

# SMALL TANK HERITAGE AND ITS CURRENT PROBLEMS

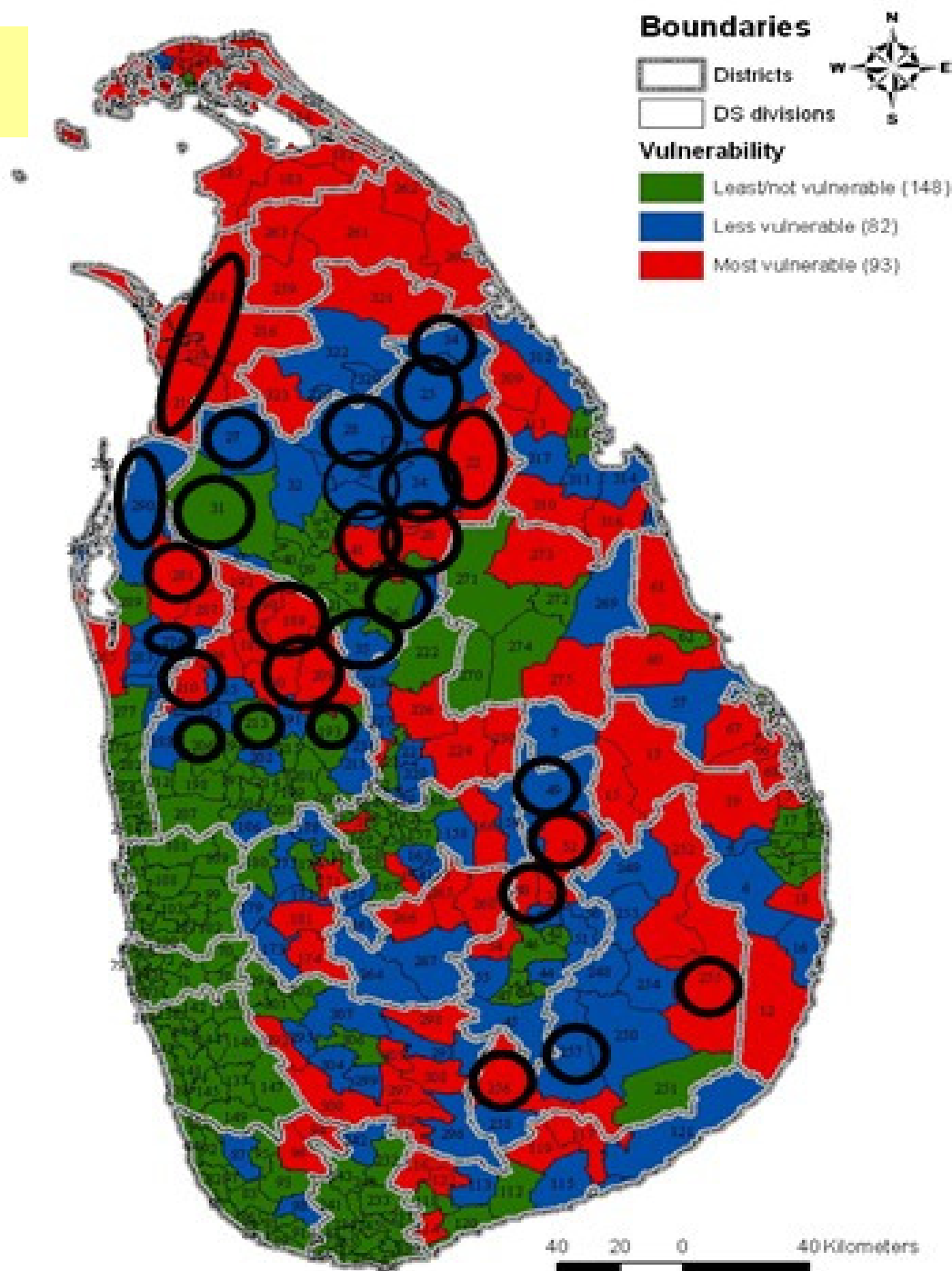
P.B. Dharmasena, Field Crops Research and  
Development Institute, Mahailuppallama

- Symposium on 'Small tank settlements in Sri Lanka' held on 10<sup>th</sup> June 2004 at SLAAS organized by NASTEC
- Workshop on 'Integrating Wetland Economic Values into River Basing Management' held from 29<sup>th</sup> - 30<sup>th</sup> June 2004 at Nuwarawewa Rest, Anuradhapura, organized by IUCN
- Symposium on 'Small tank settlements in Sri Lanka' held on 21<sup>st</sup> August 2004 at HARTI organized by HARTI
- Presentation made to SLANRM Project staff at Kurunegala on 7<sup>th</sup> October 2004
- Presentation made to PEACE Project staff at Anuradhapura on 13<sup>th</sup> October 2004

# DROUGHT - 2004

Circled areas – the most affected

Source: FAO (2004)



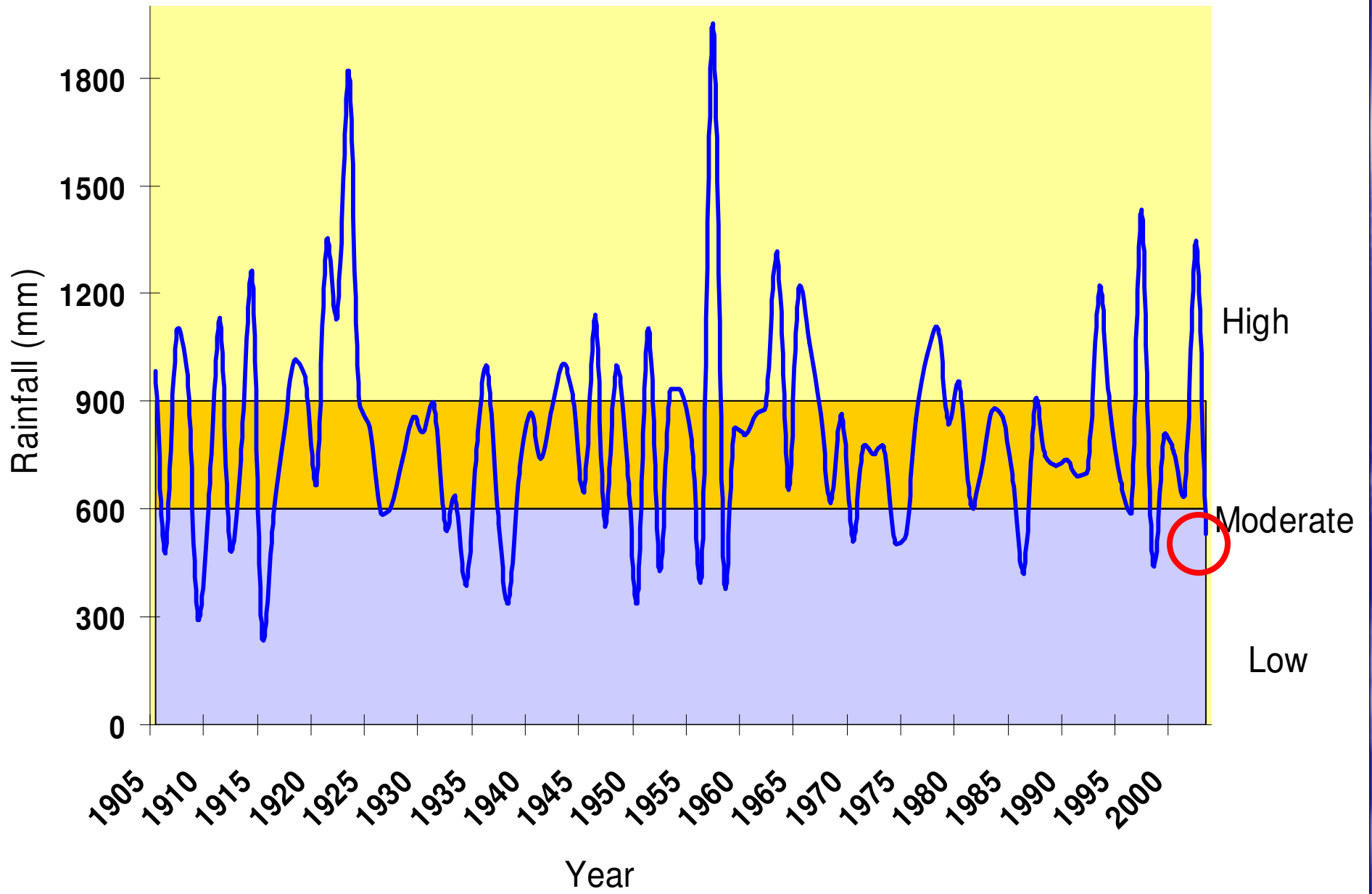
## Most affected districts Kurunegala, Anuradhapura, Puttalam

- 67,398 farming families – seriously affected
- Paddy production (2003/04 *maha*) - dropped by 50 %
- Paddy production (2004 *yala*) – *be reduced by 68 %*
- Other field crops (*rainfed*) – heavily damaged

**Source: FAO (2004)**

### RESERVOIR LEVELS - DROPPED

District	2002/03	2003/04
Anuradhapura	87 %	34 %
Kurunegala	97 %	26 %
Hambatotota	29 %	15 %
Badulla	74 %	29 %
Moneragala	71 %	21 %
Puttalam	100 %	21 %



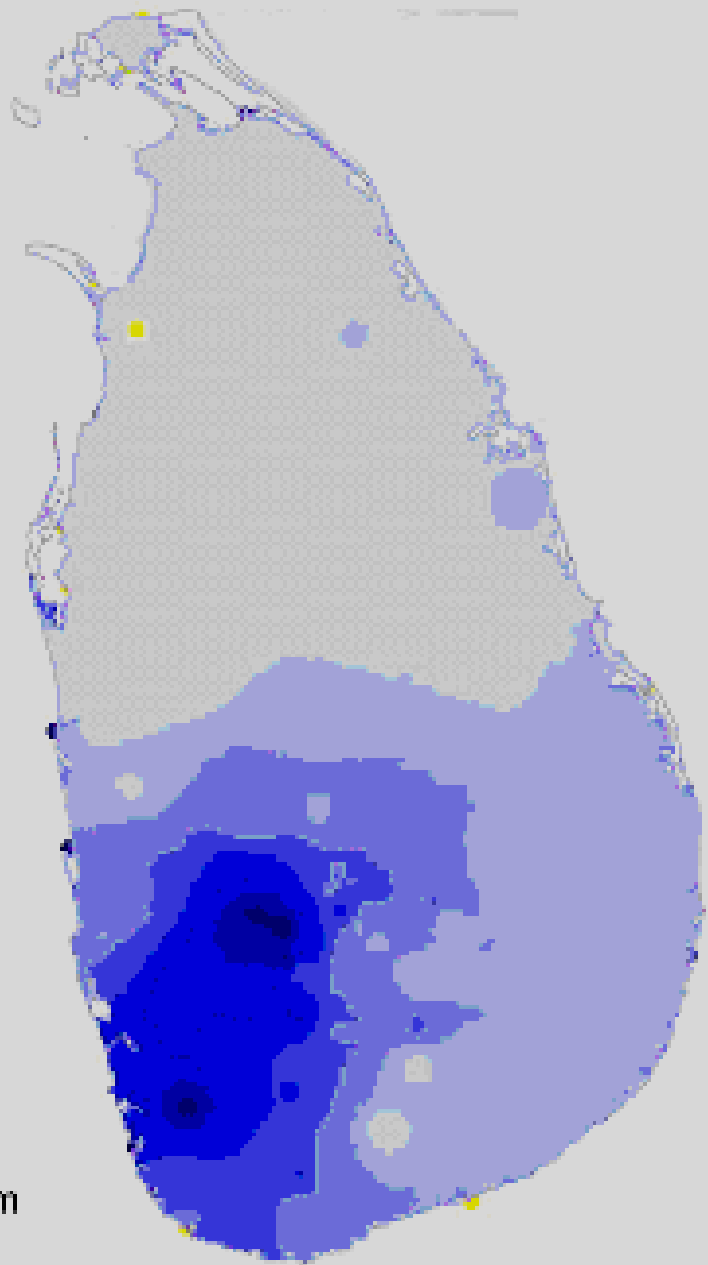
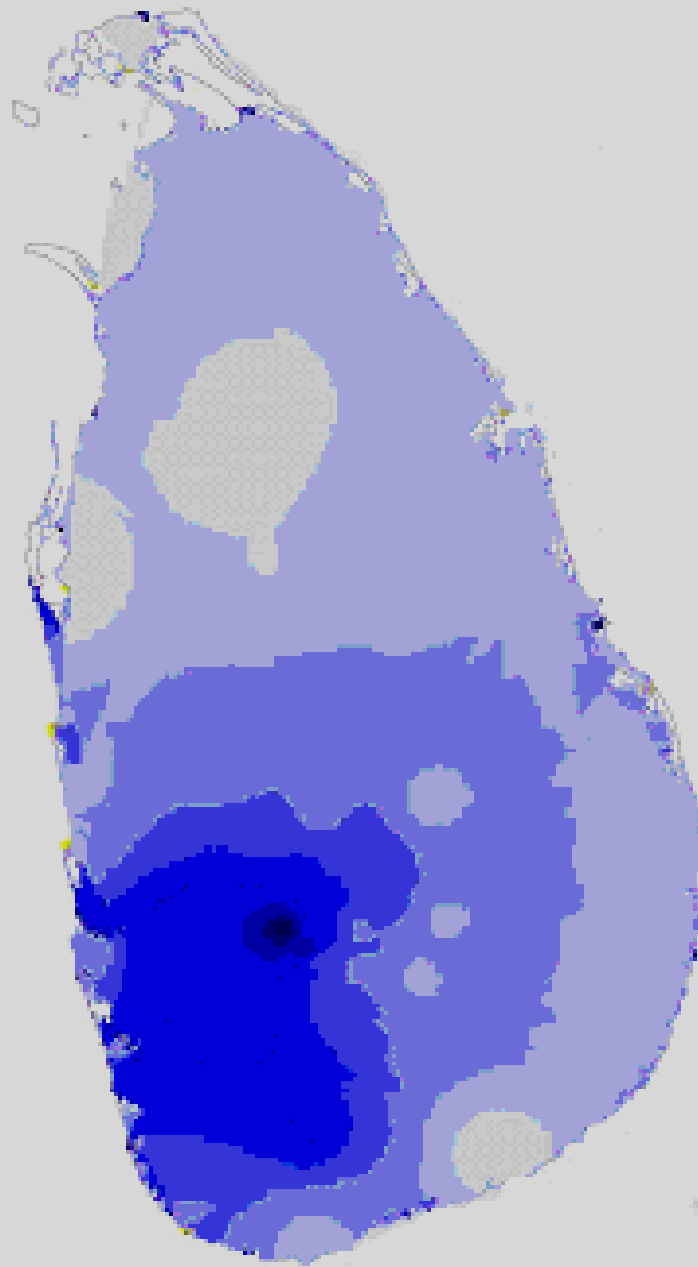
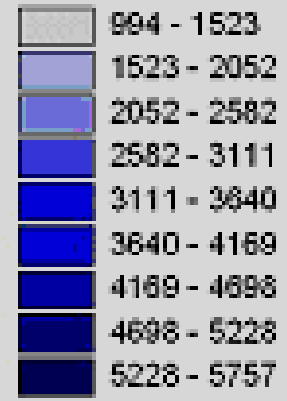
**Fig. 1 September - December Rainfall (Mahailuppallama)**

1900-1929

1970-1994



**LEGEND**



# Can we achieve rice production targets?

	1990	2025	2025
Population (million)	17.2	24.9	24.9
Rice production (mil. mt)	2.2	3.5	3.5
Rice yield (t/ha)	3.8	3.8	5
Extent of irrigated farming (mil. ha)	0.58	0.93	0.69
Irrigation water requirement (m ha.m)	0.86	1.38	0.86
Irrigation effectiveness	37 %	37 %	45 %
Cropping intensity	1.3	1.3	1.6

Attitudinal change  
from land productivity to water productivity

# *Water productivity*

Yield: 70 bushels/acre

Yaya extent: 70 acres

Effective storage: 350 ac.ft

Water use: 7 ac.ft (or 7 ft.)

Cultivable extent: 50 acres

Amount of paddy per one ac.ft.: 10 bushels

Yaya production: **3,500** bushels

Water use: 5 ac.ft. (5 ft.)

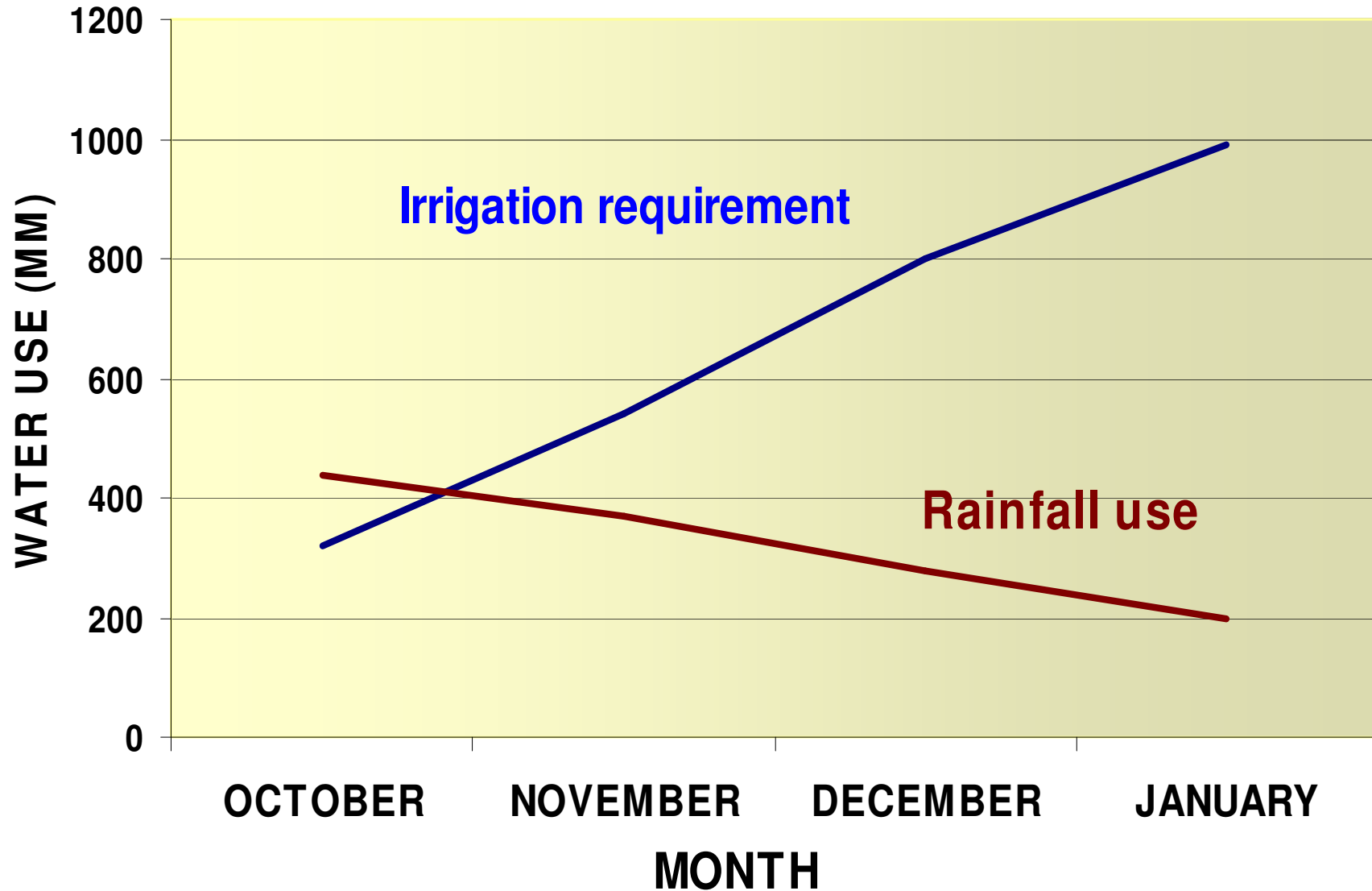
Cultivable extent: 70 acres

Amount of paddy per one ac.ft.: 14 bushels

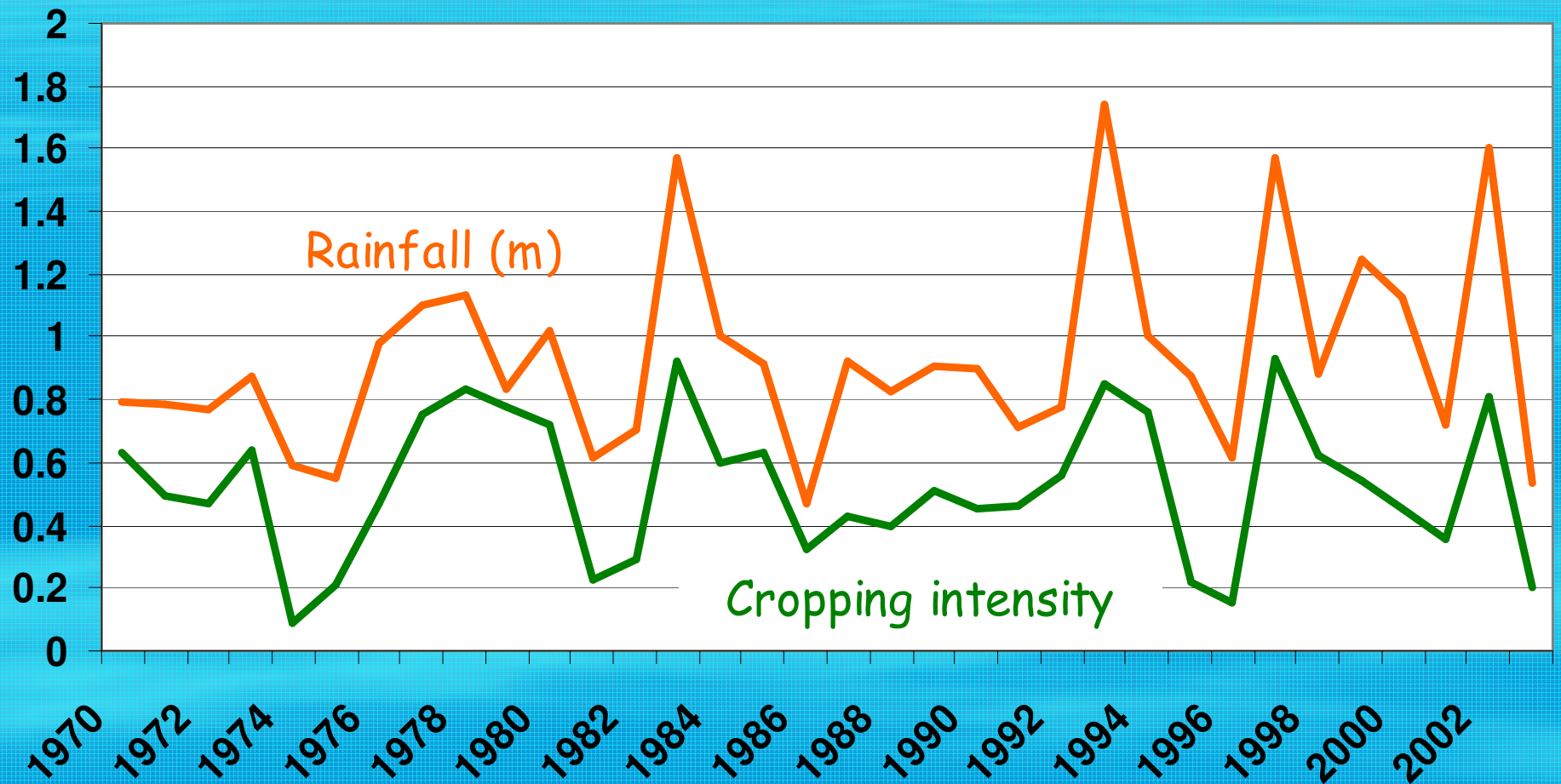
Yaya production: **4,900** bushels



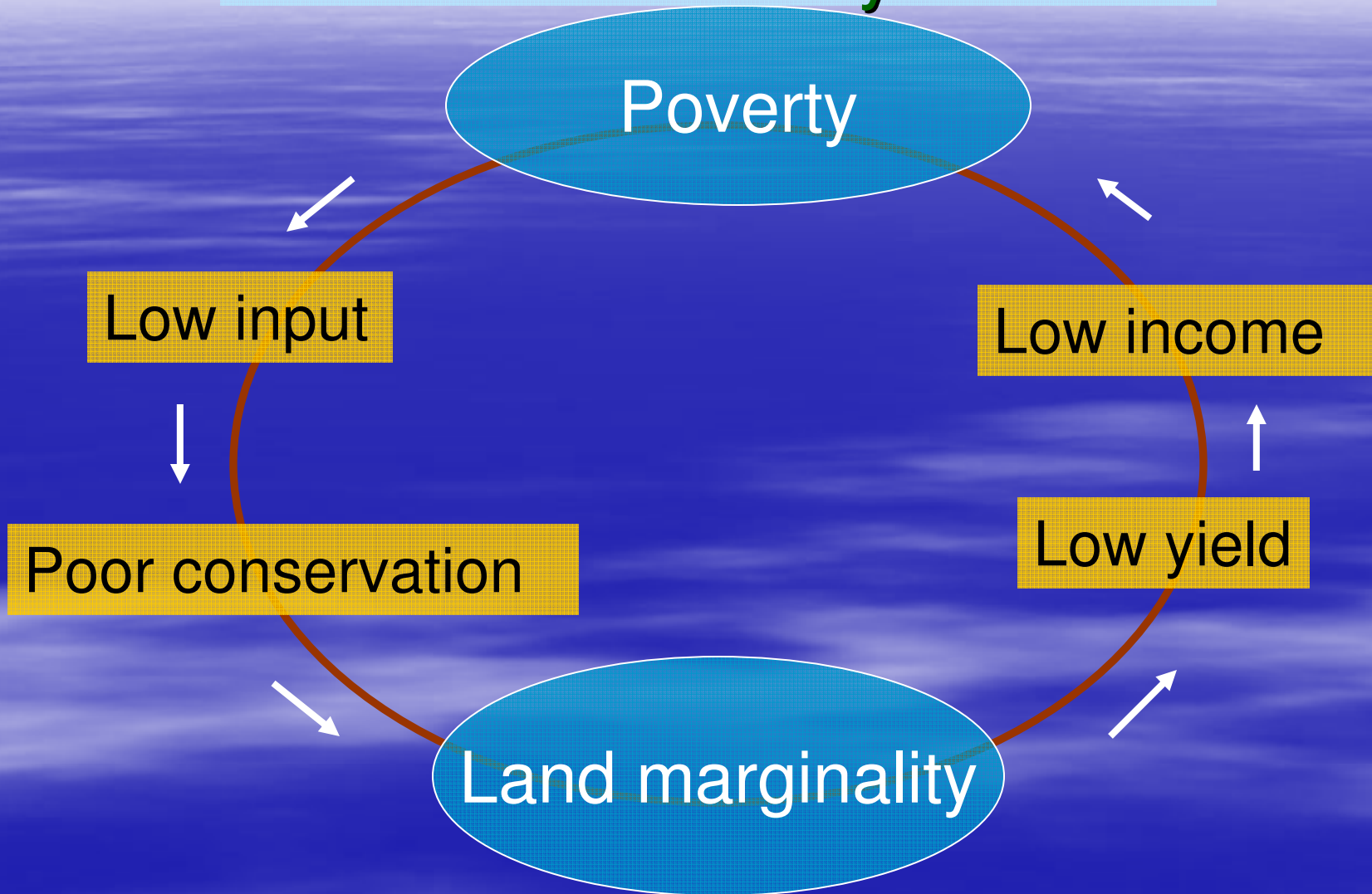
# 'KEKULAMA' to increase water productivity



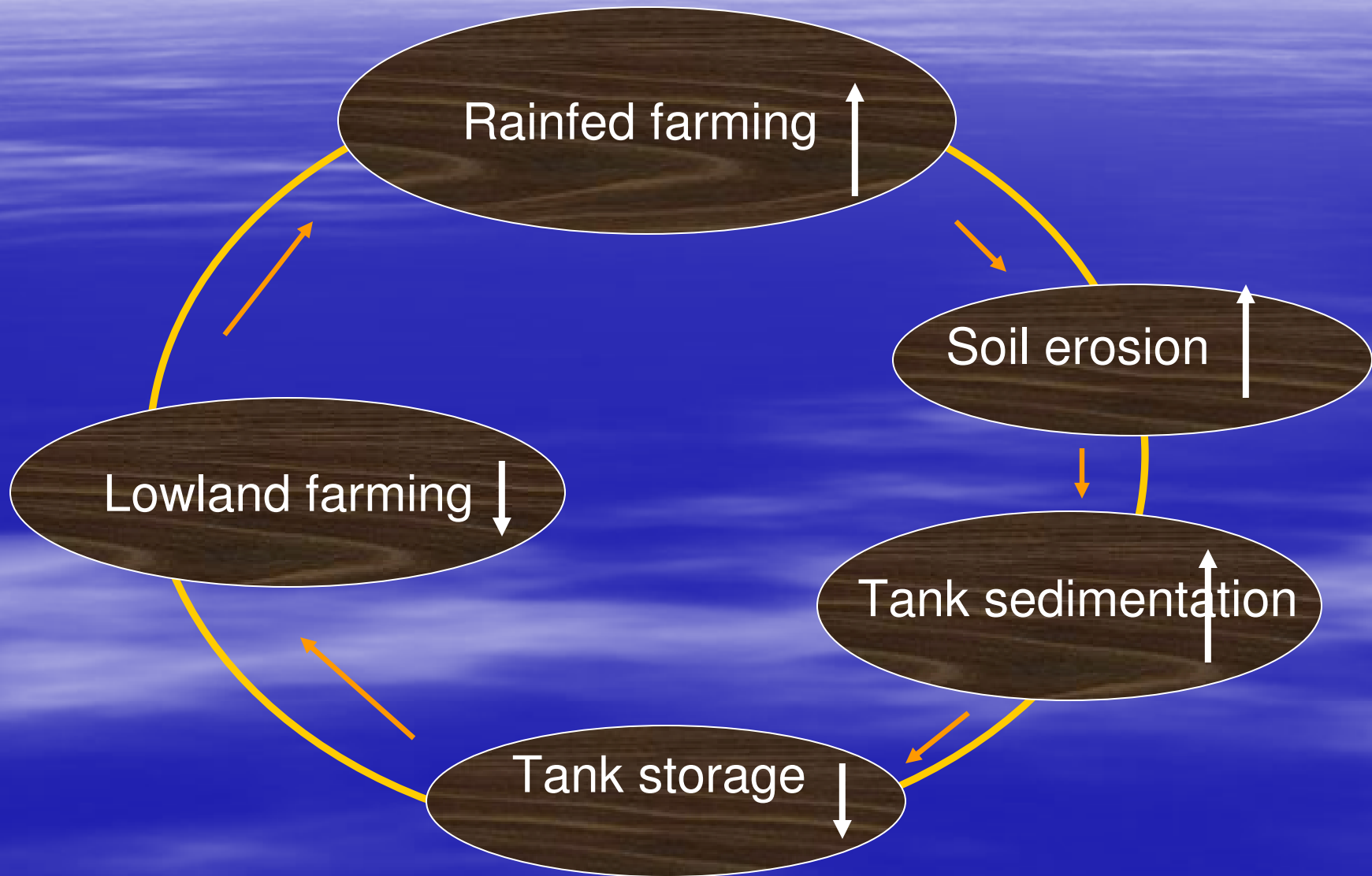
# Rainfall and Cropping Intensity under Minor Tanks in Anuradhapura District (1970 - 2003)



# Poverty and land degradation in a vicious cycle



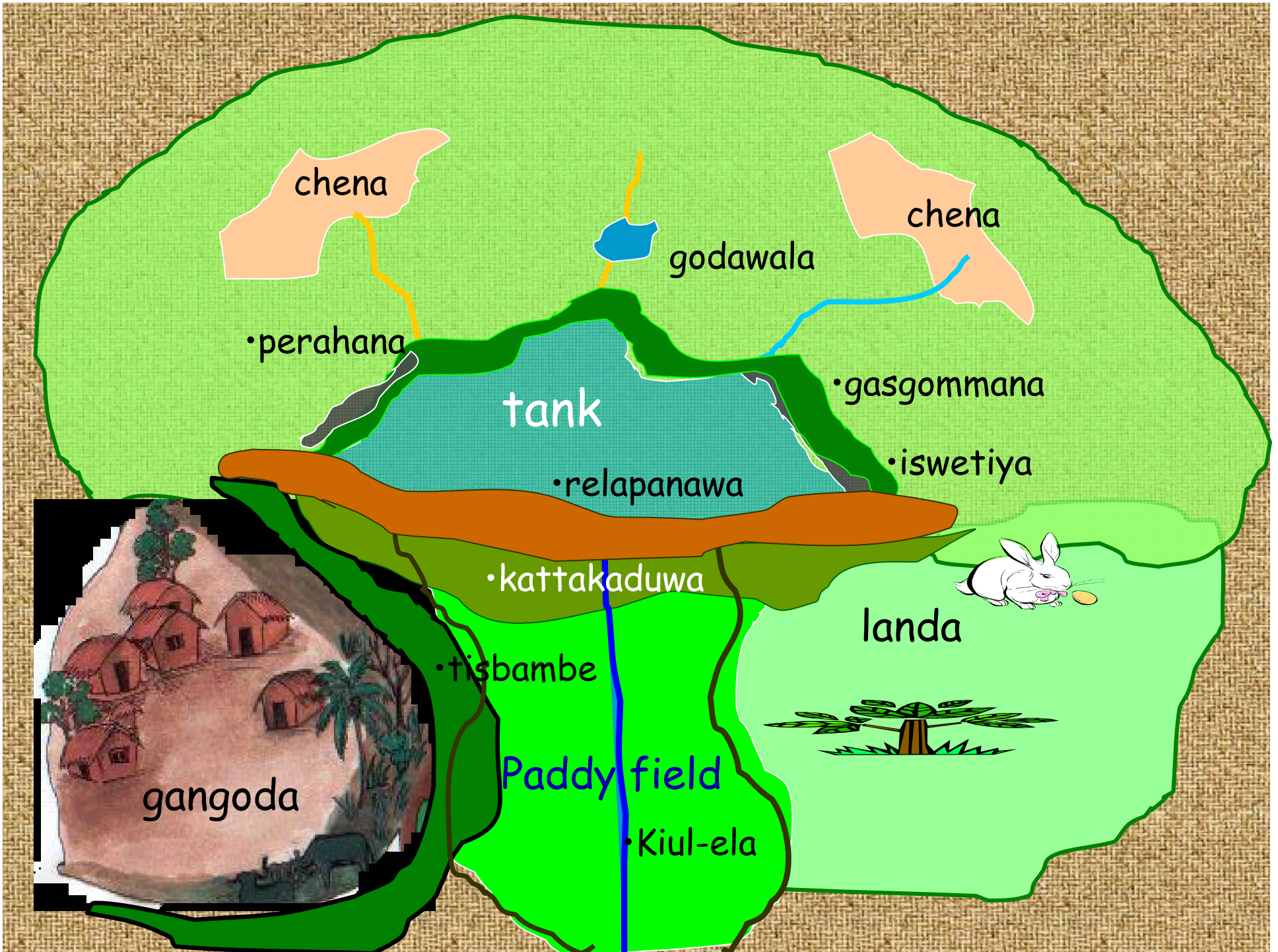
# Irrigated and rainfed farming in a vicious cycle



# SPECIAL FEATURES OF TRADITIONAL FARMING

**Risk evasive farming**  
**Resources conservation**  
**Sustainability**  
**Food security**  
**Water security**  
**Bio-diversity**  
**Equity**  
**Low environmental pollution**





# Chena - the concept of mixed farming

- Selection of location
- Sharing the land
- Clearing and burning
- Preparation of land and fencing
- Selection of crops
- Protection of crops

Type of chena	Soil condition	Crops
Nawadeli hena	Highly fertile	Mustard, Blackgram, Mungbean, vegetable
Athdanduhena	Fertile	Blackgram, Mungbean, Vegetable, maize
Landa, hirilanda	Moderately fertile	Finger millet, gingelly
Kanathu, piti	Infertile	Gingelly, minor millet
Godahena	Imperfectly drained lowland	Paddy, vegetable



# GASGOMMANA

- Upstream land strip - inundated when spilling
- Large trees such as *kumbuk, nabada, maila, damba*
- Lianes and climbers *kaila, elipaththa, katukeliya, kalawel, bokalawel* etc.
- Not planted by villagers
- Floating seeds
- *Gasgommana* acts as a wind barrier
- Reduces water temperature
- Minimizes evaporation
- Breeding and living places of some fish species
- Territory between man and animals





PERAHANA

Meadow under *gasgommana*  
Sedimented flow is filtered

ISWETIYA

A conservation bund to  
prevent entering sediment  
(*potawetiya*)

GODAWALA

A manmade water hole to trap sediment  
Provides water to wild animals  
Evades man animal conflict

KULU WEWA

A tank constructed above large  
reservoirs  
Not for irrigation purpose



RELAPANAWA

A stone pave at the inner side to prevent dam scouring in medium and large reservoirs'

TISBAMBE

The fertile land strip around the hamlet  
A common property  
Tree species - *mee, mango, coconut etc.*  
Resting place of buffaloes  
For sanitary purposes  
Protection from wild animals  
To protect from malaria

KIUL ELA

Old natural stream  
Common drainage  
Tree species - *karanda, mee, mat grass, ikiri, vetakeya*  
Small fish species  
Removal of salt and iron polluted water



# KATTAKADUWA

Land strip between bund and paddy field

Water hole, wetland and dry upland

Diverse vegetation

Prevents entering salts and Ferric ions to paddy fields

Minimizes bund seepage

Strengthens the bund stability with *vetakeya*

The village garden

Fuel wood, medicine, timber, materials for fencing, household and farm implements, food, fruits, vegetables etc.

Raw materials for cottage industries'



# Plant species

Home garden

148

Forest

76

10

23

9

34

70

13

21

*Kattakaduwa*

77



# Plant species in *Kattakaduwa*



Use	No. of species
Medicine	52
Fuel wood	52
Timber	40
Fencing	31
Farm & household implement	15
Food	12
Fruits	11
Vegetable	9
Fodder	5



## • Species for cottage industries



Plant species	Products
Indi	Hats, bags, baskets
Vetakeya	Bags, baskets, mats.
Bambo	Wood carving, flower vase, building materials
Rattan	Baskets, furniture
Palmaira	Mats, bags, baskets, sweets, toddy
Mat grass	Mats, baskets etc.
Pata-beli	Ropes, strings etc.

# SOME ISSUES IN SMALL TANKS REHABILITATION

Over estimation of catchment yield

Under estimation of tank water losses

Raising spill to increase the capacity

Planning for individual tanks

Land availability - not considered

Fragmentation of paddy lands

New ponds above tanks

Many agencies for tank rehabilitation (Irrigation Departments, Department of Agrarian Development, Projects, FFHC, Provincial Council etc.)



- Present issues in tank-village farming system

- Highly degraded tank catchments
- Silted tanks with high water losses
- Rehabilitation does not address the whole problem
- Individual component approach in development programmes (tank, command area, rainfed land, agro-wells etc.)



# PRESENT STATUS OF SMALL TANKS

Very high tank water losses ) 50 ]

Severe tank sedimentation 25 ] ) 30 ]

Destruction of the eco-system

Low productivity of the paddy land

Salt affected lands

Loss of bio-diversity

Poor water management

Lack of proper planning

No integrated planning with groundwater

# WHAT SHOULD BE DONE ?

Removal of sediment

Restoration of tank eco-system

Water based cultivation planning

Drainage improvement

Enhancement of soil fertility in paddy fields

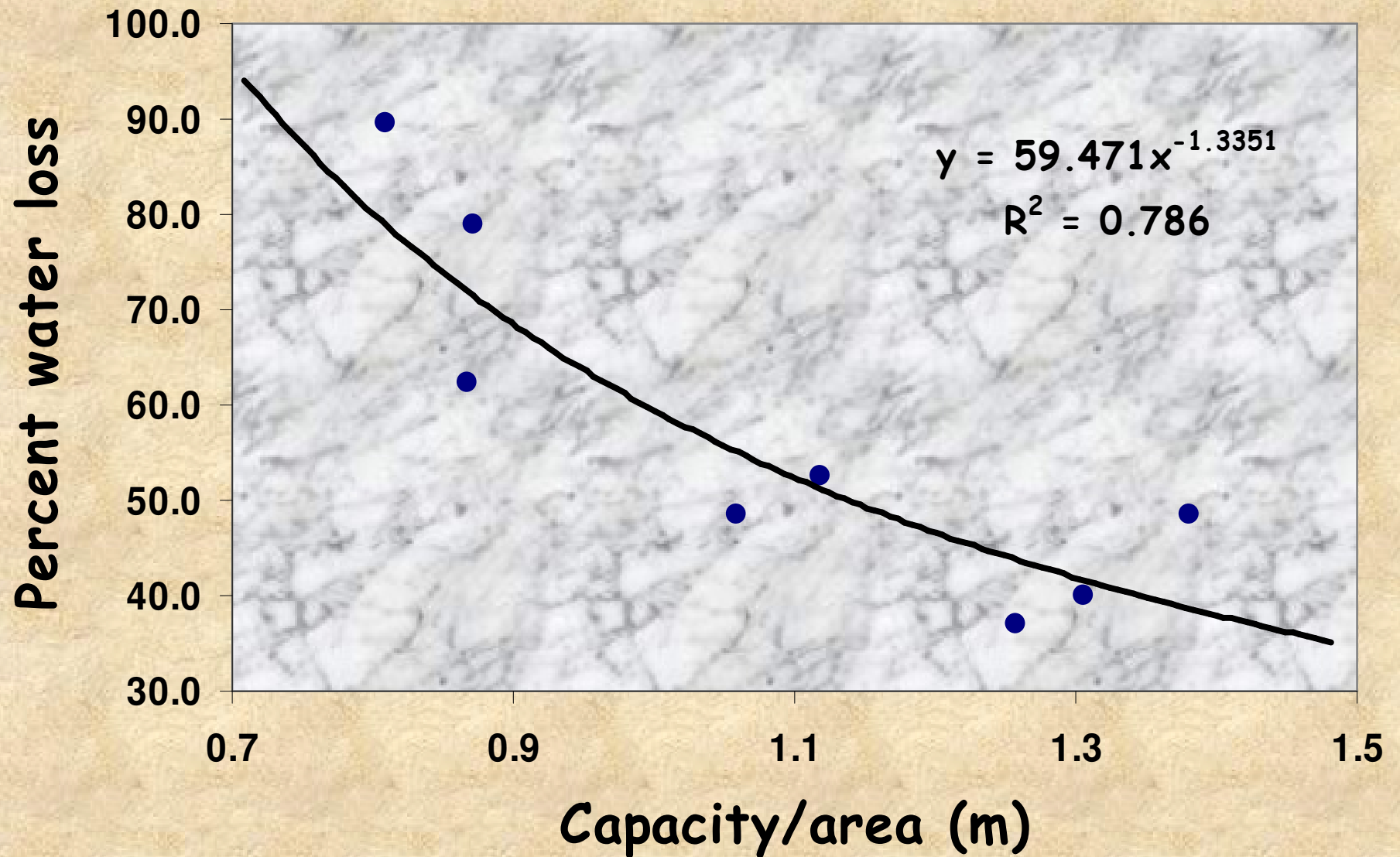
Integrated water resources management  
approach

Formulation of cultivation planning committees

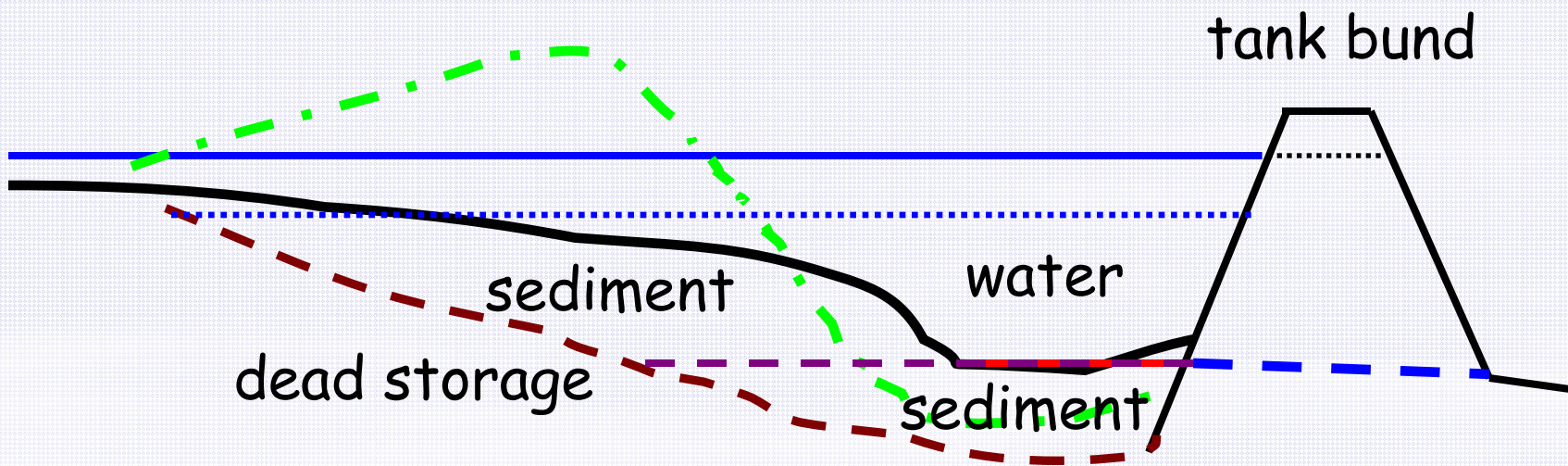
- **Some strategies towards system sustainability**

- **Cascade approach**
- **Catchment conservation (land use, conservation farming, rainwater harvesting etc.)**
- **Partial desilting concept**
- **Restoration of tank ecosystem**
- **Integrated water resource management (IWRM) approach (water productivity concept)**
- **Diverse farming**

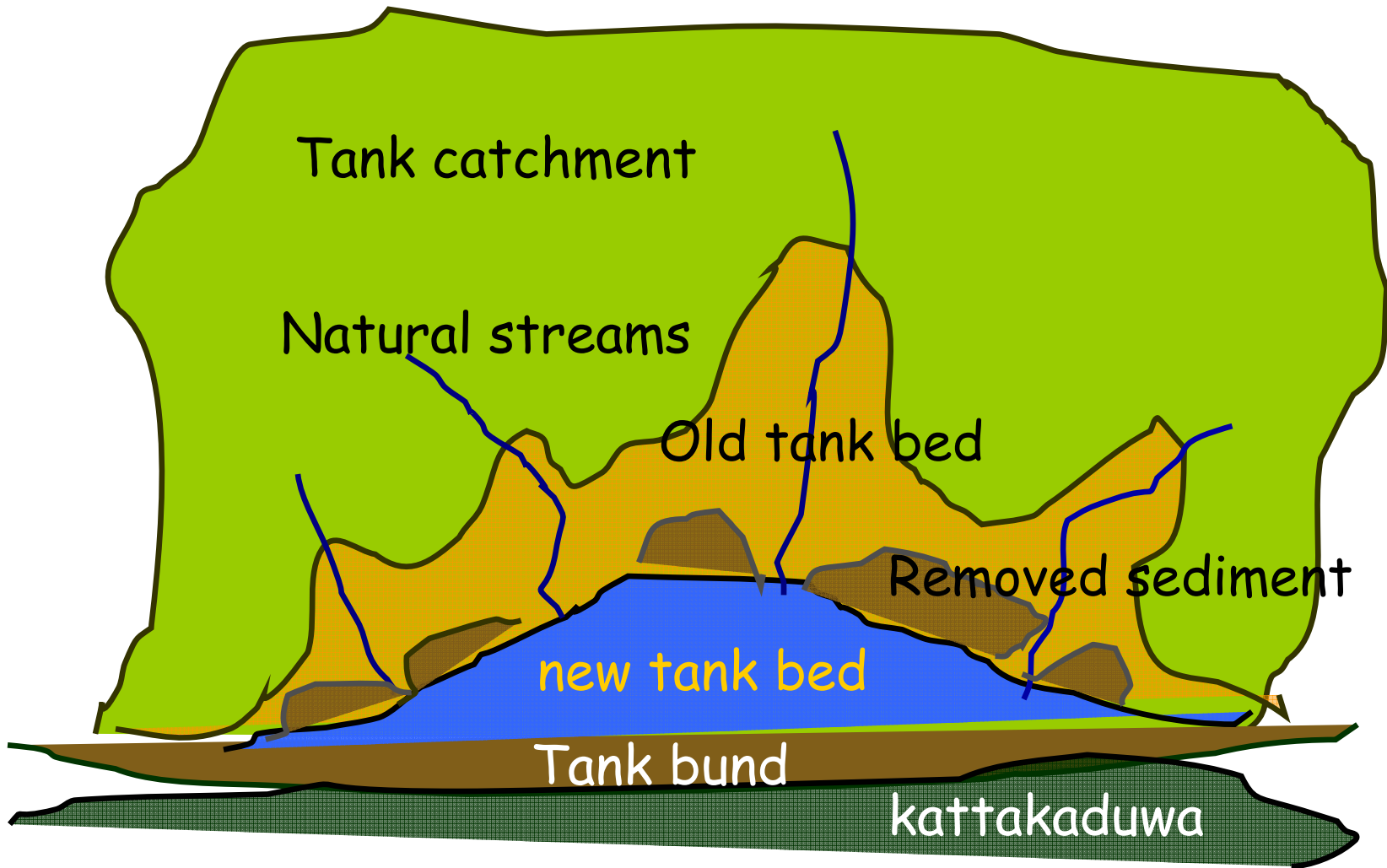
## Geometry of water body affects the loss



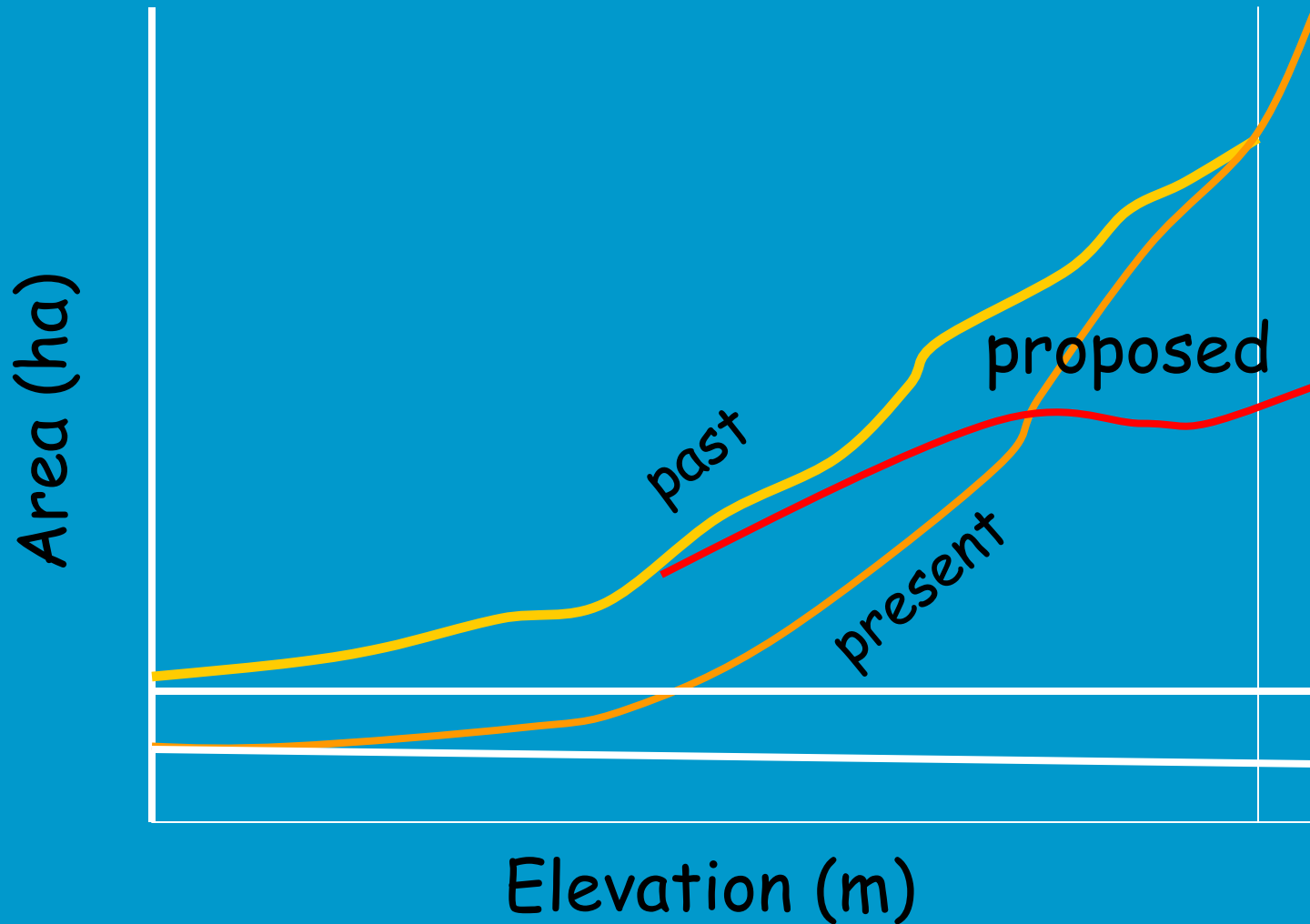
# PARTIAL DESILTING CONCEPT



# PARTIAL DESILTING CONCEPT



# PARTIAL DESILTING CONCEPT



# 10 pillars of sustainability

1. Groundwater for water security
2. Risk evading farming practices
3. Exploit environment without destruction
4. Simple life style with minimum requirements
5. Rainwater harvesting and conservation
6. Work as a group for protection from famine, pestilence, wild animals etc.
7. Store food for future use
8. Less dependency on external support
9. Indigenous wisdom for solving problems
10. Restful and peaceful mind and comfortable environment are the secret behind the success of a community



Your patience is  
greatly appreciated

