Tram Chim Wetland Vulnerability and Climate Change

Initial findings
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Please note that this presentation presents initial finding and work that is in progress. It was developed for workshop discussion only.


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The Original Plain of Reeds

- A vast, wild area of 700,000 ha called **Đồng Tháp Mười** (The Plain of the 10-storey tower)
- Named **Plaine des Jonc** by the French
- Translated into English as the **Plain of Reeds**.
- The plain was a haven of wild plants and animals.

Flood areas of Cambodia and Vietnam

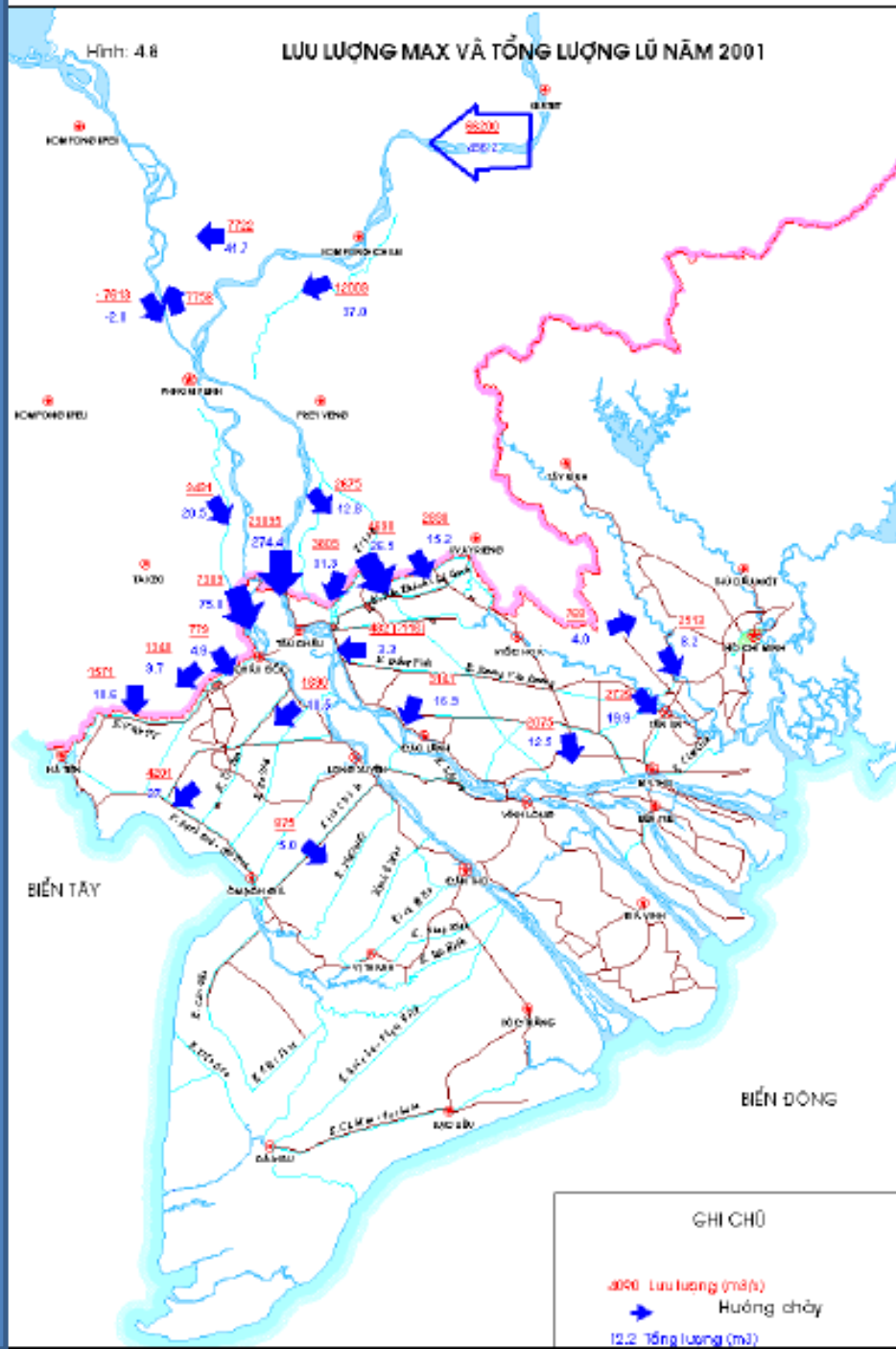
- The original Plain was a large depression with no canals.
- Annually Mekong flood water spille over the natural levees to enter the plain slowly through the vegetation mat.
- When water receded in the Mekong water flowed back to the river also slowly.
- Some water got trapped in the Plain and escaped through evaporation.
- At the end of the dry season, soil wa moist but no standing water.
- Next year the water cycle repeated.

Annual Mekong flood water brought fish eggs and fries into the Plain.

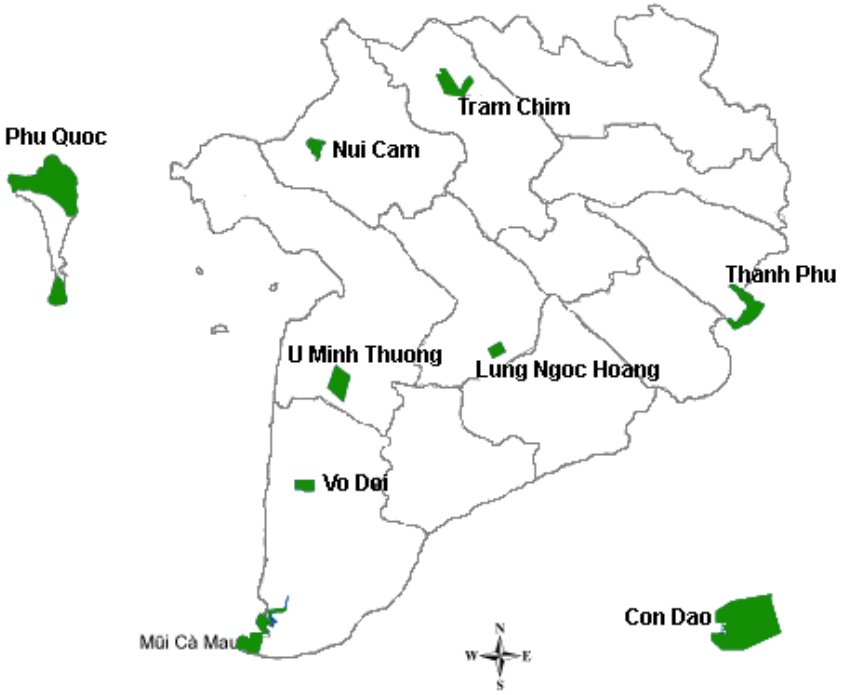
The wetland ecosystems of the Plain and their associated biodiversity were shaped and supported by the annual water rhythm of the Mekong.

- During the wars, some major canals were dug to drain water out of the Plain.

- After the wars, an extensive network of canals created for agriculture. Now most of the area converted to rice agriculture.
  - → Flows changed from sheet flows to channelized flows.
  - → Water comes in faster
  - → Water drains faster from the Plain.

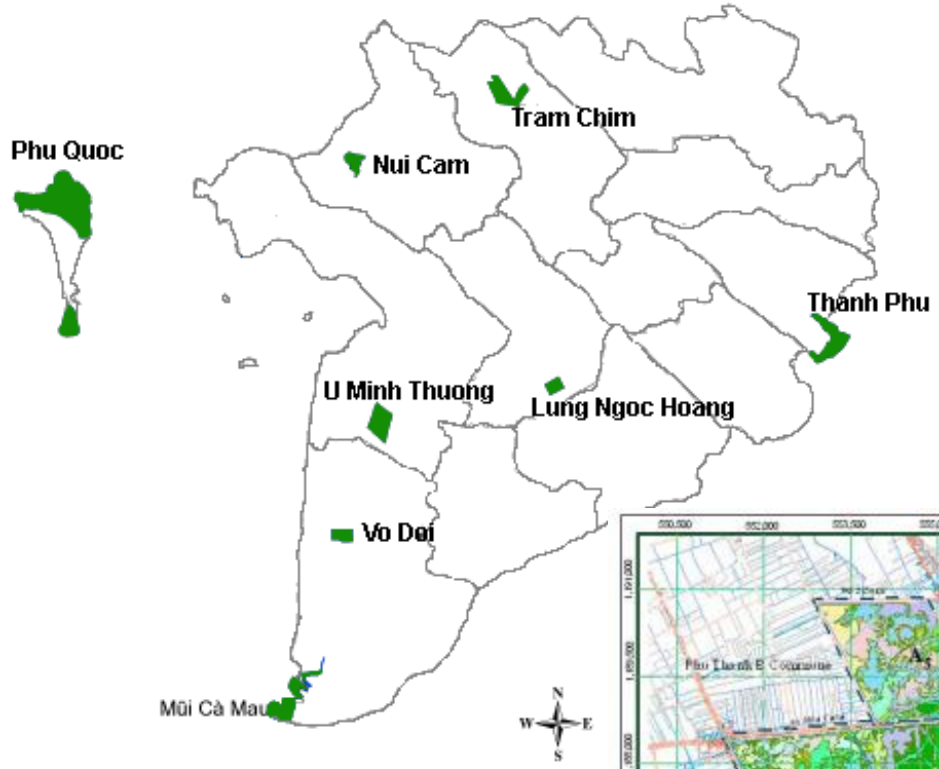


Tram Chim National Park

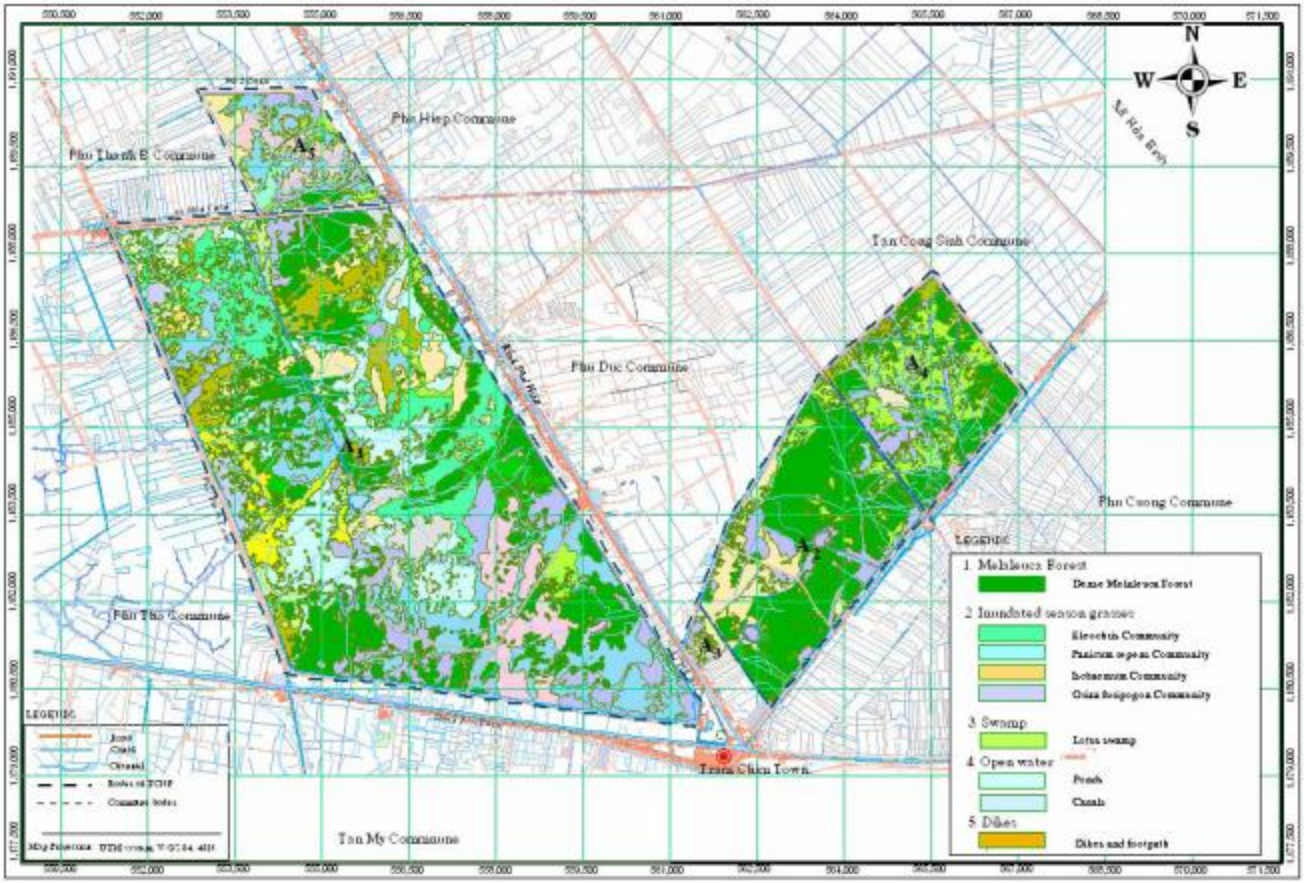


- One of the last remnants of the Plain of Reeds.
- **Purpose:**
  - Maintaining image of the Plain of Reeds for next generations.
  - Conservation of biodiversity

Description



A low ring dyke and water gate system was needed to maintain some moister in the dry season to mimic the hydrology seasonality of the Plain of Reeds.



6 main plant communities

Species Richness

- 130 species of plants
- 130 species of fish
- 231 birds; 32 of conservation value
- Flagship species: The Eastern Sarus Crane.
- Reptiles and amphibians

Provision of important goods and Services

Important to locals:

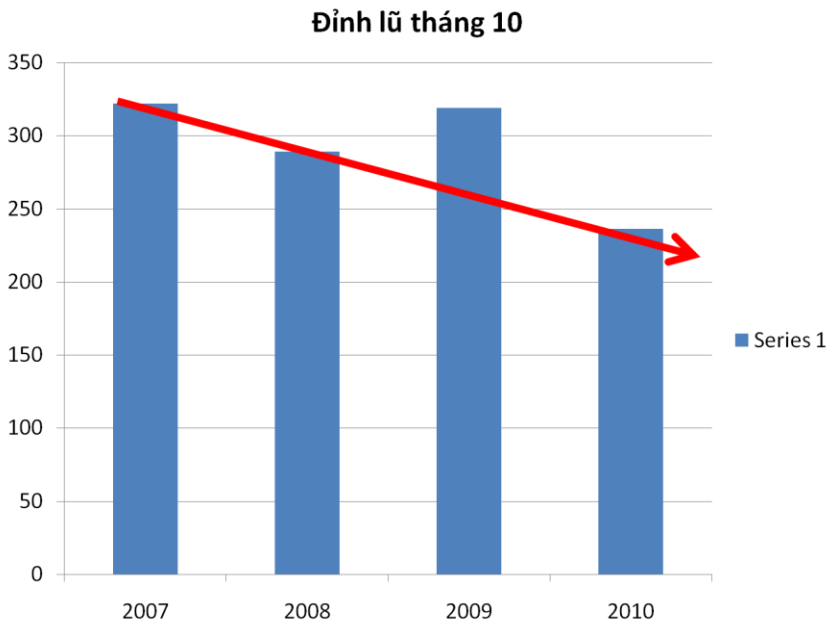
- Fish
- Fuel wood
- Grass
- Lotus and water lily for foods
- Provision of fish to the surrounding
- Micro-climate regulation

Important to Delta:

- Tourism
- History and culture
- Ground water recharge;
- Regulate saline intrusion
- Carbon sequestration
- Scientific
- Biodiversity conservation

Recently observed unusual climate-related phenomena

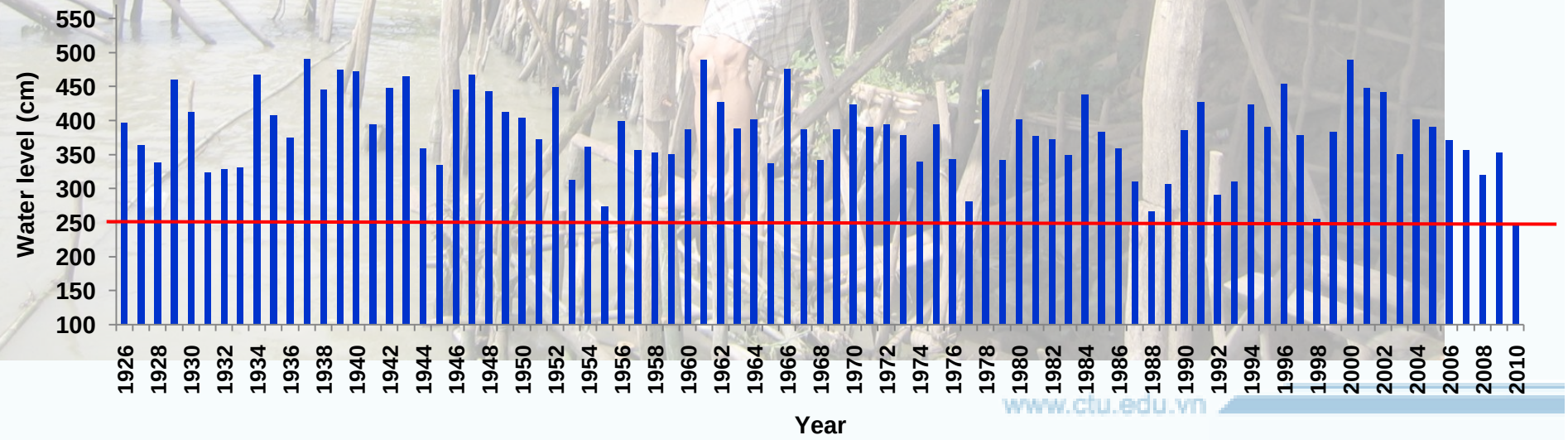
- Temperature increased➔ Increased evaporation.
- Flood peaks decreased➔ fish reduced.



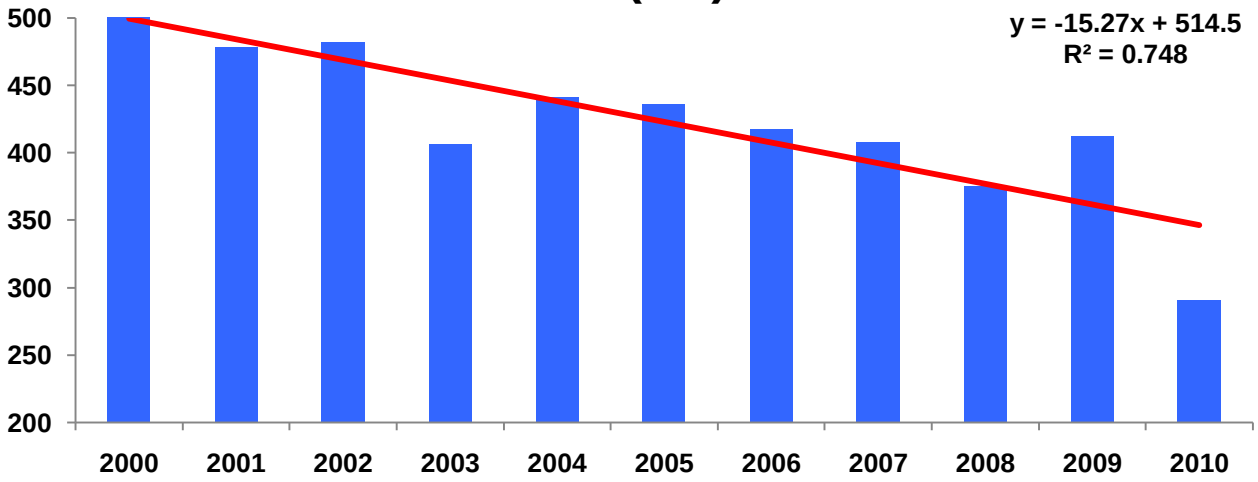
Late and low flood peaks measured at Tram Chim 2007-2010

2010 Peak Water level in Chau Doc is an 85-year record low

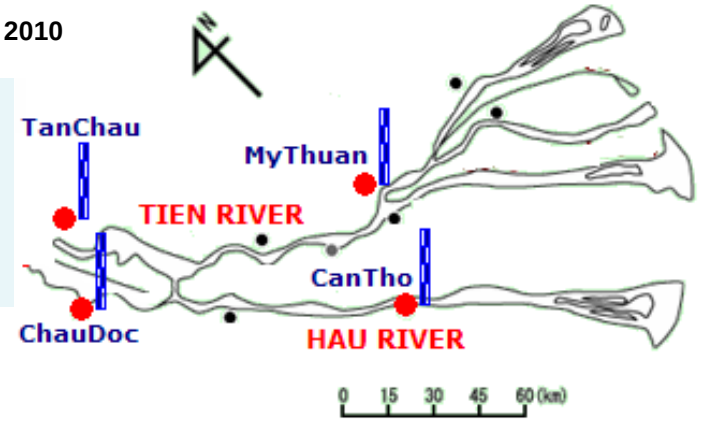
Maximum flood levels in Chau Doc



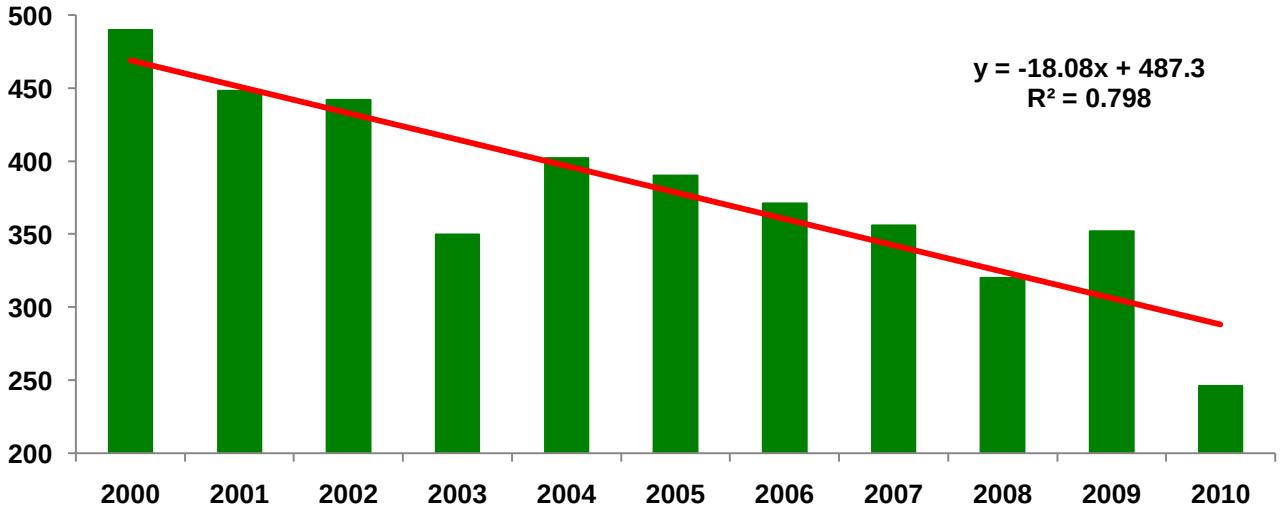
Peak water level (cm) in Tan Chau



WATER TREND IN PAST 10 YEARS



Peak water levels (cm) in Chau Doc



- Longer dry season→drought
- Unpredictable offseason rain events: High intensities, Short events→Localized inundation on field surface→Difficult to drain→Eleocharis fails to produce tubers→Sarus cranes do not have enough food supply.

Rainfall in the dry season

	Rainfall in 6 months of dry season	Annual rainfalls	Percentage
2007	376	1274	30%
2008	289	1608	18%
2009	560	1397	40%
2010	248	1236	20%

Dry season inundation caused by offseason rains: Eleocharis cannot produce tubers

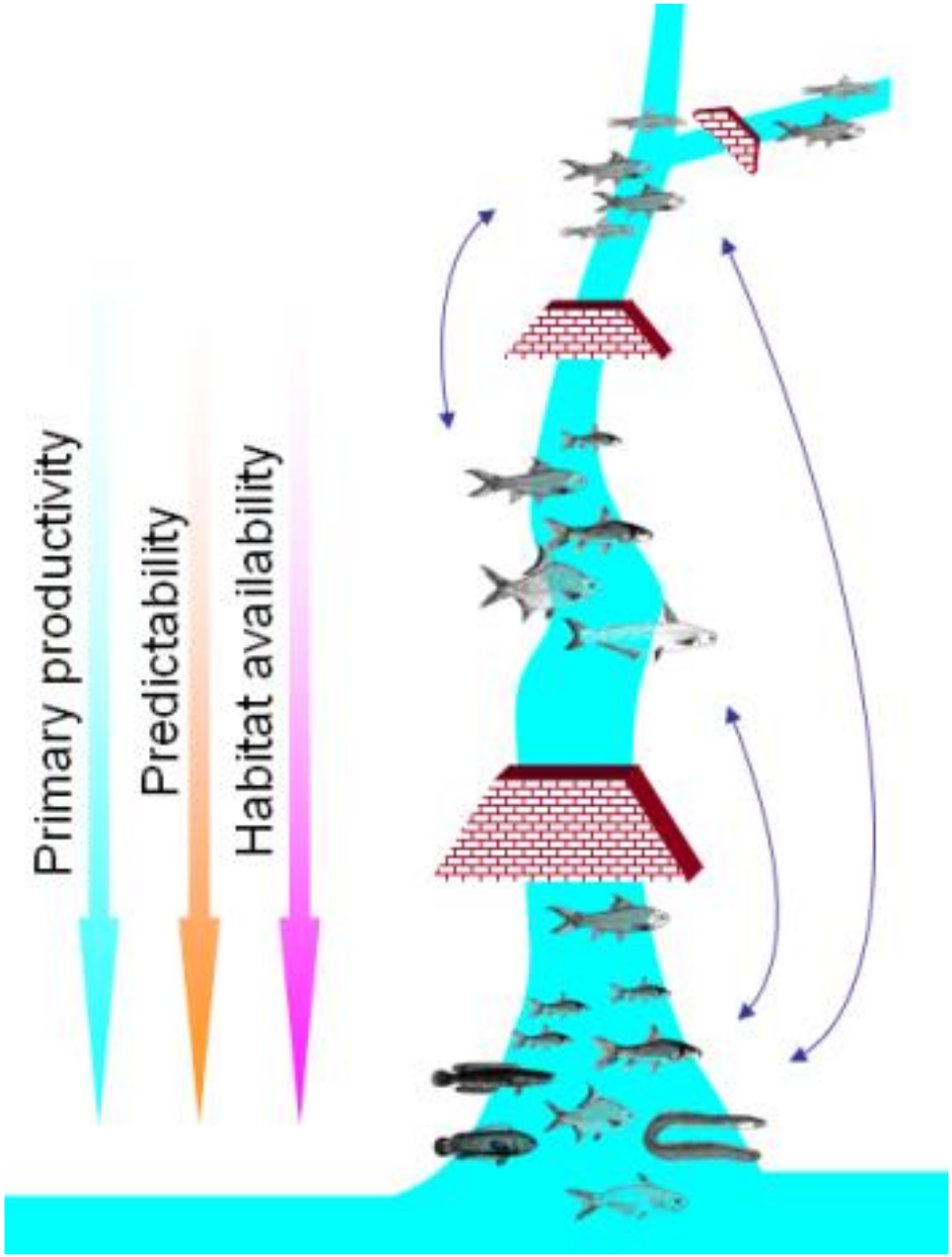
Development Pressures Mismanagments & other threats

- No significant local development pressures, except mismanagement practices being corrected (with support from WWF project)
  1 Protection of trees instead of conservation of ecosystem ➔ stocking of high water year round
  2 Ring dykes were raised high to stock water to prevent fire➔limit intake of fish eggs and fries.
  3 Protectionist approach➔conflict with locals

➔ **Rooted from the policy of intolerance of fire applied uniformly accross the Special Use Forest system designed to protect upland forest.**

- **Other threats**
- Proposed mainstream Mekong dams threaten the survival of the ecosystems at Tram Chim


Area believed to be important for the production of migrant fish (juvenile stages)
Area important for the harvest of migrant fish (adult stages)
CHINA
MYANMAR
VIET NAM
LAOS
THAILAND
CAMBODIA
GULF OF THAILAND
International boundary
Basin boundary
River
Upper Mekong Basin
Lower Mekong Basin


Primary productivity
Predictability
Habitat availability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Ecological implications of climate changes.

IF	THEN	(+) or (-)
High floods	More fish eggs & fries enter the system	(+)
	Wash away accumulated organic matters	(+)
Low and late start of floods	Less fish eggs & fries	(-)
	Organic matters accumulated➔ depleting D.O	(-)
Longer dry season	Increased evaporation➔ Fear of fire➔ Increased water stocking at end of flood season	(-)
Longer flood season	Advantage for deep-water bird species	(-)
	Disadvantage for other grassland bird species	(-)

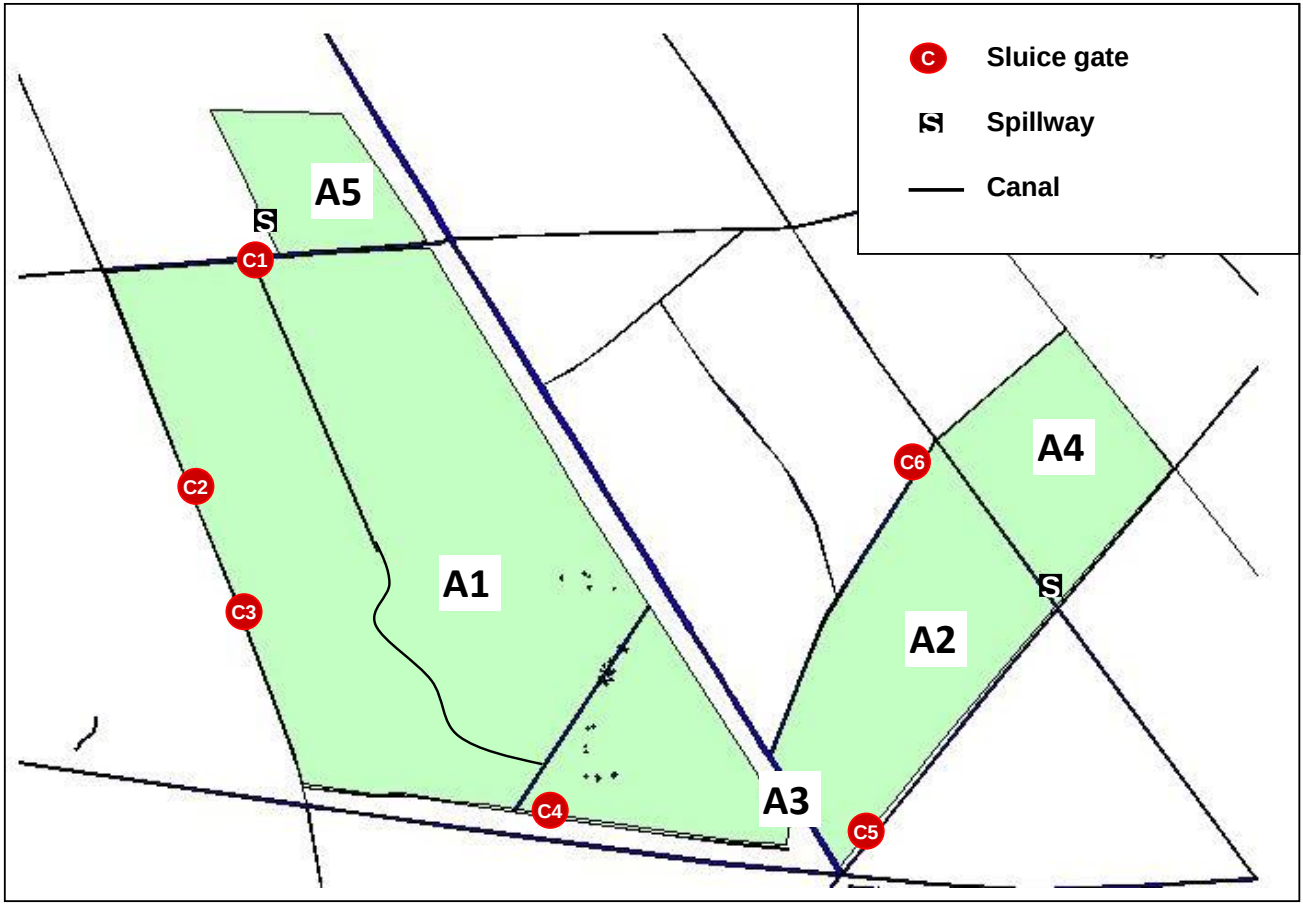
IF	THEN	(+) OR (-)
Increased T^0	Increased evaporation ➔ increased fear of fire ➔ Higher water stocking at end of flood season➔ Not good for Eleocharis	(-)
	Hotter water surface+ Stratified water column➔ * Impact on primary production (?) * Impact on fish (?)	(?)
Increased off-season rains	Localized flooding➔ Not food for Eleocharis	(-)
	Complicated water management	(-)
	Washing acidity down to low areas and canals➔ fish die-off	(-)

Existing Adaptation measures

With WWF support and endorsement from MARD, Dong Thap Province has approved a 3-year pilot statute for management of Tram Chim ecosystems to end of 2011 allowing:

1. Pilot restoration hydrology to mimic hydrologic rhythm of the plain of reeds through an Integrated Fire & Water Management Strategy➔grassland recovered from 800 ha before 2006 to 2400 ha since 2008
2. Pilot Resource Users Groups➔ increased income + less poaching (63 cases in 2009 to 16 cases in 2010)➔ reduced conflict with locals.

Hydrology management



Water management schedule

Date	Target water levels (cm a.m.s.l)			
	Zone A1	Zone A2	Zone A4	Zone A5
Jan 1	143 5	161 5	At least 110	At least 137
Feb 1	126 5	144 5	93 5	120 5
Mar 1	110 5	128 5	77 5	104 5
Apr 1	92 5	110 5	At least 59	At least 86
May 1	73 5	91 5	At least 40	At least 67
June 1	At least 60	At least 80	No target	No target
July 1	At least 70	At least 75	No target	No target

Successful Community Users Groups

Resources: Fish, grass, lotus, water lily, fuel wood

Habitat restoration

through removal of invasive species in all park zones

Recommended Adaptation Measures

- To enhance resilience to changes, the key is to maintain **integrity** of the ecosystems through restoring (i) Components (ii) Structure (iii) Processes.
- Particular recommended local measures for Tram Chim:

  (1) **Continue with current ecosystem management measures promoted by WWF project**

  (*) Hydrology restoration;
  (*) Habitat restoration;
  (*) Alien species control;
  (*) Resource Users Groups);

  (2) Dong Thap province should recognize and adopt the statute permanently

  (3) Additional future measures:

  (a) Lower ring dykes to facilitate more intake of fish eggs and fingerlings from Mekong flood waters

  (b) More flexibility in hydrology management ➔ released excessive water in the dry season caused by off season rains.

- No adaptation possible for impacts, esp., on fisheries, from upstream developments.

Socio-economics

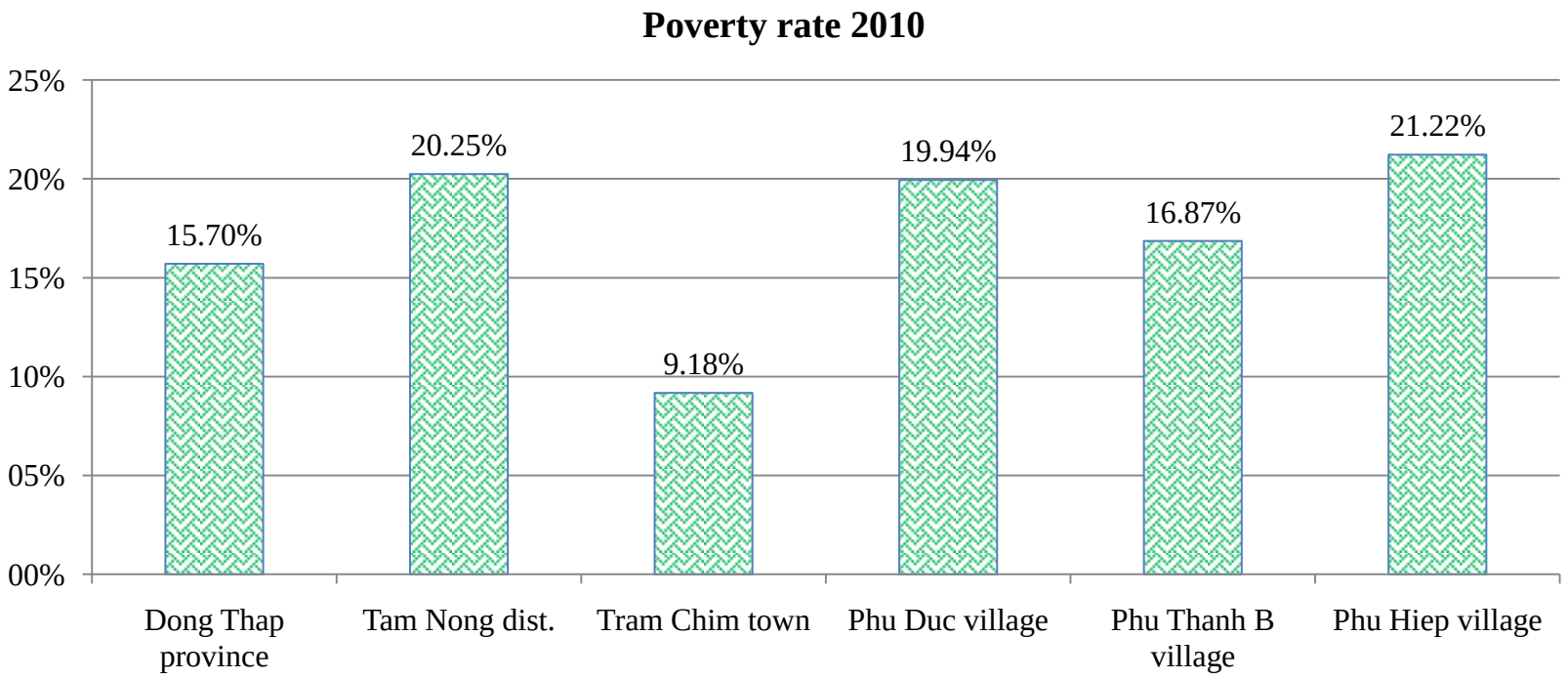
Socio-economic situation of Tram Chim National Park

Table: Socio-economic conditions of Tam Nong districts in Tram Chim National Park

Content	Unit	Dong Thap province	Tam Nong dist.	6 villages in Tram Chim NP	Tram Chim NP
Area	ha	337,400.0	47,400.0	30,700.0	7,313.0
Area percentage	%	100.0%	14.0%	9.1%	2.2%
Population	Person (%)	1,667,706 (100%)	104,932 (6.3%)	47,412 (2.8%)	
Population density	person/km^2	494	221	243	
Number of household	household		26,351	12,044	
Male	%	49.97%	50.06%	50.60%	
Female	%	50.03%	49.94%	49.40%	

Source: Dong Thap Portal - www.dongthap.gov.vn/wps/wcm/connect/Internet/sitdoanhnghiep/sitakinhtexahoi/sitasolieuthongke

High poverty rate



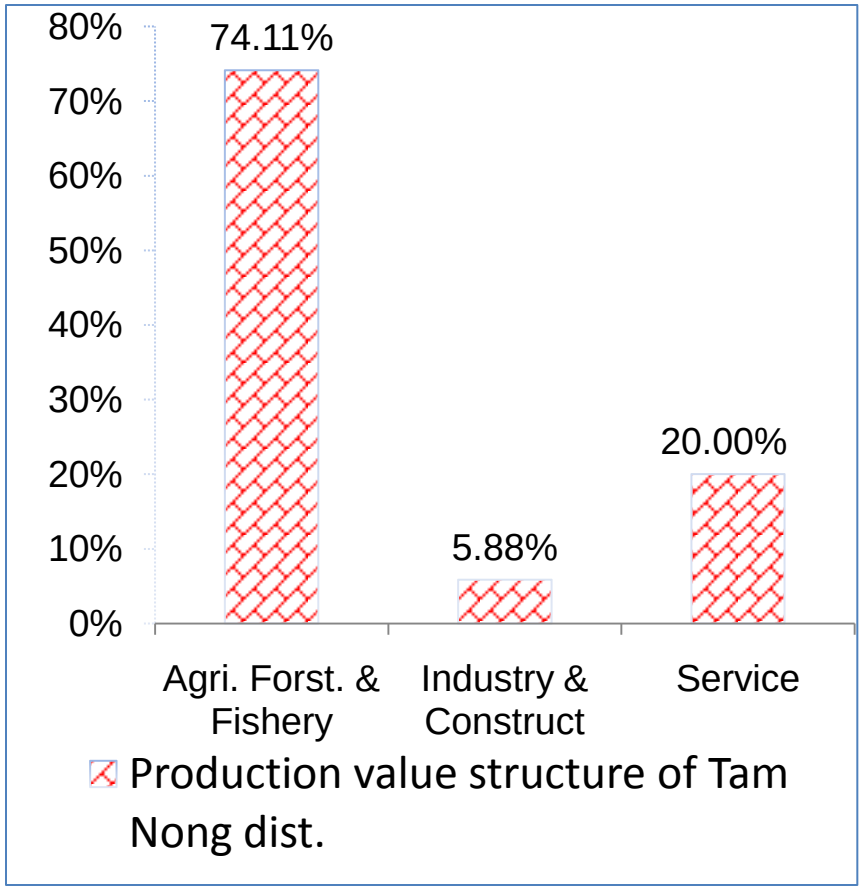
Source: Dong Thap Portal ; Department of Statistics of Tam Nong district

Big gap between rich and poor group

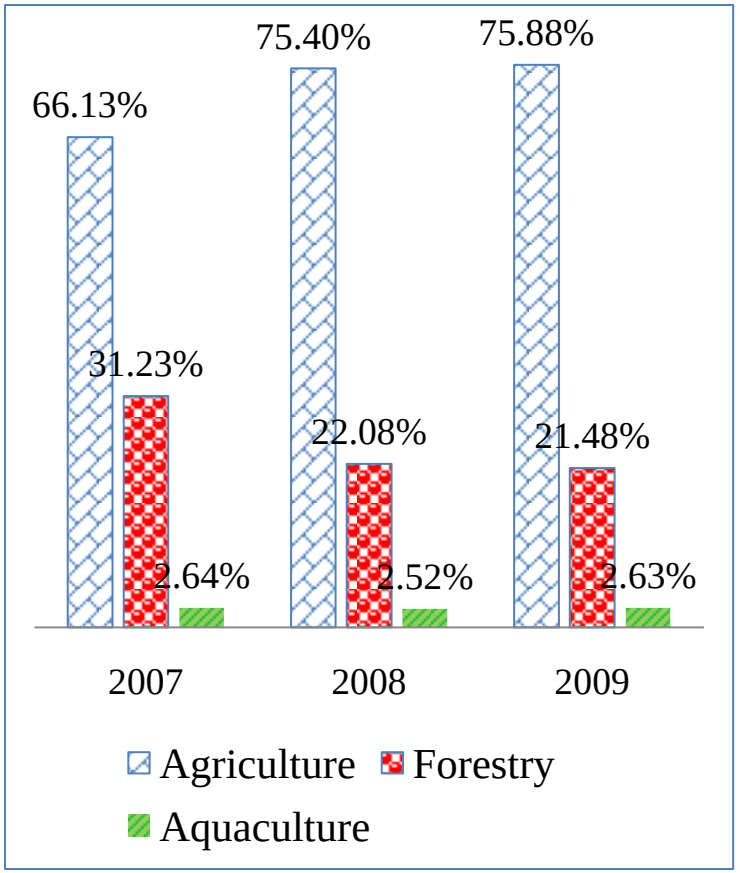
	Unit	Land for agriculture	Landless	Landless, using natural resource
Average income of household per month	Mil./month	5.41	1.55	1.6
Average income of household per year	Mil./year	64.96	18.6	19.17
Income of household from agriculture and livestock	Mil./year	45.86	3.65	3.65
Income of household from fishing, aquaculture and using vegetable, wood in National Park	Mil./year	16.2	9.55	5.74
Income of household from service and other	Mil./year	22	10.33	11.96
Income of household from agriculture and livestock	%	70%	3%	4%
Income of household from fishing, aquaculture and using vegetable, wood in National Park	%	17%	47%	39%
Income of household from service and other	%	13%	50%	57%
Average income per worker	Mil./month	2.71	0.5	0.54
Average income per capital	Mil./month	1.547	0.372	0.47

Local communities are highly dependent on natural resources

Production valu structure of Tam Nong dist. 2009



Structure of production value of Agr. Forst. & Fishery in Tam Nong dist.
(current prices)



Source: Dong Thap Portal ; Department of Statistics of Tam Nong district

Resource Users Groups organized by WWF Project

	Unit	2009	2010
Total area designated for use	ha	720	600
No. of poor households involved	houshold	278	170 (Low flood, less interest)
No. of villages involved	Villages	6	4
Total # man-day	Man-day	9,121	3,640
Total fish catch	Kg	12,526	9,767
Total harvested wild edible plants.	kg	6,209	618

Source: Tram Chim National Park

Climate change and adaptation of the local communities