality is highly variable & often poor	Mostly in developing countries (e.g. renewable energy) Big risk of double counting
Removal	Mostly projects that regenerate 'natural' landscapes *(much cheaper; biodiversity cobenefits)* Can be excellent value, but also can have high costs & low landholder motivation	DAC is expensive (energy & cost) BECCS needs a system justification Non-geological sequestration options are at low TRL and/or low scale Long-term utilisation options are limited

Figure 1: *Market trends show clear signs that new & more innovative options will be needed*

[2] Approach

Parallel pursuit of short & long-term wins

Phase 1 (by June 2023)

- Identify best candidates for innovation to increase supply of offsets with low 'quality risk'
- Which low 'quality-risk' options can provide economic co-benefits for Surat Basin landholders
- Benchmark against indicative techno-economics for regions outside Surat Basin

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Phase 2 (from July 2023)

Pongamia

- detailed tree growth models tuned to empirical data
- assess techno-economic case for waste meal to reduce cattle enteric methane (feed supplement)
- trial plantings under different growth conditions

Timber

- high quality empirically-based timber production models (for Surat)
- detailed site assessments as required

General

- atlas of land-based options for northern Aus
- improve understanding of co-benefits
- engagement with regulator (incl. method design)
- strategy for rogue-CH_4 and CCS

[3] Approach

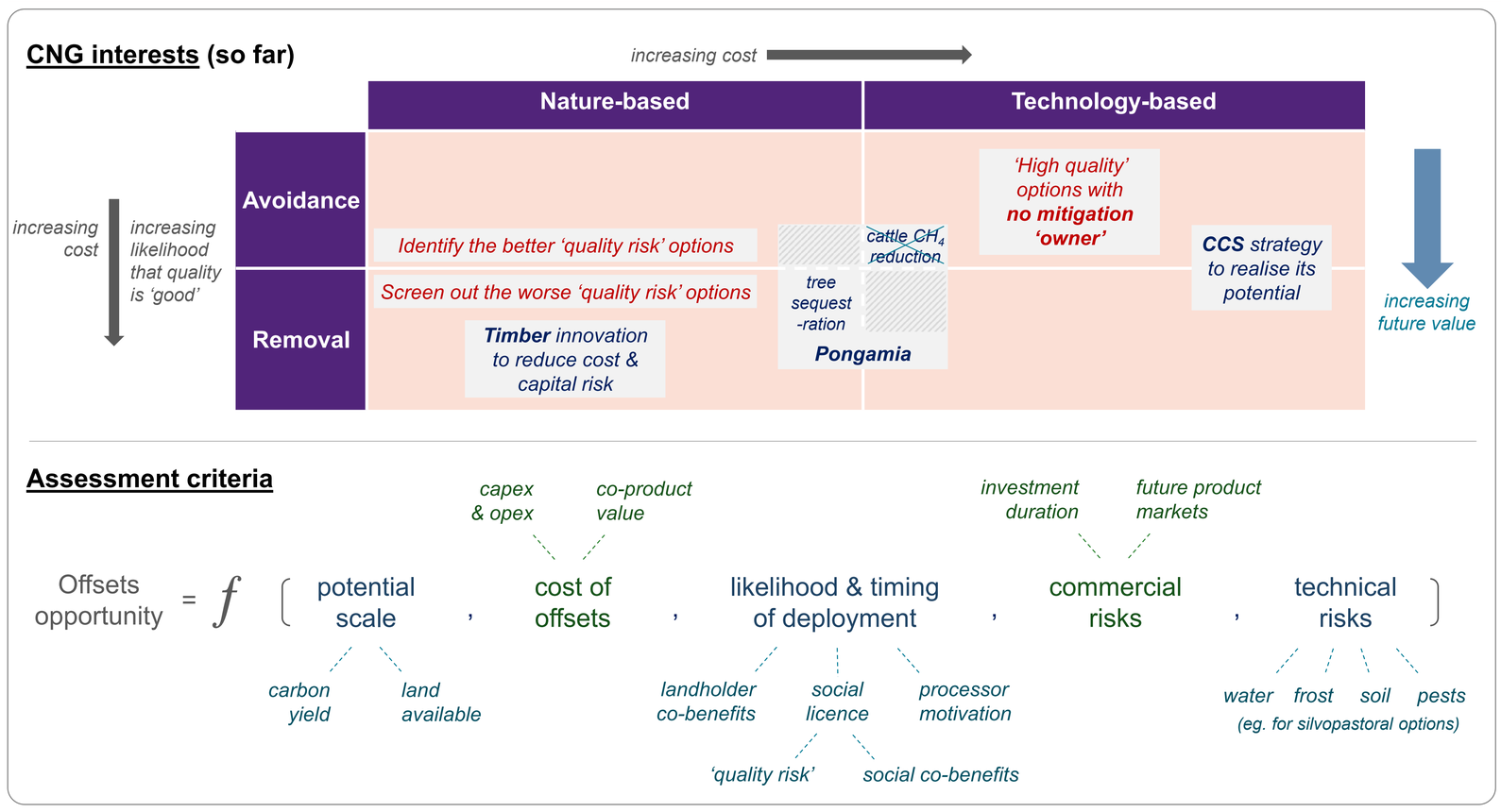

Figure 2: *Frameworks for assessing current & future offsets options, to identify the need & opportunity for innovation*

[4] Perspectives (to date)

Silvopasture - opportunity to do things differently
→ *eucalypts* & *pongamia* both have potential

access to land

- both → can yield on land with low opportunity costs
  → prospect of direct co-benefits for landholders
- partnership with offsets customers could help manage landholder capital risk

direct landholder co-benefits

- both → trees to help manage climate stress
- pongamia → business diversification
  → meal-to-feed might reduce cattle methane

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quality risk reduced through incentives for active mgmt

- pongamia → oil crop (human food) → strong incentive
- eucalypts → timber viability requires careful planning

socio/enviro co-benefits

- both → regional processing for distributed socio-economic benefits
- pongamia → reduced cattle methane (?)
  → displaced human-food production
- eucalypts → long-term C-sequestration in buildings
  → displace international logging
  → local ecosystem benefits…?

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cost & capital risk

- pongamia → offsets are incidental byproduct (∴ cheap)
  → strong cashflow from year 5
- eucalypts → careful planning to manage capital risk
  → managed regen to reduce costs

industry readiness

- pongamia → large scale needed to establish processing
  → plantations needed to prove oil yield
- eucalypts → established markets that draw on imports
  → growing demand for higher value EWP

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path to certification

- relatively minor (?) modifications to forestry method
- requires evidence for growth in marginal conditions

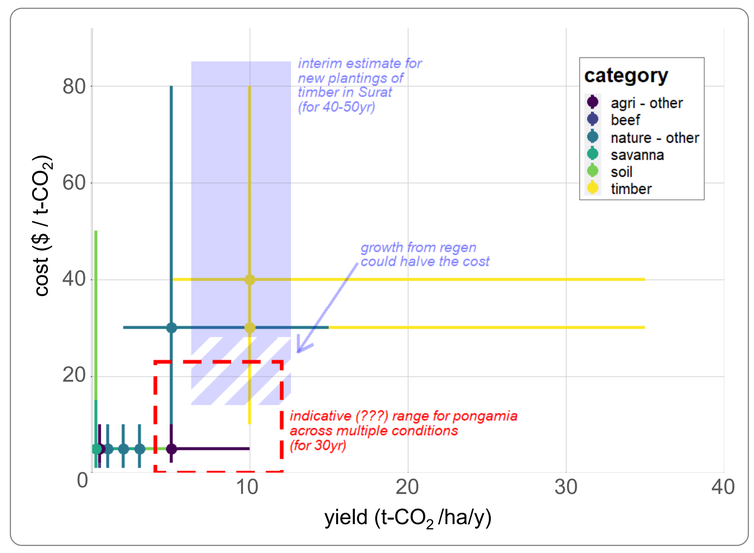

Figure 3: *Indicative ranges for conventional land-based offsets (points with range bars). The overlays show early estimates for the cost & yield prospects of innovative silvopastoral (timber; pongamia) approaches in the Surat Basin*

Surat Basin prospects need careful review

- strong motivation for gas companies to support offsets that provide financial benefit to local landholders
- Surat growth conditions are not ruled out *(but not ideal from perspective of conventional commercial priorities)*
- yield, cost & risk profiles vary strongly across basin

Expand the strategic effort

- Stronger connections to livestock sector, including an understanding of landholder motivators
- Explore nature-based options in other regions
  → for sufficient scale
  → to balance out the risk
- Expand scope to consider other nature-based removal options (e.g. soil carbon)
- Expand scope to non-nature based options:
  → establish regulator support for un-owned emissions (e.g. rogue CH_4)
  → Improved discourse needed to enable CCS

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