
Hållbar förvaltning av gemensamma naturresurser

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Gemensamma naturresurser

- Reda ut begreppen
- ”Common pool resources”
- Empiriskt exempel
- Kopplingar till klimatfrågan

Markets

- In a perfect market every good and resource has an owner and a price and agents have full information.

 - A market for a resource can be "created" if:
 - property rights for the resource can be defined,
 - these property rights are transferable,
 - there are rules (civil laws and norms) that govern contract enforcement.

 - Resource allocation will be efficient no matter to whom the property right is given (Coase Theorem)
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Resource characteristics

- Access - Excludability
 - Possible to deny access?
- Rivalry / Subtractability
 - Effect of one person's consumption on others' consumption?
- Divisibility
 - Possible to divide the resource?

Resource characteristics – types of resources

Access:	Individual	Unlimited	Group
Rivalry:			
Rivalry	Private good	Open Access	Common Pool resource
Non-Rivalry		Public good	Club good

Open access

- Impossible to deny access
- Subtractible consumption
- All users have incentive to capture as much of the benefits as possible before someone else captures them

Open Access II

- Gordon (1954): The economic theory of common property resources, *Journal of Political Economy*.
"An asset that is everyone's property is no one's property"
- Hardin (1968): *The Tragedy of the Commons*, *Science*.
"Freedom in the commons brings ruin to all"
- Resource with finite size and positive social value, but resource that is open to all is costless to use.
- Entry drives resource rents to zero

Public goods

- Available to all (*non-exclusive*)

 - One person's consumption does not reduce another person's consumption (*non-rivalry*)
 - Free-rider problem
 - Misallocation of resources
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Public goods II

- Olson (1965): "The logic of collective action"
"Unless the number of individuals is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, *rational, self-interested individuals will not act to achieve their common or group interest.*"
"The logic of collective action, public goods and the theory of groups", Cambridge, Mass., Harvard University Press, p. 2

Important distinctions

Public goods

- Non-exclusive
- Non-rivalry

Open access

- Non-exclusive
- Rivalry

Common pool resource

- Partly exclusive
- Subtractable yields

CPR *vs* Open Access

- Common pool resources are NOT open to all
- CPRs are not costless to use
- Gordon and Hardin referred to open access regimes

CPR *vs* Public Goods

- Rational, self-interested individuals do act together to achieve their common or group interest..
- ...even without outside coercion
- Free-riding is avoided by creating rules and punishments and by monitoring each other

Common pool resource

- Natural or man-made resource
- Limited entry
- Indivisibility in resource stock
- Subtractable yields

Examples of CPRs

- Fisheries
- Forests
- Irrigation systems
- Grazing
- Ground-water basins
-
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Evidence

- Poor families in arid India: 15 – 25% of income from CPRs.

Jodha (1986), *Economic and Political Weekly*, 21, pp.1169-81.

- Zimbabwe: 35% of income based directly on CPRs, 40% for poorest quintile.

Cavendish (2000), *World Development*, 28(11).

Common property regime

When a resource is managed in common by a group of users...

...who depend on each other for their use of the resource...

...non-trivial costs of excluding individuals from benefiting from the resource

CPR *vs* Private Property

- Indivisibility
 - Tropical forest
 - Fishery
 - Irrigation system

 - Need for collective action

 - High transaction costs in dividing the resource

 - Insurance
 - Variations
 - Uncertainties
-

Game theory

- Prisoner's Dilemma Games:
 - ❑ No communication
 - ❑ Incentive structure (gain from cooperating versus from defecting)
 - ❑ Defection is dominant strategy
 - ❑ Cooperation is not possible in one-period games
 - ❑ Cooperation is possible in repeated games
(Folk theorem of repeated games)

CPR *vs* PD

- CPR users communicate frequently
- CPR users meet repeatedly
- CPR users take each others' actions into account
- Have very intricate sets of rules
- Cooperate even in "last round"
- Coordination game often more appropriate

Illustration:

Farmer managed irrigation systems

- Size: from a handful of users to very large
- Rain-water fed
- Intake from river
- Main canal + branch canals
- Division structures
- Lining

Activities

- Construction
 - Maintenance
 - Make, change rules
 - Allocate, distribute water
 - Monitor users, canals
 - Punish defectors
 - Improvements
 - Newcomers
-

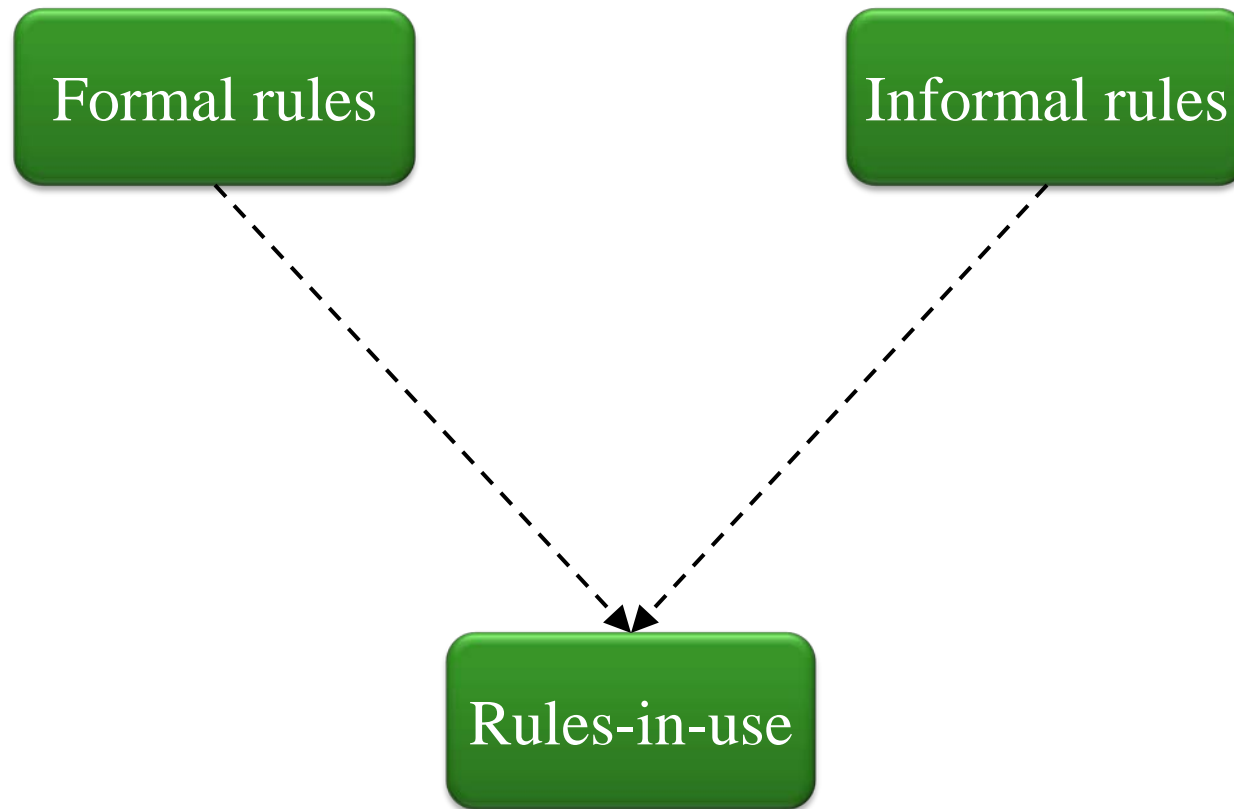
Institutional structure

- Membership
- Organisation – Water users' association or Zamindaar
- "Rules-in-use"
- Allocation and distribution
- Maintenance

How can it work?

- Physical interdependence
- NOT act independently but organized:
 1. Create and develop institutions (rules)
 2. Make credible committments
 3. Mutual monitoring

Institutions



Ostrom's design principles I

1. Clearly defined boundaries
 - Resource boundaries
 - Users
 2. Congruence between appropriation and provision rules and local conditions
 3. Collective-choice arrangements
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Ostrom's design principles II

4. Monitoring
 5. Graduated sanctions
 6. Conflict-resolution mechanisms
 7. Minimal recognition of rights to organize
 8. Nested enterprises (when part of larger system)
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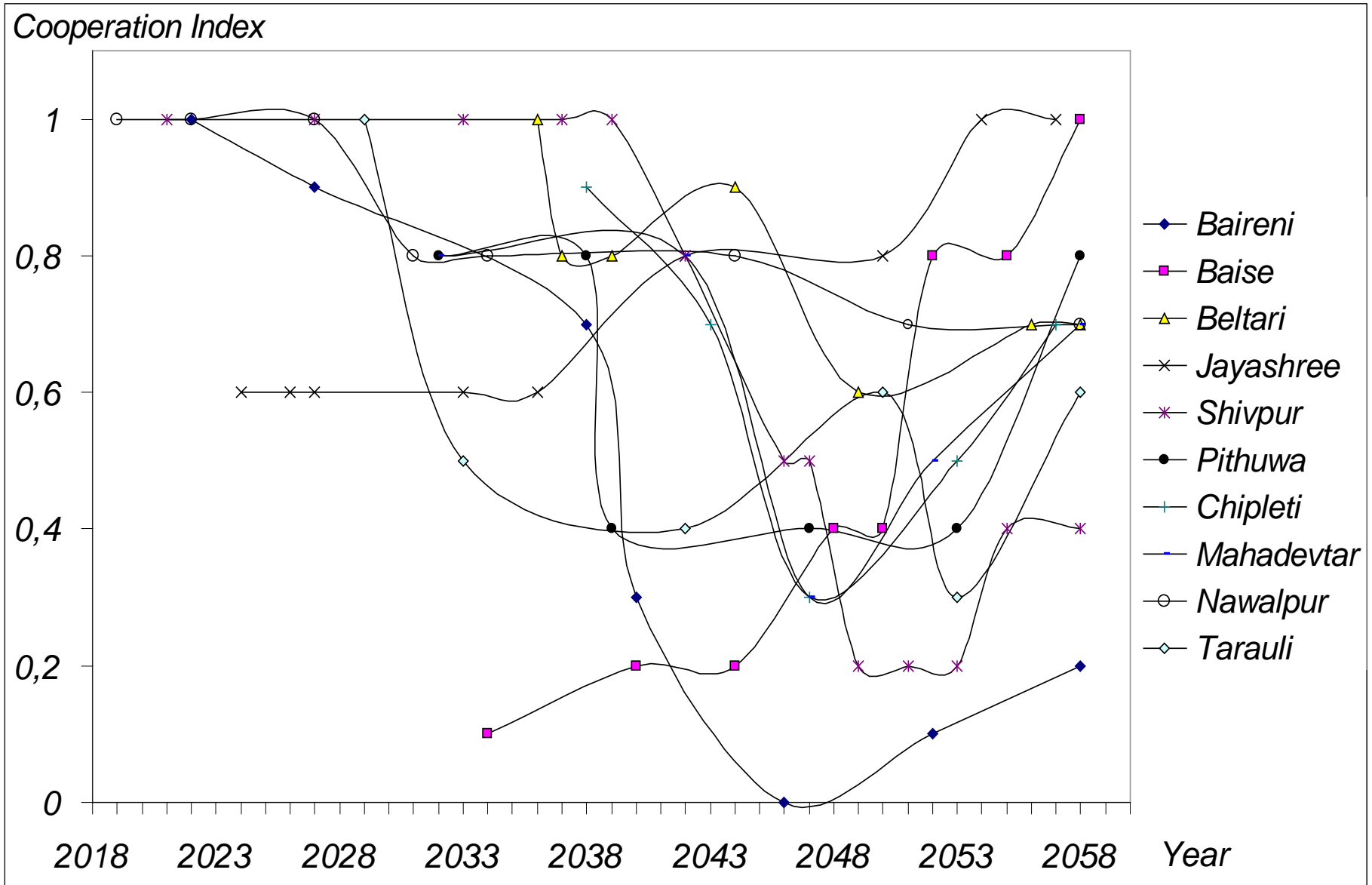
How to analyse CPRs?

- Game theory – repeated games
 - Non-cooperative: Prisoners' dilemma
 - Coordination
- Experiments
 - In the lab or on the field
- Empirical – mostly case studies
 - Need for more large-scale and time-series
 - How to measure performance?

Data

- 10 Irrigation systems in Nepal's Terai area
 - Water Management Study Program, Institute of Agriculture and Animal Sciences, Rampur, Nepal
 - Five to ten points in time each
 - Time-series data
 - Lots of narrative information...
 - Information on
 - users
 - institutions
 - external factors
 - cooperation
-

”The Spaghetti Picture”



Dependent Variable : Cooperation Index

Independent Variables :

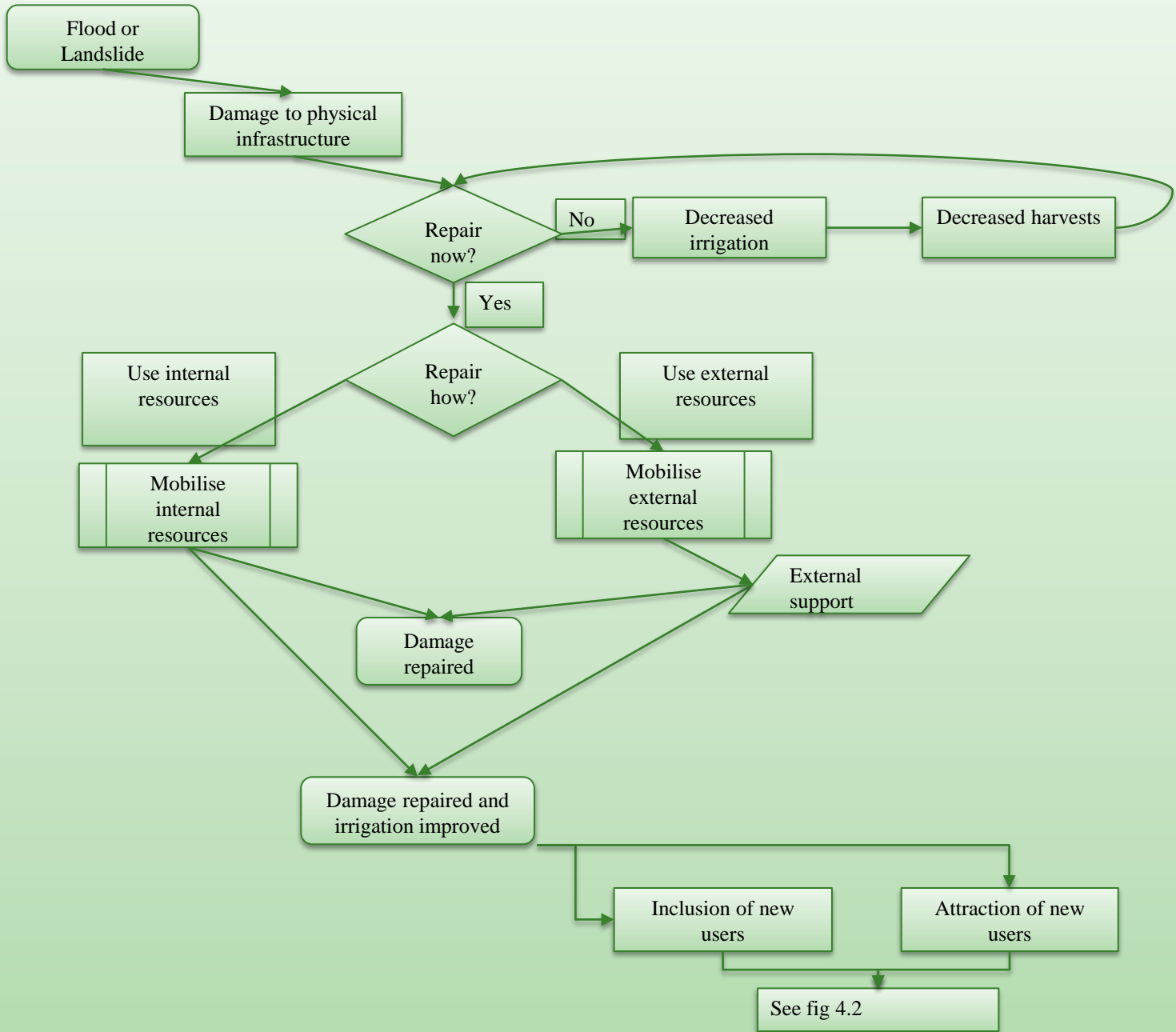
	<i>Related to: Coordination</i>		<i>Incentives</i>	<i>Coordination and Incentives</i>		
	<i>Equation 1</i> <i>(n=57)</i>	<i>Equation 2</i> <i>(n=57)</i>	<i>Equation 3</i> <i>(n=63)</i>	<i>Equation 4</i> <i>(n=57)</i>	<i>Equation 5</i> <i>(n=57)</i>	<i>Equation 6</i> <i>(n=57)</i>
<i>Person-Leader</i>	0.306*** <i>3.574</i>	0.324*** <i>3.773</i>		0.289*** <i>4.033</i>	0.245*** <i>3.307</i>	0.261*** <i>3.300</i>
<i>WUA</i>	-0.176** <i>-2.065</i>	-0.189** <i>-2.156</i>				-0.035 <i>-0.357</i>
<i>Majority Strength</i>	0.517* <i>1.794</i>				0.498** <i>2.128</i>	0.314 <i>0.881</i>
<i>Ethnic Fragmentation</i>		-0.305 <i>-1.216</i>				
<i>Average Food Sufficiency</i>			0.576*** <i>3.024</i>	0.423** <i>2.461</i>	0.567*** <i>3.947</i>	0.465*** <i>2.512</i>
<i>Land Gini</i>			-0.342* <i>-1.855</i>	-0.338** <i>-2.137</i>		-0.144 <i>-0.515</i>
<i>Democracy Dummy</i>	-0.178** <i>-2.218</i>	-0.176** <i>-2.162</i>	-0.180** <i>-2.377</i>	-0.183** <i>-2.644</i>	-0.201*** <i>-2.950</i>	-0.186*** <i>-2.639</i>
<i>Adjusted R2</i>	<i>0.4847</i>	<i>0.4662</i>	<i>0.4883</i>	<i>0.6435</i>	<i>0.6432</i>	<i>0.6336</i>

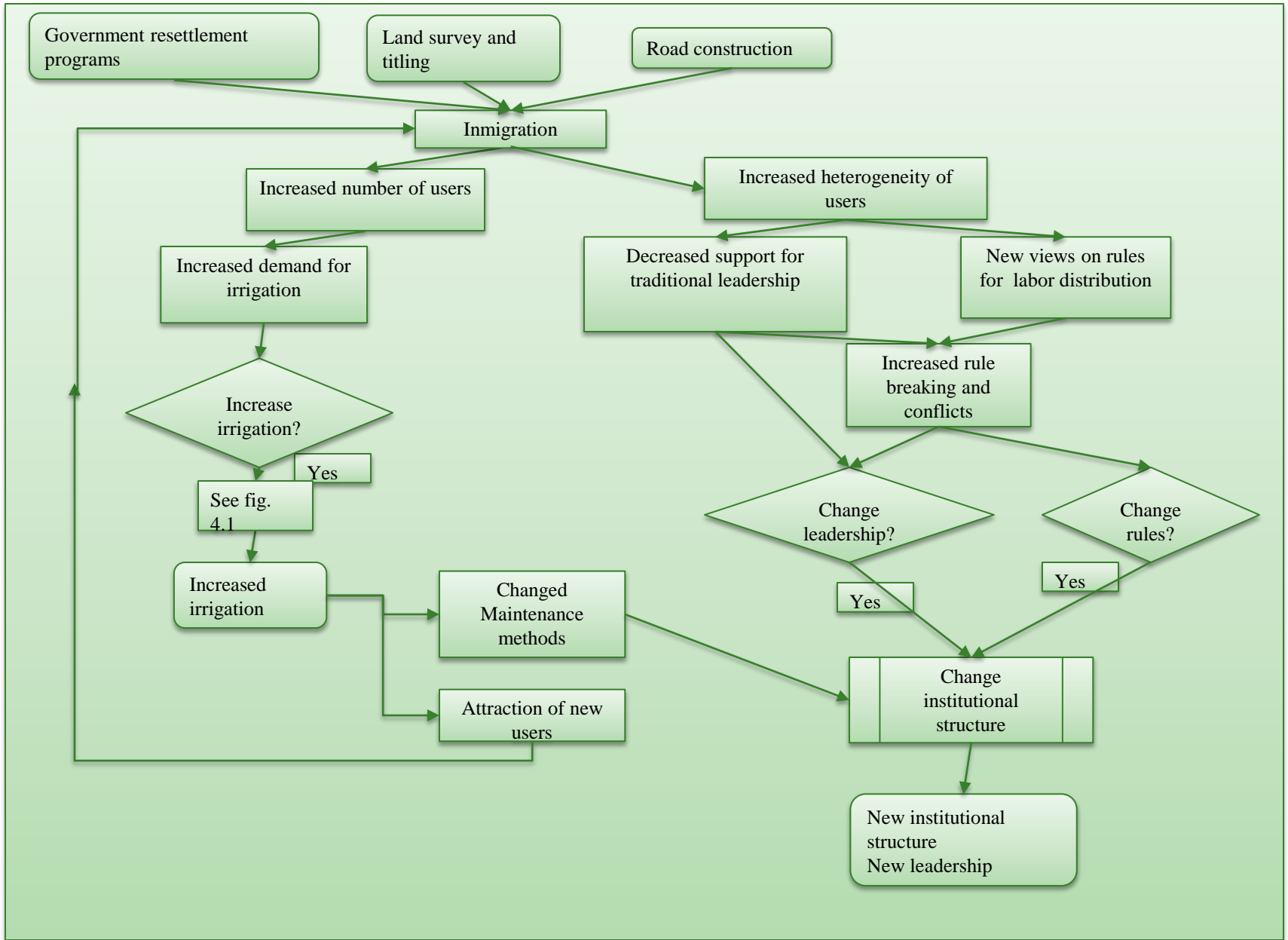
Adaptation to disturbances

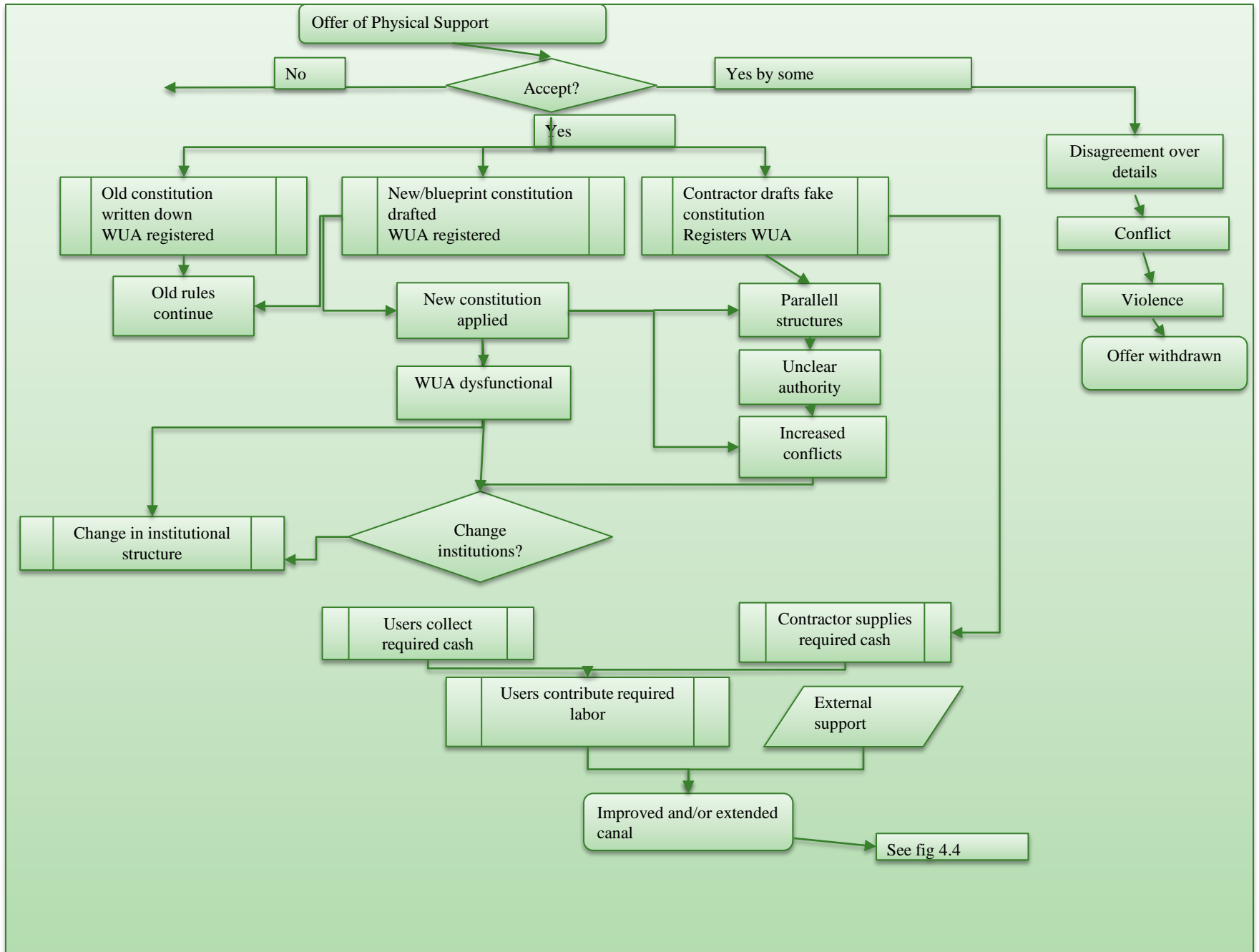
Disturbances → Processes → Reactions

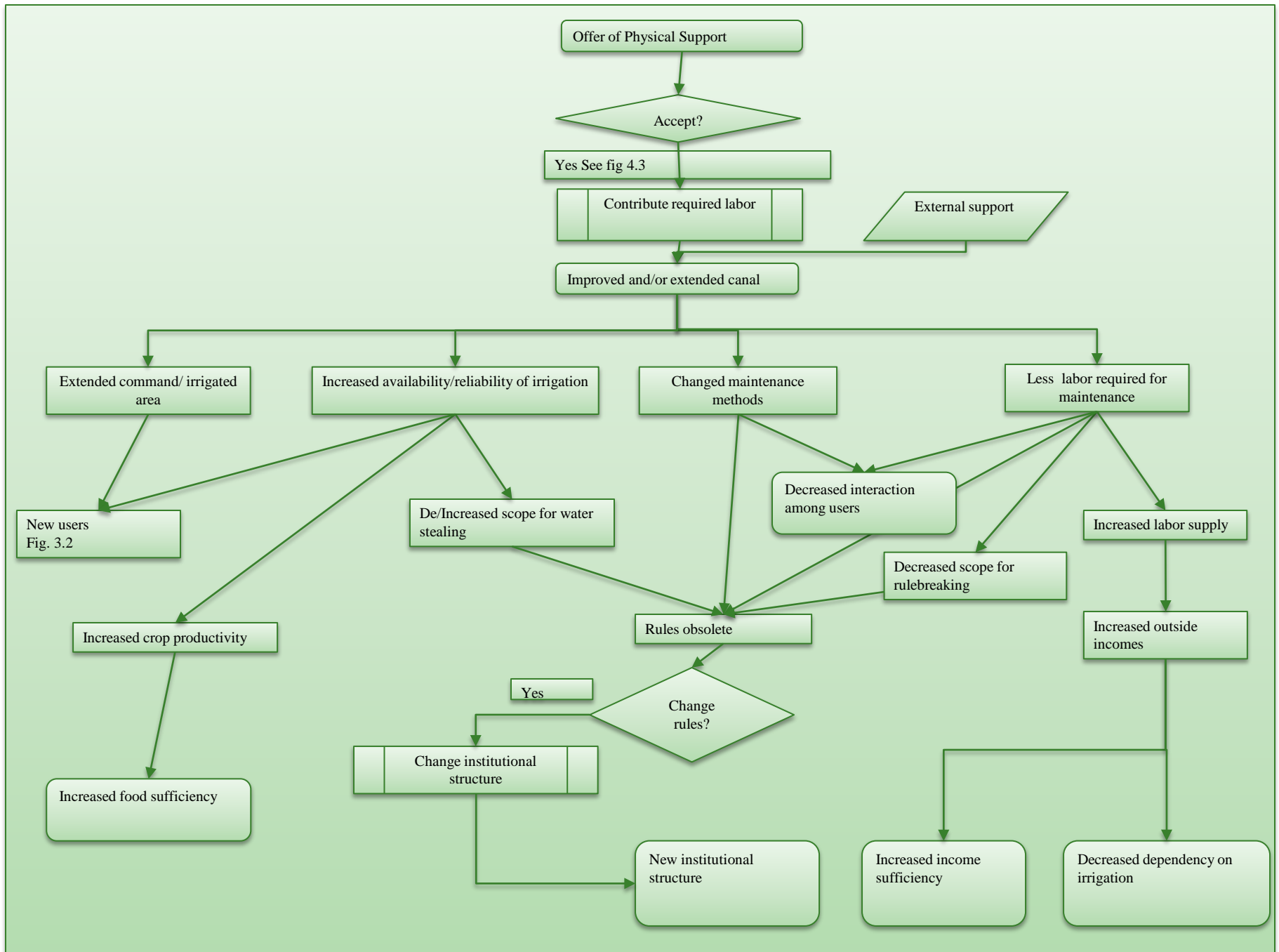
Most frequent disturbances:

- Floods and landslides
 - Immigration or inclusion of new users
 - Offer of major external support
 - Implementation of major external support
-









Immediate impact of disturbances

- Physical structures
- Institutional structures
- Individuals included

Reactions

- Decision-making
- Physical repair and reconstruction work
- Conflict resolution
- Rule changes
- Leadership replacement
- Institutional change

Who does?

Leadership



Well functioning management structure

Most serious disturbances

- New users with different culture (or income level)
- Meddling with institutional structure
- ...Not natural disasters!

Findings

- Time series analysis important
- Leadership
- Water Users' Association ↔ External support
- Migration ↔ Majority strength
- Developing ↔ Maintaining

CPR challenges

- Inequality, heterogeneity
 - Result of inequality on CPRM
 - CPRM as source of inequality
 - Gender issues
 - Mismatch empirical, experimental, theoretical results
 - Institutional creation, evolution
 - Cross-country statistical analysis
 - Global commons
 - Adaptation to climate change
-

Diskussionsfråga I:

Hur påverkas gemensamma naturresurser (CPRs) och deras användning av klimatförändringar?

- Resursen
- Användarna
- Omgivningen

Diskussionsfråga II:

Hur kan vi använda det vi vet om
samarbete kring gemensamma
naturresurser för att hantera klimatfrågan?

Klimatfrågan

- Den gemensamma nyttan ligger i att undvika en gemensam ”onytta” som orsakas av utsläpp av växthusgaser.
- Traditionella teorierna säger att utan externa regleringar är det omöjligt att uppnå de förändringar som gemensamt agerande skulle kunna ge.

Traditionella bilden av naturresurs hantering

- Grupper kan inte själva organisera ett samarbete för att uppnå det gemensamma bästa
- Grupper kan inte själva reglera användningen av gemensamma resurser

Ostroms m.fl. forskning

- Resultaten i verkligheten är ofta bättre än vad de traditionella teorierna förutspår
 - Användarna skapar själva förutsättningar för att kunna samarbeta
 - Sofistikerade informella regelverk för att fatta beslut, se till att regler följs, lösa konflikter
-

Samarbete kommer att uppstå om

- Många är överens om att en förändring behövs och ser sig själva som gemensamt ansvariga för hur framtiden ser ut
- Information om det gemensamma problemet är pålitlig och uppdateras ofta
- Individerna vet vilka andra som har gått med på att ändra på sitt beteende och att deras agerande följs upp
- Kommunikation mellan åtminstone delgrupper av deltagarna

Fokusera på flera nivåer

- Små beslut av många aktörer ger stora effekter på global nivå
- Kostnad och nytta av förändrat beteende uppstår på flera nivåer
- Förutsättningarna för samarbete är lättare att uppnå på lokal nivå

Förändringar på flera nivåer

- Visa på gemensamma resurser och problem på olika nivåer
- Information om konsekvenser på flera nivåer
- Information om tekniker, kostnader, nytta
- Lyfta fram exempel på samarbete
- Underlätta kommunikation mellan individer
- Underlätta uppföljning

Diskussionsfråga II:

Hur kan vi använda det vi vet om
samarbete kring gemensamma
naturresurser för att hantera klimatfrågan?

- Vilka teorier bör vi förlita oss på?
- Hur kan vi använda erfarenheter från CPRs?
- Hur kan vi utnyttja småskaliga bieffekter av förändrat beteende?

Diskussionsfråga I:

Hur påverkas gemensamma naturresurser
(CPRs) och deras användning av
klimatförändringar?

Hur påverkas

- Resursen
- Användarna
- Omgivningen

