



EXTERNAL FINAL REPORT

**Water, Sanitation & Hygiene
Disaster Risk Reduction Assessment**

**AYEYARWADDY DIVISION
On 05th to 19th February 2008**

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Need Assessment conducted by:

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EXECUTIVE SUMMARY

Following the December 2004 Tsunami, Action Contre la Faim (ACF) has been implementing an operational research program (to sustainably improve access to drinking water for South Asia populations) in Sri Lanka in partnership with the French Red Cross and the IRD (Institut pour la Recherche et le Développement). As the initial objectives of the project (to produce knowledge, to increase access to safe drinking water for vulnerable populations, to reinforce operational capacities of local actors) could no longer be achieved following the deterioration of the Sri Lanka context with the increase of the conflict in the area of operation, the project was terminated. The research component of the project has been transferred to India until 2009, State of Bangalore, where a PHD student is conducting a research to elaborate methodologies of aquifer studies with geophysical tools.

The assessment proposed by ACF for the Ayeyarwaddy Division was to evaluate for the French Red Cross (FRC) purposes, the needs of transferring the FRC Water Research tools (aquifer location) as well as to define and justify in details potential Water Sanitation and Hygiene (WASH) component in the coastal townships of Ayeyarwaddy division, with an additional focus on mainstreaming Disaster Risk Reduction (DRR) for the water and sanitation issues only.

It was based on field observations and data provided by NGOs and other actors running programs in this division. It was conducted after the monsoon, starting from 05th to 19th February 2008, managed by a WASH/DRR officer.

Background

Action Contre la Faim (ACF) conducted its first exploratory mission in Myanmar in 1993. And ACF obtained its first Memorandum of Understanding with the Ministry of Health in 1994.

The initial programs aimed to reduce the morbidity and mortality rates of the most vulnerable populations in Kyauktaw, Mrauk'U, and Minbya Townships of Rakhine State, through the distribution and training in the use of essential drugs. Water and sanitation programs followed these initial health programs. Action Contre la Faim expanded its programs into Northern Rakhine State to assist in the return of refugees, launching water and sanitation programs in 1995 and food security surveillance, with subsequent family food programs in 1996 and a nutrition program that opened in late 2003.

Ayeyarwaddy division is located at the Southern end of the central plains of Myanmar. In North East of it there is Bago Division and in the East is Yangon Division. It is contiguous with the Rakhine State in the North West. On the Southern and Western sides there are Andaman Sea and Bay of Bengal. Moreover Ayeyarwaddy Division is mostly in Delta region and cross by many rivers as the Ayeyarwaddy River (2,170 km) which constitute the most important river system in Myanmar.

This area, as a low-lying region, is a flood-prone area and was recently affected by severe floods. As a result tens of thousands people have been made homeless as 10,000 houses were destroyed and 40,000 acres of rice paddies were flooded. It was also the major zone in Myanmar that was affected by the 2004 Tsunami. Additionally, Ayeyarwaddy Division is strongly and frequently affected by storms and other climatic hazards.

Numerous NGOs and the international institutions working on Water and Sanitation sector are present in Ayeyarwaddy Division as Merlin, Adventist Development and Relief Agency (ADRA), Save the Children (SC), World Vision (WV), United Nations Children's Fund (UNICEF), and United Nations Development Program (UNDP).

Mains comments of Water, Sanitation and Hygiene

According to the assessment, the type of water resources used by the population are surface water (69%), groundwater (62%) and rain water (39%). The access and the use of these water resources are different according to the consumption from drinking, cooking or washing purpose, the quantity and quality of water and the socio economic situation.

The problematic are the insufficiency of water during dry season and the quality of water that is not satisfactory. The water points are unprotected and no maintained by the community so the probability of bacteriological contamination is important. In addition there is chemical contamination as Iron, Arsenic and Chloride of Potassium (salt). During the assessment, ACF team didn't collect analysis results from external institutions and it was not possible to analyze the water according to the Government. So the contamination was determine according to the taste of the water and the discussion with the population.

In coastal area, the access to water points is controlled and in 53.8% of villages the water is not free.

In 75% of case, people use open defecation. The water flush latrine is more constructed in Ayeyarwaddy division, and there is inconvenient to use it caused maintenance and cost.

The latrines are not in good conditions and people cannot afford to maintain them. For personal hygiene cleanliness, bamboos stick (92.3%) leaves (15.4%) and papers (76.9%) are used.

The community is not aware on waste water and garbage management.

Generally community has knowledge on water born diseases, as 92% know that diarrheas is related to consumption of water unclean, and 31% know that relation exists between Malaria and stagnant water. Moreover the community has knowledge on vector control with the prevalence of flies and mosquitoes and the link with diarrhea and malaria.

The community washes their hands mainly for cleanliness before eating, after eating and after defecation. 77 % of persons use only water because they cannot afford to buy soap, and it is not usual and not a priority to use soap and other products (ashes, sand, etc...) for hand washing.

Mains comments of Disaster Risk Reduction

At National level, Central Committee for National Disaster Prevention is formed to coordinate all stakeholders and 16 ministries to management natural disasters affecting Myanmar.

Local authorities (division, district, township, village tract level) have also Committee for Disaster Preparedness and Response Committee in charge to prepare evacuation, assistance and dissemination of weather forecast to the village through radio, TV and loudspeaker.

The major disaster is annual floods, and the duration can vary from 15 days to 3 months according to the area. The most affected persons are people living on the river bank and seashore. Farmers and fishermen are vulnerable according to the losses of their business.

The difficulties faced are lack of food (30%), landless (8%), lack of transport (30%), unemployment (40%), Water Points flooded (40%) and increase of diseases (8%).

The floods damage houses, paddy fields, boats and furnitures, latrines and water points. The roads, school and monastery are partially damaged.

Concerning the evacuation, on average of 46% of family evacuated to hill land, on school and monastery. They can stay in the safe building between 15 to 1 month with access to water points (bad quality of water) but not access to sanitation. Persons don't receive external support from the local authority in term of food supply and provision of shelter.

The type of disaster risk reduction set up in the village were reinforce houses, raise of animals shelter, preparation of foods, medicine and clothes before arrival of water, and construction of temporary bamboos floor under the roof of house.

Summary of recommendations

According to the access to coastal area and the problematic identified during the assessment, it will be better to develop program in one township as Ngapudaw.

The WASH component can be integrated in the Disaster Preparedness Program, as follow:

- Training on Community Based of Disaster Management
- Training on First Aid, Search and Rescue
- Training on Disaster Risk Reduction (DRR)
- Writing Village Disaster Preparedness Plan

- Set up Flood Early Warning System (communication channels, weather forecast, etc...)
- Design of Hazards and Vulnerable maps
- Set up Hazard, Vulnerability and Capacity assessment
- Set up Disaster Risk Reduction measures at household level
- Risk awareness campaign at community and school level integrating Water use, Sanitation and Hygiene component.
- Construction and rehabilitation of water points resistant to disaster
- Construction and rehabilitation of latrines resistant to disaster
- Construction of Rain Water Collector Tank at school level
- Development of safe areas with water points and latrines
- Water Quality Testing: bacteriological and chemical
- Creation of Committee integrating members to manage water points, to ensure cleaning in the compound, to disseminate hygiene and disaster messages, to assist people to set up DRR measures and during evacuation, etc...
- Development of Home Water Treatment (ceramic, sand filters, etc...)
- Technical training on water and sanitation facilities
- Provision of Latrine Kits
- Development of IEC Materials for water, sanitation, hygiene and disaster risks.

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1. INTRODUCTION

Action Contre la Faim (ACF) conducted a needs assessment in Ayeyarwaddy Division, Myanmar. This Assessment was conducted from 05th to 19th February 2008 (15 days).

The purpose of the needs assessment was to gather information on the water, sanitation, hygiene practices, and health and disaster risk reduction (DRR) situation in the division.

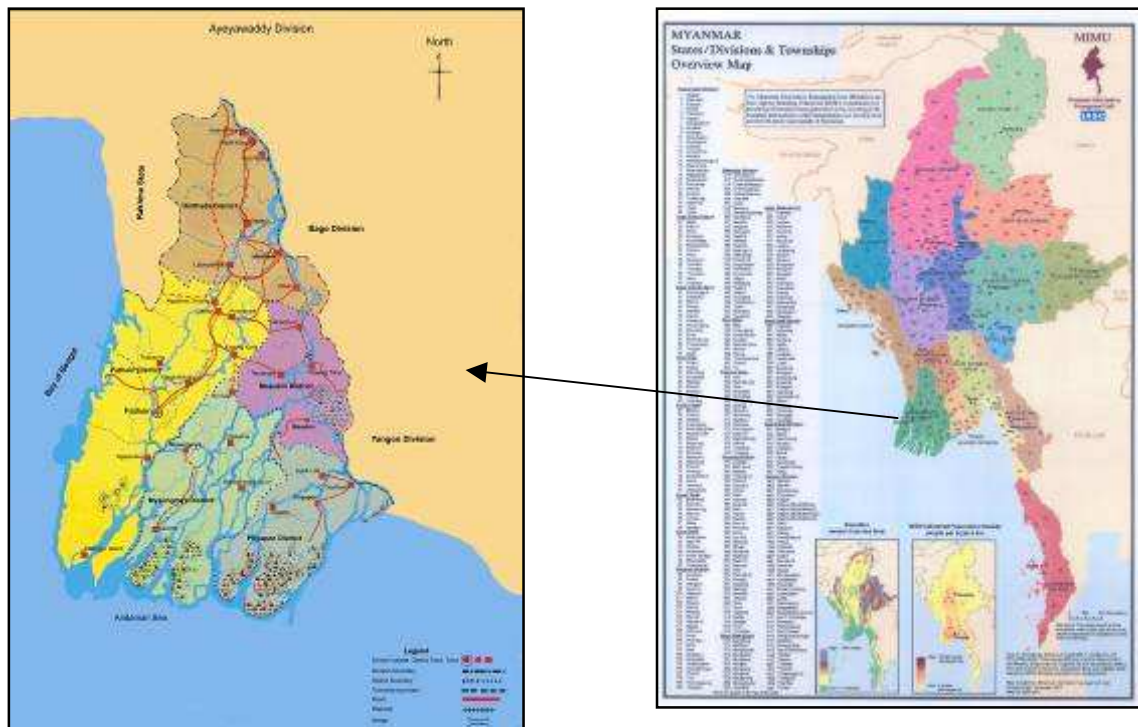
The assessment was conducted by team composed of 6 persons: WASH/DRR officer, program technical assistant, translator, 2 facilitators and logistician. The results were analyzed to identify the impact of potential disaster risks as well as a typology of water and sanitation needs and the adequate technical solutions. As well as formulation of recommendations of positioning and proposition of activities in the both fields of WASH and DRR was done.

2. BACKGROUND

a. Overview of Ayeyarwaddy Division

Ayeyarwaddy division is located at the Southern end of the central plains of Myanmar.

In North East of it there is Bago Division and in the East is Yangon Division. It is contiguous with the Rakhine State in the North West. On the Southern and Western sides there are Andaman Sea and Bay of Bengal. Moreover Ayeyarwaddy Division is mostly in Delta region and cross by many rivers as the Ayeyarwaddy River which constitute the most important river system in Myanmar.



The division lies between north latitude 15° 40' and 18° 30' approximately, and between east longitudes 94° 15' and 96° 15'. It has an area of 13,566 squares miles.

The Ayeyawady Division is made up of 5 administrative districts namely Patheingyi, Hinthada, Myaungmya, Mawbabin and Phyayapon. The division has been constituted with 26 townships and 1,912 village-tracts including 11,651 villages. Patheingyi is the capital of the division.

b. Demography

It is the most populous division with over 7 millions of inhabitants. The average of the population density is around 470 persons per square miles.

Ayeyarwaddy Division Population by district (Data from FAO – 2002)

District	Population	Household	Number of Township	Number of Village Tract	Number of Villages
Myaungmya	1 609 629	231 606	5	489	2 557
Pathein	1 802 450	285 843	7	519	2 959
Hinthada	1 562 183	241 181	6	371	3 043
Phyapon	1 113 569	152 670	4	298	1 450
Maaubin	1 095 710	170 742	4	235	1 642
	7 183 541	1 082 042	26	1 912	11 651

Among the inhabitants, there are 15% who living in urban area and 85% in rural area. The majority of the population is constituted by Bamar and Kayin nationals. Rakhine nationals are based in the western coastal region. The population professes Buddhism, Catholics, Baptism and Muslim. No conflict existing between different ethnic groups.

The houses in the Ayeyarwaddy division are mainly constructed with wood, bamboos and palm leaves roof. The houses are built on piles allowing the livestock living and the storage of materials and boats. Moreover the houses on piles can allow the people to stay during floods time. The household is composed by 5 members on average. The decision making is under the control of men. Generally women manage water, cooking, food storage, health care and education of children.

According to the data from the Department of Relief and Resettlement, during the Tsunami 2004, around 61 persons were killed, 42 injured and 2,562 victims. The number of damages and destruction of houses and other infrastructures is not available.

After Tsunami 2004 and on the coastal area, population has suffered of homeless and they have been difficulties to recover losses. At this time more than half of houses are in poor conditions and built with bamboos and palm trees roofs.

c. Climate

Annex 1: Rainfall map of Ayeyarwaddy division

The Ayeyarwaddy Division has a tropical climate characterized by the monsoon seasons:

- Pre monsoon: February to middle of May – Dry and Hot
- South West monsoon: middle of May to October - Rainy
- North East monsoon: November to January - Cold

The average temperature range is from 22° C to 32° C. The southern part (Myaunmya, Pathein and Phyapon Districts) is hotter than the northern part (Hinthada and Maaubin Districts).

The annual rainfall varies widely between the regions:

- Coastal region receives between 3 500 to 4 000 mm.
- North of Delta region receives between 2 500 to 3 000 mm.

Example of Monthly Rainfall in Pathein (Data from FAO - 2002)

	J	F	M	A	M	J	J	A	S	O	N	D	Total
Pathein	5	2	3	14	278	613	654	670	364	204	86	10	2 903

The wet zone can be subdivided into coastal and north zones, Pathein district having an annual rainfall of over 120 inches and Hinthada district having an annual rainfall of over 90 inches.

There is a weather station based in Pathein.

d. Topography and Hydrology

Annex 2: Ayeyarwaddy map

In Myanmar, there are (6) different types of aquifers: Alluvial, Irrawaddian, Peguan, Limestone, Igneous and other minor Aquifers. The aquifers of Ayeyarwaddy Division are mainly recent alluvium and Irrawaddian.

According to depositional environments, groundwater from those aquifers has disparities in quality. Of these aquifers groundwater from Alluvial and Irrawaddian aquifers are more potable for both irrigation and domestic use.

The coverage of irrigation and water resources is described below:

Table of Irrigation and Water Resources (Data from FAO – 2002)

District	Total Area (Ha)	Ground water Potential (mm)	Available Surface Water (mm)	Irrigated Area (mm)
Hinthada	698 592	119	820	19 133
Maubin	427 734	391	1 070	64 883
Myaungmya	734 640	103	1 070	135 571
Pathein	1 089 976	82	1 210	132 485
Phyapon	552 242	286	1 260	101 667
	3 503 184	981	5 430	453 739

Table of Water Usage for Domestic Water Supply (Data from FAO – 2002)

Sr. No.	State/Division	Domestic usage (Acre-ft)		
		Surface Water	Ground Water	Total
1	Sagaing	71796.97	179743.21	251540.18
2	Mandalay	99921.02	270707.59	370628.61
3	Magway	53370.67	217450.33	270821.00
4	Bago	46686.41	210229.86	256916.27
5	Yangon	292214.97	185162.70	477377.63
6	Ayeyarwaddy	82074.41	228588.32	310662.73
7	Tanintharyi	4769.96	48970.25	53740.21
8	Kachin	9147.02	49363.80	58510.82
9	Kayah	3556.85	10008.30	13565.15
10	Kayin	3010.95	76262.35	79273.30
11	Yakhine	47480.34	85311.45	132791.79
12	Chin	9327.37	13614.50	22941.87
13	Shan	69358.26	151954.73	221312.99
14	Mon	25856.65	93231.95	119088.60
	Union Total	818571.85	1820599.30	2639171.15

The Ayeyarwady River is the largest and it runs about 1 400 miles from its source (Kachin State) in the far north to its mouth. Major tributaries of the upper part of Ayeyarwady River are Mogaung, Taping Shweli, Chaungmagyi, Mu, Samon, Paunglaung, Zawgi and Myitnge. Tributaries of the central part of Ayeyarwady River are Yaw, Salin, Mon, Man, Sindewa, Pin and Yin.

e. Soils

Annex 3: Soil map of Ayeyarwaddy Division

The soils are in majority Chin Hill Complex in the centre and alluvial on the North East.

In the coastal area is composed by Mangrove Forest, meadow alluvial and meadow carbonate soils. In specific place like Pathein, it is compact soil, and on the western coast the soils are dune forest and beach sand.

f. Livelihoods

The Ayeyarwaddy Division's main produce is rice. The division is called the biggest granary of rice in Myanmar. Over 3.6 million acres out of more than 4 million acres of agriculture lands are paddy fields.

In addition to paddy fields, other prominent crops are maize, sesame, groundnut, sunflower and beans. Moreover chilis, onion, spices, tobacco, betel leaf and nuts, coconut, banana, mango, tapioca are grown.

There are 1.8 million acres of reserved forests and about 5 million acres of forests outside them. In the northern part of the division there are deciduous forests. And spring forests are located near of rivers and streams in upper part of the delta region. Moreover along tidal rivers and creeks grows Mangrove forest.

From Rakhine Yoma Forest woods such as Pyinkadoe, Taw, Thayet, Taung Thayet, Binga, Pynma and Htaukkyant can be extracted. And Mangrove forest produces Hmyaw wood used in construction and fishery works. And firewood and charcoal are mostly produced from Mangrove forest. Spring forests produce Anan and Yon wood to be used in building of houses and farm implements.

g. Access and Communication

The capital of Ayeyarwaddy, Patheingyi, is easily accessible from Yangon by roadway. Due to the proximity of touristy beaches, the request of Traveling Authorization (TA) is not necessary. Concerning the other zones, they are not accessible by tourists and foreigners must to have TA and registration next to District Peace and Development Council and Immigration Department.

The access to the villages are difficult related to the bad quality of the roads (narrow, sandy or rocky), and the coastal area can be reached only by waterway. The time spent for traveling depends of the season, with worst access during rainy season. In the countryside, the roads are not passable by car, and the population moves by walk, motorbike and/or public boats.

Along the traveling, fees taxes are managed by the Government for the roads, bridge and towns access. The amounts can vary between 0.08 to 0.5 USD (100 to 500 MMK) per vehicle.

Laputta Township is under regular control for using of waterway related to the Naval Regional Command Base located in this area. One check point exists in the harbor to register the arrival and departure of passenger boats.

In term of communication, phone lines are available in main towns of Ayeyarwaddy Division. Besides the main areas, phone lines are almost inexistent. Government has HF Radio, which can permit to establish a communication between District Peace and Development Council (DPDC), Township Peace and Development Council (TPDC) and Village Tract Peace and Development Council (VPDC).

3. METHODOLOGY

Annexes 4 and 5: Methodology and Data Collection Matrix

An in-depth analysis of WASH and disaster risks situations allows an overview of needs in the coastal townships surveyed.

The different phases of the assessment included a revision of secondary data from other agencies, meetings with the relevant stakeholders and organizations (ADRA, Save The Children, World Vision, UNICEF and Merlin), and field visits to areas which were highlighted in terms of needs and potential risks related to disaster.

The specific objectives were to:

- understand the WASH, Disaster Risks situations and Disaster Management and Response
- assess of the WASH, health and DRR
- formulate and define of potential WASH activities
- recommend of DRR technical solutions in WASH activities
- define a rank of vulnerability and the most vulnerable areas
- define a sustainable improvement in terms of water
- estimate the volume of future activities

A Data Collection Matrix was designed in order to cross check the understanding of WASH, health and DRR situations, required data, sampling of interviewees and measurements methods.

The activities were to:

- To review the WASH and DRR data collected and the documents available.
- To review disaster data base available
- To meet stakeholders to gather information on Ayeyarwaddy Division.
- To form a team composed by technical program assistant, translator and facilitators.
- To formalize a methodology and to brief the team.
- Through extensive field visits to gather information in order to assess the needs in term of water and sanitation, and Disaster Management as follows:

Indicator	Source of information
Hydro-geological context	Key informants Observation Maps
Localization of disturbance roots : power line, roads, engine/generator, activity	Focus group Observation / Village mapping Photography
Topography / Relief Land use (agronomy and economical activities)	Key informants Observation Photography
Easy Access (road, boat, isolated...)	Key informants Observation
Large Range of salinity water (localization of no salty ground water and very salty groundwater)	Key informants Observation
Quantity and quality of existing water resources	Key informants Focus groups Observation / Village mapping
Access to water	Key informants Focus groups Observation / Village mapping
Technical solutions and challenges	Key informants Observation
Water and sanitation practices	Key informants Focus Group Observation
Water related diseases	Key informants Focus groups
Potential for community participation and sensitization	Key informants Focus groups
Potential partner in the WASH domain	Key informants
Disaster History	Key informants Focus groups
Disaster Risk Reduction (Early Warning System and Response mechanism)	Key informants Focus groups Observation / Village mapping
Possible DRR interventions/ solutions	Key informants Focus groups Observation

- To analyze the data on water, sanitation, hygiene and disaster risk reduction situation.
- To formalize an assessment report.
- To report the situation to the mission, stakeholders and ACF headquarters.

4. STAKEHOLDERS INTERVENTIONS

Annex 6: Map of stakeholder's intervention

Numerous NGOs and the international institutions working on Water and Sanitation sector are present in Ayeyarwaddy Division as Merlin, Adventist Development and Relief Agency (ADRA), Save the Children (SC), World Vision (WV), United Nations Children's Fund (UNICEF), and United Nations Development Program (UNDP).

During the assessment, it was possible to meet some of them in order to have a better understanding on water, sanitation and hazards in Ayeyarwaddy division.

Discussions were conducted and reported below.

➤ ADRA

ADRA is active in 5 townships: Maungmya, Ein Me, Mawlamyaing Kyun, Wakema and Laputta on Water and Sanitation, HIV/AIDS, Infrastructure, Emergency Relief, Livelihood and Life Skill Training. Concerning the Water, Sanitation and Emergency Relief, programs are located in Wakema (20 village tracts) township.

The WASH program is a 5 years program funded by ADRA Australia (Sept 2005 – Aug 2006) and by UNICEF (July 2006 – Jan 2008).

The WASH and Emergency Relief program included:

- Construction of water point (pond, tube well, rain water collector tank).
- Construction of sanitation infrastructures (community latrine, school latrine).
- Health and Hygiene awareness training.
- Emergency Response after disasters (distribution of kit in the evacuation zone and in the villages).
- Rehabilitation Project (distribution of local available house construction materials after disaster).
- Household treatment pilot project: distribution of ceramic filter and water guard.

As ADRA finalized the project on 2008, ADRA applies to get funds for 2009 with UNICEF. If the proposal is accepted, ADRA would like to extend the project in Wakema Township to develop water and sanitation management at household level.

➤ World Vision

Since 5 years, World Vision implements Development program in 5 townships as Pathein, Thabaung, Kyan Khin, Ein Me and Myaungmya.

The Development program includes Health and Education, Socio economic, Water and Sanitation, Child protection, HIV and Disaster Management (emergency response and Community Based Disaster Management). The program on CBDM will start on January 2008 until 2010.

The WASH program is focused on:

- Water point constructions (tube well and rainwater collector tank, water testing and rehabilitation of ponds)
- Family and schools latrines
- Health program at school level

➤ Save the Children

Save the Children is currently active in 3 townships Kyonpyaw, Laymyathna and Kangyidaunt.

The WASH and Emergency Relief program consists to:

- Construction of water point.
- Construction of family latrines.
- Hygiene awareness campaign for community and schools.
- Household treatment through distribution of ceramic filter and water guard.
- Adaptation of water point in flooding areas (raise platform and raise pipe).

Save the Children intervene on Emergency Response and will plan to develop Emergency Preparedness Plan (EPP). This plan will be addressed to the national staff to improve the support during the Emergency. To improve their knowledge the plan will be accompanied by IEC materials. On the future Save the Children would like adapt the EPP at community level.

When these documents will be finalized, they will be shared with NGOs and Institutions working on Emergency Response and Preparedness in Myanmar.

➤ MERLIN

MERLIN programs started in Laputta Township after Tsunami 2004 and MERLIN started Emergency Response on Basic Health and WASH programs.

Water and Sanitation project started on 2005 and faced out on 2007. It covered all villages in Laputta Township.

Emergency Response consists to:

- Develop Basic Health assistance for 60 government health facilities, provision of medicine, capacity building, and malaria campaign (diagnostic, treatment and prevention) at community level
- Implement IMMCI (Integrated Management Maternal and Child Illness Program)
- Rehabilitate health facilities infrastructures
- Implement rainwater collector tanks at school and hospital
- Rehabilitate ponds
- Set up Hygiene awareness campaign
- Create water Village committee
- Develop Video taps on health and hygiene with the agreement of MOH

MERLIN would like to develop Emergency Response and Preparedness in the future with coordination with UNICEF. Depends of funding, MERLIN would like to develop and go depth on WASH Issue in Laputta Township.

➤ UNICEF

UNICEF responses in WASH program in partnership with NGOs to ensure the provision of safe water and proper sanitation for children and women in Myanmar.

UNICEF's actions are focused mainly on Emergency Response after natural disaster impact as:

- Distribution of Family Kit for 8,000 families (water, hygiene and sanitation)
- Coordination with NGOs, institutions and local authorities
- Provision of kits to Local authorities and management at District and Township levels

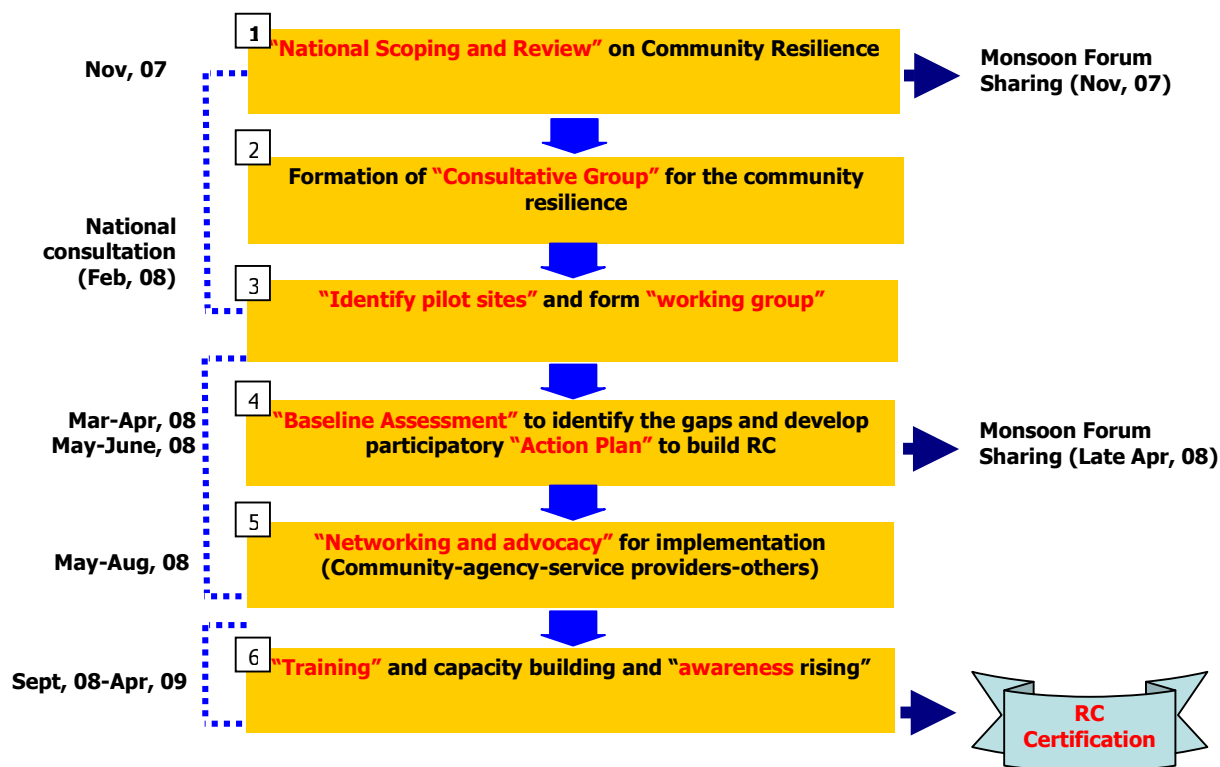
UNICEF integrates Emergency Response and Preparedness into annual work plan, and has intention to develop Disaster Preparedness in WASH activities (develop water points and latrines resistant during disaster). A creation of cluster on Emergency Response is under process in order to improve the coordination with all stakeholders in Myanmar and also to improve the Response in case of natural disaster.

➤ Asian Disaster Preparedness Center (ADPC)

National Consultation Workshop on Coastal Community Resilience (CCR) Issue in Myanmar was held on February 15, 2008 in Nay Pyi Taw and organized by ADPC.

ADPC explained overview on the CCR framework and implementation plans in Myanmar including: Context of coastal disasters, Cycle of elements of CCR, Cycle of components of CCR system and CRR Implementation plan in Myanmar

The proposition of action plan is as follow:



5. AREAS TARGETED

Annexes 7 and 8: Intervention map and Township maps

The selection of the areas was defined in coordination with NGOs working in Ayeyarwaddy Division (ADRA, Save the Children, World Vision, UNICEF and Merlin).

The assessment was conducted in 4 townships: Thabaung, Ngapudaw, Laputta and Phyapon.

ACF assessed the needs on WASH and DRR in 9 village tracts and 13 villages.

District	Townships	Total of village tracts	Nb of village tracts visited	Total of Villages	Nb of villages visited
Pathein	Thabaung	70	2	441	3
	Ngapudaw	83	1	410	4
Myaungmya	Laputta	50	3	395	5
Phyapon	Phyapon	46	1	160	1
		278	9	1 733	13

Population by village tracts

Townships	Village Tracts	Total Population	Total Men	Total Women	Total Children	Total Household
Thabaung	Thabaung Taw	1,730	898	832	NA	328
	Gonn Min	2,495	NA	NA	NA	NA
Ngapudaw	Dee Du Kone	7,809	3,920	3,889	2,393	1,743
Laputta	Gonn Gyi	8,000	2,666	5,334	NA	4,000
	Hlwa Za	7,800	NA	NA	NA	1,500
	Bine Taung Chaung	7,832	3,836	3,996	NA	1,616
Phyapon	Ayar	8,995	4,864	4,131	NA	1,764

Population by villages

Village Tracts	Villages	Total Population	Total Men	Total Women	Total Children	Total Household	Ethnic Majority
Thabaung Taw	Kwet Pyin	600	230	370	NA	90	Kayin
Gonn Min	The' Pwt	1,165	NA	NA	NA	230	Bamar
	Ohn Pin Su	700	525	175	20	100	Bamar
Dee Du Kone	Dee Du Kone	1,000	400	600	97	224	Bamar
	Kyauk Ka Let	3,600	1,800	1,800	200	525	Bamar
	Ma Gyi Chaing	1,500	600	900	98	300	Bamar
	Ah Sin Chaing	700	300	400	150	370	Bamar
Gonn Gyi	Awar Kar	540	180	360	31	100	Bamar
Hlwa Za	Danray Pyin Lay	500	100	400	30	105	Bamar
	Danray Pyin Gyi	900	400	500	NA	182	Bamar
Bine Taung Chaung	Kadan Lay	692	398	294	76	100	Bamar
	Ma Gyi Chaung	180	80	100	17	40	Bamar
Ayar	Ohn Pin Su	418	NA	NA	100	130	Bamar

6. WATER, SANITATION AND HYGIENE FINDINGS

Annexes 9, 10, 11 and 12: Semi structured interview table, Focus Group (WASH) table, seasonal calendar, problem tree on Water, Sanitation and Hygiene

The assessment evaluated the water and sanitation situation in 4 townships among them 3 are located in the coastal area (Ngapudaw, Laputta and Phyapon) and 1 in Northern of Patheingyi (Thabaung). The data were collected through local authority interviews at township, village tract and village level, focus group and community mapping. A general observation of the areas completed the information gathered.

a. Hydrologic context

Ayeyarwaddy Division depends of monsoon climate with heavy rains during 3 months (2,500 to 4,000 mm per year) which influence on the level of surface and groundwater. Moreover the coastal area is a delta area drained by many rivers and streams. The delta of Ayeyarwady river is a complex area and subject to both tide and fresh water discharges.

The proximity of Bay of Bengal and Andaman Sea has an impact on the quality of water, and in specific areas there is incursion of salty water in surface and groundwater.

According to the field visits, Ngapudaw and Laputta Townships have salinity aquifers.

Ayeyarwaddy Division is considered the first zone which exploited irrigation resources with more than 100,000 ha irrigated. The average availability of surface water is comprised on 800 to 1,600 mm per year and groundwater potential can vary between 60 to more than 250 mm per year.

b. Access to Water

The assessment evaluated the access to water resources through Local authority interviews, focus group and village mapping.

Water Resources accessible by the population for drinking and households purposes are:

- Surface water: 69.2%
- Ground water: 61.5%
- Rain water: 38.5%

The sufficiency of quantity of surface and groundwater is considerably reduced during dry season and limited during rainy season according to the flooding areas. The quality of water is poor and the potential of contamination increases during the rainy season.

According to the focus groups results, the average of amount of water collected was estimated to be 24 L/person/day. During the focus group it was not mentioned the volume of water collected for

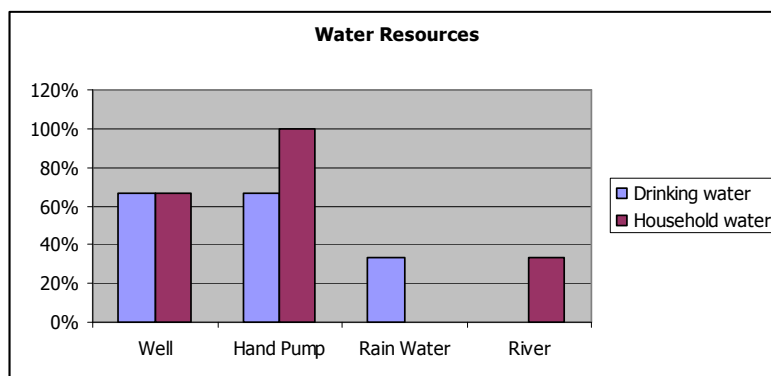
drinking and household water. This is under the SPEHRE standards which recommend 30 to 60 L/person/day for stable situation. The table below shows the average of consumption of water per day by township:

Township	Average Consumption of water(L/person/day)
Thabaung	29.6
Ngapudaw	16
Laputta	36.8
Phyapon	40

- **Northern Area: Thabaung Township**

In the plain areas and low land areas groundwater using is predominant due to the high static level of water (less than 16 meters).

The drinking and household water supply is from open ring wells and borehole hand pumps.



Even if during the dry season, from March to May, the static level of water is deeper, the quantity of water is still sufficient and the population can continue to use these water points.

During the rainy season, from June to September, the access is often limited related to the floods prone areas.

The community response is to fetch water directly in the river for drinking and households purpose. In addition small scale of family collected Rain Water with cooking utensils and only for daily consumption. Rain water collector containers are not developed in the villages visited due to the cost price (17 USD for one clay jar – 70 liters).

The quality of water is poor and part of water points are contaminated by Iron and Arsenic.

In 2 villages visited, the surveyors observed hand pumps painted on red color by UNICEF and Ministry of Health, indicating Arsenic Contamination. Also UNICEF confirmed that this area is potentially risky on Arsenic.

The majority of ring wells are constructed with concrete and bricks and by villagers themselves.

The totality of ring wells assessed are unprotected and no maintained. Moreover the ring wells are not equipped with pulley, bucket, cover, fences and roof that increase the contamination from external and surface elements. No drainage channels exist around the ring wells. The bad conditions of the water points and the environment can conduct to increase of diseases and transmission of water born diseases.

The hand pumps were installed by UNICEF, World Vision and Save the Children and they are still working. However no maintenance is ensured around the hand pump to limit water stagnant and no fences existing. In some villages, water points committees have been created but currently they are not formed and they have not responsibilities on management of water points. Moreover the population doesn't take account the cleaning outside the water points.

Hand Pump – Red Painting in Ohn Pin Su village



Ring Well in Ohn Pin Su Village



The schools visited are supplied thanks to Rain Water Collector Tank (RWCT). Unfortunately the RWCT cannot provide enough water during dry season and the maintenance of these containers is not carried out by the population. This water resource supplies the majority of the students and its use is restricted for the other part of the population.

In one village supported by World Vision, ACF observed one water tank equipped with a submersible pump and generator. But according to the income of the villagers, they cannot afford to purchase fuel daily, so the school is supplied with water 2 days per week, that is insufficient to cover the needs of the school.

- **Coastal Area: Ngapudaw, Laputta and Phayapon Townships**

There is a complementarity between surface and ground waters for drinking and household purposes. The access to surface and ground waters depends on the salinity of water and weather conditions. The surface water points are ponds and ground water points are ring wells and hand-dug wells. The ring wells are built with brick and concrete materials.

During the cold and rainy season, from June to February, the drinking water is mainly from ponds and the household water resources are divided between ponds and wells. The population has access to rain water catchments but it is mainly developed at the school level.

In addition, in 53.8% of villages assessed, the water is not free.

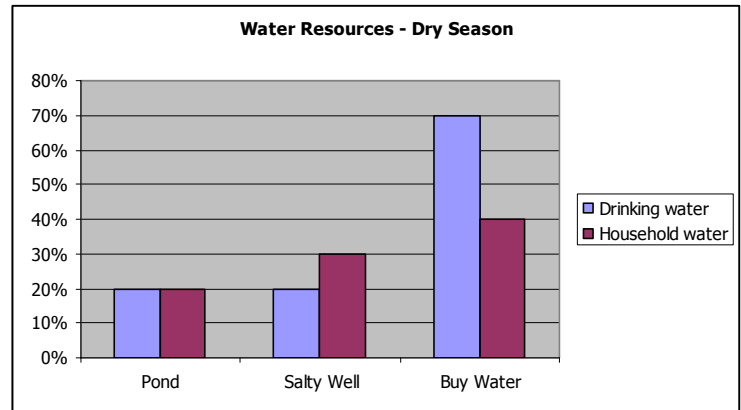
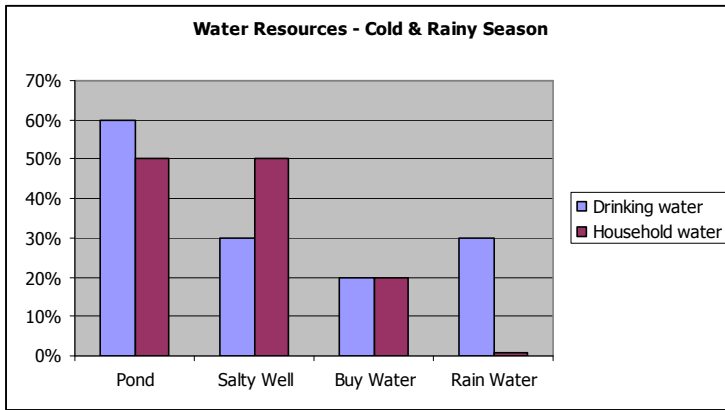
The payment for water can be:

- Payment to fetch water into the internal water points: 0.025 USD per bucket (20 liters) so 30 MMK per bucket (20 liters \approx 4 gallons)
- Payment to fetch water into the external water points: 0.1 USD per bucket (20 liters) so 115 MMK per bucket (20 liters \approx 4 gallons)
- Payment to get water from the boat seller: 0.05 USD per bucket (20 liters) so 70 MMK per bucket (20 liters \approx 4 gallons)

The payment to fetch water into the internal water points is mainly for the maintenance of the water points (fencing and cleaning around the water point).

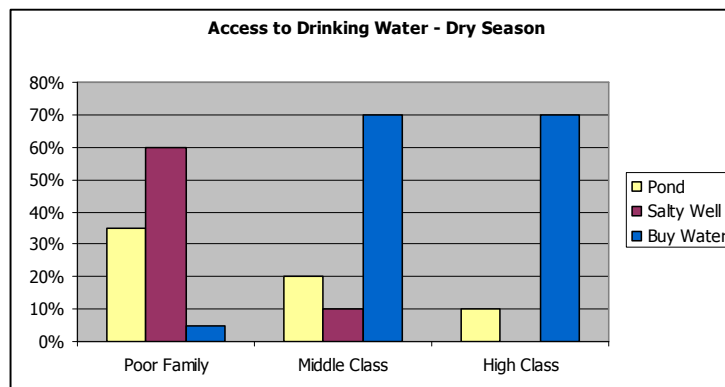
During the dry season, from March to May, the majority of the ponds are dry. The community response is divided into 2 parts for drinking and household water:

- using of salty wells
- purchasing of water from boat seller and/or neighbor's ponds



Even if rivers are at proximity, people don't use them according to their belief. According to the population, spirits living into the rivers and protect them. So the population prefers to use the river only for fishing and prevent the river.

ACF observed different levels of social classes among the population: poor families (30%), middle class (60%) and high class (10%). And according to the range of class, the consumption of water for drinking uses is different, especially during critical period from March to May. The poor families consume majority of salty water from wells while middle and high classes can afford to buy water from external water points and boat seller. The origin of the water is not clear for the population and they doubt about the quality. Moreover the price is not fixed and can vary according to the seller. The seller can come several time per week, but it still difficult for the population to manage the time and to know his timetable. During the rainy season, when the access by the waterway is difficult, the boat seller reduces his timetable and increases the price of the water.



The conditions of water points and the quality of the water are not satisfactory.

The ponds are not protected by fences that can allow the access to domestic animals and increase the potential of contamination from external factors and transmission of water born diseases. The majority of ponds contained cloudy water.

Generally the ponds are maintained 1 time per year (cleaning and digging), and in 53.8% of villages the access is paying and controlled by one volunteer selected by village leader or living near of the pond. The price is not fixed and depends of the village leader, seller and also the season. It can vary from 0.025 USD to 0.1 USD per bucket of 20 liters (30 to 115 MMK per bucket of 4 gallons).

During the dry season, the access to the pond is controlled, and the community can fetch water only 1 time per week and use 2 buckets (40 Liters) as water containers.

The ponds are dug in hill land (rocky area) from 30 minutes away. The access is secure and the population can have access to the ponds even if the village is flooded.

Concerning the groundwater, there are 2 types of community wells: brick ring wells and not protected wells.

The wells are dug by villagers themselves, and at proximity of houses. Generally the hand dug wells are built every year according to their collapse during rainy season. The water table can be reached from 1 meter and over of 2 meters, there is a potential to reach salinity aquifers. The wells are unprotected and they are not equipped by pulley, bucket, roof, cover and fence. The majority of wells are salty water, and it seems to have bacteriological contamination according to their bad conditions and the proximity of stagnant water, animals and fishery factory.

Hand Dug Well in Laputta Township



Rain Water Collector Tank – School in Laputta Township



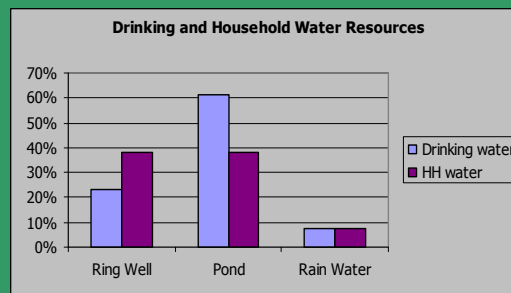
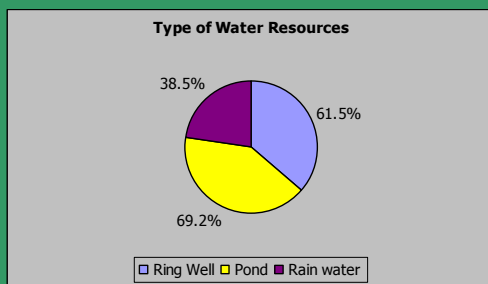
The plot of land is reduced and narrow, so the population need to loan land if they want to construct community water point. According to this topic, the number and type of water points are limited. The community has low knowledge on technical issue for construction of water points, so people build themselves hand dug wells which are not adapted to the context and on safe water supply. Related to their knowledge, the people don't pay attention to the maintenance and management of the water points.

The fact that the population has low access to drinking water during dry season, people need to fetch water in other villages. This action generates conflict between villagers about the management and use of water.

Summary:

There are 3 types of water resources:

- (1) Surface water = ponds
- (2) Groundwater = ring wells
- (3) Rain Water



The access and the use of these water resources are different according to:

- (1) The consumption from drinking, cooking or washing purpose.
- (2) The quantity and quality of water.
- (3) The socio economic situation.

The average of the water collected is estimated to be 24 liter/person/day.

80% of the water points are in bad conditions and the quality of water is not satisfactory.

80% of villages faced to insufficiency of water during dry season.

53.8% of villages faced to buy water due to insufficiency and poor quality of it.

c. Access to Sanitation

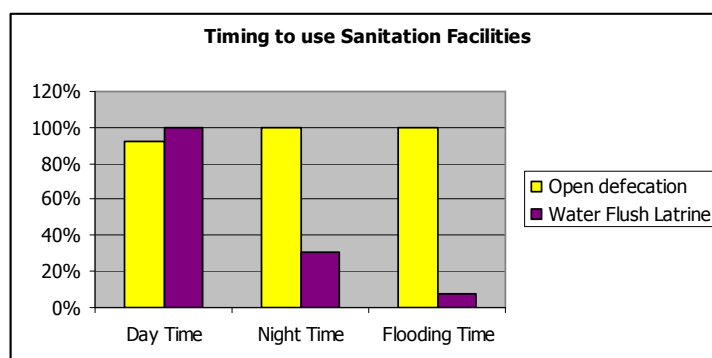
The access to sanitation facilities was assessed through Local authority interviews, focus group and village mapping. The results indicated that the sanitation situation is identical between the Northern and Coastal areas.

The type of latrine which is more developed in Ayeyarwaddy Division is the water flush latrine with pipe and pan. This is due to the "Latrine Program" set up and promotes by the Government. And as the population has low knowledge on technical issue for latrine's construction, they cannot develop other type of latrines by themselves.

The Government imposes the construction of water flush latrine with pipe and pan for each family. Normally the family without this latrine must paid tax. But according to the coastal area and floods every year the families are exempted from this tax for the moment.

The sanitation condition is still limited and the coverage of sanitation facilities is low.

There are 75% of the population who use open defecation, 20% who use water flush latrine and 5% who use surface latrine. Among 20% who use water flush latrine, everybody used it during the day time but during night time and disaster time, more than 60% of persons used open defecation. The coverage of latrines is under the National percentage which indicated that 74.5% of the population has access to sanitary means of excreta disposal.



According to the economic situation of family, people cannot afford to build own latrine.

The water flush latrine is not easy to carry out related to the cost and the provision of pipe and pan.

According to the area and the access to resources the average of price can reach:

- Bamboos = 20 USD / 25,000 MMK
- Wood = 40 USD / 50,000 MMK
- Brick = 125 USD / 150,000 MMK
- Pit = 16 USD / 20,000 MMK
- Pipe and Pan = 8 USD / 10,000 MMK
- Total latrine = 45 to 150 USD / 55,000 to 180,000 MMK

Generally the pit of latrine is a simple pit reinforced by bamboos. In case of floods, the pit collapses and there is bacteriological contamination. The daily maintenance of the water flush latrine is ensuring by the owner. In case of full pit, the interviewees mentioned that they dig new pit and protect the previous area. But it is a hard work because the latrine pit is not sustainable and families need to change it every year. Often after one or two years, they stopped the process. Moreover when the pipe is blocked up, they are constraints to build a new one caused the latrine cannot be used anymore.

According to the size of family and the access to the water resources, the quantity of water used for water flush latrine can vary from 1 to 3 liters per day.

Water Flush Latrine in Dee Du Kone Township



Water Flush Latrine in Thabaung Township



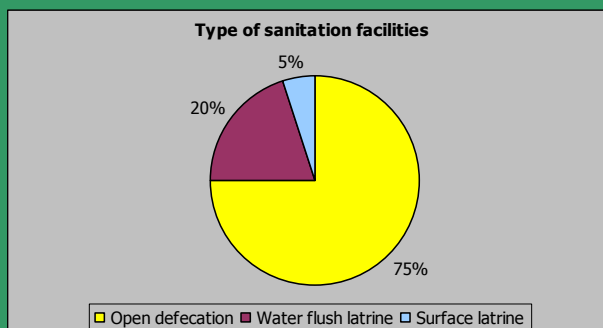
Concerning open defecation and surface latrine, the maintenance and cleaning of compound by community are inexistent. In fact the community used Natural Cleaning thanks to domestic animals (pigs, chicken and ducks) and natural phenomena (tide, flood and heavy rain).

There are not waster water and no garbage management. There is 100% of the household which throw waste water in the compound and near of their house. And 92% who throw rubbish in the compound or in the sea / creek during all year. Among them, 38% burn it during dry season. In coast area and with the extension of fishery business, the villagers complained about the flies and mosquitoes prevalence.

Summary:

There are 3 types of sanitation facilities:

- (1) Open Defecation
- (2) Water Flush Latrine
- (3) Surface Latrine



The use of sanitation facilities depends of the time (day, night and disaster) and also to the cost of the structures.

The low knowledge on latrine's construction doesn't facilitate the development of other type of latrines more sustainable and less expensive.

The community is not aware on waste water and garbage management.

d. Knowledge, Attitude and Practices

Knowledge, attitude and practices on water handling, sanitation and hygiene practices were evaluated during the assessment through to focus group and observation.

The water handling regroups the water use and water fetching, transport, storage and home treatment.

ACF team didn't observe a difference of attitudes and practices between Northern and Coastal areas.

➤ **Water Use, Fetching and Transport**

The household purpose water is mainly for cooking, bathing and washing clothes. In addition the community uses this water for gardening and livestock.

The ponds are the preferred water resource for drinking (61.5%) and household water (46.2%). In 61.5% of case, people separate drinking from household water related to the Burmese tradition and the quality of the water.

Women and children are responsible to fetch and transport drinking and household water every day. On average they go to the water points 3 times per day, and spent 5 to 30 minutes by walk for the journey.

The containers used to fetch and transport water are the same, and 100% of the population interviewed used 2 plastic containers per trip with a capacity of 20 liters each.

In the case of the water resources are outside the village and in the neighbor villages, the families rent trolley which can contain 10 to 12 plastic buckets to facilitate the transport and share the cost per quarter.

According to observation during transect walk, the plastic buckets are not in good conditions, are dirty and they don't have cover. Moreover the technique to fetch water is not adapted and don't prevent against external contamination.

Trolley in Bogalay Township

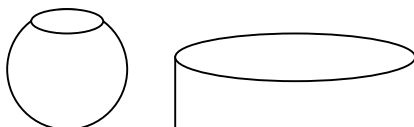


Fetching water in Laputta Township



➤ **Water Storage**

100% of villages assessed have the same organization to store the water, describe as follow:

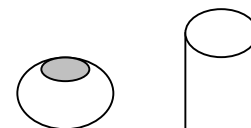
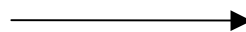


Drinking and Household Water

Storage Container:

- Clay Jar = 70 liters (16 gallons)
- Clay Jar = 215 liters (48 gallons)
- Concrete Tank = 110 liters (24 gallons)

Clay Jar



Drinking Water

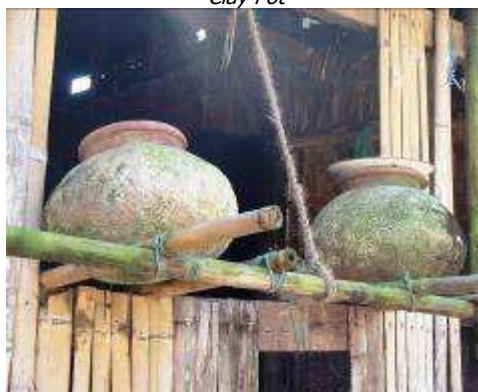
Storage Container:

- Clay Pot = 20 liters (4 gallons)
- Plastic Bucket = 20 liters (4 gallons)

Concrete Tank



Clay Pot



Among the families interviewed, 69.2% use the clay jar of 70 liters, 30.8% use clay jar of 215 liters and 30.8% use concrete tank to store drinking water and household water. One family possesses 1 or 2 containers. The clay jars and concrete tank are located in the compound and they are not covered. The containers are cleaned at least 1 time per month.

In villages visited in the coastal area, around 30% of the families cannot afford to have their own water storage containers. The price of clay jar is estimated to 16 USD (20,000 MMK). In this condition poor families share the clay jar and plastic buckets with neighbors without money exchange.

At home, the drinking water is store in specific clay pot used only for drinking water and 23.1% of household used plastic bucket. This clay pot is placed on the shelf with cover. One family possesses 2 or 3 clay pots and 2 or 4 plastic buckets. The clay pot is clean each time that it's filling up.

➤ **Water Treatment**

The reason to carry out Home water treatment is more focused on the cleaning that treatment. 76.9% of people interviewed treat the water to clean it from sands, particles and leaves, and 23.1% used the treatment to kill bacteria.

100% of persons reported to use clothes filtration, 62% used settlement during 2 nights, and 8% boiled water before drinking (excepted for Chinese tea). The settlement of sediment can be completed by addition of Alum and lime.

➤ **Sanitation**

As mentioned before, 75% of the household have not access to latrines.

According to the transect walk, latrines are not adapted to elder and disabled persons.

Also children prefer to use open defecation than latrines which are too narrow and dark for them.

The latrines are in bad conditions and are not cleaned properly. The structures of the latrines are on bamboos and it is not resistant to weather.

The water flush latrines are used on day time, and people prefer to defecate outside during night time and disaster time.

For personal hygiene cleanliness, people used bamboos sticks (92.3%), paper from book (76.9%) and leaves (15.4%).

➤ **Hygiene**

Hygiene was evaluated of water born diseases transmission, prevention and treatment. The assessment evaluated corporal hygiene, including hand washing.

Community makes easily the relation between water and diseases:

- 92% of persons interviewed reported that there is a link between diarrhea and consuming of unclean water which can be contaminated by bacteria and germs.
- 38% made the relation between skin diseases and using of unclean water especially salty water.
- 31% knew that Malaria can be caused by the dirty water near of the houses and also from the mosquitoes.

Moreover the population is aware about the vector control:

- 30.8% knew that flies can transmit germs and caused diarrhea.
- 30.8% knew that mosquitoes can cause Malaria and Dengue.

100% of the interviewees indicated that they wash their hands before and after eating (Burmese persons traditionally eat with their hands). And 62% reported to wash their hand after defecation. Generally they indicated that they wash their hands for cleanliness (85%) rather than prevention of diseases transmission (54%).

Even if the soap is available on the shops, only 23% of the interviewees used it. As the predominance is open defecation, it is not usual and not a priority for them to use directly soap after defecation.

People wash their clothes with soap at least 2 times per week either at home or at the water points. And they take bath one time per day, same for the children, either at home or at the water points.

Summary – Water Knowledge, Attitude and Practices:

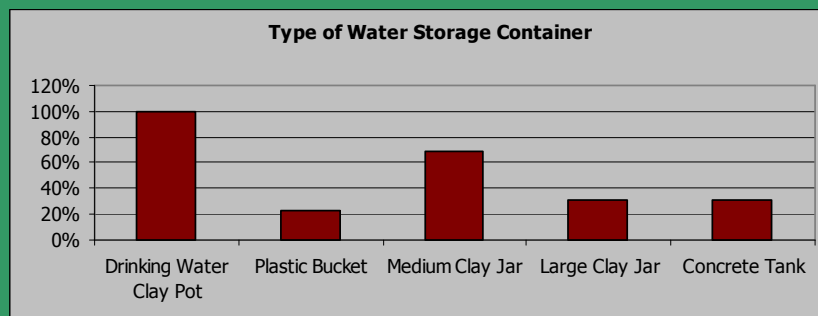
The preference is ponds for drinking and household water.

According to the poor quality of the water, 61.5% of the population prefers to separate their drinking water from household water.

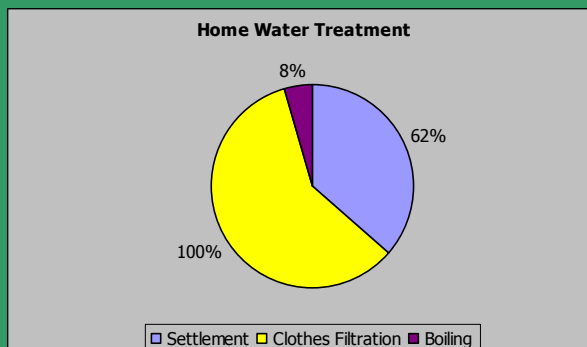
To fetch and transport water, the majority of people use 2 plastic buckets during 3 times per day. The practices of fetching are not satisfactory and water containers are in bad conditions.

To store the water, people use:

- Clay jar (70 to 215 liters)
- Concrete tank (110 liters)
- Plastic bucket (20 liters)
- Clay pot (20 liters), only for drinking water



To improve the quality of water at home, the people practice:
Settlement of sediment (2 nights)
Clothes Filtration
Boiling



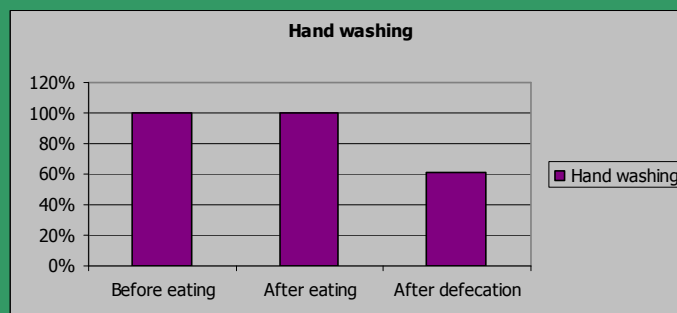
Summary – Sanitation and Hygiene Knowledge, Attitude and Practices:

The latrines are not in good conditions and people cannot afford to maintain them. For personal hygiene cleanliness, bamboos stick (92.3%) leaves (15.4%) and papers (76.9%) are used.

Generally community has knowledge on water born diseases and on vector control.

The community washes their hands mainly for cleanliness and:

- Before and after eating
- After Defecation



77 % of persons use only water for hand washing because they cannot afford to buy soap, and it is not usual and not a priority to use it.

e. Prevalence of Diseases

During local authorities and focus group interviews, ACF asked on the predominance of diseases, in which period diseases occur and how the people treat them.

100% of the villages visited are affected by diarrhea during all year and 23% of them have already had diarrhea outbreak. The second important disease concerns Malaria which occurs during all year and in 38% of areas visited.

The population mentioned a high rate of fever but they don't know if it's related to Malaria or if it's another disease. Presences of dengue, eyes infection and skin diseases have been reported.

The prevalence of diarrhea and malaria can be linked to the poor quality of water and bad conditions of hygiene and sanitation.

In these townships, there is a lack of health care access, 90% of the villages have no health center. The community can find medicine at village level, but for severe cases people need to travel at least 15 kilometers to access to sub and health center. Moreover the community has low knowledge on treatment, so they don't use adapted medicine to treat diseases.

In case of severe cases, the people need to spend money and time for transportation, especially during the rainy season when the access is difficult, and the dependence of public transport is not easy to manage.

f. Community participation and sensitization

As these townships have been supported by NGOs, as MERLIN, ADRA, World Vision and Save the Children, the local authorities and community have been already sensitizing about projects (mid and long term activities) from NGOs.

However, problems cases have referred to the team explaining that institutions cheating them and now population have not confidence on NGOs.

In addition the population mentioned that NGOs didn't implicated the inhabitants into the project. Moreover the infrastructures developed and built were not sustainable and adapted to the requests of villagers (water points damages, dry pond, no provision of pipe and pan for latrines, etc...). So the population explained us that for the future project, NGOs should to consider the community participatory and to provide relevant expertise on water and sanitation construction.

Even if the communities encountered difficulties on water and sanitation aspects, they are conscious that the water and sanitation situation shall be improved with external support. People are aware and motivated to participate during the future project.

For the future ACF project in the area, the population will participate during the design of the project and the inhabitants will be implicated during all the process of the project.

According to the ACF IN Water Policy, the project will promote integrated approaches at community and household levels in order to ensure an improvement of access to safe drinking water, sanitation and hygiene situation.

g. Culture and Beliefs

In Phyapon, Laputta and Ngapudaw townships, communities practicing type of belief based on spirits living in water resources, especially on the river and on the sea. These spirits protect water and also have benefits on fishery business.

The population living near of the river doesn't use the river as drinking and household water in order to not disturb the spirits living here.

h. Technical Solutions

According to the problematic identified, insufficiency of water for the human consumption and poor quality of water, the solutions could be:

- Better understanding of hydrogeology context
- Improvement of access to drinking water
 - Construction of concrete ring wells and boreholes
 - Construction of Rain Water Collector Tank at school level
 - Rehabilitation of water points existing: drainage and protection, equipment of wells with pulley, bucket and cover.
- Improvement of water management
 - Creation of Water Point Committee
 - Technical training on water points construction and management for Water Point Committee
 - Water Quality Testing: bacteriologic and chemical
- Improvement of sanitation access
 - Construction of latrines: latrine simple pit, double pit, water flush latrines
 - Rehabilitation of existing latrines
 - Technical training on latrines construction and management for community
- Improvement of Knowledge, Attitudes and Practices
 - Distribution and training of Ceramic filter for Home Water Treatment
 - Provision of Latrines Kits (materials of construction / Cleaning tools and soap)

- Hygiene Promotion Awareness Campaign (water use, water born diseases, vector control, sanitation, corporal hygiene practices, etc...) at school and at community level
- Creation of leaflets for water, sanitation and hygiene sensitization

The implementation of water points and latrines must take into account the risks of natural disasters. The infrastructures should be adapted to the floods risk (raise of platform, raise of pipe, protection of pit, etc...) and located in safe area easily accessible by the community.

7. DISASTER RISK REDUCTION FINDINGS

Annexes 13 and 14: Focus Group (DRR) table, Problem tree on Disaster Preparedness

The assessment evaluated the disaster situation in the 4 townships. Disaster prone areas were defined. Through focus group data were collected on type and frequency of disaster, disaster impacts and community response. During local authority interviews and documentation, ACF identified the role and responsibilities of local authorities at different levels, and disaster history.

a. Institutional Organization – National Level

Annex 15: Organization chart of National Disaster Preparedness and Response Committee

After Tsunami 2004, Central Committee on National Disaster Prevention (CCNDP) was formed in 2005 according to the Notification of the State Peace and Development Council.

The CCNDP is constituted by:

- | | |
|--|-----------------|
| - Primer Minister | Chairman |
| - Minister of Social Welfare, Relief and Resettlement | Vice Chairman |
| - State and Division Chairman | Member |
| - 16 Ministries | Member |
| - Mayor of Yangon and Mandalay | Member |
| - Deputy Ministry of Home Affairs | Secretary |
| - Deputy Ministry of Social Welfare, Relief and Resettlement | Joint secretary |

The mandate of National Disaster Prevention Committee is:

- Drawing Disaster Management Policy
- Guiding Utilization of National Resources for Disaster
- Guideline for Coordination of Foreign Aids for Disaster
- Managing National Budget and Resources for necessary area
- Drawing necessary Acts, Rules, Regulation and Orders for Disasters

Organization chart of Central Committee for National Disaster Prevention, Working Committee and Sub Committees:



➤ General Administrative Department (GAD)

The GAD contributes in Disaster Prevention and Management process as follow:

- To organize Disaster Prevention and Management Committee at National level, State & Division level, District & Township level. And reorganize Sub Committees at different levels.
- To define tasks on Preparedness, Relief and Resettlement for each level of Disaster Prevention and Management Committee
- To coordinate and collaborate with other Governmental Institutions and Local & International NGOs

➤ Ministry of Health

The Ministry of Health is in charge:

- To keep the collection of information for early warning system and timely reporting on natural disaster
- To identify the disaster risk areas and its population, usual occurrence of communicable diseases and duration of disaster period, development of disaster mapping and prepare for necessary health care services
- To identify safe buildings, hilly area, secure area for providing of emergency health care services
- Prepare suitable places for hospitals, clinics and medical staffs
- Formation of mobile medical squads at various levels, training and practicing drill
- Assess and modify the current practicing ambulance system
- To train health staffs, non-governmental organizations and community for first aid treatment and emergency relief.
- Surveillance for Communicable disease and other diseases
- Prepare for obtaining adequate, safe water for emergency use in secure places before and after disaster
- Co-operation with other sub committee in emergency for search and relief
- Co-operation with other department and organization for rehabilitation
- Surveillance for health problems during post disaster
- Evaluation and feedback of all the health care activities done during disaster
- To do preparedness plan for further events
- To prevent the consequent social and health problems in emergency relief shelters with other concerned sub committee

➤ Ministry of Information

The objective is to educate people to take preventive measures against disaster by knowing beforehand the possible outbreak of disasters of fire, Tsunami, Flood, Storm, Earthquake and Drought in the country and to inform the people of news on disasters in time.

Their duties and responsibilities are:

- To inform the people on preparedness and prevention measures through the media such as dailies, journal, magazines, television and radio
- Before, during and after disaster to disseminate information and to release news
- To supervise and scrutinize the work of subordinate bodies at different levels for ensuring effectiveness of information work.

The Ministry of Information set up techniques to disseminate relevant information (warning, weather forecast, spots, etc...) like TV Programs, Radio broadcast, dailies, advertising on movies, pamphlets and journals.

➤ Department of Welfare, Relief and Resettlement (DWRR)

The Department of Welfare, Relief and Resettlement is in charge:

- To give emergency relief to the victims of natural disaster to meet their food, clothing and shelters needs.
- To take preventive measures to minimize loss of human lives, houses and properties in time of calamities.

The action plan includes public education, awareness and advocacy integrating Disaster Management course in state and division in Myanmar. Target participants are local government staffs, Union Solidarity of Development Association (USDA), Myanmar Red Cross Society (MRCS), Auxiliary Fire Brigade and Myanmar Child Welfare Affairs (MCWA). The courses were done in Yangon Division, Rakhine State, Taninthayi, Ayeyarwady Division and Mon State.

➤ Department of Meteorology and Hydrology (DMH)

The objectives of the DMH are:

- To exchange information with others centers on weather, water and earthquake.
- To safeguard people from losing their lives and property by issuing the Early Warning and bulletins for all weather, water and geological related hazards.
- To expand the Public Awareness and Education program on Natural Disasters, Natural Hazards and Environmental Issues.
- To monitor on Climate Change, underground water resources, air and water quality of Myanmar.
- To assist to all authorities from Transport, Health, Agriculture, Construction, Health and Tourism by providing weather, hydrological and seismological information.
- To assist in all National projects.

Forecast, warning, bulletin and news issues are focused on:

- Daily, monthly and season weather and water level forecast
- Aviation and shipment weather forecast
- Squall wind and coastal area weather forecast
- Storm and Storm surge warning
- Flood warning and Flood bulletins
- Untimely Rainfall warning
- Fog and heavy rain warning
- Tsunami warning
- Earthquake news
- Agro meteorological bulletins

Different equipments of measure of natural disasters are set up in Myanmar as:

- 11 Seismological stations
- 25 River forecasting stations

The DMH develops Public awareness and educations program on natural disaster through workshop, training course, lecture to University / College / High School about weather and disaster mitigation and prevention, Radio Talks and Television News, distribution of pamphlets and articles in the newspapers.

➤ Department of Communication, Post and Telegraphs (DCPT)

The Sub committee for emergency communication is formed to provide more effective and efficient communication system in affected areas.

During disaster emergency communication system can be:

- Domestic satellite communication system
- High frequency radio telephone system
- MPT satellite terminal system

The dissemination of information follows the way described below:



➤ Myanmar Red Cross Society

MRCS has responsibilities on Disaster Management and Preparedness, as follow:

- Strengthening the capacity of National Head Quarter and Red Cross volunteers at all levels.
- Relief Response Activities
- Logistics: storage of relief goods
- Communication and Information
- Training Courses on Community Based on Disaster Management at State & Division level
- Training Courses on Disaster First Aid and Search & Rescue

b. Institutional Organization – Township, village tract and village Level

At township level, it is the Township Peace and Development Council (TPDC) who coordinates and manages the actions before, during and after disaster. Anyway their actions are still limited as collection of data, rehabilitation and resettlement and reporting to Distict level.

At village tract level, the responsibilities of VPDC are organization of evacuation, assistance for evacuates (food, shelter and health), following of weather forecast, reception and dissemination of information and warning message to village level, collection of data and reporting to TPDC.

At village level there is a lack of leading mechanisms and low knowledge on Disaster Management and Preparedness. The village leader with the coordination of 10 Household, 100 Household leaders organize evacuation of families, and manage the distribution of goods (rice, clothes, blanket, etc...). The leaders have the responsibilities to inform and disseminate message to villagers on weather forecasts and water level. The dissemination of warning message is realized door to door and with loudspeaker. After events, they report on damages, human injured, sickness and death case to the VPDC and TPDC. Before the events no evacuation plan is designed and no safe areas are identified.

It was noticed that the Local Authority doesn't consider Disaster as a priority and they are not active. According to this non acceptance, local authority doesn't provide support in case of annual floods and storm. Moreover the emergency response is insufficiency and the victims are targeted.

Summary:

At National level, Central Committee for National Disaster Prevention is formed to coordinate all stakeholders for the management of natural disasters affecting Myanmar.

National Ministries are in charge to disseminate information to Local Authority by line phone, mobile and fax/email.

Local authorities (division, district, township, village tract level) have also Committee for Disaster Preparedness and Response Committee in charge to prepare evacuation, assistance and disseminate weather forecast to the village through radio, TV and loudspeaker.

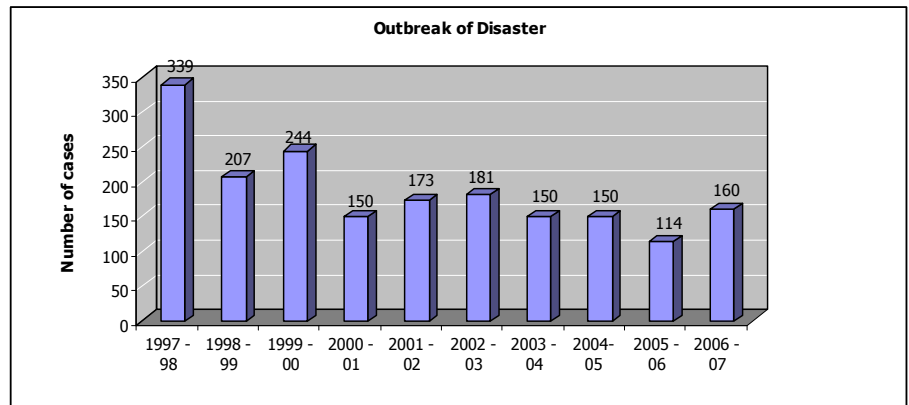
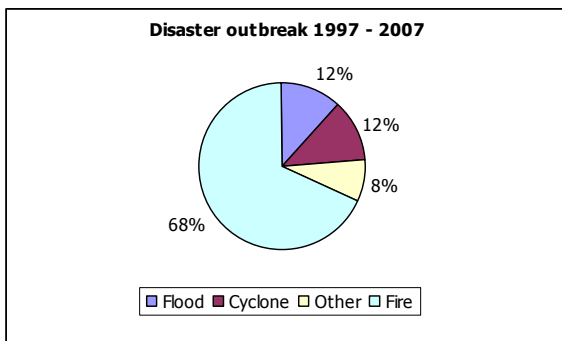
At village level, the knowledge on Disaster Preparedness is low and there is a lack of leading mechanisms to prepare evacuation and assist victims before, during and after disasters.

c. Disaster History

The disasters in Myanmar can be divided in two groups:

1. Natural disasters regrouping floods, cyclone, earthquake and Tsunami
2. Man made disaster regrouping fire

According to the data from Department of Social Welfare, Relief and Resettlement, Disaster outbreak in Myanmar from 1997 to 2007 is as follow:



Last exceptional crises affecting Rakhine State, Ayeyarwaddy and Thaninthayi Divisions were:

- Tsunami on December 2004
- Mala Cyclone on April 2006

Cyclone Mala – Scene at Chaung Tha



d. Disaster in Ayeyarwaddy Division

Among 13 villages visited, 12 are affected by annual floods (98.2%) and storms (76.9%). Storms can be caused by local heat and them coming from Bay of Bengal and Andaman Sea. Storms generally take place from May to November, with high intensity on May.

The floods are due to the intense heavy rain during the monsoon. Moreover the tidal variation has an impact on floods in Ayeyarwaddy division. Floods generally take place from May to September. According to the belief, the population mentioned that every 3 years (Myanmar Calendar), a big event occurs. The Tsunami was on 2004, and the last exceptional flood was on 2007, so the persons supposed that the next event will be on 2010.

- **Northern Area: Thabaung Township**

The duration, intensity and frequency of floods vary according to the year, but it was observed that the floods become hardest year after year.

The annual floods are from River and the water level can reach between 3 to 4 meters. The duration of floods can be 1 to 3 months, and the water recedes progressively. The floods occur from June to September. Generally floods are combined with heavy rain, and strong winds.

The most affected persons are the poor families and the persons who living near of the river bank. According to the topology, the families living in low land are most vulnerable than other families. Also farmers are affected since floods damage a part of paddy fields.

During floods, community is faced of increase of diseases (30%), lack of food (30%), no access to the plot of land (30%), lack of drinking water and sanitation (65%) and lack of transport (30%).

On average of 30% of house is damaged and more than 20% of paddy fields destroyed.

Also infrastructures are damages like school and monastery. More than 50% of water points are flooded and 30% of latrines destroyed.

During floods, 30% of family evacuated to external safe area which can be railway, school and monastery. Evacuates have access to water points a proximity like ring wells and river, but they don't have access to sanitation facilities.

The duration of lodge in the safe area can vary from 15 days to 1 month. For the other family, people stay in the village and use raise floor made in bamboos.

- **Coastal Area: Ngapudaw, Laputta and Phyapon Townships**

The frequency and intensity of floods and storms vary according to the year, and floods and storms are more frequent since the Tsunami.

The annual floods can from River and Tide Sea. The average of the water level is 1 meter and the water level is under the house floor. The floods don't stay longer in the village, maximum of 15 days. The floods occur from May to November. Generally floods are combined with heavy rain, and strong winds.

The most affected persons are fishermen who cannot continue fishing during rainy season due to danger with high waves. The community living on the river bank and on the seashore is most vulnerable.

The difficulties faced by the community are unemployment (55%), water points flooded (30%), lack of access of food (30%) and lack of transport (30%).

An estimation of 5% of house is damage, and fishery office, boats and roads are partially damaged after each flood. Less than 35% of water points are flooded and latrines destroyed. In specific areas, more than 20% of paddy fields are destroyed every year.

For Laputta and Phyapon townships, the community doesn't evacuate since the water level is under the floor of house.

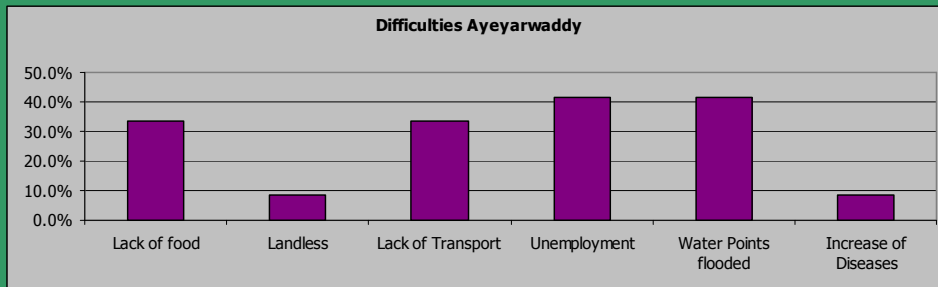
And in Ngapudaw, where the water level is higher, there is 50% of family who evacuate to hill land. Generally the safe areas are located in the village, and people can stay in the school and in the monastery. Evacuates stay at most 15 days and they have access to drinking water but not to sanitation facilities.

Summary:

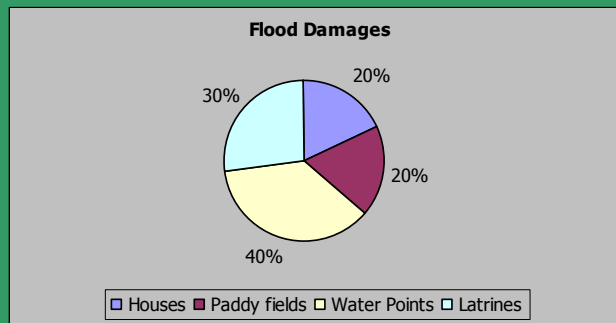
The major disaster is annual floods, and the duration can vary to 15 days to 3 months according to the area.

The most affected persons are people living on the river bank and seashore. Farmers and fishermen are vulnerable according to the losses of their business.

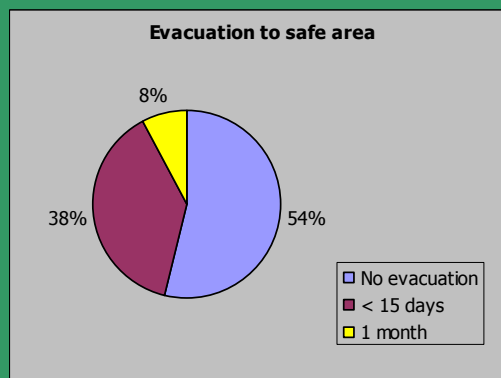
The difficulties faced are lack of food, landless, lack of Transport, unemployment, Water Points flooded and increase of Diseases.



The floods damage houses, paddy fields, boats and furnitures, latrines and water points. The roads, school and monastery are partially damaged.



Concerning the evacuation, on average of 46% of family evacuated to hill land, on school and monastery. They can stay in the safe building between 15 to 1 month with access to water points (bad quality of water) but not access to sanitation. Persons don't receive external support from the local authority in term of food supply and provision of shelter.



e. Disaster Risk Reduction Measures

The focus group discussion showed that the community has low knowledge on Disaster Preparedness. After Tsunami, the community is more aware on Disaster and its impact. A part of the community knows that measures as protect food, medicine and reinforce houses, can reduce the impact of the disaster, but people cannot afford to set up disaster risk reduction.

After floods and storms, people cannot afford to recover their losses. They partially rebuild their houses, but they cannot repair water points and latrines. Concerning the damages on school, monastery and fishery office, the community cannot remove them without external support.

The type of disaster risk reduction set up in the village were:

- Reinforce of houses with bamboos sticks
- Raise of animals shelter
- Preparation of foods, medicine and clothes before arrival of water
- Construction of temporary bamboos floor under the roof of house

Traditional way to predict the arrival of storms and floods exists as observation of natural phenomenon (bird, aunts, tree leaves, snails, etc.), Astrology and Spirit (sound in pagoda).

Concerning the warning message, the community receives it but the people don't believe on it and they think that it not accurate at all, and not at time. The warning message is mainly the weather forecast broadcasts from National Radio and TV.

f. Technical Solutions

The weakness of knowledge on Disaster Management and Disaster Preparedness from local authorities and community, not facilitate the implementation of Disaster Risk Reduction Measures and also the management of evacuation of vulnerable persons at time.

In order to improve the livelihoods and reduce the risks related to floods and storms, solutions can be proposed as follow:

- Training on Community Based of Disaster Management for local authorities
- Training on Disaster Preparedness and Disaster Risk Reduction at village level
- Writing Village Disaster Preparedness Plan
- Creation of Disaster Prevention Committee and/or volunteer
- Set up Hazard, Vulnerability and Capacity assessment
- Design Hazards and Vulnerable Maps for Township, village tracts and villages
- Identification of safe areas
- Construction of building to lodge victims in safe area
- Risk awareness campaign for community
- Identify of communication channels to disseminate warning message
- Revision of warning message
- Set up Disaster Risk Reduction
- Construction and/or rehabilitation of water points and latrines resistant in village and in safe area
- Water use, sanitation and hygiene awareness campaign
- Set up Early Warning System

Disaster Preparedness program should be develop with the coordination with stakeholders (INGOs, local authorities and institutions).

8. CASE STUDY

	Thabaung Township Ohn Pin Su Village	Ngapudaw Township Dee Du Kone Village	Laputta Township Daray Pyin Lay Village	Pyapon Township Ohn Pin Su Village
Population	700	1 000	500	418
Household	100	224	105	130
Drinking water source	Ring well Hand pump	Pond External Ring well (Payment of water: 0.08 USD for 20 liters)	Pond External Pond (0.1 USD for 20 liters)	Hand Dug Well External Pond (0.01 USD for 20 liters) Boat Seller (0.1 USD for 20 liters)
Household water source	Ring well Hand pump	Ring well	Pond External Pond (0.1 USD for 20 liters)	Hand Dug Well External Pond (0.01 USD for 20 liters) Boat Seller (0.1 USD for 20 liters)
Distance	10 minutes by walk	15 to 30 minutes by walk 1 hour for external well	30 minutes by walk	15 to 30 minutes by walk
Fetching and Transport	2 times per day Use 2 buckets (20 L each)	1 time per day Use 2 buckets (20 L each)	3 times per day Use 2 buckets (20 L each)	5 times per day Use 2 buckets (20 L each)
Consumption	10 to 16 L/day/person	10 L/day/person	15 L/day/person	40 L/day/person
Water Problems	Bad water quality Iron and Arsenic Water points flooded	Poor water Storage Dry pond Salty water	Poor water storage and quality Dry pond Control of fetching water	Poor water storage Bad quality of water Dry well
Community Response	Use water from river Use Rain Water Collector	Use water from external ring well when the pond is dried	Fetch water from external resource Buy water	Buy water
Sanitation Facilities	80% open defecation 20% water flush latrine	75% open defecation 20% water flush latrine 5% surface water	85% open defecation 15% water flush latrine	80% surface latrine 15% open defecation 5% water flush latrine
Personal Hygiene	Hand washing before and after eating No soap	Hand washing before and after eating and after defecation No soap	Hand washing before and after eating No soap	Hand washing before and after eating No soap
Sanitation Problems	Low knowledge Low access to latrines Cannot afford to build latrine Latrines flooded	No waste water management Flies prevalence Low access to health facilities	Low access to latrine Expensive cost for latrine: 25 to 45 USD	Expensive cost for latrine 12 USD for bamboos latrine Pit collapsed every year Rebuild new latrine every year
Disaster	Flood Water Level > 2.5 meters Duration of 1 month	Storm and Flood Water Level = 1 meter Duration of 10 days	Flood Water Level < 0.5 meters Duration of 2 days	Flood Water Level < 0.5 meters Duration of 2 days
Period	June to September	April to November	July to August	July to August
Difficulties	Access to food Transport Access to drinking water Access to latrines	Transport Unemployment	No major difficulties	Access to food Unemployment
Damages	5% of houses damaged	Roads, boats, houses, etc...	3% of houses damages	No damaged
Community Response	Evacuation to external safe area Construction of raise floor Listening to weather forecast	Evacuation to monastery Prepare evacuation Listening to weather forecast	Observation of water level Listening to weather forecast	Loan money Listening to weather forecast

9. CONSTRAINTS

❖ Travel Authorization

Ayeyarwaddy division is not accessible by foreigners except Patheingyi which is touristic area.

As ACF has never intervened in this part of Myanmar, the control and the registration at District level were strong and reinforced.

Also the expatriate was allowed to have a night stop in specific areas. The expatriate didn't attend to the field visit in the coastal area according to the far distance.

During the assessment, ACF was accompanied by the Liaise Officer who controls the expatriate movement and intervention. It was a major constraint, because during the field visit the expatriate

didn't participate during focus group, cannot assist the facilitator and reviewed the methodology. The villagers and village leader were not comfortable to speak behind of liaison officer.

❖ Selection of village tracts

Ministry of Defense asked to ACF to provide a list of village tracts before the departure on the field. On time on the field the access to these areas was difficult (time spending for the travel), and other most vulnerable areas were identified with local authorities. But according to the previous list, it was not possible to negotiate with the local authorities to change the location.

❖ Access to the villages

The majority of the vulnerable villages were located on the sea coast, so only accessible by waterway. The team spent a lot of time on boat and the time spending in the village was reduced.

❖ Relation with local authorities

In Laputta Township, the TPDC was not welcome with NGOs and didn't facilitate the trip. During the field visit in this township, Military and Police accompanied us.

10. RECOMMENDATIONS

a. Intervention area

After the assessment and data analysis a range of vulnerability has been design according to:

- Access to drinking water during all year
- Access to sanitation facilities during all year
- Disaster prone areas (type, frequency and intensity of disaster)
- Disaster Impact (materials damages, human losses and difficulties)
- Accessibility

Following these factors, ACF classified the areas as follow:

- 1st : Ngapudaw Township
- 2nd : Thabaung Township
- 3rd : Laputta Township
- 4th : Phayapon Township

Ngapudaw Township is considered as the most vulnerable related to the insufficiency of quantity of water and also to bacteriological and chemical contamination of water (85% of salty wells and 70% of dry ponds). The sanitation situation is very insatisfactory, more than 80% of people use open defecation. The knowledge on hygiene practices is low and people doesn't consider the corporal hygiene as a priority.

Moreover this zone is a floods, storms and cyclone prone area. During annual floods, part of the population needs to be evacuated, and business (fishery and paddy fields) need to be stopped.

According to the low income of the population, people cannot afford to set up Disaster Risk Reduction measures and cannot recover their losses.

It is possible to access to Ngapudaw town by road and by waterway easily. The access to the coastal area is only by waterway, and the extremity of the area is accessible after 7 hours by public boat.

According to the TPDC there are 3 village tracts which seem vulnerable on water, sanitation and natural disaster: Ma Gyi Pyin, Sin Ku Gyi and Dee Du Kone. Moreover Ngapudaw downtown has difficulties on drinking water access and sanitation management.

Thabaung Township is the most affected by floods (high level of water and long duration) compared with other townships visited.

This area is an Arsenic Risky zone, and the access to drinking water is considerably reduce during rainy season related to the floods. Concerning the sanitation access is not satisfactory and more than 80% of the population use open defecation, and the population has low knowledge on hygiene practices.

In term of accessibility, it is easily to access to the village by motobike. As the roads are narrow, it is difficult to access by car.

According to the data collected from TPDC there are 2 village tracts which seem vulnerable on water, sanitation and natural disaster: Mandine Wangabar and Thapyay Kyun.

The main difficulties encountered on water, sanitation and disaster impact was in Ngapudaw Township, so it is recommended to implement Disaster Preparedness Program integrating WASH component in this area.

b. Intervention recommendations

It is recommended to combine and integrate WASH activities in the Disaster Preparedness program. To guarantee a better impact in term of improvement of knowledge on Disaster Preparedness at Township, Village Tract and Village levels, it will be more relevant to start in Ngapudaw township and targeted villages located near of the sea coast.

Moreover the disaster preparedness program can start to thinking on Floods affects and then develop year after year other problematic as cyclone, tropical storms and Tsunami.

In term of Disaster Management and Preparedness Program, the activities could be developed at different levels and be more active at community level.

(1) Local authorities (TPDC – VPDC – Village leader)

The activities might be:

- Training on Community Based of Disaster Management
- Writing Village Disaster Preparedness Plan including:
 - Identification of volunteer to disseminate disaster and warning messages
 - Identification of safe area
 - Evacuation Plan
 - Identification of communication channels to disseminate warning messages
 - Identification of measures to set up before, during and after disaster
- Training on First Aid, Search and Rescue
- Design Hazards and Vulnerable maps
- Set up Flood Early Warning System (communication channels, weather forecast, etc...)

(2) Community level

The activities should integrate community participatory approach and they might be:

- Training on Disaster Risk Reduction (DRR)
- Design of Community Hazards and Vulnerable maps
- Set up Hazard, Vulnerability and Capacity assessment
- Set up Disaster Risk Reduction measures at household level
- Risk awareness campaign at community and school level integrating Water use, Sanitation and Hygiene components.
- Construction and rehabilitation of water points resistant to disaster
- Construction and rehabilitation of latrines resistant to disaster
- Construction of Rain Water Collector Tank at school level
- Development of safe areas with water points and latrines
- Construction of building to lodge victims in safe area
- Water Quality Testing: bacteriological and chemical
- Creation of Committee integrating members to manage water points, to ensure cleaning in the compound, to disseminate hygiene and disaster messages, to assist people to set up DRR measures and during evacuation, etc...
- Development of Home Water Treatment (ceramic, sand filters, etc...)
- Technical training on water and sanitation facilities
- Provision of Latrine Kits
- Development of IEC Materials for water, sanitation, hygiene and disaster risks.

c. Need and justification of FRC Aquifers Research

Ngapudaw, Laputta and Phayapon townships are located in the coastal areas and are affected by tide variation and tide floods.

After Tsunami 2004, people reported that the majority of the water points have been contaminated by incursion of salty water. And currently the soil is salty, and the farmers cannot plant vegetables caused to bad quality of soils.

During the rainy season, the infiltration of water through salty soils continues to contaminate the aquifers.

In this area, the population dig hand dug wells (depth: 0.5 to 1 meters) and reported that if they dig other than 1.5 to 3 meters, they find salty water. However there is ring wells with depth over 10 feet located in rocky area which are not contaminated by salty water.

During dry season, the quantity of drinking water is insufficiency and part of the people has not other choice to drink salty water to cover their need.

In order to improve and guarantee the access to drinking water, a study of aquifers can be developed to understand the hydrogeology situation.

According to the disparity between sea coast and hill land aquifers, it will be interesting to conduct aquifers research to facilitate the implementation of water points in coastal areas.

If the disaster preparedness program takes account the development of drinking water points in safe areas, it could be combined with a study of aquifers research.

11. ANNEXES

Annex 1: Rainfall map of Ayeyarwaddy Division

Annex 2: Ayeyarwaddy Map

Annex 3: Soil map of Ayeyarwaddy Division

Annex 4: Methodology

Annex 5: Data Collection Matrix

Annex 6: Map of stakeholder's intervention

Annex 7: Intervention Map

Annex 8: Townships Maps

Annex 9: Semi structured interview table

Annex 10: Focus Group (WASH) table

Annex 11: Seasonal calendar

Annex 12: Problem tree on water, sanitation and hygiene

Annex 13: Focus Group (DRR) table

Annex 14: Problem tree on Disaster Preparedness

Annex 15: Organization chart of National Disaster Preparedness and Response Committee