

Ministry of Environmental Conservation and Forestry
Forest Department



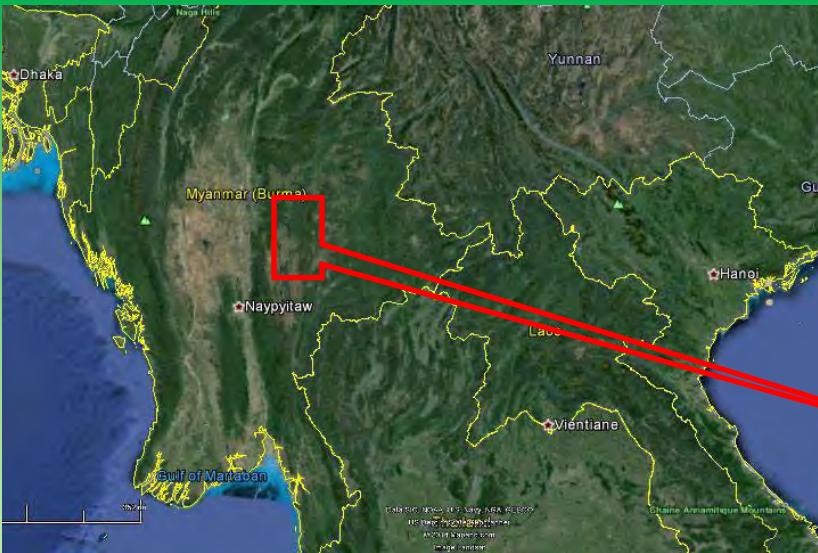
5 year Action Plan for the Sustainability
of
Inle lake and Environmental Conservation
in Myanmar



October, 2014

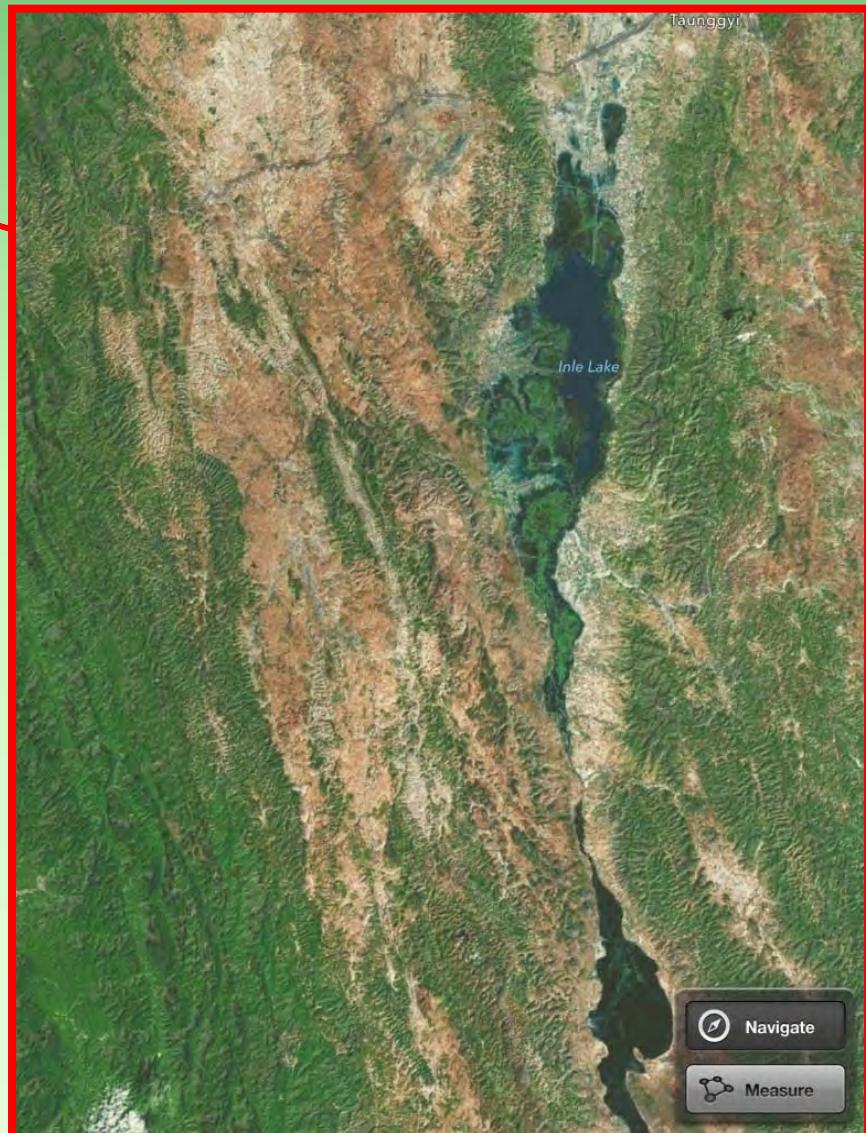
Inle Lake

- Inle Lake, located in Shan State is a shallow, high-altitude fresh water body which is the second-largest lake in Myanmar.
- It is home to a number of endemic species as well as being a stopping-point for migratory birdlife.
- The lake is reknowned for a number of traditional cultural and livelihood practices, which have made it one of the main attractions for Myanmar's booming tourism industry.
- Inle Lake is suffering environmental degradation from the combined effects of
 - unsustainable resources used
 - increasing population pressures,
 - climate change and
 - rapid tourism development.
- The original Lake area was 271 km², but gradually decreasing ,
- In the year 2007 the lake area had decreased to 163.2km², of which only 62.2km² remained as open water surface area.



Inle Lake

- Located in Southern Shan State
- Second largest fresh water lake in Myanmar
- *Inle Lake wildlife sanctuary* is established in 1985 with the extent of 247.48 square miles.
- It is an **ASEAN Heritage Park** (December, 2003}



Traditional culture and livelihood practices



**Phaung-daw-Oo , Buddha's Relic
Pagoda**

Leg-rower





Floating Gardens



Tour in the lake



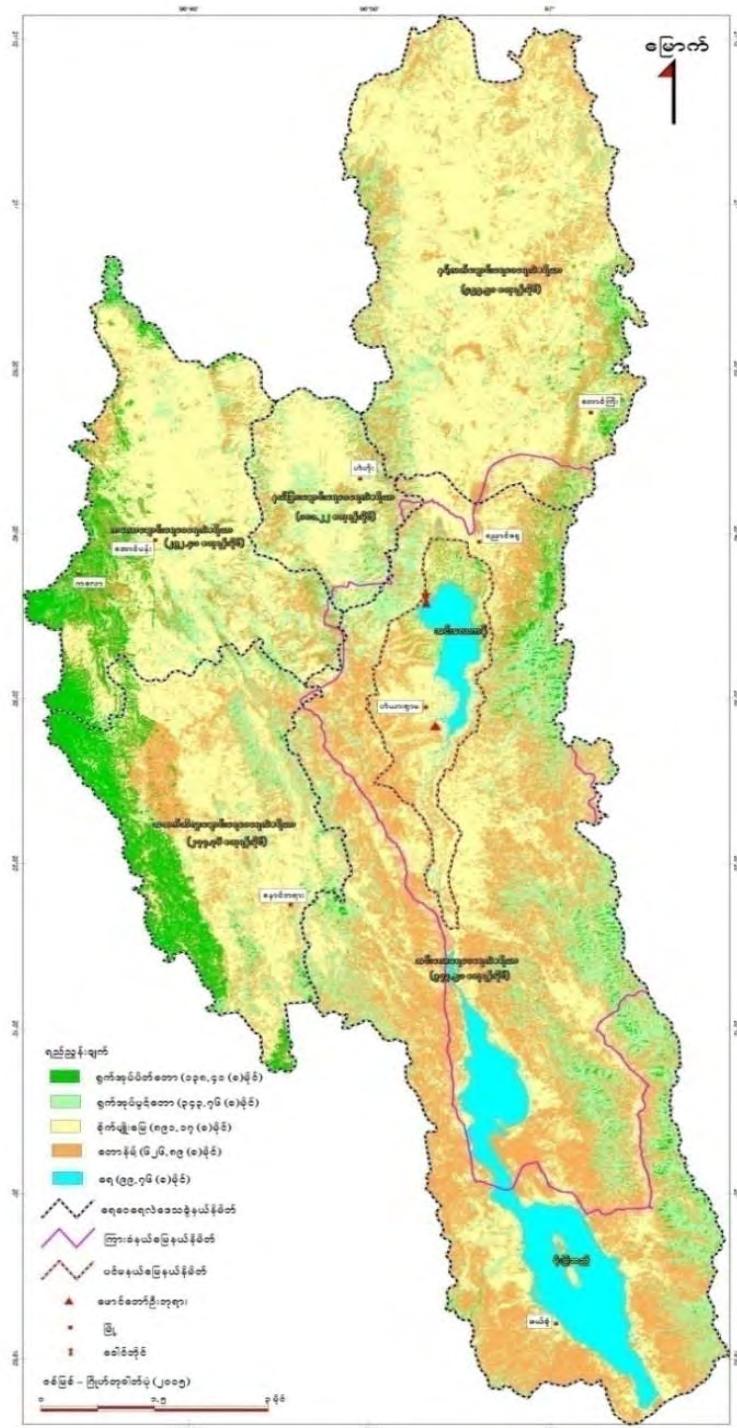
**Collecting water hyacinth
to make the floating
garden**



Forest cover in Inle lake watershed (2010)

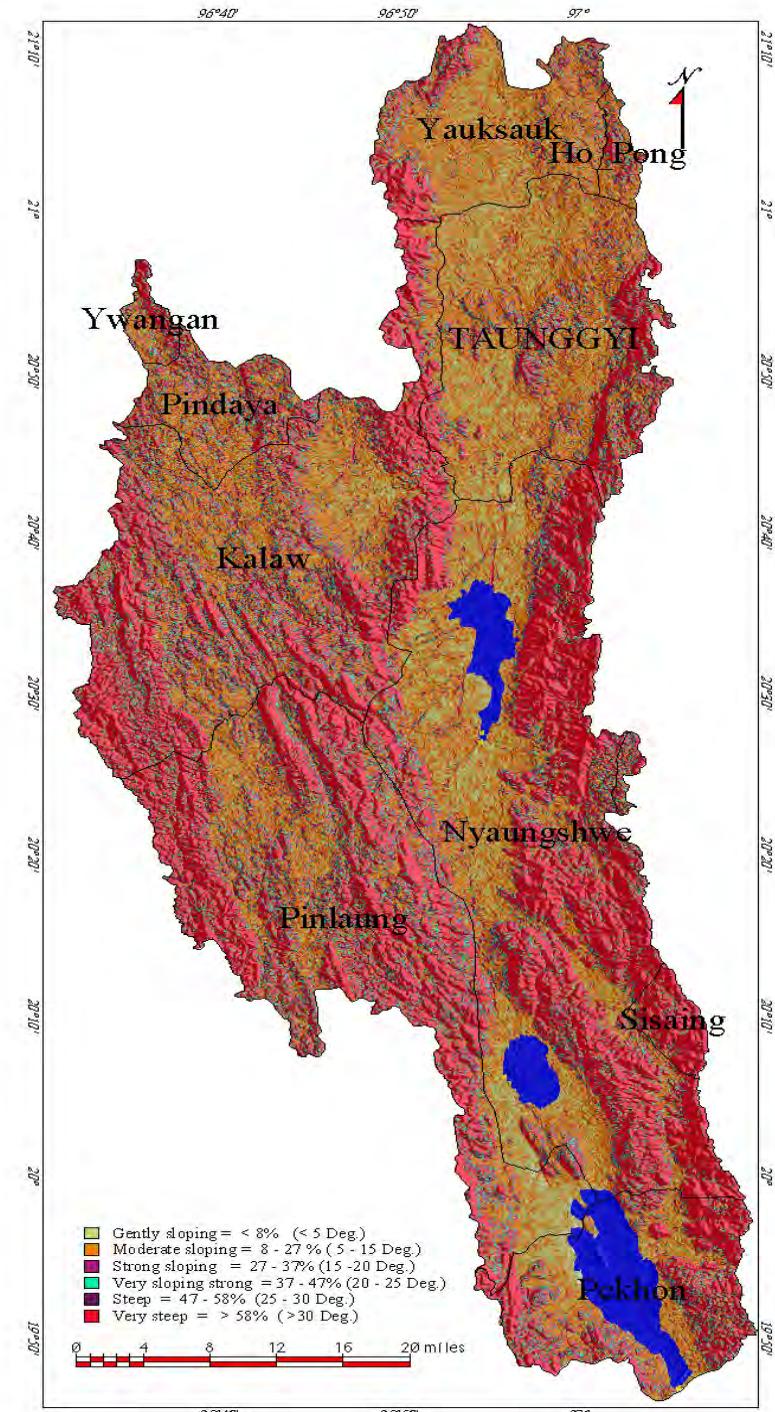


Source: Planning and Statistic Division, Forest Department



Slope Classification Map of Inle Lake watershed

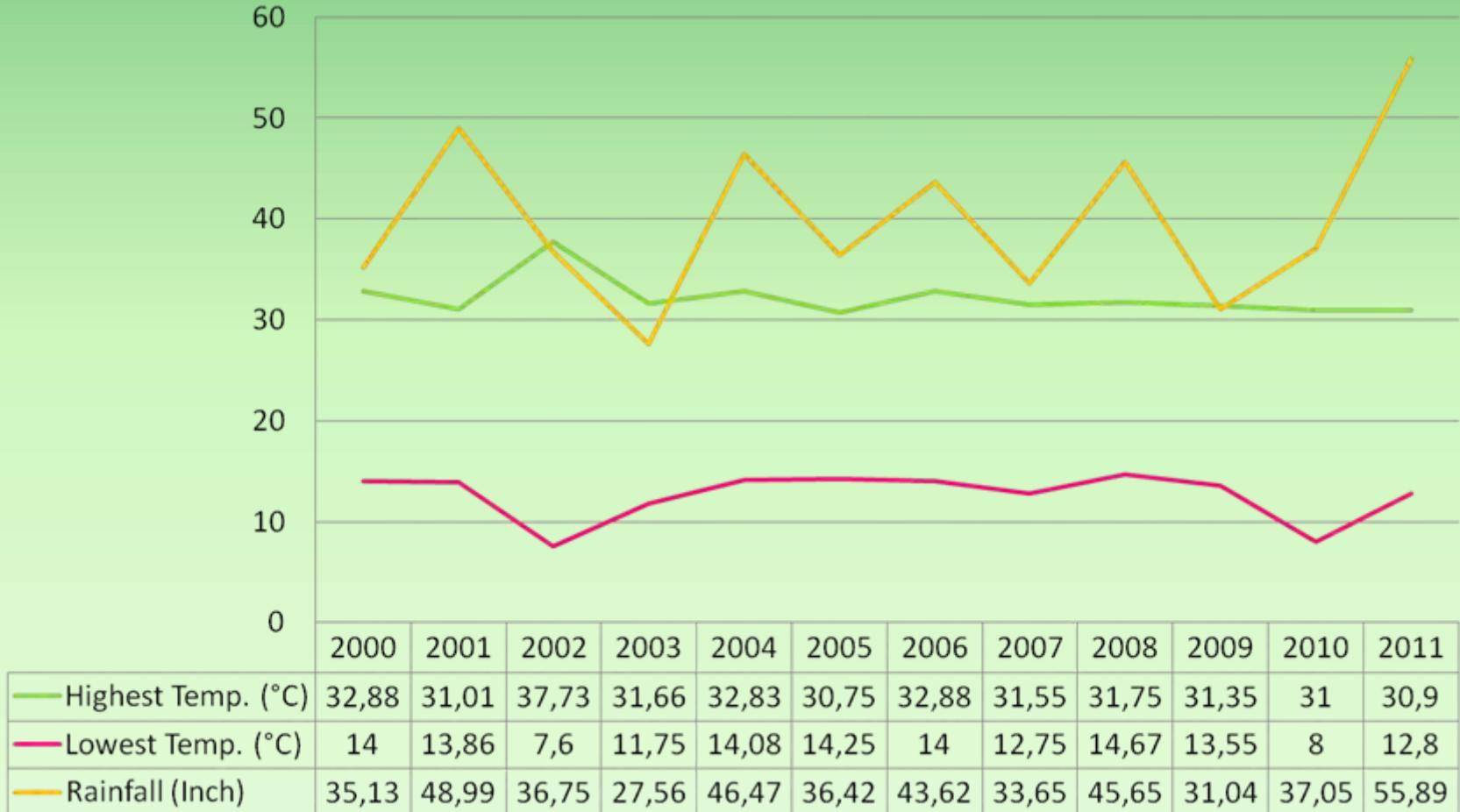
Gently sloping	<8%	(<5Deg.)
Moderate sloping	8-27%	(5-15Deg.)
Strong sloping	27-37%	(15-20Deg.)
Very Strong sloping	27-37%	(15-20Deg.)
Steep	47-58%	(25-30 Deg.)
Very steep	>58%	(>30 Deg.)



Slope class area in Inle watershed

No.	Township	Area (acres)						Grand Total
		<5°	5 - 15°	15 - 20°	20 - 25°	25 - 30°	> 30°	
(<8%)	(8 - 27%)	(27 - 37%)	(37 - 47%)	(47 - 58%)	(>58%)			
1	Kalaw	22955	82178	35045	28575	22703	86336	277791
2	Sisaing	210	1140	717	775	798	10096	13735
3	Nyaungshwe	63506	103640	28472	22967	19983	132538	371105
4	Taunggyi	36937	74265	17596	10588	6724	19390	165501
5	Pinlaung	20990	63110	29133	25775	21690	92085	252782
6	Pindaya	4048	16664	6903	4970	3226	5355	41167
7	Pekhon	21357	28826	8935	7093	5936	24916	97063
8	Yauksauk	19300	41716	8557	4726	2903	9577	86779
9	Ywangan	855	3188	1257	928	692	2470	9390
10	Ho Pong	1072	4212	1472	835	486	1012	9089
Grand Total		191230	418940	138086	107231	85141	383774	1324403
Percent		14%	32%	10%	8%	6%	29%	100%

Highest and Lowest Temperature and Rainfall in Inle Lake over the last 14 years



Source: Department of Meteorology and Hydrology

Population in Inlay Lake area over the last 14 years

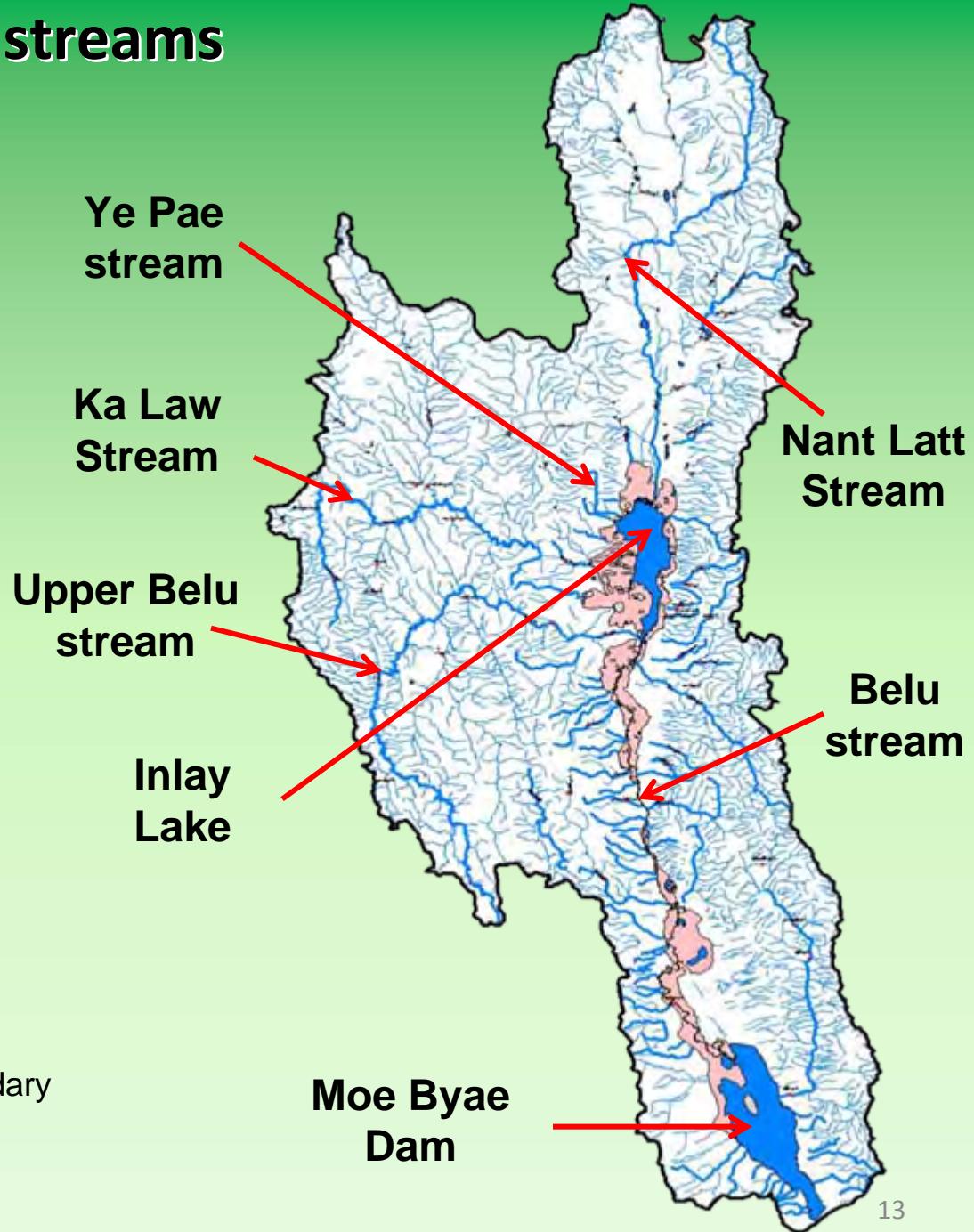


Population in the Inlay Lake watershed in 2011

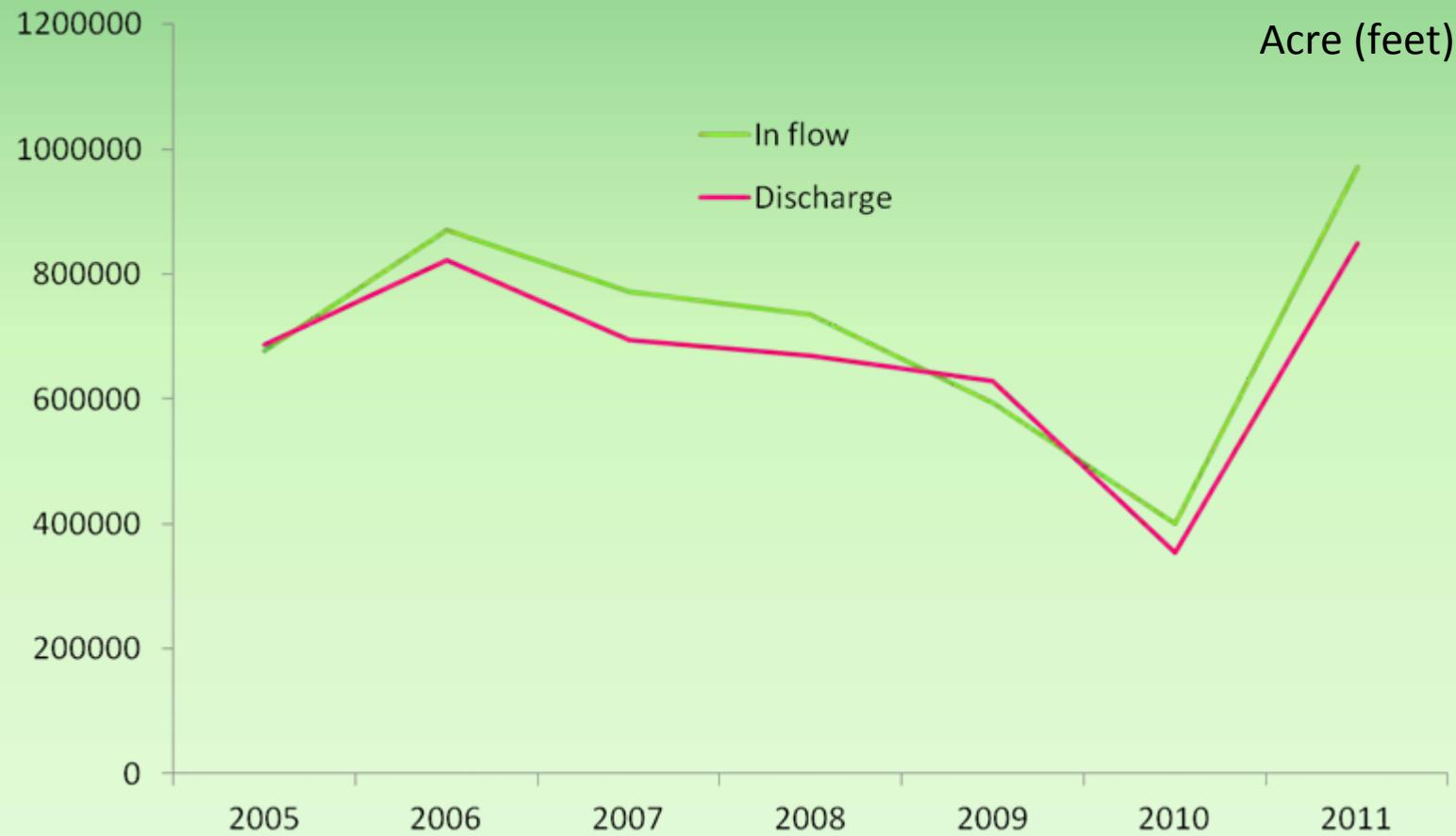


Map showing the major streams flow into Inlay

Stream name	Watershed area (sq. miles)
Nant Latt	455.5
Upper Belu	277.36
Ka Law	292.41
Ye Pae	101.22
Total	1126.49



Inflow and Discharge from Inlay Lake over the last 6 years



Source: Department of Irrigation

Major drivers for environmental deterioration in Inle Lake watershed area



National Workshops to explore ways and methods to restore the environmental condition of Inle Lake

- From 1st to 2nd July, 2010, a workshop had been conducted at the Forest Department to restore the environmental condition of Inle Lake with 5 Objectives.
- Representatives from line ministries, academic institutions, UN organizations, INGOs, NGOs, Private sectors and media, altogether (166) participants were participated in this workshop.
- From 12th to 14th July, another workshop had been conducted at Taung Gyi Township, Shan State to explore ways and methods to restore the Inlay Lake, altogether (207) participants were participated in this workshop.



Organizing a committee to formulate a 5 year action plan to conserve and restore Inle Lake

- A committee was organized to formulate a 5 year action plan based on the outcomes of the Workshops.
- Under the guidance of this committee, the Action Plan for the Sustainability of Inle lake and Environmental Conservation (from 2010 to 2011), was formulated.
- Committee members are
 - Director General of the Forest Department Chairman
 - Rector, University of Forestry Vice Chairman
 - Deputy Director General of the Forest Department Vice Chairman
 - 5 Directors from the Forest Department Members
 - 4 Directors from line Departments
(Agri, Irrigation, Settlements and Land Records, Fisheries) Members
 - General Administration Department (Shan State) Members

Organizing a national level committee for the sustainability of Inle lake and environmental conservation

In order to oversee and monitor the 5 year action plan for the Sustainability of Inle lake and Environmental Conservation, a national level committee has been organized by Cabinet on 21.6.2011 with the following members.

- Union Minister, MOECAF Chairman
- 4 Deputy Union Ministers Member
- 3 Ministers from local Government (Shan State) Member
- 5 Director Generals / Managing Directors Member
- Secretary (Shan State Government) Member
- Director General of the Forest Department Secretary
- Deputy Director General of the Forest Department Joint Secretary

List of relevant departments in 5 Year Action Plan

1. Forest Department
2. Department of Irrigation
3. General Administration Department (Township Municipality)
4. Settlements and Land Records Department
5. Department of Agriculture
6. Department of Fisheries
7. Department of Meteorology and Hydrology
8. Department of Health
9. Department of Basic Education (Upper Myanmar)
10. Myanmar Hotel and Tourism Services
11. Department of Livestock & Breeding
12. Municipality of ***Nyaung Shwe Township***

5 Major Activities in 5 year Action Plan

1. Watershed conservation, maintaining streams flow conditions and preserving area of open water body
2. Preventing soil erosion and sedimentation
3. Conducting activities for extension, capacity building and technical cooperation
4. Biodiversity conservation

5. Conducting activities to improve socio-economic status of local communities
In order to restore the Inle Lake ecosystems and its watershed, the 5 year Action Plan for the Sustainability of Inle Lake and Environmental Conservation has been implementing by MOECAF and line ministries in the close collaboration of local Government (Shan State) and with the participation of local communities and relevant stakeholders under the guidance of the National Committee for Inle Lake Conservation.

Approach to implement the 5 Year Action Plan

- The whole watershed area has been divided into three zones;

Core zone 72, 100 acres

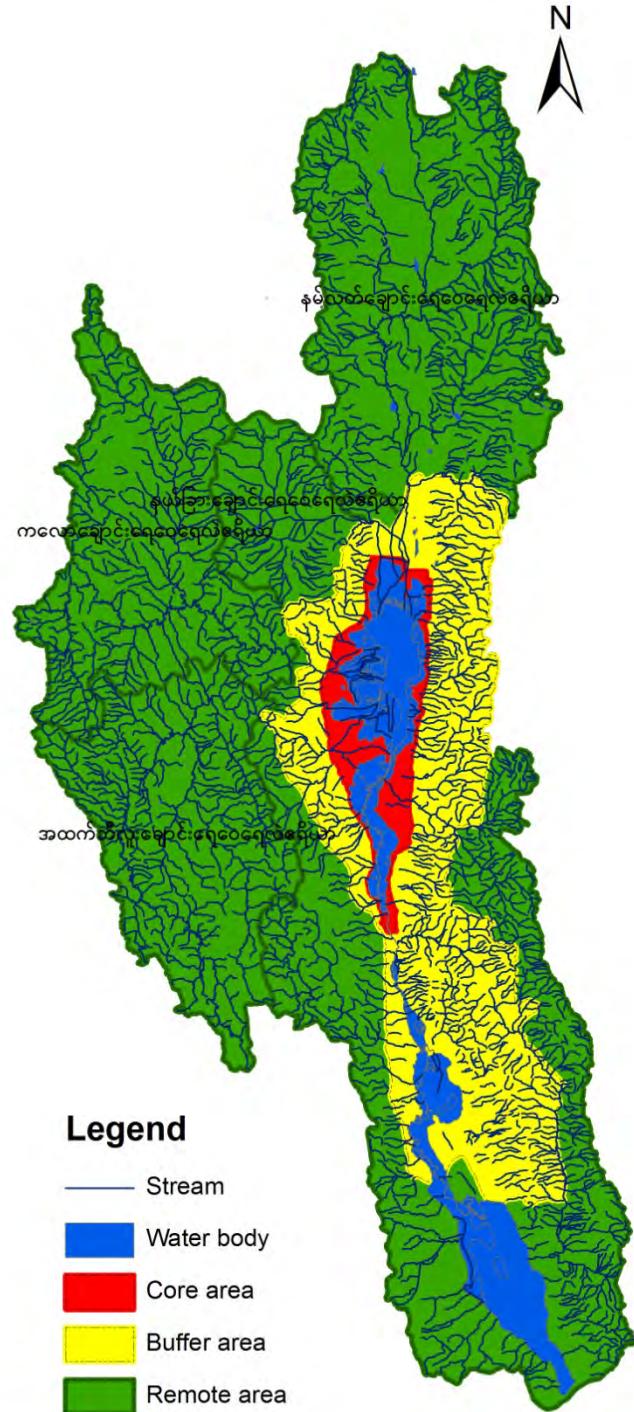
(the whole Inlay lake area)

Buffer zone 281, 800 acres

(the whole Nyaung Shwe township area)

Headwater area 1, 004, 180 acres

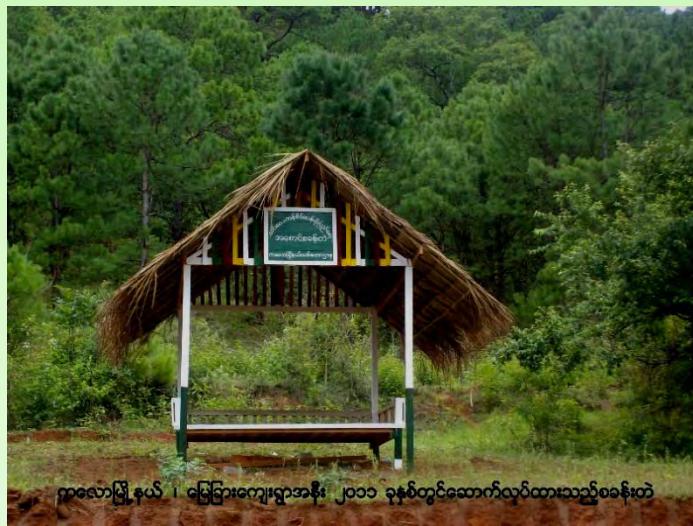
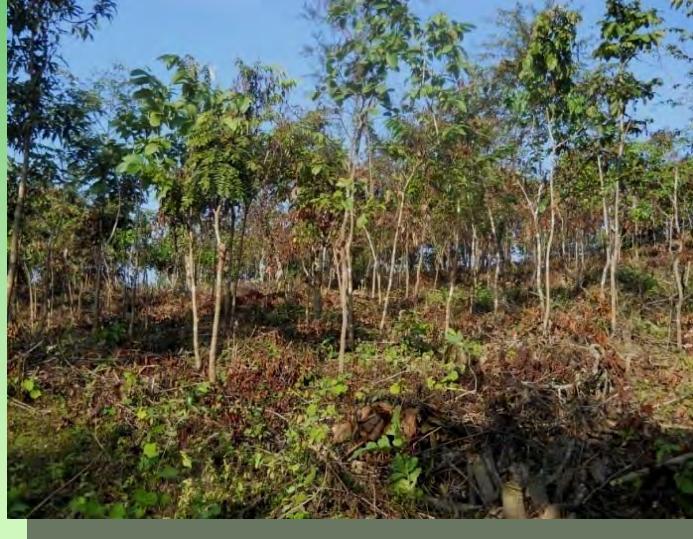
(the remaining area in Inlay Lake watershed)



Implementation Status on 5 Years Action Plan

Forest Department

Natural forest protection, natural regeneration and guard post



Establishing forest plantation, nursery and agro-forestry plantation



Gully Control and constructing check dams



ကလောင်းနယ်၊ ၂၀၁၀ - ၂၀၁၁ ခုနှစ် အိုဝါယာကောင်ပြောဖြော်ပြန်လုပ်ငန်း (ကမ်းပြည်တော်ပြည်တော်)



ကလောင်းနယ်၊ ၂၀၁၀ - ၂၀၁၁ ခုနှစ် အိုဝါယာကောင်ပြောဖြော်ပြန်လုပ်ငန်း (ပြောဖြော်ဆင်ရွက်ပြုလုပ်ငန်း)



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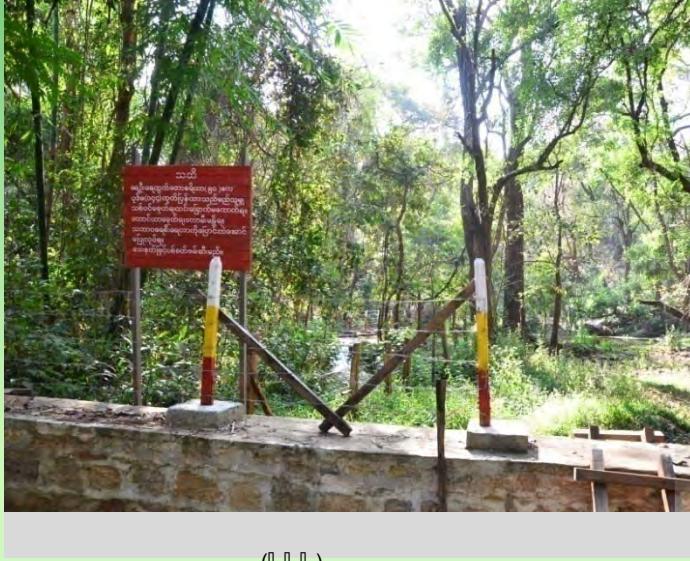


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On farm soil and water conservation and conducting trainings



Protecting natural springs, providing fuel efficient stove and environmental awareness programs



(၁။။)



ကလေးမြို့နယ်၊ ၂၀၁၁ - ၂၀၁၁ ရွှေနံပါတ်အား သိမ်းသိမ်းတော်း။



ပြည်ထဲမြို့နယ်၊ ၂၀၁၁ - ၂၀၁၁ ရွှေနံပါတ်အား သိမ်းသိမ်းတော်း။ (ကျော်လောင်းကျော်)



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Micro Finance program to members of Community Forest User Groups



On farm soil conservation activities



Department of Irrigation

Constructing a Geotube barrier to enhance water storage in the Inlay Lake



Monitoring water quality and discharge in the Inlay Lake



Collecting water samples



Discharge monitoring station

Constructing check dams



Removing sediments along the water ways and in the Inlay lake



Removing sediments along the water ways and stabilizing stream banks



Removing old floating gardens and aquatic weeds



Settlements and Land Records Department

Boundary demarcation and measuring way points along water way



Monitoring and controlling further expansion of Floating Gardens in the Inlay Lake



Nyaung Shwe Township Municipality

စည်ပင်သာယာရေးဦးစီးဌာန(ရုံးချုပ်)တောက်ပုံငွေဖြင့်ဆောင်ရွက်သော ကျေးလက်ရေရှိရေးမှတ်တမ်းရီတုပုံများ



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မကျည်းကုန်းကျေးဇား စီမံစစ်းရေသွယ်ခြင်းလုပ်ငန်း



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နောင်ကင်ကျေးချာ စီမံစစ်းရေသွယ်ခြင်းလုပ်ငန်း



Department of Agriculture

Composting, Earthworm farming to produce organic fertilizer



Application of organic pesticide and fertilizer in Tomato floating gardens



Supporting materials for Tomato organic farming by Minister for Inthar



Prime Minister (Shan State) inspecting the Tomato organic farming



Successful Tomato organic farming on floating gardens



Collecting aquatic weeds from the Inle Lake for organic farming in floating gardens



Making contour bands at sloping land cultivation area



Inle Lake Conservation and Rehabilitation Project (UNDP Myanmar)

Project objective	Community development is promoted in balance with environmental conservation in the Inle Lake Area.
Implementation body	UNDP implements the project activities in collaboration with local NGOs and CBOs with a contract system
Project period	January 2012 to July 2014, (2 ½ Years)
Project area	Inle Lake and its watershed areas, Taungyi District, Southern Shan State
Project Financing	US\$ 2.58 million (Norwegian Government contribution – US\$ 2 million and UNDP contribution – US\$ 0.58 millions)
Project Beneficiary	People from 71 villages
Project implementation method	UNDP makes call for proposals for the project implementation and then selects the NGOs and CBOs through convening a meeting of Technical Advisory Group which involved related government officials and representatives from UN Organizations in Myanmar.
Major project activities	<ul style="list-style-type: none">- Conservation of the lake environment and its watershed forests- Conservation of water and soil- Implementation of activities on Agriculture, livestock and fisheries- Development of ecological tourism- Conducting activities to enlist Inle Lake as a biosphere reserve of the world- Preparing a set of procedures and guidelines of a lake trust fund for Inle lake conservation- Promoting access to freshwater and hygiene for local communities- Sharing information on Inle Lake conservation and rehabilitation.

Next to

- To continue the sustainable development and environmental conservation of Inle Lake past 2014, MoECAF has prepared the *Inle Lake Conservation 5-Year Action Plan (2015-2016 to 2019-2020)*, that identifies critical sites, proposed activities, estimated costs, inputs and monitoring and evaluation plans for future conservation of Inle Lake.
- This *Inle Lake Conservation 5-Year Action Plan (2015-2016 to 2019-2020)* is the second 5-year Plans part of MoECAF's 15-year *Action Plan for Environmental Conservation and Sustainable Management of Inle Lake*; the *Action Plan* has been prepared in 5-year increments from 2010 until 2025 (MoECAF 2010).
- The *Inle Lake Conservation 5-Year Action Plan (2015-2016 to 2019-2020)* will build off past achievements and will guide the governmental budget allocation and **international donor support necessary** to achieve the sustainable development and conservation of InleLake. Issues and actions identified in the MoECAF (2010-2015) Action Plan, as well as other conservation plans recently prepared for Inle Lake (IID [2012]; UN-HABITAT [2013] and the UNESCO *Man and Biosphere Reserve* application [2012]) provided the key information for development of this *Inle Lake Conservation 5-Year Action Plan (2015-2016 to 2019-2020)*.

□ A number of consultation workshops were held with key stakeholders from the Union Government, Shan State Government, and local community organizations to prioritize the activities, schedule and implementation mechanism for the Action Plan. The final version of the Action Plan will be prepared following additional inputs from stakeholders at the *Draft Action Plan Review Workshop in the end of October*.



GOAL AND OBJECTIVES

- To conserve and protect Inle Lake with active participation of local communities and key stakeholders;
- To implement remedial measures to reduce environmental degradation and improve the Inle Lake ecosystem;
- To improve socio-economic conditions and protect livelihoods of local communities in the Inle Lake watershed;
- To maintain the cultural values of the communities living in the Inle Lake area; and
- To establish effective monitoring and management systems for evaluating progress of conservation efforts.

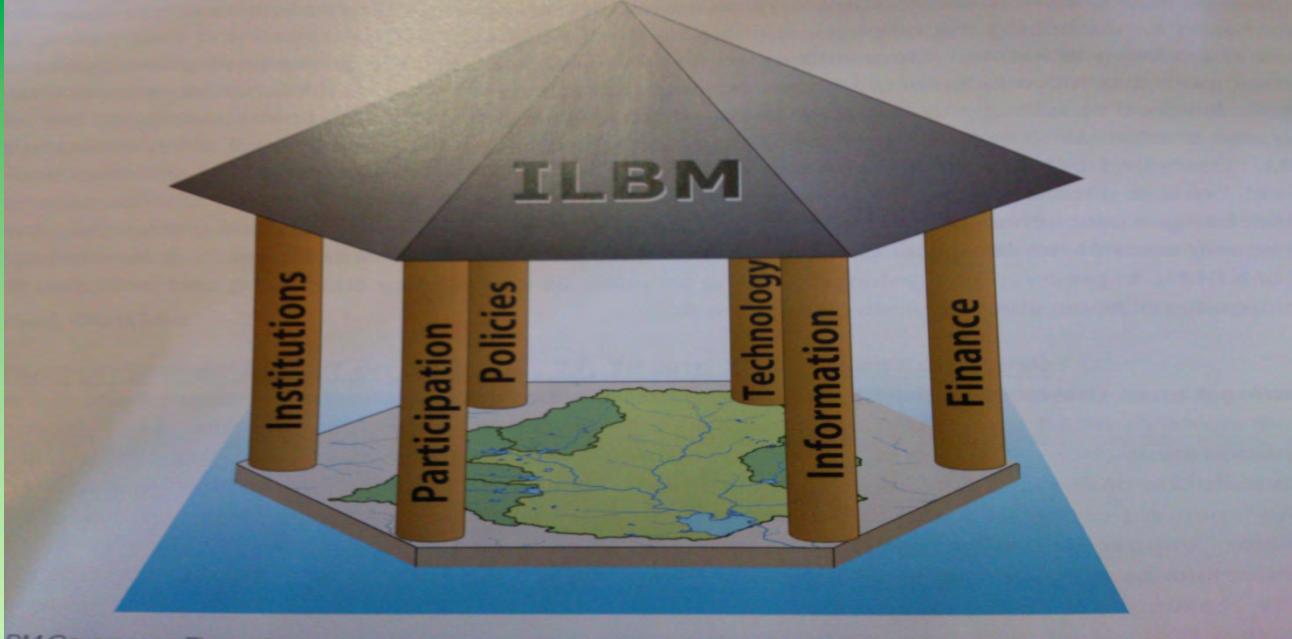
Goal and Objectives

To ensure a balanced approach between

Conservation and Development

of Inle Lake.





- Integrated Lake Basin Management (ILBM) approaches are required, so that conservation measures proposed address environmental, social and economic issues affecting the Inle Lake basin. An ILBM approach consists of six components:
 - (1) Adequate institutions for implementing change;
 - (2) efficient, effective and equitable policies;
 - (3) meaningful participation of all stakeholders;
 - (4) technical measures to ameliorate certain problems;
 - (5) appropriate information about current conditions (baseline information and monitoring); and,
 - (6) sufficient financing. These key components of an ILBM approach reflect the same priority issues identified in the Inle Lake Action Plan.

**Priority issues to be addressed under the *Inle Lake Conservation 5-Year Action Plan*
(2015-2016 to 2019-2020) (Draft)**

Priority Issue	Description
1. Institutional framework for Inle Lake conservation is required	A governing body responsible for conservation of Inle Lake needs to be established (e.g., Lake Authority). This body would be responsible for implementation of the Action Plan; developing and enforcing regulations, procedures, guidelines; coordinating with stakeholders; research and development; monitoring and evaluation; and, communications and awareness-raising.
2. Baseline data on the natural and social environment are essential for future conservation and development of Inle Lake. Data and information management systems are required.	Information gaps need to be filled and information sharing mechanisms established. Baseline data are required in several areas, including: water quality and quantity, biodiversity, meteorology, chemical and other pollution, sedimentation rates, socio-economic and health issues, etc. A knowledge management and information sharing system is required to properly store, manage and share the data collected.
3. Threats to human health must be reduced, and overall living conditions improved for Inle Lake residents.	Lack of clean water supplies, proper sewage treatment facilities, and use of chemical fertilizers and pesticides poses serious potential health threats to local communities.
4. Improved environmental awareness is required at all levels: national, state and local.	Overall environmental awareness levels are low. An Environmental Education Centre is required, with development of training materials and programs for local residents and tourists, to promote conservation practices and sustainable development of the Inle Lake area.
5. Deforestation rates are unsustainable, and reforestation in the watershed is essential.	There is heavy reliance on wood as a fuel source throughout the watershed, and current harvest levels are unsustainable. Awareness raising and training on forest conservation and management, including extensive reforestation programs, is required. Expanded use of fuel-efficient stoves can help decrease reliance on wood as a primary fuel source.
6. Biodiversity conservation and fisheries resource management are critical for sustaining livelihoods.	Aquatic and terrestrial biodiversity in the Inle Lake basin are under increasing pressure from overharvesting, habitat loss, impacts of chemicals and other pollution, introduction of invasive species (e.g., aquaculture species, water hyacinth, etc.) and declining water quality. Assessment of fisheries resources and biodiversity, management planning, expansion and enforcement of conservation areas, and awareness-raising are critical to protect endemic species and to ensure sustainable livelihoods for Inle residents.
7. Sustainable agricultural practices are required, especially reductions in the use of chemical fertilizers and pesticides.	Excessive use of chemical fertilizers and pesticides is occurring in Inle Lake, which impacts the ecology of the lake system and has potentially serious human health consequences. Regulations, law enforcement procedures, policies and guidelines are required for monitoring the use agro-chemicals.
8. Sedimentation and soil erosion rates impact lake health and productivity.	Excessive soil erosion occurs from deforestation, agriculture and land use practices in the Inle Lake basin. Baseline data are lacking on the extent of the problem, and measures need to be taken to control soil erosion rates in surrounding hillsides bordering Inle Lake.
9. Promotion of sustainable tourism practices, including improvement in infrastructure, training and capacity building for local people	The Inle Lake region forms one of Myanmar's top four flagship tourism destinations, and has received nearly 100,000 visitor arrivals over the 2013-14 tourist season. Key issues faced by the tourism industry include: lack of coordination at the planning and management level; need for education and training in tourism management for local people; environmental vulnerability; poor infrastructure of all types; and, the challenge of ensuring all of the region's people, especially poorer and disadvantaged minorities have opportunities to benefit equitably from tourism.

A photograph of a hillside covered in sparse vegetation and young trees. A small green wooden pavilion with a white roof and a porch is situated on the right side of the hill. Two signs are visible near the pavilion: a red one and a green one. A set of wooden steps leads up to the pavilion. The sky is blue with some white clouds.

Thank you for your attentions

theinwin26@gmail.com

Project Implementation Estimate Budget: MYA5025 (MYA2012007)

Year	Input	Component	Fund Source	Budget Estimate (Euros)
2015	2.2.1 1.2.1 FE1 (3m) land management	Fellowship	Agency	14,580
2015	2.2.2 1.2.2 FE2 (3m) land management	Fellowship	Agency	14,580
2015	3.1.1 2.1.1 EM1 (5d) assist set up and conducting experiments	Expert	Agency	5,000
2015	3.1.3 2.1.3 PROC2 N15	Procurement	Agency	3,500
2015	3.1.5 2.1.4 PROC3 logistical support for field activities (2015)	Subcontract	Agency	4,000
	Sub-total for 2015			41,660
2016	3.1.5 2.1.5 PROC4 logistical support for field activities (2016)	Subcontract	Agency	5,000
2016	3.1.4 2.1.5 PROC5 CSSI (Compound- Specific Stable Isotope)	Procurement	Agency	5,000
2016	2.2.3 1.2.3 SV1 (5d) In the Region	Scientific Visit	Agency	3,000
2016	2.2.4 1.2.4 SV2 (5d) In the Region	Scientific Visit	Agency	3,000
2016	2.2.5 1.2.5 FE3 (3m) Model Testing (Year 2016)	Fellowship	Agency	16,200
2016	2.2.5 1.2.5 FE4 (3m) Country Nutrient Management	Fellowship	Agency	16,200
2016	2.3.1 1.3.1 EM2 (5d) Isotopic techniques Training and Data Interpretation	Expert	Agency	5,000
	Sub-total for 2016			53,400
2017	2.3.2 1.3.2 EM3 (5d) Project progress Review/ Assessment	Expert	Agency	5,000
2017	4.1.1 3.1.1 FE5 (3m) Model Testing and Validation	Fellowship	Agency	16,200
	Sub-total for 2017			21,200
2015	3.1.2 2.1.2 PROC1 spectrometer	Procurement	Donor/Extrabudgetary Contribution(Footnote-a/)	35,000
	Sub-total for 2015			35,000
	Grand Total			151,260

Organizing National Water Resource Committee

In order to manage water resources throughout the country, the National Water Resource Committee has been organized as follow;

- | | | |
|-----|---|-----------|
| 1. | Vice President (2) U Nyan Tun | Chairman |
| 2. | Union Minister, Ministry of Transport | Member |
| 3. | Union Minister, Ministry of Border Affairs | Member |
| 4. | Union Minister, President Office No. (1)/ Mayor, NayPyiTaw Development Council | Member |
| 5. | Union Minister, Ministry of Agriculture and Irrigation | Member |
| 6. | Union Minister, Ministry of Environmental Conservation and Forestry | Member |
| 7. | Union Minister, Ministry of Electrical Power | Member |
| 8. | Union Minister, Ministry of National Planning and Economic Development | Member |
| 9. | Deputy Minister, Ministry of Transport | Member |
| 10. | Deputy Minister, Ministry of Industry | Member |
| 11. | Deputy Minister, Ministry of Health | Member |
| 12. | Deputy Minister, Ministry of Construction | Member |
| 13. | Mayor, Yangon City Development Council | Member |
| 14. | Mayor, Mandalay City Development Council | Member |
| 15. | Minister level Representatives (each from States & Division) | Member |
| 16. | Director General, General Administrative Department, Ministry of Home Affairs | Member |
| 17. | Director General, Department of Water Resource Utilization, MoAI | Member |
| 18. | Director General, Department of Irrigation, MoAI | Member |
| 19. | Director General, Department of Environmental Conservation | Member |
| 20. | Retired Colonel San Myint, Advisor of President Office | Member |
| 21. | Chairman/ Secretary, Water Expert Group/ Water, Research and Training Center (WRTC) | Member |
| 22. | Director General, Directorate of Water Resources and Improvement of River Systems | Secretary |

Terms of Reference for the National Water Resource Committee are as follow;

- (a) to take responsible to management, practice and implement Integrated Water Resources Management Systems in Myanmar basing on equitable and transparency with all inclusive manner
- (b) to develop a National Integrated Water Resources Management (IWRM) Strategy
- (c) to formulate a National Water Resources Policy
- (d) to draw up Water Framework Directive basing on Country's water resources for sustainable development of water resources in Myanmar
- (e) to supervise the development of Laws, Rules and Regulations to be implemented in line with the developed National Integrated Water Resources Management (IWRM) Strategy and National Water Resources Policy, and to oversee to amend the constitution to allow Water Resources related laws
- (f) to take leading role in managing surface water resources such as rivers, streams, wetlands, lakes and ground water resources through River Basin Approach/ Development taking into account the consequences of climate change

- (g) to emphasize on efficient water utilization, pollution prevention and reducing wastes in various water resource sectors through proper planning
- (h) to explore ways and means to collect revenue either direct or indirectly from water based business and services and to promulgate water tax law
- (i) to formulate policies for water resource related investments to allow local and foreign private entrepreneurs in line with the Myanmar Investment Law
- (j) to establish an essential Water Resources Decision System and Data Banks in order to protect losses due to water related disasters, to assess water resources development related plans
- (k) to strengthen international cooperation in water sectors
- (l) to form an Expert Group to get technical assistance for implementing above mentioned IWRM and to support Expert Group to able to work
- (m) to seek fund from International and national to establish Water Resources Trust Fund for IWRM implementation

The letter of President Office 87/100/7/Presidential Office dated on November 29th 2012 has been replaced by this order.

Detailed activities for watershed conservation, maintaining stream flow conditions and preserving area of open water body

1. constructing a barrier/ structure to control water level and volume in Inlay Lake
2. constructing reservoirs along the major streams which flow into the Inlay Lake
3. conducting forest inventory in Inlay Lake watershed area
4. generating landuse maps for Inlay watershed area
5. notification of article 144 to protect forest in headwater area
6. managing water utilization from natural springs, streams and cannels
7. re-demarcating the boundary and open water body area of Inlay Lake
8. maintaining internal navigation system around the villages located in the Inlay lake

Detailed activities for preventing soil erosion and sedimentation

1. disposing of excavated sediments from the Inlay Lake systematically
2. conserving natural forest
3. establishing forest plantation
4. preventing gully erosion
5. utilizing alternative fuel and fuel efficient stove
6. construction of check dams
7. removing sediments from old check dams
8. establishing agro-forestry and community forestry system at encroached areas inside reserved forest and protected public forest in Inlay Lake watershed area
9. generating slope classification map
10. applying appropriate and relevant landuse practice

Detailed activities for conducting activities for extension, capacity building and technical cooperation

1. setting up a historical records and database archive about the Inlay lake
2. conducting public awareness programs for soil and water conservation
3. conducting capacity building programs for soil and water conservation
4. controlling encroachment into the Inlay lake for settlement and extension of floating gardens
5. establishing a meteorological station
6. conducting technical cooperation with NGOs, INGOs and International Organizations
7. implementing payment for ecosystem services
8. establishing an environmental education centre

Detailed activities for Biodiversity conservation

1. protecting water pollution in Inlay Lake
2. conserving fish species
3. managing to balance ecosystems in Inlay lake systematically
4. managing wastes properly
5. identifying appropriate habitat for biodiversity conservation

Detailed activities for conducting activities to improve socio-economic status of local communities

1. supplying sufficient drinking water
2. creating income generation activities to ensure the sustainable livelihood for local communities
3. conducting environmental awareness and health care program for local communities
4. introducing and establishing Community Based Natural Resource Management (CBNRM) practice