Journal of Agricultural Technology 2013 Vol. 9(5): 1081-1096
Available online http://www.ijat-aatsea.com
ISSN 1686-9141

Dynamics of songkhla lake basin research in the south of Thailand

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Tippayawong, S. and Somboonsuke, B. (2013) Dynamics of songkhla lake basin research in the south of Thailand. Journal of Agricultural Technology 9(5):1081-1096.

The study aimed to investigate the dynamics of SLB research in the south of Thailand that can be used to integrate planning, decision making, and developing of the local area. It was believed that the knowledge development and research extension would increase the integrated management capability of Songkhla Lake Basin (SLB) for sustainable development. Focus group discussion was used as a tool to find out the dynamics of SLB research. The result of this study indicated that the future study of this particular area would be proactive that could match the aptitude of individual researcher to serve the requirement appropriately. The requirement was categorized into 4 sectors; a government sector, a community sector, an academic or expert sector, and a private organization sector. The outcomes of this study are useful information for the research management in SLB.

Keywords: dynamics, information system, research management, Songkhla Lake Basin (SLB).

Introduction

Songkhla Lake Basin (SLB) is located in the south of Thailand, lying in 3 provinces of Phattalung, Songkhla, and Nakorn Si Thammarat. SLB covers an approximate of 7,687 sq/km. of land area and an approximate of 1,042 sq/km. of the lake area for the total of approximately 8,729 sq.km. Songhkla Lake has a unique characteristic of 3-water ecosystem. The complex ecosystem has made the lake rich in biodiversity, natural resources, and environment. However, all rich resources in SLB have been deteriorated by various economic activities without reasonable effort to properly conserve and rehabilitate those resources. This area is unsustainable. Many problems have impacts to the quality of life and lifestyles of people in the community (Ratanachai and Sutiwipakorn, 2006). In 2005, the SLB master plan was initiated to specify the framework of the recovery and sustainable development of SLB as shown in Table 1.

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Table 1 The SLB Master Plan (SLBMP)

Strategy 1	Rehabilitation of SLB natural resource and biodiversity, consisting of 5 measures
	Restoration of, and thereafter nourishing, forest in upstream part of the Basin; Restoration of, and thereafter nourishing, mangrove forest and peat swamp forest along coastline of the Lake, and around islands within the Lake; Provision of public land for inhabitants who may be displaced following the above measures; Dredging the Lake where appropriate, e.g., where siltation is severe, or where it is anticipated that dredging can restore abundance of aquatic fauna; and Restoration of rare and vulnerable aquatic fauna.
Strategy 2	Sustainable use of SLB natural resources, consisting of 6 measures
	Management of soil resource and land use in SLB, in line with their natural potentials; Management of surface water and groundwater, in an integrated manner, both for consumption and other economic activities; Controlling the amount of freshwater pumped from the Lake during dry seasons; Management of water resource with emphasis on public participation; Improvement of drainage system and mass transportation system; and Sustainable management of fishery and aquaculture activities.
Strategy 3	Pollution prevention and control, consisting of 6 measures
	Reduction of discharged nutrients, from domestic waste, industrial waste, swine farms and aquaculture activities, into the Lake; Installation of appropriate waste treatment systems for municipalities; Campaign for environmental awareness in pollution problems; Establishment of efficient and effective management scheme for solid wastes, with careful consideration on economic, social and political feasibility; Controlling land use and pollution source; and Improvement of environmental quality for communities along selected waterways, allowing sufficient participation from stakeholders.
Strategy 4	Restoration and conservation of arts and culture, historical and archeological sites, tourism sites and local wisdom, consisting of 4 measures
	Restoration and conservation of arts and culture, tradition and local wisdom; Restoration and conservation and utilization of historical and archeological sites, and tourism sites; Development of network for learning and exchanging information about arts and culture, historical and archeological sites and local wisdom; and Promotion of sustainable tourism, in line with potentials of the sites, with careful consideration on communitiesô benefi
Strategy 5	Enhancement of efficiency in SLB administration and management, with emphasis on public participation, consisting of 5 measures
	Improvement of mechanism for administration and management of SLB natural resource and environment, so as to drive execution of the Master Plan; Enhancement of public participation; Establishment of mechanism for improving work culture; Establishment of mechanism where SLB database can be continually improved and update, while maintaining its integrity; and Establishment of a surveillance process where SLB development can be continuously and effectively monitored and evaluated.

The development plan related to the area before the SLB development plan was the national economic and social development plan 1-10) Ministry Operation Center, Ministry of Education, 2009) starting from 1961 to present

(Fig 1). Furthermore, the National Research Council of Thailand (NRCT) was also involved. However, the overall of policy planning was parallel with the national plan.

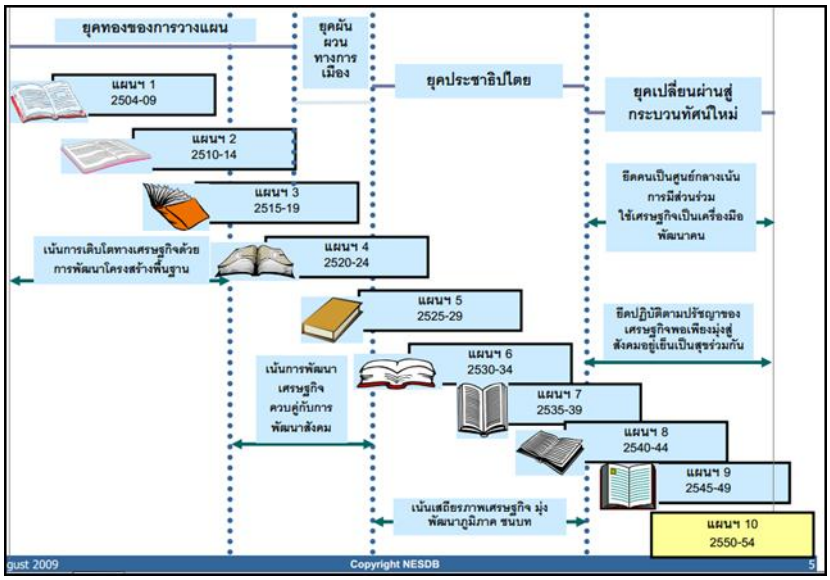


Fig. 1. The National Economic and Social Development Plan
Source: Ministry Operation Center (2009)

Research Dynamics

Dynamics refer to something of a process or system characterized by constant change, activity, or process. Therefore, the study on research dynamics was the study of research data from the past to present to find out the results that can reveal the past research and to support the research points and the future research direction which is relevant to Thailand Productivity Institute (2003) mentioning that the achievement of organizations was derived from the good selection and effective management of information technology. It was shown that the data were related to the direction and target of the organizations. Assessment and analysis revealed the actual management that would be able to improve and indicate the right target or right management direction as the basin management for sustainability. Also, research data are useful information and kinds of research for this area were conducted. If there were an effective research management system that could analyze the data relevant to the direction and the target, there would be a lot of useful information that was able to support the management in planning, decision making, and developing.

Songkhla Lake Basin Research Management Center (Faculty of Environmental Management and Research and Development Office, 2009) found the following issues; 1) a lot of data were being used in research management and planning but information in SLB had to be created continually with the right direction, and 2) main research issues of SLB should be created by issues or problems and questions relevant to the area. In addition, the results can be used to solve, conserve, and rehabilitate the SLB natural resources and environment. The study found redundancy and inconsistency of information that had been synthesized by specific objectives, not related to requirements of all user sectors. SLB researches did not support for integrated planning, decision making, and developing of the local area in the past. This study aimed to investigate the dynamics of SLB research in the south of Thailand. The investigation was divided into 3 parts; surveying and classifying data or research papers in the area, studying requirement of all sectors, and dynamics of SLB research according to based research findings of Hoffer *et al.* (2002), Diebold (1985), Partnership for rehabilitation of Songkhlalake Basin (2010), Prince of Songkla University and Health Systems Research Institute (2004), Roodenrijs (2009), Search Software Quality (2000) and Songkhla Lake Basin research management center (2010).

Materials and methods

Studied Area

The studied area locates in the south of Thailand, lying in 3 provinces of Phattalung, Songkhla, and Nakorn Si Thammarat (Fig 2). Data and useful information can be found for continual creating of the relevant research issues in this area.

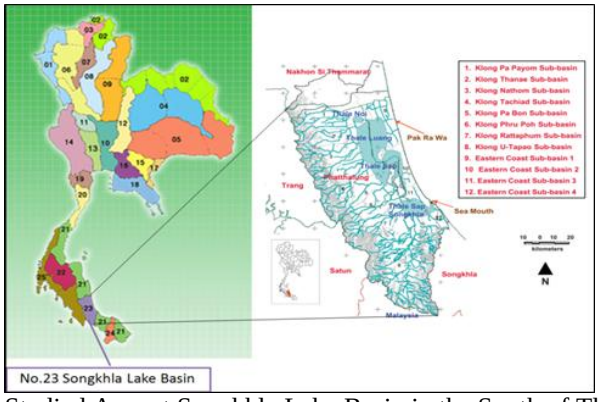


Fig. 2. Studied Area at Songkhla Lake Basin in the South of Thailand
Source: Department of Water Resources, 2006 and Institute for Social Sustainability, 2008

Focus Group Discussion

Focus group discussion with 8 groups of beneficiaries was taken along with the analysis of relevant documents. They were participants with various experiences and similar social backgrounds, such as researchers, lecturers, system administrators and staff. The objectives of focus group discussion were used to classify the research issues, to classify the research direction, and to design the requirement for the Research Management Information System in SLB that was a tool of data analysis (Fig 3).

Fig. 3. The Research Management Information System in SLB
Source: Tippayawong (2010)

Results and discussion

Current SLB Research Classification

According to the data, the total number of 1,284 research papers had been done in this area from 1970 to 2009 and was found in several organizations. The primary classification of research based on environment can be divided into 4 aspects; physical resources, biological resources, utilization of human values, and quality of life. Figure 4 shows that most research development focused on specific development. That is, the research for quality of life has the highest number of papers at 52.57%. This indicates the lack of balance in research for environment development. Besides, if analyzing into minor points, it was found that; (Fig 5).

For physical resources, the point of research for water has the highest number of papers at 72% while it was the least for air at 2%.

For biological resources, research on aquatic animals has the highest number of papers at 28% while research on benthos has only 4% of papers.

For utilization of human value, agriculture and livestock has the highest number of research at 63% but it was found least on the research on transportation at only 1%.

For quality of life, research on health showed the highest number of papers at 49% while research on politics and government, and security were found at 2% only.

From the study, it showed that there was a lack of balance in research development. This was due to the policy of research development and budget. Therefore, the specification on some aspects of research development could not solve the problem eventually and this affected the planning, decision making, and developing the SLB.

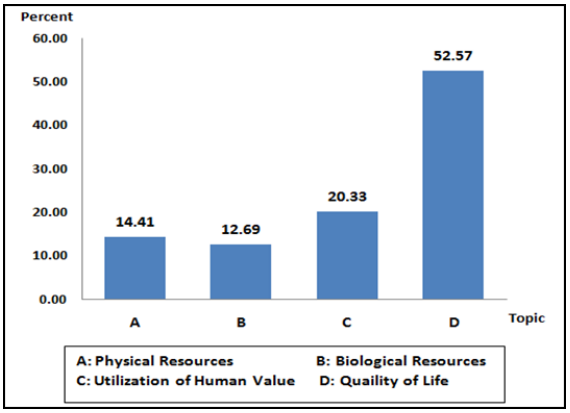
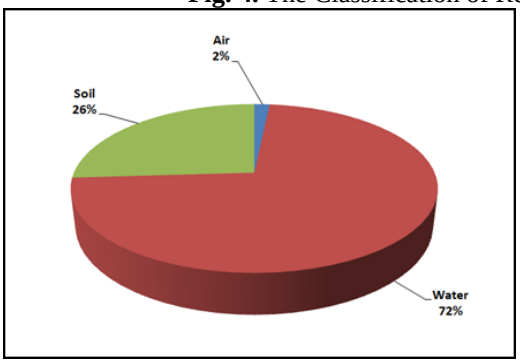
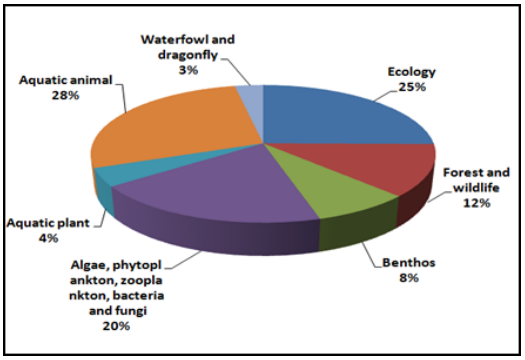


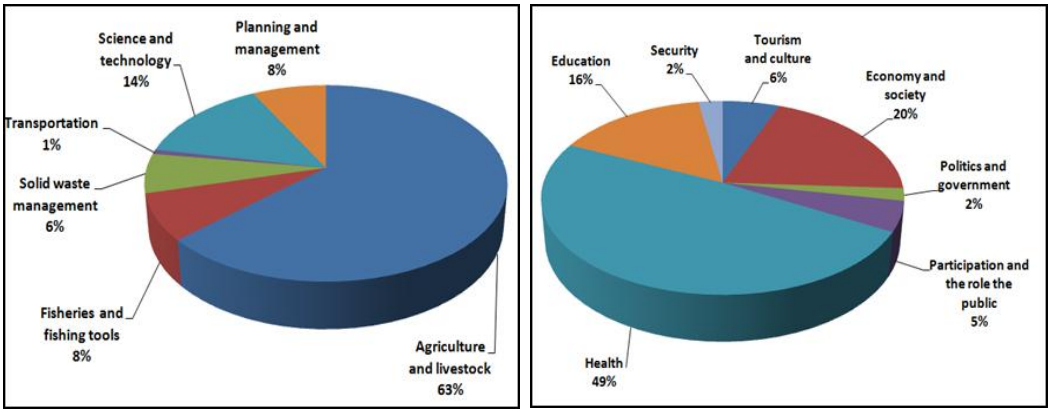
Fig. 4. The Classification of Research Based on Environment



A: Physical Resources



B: Biological Resources



C: Utilization of Human Value D: Quality of Life

Fig. 5. The Classification of Research Based on Sub-topic of Environment

The classification of research based on SLBMP can be divided into 6 topics as follows: 1) rehabilitation of SLB natural resource and biodiversity, 2) sustainable use of SLB natural resources, 3) pollution prevention and control, 4) restoration and conservation of arts and culture, historical and archeological sites, tourism sites and local wisdom, 5) enhancement of efficiency in SLB administration and management, with emphasis on public participation, and 6) others (health, science technology, education, economy and community). Figure 6 showed that the overall research development was not relevant to the SLB master plan and in minor points of development concerning provision of public land and freshwater were found not being studied. From above, it is showed that most research topics were not related to the SLB master plan at the number of 573 or the percentage of 44.60. Besides, the provision of public land sub-topic and freshwater pumped sub-topic were not studied. This shows no balance in the research development according to the SLB master plan. If analyzing into aspects (Fig 7), the research found that researches on mangrove forest and peat swamp forest in rehabilitation of SLB natural resources and biodiversity were done most at 42%. The research on sustainable use of SLB natural resources was done at the number of 67%. Nevertheless, these researches were not significant for the SLB master plan. Researches on reduction of discharged nutrient in the pollution prevention and control were done at the number of 41%. Researches on arts and culture, tradition, and local wisdom in terms of the restoration and conservation of arts and culture, historical and archeological sites, tourism sites, and local wisdom were studied at the percentage of 54. Researches on SLB database in the enhancement of efficiency in SLB administration and management, with emphasis on public participation were done most with the papers of 35%.

The above findings indicated the lack of balance in research development and integration with organizations. These related to the report of the SLBMP revision and improvement (2011) mentioning that there was not enough integration of the plan among each organization. This affected the development in divisions. Besides, budgeting and the problem solutions for fishery tools, nature decadence, coastal erosion, water pollution and, water management were still unclear.

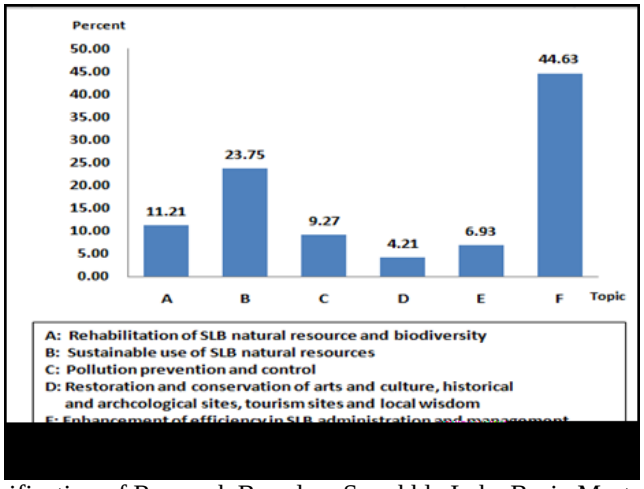


Fig. 6. The Classification of Research Based on Songkhla Lake Basin Master Plan (SLBMP)

A: Rehabilitation of SLB Natural

B: Sustainable Use of SLB Natural Resources and BiodiversityResources