

ອົງການຊັບພະຍາກອນນ້ຳແລະສີ່ງແວດລ້ອມ



Water Resources and Environment Administration-WREA
Water Resources and Environment Research Institute-WERI
Modeling Unit/ Water Resources Research Center-WRC

Climate Modeling and Support in Lao PDR

By: Chanseng Phongpachith

WERI/WREA

09 September 2009



9 1 % of Flow into Mekong river such as 13 major river basins such as Nam Tha, Nam Beng, Nam Ou, Nam Seung, Nam Khan, Nam Ngum, Nam Gieup, Nam San,Nam Kading, Sebanfai, Sebanhierig, Sedoneand Sekong.

9 % of Flow out of Mekong through Flow Viet Nam into the South China Sea.

These are 3 major river basins such as Nam Ma, Nam Sam, and Nam Neune.

Population of 6 mil (2006 est)
Capital City – Vientiane
Land area of 236,800 sq. km.
Covered by forest 46%

Mountainous 80 %

Lao PDR currently has 20 National Protected Areas (NPAs) and two Corridors, covering almost 3.34 million ha, or 14% of the country' land mass. Adding areas under provincial and district protection, the total protected areas increase to 5.3 million ha or 22.6% of the land area Length of Mekong through: 1860 Km water resources per capita in ASEAN (55,000 m³/person/

Environment and Social impacts

- Average river runoff and water availability are projected to decreased by 10-30% over some dry areas; droughtaffected areas will likely increase in extent; heavy precipitation events, which are very likely to increase in frequency, will augment flood risk
- Affect the health status of millions, those with low adaptive capacity (increases in malnutrition and injury due to heat waves, floods, storms, fires and droughts)

Government Efforts

- Ratified the UNFCCC in 1995 and Kyoto Protocol in 2003
- Inter-agency National Steering Committee on Climate
 Change was set up in 2008
- Submitted Initial National Communication (INC) in 2000
- In the process of preparing the Second National Communication (SNC), completion by 2011

Government Efforts (Cont'd)

- National Adaptation Plan of Action (NAPA) was released in April 2009
- CDM decree was proclaimed in 2008
- National Climate Change Strategy and Action Plan (upgrading the policy and institutional framework, by strengthening mitigation and adaptation actions by forging closer relationships with international partners)

Climate Change Priority



ON NAPA **CDM Key impacts:** Drafted regul. flood &

drought

46 pp, 4 Sec:

1.Agriculture

DNA Energy eff. at

Established

Oa

Beer Lao

project

2.Forest factory is the 3. Water Res. first CDM 4.Pub. Health

Energy Follow Up phase efficiency **Promotion** NCSA:

•UNFCC C

•UNCBD

•UNCCD

SNC:

GHGI V&A Mitig.

Scenario

1. National In-dept Study on CC impact in 8 focal areas 2. Drafting three doc.:

- National Startegy on CC up to year 2020 (end of 2009). - Interim Plan for 2009-2011

- First National Action Plan for period 2011-2016 aligned with the 7th National Socio-Economic Development Plan

A-riass1tssea WG 2: Forest

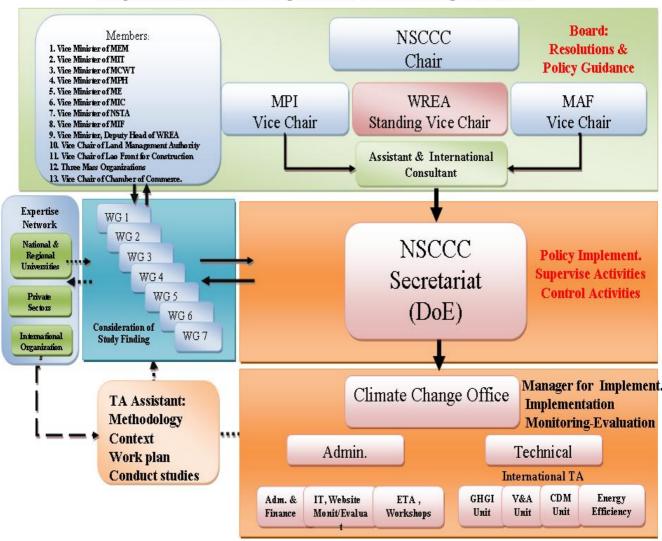
WG 3: Energy

WG 5: Industry-urban

₩G 7: WG 8: Public Health

activities

Proposed Institutional Arrangement for Climate Change, Lao PDR



Climate Change with New Development challenge

- Long term National Development Goal:
- 1) Moving consistently towards a market-oriented economy;
- 2) Building up the needed infrastructure throughout the country;
- 3) Improving the well-being of the people through greater food security and extension of social services;
- To date there has been limited assessment, analysis or prediction of the potential impacts of climate change on physical and social environment, long term climatic data do not exist

Climate Change with New Development Challenge (Cont'd)

- Evidence has shown that the dry season is becoming longer, droughts are more frequent and severe, unusual and extreme flood events is increasing
- Flood in August 2008, over 200,000 people were affected, 75,000 ha of agriculture land were submerged -> crop losses on 50,000 ha of land
- 80% of Lao population, which live in rural areas will have serious consequences

Mitigating

- GHG emission
- Agriculture
- Land use change and forestry
- Energy
- Industrial processes
- wastes

Adapting to Climate Change

- NAPA (supported from GEF, UNDP)
 - Agriculture,
 - Forestry,
 - Water resources,
 - Human health

Modeling Development in Lao PDR

MRC DSF Application

2001-2005 There are 7 modelers (@LNMCS, DMH, WAD/MPWT, DOE/MOEM)

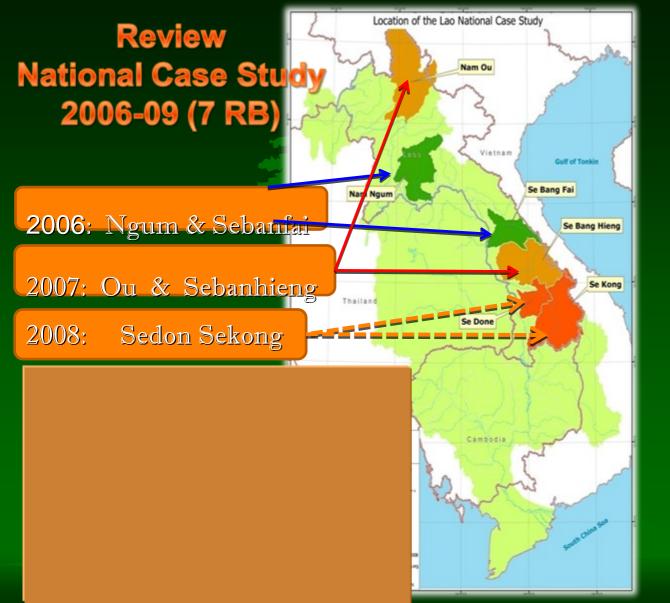
2006-2008 First form team for Nat. Case Study 6 Modelers (@LNMCS,DMH,DOE/MOEM)

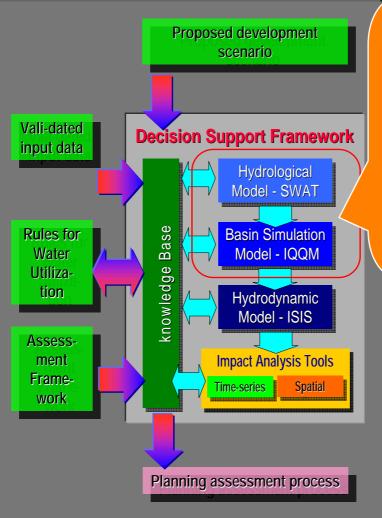
2009 Established 9 Modelers 1 DWR/WREA,1 DOE/MOEM@MRCS & 7 @WRC/WERI/WREA

Up to 2009 > 22 Modelers using DSF

Capacity Supported from MRC WUP and IKMP

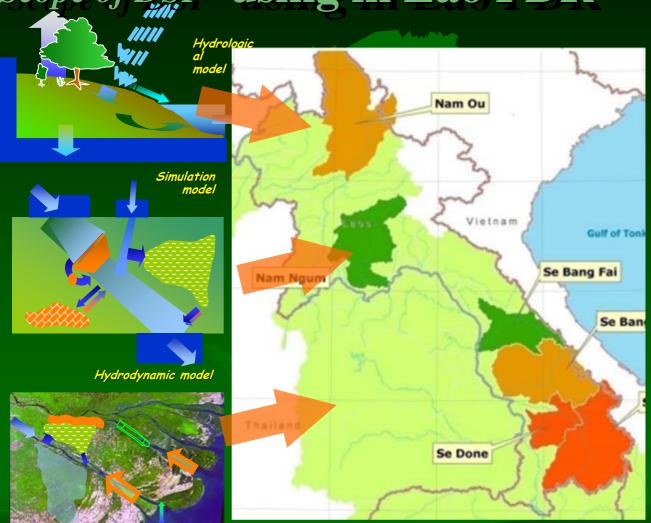






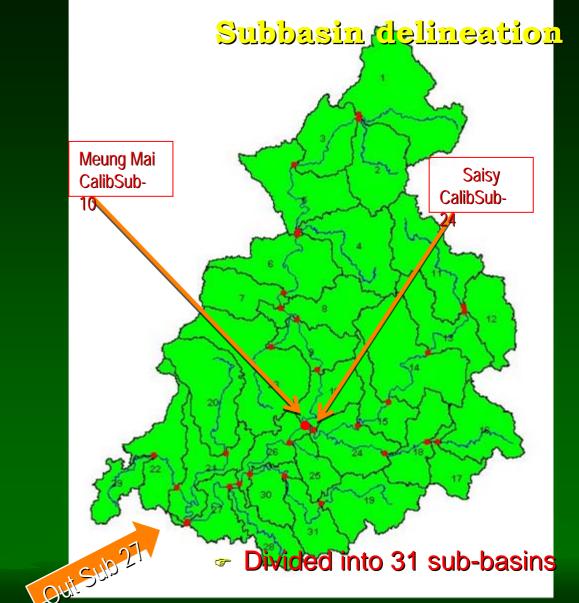
Available
Climate
Change
Scenario each
River basin in
Lao PDR

Scope of DSF using in Lao PDR



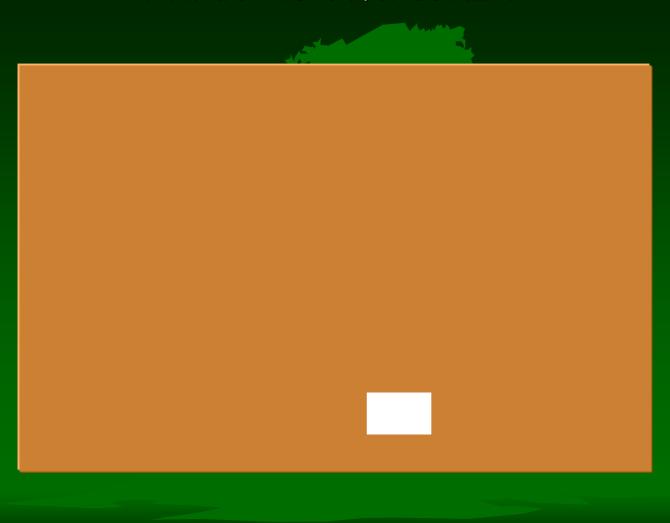
Expected Scenarios

- Hydropower Development
- Climate Change
- Landcover Change





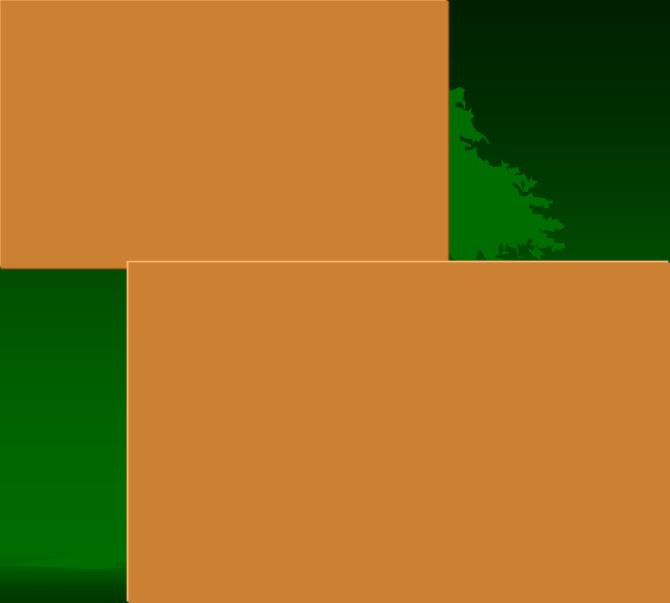
Criteria sellection for Scenario

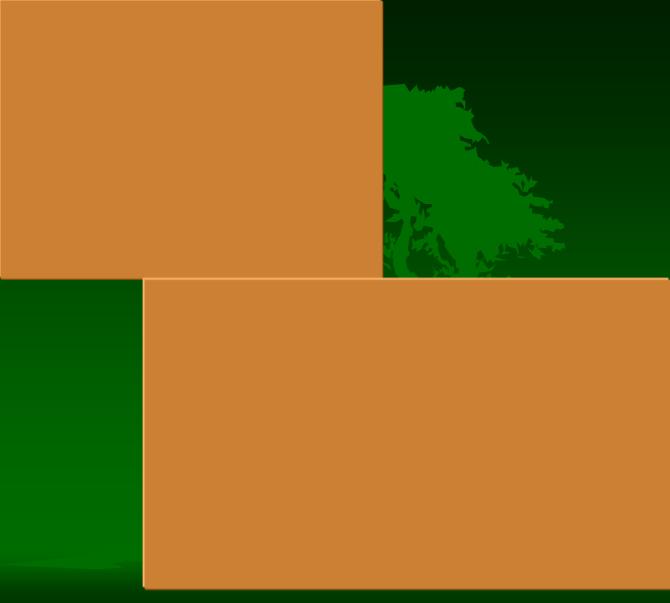






Methodology

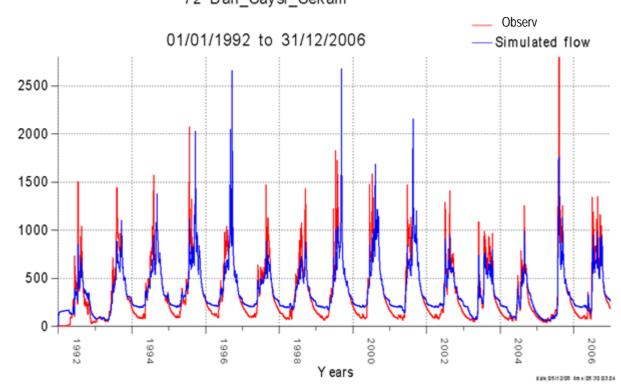




Flow Comparison Dam Scenario @Saysi Station

72 Ban_Saysi_Sekam 72 Ban_Saysi_Sekam

m3/s



Conclusions

- Each National Case Study will be Improve after Implementation MRC KB (1985-2006) Than re-calibrate
- Evaluate: 2006-2009 on the job training such as Ass. Modelers@ MRCS MT, LNMCS and WREA
- The models result : Practice and Lesson learn of New Modelers
- Need Training from MRC CICh Model

Photo for ClCh Impact in Lao







Natural Disaster:

Flood (river flood and flash flood)
Drought

Local Storm,

Hail

Tropical Cyclone, Southwest

Monsoon,

Landslide Birth flu

Earthquake

Epidemic (human and animal Disease) Pest

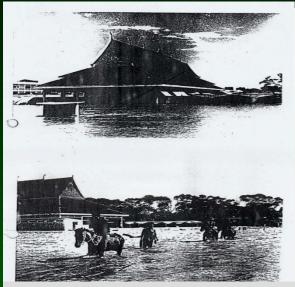
Man-made

UXO Fire











Severe flooding has occurred in 1966, 1976, 1978, 1995, 1996 and 2000.









In mountainous areas, flash floods washed away paddy fields and destroyed irrigation systems.



While some families had time to protect their stored food from the flood waters...



Agriculture was badly hit with many farms flooded.

Statistics of Flood Damages / Natural Disasters

Year	Natural Disaster	Flood Damages(US\$)	Regions Affected
1966	Large Flood	13,800,000	Central
1967	Drought	5,120,000	Central/ Southern
1968	Flood	2,830,000	Southern
1969	Flood	1,020,000	Central
1970	Flood	30,000	Central
1971	Large Flood	3,573,000	Central
1972	Flood and Drought	40,000	Central
1973	Flood	3,700,000	Central
1974	Flood	180,000	Southern
1975	Drought	Not available	Not available
1976	Flash Flood	9,000,000	Central
1977	Severe Drought	15,000,000	Northern
1978	Large Flood	5,700,000	Not available
1979	Flood & Drought	3,600,000	Not available
1980	Flood	3,000,000	Central
1981	Flood	682,000	Central
1982	Drought	Not available	Not available
1983	Drought	Not available	Not available
1984	Flood	3,343,000	Not available
1985	Flash Flood	1,000,000	Oudomxay
1986	Flood & Drought	2,000,000	Central/
			Southern

Historic Flood Damages of Natural Disasters (Cont.)

/			
1987	Drought	5,000,000	Central/
			Northern
1988	Drought	4,000,000	Southern
1989	Drought	20,000,000	Southern
1990	Flood	100,000	Central
1991	Flood & Drought	3,650,000	Central
1992	Flood & Drought,	302,151,000	Central(F),
	Forest Fire		Northern(D)
1993	Flood & Drought	21,000,000	Central/
			Southern
1994	Flood & Drought	21,150,000	Central/
			Southern
1995	Large Flood	34,830,000	Central/
			Southern
1996	Large Flood	21,000,000	Central
1997	Flood and Drought	1,860,300	Southern
1998	Drought	5,762,715	Northern/
			Southern
1999	Flood	47,040,000	Central
2000	Flood	1,550,000	Central/
			Southern
2001	Flood	3,640,715	Northern/
			Southern
2002	Flood	Not available	

* Source : the Department of Meteorology and Hydrology

Historic Flood Damages of Natural Disasters (Cont.)

2002	Large flood ,Flash	24.454.546	Northern, Central and
	flood and land-slight		Southern
2003	Drought	16.500.000	Northern and Central
2004	Flood	20.750.000	Southern
2005	Flash flood and	218.304	Central and Southern
	land- slight		

Flood 2008 (40 year period):

- Provinces affected 11
- Districts affected 53
- Villages affected 865
- People affected 204,199
- Rice fields damaged 75,000 Ha
- 13 people dead









