

Biodiversity And Nature Conservation Association

**INTEGRATED MULTISTAKEHOLDER ECOSYSTEM  
APPROACH AT INLE LAKE (MYANAMAR) BASED ON  
ZONING PRINCIPLES AND INTEGRATION OF  
ECORESTORATION AND AGROFARMING PRACTICES**



# Completion Report

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## INTEGRATED MULTISTAKEHOLDER ECOSYSTEM APPROACH AT INLE LAKE (MYANAMAR) BASED ON ZONING PRINCIPLES AND INTEGRATION OF ECORESTORATION AND AGROFARMING PRACTICES

### THE EXECUTIVE SUMMARY:



***Inle Lake*** , the most beautiful and well-known lake in Myanmar is situated in Nyaung-shwe township in the Southern Shan State of Myanmar. It is famous for its scenic beauty and unique culture of the local people, Intha. Myanmar people recognise Inle Lake with Phaung-taw-U Pagoda, one of the most famous religious place in Myanmar. Inle Lake is also famous for its good-quality delicious tomatoes which is distributed all over the country.

Inle Lake is an upland lake of about 870 meter above sea level. It is the second largest inland freshwater lake in Myanmar. Due to its unique beauty and culture, Inle Lake become the main spot of tourist attraction. The lake and its environment is the habitat of a large variety of migrating water-birds. It is also the main water source of Law-pi-ta hydropower station, the biggest plant of Myanmar.

Inle Lake is now facing pollution problem. The main two problems are *shrinkage of water area* and *reducing water quality in the lake*. It effects on the nature and biodiversity around the lake area and has become a threatening the environment of the lake.

Due to the excessive use of chemicals on production of crops and industrial purposes, the water quality has reduced extremely. Serious deforestation around the mountain area and shifting cultivation practices of the traditional agriculture are also major causes of siltation in the lake and has resulted in the shrinkage of the water area. Under the climate change condition, this effect is becoming more significant year by year.

Biodiversity and nature Conservation Association (BANCA), cooperated with Thai Environmental Institute (TEI), has conducted the “**Integrated Multi-stakeholder Ecosystem Approach at Inle Lake (Myanmar) based on Zoning Principles and integration of Eco-restoration and Agro-farming practices**” project in Inle Lake during the period of 2008 to 2010.

The project site is selected in two villages situated in the marginal Zone of Inle Wetland Wildlife Sanctuary, **In -U** and **Si-tha**. This marginal zone is the mouth of Namlat and Yepe stream and is being covered with a high biomass of plants which functions mainly in sediment trapping, absorption of in-flow nutrients, clarity of water and provision of habitats of fishes, birds, amphibians and insects. All of these are naturally playing a vital role for healthy condition off the shallow lake ecosystem.

The **main objectives** of the project are:

- To conserve wetland ecosystem of Inle Wetland Wildlife Sanctuary (IWWS).
- To maintain the scenic beauty of highland lake.
- To manage wetland flora, fauna and their habitats.
- To conduct environmental education programs extending towards the local people.
- To achieve socio-economic development of community by ecotourism.

The **implementing strategies** of the project are:

- Meeting, to the village head and villagers enquiring and recording their household and their livelihood.
- According to their livelihood pattern, choosing sample family.
- Preparing and recording questionnaires (on paper and oral).
- Identifying natural and social issues from the data being collected from the questions.

The project is mainly based on a Zoning Plan of 5 village tracts including 31 villages which covers an area about 60km<sup>2</sup>. This zone covers the whole marginal zone of the lake, part of open water and part of lakeshore.

In order to address the current ecological degradation and to ensure future improvement of the ecosystem, **eco-restoration** as well as **agro-farming activities by the communities** performs as two key subcomponents. These activities were carried out in 2 villages (In-U

and Sitha) in order to test feasibility, set an example for other villages and start implementation of the newly developed zoning plan.

The project was recorded with the following milestones:

- The proposed zoning area was demarcated in the 500, 000 scale UTM map covering Sitha and In-U villages.
- The Zoning Map indicated the 5 different zones according to different degree of activities.
- Two VLRT were formed in In-U and Sitha villages and included about 44 and 28 members of each villages respectively.
- Environmental Education Exhibitions were conducted twice\_ covering issues and information about Inle Lake environment, pollution , plastic disposal, plants and wildlife, fishes floating agriculture gardens, environmental impacts on Inle Lake and Do's and Don'ts in Inle Lake.
- The project introduced organic farming in 1 acre of paddy and 0.8 acre of tomato farm.

Even though the project got good results, there were many unexpected events occurred in the project period as stated below:

- U Than Htay, the park warden of IWWS died in an accident on 31<sup>st</sup> September 2008 and the project activities have stopped unfortunately.
- U Uga, the chairman of BANCA has also passed away on 13<sup>th</sup> May 2010 and the project had another delay in progress.
- The organic farming of paddy and tomato suffered some unforeseen drought and was destroyed totally.

BANCA can get a lot of lessons learnt from the project and there are some recommendations for future project.

- The zoning principle should be extended to the catchment and mountain area of the Inle Lake.
- More incentive and micro-credit income program are needed to sustain in forming of CBOs.
- Training of organic farming is essential to increase skills, knowledge and attitude of environmental conservation in Inle Lake.
- Fuel-wood consumption is not sufficient in the lake area and the project should encourage establishing potential fuel-wood plantation for long-term use. Efficient stoves and wood-fuel technology should also be introduced in the area.

The project has established a good relationship among TEI, BANCA, IWWS, VLRT and other stakeholders and introduced environmental education for local community. The project also induced synergy of conservation activities by forming CBO and implementing Zoning Principle. The achievement of project should be maintained for long-term sustainable uses of natural resources in Inle Lake. Regional and international cooperation of technical contribution should be necessary for future project.

## PROJECT IDENTIFICATION

The project was based around Sithar and Inn Oo Village, Inle Lake, Nyaung-shwe Township in Shan State.

**Inle Lake** is the second largest freshwater lake in Myanmar located in Nyaung-shwe Township, Taung-gyi District, Southern Shan State. Inle Lake has been classified as a shallow freshwater lake because of its depth ranging from 2m-6m during summer and rainy season. Inle catchment area is 3648 km<sup>2</sup> comprising land systems, ridges, mountains, plains, and basins and altitudes ranging from 885m to 1700m above sea level.

Inle Lake has been a priority for conservation activities due to its high biodiversity and fish endemism. It is high altitude natural fault-like lake, having high endemism, high cultural and historical values and high aesthetic value. Moreover, the lake has been a potential RAMSAR (Conservation on Wetland Association) site as well as Important Bird Area (IBA). In order to protect the rich biodiversity and endemism, the Inle Wetland Wildlife Sanctuary (IWWS) comprising 635 km<sup>2</sup> was established in 1985. In open water, submerged plants grow luxuriantly and some fishes and diving birds feed in the area. The marginal zone of lake is comprised of floating islands with some vegetation. These areas are important breeding and nesting grounds of fishes and habitats for birds and amphibians. This area has been identified as a refuge zone by the warden of IWWS in 1990.

Besides the environmental importance the site has very high cultural and scenic values and therefore is one of the main tourist attractions in Myanmar. Tourism is very importance to local economy and will likely increase substantially in the future.

Inle Lake provides several ecosystem services on which the local people depend both directly and indirectly. Some of these ecosystem services are more obvious such as the Lawpita Hydropower Station connected to South of the lake, which generates electricity for quite a large portion of the country. Example of a less obvious ecosystem service is the ground water recharge function of the lake as permanent water body in an area, which undergoes a prolonged dry season. Through the very high biomass of water plants in and around the lake plants play an important role in absorbing nutrients flowing in and by tapping sediments and maintaining the water clarity and quantity of the lake.

Sitha Village and In-U Village are lying in marginal Zone of Inle Wetland Wildlife Sanctuary. This marginal zone is the mouth of Namlat stream and Yepe stream and is being covered with high biomass of plants which mainly functions in sediment trapping, absorption of in-flow nutrients, clarity to water and provision of habitats of fishes, birds, amphibians and

insects, all of these are naturally playing a vital role for healthy condition off the shallow lake ecosystem.

Most of the villagers in In-U village practice floating agriculture using chemical fertilizers and pesticides, encouraging eutrophication and water pollution. The minorities in the village are landless and are mainly living on fishing, illegal poaching of birds while the village women weave mats. Only a few families are farmers. Environmental friendly income generation activities and awareness raising program are needed to alleviate poverty in these villages.

Sitha and Sison villages are within the notified refuge area of 10.35 sq-km, which also adjoins In-U village. So that villagers from these villages usually breach prohibitions of refuge area, and thus there is a need to educate the villagers as well as the school children. For education program for school children, In-U and Sison villages, where there are primary schools, have been selected. There is no primary school in Sitha village.



## ORIGIN AND PROBLEM

The **Intha** (the people living in and around the lake) are very active farmers on the shores of the lake and surrounding hills/mountains and they are particularly skilled in floating island agriculture (hydroponics). The tourism potential of this lake and the rich Intha Culture surrounding it provides a large source of income. As a consequence, most of the lake shore has been converted into paddy fields, sugar cane plantations, villages and hotels.

The floating agriculture on the lake and the fishes provide the village with food and export opportunities of the tomatoes grown under the ideal lake conditions. The survival and livelihoods of the Intha is to a great extent dependent of the healthy condition of the Inle Lake Ecosystem.

At the moment, this relationship between local people and ecosystem is out of balance as consequences of several human activities. Most of these problems are related to the lack of clear zoning and land use system. Due to clearance of the forests on the hills for agricultural purposes and the paddies on the shores, erosion in mountain is leading to increase sedimentation in the lake. Chemical pesticides and fertilizers used for agriculture uphill end up in the affluent of the lake, creating high concentrations of nutrients, nitrates and other chemicals, which has a double impact through pollution and eutropication. The water quality deteriorates and the increased algae blooming leads to lower oxygen levels, which then has impact on fish population. Birds were seen to move their breeding sites outside the lake. This effect will be irreversible if not dealt with in the near future. Additional problems that need to be addressed are hunting and overfishing.

To summarize, the wetland ecosystem is deteriorating and as a consequence, the survival of the people relying on this lake is being challenged. It is firmly believed that zoning with proper land use hand in hand with overall sustainable resource use and community based nature conservation can resolve the existing issues, support the objectives of IWWS and at the same time improve the socio-economic situation of the people.

## PROJECT OBJECTIVES AND IMPLEMENTATION STRATEGY

The main objective of the project is **to clearly designate specific zones for different land and lake-use practices in Inle Lake region in order to guarantee sustainable development by engaging the local communities in biodiversity conservation, sustainable and effective natural resource use and eco-restoration.**

The pilot demonstration project intends to examine the feasibility of this approach in Inle Lake could hopefully become an example that can be replicated in other sites in Myanmar. Community based co-management of biodiversity in Inle Lake region is an excellent project site to test this feasibility, as it is an important economic site for tourism, a biodiversity rich ecosystem and a culturally diverse region.

The main outcome of this project is **to have a functional zoning Plan in place for Inle Lake,** which has been agreed on by all involved stakeholders. Additional outcomes include an understanding on the feasibility of community engaged biodiversity conservation through eco-restoration as well as more sustainable agricultural practices. A well-documented pilot site project will develop recommendation based on best practices and lessons learned in order to replicate this approach to other site.

The main **objectives** of the project are

- To conserve wetland ecosystem of IWWS.
- To maintain the scenic beauty of highland lake.
- To manage wetland flora, fauna and their habitats.
- To conduct environmental education programs extending towards the local people.
- To achieve socio-economic development of community by ecotourism.

The implementing **strategies** of the project are:

- Meeting the village head and villagers, enquiring and recording their household and their livelihood.
- According to their livelihood pattern, choosing sample family.
- Preparing and documenting questionnaires (on paper and oral).
- Using questions on
  - Changing of nature on Inle Lake
  - Changing of their livelihoods and changing of their income due to changing nature
  - Disease of local people
  - Issues of social and economic
  - Community opinion on above issues
- Detailed questions and getting data on
  - Household of village

- Village population
- Male and female proportions
- Drinking-water system
- Litters of their families and firm residue
- Annual income and outcome
- Types of dwellings and buildings
- Getting support for education
- Getting support for health
- Knowledge on environment and their impact
- Knowledge on biodiversity
- Knowledge on wildlife Law and Rule
- Rights and privileges which they want on water resources and natural resources of the lake
- Satisfaction with their current situation of their life

## PROJECT PERFORMANCES (PROJECT ELEMENTS PLANNED)

The project is mainly based on a zoning plan of 5 village tracts including 31 villages, which covers an area about 60km<sup>2</sup>. This zone includes the whole marginal zone of the lake, part open water and part lakeshore.

In order to address the current ecological degradation and ensure future improvement of the ecosystem, **eco-restoration** as well as **agro-farming activities by the communities** make up to be two key subcomponents. These activities were carried out in 2 villages (In-U and Sitha) in order to test feasibility, set an example for other villages and start implementation of the newly developed zoning plan.

### 1. DEVELOPING A ZONING PLAN

The proposed zoning area is about 60km<sup>2</sup> and covers 5 village tracts (Khaungdaing, Taungbogyi, Taungchae, Nanthe, Mong Hsawk), including 31 villages. The zoning Plan includes different zones allowing different degree of activities:

- Core Conservation Zone (Refuge Zone)      Strict biodiversity conservation
- Buffer Zone      Limited activities allowed
- Sustainable Use Zone      Sustainable resources use (fishing, agro-farming)
- General use Zone
- Village Use Zone

### 2. ACTIVITIES

- Discussed between different stakeholders (Department of land Records and Settlements, Irrigation Department and Inle Wetland Wildlife Sanctuary, BANCA, villages) to explain the project, zoning principles, categories and included activities.
- Negotiated with group of village elders for exact boundary demarcation of each zone.
- Got government approval on Zoning Plan and preparation of rights, privileges, rules and regulations for each zone based on and in agreement with communities.
- Finalized Zoning Plan (Including maps with clear indication of land uses) and dissemination all over the Zoning Area and the adjacent areas.
- Ensured implementation and law enforcement system for each zone.

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### 3. PILOT VILLAGE –LEVEL LAKE RESTORATION

In order to properly manage and restore the Inle Lake as a balanced ecosystem through community participation, two Village Lake Restoration Teams (VLRT) were formed in In-U and Sitha villages. The Main Committee (MC), to supervise the two VLRT was formed and it comprises the warden and rangers of IWWS; head of 2 villages and 2 influential persons representing.

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#### ACTIVITIES

- The MC visited all the villages in the project area, and forms each Village Lake Restoration Team (VLRT) after serious discussion and negotiations with the villagers.
- MC provided guidance and technical support to both VLRT in relation to environmental conservation, eco restoration and sustainable resource use in and around the lake.
- The MC visited VLRTs every month, assesses, monitor, evaluated and rewarded persons with significant performance.
- Each VLRT designed an action plan and follow up cooperation with MC on the following implementation.
  - Designing environment friendly waste management
  - Plant harvesting to clean up parts of the lake and the waterways
  - Patrolling for poaching and illegal extraction of resources
  - Conducting environmental education activities

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### 4. ORGANIC FARMING IN FLOATING AGRICULTURE

To prevent further pollution and eutrophication in the lake, more sustainable agricultural practices will be encouraged. Farmers were organized to abandon chemicals and fertilizers in order to demonstrate sustainable agriculture and the long-term benefits related to it. Organic farming was introduced and demonstrated in 2 villages. Sitha and In-U, focusing on rice paddies and tomato.

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#### ACTIVITIES

- Selected the most dedicated among the volunteer farmers who own suitable and enough land areas.
- Trained of these farmers by an expert in agro-farming and one supervisor

- Demonstrated the organic farming practice and supervising the whole project
- Encouraged use of organic fertilizers and pesticides by providing sufficient information
- Differentiated benefits and profits between organic farming and seasonal, traditional farming
- Demonstrated best practices to surrounding communities

## PROJECT OUTCOME, TARGET BENEFICIARIES INVOLVEMENT

### 1. DEVELOPING A ZONING PLAN

#### a. Demarcation of Zoning Principle

The proposed zoning area was demarcated in the 500, 000 scale UTM map and covered Sitha and In-U villages.

#### b. Mapping of the Zone

The zoning Map indicated the following zones allowing different degree of activities:

1. Core Conservation Zone (Refuge Zone) Strict biodiversity conservation
2. Buffer Zone Limited activities allowed
3. Sustainable Use Zone Sustainable resources use (fishing, agro-farming)
4. General use Zone
5. Village Use Zone

### ACTIVITIES

1. Three times of discussions were made by BANCA and IWWS on April 2008 and about 30-50 local people attended the meeting. BANCA members explained the project, zoning principles, categories and included activities.
2. Four times of meeting were also conducted in August 2009 and about 30-40 local people attended and discussed detail on zoning principle and conservation of Inle Lake.
3. One Magellan GPS and skeleton maps were bought and contributed to IWWS staffs for zoning mapping.
4. Boundary demarcation for each zone was made by the team which was included in Township authority, Agriculture Department, Department of Land-record and Settlement, IWWS and BANCA on October 2009.
5. To reduce miss-conducting natural resources, signboards for each zone were made and declared by the IWWS and BANCA.
6. For regular patrolling and checking in Core Zone and Buffer Zone, BANCA have supported a small boat for IWWS staffs.

## 2. PILOT VILLAGE –LEVEL LAKE RESTORATION

### a) Forming Village Lake Restoration Teams (VLRT)

Two VLRT were formed in In-U and Sitha villages and included about 44 and 28 participants of each village. The Main Committee (MC) was formed and it comprises the warden and rangers of IWWS, head of 2 villages and 2 influential persons representing.

#### Village Lake Restoration Team at Inlay Lake (Sitha Village)

Sr.No	Name	Occupation
1	U Sein	Fisher
2	U Tun Myint	Fisher
3	U Tha Htu	Fisher
4	Ko See	Boat man
5	U Aung	Fisher
6	Ko San Win	Casual Labour
7	Ko Shwe Tun	Casual Labour
8	U Maung	Fisher
9	Ko Win Bo	Agriculture on Floating island
10	Ko Tun Kyi	Agriculture on Floating island
11	U San	Agriculture on Floating island
12	U Phyu	Fisher
13	Ko Win	Agriculture on Floating island
14	Ko Phaw	Agriculture on Floating island
15	Ko Gyi	Agriculture on Floating island
16	Ko Lin	Fisher
17	Ko Tun Lin	Agriculture on Floating island
18	Al Phaw	Agriculture on Floating island
19	U Sein	Agriculture on Floating island
20	Ko Chit Oo	Agriculture on Floating island
21	Al Myo	Agriculture on Floating island
22	Ko Sin	Agriculture on Floating island
23	Ko Chain	Fisher
24	U Chit Wai	Fisher
25	Ko Tun Win	Fisher
26	Ko San Min	Fisher



Sr.No	Name	Occupation
27	Ko Thar Ngal	Fisher
28	Ko Sei	Fisher

Village Lake Restoration Team at Inlay Lake (In U Village)

Sr.No	Name	Occupation
1	U Than Tun	Agriculture on Floating island
2	U Toe Wa	Agriculture on Floating island
3	Mg Tin Tun	
4	Ko Ngway Oo	Agriculture on Floating island
5	U Aung Myo Thu	Fisher
6	Ko Than Naing Oo	Casual Labour
7	Ko Khin Maung	Fisher
8	U Chit Tway	Boat man
9	Ko Aung Lwin	Agriculture on Floating island
10	Ko Kyaw Htway	Casual Labour
11	U Soe Min Gyi	Agriculture on Floating island
12	U Pa	Agriculture on Floating island
13	Ko Myo	Agriculture on Floating island
14	Ko Aung Kyaw Tun	Agriculture on Floating island
15	Ko Aung Naing Oo-2	Agriculture on Floating island
16	Ko Kyaw Than	Agriculture on Floating island
17	Ko Soe Tint	Agriculture on Floating island
18	Aung Khin	Casual Labour
19	Ko Yo	Agriculture on Floating island
20	Ko Naing	Casual Labour
21	U Aung Khaing	Casual Labour
22	Ko San Lin	Agriculture on Floating island
23	Ko Tin Maung Soe	Shop Keeper
24	Ko Oo	Boat man
25	Ko Soe Win	Casual Labour
26	Ko Nyunt	Agriculture on Floating island
27	Ko Aung Myint	Agriculture on Floating island
28	Ko Kyaw Lin	Agriculture on Floating island
29	Ko Tin Aung Moe	Agriculture on Floating island
30	U Kyaw wai	Agriculture on Floating island

Sr.No	Name	Occupation
31	U Soe Min	Agriculture on Floating island
32	U Kyaw Lay	Agriculture on Floating island
33	U Kyaw Zaw	Casual Labour
34	U Shwe Paw	Agriculture on Floating island
35	U Hlaing Myint	Agriculture on Floating island
36	Ko Maung Aye	Agriculture on Floating island
37	U Aung Tint	Agriculture on Floating island
38	Ko Maung Ngal	Agriculture on Floating island
39	Ko Zar Ni	Agriculture on Floating island
40	Ko Mya Soe	Agriculture on Floating island
41	U Nay Win	Fisher
42	Moe Kyaw Hein	Casual Labour
43	U San Htay	Fisher

#### b) Education Program

Environmental Education was conducted about Inle Lake environment, pollution , plastic disposal, plants and wildlife, fishes floating agriculture gardens, environmental impacts on Inle Lake and Do's and Don'ts in Inle Lake.

### ACTIVITIES

1. Environmental Education Exhibition aiming at pilgrims and local community are conducted on Pagoda Festival on October 2008. The following panels were exhibited in the program:
  - 1) Forest Types Map of Myanmar
  - 2) Ecosystem of the country
  - 3) Zoning Principle in Inle Lake
  - 4) National Parks and Wildlife Sanctuaries in Myanmar
  - 5) Eco-tourism activities in the country
  - 6) Endangered Species of both Flora and Fauna of Myanmar
  - 7) Endemic Species of both flora and Fauna of Myanmar
  - 8) Significance of Inle Lake
  - 9) Education on water Pollution, contamination and siltation in Inle Lake (cartoon)
  - 10) Root Causes of Loss of habitats and Biodiversity, Environmental Degradation and Disappearance of the Ecosystems (Cartoon)

- 11) Benefits Generated from Forests and Trees (Cartoon)
- 12) People Participation in Biodiversity Conservation

- 2. BANCA conducted active participation with VLRT in the following actions:
  - i. Waste Management of the households in the villages
  - ii. Clearing the waterway for better transportation of the villages
  - iii. Pollution controlled by VLRT for proper use of chemicals and pesticides

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### 3. ORGANIC FARMING IN FLOATING AGRICULTURE

#### I. Introduced Organic Farming in the Paddy Farm

BANCA conducted organic farming in the Daw Ohn's paddy farm at Sitha village. The farm is about 1 acre. The farm was prepared for the hot season paddy-farm and introduced natural fertilizer on January 28, 2010. In March of 2010, unexpected low water level of Inle Lake and the farm was totally destroyed by the drought.

#### II. Introduced Organic Farming in the Tomato Farm

BANCA also introduced organic farming in the tomato farm belonged by the U Ngwe Thee of In-U village. The tomato seeds were sow at nursery bed and the seedlings were transplanted to the planting site after germinating of seeds. These processes were conducted on first week of January. The seedlings were growing very well and all of the local visitors are interested in the organic farming. The owner harvested about 5 kilograms tomatoes in two times harvesting. But, it was occurs of drought in March of 2010, the tomato farm were also destroyed unexpectedly.

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### 4. OTHER PROGRAMS

- a) BANCA contributed small patrolling boats and other accessories to IWWS.
- b) BANCA contributed traditional Shan costume for VLRT.
- c) BANCA constructed Bird Watching Camps to induce Eco-tourism for villagers.
- d) BANCA contributed Televisions and DVDs for villagers.

## ASSESSMENT AND ANALYSIS

BANCA has been looking forward the following project evaluation procedures.

### 1. ZONING

#### 1. Zoning Principle Meetings

The following meetings were conducted for pre-zoning investigation to know the desire of villagers who live in project village tracts by interviewing.

No.	Date	Village	Participants
1	20-4-2008	Sitha	27
2	23-4-2008	Sison	30
3	27-4-2008	In-u	43
4	31-8-2009	In-U	33
5	31-8-2009	Sitha	34
6	14-8-2009	In-U	38
7	15-8-2009	Sitha	28
	Total		233

#### 2. Inle Lake Zoning Map

Pilot Inle Lake Zoning Map was drawn by the BANCA, IWWS and local communities.

#### 3. Bird's Survey

Bird's survey was conducted in the proposed zone and the following data was recorded.

Year	2009					2010
	Aug:	Sept:	Oct:	Nov:	Dec:	Jan
No. of Birds Species	135	22	51	71	59	60
No. of Birds	372	192	3664	6421	5679	5309

#### 4. Post-zoning investigation

The villagers are satisfied the Zoning Principle for the following reasons:

- They can save their fish resources for long-termed use.

- The Core and Buffer area around the village are protected from the encroachments of the other villagers.
- They recognized the changes of lake and they wanted to conserve the Inle Lake's natural heritage.

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## 2. VILLAGE LAKE RESTORATION TEAMS (VLRT)

### 1. Forming VLRT

To induce decision making in the natural resource management, forming Community based Organization (CBOs) of Inle Lake made by the villagers of the Sitha and In-U villages.

### 2. Monthly and post-project evaluation

The following activities were conducted by the VLRT cooperation with BANCA.

- Waste management activities were conducted by the VLRT, IWWS and BANCA.
- Clearing the water ways made by the VLRT to better transportation for the village.
- The regular patrolling was made by the VLRT for conserve natural resources.

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## 3. ORGANIC FARMING IN FLOATING AGRICULTURE/WETLAND PADDY FIELD/ TOMATO

### 1. Pre-evaluation

The villagers were not interested in organic farming because there is a lot of preparation to introduce organic farming. Normally, organic farming needs proper techniques and procedures.

### 2. Monitoring in introducing organic farming

Organic farming produced satisfied results of production in tomato farm. People are interested in organic farming and people need more training program to make organic farming.

### 3. Compare the cost-benefit analysis between organic farm and traditional farm

Organic farming was cheaper than chemical fertilizer farming but the procedure of organic farming was more complicated than chemical fertilizer farming. In Inle Lake area, there is no cow-den and people used decayed floating islands to use as organic farming. More technical contribution to make organic farming is necessary to introduce organic farming.

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#### 4. FINAL EVALUATION

1. Zoning principle is successful and local people are satisfied for the zoning principle.
2. Forming VLRT is useful for the village and local community but more action are necessary to make clear understanding of in their duties.
3. Organic farming is necessary for Inle Lake area but more technical skills and procedure are necessary in using organic farming for control pollution.

## LESSONS LEARNED

- a. The Zoning Principle is an effective way to protect natural resources in the Inle Lake. But the Inle Lake's problem comes from not only in the lake area alone but also in the mountains around the Inle Lake. Therefore, the Zoning concepts should be extended to the catchment area of the Inle Lake. The greening project of the mountain area around the Inle Lake is essential to conserve nature of Inle Lake. To maintain Zoning Principle, more cooperation and clear understanding of local people should be necessary.
- b. Forming CBO like VLRT team is necessary to conserve nature of the Inle Lake. More incentive and micro credit income program are needed to sustain in forming of CBOs. Create cooperative concept in production of value-added products like mats and in marketing of the finished products are essential.
- c. Organic farming is needed to reduce polluted water of the Inle Lake. But more technical skills, knowledge and attitude should be created by the technical training of organic farming. Success stories of organic farming in country and foreign country should be distributed to the interested farmers to increase participation. Use natural pesticides like "*Azadirachta indica*" other than chemicals pesticides will be reduced in pollution of water.
- d. Fuel-wood in Inle Lake area is not sufficient and the area is urgently needed to establish potential fuel-wood plantation. Efficient stoves and wood-fuel technology should be introduced in the area. In mountain area, there is necessary to introduce Zoning principle to maintain ecosystem and biodiversity conservation. Before making the project, sufficient Socio-economic Survey should be made to know clear understating of the local people's needs.

## CONCLUSIONS AND RECOMMENDATIONS

- **Identification:** Zoning principle is effective technique for conservation of natural resources in Inle Lake. Zoning Principle should be discussed in all people of 5 village tracts (31villages) and should find clear solution for all community. All stakeholders of Inle Lake community should perform in the meeting. Discussion between local community and governmental organization is also essential.
- **Design:** Due to the interrelation of Zoning Priciple, forming VLRT and using organic farming, the project design is good and sound to conserve ecosystem and biodiversity of Inle Lake. Sufficient education program is necessary to make more cooperation of local community in the activities of the project.
- **Implementation:** There is a little weak implementation in the project. Park Warden, the key player of project died in accident and all the project works were stopped unexpectedly. Introducing organic farming in the dry season can also result in failure. VLRT teams are formed for conservation of the Inle Lake environment, but they depend on the contribution of the project. Initiated mind of the CBO should be created for the success of the project.
- **Organization:** There were some unclear organizational conflicts during the project. BANCA contributed fund to the IWWS and IWWS is the implementing agency of the project. There is no legal binding between BANCA and IWWS and sometimes misunderstanding occurs in conducting the project. BANCA should make clear office formalities to IWWS and the Forest Department.
- **Management:** Management of the project was also quite weak. There is no responsible person for the project and BANCA members served as volunteers in the project. It is necessary to assign a qualified person as project manager to implement project activities effectively.

Responsible for the Report

<b>Name:</b>	Maung Maung Pyone
<b>Position held:</b>	Secretary (BANCA)
<b>Date:</b>	31-7-2011



## ANNEX 1 THE LOGICAL FRAMEWORK

Problem	Objective	Output	Activities
Lack of environmental education	To conduct environmental education programs extending towards the local people.	2times environmental educational exhibition were conducted in 2008	Conducting environmental awareness and education programme
Insufficient conservation on the Inle Lake	To conserve wetland ecosystem of IWWS	5 different Zone were demarcated for different purposes	Introduce Zoning Principle in Inle Lake
Pollution occurs in the Inle Lake	To maintain the scenic beauty of highland lake.	1 acre of paddy and 0.8 acre of tomato farm were conducted	Introduce Organic farming in Paddy and Tomato Farm
No income from the nature	To achieve socio-economic development of community by ecotourism.	2 eco-tour houses were established for eco-tourism	Establish 2 Eco-tour houses in 2 villages
Lack of institutional cooperation to conserve nature	To manage wetland flora, fauna and their habitats.	VLRTs of In-U and Sitha village were formed	Form VLRT in 2 villages

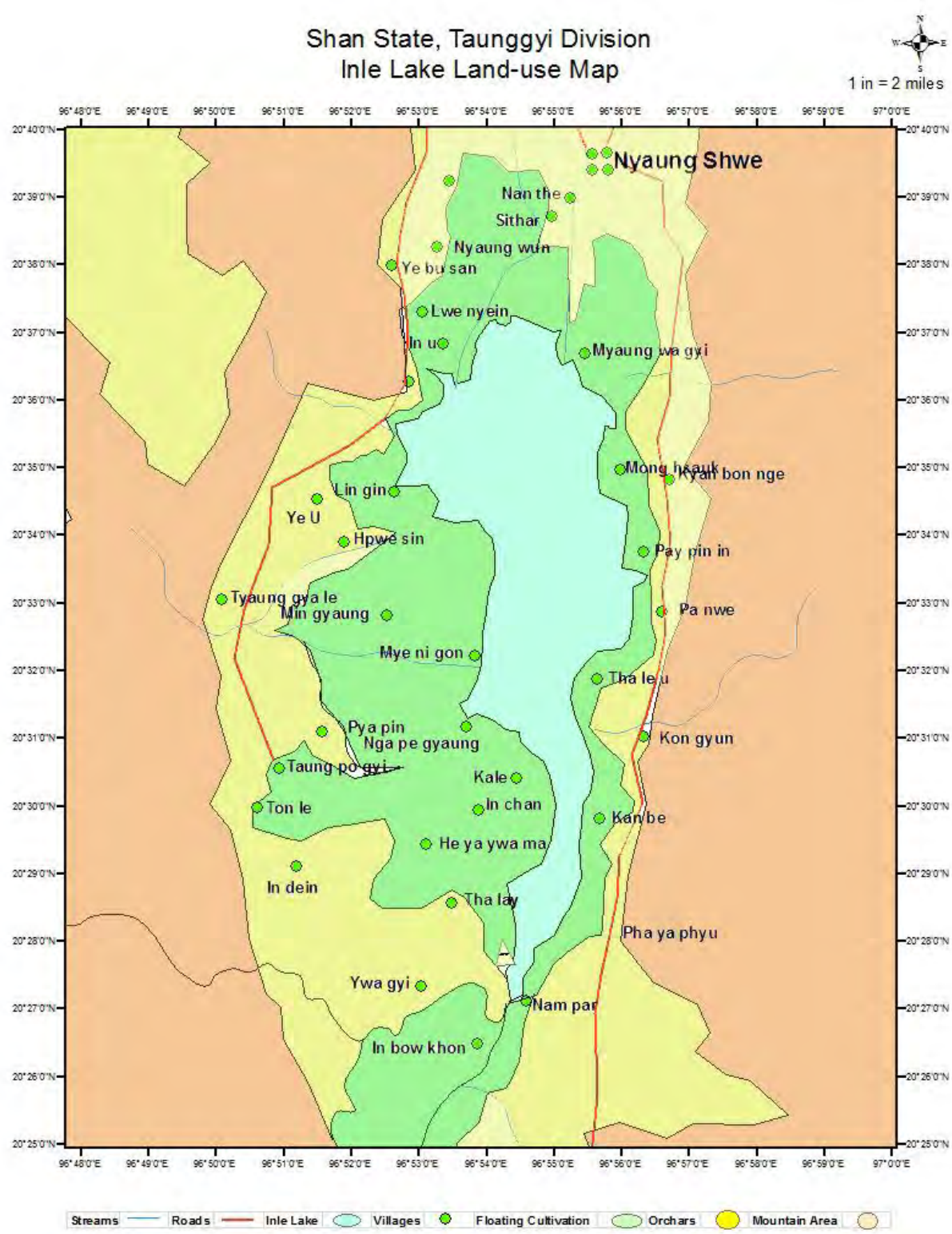
## ANNEX 2 PROJECT FINANCIAL STATEMENT

No.	Particular	1st Interim Report	2nd Interim Report	3rd Progress report	Total
	<b><u>Materials and equipments provided by the project</u></b>				
1	1 Magellan GPS	570.00			570.00
2	1 Digital camera	122.73			122.73
3	2 Eco-tourism Bamboo houses		1,000.00	1,990.00	2,990.00
4	1 set of Base ot base cordless phone		300.00		300.00
5	1 number of 12 Volt battery		100.00		100.00
6	1 Motor boat		1,050.00		1,050.00
7	2 H.P engine for boat		300.00		300.00
8	Life jacket		66.00		66.00
9	Traditional Costumes for VLRT		120.00		120.00
10	2 sets of TV and Video-player			635.00	635.00
	<b><u>Boat hiring cost for project activities</u></b>				
1	Travel to In-U, Sitha and Namthe Villages	45.45			45.45
2	Travel to Khaung taing and Linkin Villages	45.45			45.45
3	Travel to Heya-ywama and Phe-chaung Villages	54.55			54.55
4	Travel to Inpawkon and Nampan Villages	59.09			59.09
5	Travel to Sison and Naungtaw Villages	59.09			59.09
6	Petrol for motor boat and car	204.54		480.00	684.54
7	Hand rowing boats for collection of house disposal			160.00	160.00
	<b><u>Expenditure for Enviromental Education</u></b>				
1	Educational signboards	210.00	150.00	370.00	730.00
2	Educational pens			60.00	60.00
3	Birds guide-book		300.00		300.00
4	Pamphlets		50.00		50.00
5	Educational Booklets	454.55			454.55
6	Maps and information sheets	804.55			804.55
7	GIS specialist	200.00			200.00
	<b><u>Organic Farming</u></b>				
1	Tomato seeds		23.40		23.40
2	Plactic sheet for organic farming		12.80		12.80
3	EM Bocashi		100.00		100.00

No.	Particular	1st Interim Report	2nd Interim Report	3rd Progress report	Total
4	Organic farming for paddy-field		200.00		200.00
	<b><i>Patrolling Unit</i></b>				
1	Uniform for patrolling		320.00		320.00
2	Patrolling cost		500.00		500.00
	<b><i>Training Unit</i></b>				
1	DSA for trainees			350.00	350.00
2	travelling Allowance for trainers			50.00	50.00
3	Per diem for trainers			350.00	350.00
	<b><i>Salaries and wages</i></b>				
1	DSA for ground survey team			1,050.00	1,050.00
2	Salaries for patrolling team			1,056.00	1,056.00
3	DSA for Main Committee meeting			600.00	600.00
4	Honorable pay for teachers in two Primary schools			1,600.00	1,600.00
5	Travelling allowance of BANCA members			2,078.80	2,078.80
	<b>Total</b>	<b>2,830.00</b>	<b>4,592.20</b>	<b>10,829.80</b>	<b>18,252.00</b>



# APPENDIX 4. MAPS



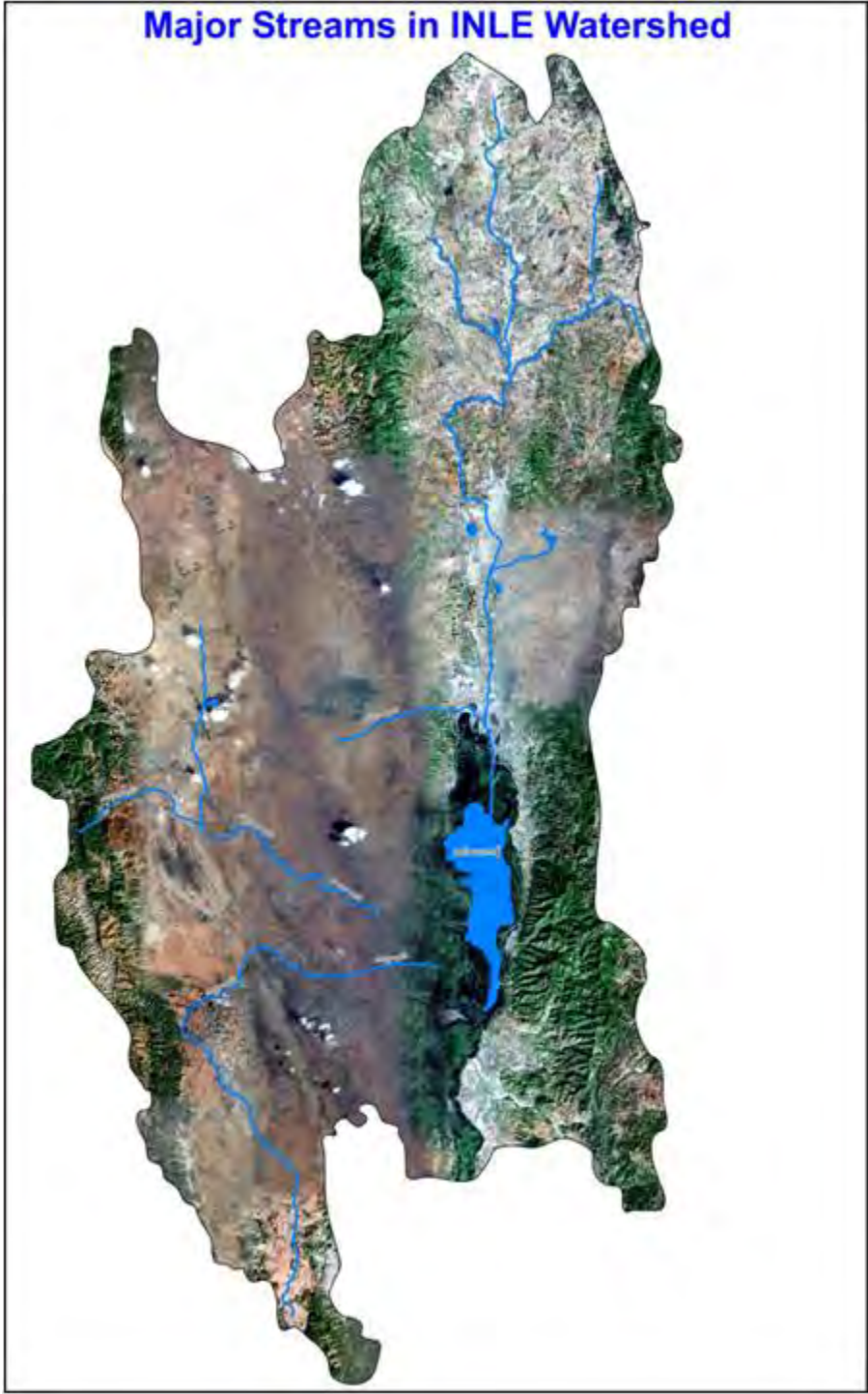


Photo Section



*Unique Fishing Practice and a kind of fancy Fish at Inle lake*



*Floating Agriculture and the Tomatoes came from Inle Lake*



*Village-houses and Resorts of the Inle lake*



*Inle lake is the Home of Water Birds*



*Some Amphibians at Inle lake*



*Cethosia cyane auanthes Fruhstorfer*

*Some Orchids and Butterflies can be found at Inle Lkae*





*Signboards to protect misconduct in Inle Wetland Wildlife Sanctuary*



*Some Clothing and Silversmith Industries at Inle Lake Area*



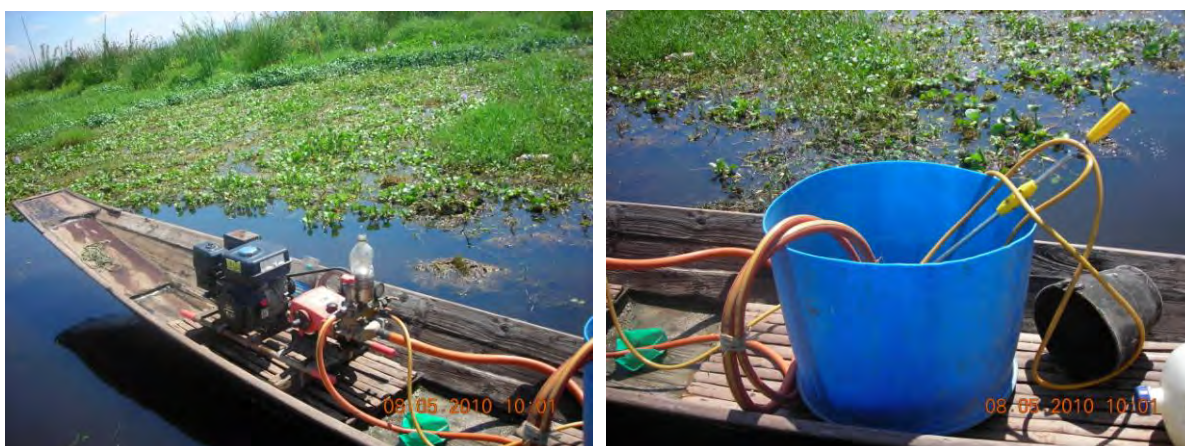
*Inle is now Facing Water Pollution and Draught at Dry Season*



*Deforestation Occurred at the Watershed area of Inle lake*



*Reduced Water level and New Invasive Species in Inle Lake*



*Power Spraying Apparatus used for Chemical Insecticide*



*Exhibition on Environmental Education Program of Project*



*Forming of CBOs at In-U and Sitha Villages*



*Patrolling and Seizure of Wildlife Poaching*



*Project supported Medium Boat and Waterway Cleaning at Bird-watching Camp*



*Project Introduced Organic Farming*



*Waste Management Campaign*



*TEI Evaluation Team, BANCA and Forest Department Officials*



*Discussion with CBO and Contribution of TVs and Accessories*



*Tree Planting Campaign*