Thoughts on vulnerability and resilience to climate change

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Vulnerability is:

- The potential for loss.

- "…the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including variability and extremes" (IPCC 2001)

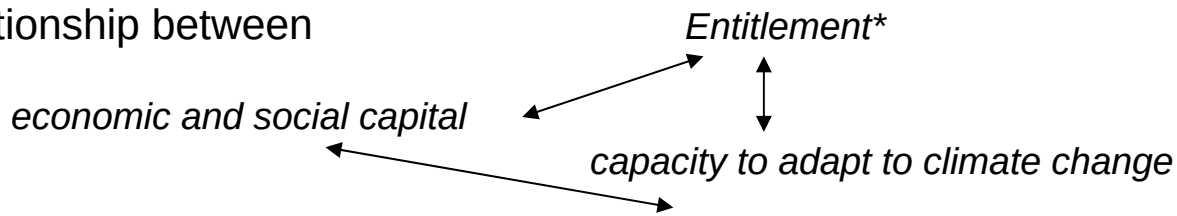
- "Characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard" (Wisner et al, 2004)

"Climate impact studies have tended to focus on direct physical, chemical or biological effects, yet a full assessment of consequences for human well-being clearly requires evaluation of the manner in which society is likely to respond through the deployment of coping strategies and measures which promote recovery and, in the longer-term, adaptation." (Adger, 1999)

Two research tasks:

1. Need to assess the three areas in order to improve them :
   'exposure to climate risk, susceptibility to damage, ability to recover'.

- Or put slightly differently
  Relationship between



(Barnett & Adger 2005)

*Entitlements (social and economic) can mitigate serious environmental hazards. They include good community support, infrastructure, early warning systems, reliable transport, good housing design, freedom to move across country without restriction, and so-on.

2. Recognise the past. Analogues: look at past human adaptations to climate change (e.g. glacial/postglacial, and more recent events). The past shapes the present – including the adaptations to the major changes in N. Australia over the last 200+ yrs.

- But there is a limit to what past events, and events in other parts of the world, can tell us here – because of the rapidity of global warming, and the pace of socioeconomic changes since the colonial period.

Existing work on climate impacts on communities that we can learn from

A) A focus on local economics and institutions. What limits the access to resources that people need to respond to climate events and to longer term processes? Money? Land? Political power? Other aspects of livelihood systems?

b) Studies from W Africa: adaptation chains and 'fighting back' by families and communities. For farmers, adaptive response to drought is often

Farming>livestock>business>migration (M.Mortimore)
as drought worsens

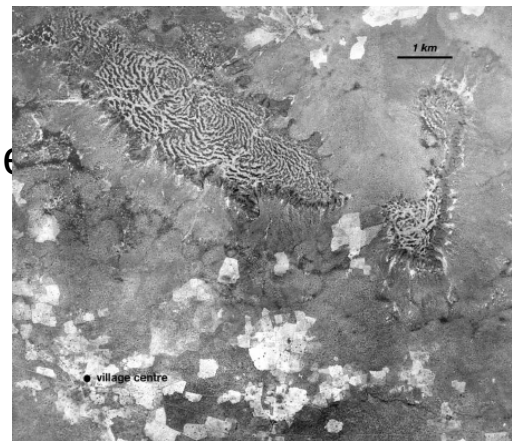
But this happens under severe disruptions (vulnerabilities) since colonial times, with persistently uncertain rainfall, market prices for crops unreliable, unstable and unreliable governments and aid flows.

- Very different in N Australia due to differences in traditional livelihood systems

c) Other studies: Adger in Vietnam, Minnegal & Dwyer in PNG, UEA teams led by Frank Ellis in E. Africa, Debbie Bryceson in Africa, Pacific island studies, all show that we know something, but too little about adaptation.

Methods to assess vulnerability

1) Livelihood analysis

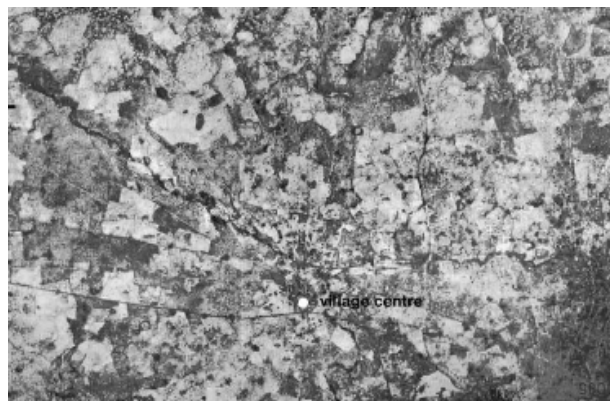


Short term and long term responses to change – linking what people DO and the VULNERABILITY CONTEXT, in a livelihoods analysis

Assumes natural hazards *modify* the capabilities and preferences of people, through the assets they have

Hazards are a “shock to expectations” (Wisner et al 2004).

But studies find that people *adapt*.



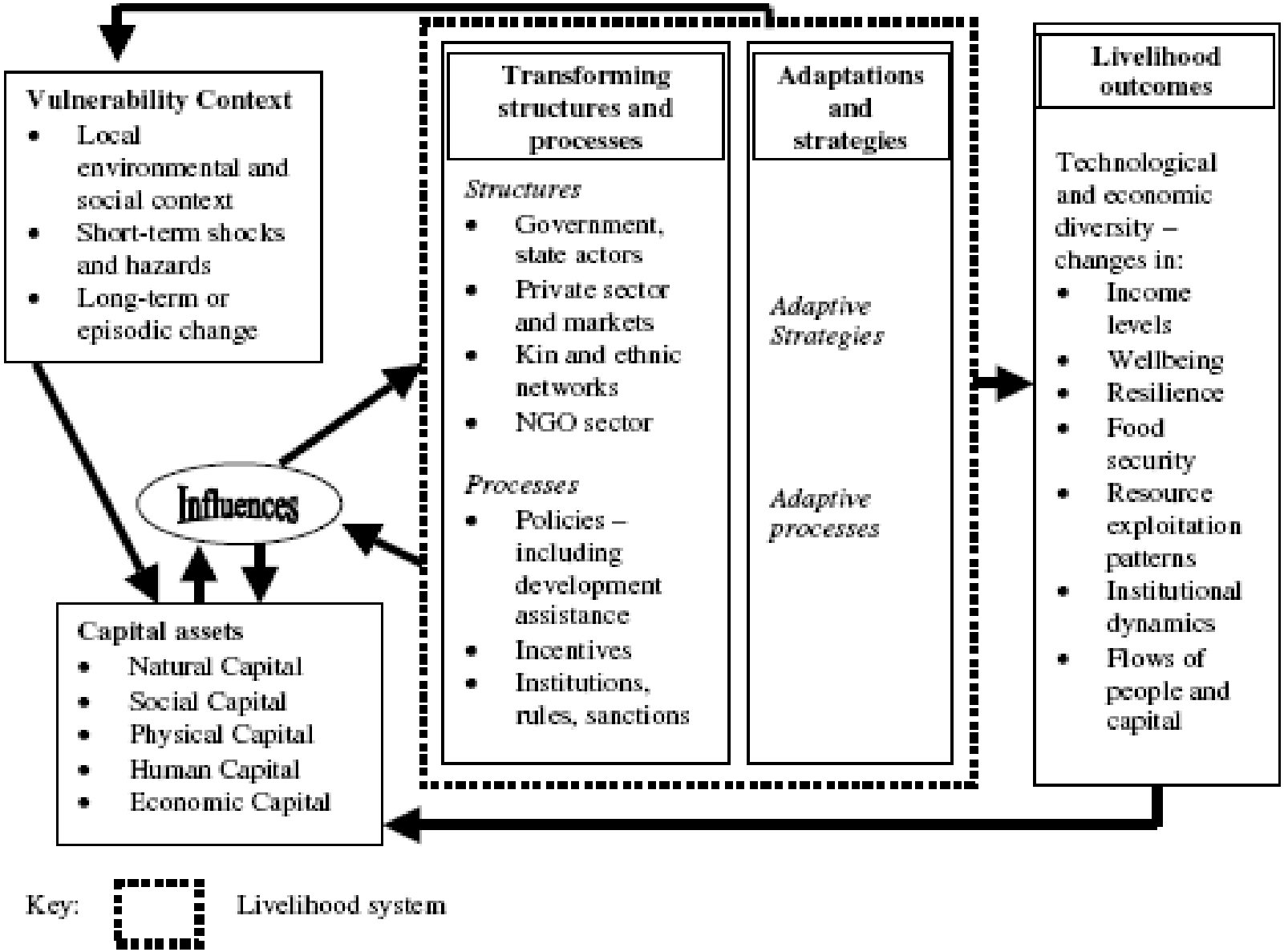


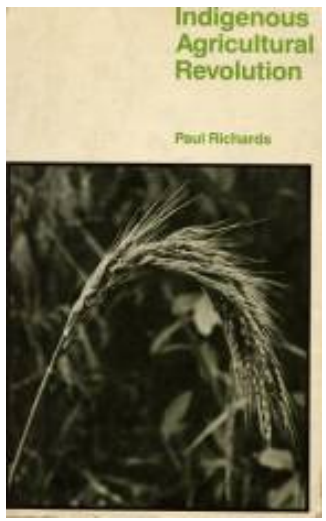
Figure 1 A framework for sustainable rural livelihoods

Source: Batterbury and Forsyth (1999), adapted from Carney (1998) and Scones (1998)

- IDS and IIED - Robert Chambers, Gordon Conway

  Rapid Rural Appraisal, late 1970s. ….“During village fieldwork in the mid 1980s, Chambers asked “why… did the experts have to draw all the maps and ask all the questions? Why could the farmers not do this themselves?” (Conway 2003: 111). The two of them reoriented their village study, and the rest is history – participatory methods and philosophies have taken off worldwide, and a whole generation of development researchers and project staff now find themselves “listening as much as talking”

(Batterbury 2004, *Glob.Envt.Ch.* p113).



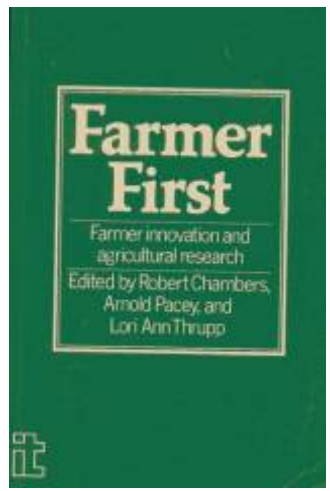
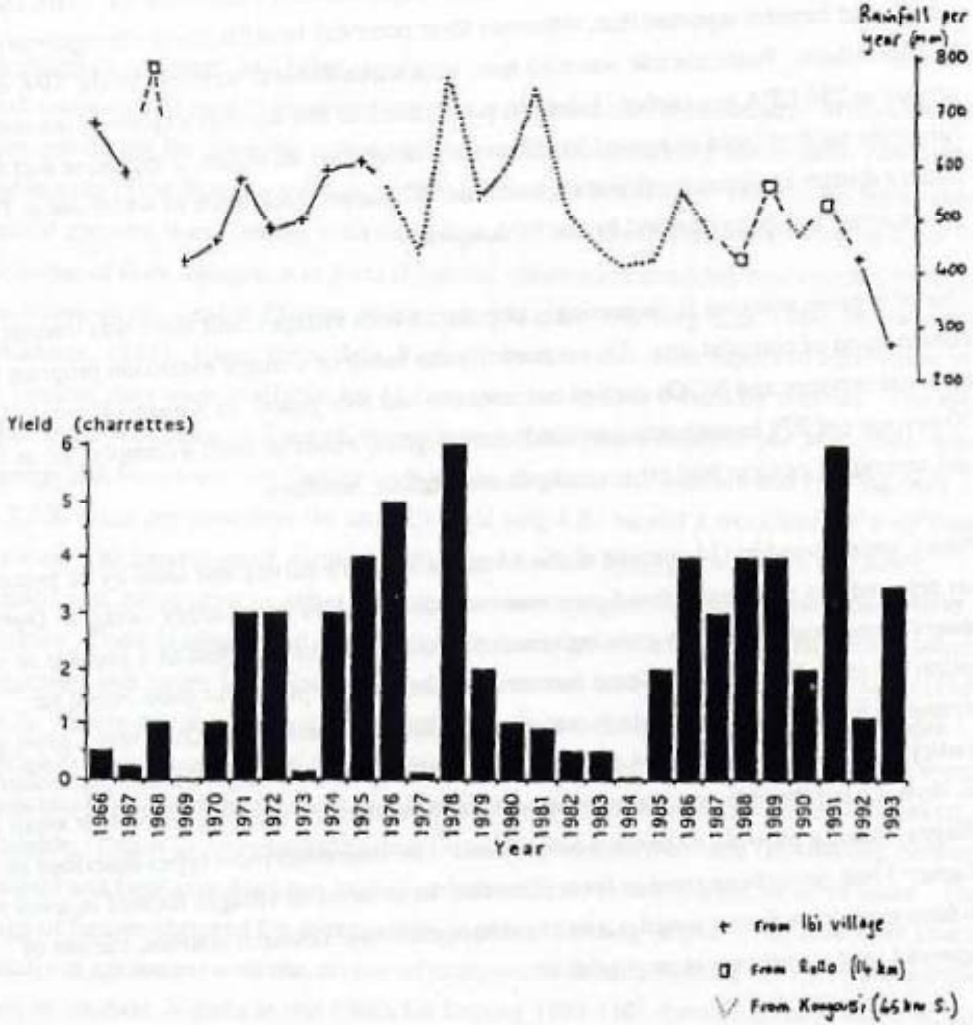


Figure 5.15. Long term trends in yield and rainfall, "Farmer Three", Ibi



Source: Farmer's yield data and rainguage data from various sources. This field is situated around an isolated dwelling. Because this farmer has residence rights only over this land, the field size has been held constant over most of this period, and is currently 2.7 ha. Manure inputs have been added each year, supplemented by fertilizer since 1985.

Robert Chambers - key points:

Unlearn (clear your mind of previous experiences).
Ask what they want.
Hand over the stick or pen.
Embrace mistakes (and move on from them).
Be relaxed – no rushing.
Sit down, listen, watch, learn.
Use your best judgment at all times.
Shut up (be quiet).

Source: Batterbury 1997. Political ecology of environmental management. PhD thesis, Clark University, USA. www.simonbatterbury.net/pubs.

Table 1 ~ Changes in Fandou Béri noted by men and women since the 1950s

BY MEN

The worst period for the men of the village was 1954–64, when the village was isolated from services; there were food deficits, many medical problems and a high death rate. But in 1975 Niger 'woke up' under President Kountché's rural development efforts and his new government. The best period was 1978–87, when the laterite road was built, as well as a school, a market, a borehole and a seed cooperative. State support to the village was greatest in 1984 during a famine, when government grain was delivered to each household. Food deficits prior to the 1960s were less numerous than today, but were more serious in their effects.

Agriculture and land

Black and fertile sandy soils still existed in 1950, but are now all gone.
In the 1950s, surplus grain was produced, which was sold to buy animals.
In the 1950s most cultivation took place close to the village, and there were 20 large lineage-held fields plus some individual ones; now there are many more (usually 3–5 plots to each household), and the loaning of land to others has increased.
Crop yields have declined, particularly since the mid-1960s. More quick-maturing millet varieties are used today. Cotton, once used mainly for local production of clothing, is no longer grown.
There has been limited adoption of Islamic inheritance laws for land over time.

Business

Prior to the 1950s, trips were made on foot to Hamdallaye or Niamey to buy kola (*Cola vera*, a stimulant), salt, spices and tobacco.

Migration

Migration in the 1950s was usually by camel, horse or foot to Ghana, Côte d'Ivoire or Nigeria. But in 1950 only 2–3 men migrated (to Ghana or Côte d'Ivoire) – by contrast, now almost all the adult male population is involved.

BY WOMEN

There was almost no contact with the state or development programmes in the 1950s up to the early 1970s. Some women reported that life was 'easier back then', but childbirth and illness caused many fatalities. After 1975, however, government edicts (the reform programmes of President Kountché) eased travel and social controls on women's activities, and there was some state support. Men once retained much greater control over domestic activities, but this has been relaxed to allow women much more freedom to decide.
There are now more wells in the village, reducing women's burdens.

Agriculture and land

In the 1940s–1950s the surrounding bush contained many wild animals: lions, hyenas, monkeys, antelopes. Bush meat was eaten and sold, but now there is none. 'Forest' surrounded the village in the 1950s, making wood collection easier.

Livestock

In the 1950s households had the same range of domestic animals as today, and women retained the animals given to them at marriage.
Hyenas once attacked domestic animals within enclosures. This is no longer so.

Understand social and environmental changes together – hybrid research.

Table 4 ~ Women's perceptions of vegetation change, 1960s–1990s: Species less plentiful than 40 years ago: (t) = tree (s) = shrub

Local name	Scientific name	Perception of availability
Kulu kulu (t)	*Strychnos spinosa*	Disappeared
Sageye (t)	*Calotropis procera*	Disappeared
Tàásá (s)	*Grewia bicolor*	Disappeared
Fàntú (t)	*Detarium microcarpum*	Greatly decreased
Hàuji-ba-zàmbù (s)	[arbustre à fruit rouge]	Decreased
Fòrgò (t)	*Bombax costatum*	Decreased
Sàátàrà kósì (t)	*Heeria insignis*	Decreased
Samaràý (s)	*Cochlospermum planchoni*	Decreased
Korkondo (t)	[not known]	Decreased

Source: Batterbury and Longbottom, 'Social and environmental change in a Nigérien village' (see n. 57).
(t) = tree; (s) = shrub.

(Batterbury 2001, Ecumene www.simonbatterbury.net/pubs))

2) Comprehensive analysis of communities

Climate change is one of a number of factors affecting communities – there is also poverty, the degree community support or discrimination, extent to which state support and services are forthcoming, access to economic opportunities, population loss, social cohesion, health and governance. All of this is relevant.

Questions:

- who should do this work?
- How is it used?
- perceptions of risk vary between individuals, even if the hazard of sea level change/temp increase/storms is understood. Who decides if major action is needed – government? Community leaders?

- Can vulnerability be quantified and measured? (no except in broad terms, I think, although NOAA, EMA and insurance companies have tried)

3) Research-advocacy

Worryingly, some of the above has already been done in certain localities, by researchers, government departments, and local people….

And yet people remain vulnerable.

So…..

For some: we need radical action now. But what action, given timelags in climate signals, uncertainty, and lack of political progress on abatement?

- FoE's climate justice/refugees work?
- Alternative energy lobbyists.
- UN Indigenous Decade & Commission on human rights and lobbying

For many: Precaution. The best way forward is collaborative - civic science, participatory, and policy-relevant. But perhaps slower action likely on emissions reductions and on climate mitigation.

- IIED in the UK?
- Gentle reminders from scientists, since this science is inherently political - Steve Schneider on climate policy and science, Jonathan Overpeck on fate of Arctic

For others: Optimism. National governments will see sense, and treat vulnerability seriously. Corporations will scale back emissions, Gaia can adapt, etc…

- Assume business will reduce emissions and technologies will emerge
- commission more climate research rather than acting on existing warnings

(unlikely)

More focus on adaptation to climate change

•Adaptation

•“ an adjustment in ecological, social or economic systems in response to observed or expected changes in climatic stimuli and their effects and impacts in order to alleviate adverse impacts of change or take advantage of new opportunities.” (Adger, 2005)

Possible responses

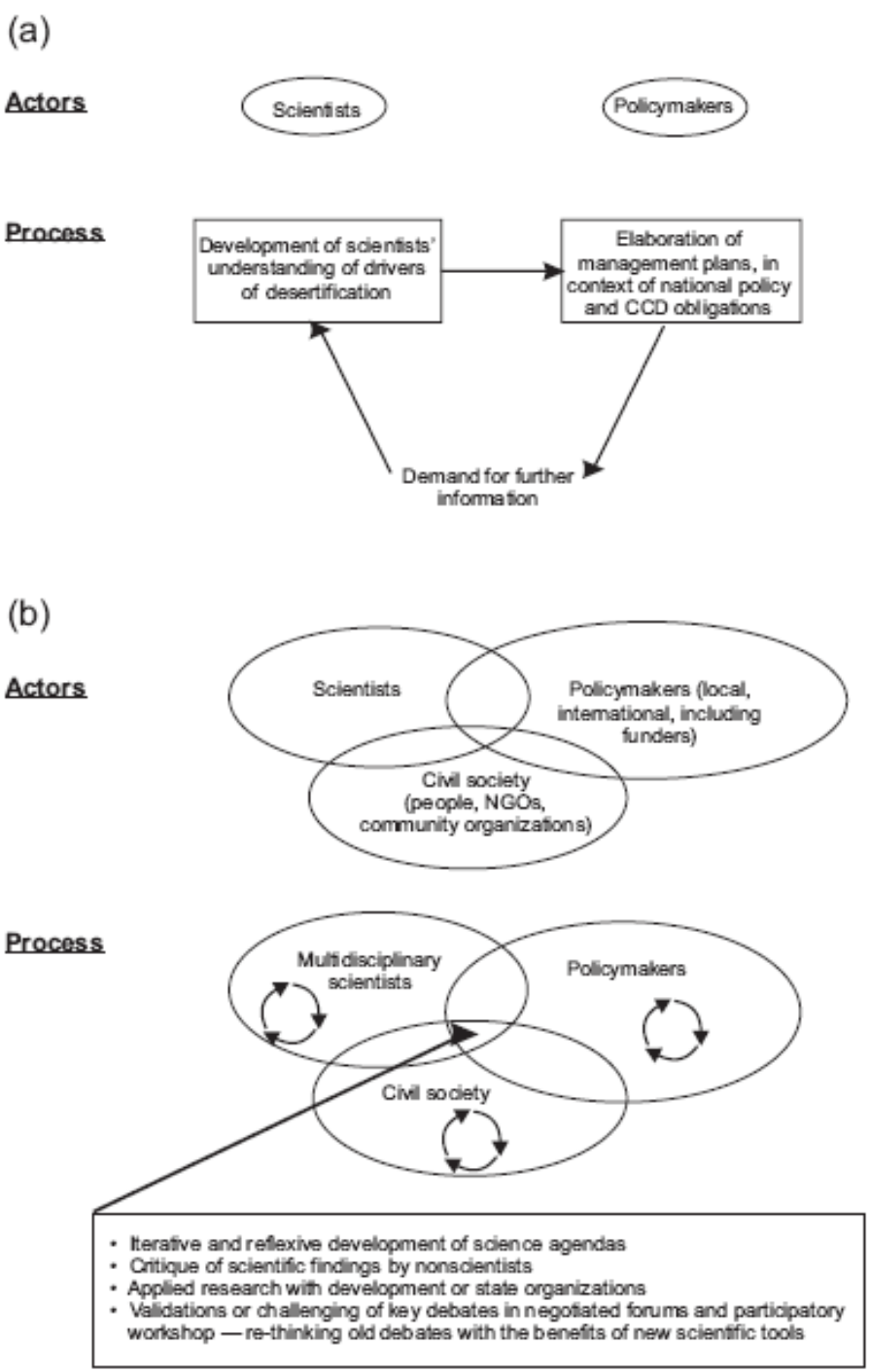
1) reduce the sensitivity of the system to climate change; (e.g. provide more water storage, or storm shelters)

2) alter the exposure of the system to climate change; (e.g. hazard preparedness systems)

3) increase the resilience of the system to cope with changes. (e.g. enhanced wellbeing, infrastructure, flood-proof housing)

Government adaptive measures cannot always be separated from individual or community level adaptations – they often blur. But when the state does nothing, people adapt (in contradiction to Malthus!)

Smooth change in adaptive strategies unlikely – the pace of change is now unprecedented, the political economy of Australia is radically different to 200+ years ago, and short-term shocks (e.g. cyclones) now affect more infrastructure and investment than in previous decades.



Something to move towards?

The interdisciplinary model for research on these issues

a) Scientists inform policymakers
b) Scientists, policymakers and people work together

(Batterbury et al 2002
www.simonbatterbury.net/pubs)

Remaining challenges

- Scale. The problem is bigger than all of us. This is the main challenge, by far.

- Regulatory authorities must recognise asset/livelihood strategies. Need to know how people live, using their own abilities and social systems. Without this, more effective responses are impossible.

- Be realistic. Assets will be lost from sea level rise and storms. Temperatures will increase. Ecosystems will suffer badly. Communities may have to move.

- Monitor specific threats, particularly sea level rise and drought/rain cycles – but also, how do they interact with other aspects of livelihoods?

- Needed: better assessment of threats and needs for mobile peoples and low-lying populations.

- Better recognition of how politics of climate change filters up and down scale to influence vulnerability. E.g. responses to Indian Ocean tsunami – how have rebuilding efforts resulted in ethnic grievances and political parties swaying the process? Could this have been avoided?