Management guidelines for Asian Floodplain river fisheries

An overview of FMSP research - published as FAO Fisheries Technical Paper 384

UK Department for International Development (DFID)
Fisheries Management Science Programme (FMSP)

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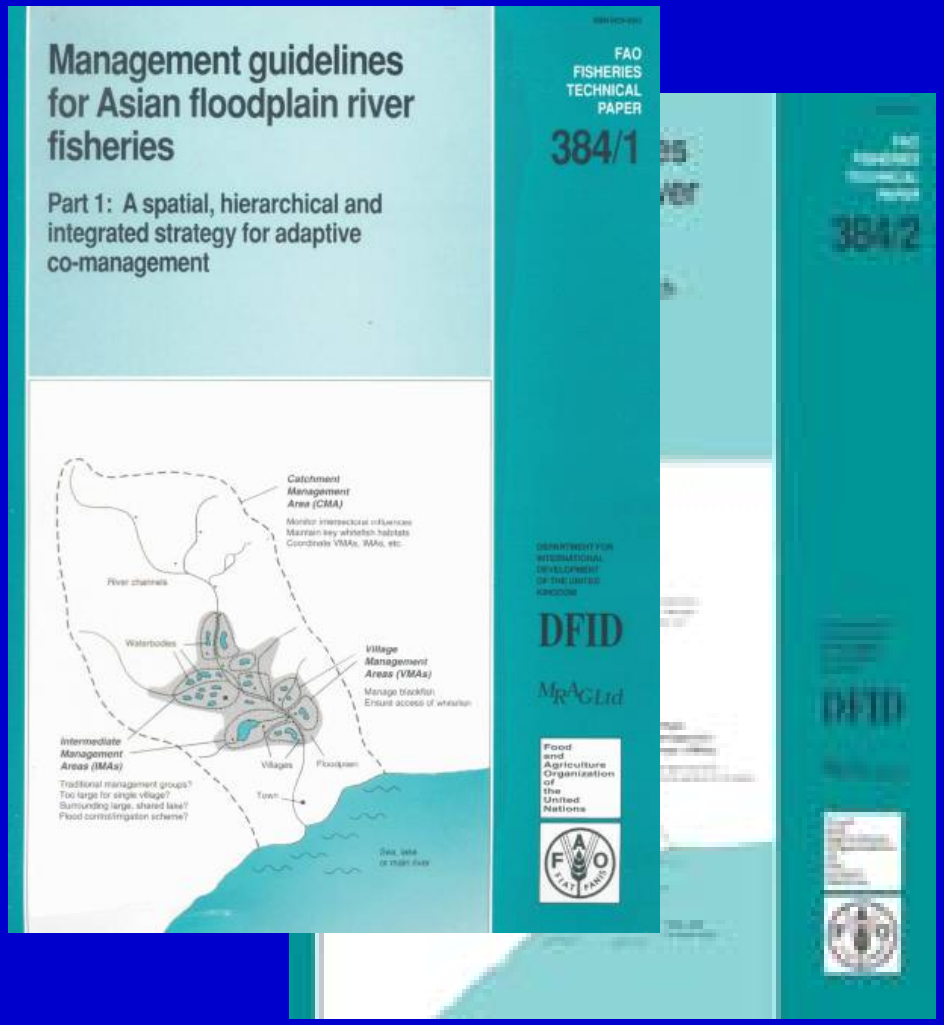
Background

This presentation is one of a series of five presenting key outputs from FMSP floodplain projects, carried out in the Asian region between 1992 and 2005. The five papers focus on:

- General management guidelines for floodplain river fisheries (as published in FAO Fisheries Technical Paper 384/1)
- Selection and management of harvest reserves (key messages)
- Materials for a training course on harvest reserves
- Management of sluice gates and water levels in flood control, drainage and irrigation (FCDI) schemes for integrated benefits of agriculture and fisheries (key messages)
- FMSP approaches to modelling floodplain fisheries

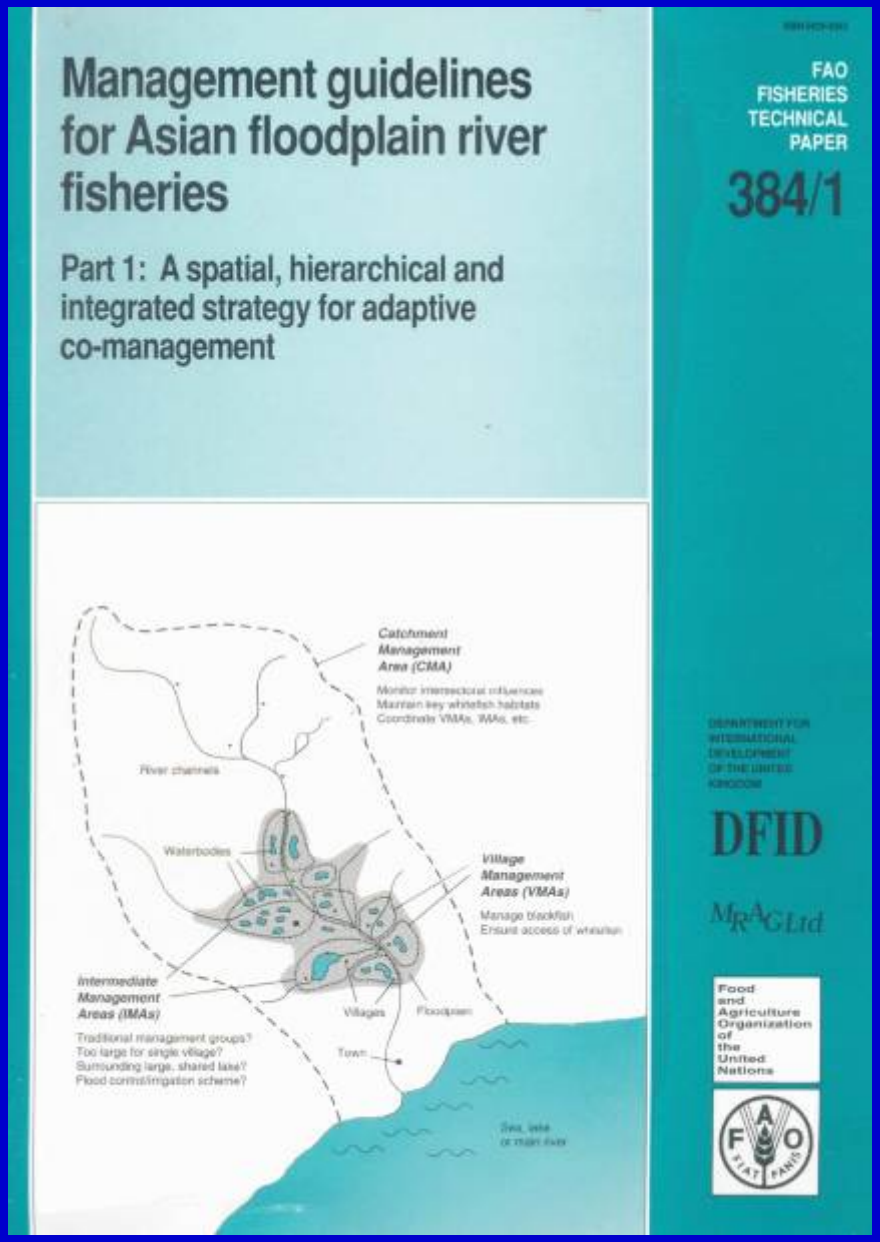
This presentation was prepared by FMSP Project R8486 – 'Promotion of FMSP guidelines for floodplain fisheries management and sluice gate control'

Presentation based on FMSP research published as FAO Fish. Tech. Paper 384



- Hoggarth, D.D., V.J. Cowan, A.S. Halls, M. Aeron-Thomas, A.J. McGregor, R.L. Welcomme, C. Garaway & A.I. Payne, 1999.
- *Management Guidelines for Asian Floodplain River Fisheries.*
- FAO Fisheries Technical Papers 384/1, 384/2

- *Part 1. A Spatial, Hierarchical and Integrated Strategy for Adaptive Co-Management*. 63pp.
- *Part 2. Summary of DFID Research*. 117pp.



Part 1. Summary guidelines for floodplain river fishery management

Content:

- Why manage?
- What to manage?
- Who should manage?
- How to manage?
- Steps to successful management

Download from FAO web site:

http://www.fao.org/DOCREP/006/X1357E/X1357E00.HTM

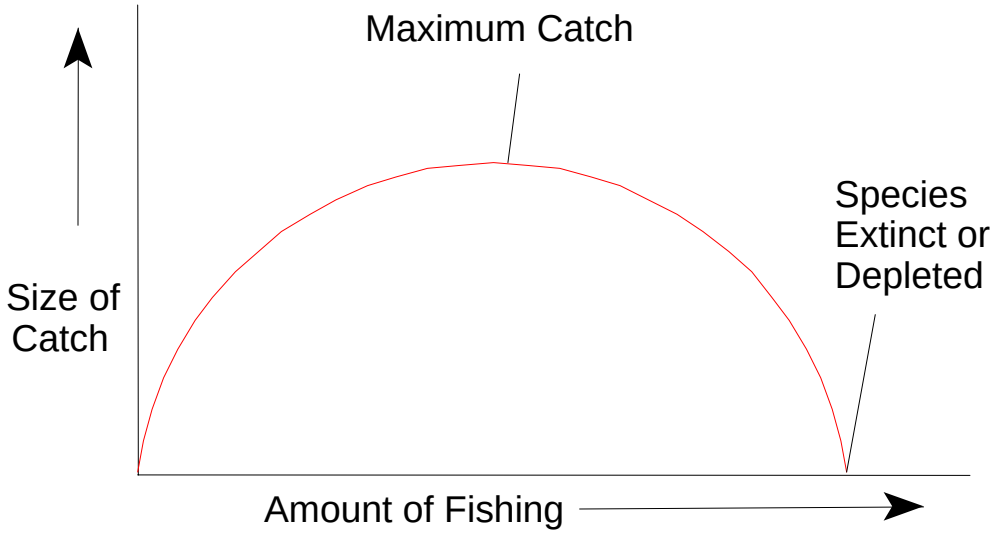
Chapter 1. Why manage floodplain rivers?

Because floodplain rivers are both *valuable* and *vulnerable*

Objectives will vary between sites (ecological, social etc)…

i.e. *you* should decide your own priorities for management with *your stakeholders*

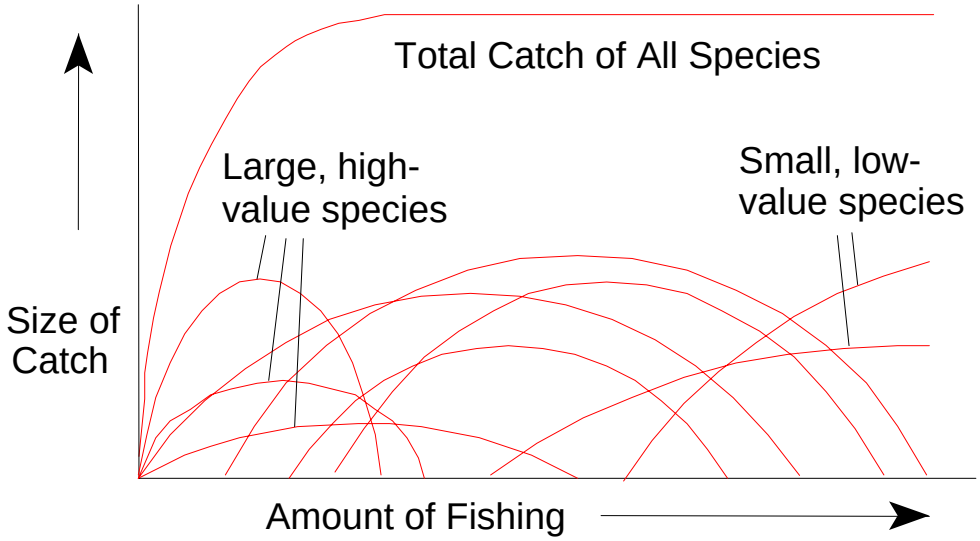
Catch vs Fishing Effort



Single Species Fishery

Moderate fishing gives maximum catch

Too much fishing causes extinction or depletion



Multi-Species Fishery

Valuable species become extinct or depleted first

Total catch approximately constant

A typical catch in Bangladesh

Lots of fishing = small fish

Chapter 2. What are we managing?

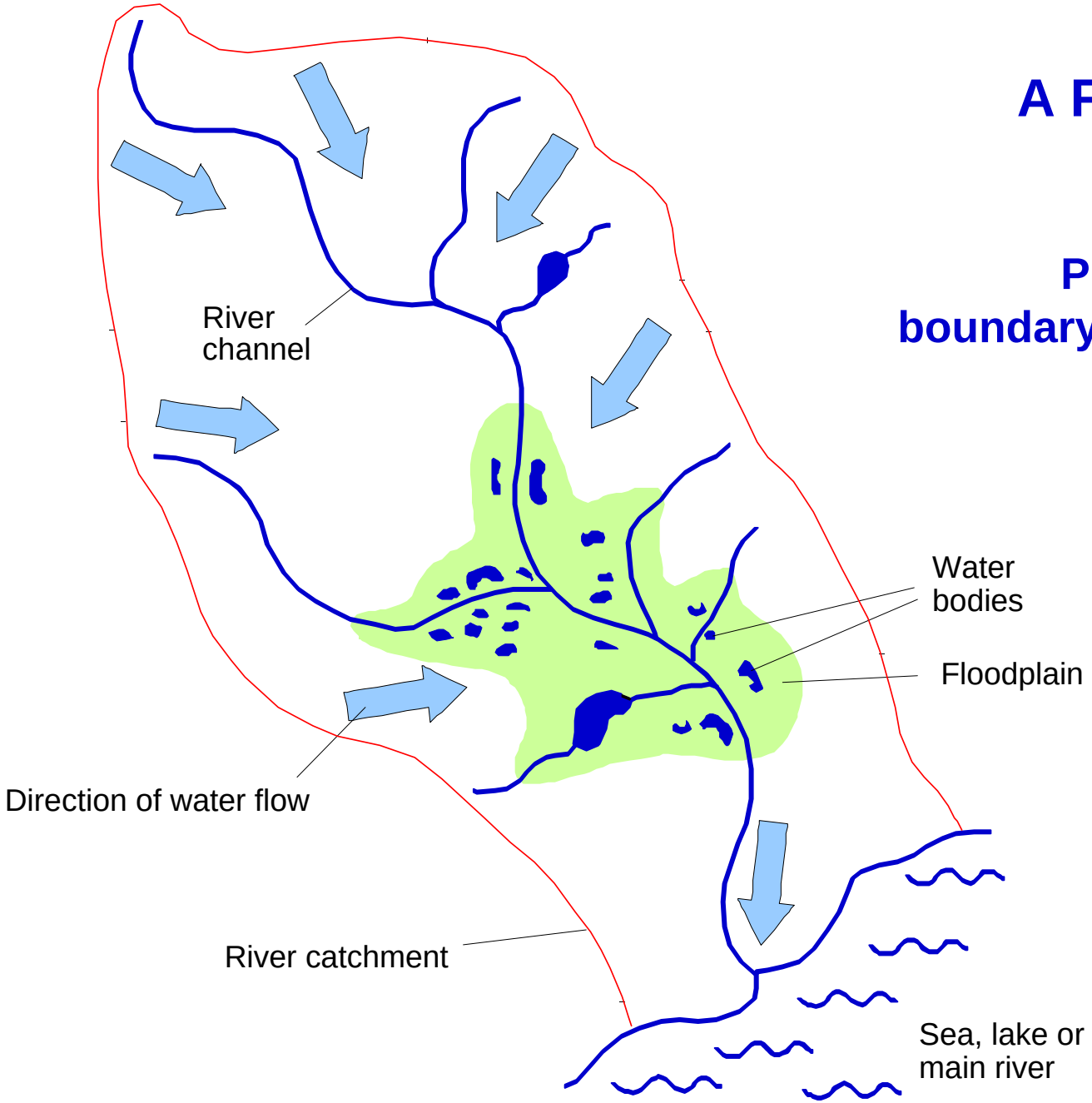
In inland fisheries, we can manage:

- the environment
- fish stocks
- fishing

Need for integrated management

A Floodplain River Catchment

Provides the natural boundary for environmental impacts and fish distributions



Floodplain River Fish

You need to manage both:

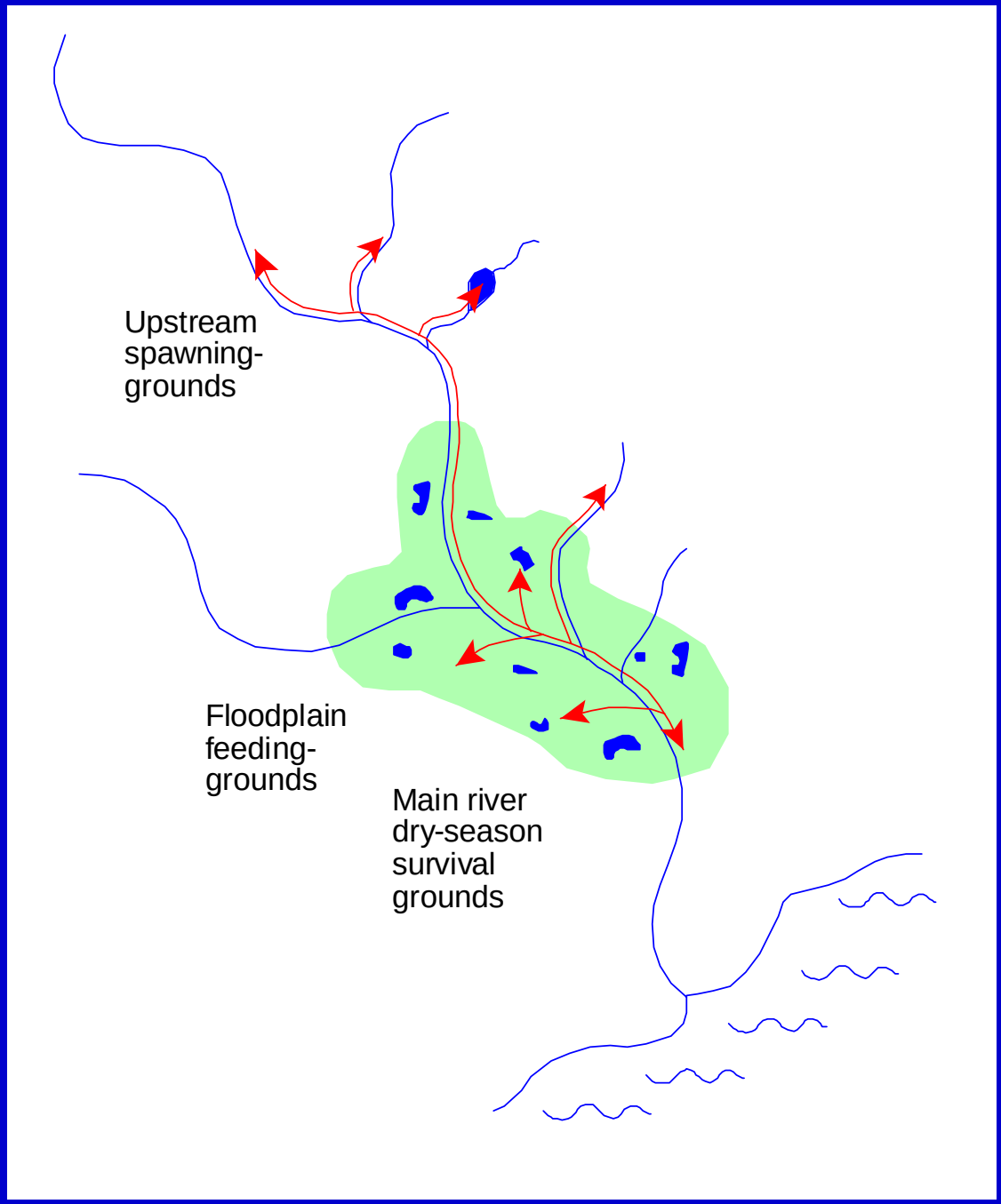
Whitefish

- ‘Flowing water fish, can not tolerate low oxygen conditions, migrate long distances e.g. to feed and breed on the floodplain.
- Survive dry season in main river channels, often downstream.

… and Blackfish

- ‘Still-water’ fish, can survive low oxygen conditions, tend to migrate short distances.
- Survive dry season in floodplain pools and creeks (even in mud).

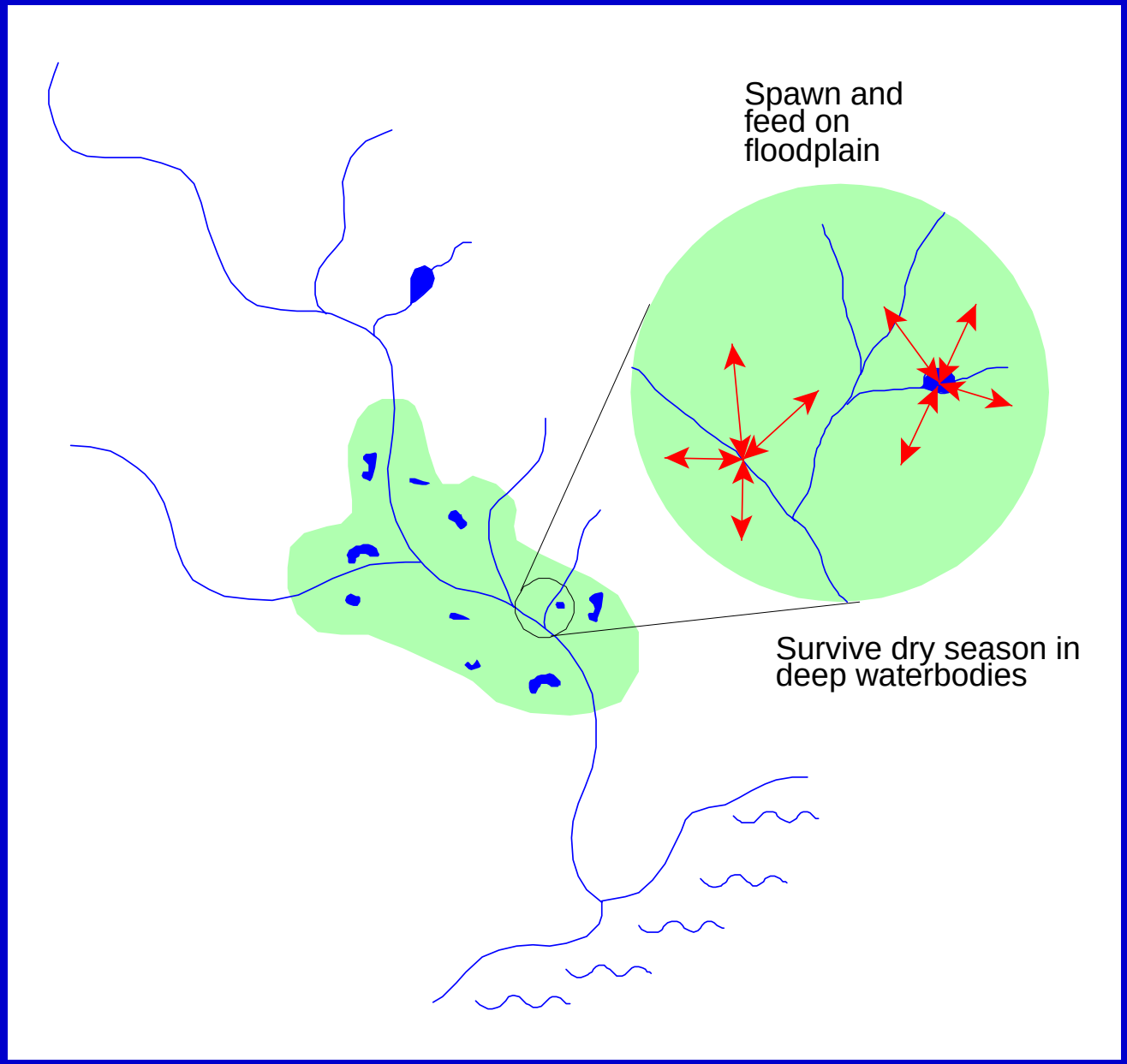
Feeding, taxonomic groups, sizes and values also vary…



Whitefish

migrate at a catchment (regional) scale

…. and need to be managed at a catchment or sub-catchment scale

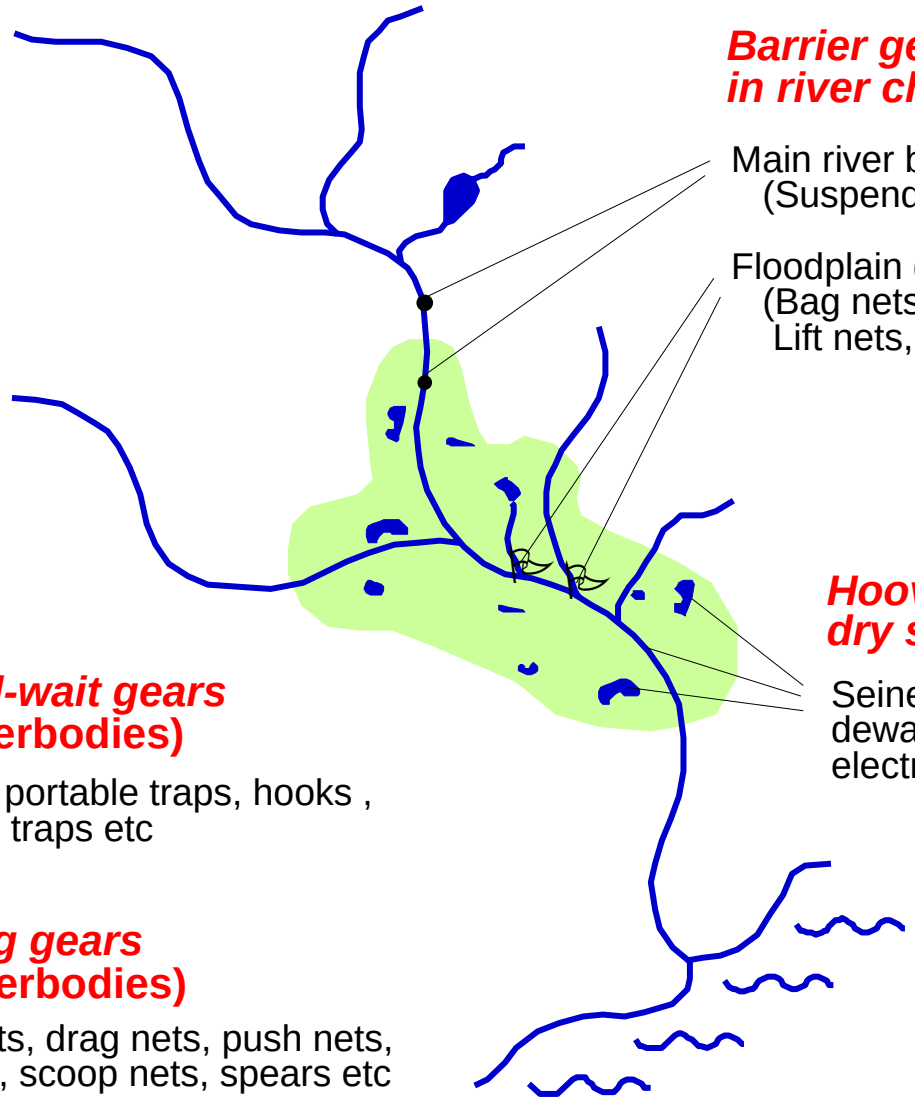


Blackfish

migrate at a *local* scale (from each floodplain lake or river)

… and can best be managed at a local level e.g. by each village

Floodplain River Fishing Gears



Barrier gears in river channels

Main river barriers
(Suspended trawls, flume traps etc)

Floodplain drainage channel barriers
(Bag nets, bamboo barricades, Lift nets, fyke nets etc)

Hoovering gears in dry season waterbodies

Seine nets / fish drives, dewatering, poison, electric fishing etc

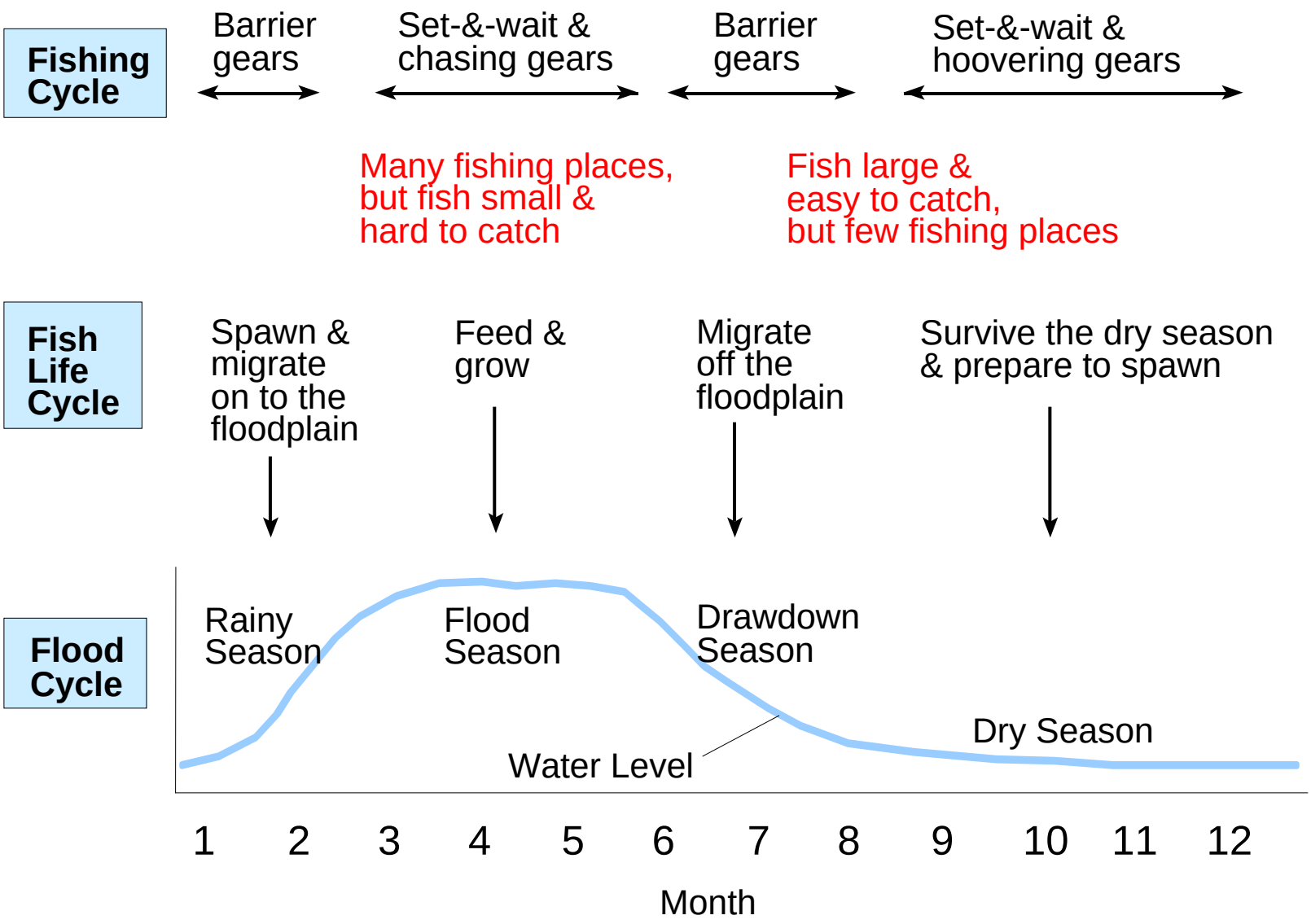
***Set-and-wait gears* (all waterbodies)**

Gill nets, portable traps, hooks , brushpile traps etc

***Chasing gears* (all waterbodies)**

Seine nets, drag nets, push nets, cast nets, scoop nets, spears etc

The Annual Floodplain River Cycle



Bad news for whitefish migration – barrier traps

Bad news for dry season blackfish survival - Dewatering

Management implications of floodplain ecology

- Migration patterns of ‘blackfish’ and ‘whitefish’ determine fishery management units
- Due to fish migrations and water flows, management units can not be managed in isolation, though some local management can be applied for blackfish (cf. forest units)
- Variability in local conditions requires local involvement in management
- Floodplain river fisheries are complicated and should be managed as integrated systems (not as individual species or gears)
- River channels must be maintained to ensure fish can reach spawning and feeding grounds
- Fish are most vulnerable to capture in the dry season and should be protected at this time

Chapter 3. Who should manage?

Co-management – sharing roles and responsibilities

What does management involve?

What capacity and skills are held by different stakeholders?

Making the match…

Co-management – a balance of power

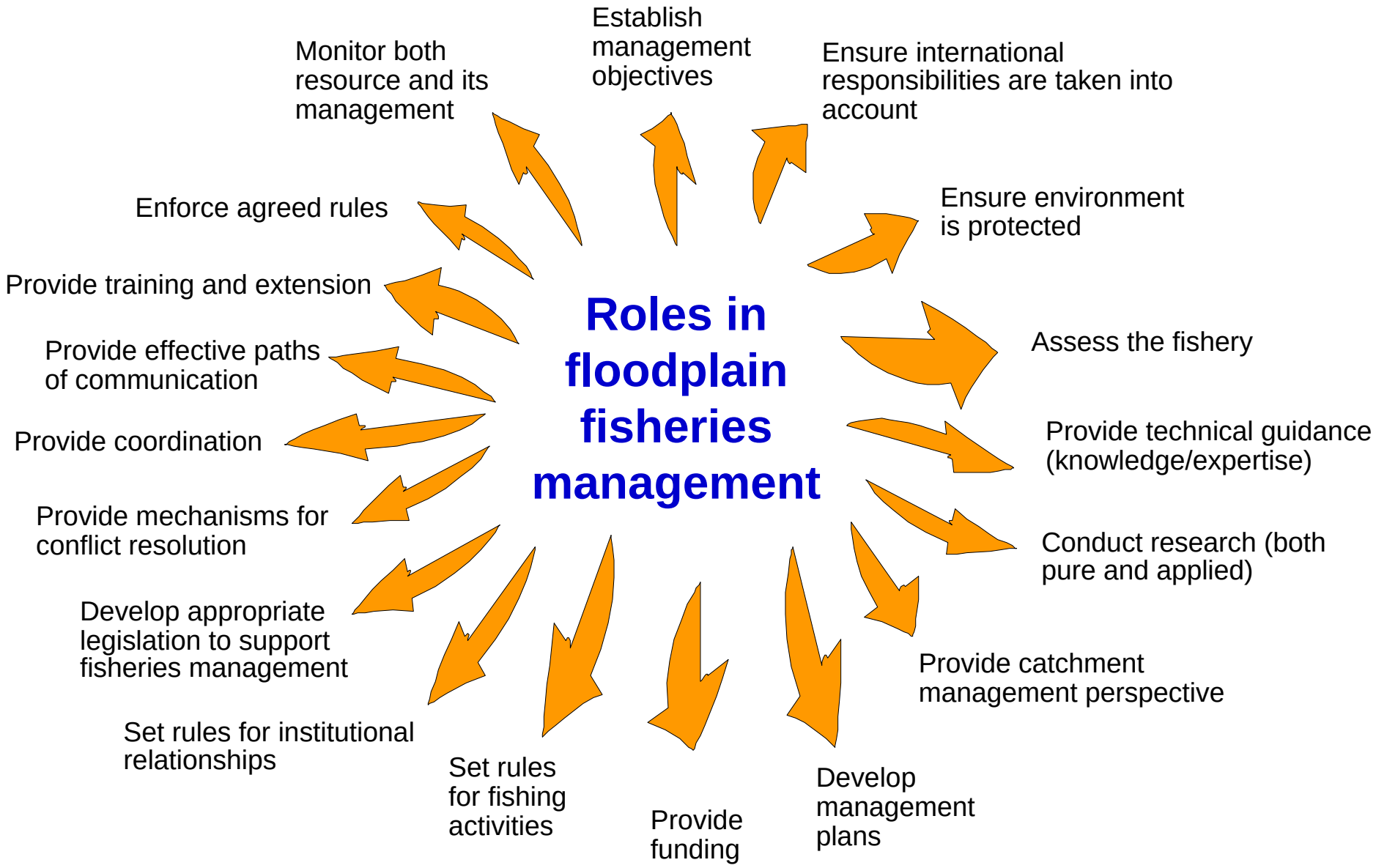
Best co-management arrangement for each location depends on the capacities of the different local stakeholders

Where should co-management be used?

Co-management may be easiest to develop where:

- its **legality** is recognised both by government and by local people
- the **ownership rights** of villages over the water-bodies (wetlands) in their territory are recognised by local people
- physical resource boundaries are clear and within the administrative boundary of a **single village**
- local people agree that there are **problems** with their fishery (wetland) resources
- local people express a **strong interest** in being involved in management
- the community or user group is highly **dependent** on their fishery resources
- the community has strong **organisations** (e.g. the village committee), skilful and respected **leaders**, or effective **mechanisms** for discussing issues and finding solutions to local problems, and for enforcing their own management rules and resolving conflicts
- villages are **small**
- local stakeholders share the same **culture**, **ideals**, and/or **religions**

Co-management may also be developed in water-bodies that are shared between several villages ('IMA's), but greater efforts will be required for their management and simpler management strategies and tools should therefore be used


Roles in floodplain fisheries management
Establish management objectives
Ensure international responsibilities are taken into account
Ensure environment is protected
Assess the fishery
Provide technical guidance (knowledge/expertise)
Conduct research (both pure and applied)
Provide catchment management perspective
Develop management plans
Provide funding
Set rules for fishing activities
Set rules for institutional relationships
Develop appropriate legislation to support fisheries management
Provide mechanisms for conflict resolution
Provide coordination
Provide effective paths of communication
Provide training and extension
Enforce agreed rules
Monitor both resource and its management

Management capacity

Resources

- People, money, equipment etc

Suitably trained people

- Skills are needed in technical, social and management issues

Rights

- Recognition of rights to participate and roles assigned

Motivation

- Returns for participation, achievement of objectives
- Salaries of government staff, opportunities for promotion etc…

Chapter 4. How to manage?

Strategic assessment procedures

Division of floodplain fishery into management units

Technical tools and management planning

Monitoring and adaptive management

Key river fishery assessment questions

- Are fish stocks relatively stable or in decline (i.e. becoming smaller, or harder to catch, or extinct)?

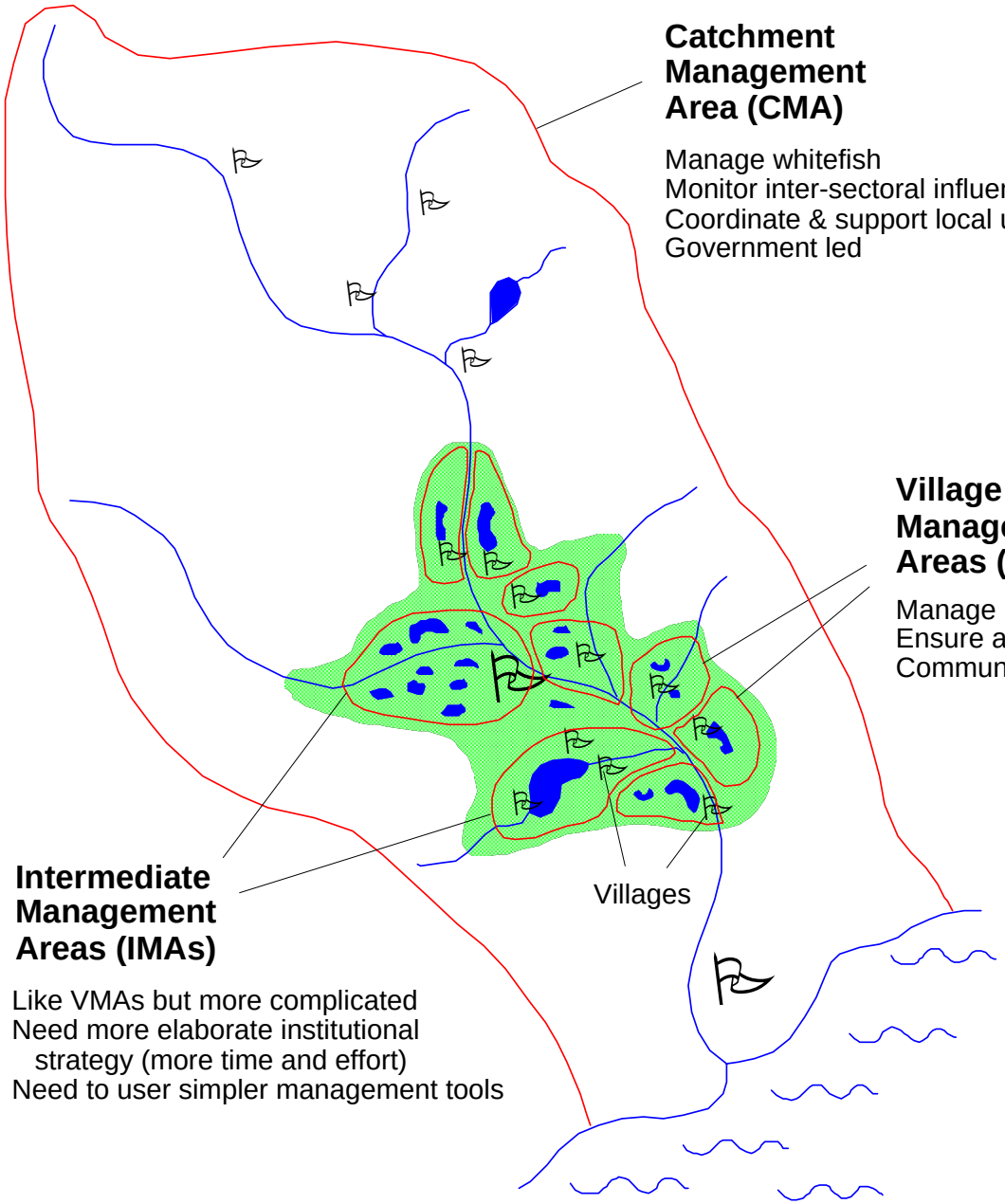
- Which stocks are declining - are they blackfish or whitefish? Where do such fish survive over the dry season? Where do they breed? Where are they badly affected by fishing practices or other activities? How could such negative impacts be reduced?

- How could the local blackfish species be protected over the dry season? Are there any permanent local water-bodies that blackfish could survive in, but which are heavily fished instead?

- Can migrant whitefish species access local fishing grounds from the main rivers? Could access be improved by dredging channels or limiting barrier gears?

- Could a proposed management measure be effectively monitored and enforced, given the resources and skills available?

Suggested three levels of management units for floodplain river fisheries



Catchment Management Area (CMA)

Manage whitefish
Monitor inter-sectoral influences
Coordinate & support local units
Government led

Village Management Areas (VMAs)

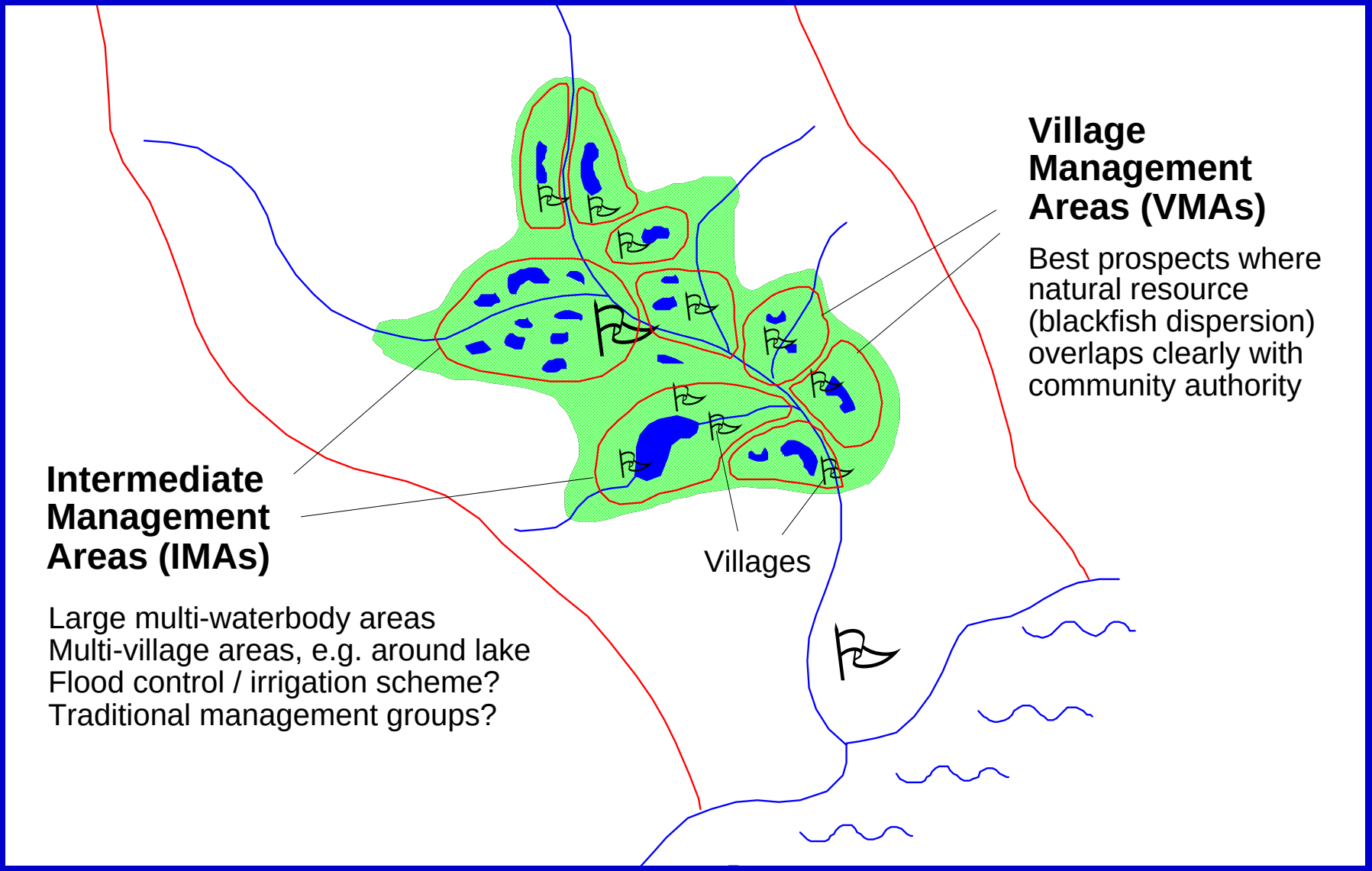
Manage blackfish
Ensure access of whitefish
Community led

Villages

Intermediate Management Areas (IMAs)

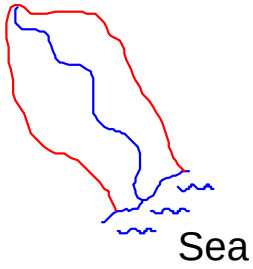
Like VMAs but more complicated
Need more elaborate institutional strategy (more time and effort)
Need to user simpler management tools

How to identify local management units?

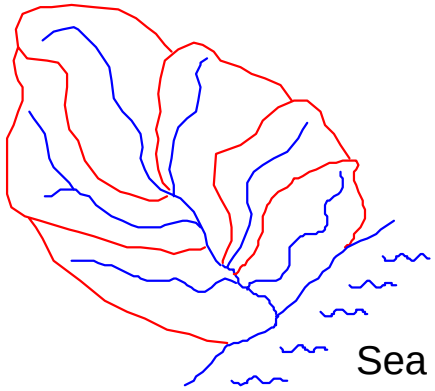


Catchment Management Areas (CMAs) for different rivers

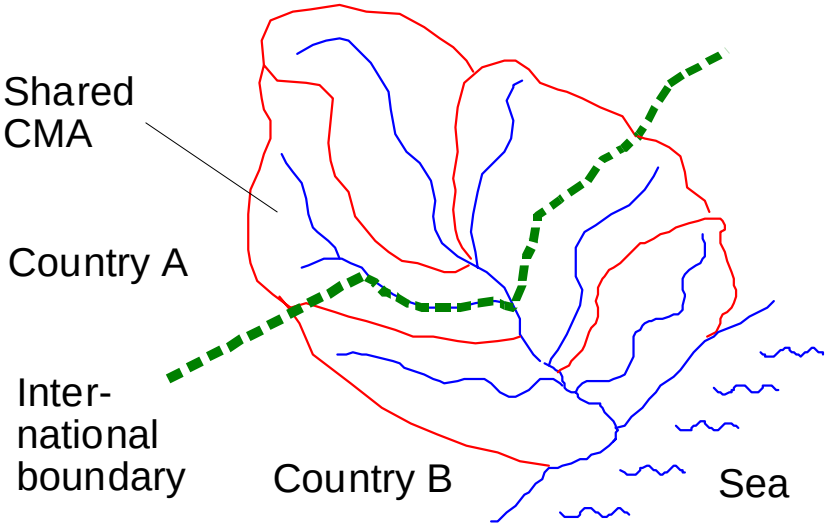
Small river
Single CMA

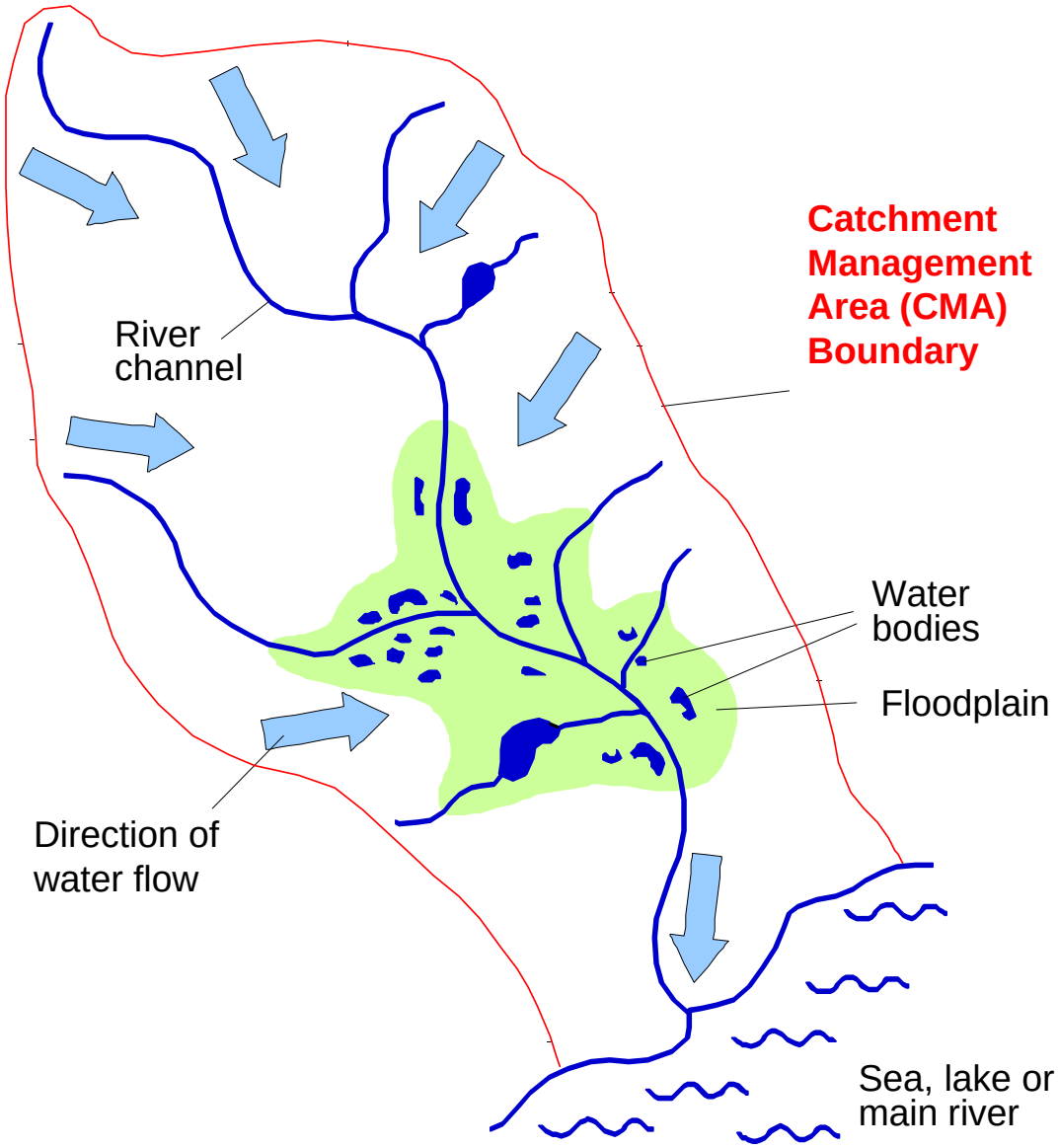


Large river
Six (Sub-) CMAs



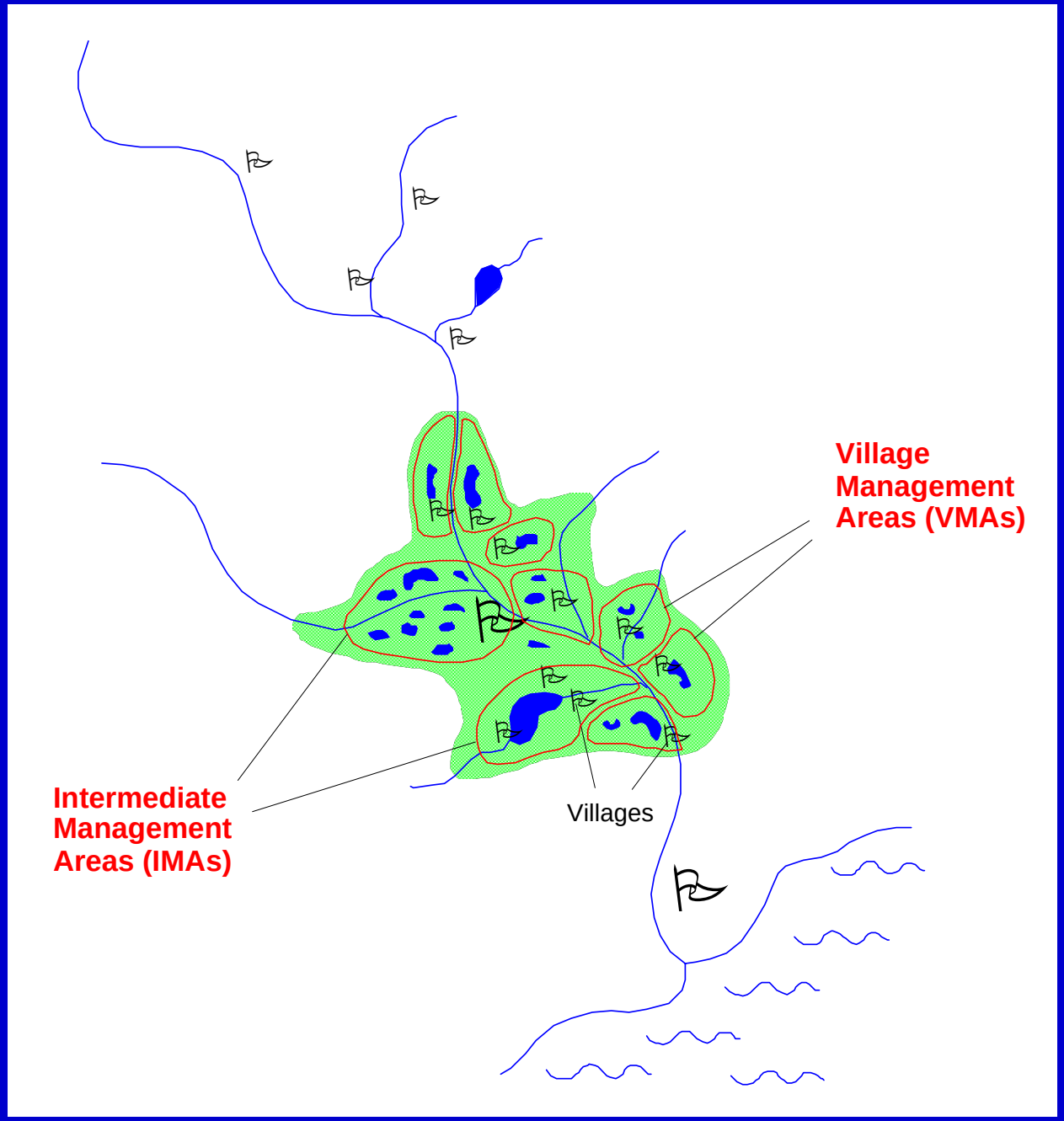
International river
2 CMAs in Country A,
3 CMAs in Country B,
1 CMA shared between countries





Roles of Catchment Management Area (CMA) Authorities

- Coordinate integrated management of fisheries and other sectors
- Provide training, coordination and support to village management units (VMAs)
- Maintain key whitefish habitats



Roles of VMA and IMA Managers

- Develop own VMA Management Plans (and objectives)
- Manage local blackfish stocks
- Ensure access of whitefish
- Set local rules and enforce
- Monitor and adapt local rules as needed

Technical strategies for river fishery management

River fishery management plans should include a mixture of different tools for:

- Ensuring sustainability (protecting resources for the future)
- Ensuring a fair distribution of benefits
- Raising revenues to pay for management (e.g. by licensing)

Best combination of rules for each place depends on its hydrological, physical and social characteristics

Fishery assessment should combine the local knowledge of the fishing community and the scientific knowledge of government officers, academics and NGOs etc

Give careful consideration to the implications of different rules for different stakeholders

A menu of floodplain river fishery management tools

Management Category	Management Tool	Primary Objective(s)
Managing the environment	Environmental protection	Maintain overall integrity and productivity of river floodplain system
	Habitat restoration	Maintain primary habitats for fish spawning, feeding, and migrations
	Sluice gate management	Allow access of fish to polders (only in hydrologically modified floodplains)
	Water level manipulation	Maintain dry season water levels to maximise fish survival and fry production (only in hydrologically modified floodplains)
Managing *Who* Can Fish	Waterbody leasing	Raise revenue Reduce conflicts between fishers (control access)
	Gear licensing	Limit number of fishers / gears Raise revenue
Managing the *Amount* and *Type* of Fishing	Mesh / fish size limits	Limit capture of small / immature fish
	Reserves	Ensure some fish can survive the fishery to spawn and produce next year's stock
	Closed seasons	Limit capture of small / immature fish (flood season) Ensure some fish can survive the fishery to spawn (dry season)
	Dry season gear bans	Ensure some fish can survive the dry season to spawn and produce next year's stock
	Barrier gear bans	Allow access of (white)fish to spawning, feeding and survival grounds
Managing Fish	Once-only species introductions	Increase productivity of fish stocks, where appropriate species are missing
	Repeated fish stocking	Increase size of fish stocks, where natural breeding insufficient or depleted due to overfishing

Some tools are more appropriate for VMAs or CMAs

Each tool has its own advantages and disadvantages (see FAO Fish. Tech. Pap. 384/1)

Adaptive management

For complex and locally variable resources like flood-plain rivers, it is impossible to predict the exact outcome of different management actions

Different conditions need different solutions

Adaptive management therefore:

- actively *monitors* the effects of any management intervention or change;
- *evaluates* the outcome by comparison with other places or previous times; and thus
- develops management strategies based on *learning* and *feedback*.

Adaptive management – a change in attitude

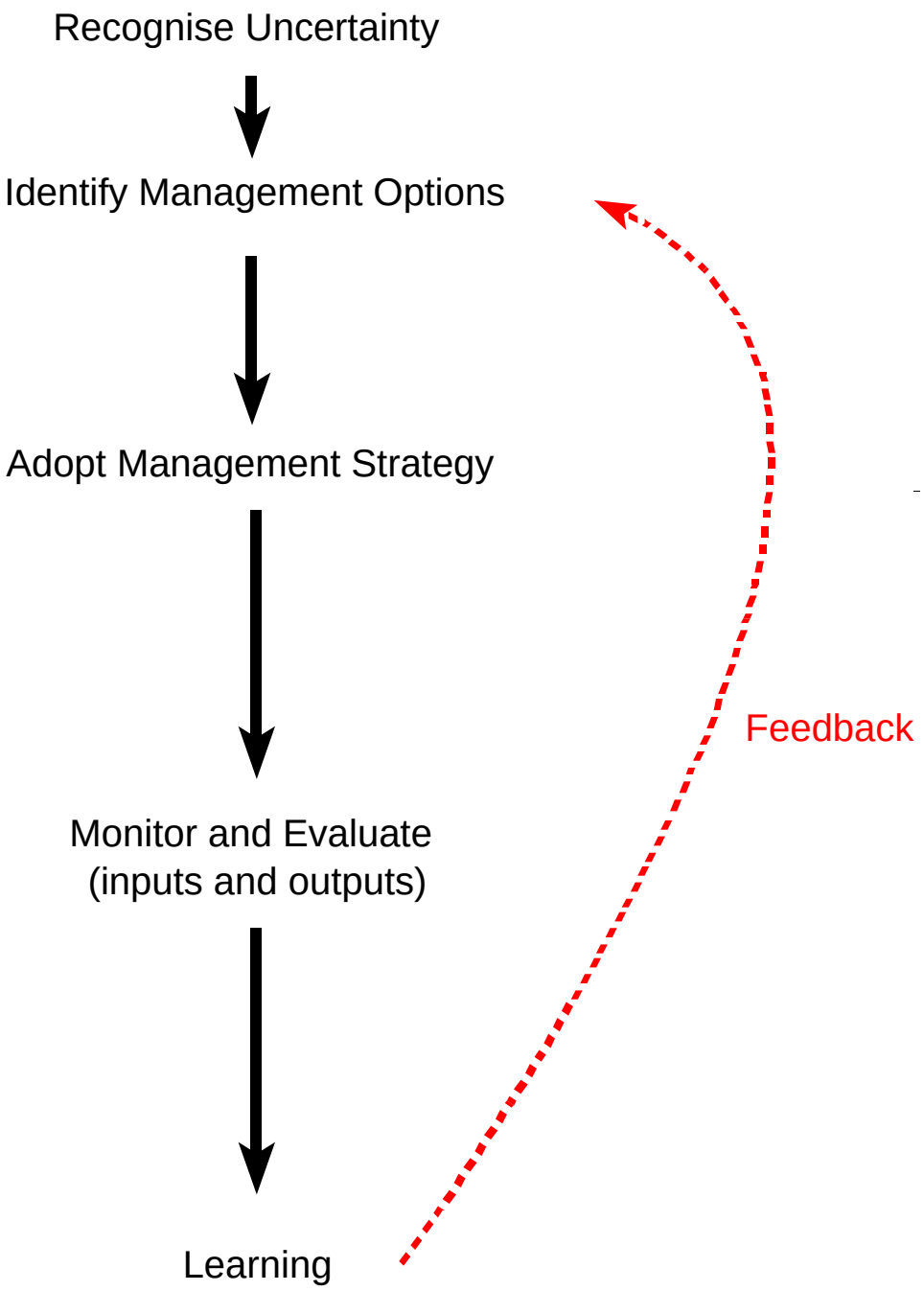
Change

- from a rigid, predictive approach ...
- ... to a flexible, experimental approach

An adaptive attitude

- Recognises that mistakes are an opportunity for learning
- Rewards people for identifying problems … and promoting innovative solutions

As the saying goes ‘Change happens; growth is optional !’



Steps in Adaptive management

For a single management unit, e.g. a village

Adaptive Management Approaches

Villagers can learn from their own experiences by comparing their results this year with those in previous years (i.e. *before-after*)

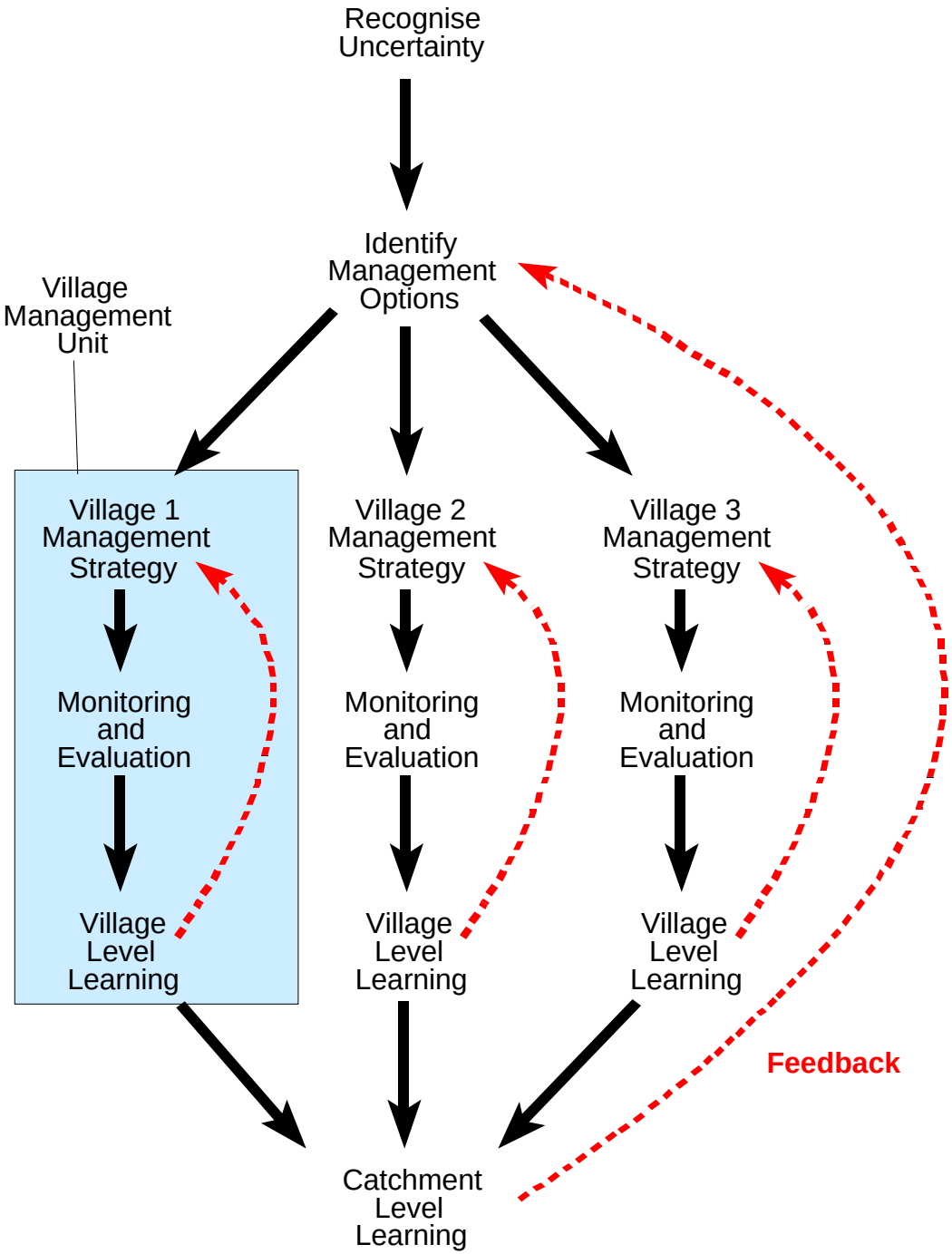
- *But*: year-to-year comparisons must allow for natural variability

Lessons may also be learnt by comparing outcomes between villages (i.e. *with-without* approach)

- *But*: between village comparisons must allow for differences between the villages

Best adaptive management (e.g. by *scientific control* approach) requires a combination of these approaches:

- Local community understand local situation, and able to interpret local results
- Regional partners more able to make comparisons between the villages, and be aware of the effects of external impacts on the catchment's resources.

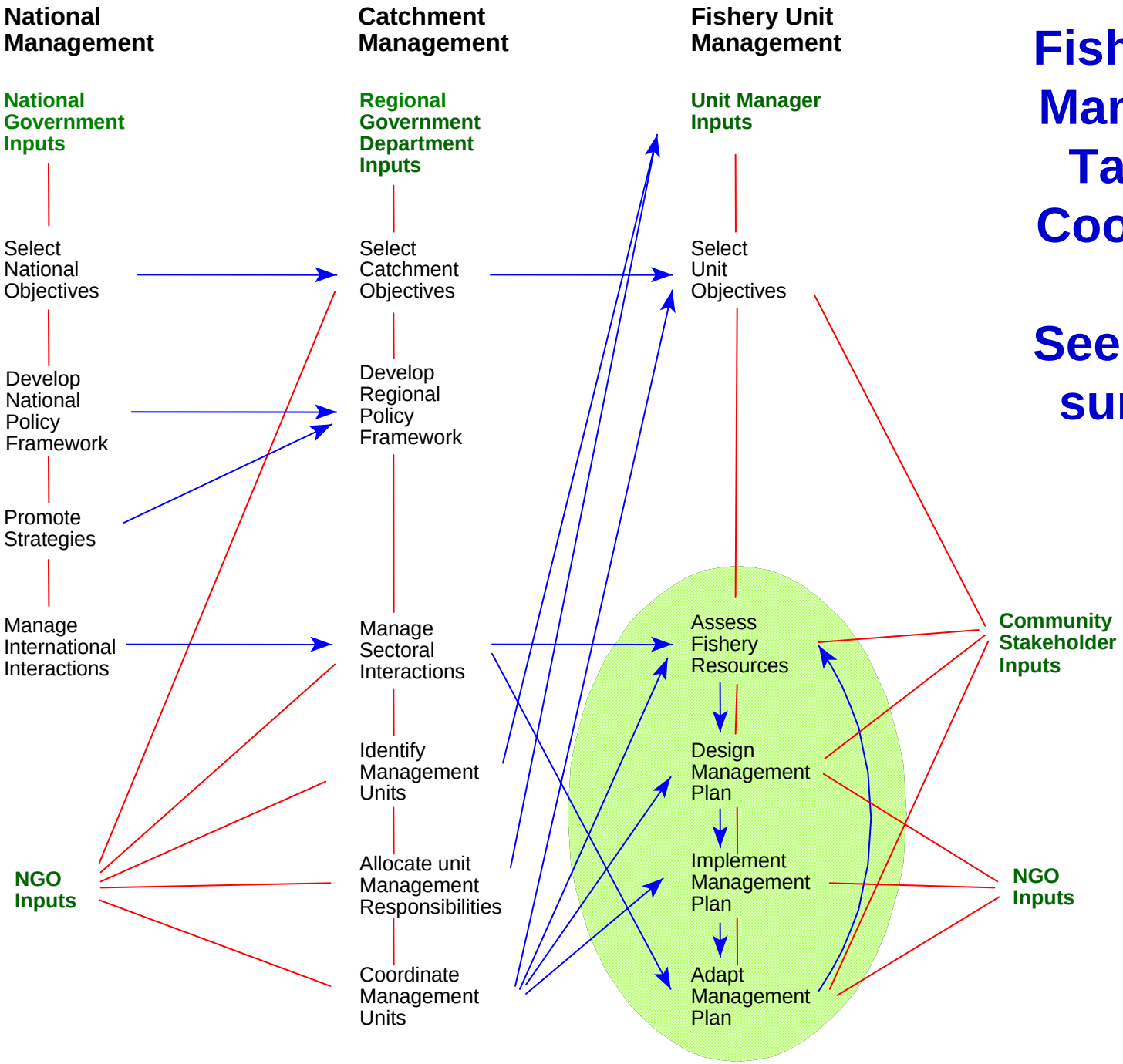


Adaptive management for several management units

e.g. villages within a catchment area

Chapter 5. Steps to successful management

National level (leadership, endorsement and legitimisation)
Catchment level (regional leadership and coordination)
Management unit level (resource management)



Fisheries Co-Management Tasks and Coordination

See checklist summaries

Disclaimer

This presentation is an output from a project funded by the UK Department for International Development (DFID) for the benefit of developing countries. The views expressed are not necessarily those of the DFID.

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