Xe Champhone Wetlands: Initial Findings

Prepared for:

Climate Change Impact and Vulnerability Assessment for the Wetlands of the Lower Mekong Basin for Adaptation Planning

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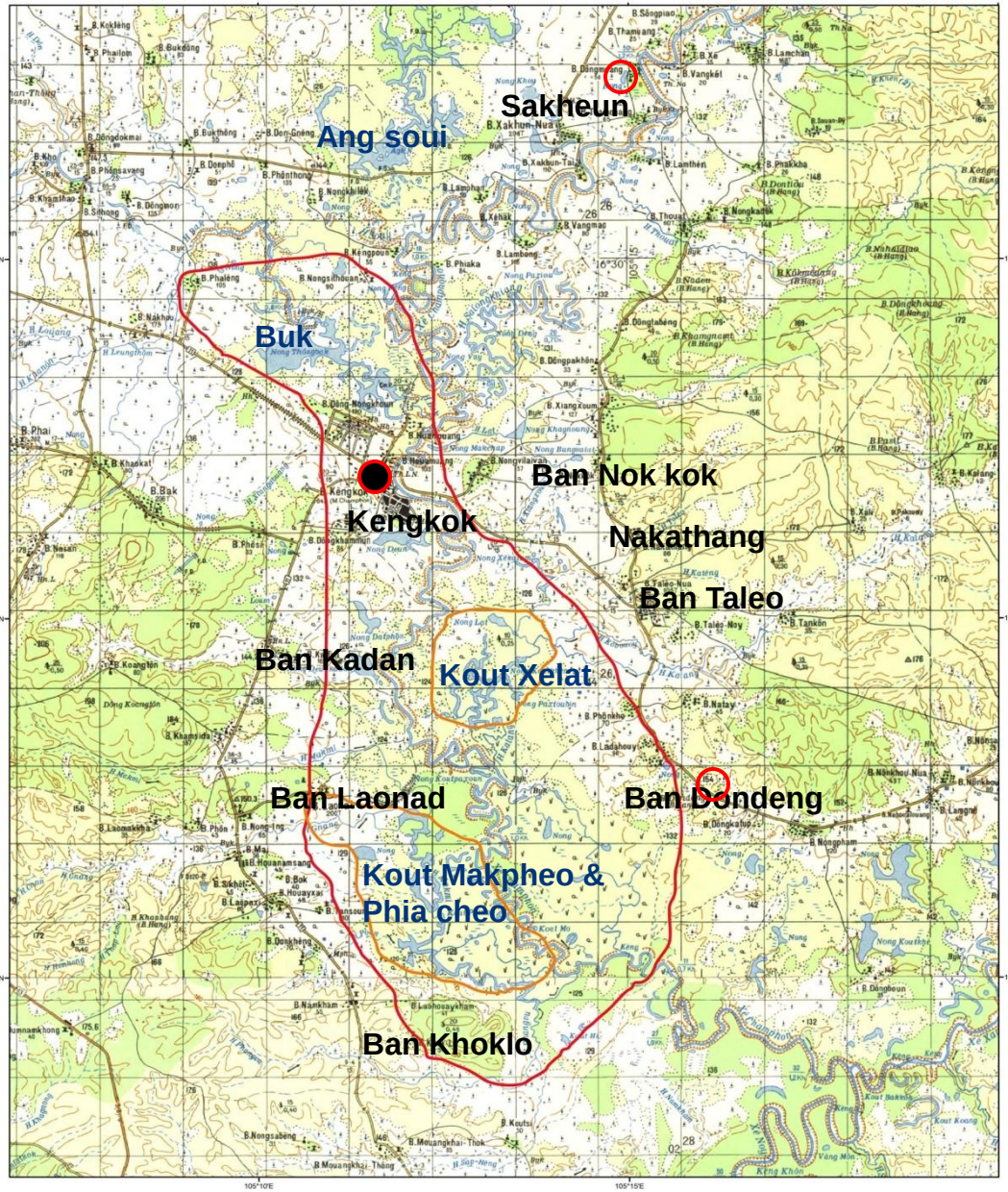
Please note that this presentation presents initial finding and work that is in progress. It was developed for workshop discussion only.

Outline

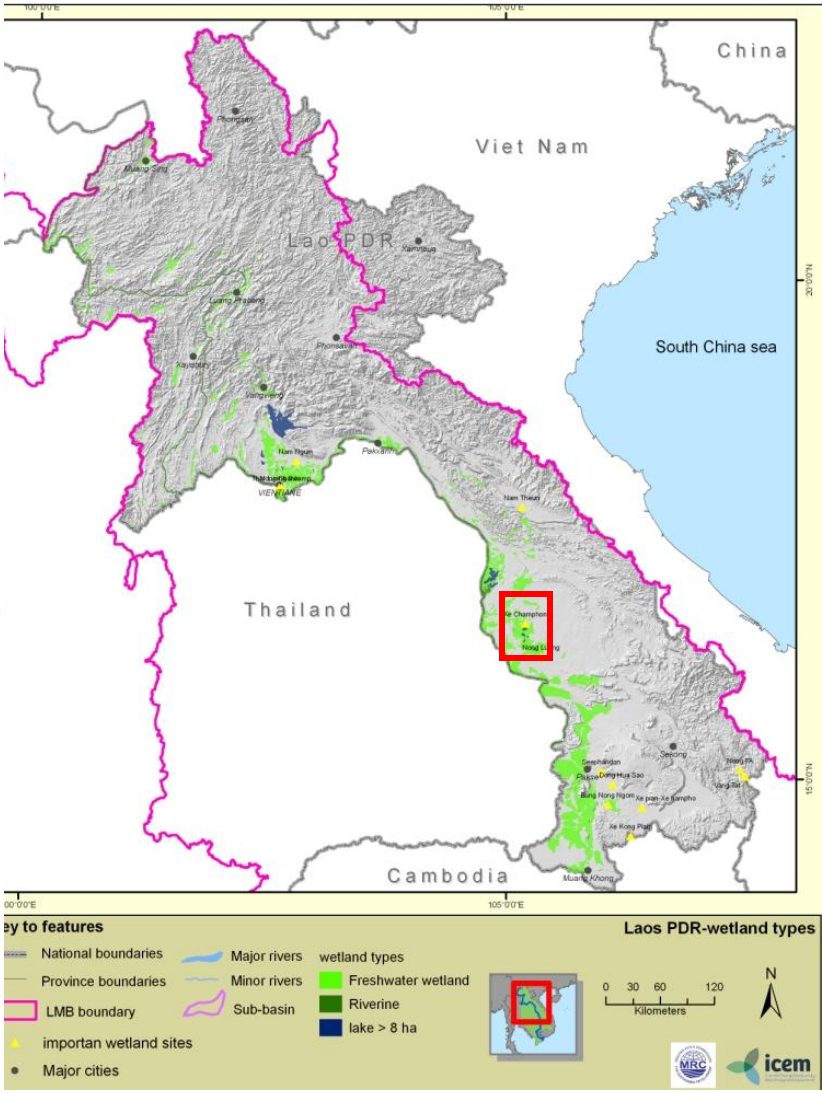
1. Wetland description
2. Climate and climate change predictions
3. Biodiversity and impacts
4. Ecosystem services
5. Livelihoods and Economic values
6. Livelihoods trends
7. Development pressures
8. Management context
9. Suggestions



Overview Map Xe Champone Wetland

Kilometers

0 0.5 1 2 3 4 5




XNX 1
XNX 2
Kout Kouang Nyai


Image © 2008 DigitalGlobe
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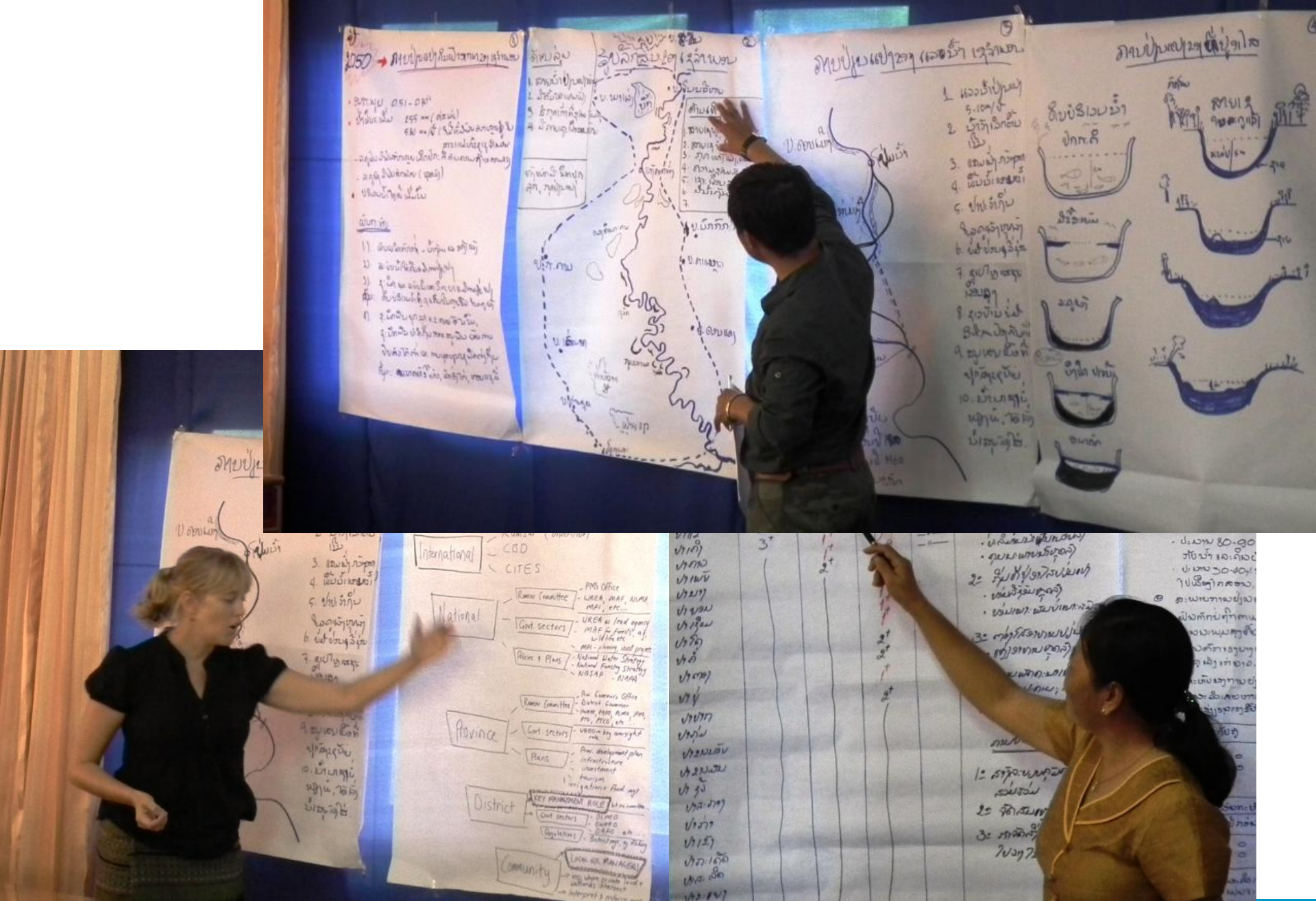
Consultations were conducted at all levels from the provincial, district, village cluster and at village

Field visit: Xe Champhone River, the section at
Ban Sakheun and Ban Muang, Champhone District,



Presenting initial findings and consultation with the officials

Wetland description

Location: located along the Xe Champhone River from below Ban Sakheun (16˚31’01”/105˚11’41”) down to Ban Khoklo at Phia cheo (16˚20’61”/105˚13’53”). Ban Kengkok is the town of Champhone, which it divides the north and south zones of the Xe Champhone wetlands.

Area: 12,400 ha as ramsar site

Wetland type: perennial and seasonal river channels, permanent and seasonal freshwater marshes, freshwater swamp forest, lake, pond, permanent reservoir, fed rice paddy, irrigated rice paddy and peatland.

Population: 40 villages, ca. 20,000 people, of which 13 villages are located adjacent and use the wetlands directly. They are Phouthai, Makong and Katang which they have strong belief in spirit associated with wetland protection.

Surrounding land use: common land and main wetlands belong to the government or communities but local villagers have right to use. Individually owned property includes house settlement areas, paddies and gardens.

Key habitats

Open water and peatland

Permanent marshes, Nong Maemay
Floating mats being built

Seasonally flooded bamboo forest

Transactions to

Seasonally flooded forest at Kout Phinoy

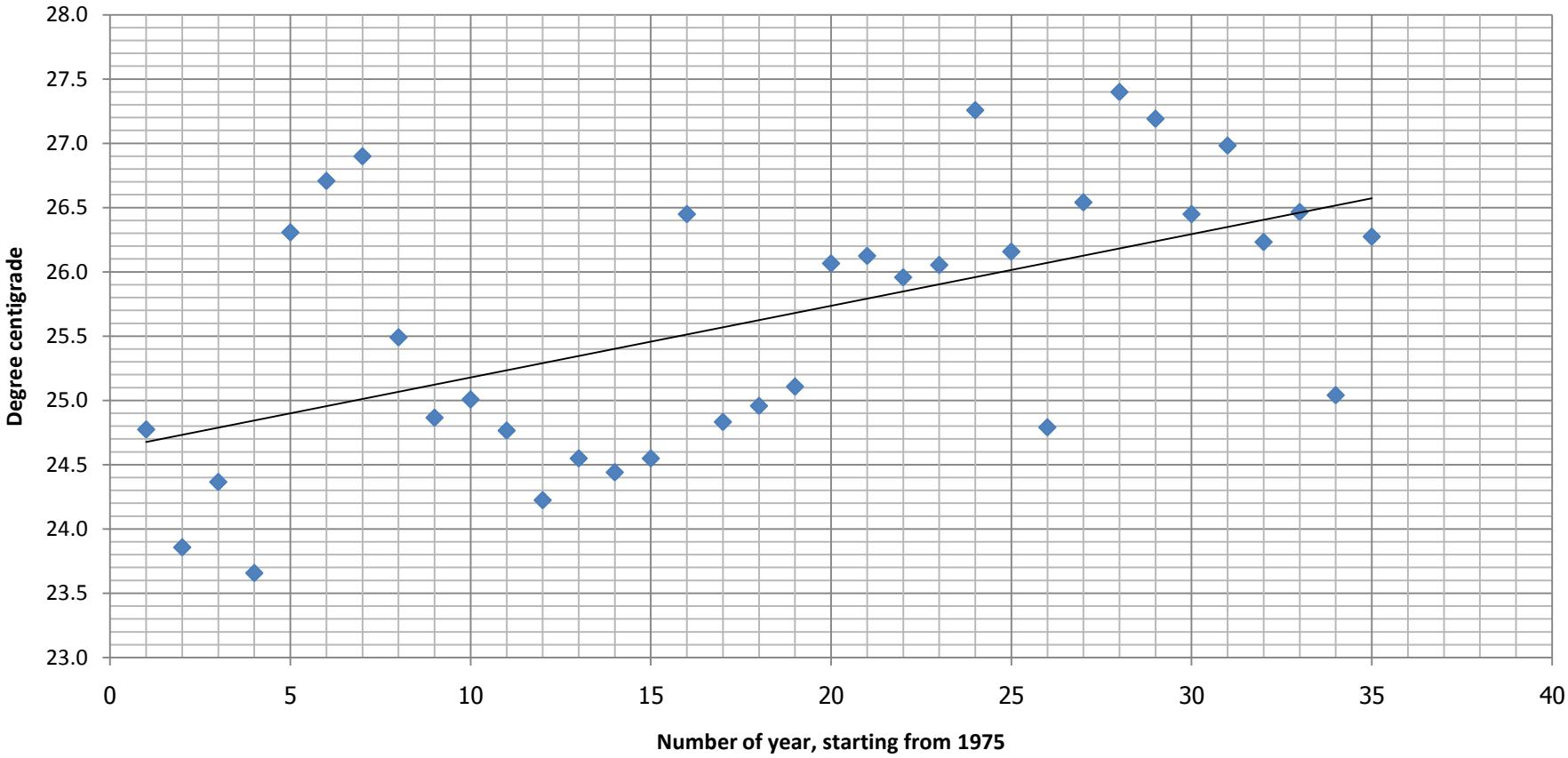
Permanent marshes, Xe Hak
Floating mats completely built

Evergreen forest

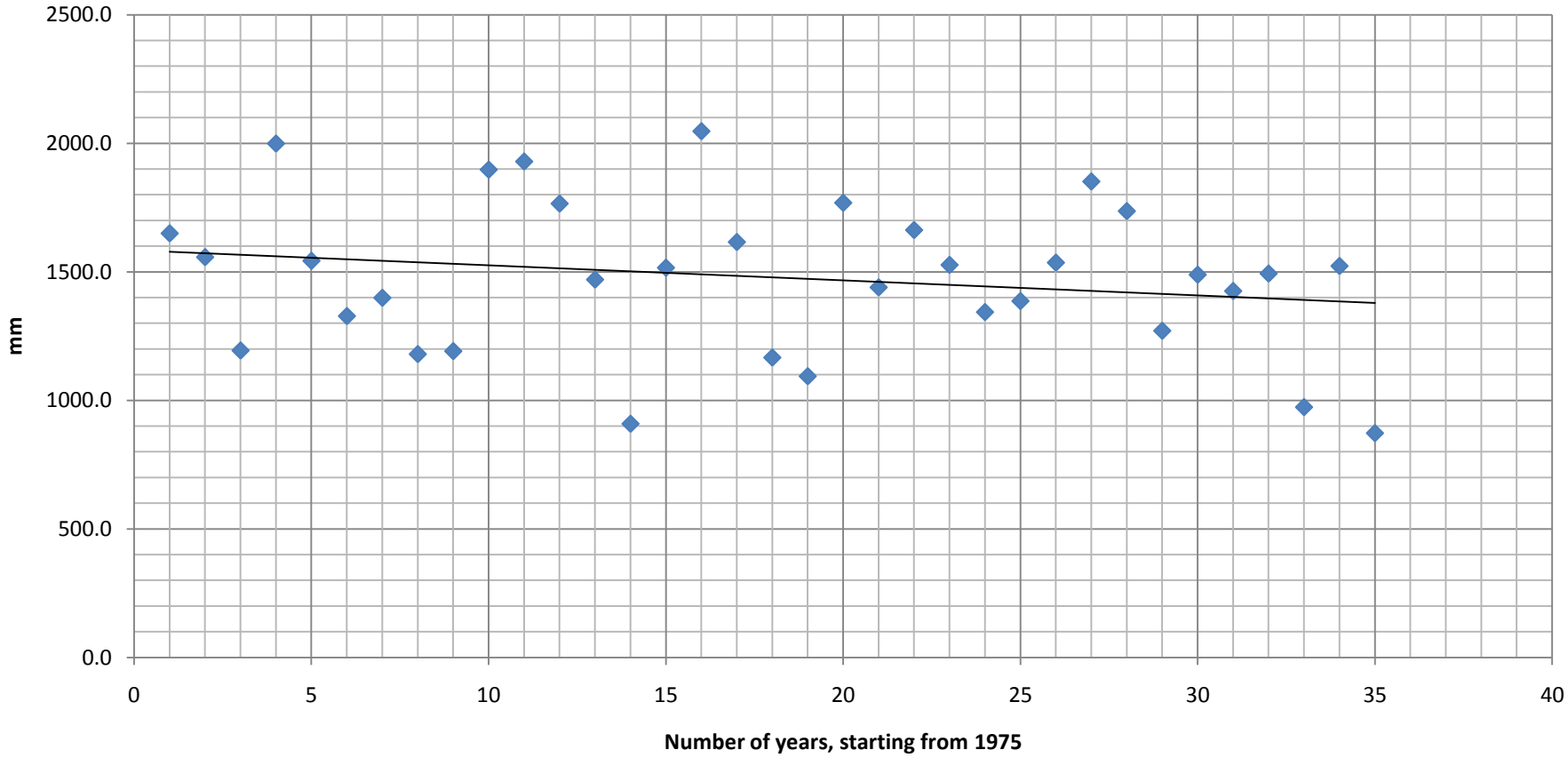
Xe Champhone's climate

- In a monsoonal zone with dry season (late October-early May) and wet season (late May-October).
- Temperatures range from an approximate low of 13^{o}C in January to a high of around 39^{o}C in April.
- Average annual rainfall at the site is around 1800 mm with up to 1/3 of the rainfall recorded during August.
- Water level varies significantly between wet and dry seasons…...

Average temperature in Savannakhet Weather Station



Rainfall in Champhone District



This figure is contradict to the Regional Circulation Model (RCM)

Local opinions on climate/climate change

- Flooding is a serious issue; areas around the XCP river flood every year, with varying levels of intensity.
- Drought is also serious, as the river dries down and the parts of the wetland dry out every year. People complain of higher temperatures and a longer dry season.
- Salinity is also a growing problem for local communities.
- The seasons seem to be changing; for e.g, the rains don't "come on time", the wet season peaks once early in the season, then there is a lack of rain until a second peak around September.
- There are more problems with invasive species, especially with Mimosa pigra.

Climate change predictions for Xe Champhone

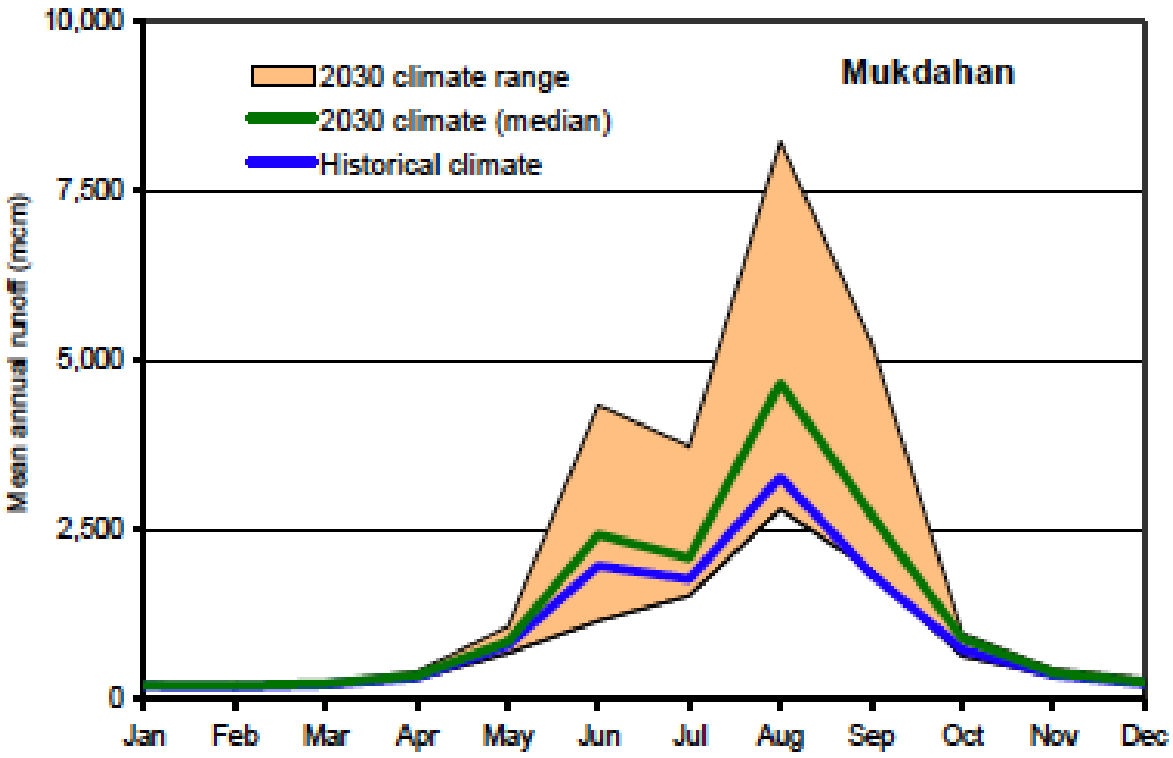
- Mean annual temperatures expected to increase by 0.51 – 0.70^{o}C by 2050.
  - Increases in the evaporation rate may be significant for dry season and when pools are isolated from river channel
  - Potential impacts from increases in water temperature?
- Approximate 14% increase in the annual average rainfall of up to 255mm (A2).
  - Minor impact on flooding expected, but other potential impacts on local communities re: rainfed agriculture and water use. (XCP already suffers drought and flooding each year).

Climate change predictions, cont.

- Most significant impacts are expected for the flow regime.
  - Increase in rainfall (potentially up to 530mm/year) in the three the major tributaries that feed the XCP wetland may lead to dramatic changes in the wet season inundation regime.
  - These changes will be focused in the wet season between May and October
- Climate change likely to have a greater impact on extreme seasonal flows:
  - During the dry season, minimum flows may drop.
  - During the wet season, increases in the length, intensity and frequency of peak flows , ie increases the likelihood of flooding.

Climate change predictions, cont.

Figure 1. **Historical (1951-2000) and future (2030) monthly runoff for Mukdahan sub-basin of the Xe Champhone case study sites** (Source: Eastham et al. 2008)



Potential impacts for Mukdahan sub-basin (Eastham et al)?

- Agricultural productivity unaffected;
- Existing food scarcity increased through population growth;
- Temperature and annual precipitation increased;
- Dry season precipitation decreased;
- Annual runoff increased;
- Dry season runoff increased;
- Potential for increased flooding (not quantified).

Biodiversity and impacts

Biodiversity in Xe Champhone

- **Fauna:** Critically endangered *Crocodylus siamensis*, Asiatic Soft-Shell Turtle, Turtles, Snipes, Pythons, Spot-billed duck, water duck(?), Waterhen, Starling, Kingfisher, herons and number of key fish species – mainly Padouk (*Clarias batrachus*) Pakho (*Channa striata,*) Patongnoy (*Notopterus notopterus*), Pado (*Channa sp*), Pabou (Glossogobius sp.)

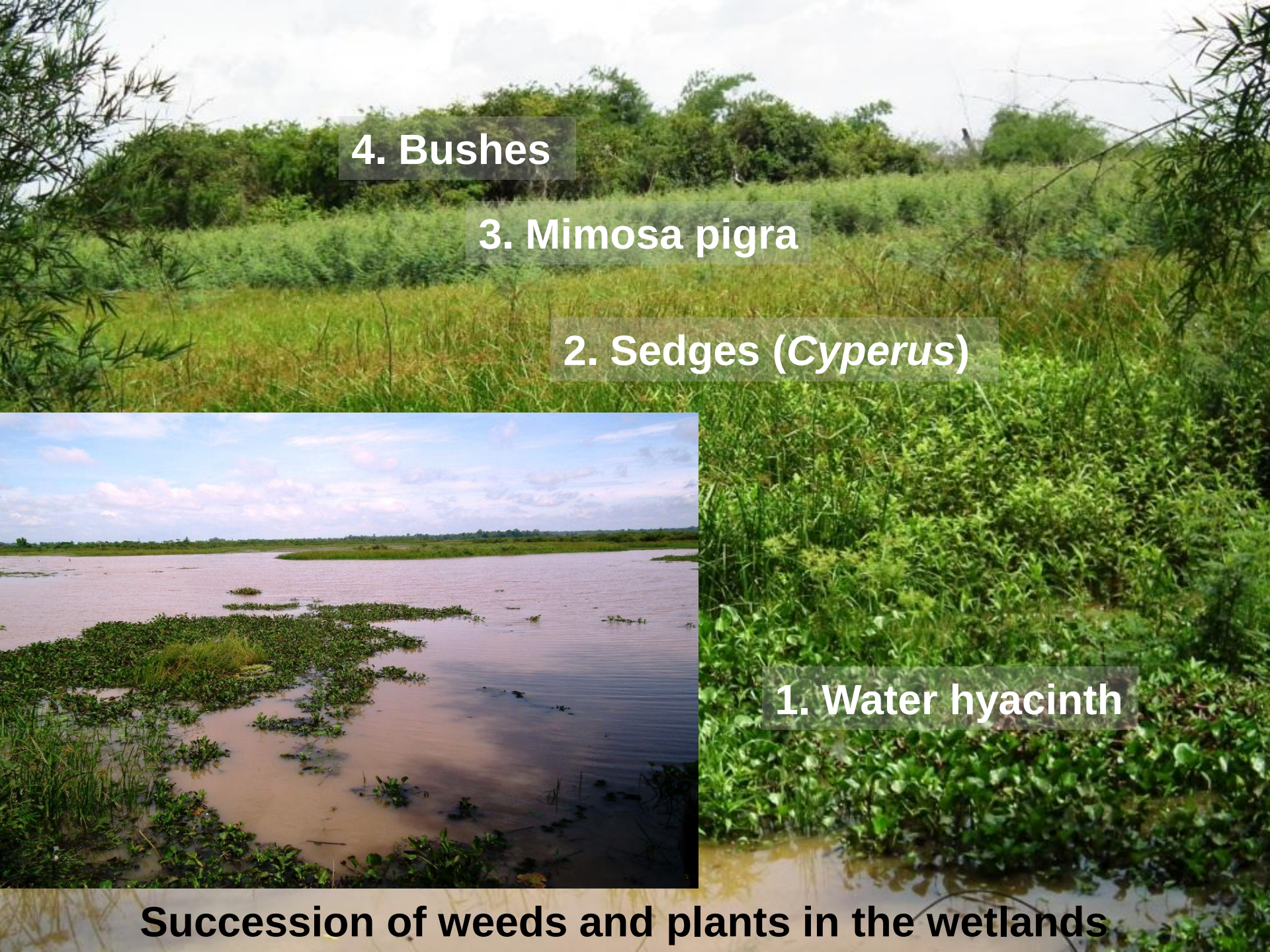
- **Flora:** mixed semi-evergreen and open woodland, bamboo and an under storey of shrubs and grasses. Tall weeds, Pheu (*Cyperus*), Choknoy (*Pista*) and (*Chokbai Salvinid*).

- **Bio values:** highly significance as home of most important habitat where the Siamese crocodile remains, feeding and breeding habitat of fish, fish migration paths, nesting sites for some bird species as well as nutrient cycling.

Habitat impacts

Habitat type	Exposure	Sensitivity	Adaptation	Vulnerability	+ other threats
Open water	Med	High	Low	High	colonized by invasive sps.

Landscape of Phia cheo, a man-made reservoir built in 1979, it is an open water wetland but it will become a closed water wetland in the future when joining of the floating thick mats - tall weeds, *Leesia hesandra*, *Imperata cylindria*, *m. pigra* etc.



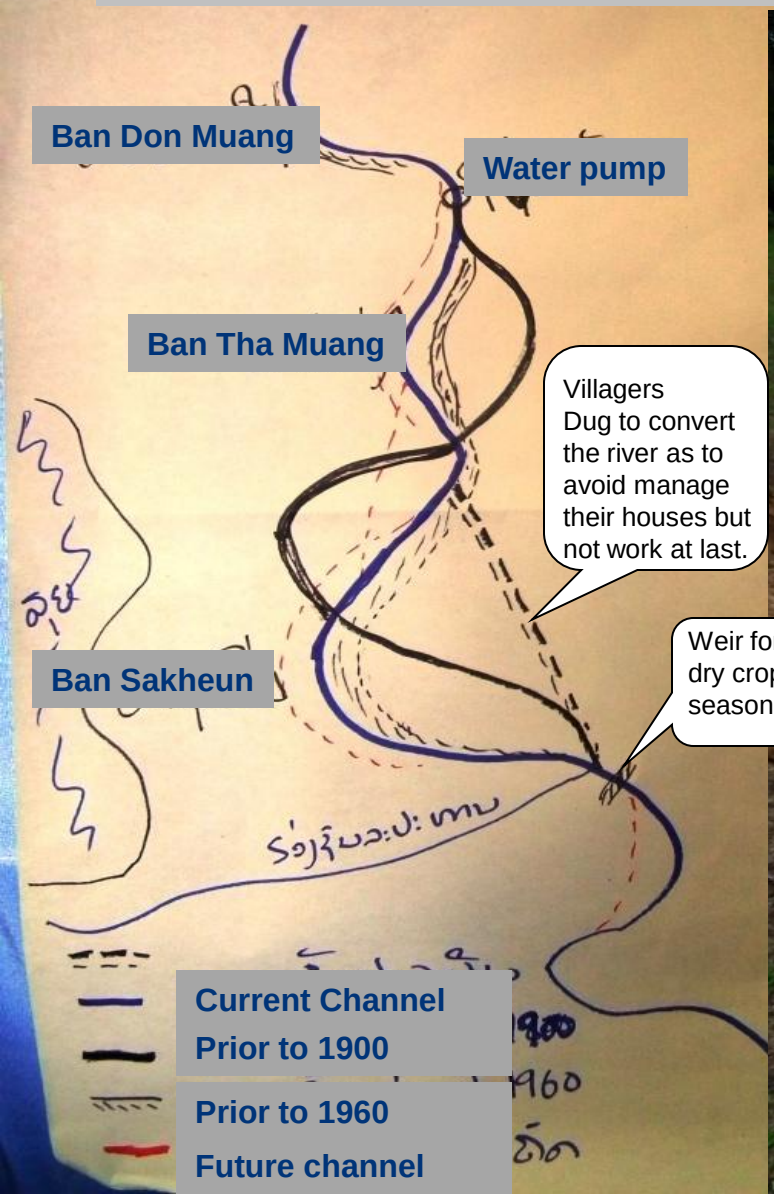
Succession of weeds and plants in the wetlands

Due to the banks of Xe Champhone made of fine sands makes instable and easily eroded when there is a flood.

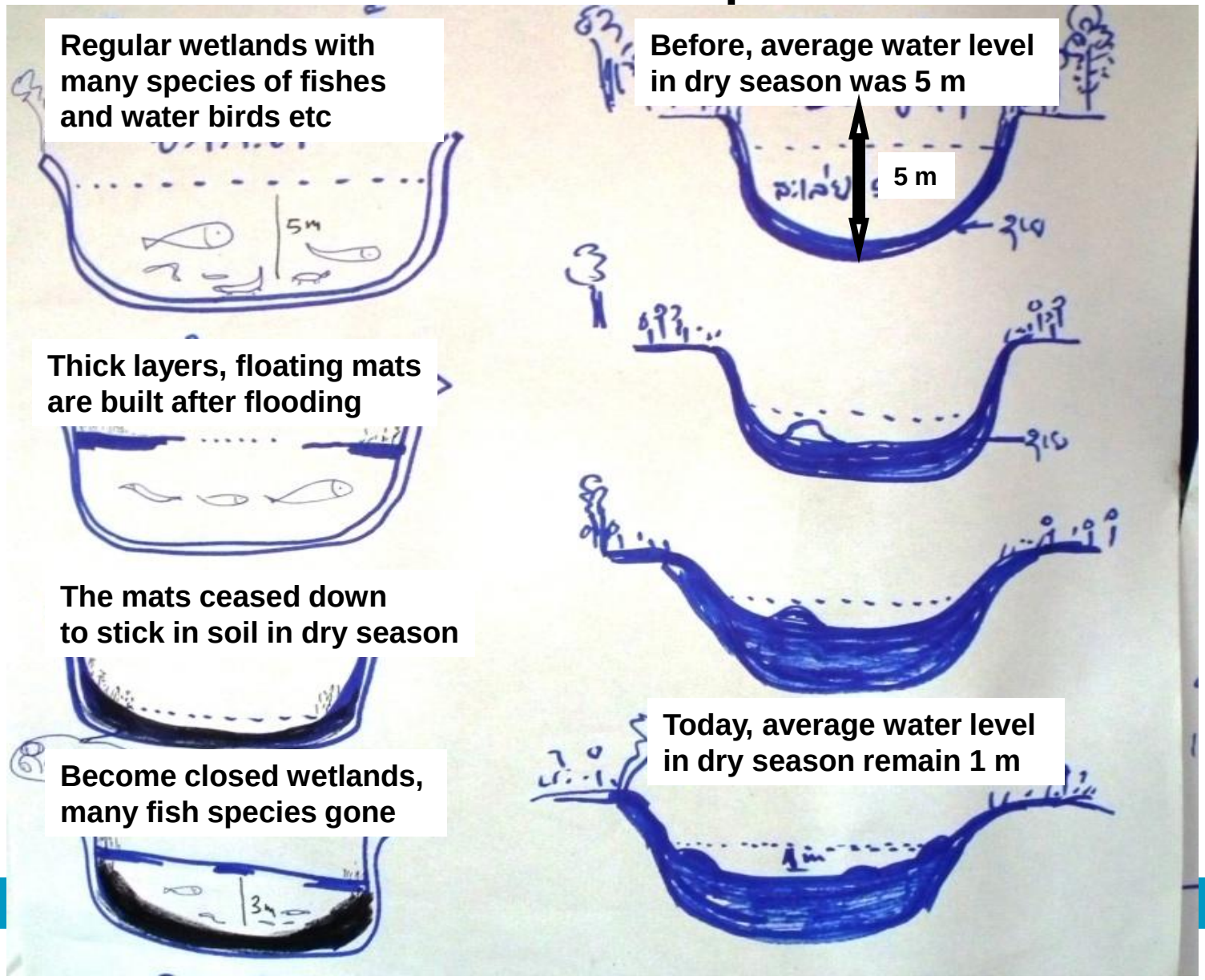
The river is shallower, wider and loss of deep pools, and almost no debris where fish can refugee during a critical life span in dry season.

Bank erosion is high and unable to control make many deep pools filled up and collapse of local settlements, paddy fields and gardens. Here at Ban Sakheun, the man shows that before their houses just at another riverbank.

Example: Changes in a river channel of Xe Champhone the section of Ban Tha Muang to Ban Sakheun, Champhone District



Sketches of the processes of changes in Wetlands and Xe Champhone River



Habitat impacts, con't

Habitat type	Exposure	Sensitivity	Adaptation	Vulnerability	+ other threats
Deep pool	Med	Med	Low	High	High
Meander	Med	Med	Low	High	High
Oxbow	Med	Med	Med	Med	High
Flooded Forest	Low	Med	Low	Low	Low
Seasonally Flooded bamboo Forest	Low	Med	Low	Low	Med, over use no zone
Riparian vegetation zone	very few trees stand along the river……				

Species	Exposure	Sensitivity	Adaptation	Vulnerability	+ other threats
Diplazium esculentum (Wetland ferns)	Med drought	Med	Med	Med	Med
Crocodylus Siamensis	High drought	Med	Low	High fragmented	**very High** pump water from wetlands for dry cropping breeding failure
Amyda cartilaginea *(only Dondeng)*	Low	Low	Low	Low	High food and inbreeding
Indotestudo elongata	High flooding	Med	Low	High habitat flooded	**very High** over harvest
Ranna sp. (Kiat luang)	Med	Med	Med	Med habitat loss	High over harvest

Species	Exposure	Sensitivity	Adaptation	Vulnerability	+ other threats
Anas Poecilorhycha *(Spot billed duck)*	**Med**	**Med**	**Med**	**Med** habitat loss	**High** hunting for sale
Bagarius bagarius (Pa ke)	Med	Med	Low	Med	High *barrier and high* market demand
Boesemania microlepis (Pa kheung)	Med	Med	Low	Med	High *possible barrier*
Pila scutata (Hoi Tadeng)	Med	Med	Med	Med	High
Pila sp. (Hoi peng)	Med	Med	Med	Med	Med *colonized by purple snail*
Mimosa pigra	*……....main colonized species and makes change wetland habitat……*				
Eichornia crassipes (Water hyacinth)	*……....make shallow pool……..……*				

Ecosystem services

Types of services	Rivers and stream	Seasonally flooded forest	Man-made/ rice fields	Oxbows/ natural lakes
Provisioning (food production, fruits, grain, fiber, fuel wood, genetics materials)	High	Low	Very high	
Regulating (climate and water reg, hydro, flows, discharge, water purif. & treatment)	High	High	Very high	
Cultural (spiritual, recreation, aesthetic and education)	Low	Low		High
Supporting (bio-habitat, spawning, sediment retention and nutrient cycling)	Low	Low	High	

Livelihoods and economic value

Economic value of Xe Champhone:

- Uses of Xe Champhone wetland:
  - Agriculture production, especially for crop production and livestock raising;
  - Fishing, hunting and NTFPs collection (bamboo, wild vegetables, snails, etc.);
  - Tourism sites (Monkey forest, Turtle pond).
- Estimated economic value of Xe Champhone Wetland:
  - Very important food and income source for people in Champhone District;
  - Over 95% of population in Champhone District are engaged in activities related to wetland ;
  - Economic value of Xe Champhone wetland is estimated to be around **USD 85 million** contributing to around 80-90% of total production value of Champhone District in 2010;
  - About 30-40% of wetland products (rice, fish, etc) are exported to Savannakhet provincial center, Outomphone and Sonkone districts and also to Vietnam (snails).

Livelihood trends

Wet rice production:

- Reduced wet rice harvest areas due to drought, flood and pests, by around 20% or over 30 ha on average;
- Economic loss is estimated to be around USD 3.9 million very year;
- This trend is expected to increase;
- Increasing costs for wet rice production by around 20% because of chemical fertilizers, insecticides and water pump or irrigated water;
- Reduced wet rice productivity in some areas because of salinity.

Livelihood trends, cont.

Livestock raising

- Every year more than 3,000 cow and buffalos die because of insufficient food, clean water and diseases;
- Economic loss is estimated to be over USD 800,000;
- Population of cattle and buffalo has decreased by over 40 percent during last four years

Livestock	2006	2007	2008	2009
Buffalos	28,690	20,706	21,193	19,073
Cows	34,054	32,280	28,129	25,316
Total	62,744	52,986	49,322	44,389

Livelihood trends, cont.

Impacts on fishing and NTFPs collection:

- Significant reduction in fish population (around 70 % during last decade) due to many reasons including climate change and commercial fishing;
- To maintain and increasing their income, men increase their fishing around three times during last decade;
- More fishing nets and fishing equipment, including electric fishing gear, are being used in Xe Champhone.

Impacts on drinking water sources:

- Wells in some areas are not useable in dry season because of decreasing ground water;
- E.g: people in Khamtao village must buy expensive drinking and general use water in dry season (about USD 50 per month)

Livelihood trends, cont.

Health:

Diseases	2006	2007	2008	2009	2010	2006-10
Hemorrhagic fever	64	145	0	5	93	307
Diarrhea	1,853	2,304	936	1,940	2,694	9,727
Total	1,917	2,449	936	1,945	2,787	10,034

Living costs:

Increasing food (rice, fish, vegetable, meat, etc) prices around three times during last five years, due to declining natural resources and increasing demand.

Changing livelihood strategies

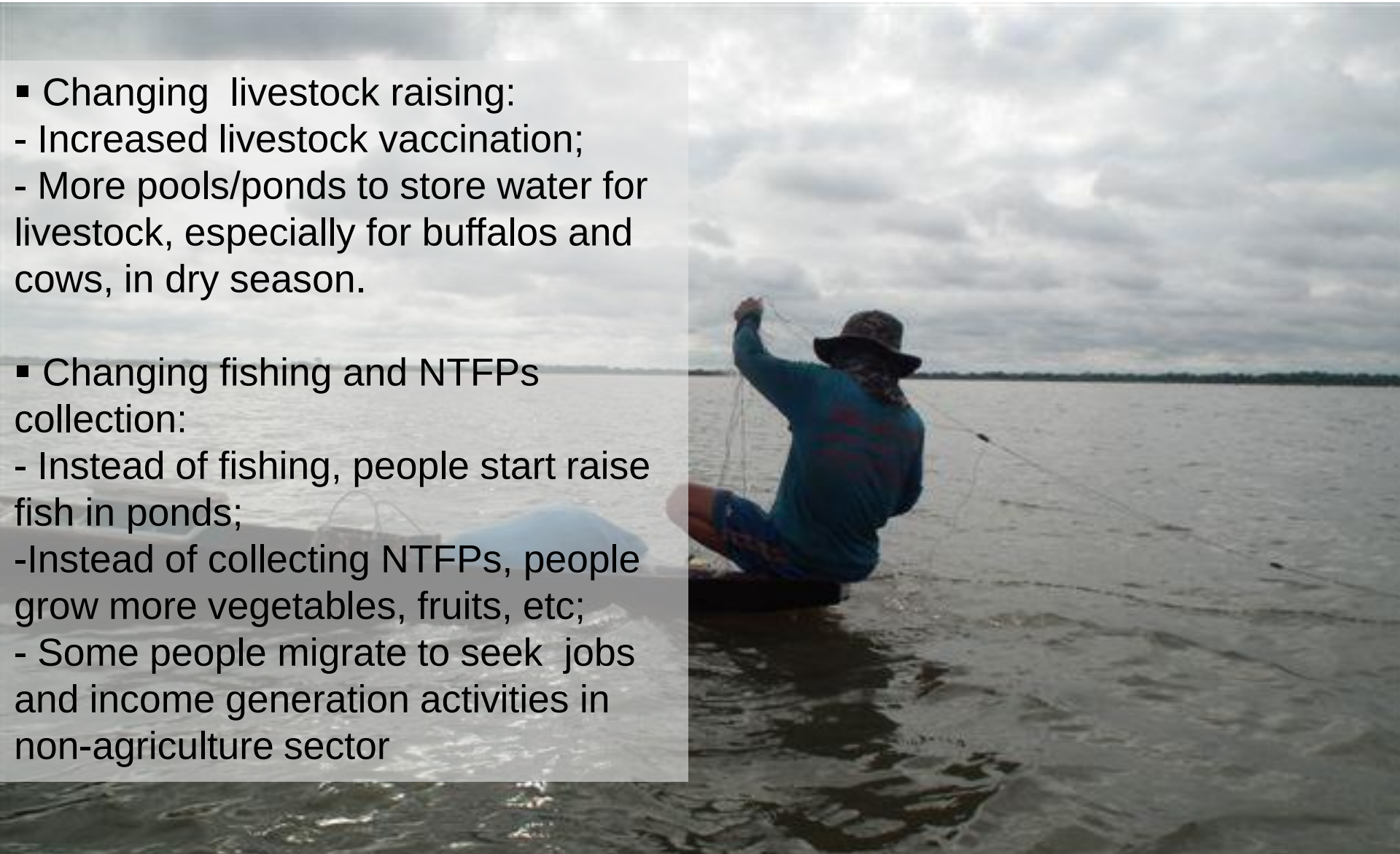
- Changing rice production:

- Increasing irrigated and dry season rice production;

- Using more techniques and technologies including hand tractors, water pumps, chemical fertilizers and insecticides to increase productivity;

- Testing/introducing of new rice strains, which are expected to be more tolerant to flood and drought (WREA/CCAI project).

Changing livelihood strategies



- Changing livestock raising:

- Increased livestock vaccination;
- More pools/ponds to store water for livestock, especially for buffalos and cows, in dry season.

- Changing fishing and NTFPs collection:

- Instead of fishing, people start raise fish in ponds;
-Instead of collecting NTFPs, people grow more vegetables, fruits, etc;
- Some people migrate to seek jobs and income generation activities in non-agriculture sector

Other pressures on the wetland

- Increasing salinity
- Increasing irrigation off-take
- Increasing chemical contamination problems
- Increasing invasive species
- Increasing fishing
- Bridge and road-building, upgrades
- Concession projectes, eg sugarcane plantation, biofertiliser
- Decreasing drinking water
- Decreasing biodiversity

Management context

- **International**

  Treaties like Ramsar, CBD, CITES oblige Lao PDR to conserve NR and biodiversity, including in wetlands; Ramsar site
- **National**
  - Ramsar Committee
  - Govt sectors: WREA, MAF, etc
  - Policies & plans: National Water Strategy; FS2020; NAPA, NBSAP, plus investment and infrastructure projects
- **Provincial**
  - Prov. Ramsar Committee
  - Govt sectors: especially key oversight of PWREO
  - Plans: Provinicial 5 Year Plan; infrastructure and investment plans, tourism plans, irrigation & flood management schemes.
- **District**
  - key role in on-ground management of site, eg irrigation, LUP.
  - Govt sectors: Importance of DLMO noted, plus DWREO and DAFO
  - Regulations: district regs on fishing, forest, etc.
  - Lack of formal multi-sector cooperation
- **Community**
  - Local NR managers (esp. on private land)
  - Interpret and enforce regulations
  - Local practices and beliefs influential

Special management features

- Local belief systems that contribute to conservation and management (eg Dongling, spirit forest, turtles, crocodiles)
- Local beliefs/management systems present in all groups in area (Lao Loum, Phutai, Mangkhong, Katang)
- Recognition that these systems are more effective than formal regulations/instruments; also support GoL and Ramsar goals (wise use)
- Locals already adapting and have experience in managing NR independently.

Key management challenges in the context of climate change.

- How to manage increased competition over scarce water?
- Which use or which people have the most right to water?
- How to ensure environmental flows at the same time, eg to maintain key habitats?
- What are the best ways to adapt/manage flooding and drought? (not all adaptation is good)
- Who decides how to implement adaptation? How can it be coordinated?
- How to implement and enforce regulations and maintain local beliefs/practices?

Adaptive capacity

Strengths	Constraints
Traditional systems efficiently protect key habitats and species	Increased tourism, fishing and other pressures at habitat sites need to be sustainably managed
Communities have started adapting already; have useful local knowledge and ideas	Existing adaptations not coordinated or supported; avoid maladaptation/potential cumulative impacts
Ramsar status of XCP; zoning, committees, wise use, attention	Ramsar management plan/regulation for XCP still needed, with local input
Ad-hoc cooperation already between district sectors	Lack formal multi-sector cooperation at district level for either wetlands or climate change
District regulations in place for managing fishing, forest, wildlife, etc	Law enforcement required for existing regulations; relieves other pressures on species and habitats
Political reform of MAF and WREA may help coordination for wetlands	Lack of understanding about the natural values of wetlands (as opposed to engineering/ infrastructure solutions)
	Differing priorities between province, district and communities, eg flooding on XBH vs XCP, fishing vs irrig

Suggestions for increasing resilience

- Development of a XCP wetlands regulation, through local consultation, incorporating local customary law/practices.
- Formation of a district wetland/Ramsar committee, with all key sectors represented.
- Formation of a CC Adaptation Taskforce, potentially through CCAI project, with responsibility for analysing XCP's situation, collating information on existing adaptations, coordinating future adaptation.
- Formation of a XCP sub river basin committee, under the XBH RBC, with prime task to help decide water-sharing between up and downstream and required environmental flows.
- Remove invasive species, purple snails and *Mimosa pigra* from wetlands and farms. E.g. Establishment of a pilot *M. pigra* scheme, eg biofertiliser plant, preferably with private sector partnership.

Suggestions, cont.

- Riparian forest should be rehabilitated e.g bamboo and *ficus* sp.
- The wetland management regulations should take account of key wildlife species that in high vulnerabilities to ensure that those species are protected and addition to, for example:

  - crocodile, habitat to be connected and not over pump the water from wetlands

  - Spot billed duck, open water wetlands to be maintained or rehabilitated

  - Zoning and manage some important food source species e.g rana sp., hoi tadeng, hoi peng.


Thank you!