Conditions for Better use of Water in Agriculture and the Pricing Issue

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The Management Challenge

[A] Uses:

non-consumptive

consumptive

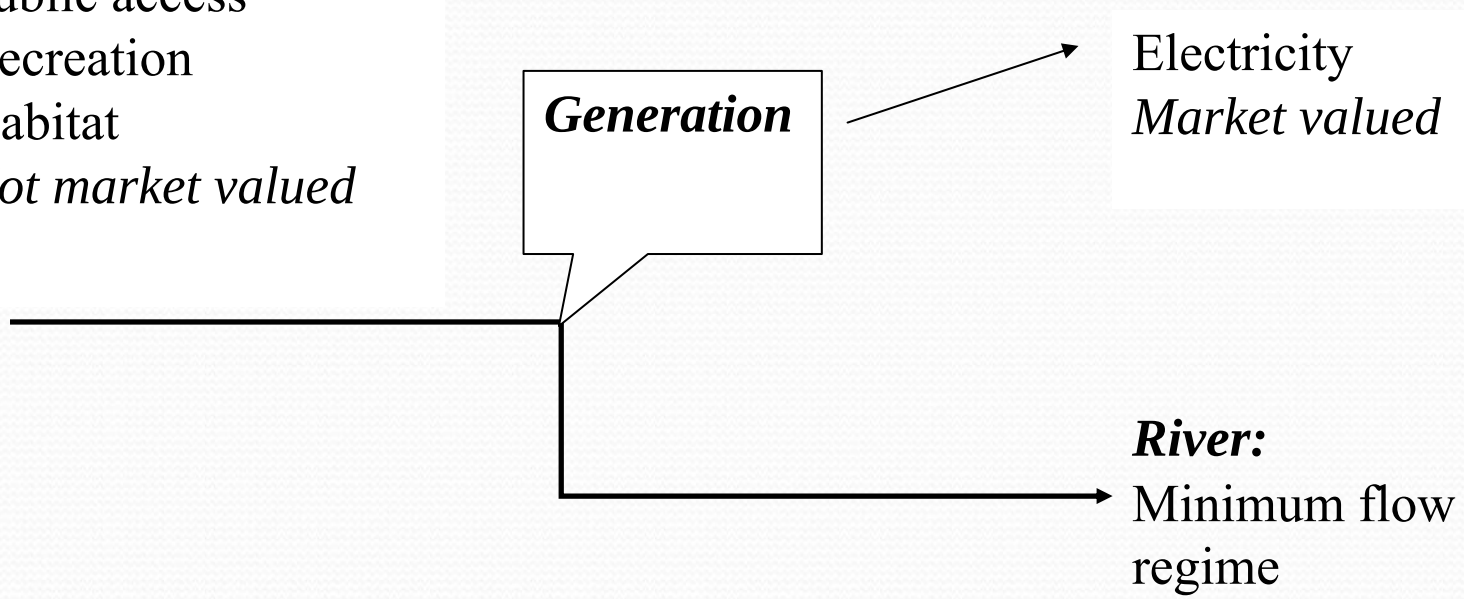
[B] Non-uses:

Habitat

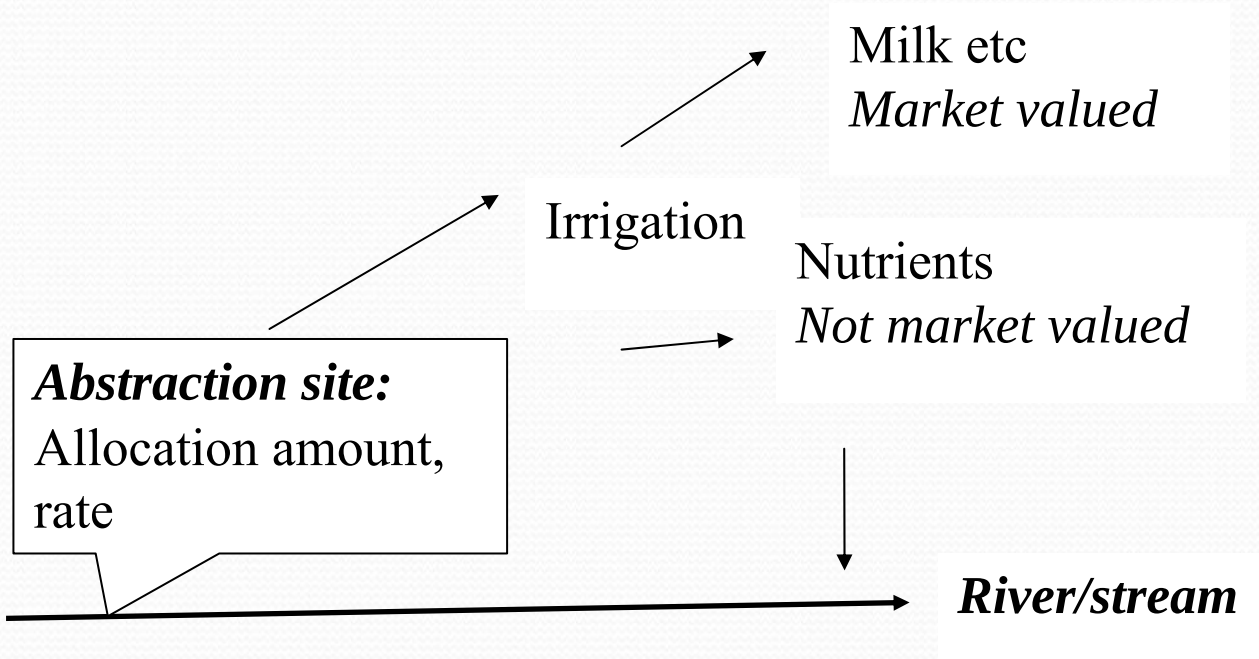
Ecosystem

Non-consumptive use

Hydro storage:
Public access
Recreation
Habitat
Not market valued



Consumptive use



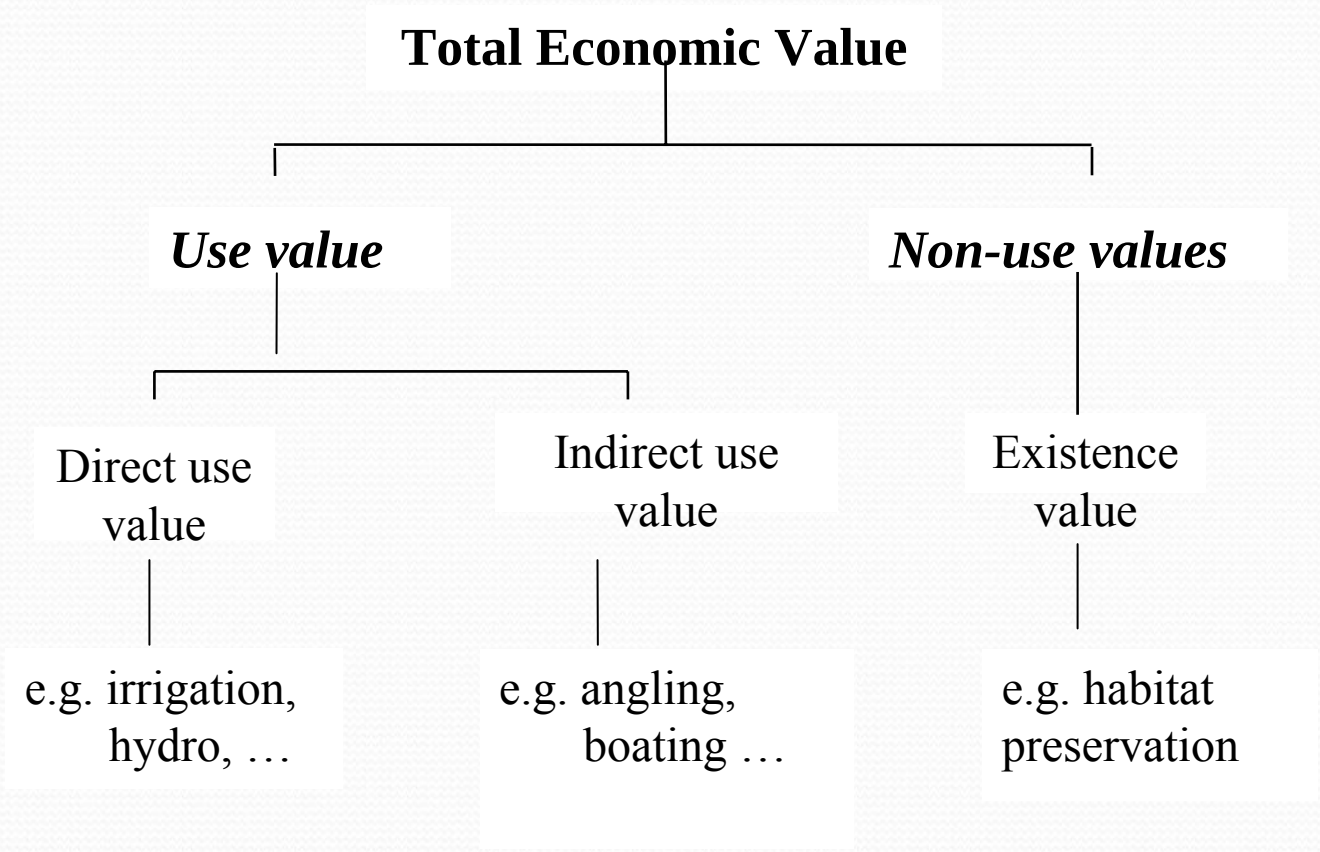
What is the Problem?

Competing uses → Competing values

- Energy producers
- Farmers
- Salmon anglers
- Streambed preservation
- Wild life habitat

Market valued & non-market valued

TEV Framework



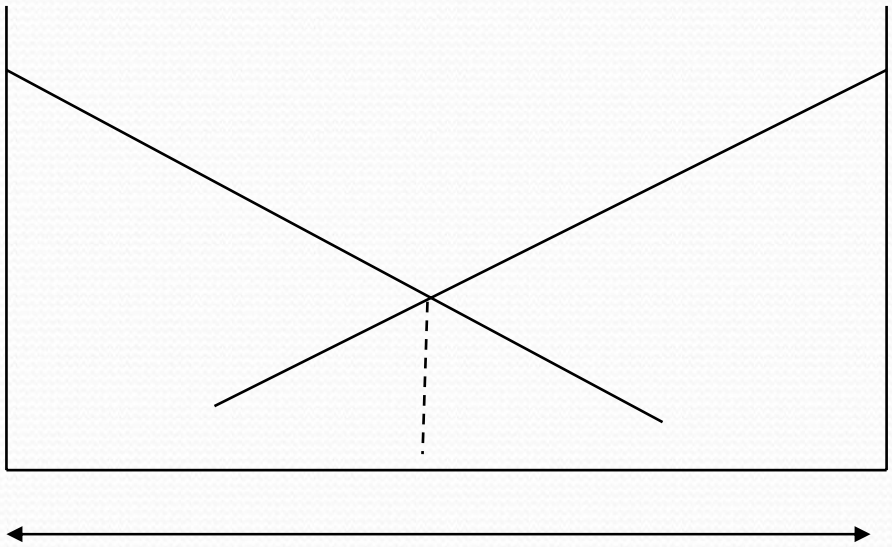
Total Economic Value
Market & Non-market Values

- Basic Idea
  - (A) Use of water resource
    - Input into production process
    - → value (use value)
  - (B) Non-use
    - Maintain flows
    - → value (use & non-use values)
  - Economic efficiency seeks to balance (A) and (B)

Total Economic Value

Marginal Use Value

Marginal Non-Use Value



Quantity of Water

Condition #1

- Embed non-market values into water allocation and management plan
- Focus on mechanisms & processes that generate on-going information on both market & non-market values
- Outcome:
  - Sustainable supply of water that meets community requirements, environmental goals and demands of water users

Two Approaches to Pricing

- Tradable rights: market price reveals value to users
- Administered price based on estimates of value using residual method:
  - Rent = total revenue *less* total variable costs *less* return to non-water fixed factors (e.g. owners equity) *less* any non-water rents (e.g. location)
  - Calculate average and marginal rent:
    - Average = $total value/total use
    - Marginal = change in $total value/change in total use

Are They Equivalent?

- Both create opportunity costs and signal scarcity
  - Work on different axes: price - quantity
- But outcomes not equivalent:
  - Price may (probably will not) not deliver the desired environmental outcomes
  - Tradable rights, provided enforced, will deliver desired environmental outcomes and provide ongoing information on value
  - Information requirements not equivalent
  - Government revenue

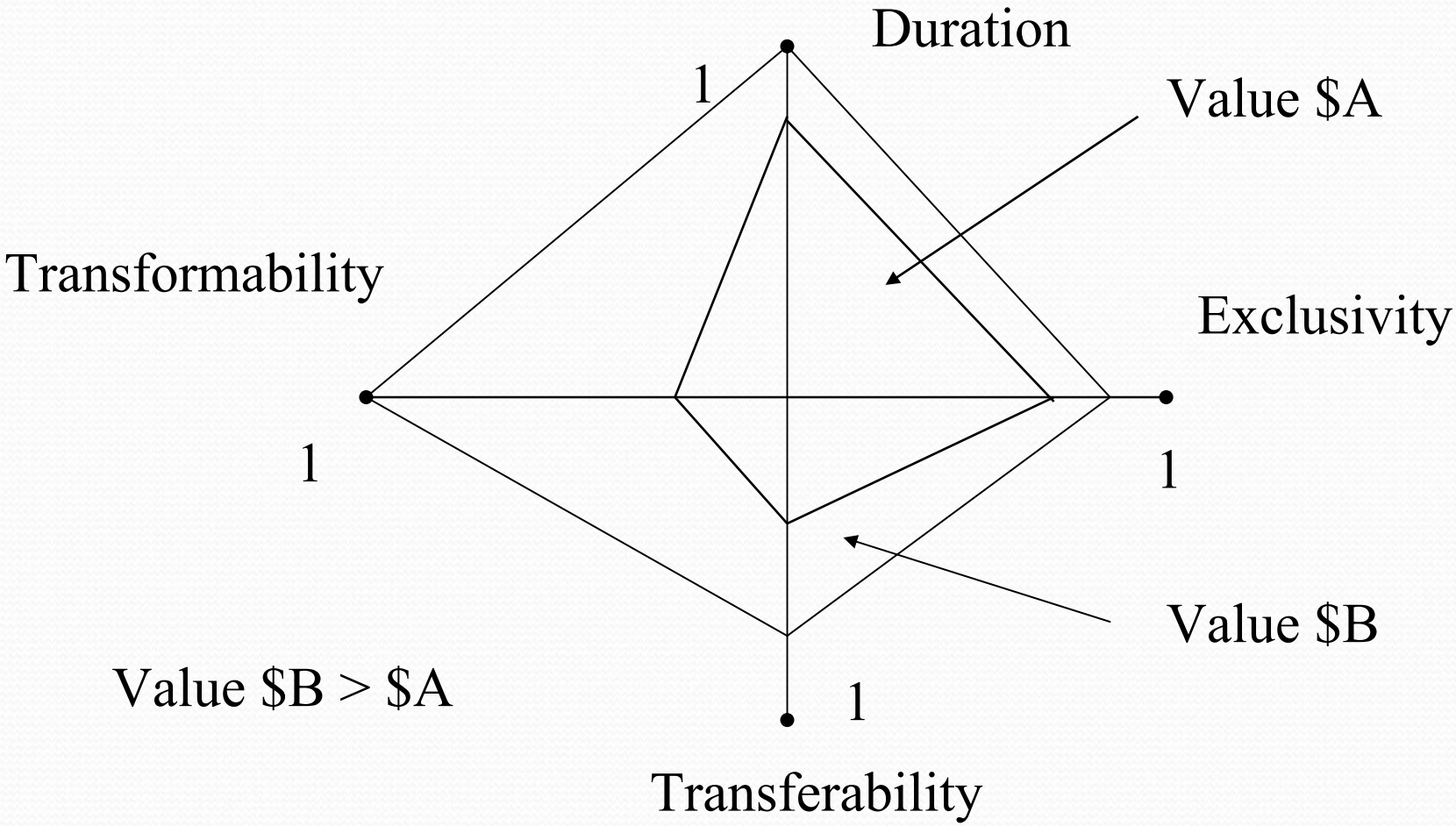
Property Rights

- For decentralised coordination of production and consumption to work efficiently, in a society with diffused knowledge, individuals must have secure private property rights that are tradable at mutually agreed prices with relatively low costs of contracting.
- Little disagreement that stronger private property rights are more valuable than weaker private property rights.

Structure of Permits and Value

- Duration: time hold claim to benefits associated with use – maximum duration 35 years
  - Longer duration more valuable, return on investment e.g. water efficient technology
- Exclusivity: ability to appropriate the benefits associated with investment
  - Align profits with cost
- Transferability: move to higher valued use
  - Unleashes dynamic
- Transformability: create derivative right e.g. lease
  - Improves flexibility, manage risk

Value of water permits



Condition #2

- Robust system of rights governing use of water that is integrated with “environmental values”
- Governance must recognise uncertainty
  - Stochastic nature of water supply
  - Community needs
  - User demand
- Definition of use right e.g. share system
- Outcome:
  - Agricultural users can better align their management & investment decisions with expected returns

Water Economics

- Pricing water services
  - Key principle in sustainable development policy (e.g. OECD, 2002)
- Approach in NZ:
  - Resource Management Act: provides basis for administrative systems at regional level
  - Not priced
  - First-come-first-served
  - Rights not transferable
  - History of little monitoring
  - Total abstraction limited by minimum flow

Property Rights in NZ

- Water permit:
  - Water vested in Crown
  - Maximum 35 years, typically 10-15 years
  - Can’t transfer outside catchment
  - Conditional aspects:
    - Hierarchies of use
    - May have freedom when and how to use
    - May transfer to subsequent owner of land
    - May not be able to exercise right

Should we be Concerned About this Allocation Process?

- Most definitely yes!
- Why?
  - Race to the pump house
  - Water “demand” > supply
  - Existing uses unlikely to be efficient
  - Substitution of natural capital for manufactured capital
  - Dynamic investment incentives

Tradable Rights: A Feasible Alternative

Tradable rights:

- Establish sustainable target e.g. minimum flow
- Define rights e.g. water permit as a % of annual quantity
- Set initial entitlements:
  - existing use
  - could auction
- Establish rules governing transfer

Governance: International Practice

- Water resource development → water allocation and water quality
- Old development model: centralised decision-making, administrative regulation
- New model: decentralised decision-making, economic instruments, stakeholder participation

Australia

- Government: federation, financial levers, public ownership, state management
- Policy: in transition, economic substituting for administrative approach
- Entitlements: 10 years, volumetric, security classes, cost recovery, interstate trade
- Outcomes: toward high value uses
- Challenges: environment, native title

Canada

- Government: federation, public ownership, provinces manage
- Policy: transition to economic basis for cost-recovery
- Entitlements: administered
- Outcomes: lack investment in infrastructure, low level conservation
- Challenges: conservation

Chile

- Government: federation, public ownership, role of NGOs in management and pricing
- Policy: advanced rights based, fine tuning
- Entitlements: granted free, proportional volumetric
- Outcomes: basis for rural prosperity, net gains from trade
- Challenges: non-irrigation sector, traditional rights, spatial aspects

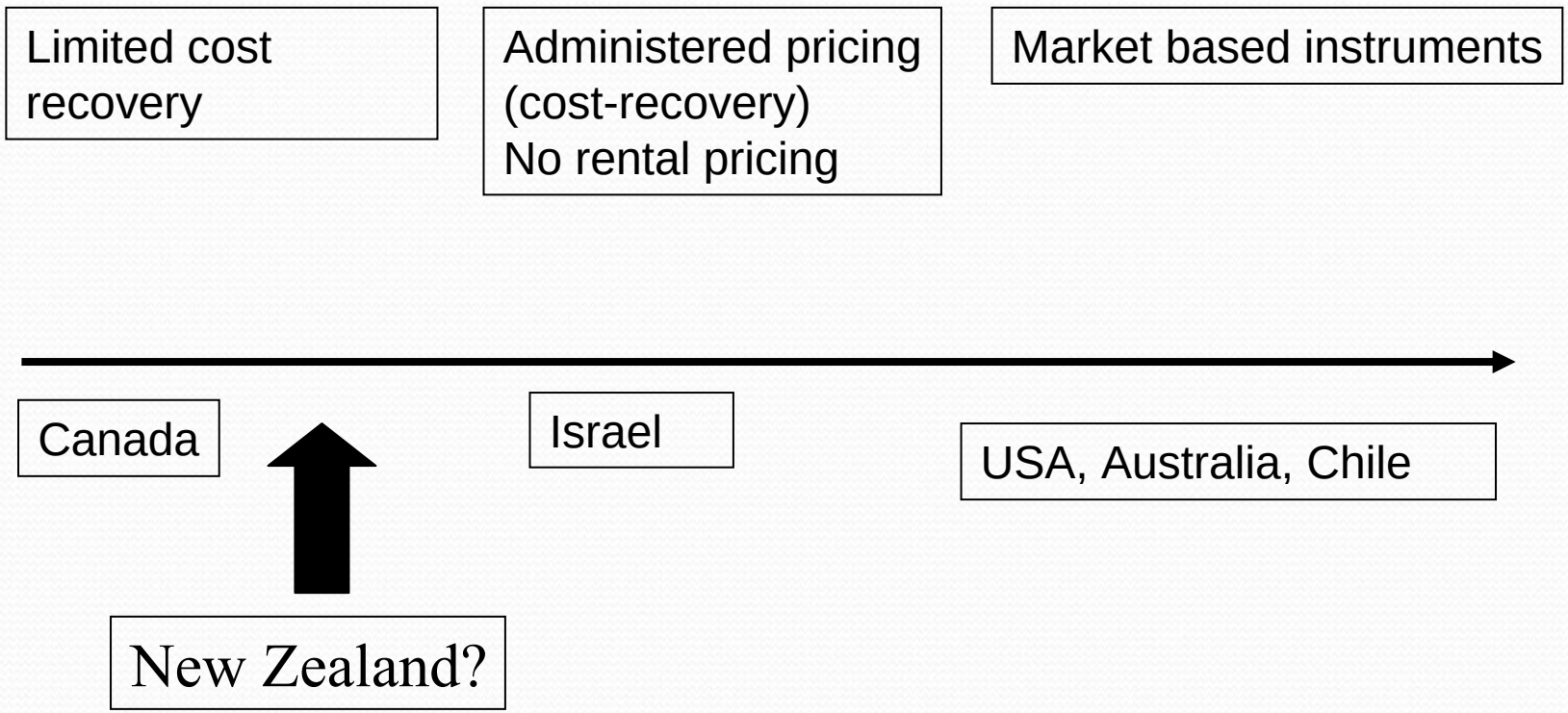
Israel

- Government: unitary, public owners, centralised, SOEs
- Policy: transition to strengthen pricing, devolution
- Entitlements: administered, hierarchical use rights, volumetric
- Outcomes: low wastage, high productivity
- Challenges: water quality, transboundary issues

USA

- Government: federal, financial levers, states own and manage
- Policy: state planning, strengthen pricing
- Entitlements: often spun-off federal projects, temporary/permanent transfers, state approval of transfers
- Outcomes: to high value uses, cross sector transfers
- Challenges: environment, equity

Gradient of Structures



Summary

- Policy:
  - Transition to economic instruments
  - Resource pricing/tradable rights
  - Devolution, NGO/stakeholder involvement
- Entitlements:
  - Volumetric, in some cases hierarchical
  - Tradable, tort “v” agency approval
- Outcomes
  - Basis for rural prosperity
  - Low value use high value use
- Future Challenges
  - Environment
  - Traditional rights
  - Non-irrigation sector