Environmental Security

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Definition of "environmental security" ?

- has been understood extensively, including **human, physical, social and economic well being**.
- **this scope gives** *hardly any limitation for interpretations*
- at present, there is ***no consensus*** on a clear definition of *environmental security*

Traditionally "Security"

- ✓ a synonym for national security.

- ✓ has two main objectives:

  (a) to preserve the territorial integrity of the State, and

  (b) To maintain the preferred form of government, by political and military means

Environment and Security

- has been under consideration since 1980s.
- Mainly by two groups:
  1. The **environmental policy community**, addressing the security implications of environmental change & security, and

  2. The **security community**, looking at new definitions of national security

Political scientists

- defined **environment impacts as being part of the security issue**.

- This has tempted to re-define the concept of national security completely.

It is now accepted, that global impacts of

- Environmental/ climate change,
- the depletion of the ozone layer, and
- transboundary pollution, etc.,

have clear security implications.

This made the military authorities to re-evaluate the security dimension of environmental issues.

Internationally, …

- The “World Commission on Environment and Development” - **Brundtland Report** (1987) clearly linked security with environment.

“Humankind faces two great threats.

The ***first*** is that of a **nuclear exchange**. Let us hope that it remains a diminishing prospect for the future.

The ***second*** is that of **environmental ruin** world-wide and far from being a prospect for the future, it is a fact right now.“

Action by the International Community

- Following this inter-linkage the **General Assembly** officially introduced the *concept of security and environment* at its **42nd Session**.

- Since the UN General Assembly introduced environmental security in the mid -late 1980s, many institutions dealt with the issue.

  e.g. UNEP, OSCE and NATO, …

Environmental Stress - Cause of a Conflict?

- **Deforestation on the Philippines** (Anti-government rebels - New People's Army)
- **Deforestation in Ethiopia and Somalia** (land degradation, food prices, rivers emerging from Ethiopia to Somalia, …)
- **Deforestation in the Caribbean (in Haiti, El Salvador**) -firewood shortages and cultivation of marginal soil would promote social disruption and instability;
- **Water in the Middle East** (Jordan River waters)- (Israel, Jordan, Lebanon and Syria).

‘Environment’

“The surroundings of a physical or non-physical systems that may interact with us by exchanging **mass**, **energy**, or **other properties**”.

Source: Wikipedia

‘Security’

“The degree of resistance to,
or
protection from, harm”.

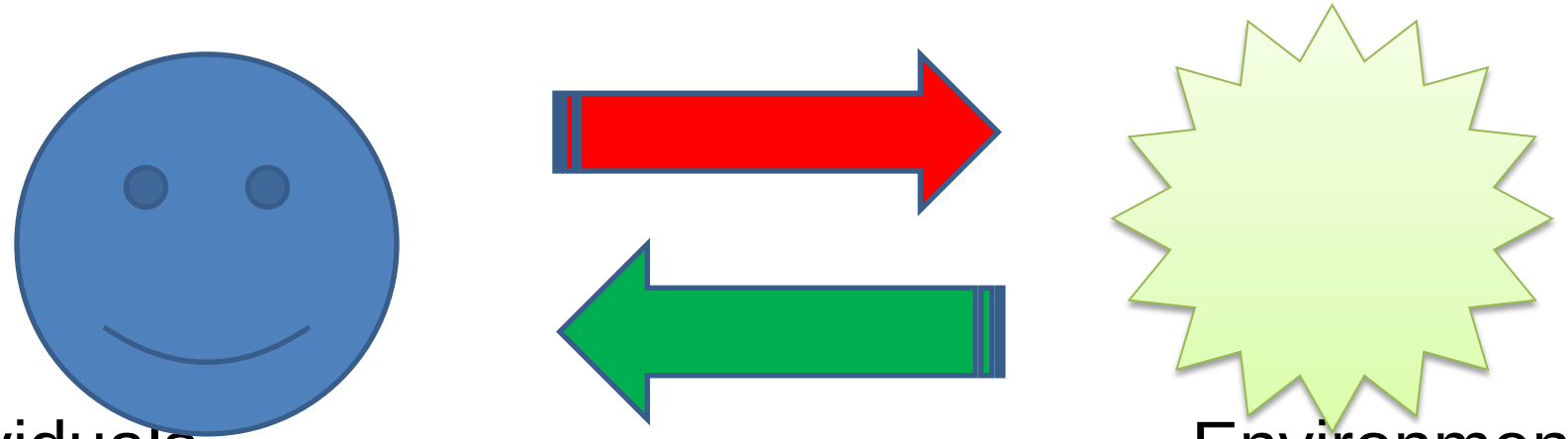
It applies to any vulnerable and valuable **asset**,

- a person,
- dwelling,
- community,
- nation, or
- organization.

Source: Wikipedia

“Environmental Security” examines

events and trends which poses threats



Individuals, Communities or Nations

Environment

***** aspects of **food security** or **water security, etc.**

It considers:

The abilities to cope with environmental risks, changes or conflicts, or limited natural resources.

(Example: climate change)

NATURAL ENVIRONMENT – ecosystems - (resources & services)

- benefits are widely recognized but poorly understood!

- under enormous pressure from the growing demands we place on them

Population growth and prosperity translates:

- into increased **land conversion**

(to agricultural, industrial, or residential use)

but also

- into increased demand for ecosystem inputs

(such as fresh water, fiber, and soil fertility)

as well as

- increased pressure on the capacity to assimilate our waste

(including air and water pollution as well as solid waste)

In short,

we are asking more and more from natural ecosystems even as we reduce their capacity to meet our needs!

Conserving …

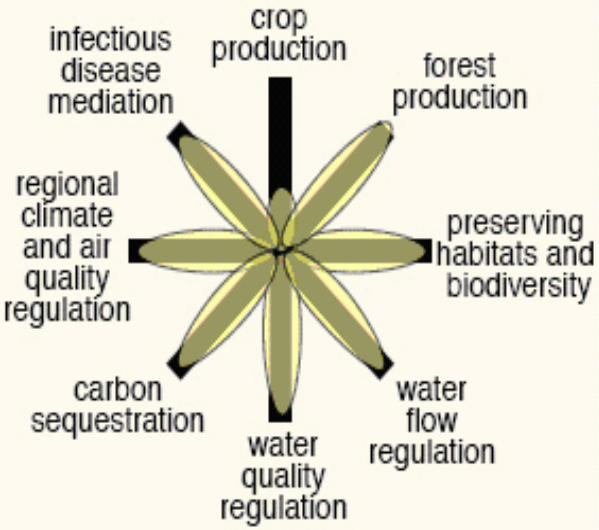
goods and services may also involve loosing certain uses of these ecosystems!

EX. forest → agriculture

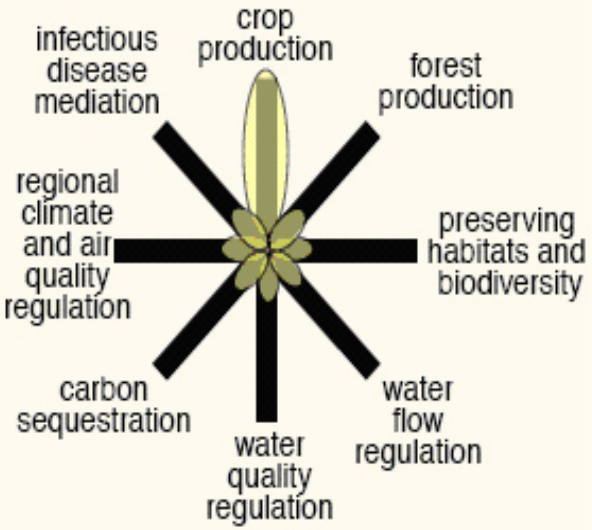
- conservation preserves certain valuable ecosystem services from forest,

but it also

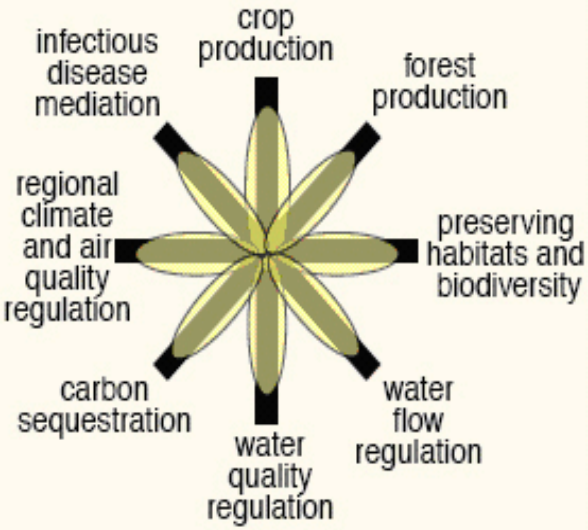
- prevents benefits of agricultural production



natural ecosystem



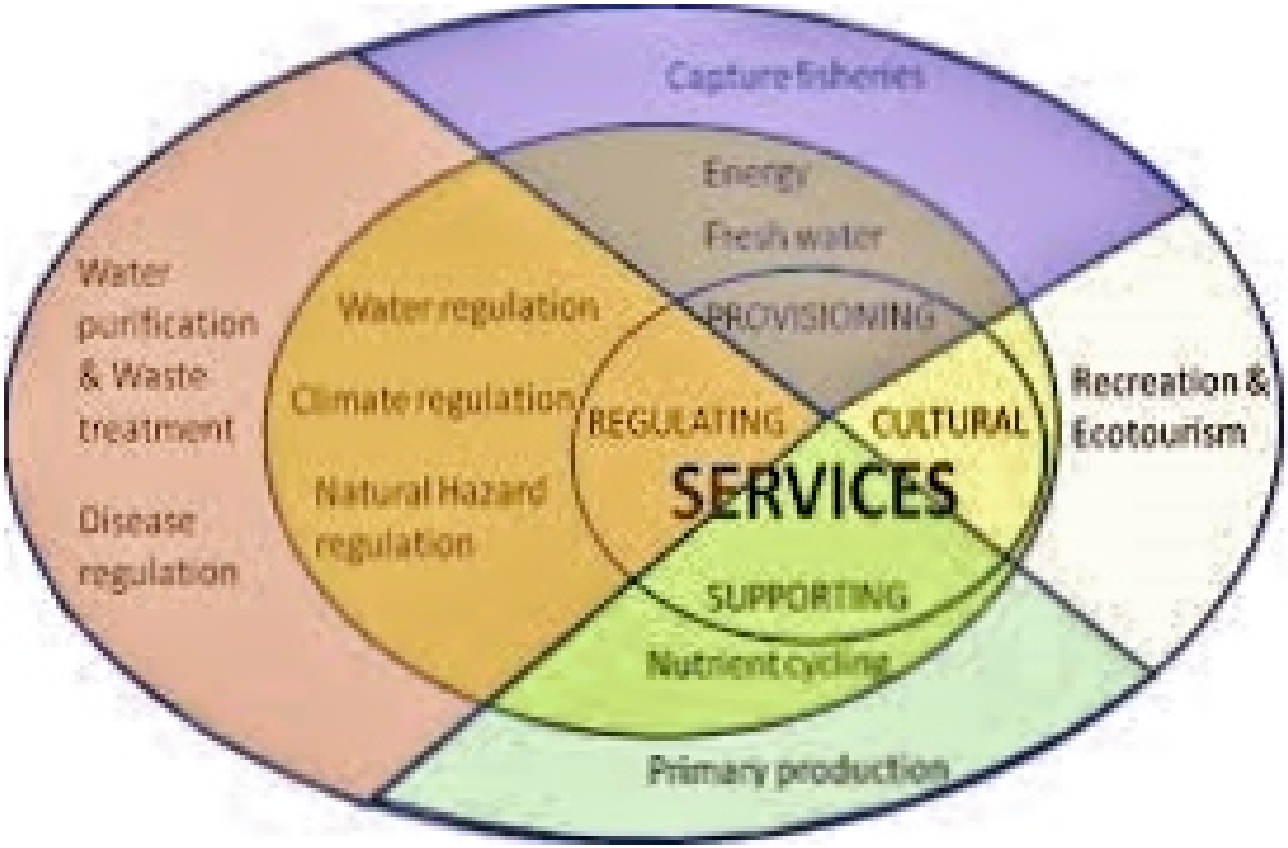
intensive cropland



cropland with restored ecosystem services

To assess the consequences of actions,
not enough to know that
ecosystems are valuable,
but also
need to know
how valuable they are, **and**
how that value is affected by different forms of management.

Ecosystem Services



Normal practice

(in RBs of **developed** countries)

- is measuring ***Water quality****
  - basis for *environmental condition* and
  - set management objectives of rivers

- WQ is just a one indicator of results of ongoing activities in the catchment area or river.

The felt need
(in **developing** countries)
is…

- a more rigorous and comprehensive approach with range of indicators to reflect all aspects of the ecological health of catchments and rivers, including
  - quality,
  - quantity (e - water req.) and
  - Catchment and river health

What is required is …

- a systematic, consistent approach that would underpin:
  - the monitoring of river / catchment condition,
  - evaluate the impact of management actions and,
  - assist in the prioritization of rivers and river reaches for particular management attention

It should be

a ***holistic***, ***asset-based*** **framework** for evaluating

catchment health,

river health and

environmental flows

Holistic

- ***Holistic*** refers to consideration of the ecosystem in its entirety:

  ✓ Biodiversity (fish, birds, vegetation, invertebrates, …), their lifecycles, movements

  ✓physical processes (physical form, sediment transport, hydrology and hydraulics)

… Holistic

- ✓water quality variables (nutrients, toxins, salinity, acidity, turbidity, dissolved oxygen)
- ✓flow regime (low flows, high flows, pulses, floods)
- ✓ecosystem services
- ✓human uses
- ✓interactions between all of these aspects of the system

Asset-based

- Focusing on protecting ***key*** identifiable assets such as

  - ✓ biodiversity,
  - ✓threatened species,
  - ✓native species,
  - ✓species of high conservation value,
  - ✓certain habitats,
  - ✓ecosystem services, or
  - ✓the relative health of ecosystems

‘**Key**’ or ‘**significant**’ *ecological assets* are:

- Identified as high-value
- also their protection lends a protection to lesser assets

Key assets (**identified by whom**?)

- identification of ecological asset relies heavily on how much the ***community values*** it, and
- whether it serves a ***utilitarian purpose***

Framework

- is a basic logical structure that simplifies a complex process of decision making and scientific inquiry,

and

- provides guidance for those involved in activities associated with related issues.

Framework …

- aims to balance environmental, economic, recreational and cultural needs to achieve “healthy rivers”

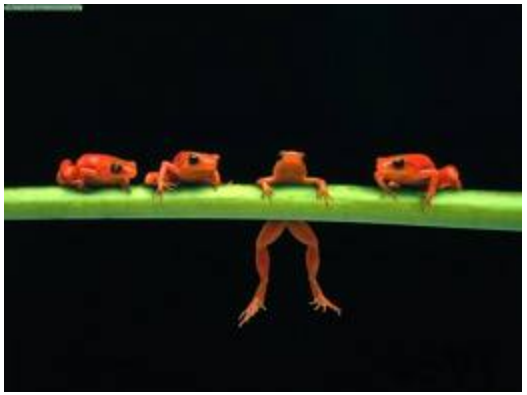
- a good strategic *fw* components:
  - Catchment and river health monitoring,
  - environmental flows assessment and
  - water re-allocation rules

Framework …

- framework is not a fully specified strategy,

  but

- it does address some core elements of such a strategy.



Catchment health

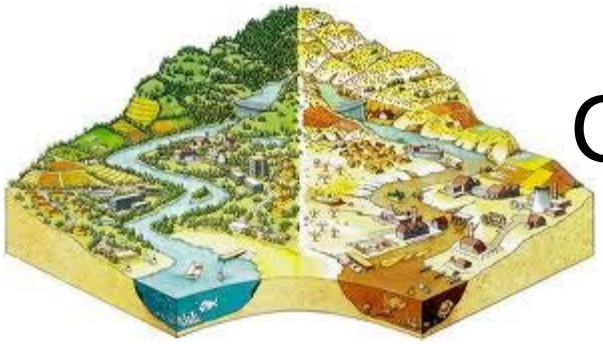
- In developed countries: strict rules and guides land use conversions

  (hence, the need is to check on the river flow quality)
- Developing countries lack such rigid regimes of land use conversions, monitoring, etc

  (Hence, managing catchment health is important)

…Catchment health

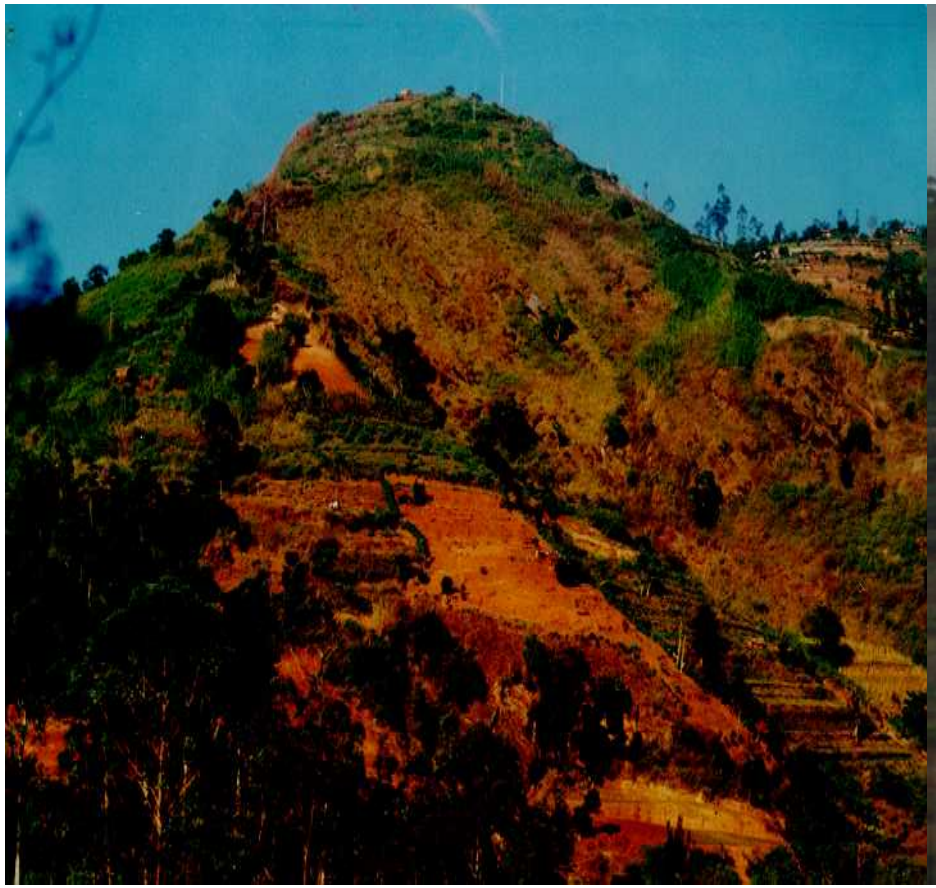
- EIA, Building codes, land management codes, waste disposal codes,… etc. comes into play
- Hence, focus should be on:
  - Collecting and managing information on where and what is happening
  - Involvement of stakeholders
  - Guiding through a safe passage

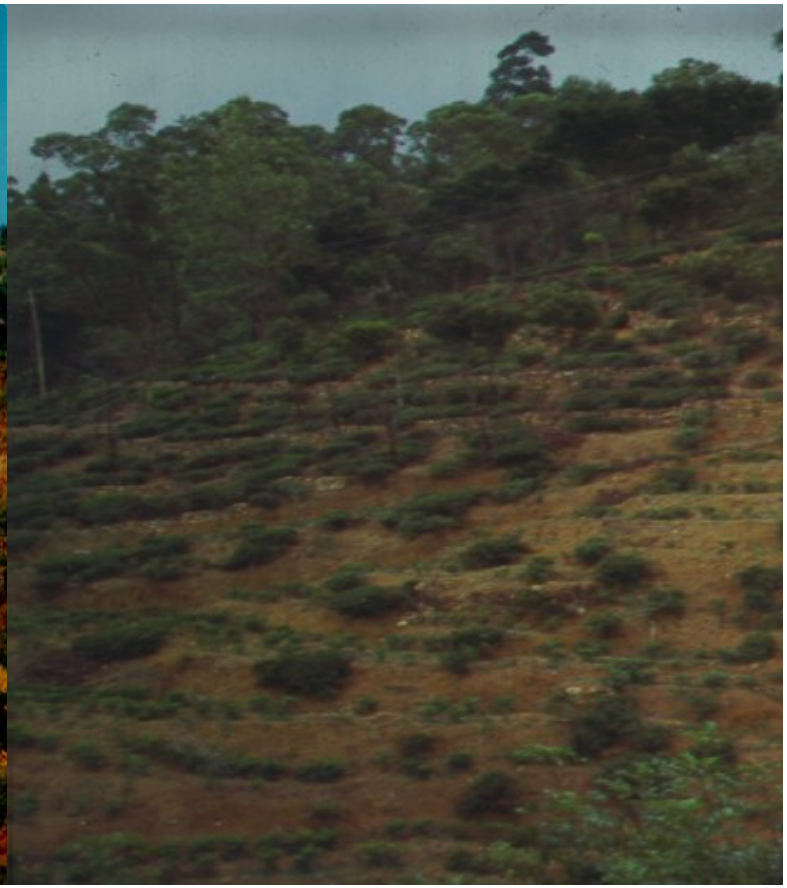


Catchment mgt

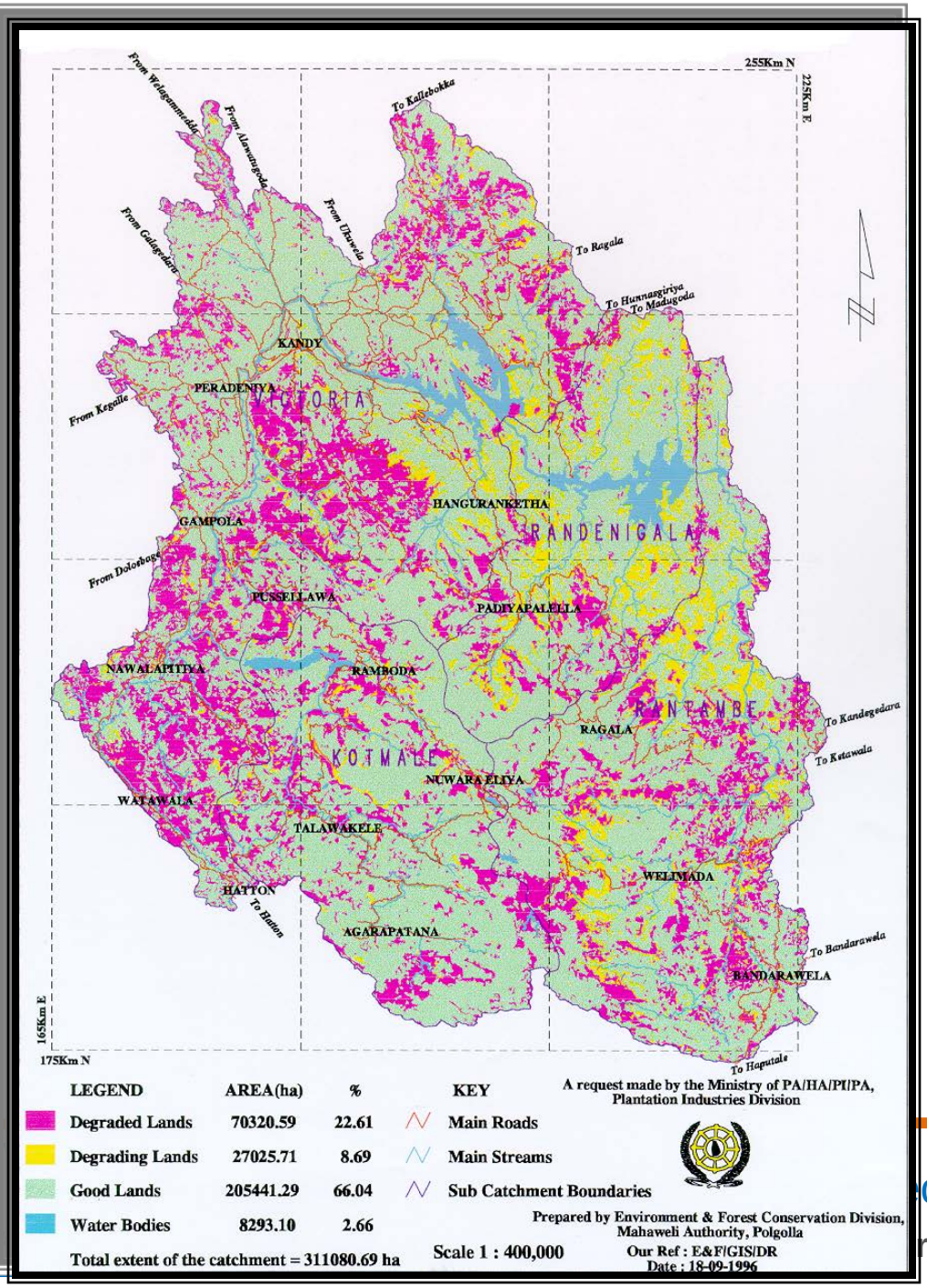
- Requires a systematic, nationally consistent approach that would underpin:
  - the monitoring of catchment and river condition,
  - evaluate the impact of management actions and, assist in the prioritization of rivers and river reaches for particular management attention

Catchments



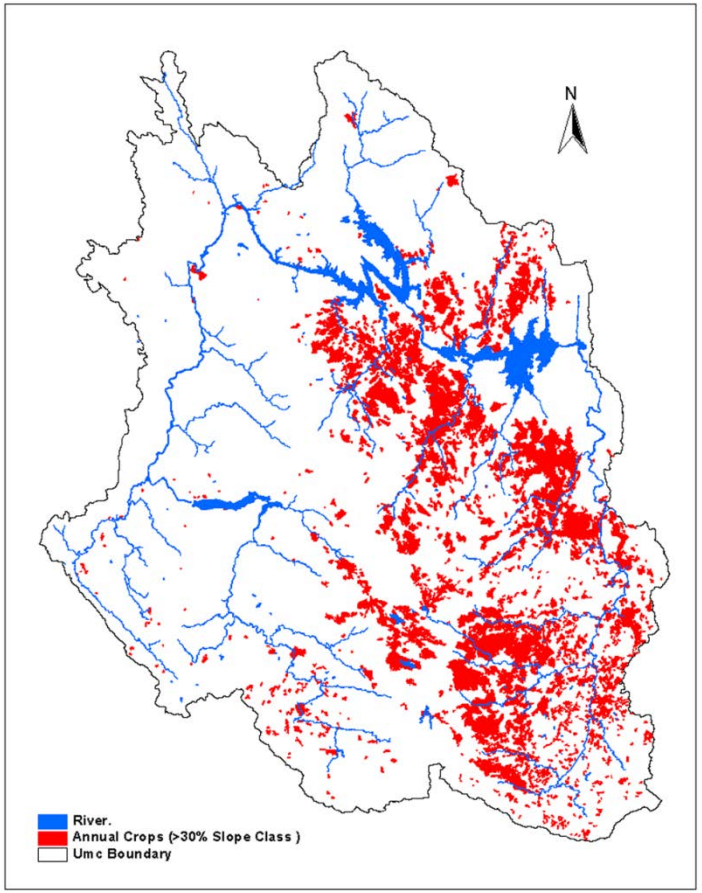


INDICATIVE MAP OF LAND DEGRADATION



Hill Country

Annual crops on lands over 30% slope in UMC



- Strategic assessment of catchments
- Land use and hydrology
- Water allocation and Reservoir management
- Anicut schemes

MAHAWELI RIVER BASIN GENERALIZED LAND USE
1979 - 86

LEGEND	EXTENT(ha.)
Dense Forest	217393.00
Paddy	105535.00
Scrub/Open Forest	192139.00
Other	451936.00
Marsh	10524.00
Water	34150.00

Source : Survey Department of Sri Lanka
(1:100,000 Land Use Map Series)

LAND USE OF MAHAWELI RIVER BASIN
(BASED ON SATALLITE IMAGES) - 1996

LEGEND	EXTENT(ha.)
Dense Forest	295336.00
Paddy	125577.00
Scrub/Open Forest	191396.00
Other	352984.00
Marsh	8449.00
Water	37928.00

DATA SOURCE - Landsat Thematic Mapper (TM)-1996
RESOLUTION - 30m x 30m
RADIUS - 3,4,5

River Health

- '**biological integrity**'
  - "*the capability of supporting and maintaining a balanced, integrated, adaptive community of organisms having a composition and diversity comparable to that of the natural habitats of the region*" (Frey, 1977).

‘River condition’

- the degree of deviation from a healthy state
  - reflects the overall state or character of a river and can be described using various indices that apply to certain attributes of rivers
  - is measured relative to an arbitrary benchmark or reference condition

river health …

- **monitoring** - collection and reporting of data,
- **assessment** - analysis and reporting of the implications of those data for resource management

✓ **Application** of river health data and assessment

- utilization of the information to improve resource management


WARNING
A POTENTIAL HEALTH HAZARD


DANGER
THIS WATER IS CONTAMINATED
WITH A TOXIC (POISONOUS)
BLUE GREEN ALGAE
WATER CONTACT FOR BOTH
HUMANS AND ANIMALS
IS EXTREMELY DANGEROUS
AND IS ABSOLUTELY PROHIBITED

Environmental flows*

- *flows* that are *needed to* ***maintain healthy functioning of water dependent ecosystems*** and
- ***ensure that the benefits derived from rivers and streams can be sustained***.

- There is growing recognition that many attributes of the natural flow regime need to be considered.

E-flow calculation methods

Approach has moved on from min flow (10-15%) to rigorous methods:

- identification of environmental **assets** of a river,
- use of conceptual **flow models** to maintain those assets,

Methods …

- a **flow regime** that will maintain the assets at a low level of risk, and

Alternatively,

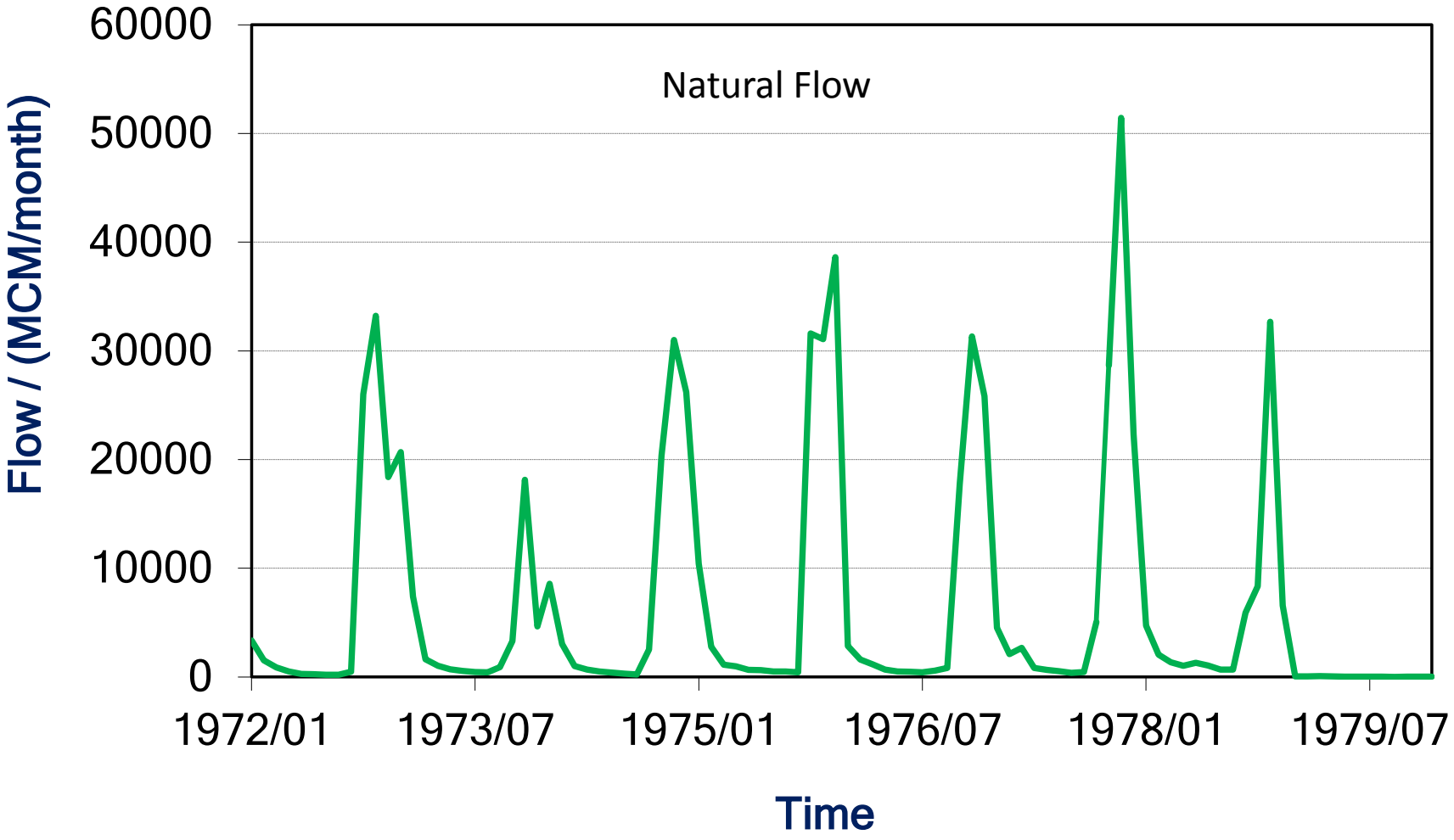
- flow regimes with a **known (higher) risk** to the assets and
- a **known impact** on other water users

E-flow rules

- The information from such assessments provides:

the foundation for rational decision making regarding what environmental flow rules should be adopted.

Estimation Method - 1

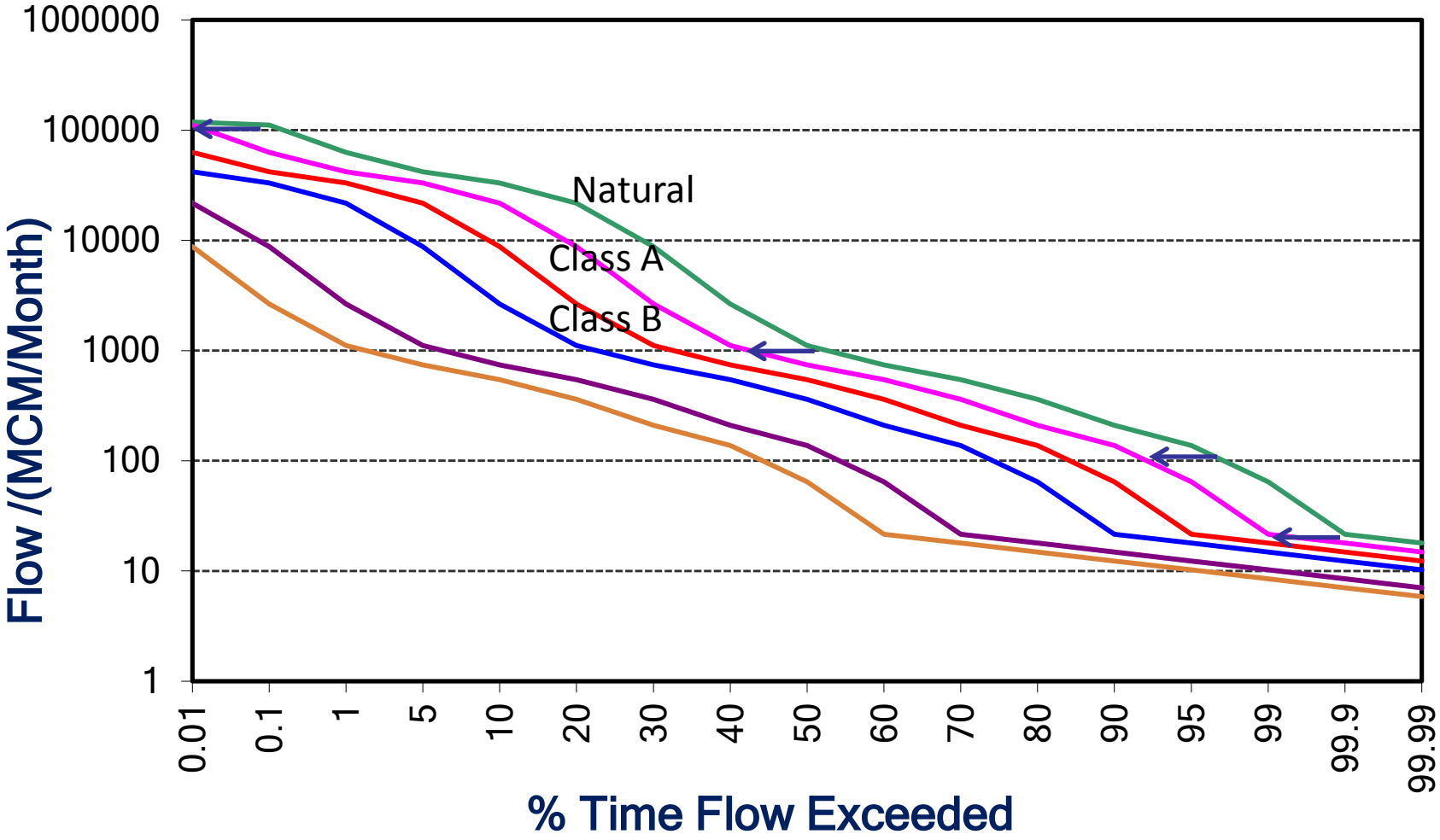


Sri Lanka Environmental Flow Calculator (SLEFC) - 3

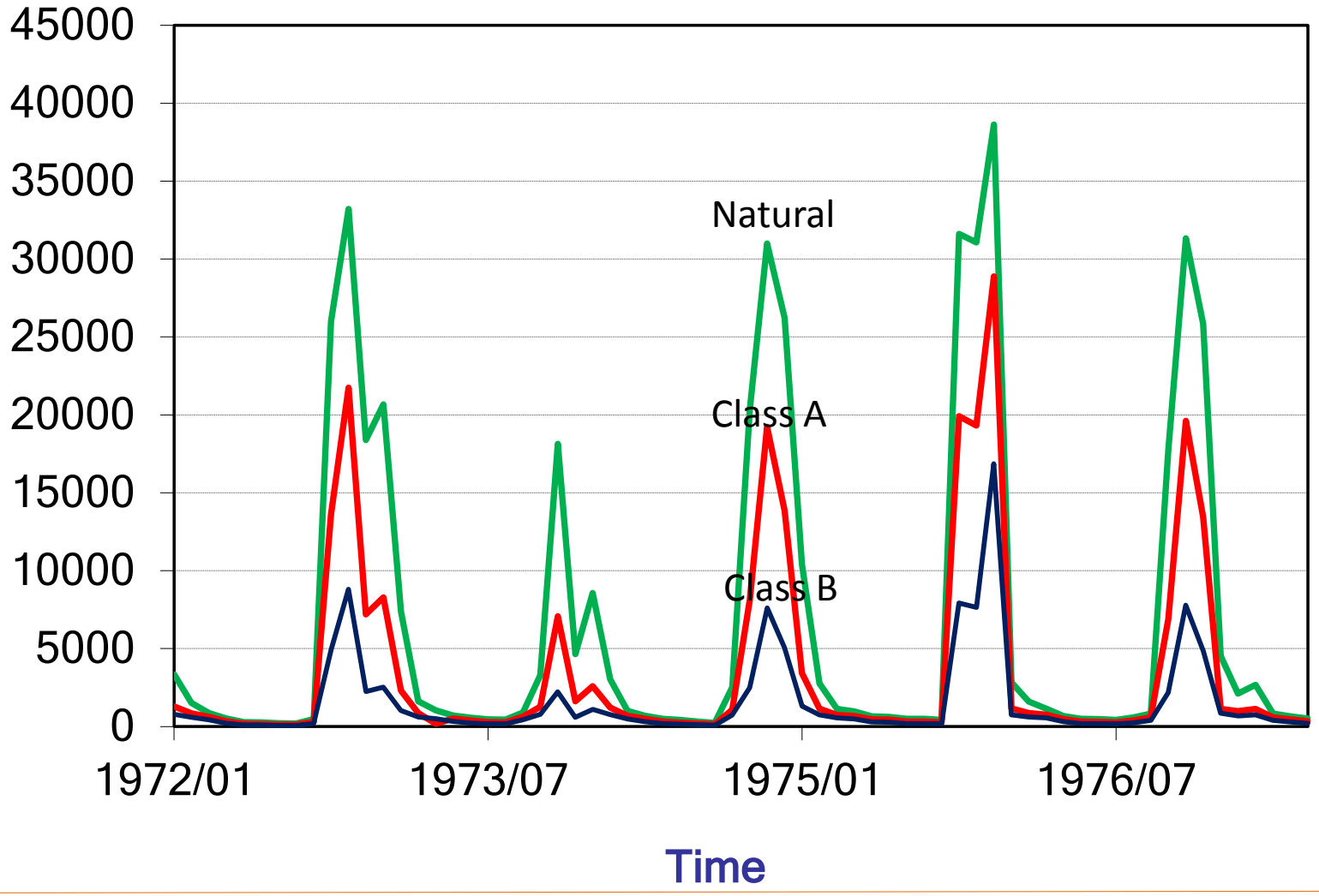
Environmental Management Classes

A	Minor modifications	Protected rivers
B	Slightly modified	Water supply/irrigation development allowed
C	Habitat, biota disturbed, but basic functions intact	Dams, diversions, reduced water quality
D	Large changes in habitat, biota and basic functions	Significant, clearly visible disturbances by regulation
E	Habitat diversity declined. Only tolerant species exist	High population density and extensive development
F	Total loss of natural habitat and biota	Unacceptable status

Estimation Method - 2



Estimation Method - 3



Making provisions for e-flows means,

- recognizing and balancing
  - environmental needs with other demands on the water resource
- E - flow volumes included in
  - the water allocation arrangements and
  - annual water resource allocation plans for the river basins

Environmental Security

- Requires resources!
- Requires understanding and cooperation!
- Requires a leadership!
- And many more…

It is easier said than done!

but

Can be achieved!


THANK YOU
" Let not a single drop of water received from rains go waste into the sea without benefiting the man"
King Parakramabahu (1153-1186 AD)