Songkhla Lake Basin

- Southern Thailand
- Basin 8,495 sq.km.
- Lake 1,040 sq.km.
- Covers 3 provinces
- Fresh - Brackish - Saline
- 1.6 millions inhabitants (2010)

Source: PSU GIS (2010)
SLB Population during 1950 - 2030

NESDB & NEB *SLB Development Plan* (John Taylor & Sons) completed.

Key issues 1980-1985

1. Large income gaps between Bangkok and the rest of the country, between urban and rural areas, leading to labor migration. National policy thus emphasized income distribution and rural development, to bridge the gaps;
2. SLB was a designated area for socio economic-cum-environmental development;
3. Primary objective of the SLB Development Plan was to induce development: ‘with a higher induced level of commercial and industrial development & further development of the primary sector, within acceptable environmental standards, but requiring additional expenditure on environmental control’
4. Set target GRP @ 5.7% Growth
Preferred Strategy

- Continue rubber replanting
- Develop lake aquaculture potential 😊
- Extend irrigation
- Diversify markets & produce

- Massive infrastructural development – deep sea port, fish port, airport & highways expansion, etc.
- Agricultural products (rice, rubber, aquaculture) sharply increase
- Several new industries
- Regional ONEB Office established, Technological Park planned
Preferred Strategy

Priority projects

- Establishing GIS Center
- Constructing 50(10)^6 m^3 Reservoir
- Constructing Salinity Barrier


John Taylor & Sons
EmSong Study (DANCED & OEPP) completed & shelved

Source: DANCED (1999).
Integrated Environmental Management Approach for the EmSong Project
ONEB SLB Master Plan (PSU-TU-SKRU) 2006-2015
Key issues 2003-2005

1. Steady decline of upstream forest & mangrove;
2. Soil erosion & sedimentation in waterways & Lake;
3. Inappropriate and unplanned land use;
4. Freshwater over-pumping / saline intrusion;
5. Groundwater overuse;
6. More severe flooding;
7. Over-capacity fishing;
8. Water pollution, including domestic wastewater, industrial wastewater, wastewater from swine farms and shrimp farms;
9. Culture and local wisdom disregarded historical / archeological sites deteriorated;
10. Problems with previous development plans;
11. Lack of effective management and full public participation.

etc.
public worries

1. Songkhla Lake is running short of fishery resource, thus rehabilitation program is urgently needed.
2. Too many fishing gears, fish cannot penetrate into inner part of the Lake. Appropriate fishery resource management is needed.
3. Sedimentation is a serious problem. Proper control measures are needed. In some cases, dredging is a must.
5. Prevention measures for coastal erosion is urgent.
6. It was contended that fish population is killed by wastewater from large cities.
7. Rehabilitation program for mangrove forest is needed.
8. Conflicts between shrimp farming and paddy rice must be solved.
9. Is eco-tourism in SLB and its vicinity a viable option?
10. Let communities create their projects, since they know better than others, what they want etc.
Fishery

Source: PSU GIS (2010)
Sedimentation

Change in depth from 1975 to 2003

<table>
<thead>
<tr>
<th>Shallower (m)</th>
<th>Deeper (m)</th>
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<tbody>
<tr>
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<td>-0.4 - -0.3</td>
<td>0.1 - 0.2</td>
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<tr>
<td>-0.3 - -0.2</td>
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<tr>
<td>-0.2 - -0.1</td>
<td>0.3 - 0.4</td>
</tr>
<tr>
<td>-0.1 - 0</td>
<td>&gt; 0.4</td>
</tr>
</tbody>
</table>

Source: Sutiwipakorn and Ratanachai (2005)
Sedimentation rate

Source: Dumrongrittamatt (2005)
MP Formulation Process

- Literature review / Information synthesis
  Linking past to present
- Study present situation & future trend
- Public meetings for opinions & needs
- Draft master plan
- Public meetings to review draft plan
- Operation Plan / Position paper / Database
  Admin & Mgt. mechanism which emphasizes PP
  monitoring & assessment plan - KPI

Source: Sutiwipakorn and Ratanachai (2005)
SLB is to be rehabilitated & nurtured in the sustainability framework under proper equilibrium among ecol – socioecon – community systems under appropriate efficient, transparent and just institutional / organizational setting which emphasizes public participation.

**Reform admin/mgt. organisation**
- Reform admin/mgt. organisation
- Manage water res in inter-disciplinary
- Reduce sedimentation rate
- Plan landuse in accord with potentials
- Raise environ awareness

**Manage water pollution/solid wastes**
- Manage water pollution/solid wastes
- Reorganize fishery & aquacult
- Rehab-conserve cultural/local wisdom
- Promote sustainable tourism

**Rehab-conser upstream forest/mangrove/wetland**
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- Manage water pollution/solid wastes
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- Promote sustainable tourism

**STRATEGIES**
- Manage water pollution/solid wastes
- Reorganize fishery & aquacult
- Rehab-conserve cultural/local wisdom
- Promote sustainable tourism

**PLANS/PROJECTS**
- STOP-REHAB-CONSERVE-SUSTAINABLE
- SHORT – MEDIUM –LONG TERM
- KPI
- RESPONSIBLE

**VISION**
- SLB is to be rehabilitated & nurtured in the sustainability framework under proper equilibrium among ecol – socioecon – community systems under appropriate efficient, transparent and just institutional / organizational setting which emphasizes public participation.

**ISSUES**
- LACKING
- EFFICIENCY
- UPSTREAM FOREST ENCROACHED
- WASTEWATER/WATER QUALITY DEGRADING
- INAPPROPRIATE LANDUSE
- LACKING ENVIRONMENT AWARENESS
- OVERFISHING
- SILTATION
- EFFICIENT WATER RESOURCES MANAGEMENT

**SLB MASTER PLAN**
Key performance indicators

1. Establishment of the SLB Board which will oversee and coordinate the SLB research center and relevant stakeholder networks;
2. Good governance in natural resource and environmental management.
3. Communities are happy with their quality of life which reflect economic, social and ecological improvements in well balanced manner;
4. Upstream forest increase at least 20%;
5. Fishing gears decrease at least 30% while catches per unit increase at least 30%;
6. Establishment of historical park, heritage old towns and local study centers/museums in at least 26 locations;
7. Water quality in SLB is not less than Class 3 of National Water Quality Standards.
SLB BOARD was proposed

People sector: in 3 provinces

Fishery
- Network/Assoc
- Rep
- Offices

Paddy
- Network/Assoc
- Rep
- Offices

Shrimp
- Network/Assoc
- Rep
- Offices

U/S Forest
- Network/Assoc
- Rep
- Universities

Development
- Network/Assoc
- Rep
- Schools

Operator
- Network/Assoc
- Rep
- NGOs/Others

Others
- Network/Assoc
- Rep

Government offices

Academics
LADDER OF PARTICIPATION

Public can make decision & act for themselves

Public can give their views but their views may not be followed

Two way information flow

SLB ?

One way information flow


True participation

Acting together

Deciding together

Partnership

Consulting

Information

Public relations

Supporting inadequate initiatives
SLB Revised Master Plan (ONEP)  
2011-2015

Source: Dansawad et al. (2010)
Problems with SLB MP 2006- implementation

1. Reforestation target @20% was not practicable;
2. Problems with fishing gears remained unsolved;
3. Sedimentation issue remained unsolved, drainage was not practicable;
4. Pollution problems still existed, mostly due to conflicts between local and central government agencies;
5. Coastal erosion has become serious and needed immediate attention;
6. Budget ceiling?
7. Decentralisation?
8. Political will? Policy conflicts?
Comparing planned & actual budget
SLB natural resources and environment shall be so nurtured that they are capable of fostering socio-economic development and quality of life of its people through proper public participation.

**Vision**

**Objectives**

- SLB Resource & Environment to be conserved & restored so that they are capable of fostering socio-economic development & qual of life in balanced manner
- SLB Resource & Environment to be efficiently managed such that they do not pose impacts on other sectors beyond tolerable limits
- Mechanism for SLB admin & management to be efficient, equitable & just with proper public participation

**Issues**

- Forest & wetland resources
- Aquatic resources & fishery
- Sedimentation
- Coastal erosion
- Envir qual (wastewater & solid wastes)

**Plans/Programs**

- Restore forest & wetland ecosystem
- Restore diversity & abundance of aquatic fauna
- Control & fix lake sedimentation problem
- Reduce coastal erosion
- Improve water qual @ critical areas & integrated solid waste mgt

SLB Revised MASTER PLAN 2011 - 2015
R & D Issues

- Establish GOOD baseline data / information.
- Math modeling - Calibration - Verification - Tested.
- What is appropriate management scheme for agricultural water demand? How effective is the warning system for freshwater pumping (before it turns saline) for agriculture? Are we serious about the demand-side management? What is appropriate water management? Cost-effective? Equitable? Just? Wise?
What are impacts of roads around Songkhla Lake? Do they obstruct drainage from waterways? From wetlands? Aggravate flooding?

What is Rainfall / Runoff pattern in forest – in rubber plantation? What is infiltration? Remedial action?

What are causes of Lake sedimentation? Erosion? Eutrophication? Remedial action?

Appropriate fishery management & Enhance fishery productivity under current constraints – How to do it?

Population dynamics? Fisherfolk communities?

Ecotourism in SLB & vicinity

Law enforcement – obstacles – Incentives
R & D Issues

- Capacity building for local governments & people sector
- Restoration of upstream forest? Mangrove forest? Wetlands?
- Restoration of local culture / traditions?
- Water pollution problems? Solid wastes problems?
- Coefficient ; Leachate ; Rates ; Characteristics, Carrying capacity, etc.
- What is appropriate process for building public awareness? Effective public participation process?
- Art & culture? Historical / Archeological? etc. . .
Current issues

Pollution – Sanitation problems
Current issues

Encroaching upstream forest
Current issues

Encroaching wetland for oil palm plantation
Environmentally managed case example

Saikling-Hua Pa Road crossing wetland
Proposed Environmental Protected Zone

Kreng Wetland

Sating Phra Peninsula

Source: Dansawad et al. (2010)
References