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Experience and Lessons Learned Brief for Laguna de Bay

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Laguna Lake Development Authority

Figures



Figure 1. Map of Laguna de Bay

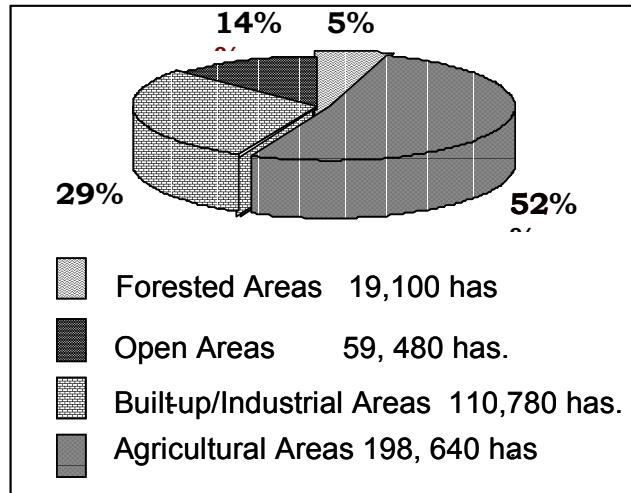


Figure 2. Watershed Land Use

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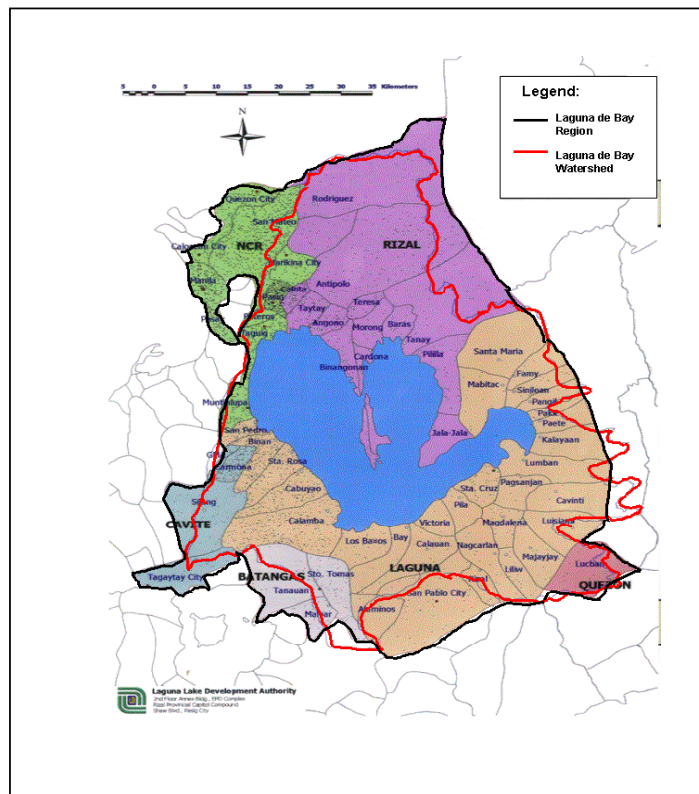


Figure 3. The Laguna de Bay Region

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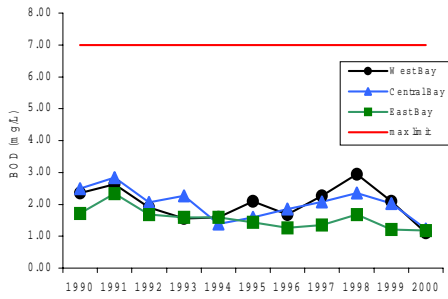


Figure 3A: Biochemical oxygen demand in Laguna de Bay.

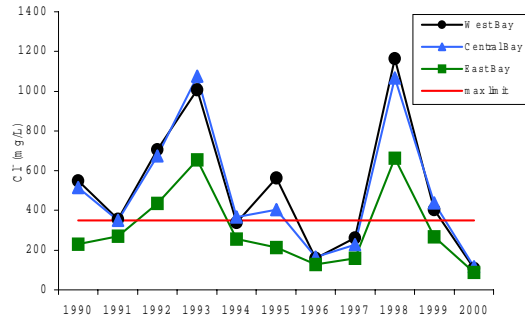


Figure 3B: Chloride concentration in Laguna de Bay.

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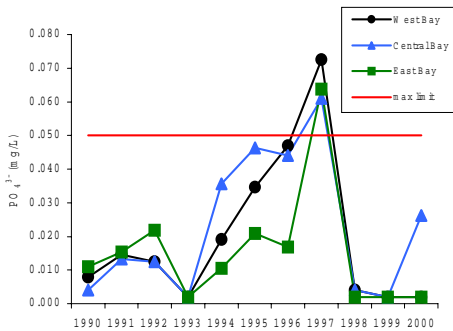


Figure 3C: Phosphate concentration in Laguna de Bay.

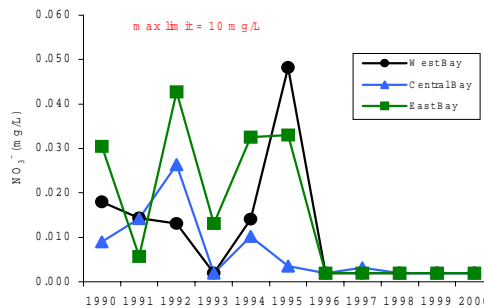


Figure 3D: Nitrate concentration in Laguna de Bay.

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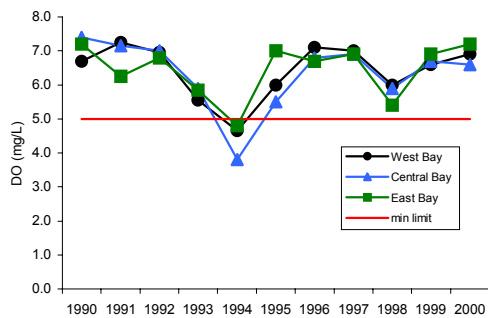


Figure 3E: Dissolved oxygen concentration in Laguna de Bay.

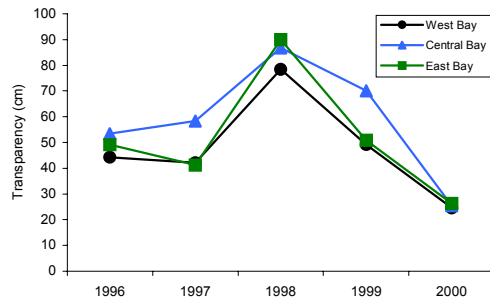
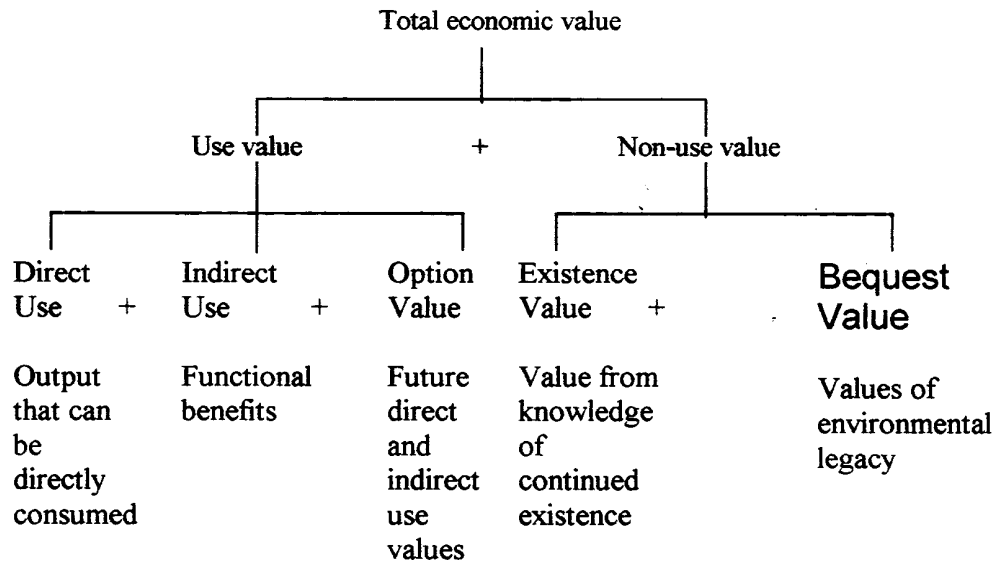


Figure 3F: Transparency of water in Laguna de Bay.

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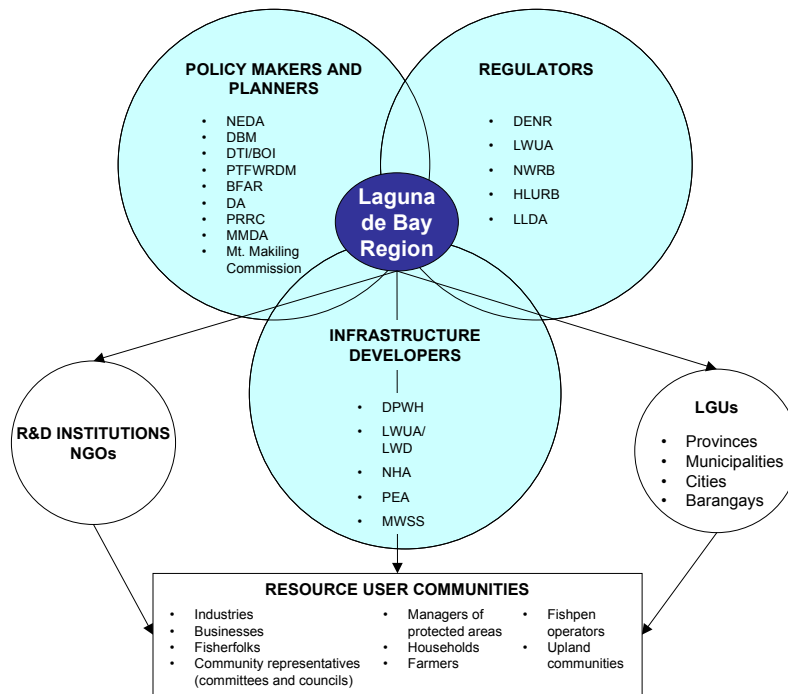
Figures 4A, B, C, D, E, F

Figure __
Total economic value



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Figure 5. Total Economic Value of Using Laguna de Bay's Resources



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Figure 6. Stakeholders of Laguna de Bay Watershed

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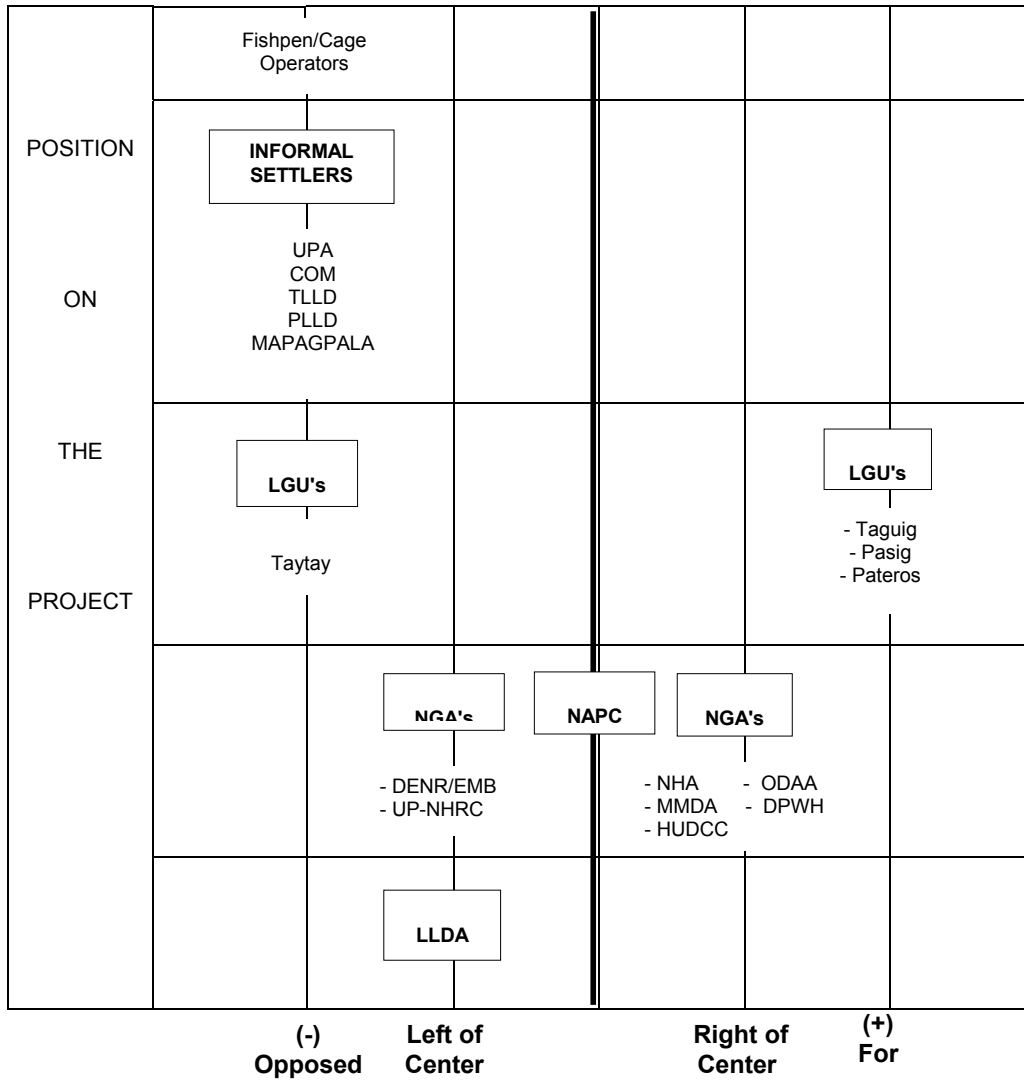


Figure 7. Force Field Map

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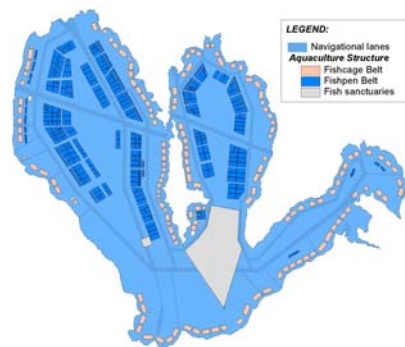
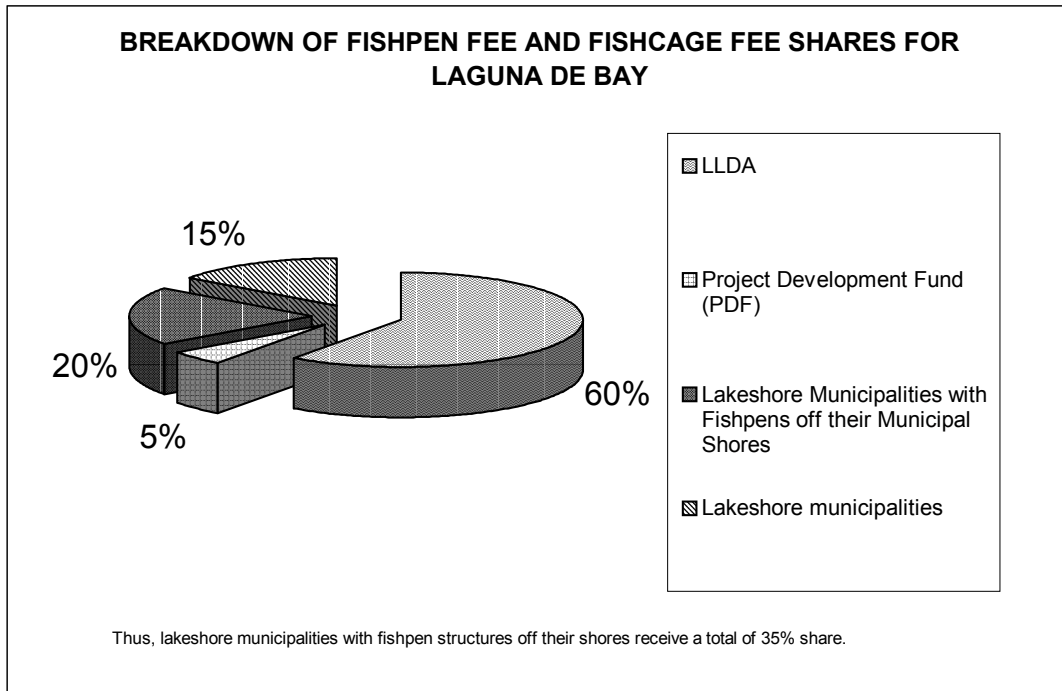
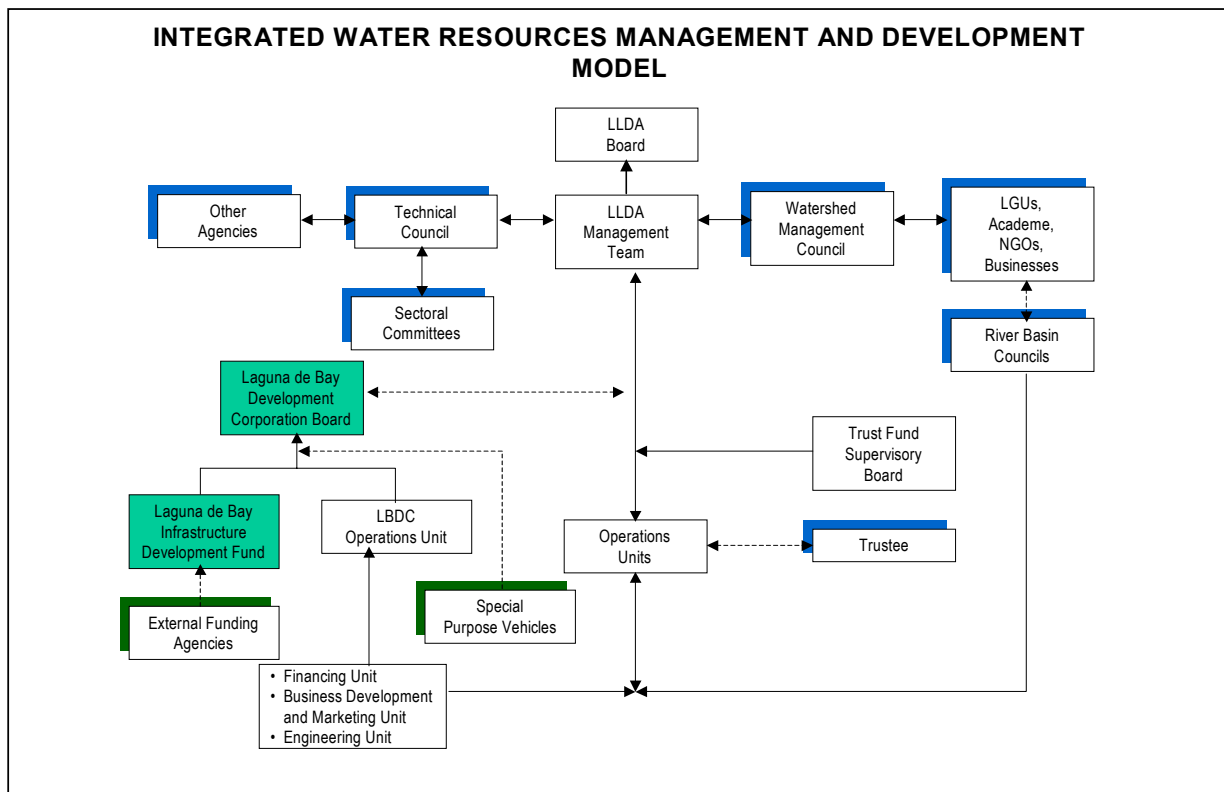


Figure 8. Zoning and Management Plan of Laguna de Bay



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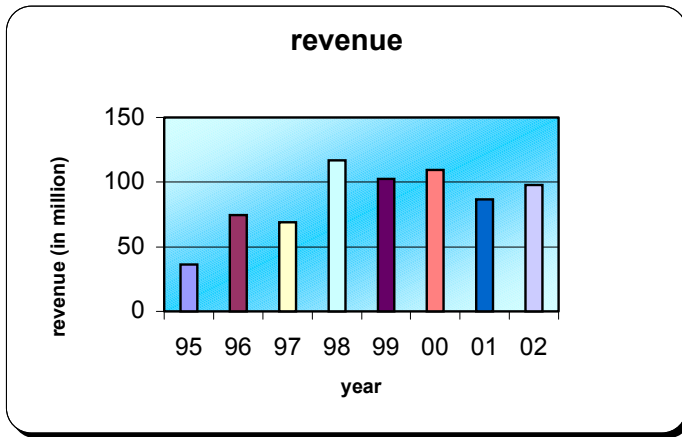
Figure 9. Sharing scheme for fish pen and fish cage fees (Santos-Borja 2002)



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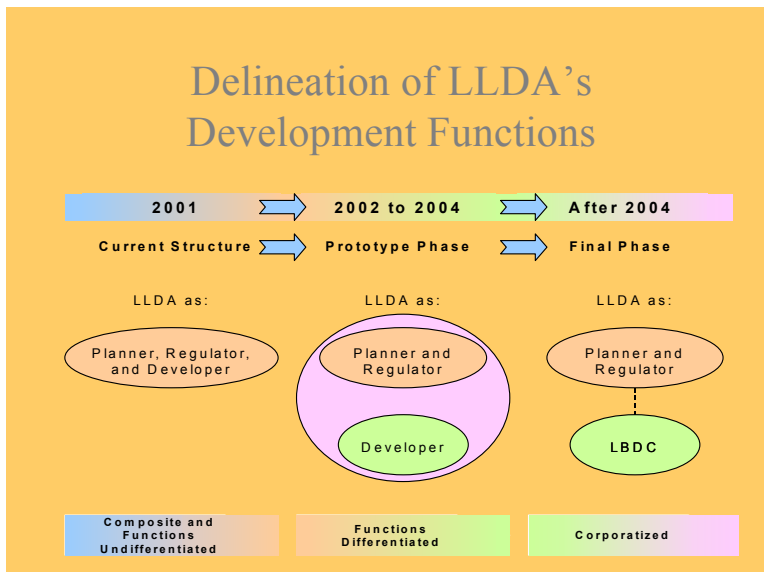
Figure 10. The LLDA Institutional Re-engineering Model (TetraTech EM Inc. and PNB Capital and Investment Corp. 2001)

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Figure 11. Annual revenue collection



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Figure 12. Evolution of the LLDA's development functions

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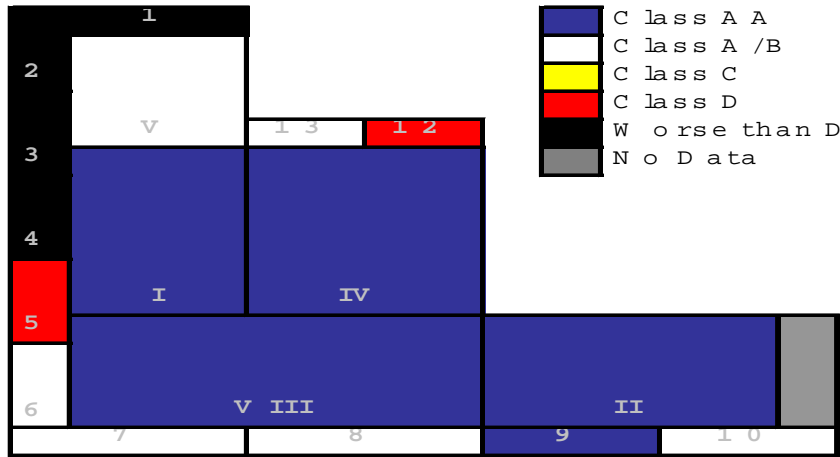


Figure 13. The Water Mondriaan

TABLES

Table 1: General Methodology for computing benefit from important direct use fo Laguna de Bay

Nature of Direct Use	Method used to compute benefits
Fisheries	Value of fish catch lost without the project
Irrigation	Additional cost of sourcing water without the project
Industrial cooling	No benefits computed, but the benefits equal the additional cost of adopting alternative technologies for industrial cooling
Domestic	Cost avoided in extracting drinking water from alternative source
Recreational activities	Value of recreational benefits lost without the project
Power generation	No economic benefit (for hydropower plants)

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Table 2. Water quality of Laguna de Bay and fish catch

Year	BOD	TSS	TDS	Fish Catch
1990	2.1	56	1,011	
1991	2.6	46	750	
1992	2	56	1,223	
1993	1.8	34	1,726	44,741
1994	1.6	67	734	18,020
1995	1.8	82	1,113	24,432
1996	1.6	48	368	13,060
1997	2.04	89	555	
1998	2.68	47	2,192	
1999	1.81	39	823	
2000	1.14			

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6 **Table 3 Total BOD Loading (MT/Day)**

No. of Firms*	1997	1998	1999	2000
222 firms	5,403.29	4,102.38	1,200.37	1,240.51
255 firms		4,431.71	1,515.78	1,278.75
429 firms			1,790.03	1,448.48
628 firms				2,309.08

7 Note: The increase in BOD loading for 2000 was due to the increase in the volume of
8 discharge (industrial park and residential subdivision) and increase in BOD concentration of
9 firms with water pollution cases. Only firms those with complete documents are counted.

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Table 4. Stakeholders of Laguna de Bay, areas of conflicts and response

Stakeholders' Category	Areas of /conflict	Response
Regulators	Coordination, development, monitoring, enforcement of land use plans, issuance of permits/clearance, standard setting, policy development on resource pricing and allocation, market-based instruments	Rationalizing the mandates/functions, Streamlining of their functions, procedures and requirements (e.g., one-stop-processing of permits), policy and program coordination
Policy makers, planners and coordinators	Inconsistencies in policy setting, and planning; lack of coordination; sectoral policy development approaches result in inconsistencies/contradictions/overlapping; lack of clear responsibility for formulating and implementing commonly acted policy	Institutionalize micro-watershed, participative environmental action planning at the LGU/agency level
Infrastructure developers	Uncoordinated infrastructure development planning by national/regional agencies in	Creation of enabling environment for

	relation to LLDA; inconsistency of infrastructure projects with the strategic policy direction for the management of the lake as set out in the Master Plan; limited public investments in environmental infrastructures	private sector participation with government as facilitator and catalyst
Research and development institutions	Lack of proper coordination with LLDA; dissemination of research outputs is limited	LLDA as clearing house to coordinate & integrated R & D activities to (i) ensure focused research agenda centered around priority research areas, (ii) minimize duplications and maximize outputs; dissemination of outputs to the widest audience/users as possible
Resource Users/ communities	In addition to using the resources of the lake and the watershed for common good (fisheries, irrigation, drinking water, navigation, recreation, etc.), the lake has served as recipient of waste.	Strengthening regulation, monitoring and enforcement; expansion of MBIs, enhanced IEC activities; application of user fee to households;
Local Government Units (LGUs)	Sometimes conflict with LLDA responsibilities in the management and maintenance of ecological balance within their territorial jurisdiction	Co-management of the watershed with LGUs and communities of stakeholders

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Table 5. Estimated BOD reduction in the lake due to EUFS implementation

Year	Cumulative No. of Firms	BOD Loading (in MT/year)	BOD Loading Reduction (%)
1997	222	5,403	
1998	255	4,432	24.08
1999	429	1,790	65.80
2000	628	2,309	19.08
2001	738	1,687	40.61
2002	914	791	61.30

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Table 6 Laws, Rules and Regulations for Laguna de Bay Basin Management

Objectives	Names of laws and ordinances
General Mandates on Lake Basin Management	1. Republic Act No. 4850

	<p>An act creating the Laguna Lake Development Authority, prescribing its powers, functions and duties, providing funds thereof and for other purposes. (July 18, 1966)</p> <p>2. Presidential Decree No. 813 Amending certain sections of Republic Act No. 4850, granting the LLDA the exclusive jurisdiction to issue permits for the use of all surface waters of the lake for any project or activity within the region. (October 17, 1983)</p> <p>3. Executive Order No. 927 Further amending the original charter of the LLDA granting the power to control and abate pollution within the Laguna de Bay Region. (December 16, 1983).</p>
General Mandates on Lake Basin Management	<p>4. Executive Order No. 121 Creating the Mt. Makiling Reserve Area and Laguna de Bay Commission. (August 24, 1993).</p>
	<p>5. Executive Order No. 149 Streamlining the Office of the President (December 28, 1993).</p> <p>6. Executive Order No. 349 Adopting the Mt. Makiling Reserve Area and Laguna de Bay Region Master Plan, providing for the implementation thereof and for other purposes. (July 18, 1996).</p>
Pollution Control	<p>1. Presidential Decree No. 984 Providing for the revisions of Republic Act 3931, commonly known as "The Pollution Control Law of the Philippines", and for other purposes (August 18, 1976).</p> <p>2. Presidential Decree No. 1586 Establishing an Environmental Impact Assessment System including Environmental Management-related measures and for other purposes (June 11, 1978).</p> <p>3. DENR Administrative Order No. 34, Series of 1990 Revised water usage and classification/water quality criteria amending section nos. 68 and 69 and Chapter III of the 1978 NPCC Rules and Regulations (March 20, 1990).</p> <p>4. Republic Act No. 6969 An act to control toxic substances and hazardous nuclear wastes, providing penalties for violations thereof and for other purposes (July 23, 1990).</p> <p>5. DENR Administrative Order No. 26-92, Series of 1992 Amending Memorandum Circular No. 02 Series of 1981: Appointment/Designation of Pollution Control Officers (June 29, 1992).</p>
	<p>6. Resolution No. 7, Series of 1993 Approving new schedule of processing fees for environmental permit/clearance (November 4, 1993).</p>
	<p>7. DENR Administrative Order No. 35-91, Series of 1993 Revised effluent regulations of 1990 revising and amending the effluent regulations of 1982 (December 9, 1993).</p> <p>8. Resolution No. 24, Series of 1996</p>

	<p>Adoption of Department Administrative Order (DAO) no.30, section 3, paragraph 3.3 (C) of the Department of Environment and Natural Resources (DENR) as part of the policy of the Laguna Lake Development Authority (LLDA) (September 26, 1996).</p> <p>9. Resolution No. 25, Series of 1996 Implementation of the Environmental User Fee System in the Laguna de Bay Region and approval of its work and financial plan for CY1997. (November 19, 1996).</p> <p>10. Resolution No. 33, Series of 1996 Approving the rules and regulations implementing the Environmental User Fee System in the Laguna de Bay Region (December 19, 1996).</p> <p>11. Resolution No. 41, Series of 1997 Adoption of the definition of development activities per DENR Administrative Order No. 96-37 and integration of said definition in the LLDA rules and regulations thereby clarifying further the development activities required to secure LLDA clearance. (March 21, 1997).</p>
Pollution Control	<p>12. Resolution No. 42, Series of 1997 Approving the administrative fines for violations of LLDA Rules and Regulations (March 21, 1997).</p>
	<p>13. Memorandum Circular No. 2, Series of 1997 Inspection and investigation of establishments compliance to environmental quality standards and pollution control rules and regulations (May 2, 1997).</p> <p>14. Resolution No. 64, Series of 1997 Prescribing new schedule of processing fees and other fees for environmental permits/clearances within the Laguna de Bay Region. (December 23, 1997).</p> <p>15. Memorandum Circular No. 98-8 Ensuring safe navigation in specified lake areas (December 10, 1998).</p> <p>16. Resolution No. 104, Series of 1999 Adoption of Department Administrative Order No. 51, Series of 1998, pertaining to the Industrial Ecowatch System and its implementing guidelines, of the Department of Environment and Natural Resources (DENR) as part of the policy of the Laguna Lake Development Authority (LLDA) (March 25, 1999).</p> <p>17. Memorandum Circular No. 99-02 Amendment of certain provisions of Memorandum Order No. 97-84, Series of 1997, concerning the simplified requirements for Accrediting Pollution Control Officers (March 29, 1999).</p> <p>18. Resolution No. 106, Series of 1999 Approving the policy guidelines governing all industrial estates/parks within the Laguna de Bay Region (April 25, 1999).</p> <p>19. DENR Administrative Order No. 99-17, Series of 1999. Updating Department Administrative Order No. 35, Series of 1990 otherwise known as the Revised Effluent Regulations of 1990, revising and amending the effluent regulations of 1982 (July 8, 1999).</p>
Fishery Management	<p>1. Executive Order No. 240</p>

	<p>Creating Fisheries and Aquatic Resources Management Councils (FARMC's) in barangays, cities and municipalities, their composition and functions (April 28, 1995).</p> <p>2. Memorandum Circular No. 96-60 Policy guidelines for the fishcage operation in the Laguna de Bay ((April 28, 1995).</p> <p>3. Rules and Regulations Implementing the Revised Laguna De Bay zoning and Management Plan (ZOMAP) (January 25, 1996).</p> <p>4. Resolution No. 9, Series of 1996 Amending Section 4.3 of the Rules and Regulations implementing the Revised Laguna De Bay Fishery Zoning and Management Plan (ZOMAP) of 1996. (February 29, 1996).</p> <p>6. Resolution No. 15, Series of 1996 Approving the implementation of the modified sharing of fishpen fee per R.A. 4850, as amended (June 27, 1996).</p>
	<p>7. Resolution No. 26, Series of 1996</p> <p>Approving the co-management approach to attain sustainability of the Seven-Crater Lakes of San Pablo City by deconcentrating certain administrative functions of the LLDA (November 19, 1996).</p>
	<p>8. Resolution No. 27, Series of 1996 Approving the policy guidelines for fishcage operation in the Laguna de Bay (November 19, 1996).</p> <p>9. Resolution No. 28, Series of 1996 Approving the policy guidelines for public bidding of the remaining free fishpen area in the Laguna de Bay (November 19, 1996).</p> <p>10. Memorandum Circular No. 97-5 Fishpen block verifications (July 15, 1997).</p> <p>11. Resolution No. 70, Series of 1998 Approving the policy framework on the use of Seven-Crater Lakes of San Pablo City (March 30, 1998).</p> <p>12. Memorandum Circular No. 2, Series of 1998 Moratorium in the construction of fishcages in Laguna de Bay (August 19, 1998).</p> <p>13. Memorandum Circular No. 98-06 Policy guidelines for fishcage operation in the Laguna de Bay (October 7, 1998).</p> <p>14. Memorandum Circular No. 7, Series of 1998 Policy guidelines in the collection of annual fishpen fees for Winning bidders.</p> <p>15. Memorandum Circular No. 1, Series of 1999 Policy guidelines for fishpen registration in Laguna de Bay (January 25, 1999).</p>
<p>Shoreland Management</p>	<p>1. Section 41 (11) of Republic Act No. 4850</p> <p>2. Memorandum Order No. 204 Creating an effective committee to oversee the implementation of the short and long term plans for the Mt. Makiling Reserve Area and Laguna de Bay Commission (April 27,</p>

	1994).
	<p>3. Resolution No. 10, Series of 1995 Asserting LLDA's authority and exclusive jurisdiction in Laguna de Bay concerning issuance of permits for reclamation projects and disallowing any non-environmentally-feasible activities in the lake (June 29, 1995).</p> <p>4. DENR Administrative Order No. 27-95 Moratorium on the acceptance and processing of all public land applications covering areas immediately adjacent to the Laguna Bay Basin (November 17, 1995).</p> <p>5. Resolution No. 23, Series of 1996 Approving the rules and regulations implementing section 41 (11) of R.A. no.4850, as amended defining and regulating the use /occupancy of Laguna de Bay shoreland areas (December 14, 1996).</p>
	<p>6. Resolution No. 39, Series of 1997 Approving the increase of rates for the survey of shorelands within the Laguna de Bay Region and areas for aquaculture operation (February 27, 1997).</p> <p>7. Resolution No. 110, Series of 1999 Amending the Administrative Fine for violation of LLDA Rules on reclamation/landfilling of any portion of the Laguna de Bay and its shoreland</p>
	<p>8. Resolution No. 113, Series of 1999</p>
	<p>Amending Board Resolution No.23, Series of 1996, by adding the implementing guidelines governing the lease of the Laguna de Bay shoreland areas</p> <p>9. Resolution No. 42, Series of 1997 Approving the administrative fines for violations regarding LLDA rules and regulations.</p>
Ferry System Operation Management	<p>1. Resolution No. 66, Series of 1998 Approving the navigational route for the ferry system to be introduced in Laguna de Bay (January 29, 1998).</p> <p>2. Resolution No. 67, Series of 1998 Approving the policy framework towards operationalizing a ferry system in Laguna de Bay (February 26, 1998).</p> <p>3. Resolution No. 74, Series of 1998 Approving the policy guidelines on the operation of a ferry system in the Laguna de Bay Region (June 19, 1998).</p> <p>4. Resolution No. 75, Series of 1998 Ratification of policy guidelines on the operation of a ferry system in the Laguna de Bay (July 2, 1998).</p> <p>5. Resolution No. 81, Series of 1998 Approving the implementing rules and regulations governing the operation of a ferry system in the Laguna de Bay Region (September 12, 1998).</p>

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Table 7. Sources of corporate revenues

	1995	1996	1997	1998	1999	2000	2001	2002
	(in Million Pesos)							

Revenue from operations								
Fishpen/Fishcage Fees	17.873	44.571	17.054	28.505	25.856	36.938	22.901	39.766
Fishpen Repairs/Processing	0.121	0.012	-	0.008	0.022	0.008	0.013	0.211
Survey Fee Fishpen	0.039	0.040	0.404	0.718	0.326	0.816	0.642	0.926
Barging Fees	0.380	0.437	0.676	0.595	0.352	0.418	0.470	0.046
LLDA Clearance Fees/Air Pollution	7.175	9.210	11.903	16.537	19.746	17.844	17.060	7.192
Discharge Permit Fees	-	-	6.660	14.798	12.490	13.334	11.964	21.376
Laboratory Fees	0.370	0.398	0.223	0.650	0.225	0.126	0.341	0.625
Admin Fines Pollution	1.395	5.914	16.114	33.217	24.649	20.004	14.080	13.762
Shoreland Management Fees	-	-	-	-	0.112	1.225	2.133	2.194
Survey Fees Land	-	-	-	-	-	-	0.055	0.193
Water Abstraction	-	-	-	-	0.184	1.158	1.607	1.844
Receipts from Market	0.488	0.421	0.036	0.025	0.064	0.389	-	0.026
Interest on Marketable Securities	8.388	11.770	12.470	18.873	15.776	13.940	13.985	7.484
Interest on Other Bank Account	0.073	0.143	0.121	0.235	0.167	0.207	0.169	0.103
Miscellaneous	0.261	1.586	3.482	2.937	2.414	3.256	1.394	2.278
TOTAL	36.563	74.502	69.143	117.098	102.383	109.663	86.814	98.026