

I. INTRODUCTION

1.1 Background:

Lao PDR is a landlocked country, which located in the Southeast Asia. The Country covers an area of 236,800 square km² and has bordered with China, Myanmar, Thailand Vietnam and Cambodia. Lao PDR is also lying along middle part of the Mekong, which is the 12th longest river in the world. It flows through Lao territory almost 1,860 km. Climate is governed by Southeast monsoon in the period of May to the end of October. Some years Laos is affected from Typhoon, which is formed in the Pacific Ocean and move through South China Sea to the middle of Vietnam and hit to Luang Mountain and then move to the North of Lao. Lao PDR territory approximately 70% comprises of mountains and plateaus. 35% of water flow contributes of the whole Lower Mekong Basin runoff.

Flood in Lao PDR is occurred year by year and depends on the natural phenomena. Usually, in late of May to the end of October, the Southwest monsoon comes from India through Myanmar to the Northern Lao and resulted long lasting and heavy rain. Other way is affect from Typhoon, which comes from Pacific Ocean through South China Sea to the middle part of Vietnam and Laos, this resulted also long lasting and heavy rain. Now the flood cycle is very short and effected to large area of the territory of Laos. Therefore, we should be found the reason to protect the flood in Laos.

1.2 Flood Policy

1.2.1 Administrative framework.

The flood management and mitigation in Lao PDR at the time being is under the supervision of the Prime Minister's Office, which comprises of different line Ministry and agency concerned such as: Ministry of Labor and Social welfare, Ministry of Agriculture and forestry, Ministry of Industry and Handicraft, and Ministry of Communication Transport Post and Construction.

1.2.2 Government Policy

To reduce disaster risks and contribute to poverty eradication, the Government set to achieve the following targets by 2005-2010-2020:

The aims to 2020 are:

- Making Lao society safer and minimizing the impact of disaster to people life, country economy, government's and population property.
- To timely assist to the victims of disaster helping they mitigate disaster impact and quick return to normalcy.
- Building completed legal system on disaster management and prevention of disaster impact to individual, community, society and country economy.
- Making disaster management concept and environmental protection as unique to development and becoming cultural perception of society.

The Goals to 2010 are:

- Establishment of DDMC at all districts.
- Establish DM focal points and contact persons in all major government agencies, units, privates, factories and other.
- Develop early warning information receiving points at risky to disaster villages.
- Establish storages at provinces and some vulnerable to disaster districts.
- Continue sustainable public awareness and education programs through media.
- Expand DM training in all sectors at various levels.
- Organizing drills and simulation exercises with participation of emergency rescue teams of sectors and population.
- Enhance capability on cooperation with ASEAN, region and international on exchanging of expertise, information on DM and joint implementing projects, simulation exercises and relief drills.

The Goals 2005 are:

- Establish DDMC with created their role and responsibility at 80% of total districts through out country.
- Establish DM focal points and contact persons as appropriate at :
 - 10% of total primary school
 - 20% of junior secondary school
 - 30% of upper secondary school
 - 50% of professional school
 - 80% of military division
 - 40% of factory.
- Develop DM regulation and code.
Enhance and establish information dissemination system and receiving at 30% of total 142 districts in country. Establish information dissemination at 30% of vulnerable village. Annually organize 4 DM training courses for government officials and privates at provincial and district levels and 4 other courses for village leaders.
- Establish rescue and relief teams at VTE MUN, provinces base on manpower of military, police, schools and Lao Red Cross volunteer.
- Develop hazards and risk map of Lao PDR.
- Establish DM information exchange centre at the NDMO and urban disaster information at the Urban Research Institute (URI).
- Organize 2 rescue drills or simulation exercises on annual basic
- Integrating DM concept into other projects of urban and rural development with focused on flood, drought, fire, land management, bank erosion, water management, protection of environment, forest and other natural resources. NDMO is a center focal point on implementation.

II. THE ROLES OF FLOOD HAZARD MAPS TO MITIGATING FLOOD DAMAGE IN LAO PDR

The population pressure in the Lao PDR has not yet reached the alarming levels of many other countries. However, the population in the my country is growing rapidly at 2,2 % per annum. It will increase from 5, 7 million at present to amount 9 million in 2020. This will certainly have negative impacts on the availability of clean water and other resources. Urbanization and construction of infrastructure also contribute to an increase in flood risks in the unprotected parts of the river. The wetlands and floods have also proven to be a challenge to the country as annual floods are a natural phenomenon in the region. They are important for replenishing soil fertility and also cause deaths by flash flood and land slide, damage to crops and property. It is not only global and climatic factors that are influencing the flood patterns but also human activities.

2.1 The Flood Status in Lao PDR:

Lao PDR was seriously flooded in 1966, 1995, 2001 and 2002. In the year 2002, flood was very heavy rained and affected to the territory in Laos. As a result of an effect of strong Southeast Monsoon and from Wongfong-14 storm, water level at Mekong River and its tributaries dramatically increases and flood occurs at all regions in the country. This year had flooding in the northern provinces of Laos, as LouangNamtha, Phongsaly, Borikhamxay and was flooded in large the all territory of Laos, as Bokeo, LouangPhabang, Vientiane Municipality, Borikhamxay, Khammoune, Savannaketh, Saravanh, Champasack and Attapeu. As in this year, flood affected 12 Provinces, 62 Districts, 1,142 villages and 50,342 families (249,782 people); where 8,556 household damages and 3 persons died.

The flood of the year 2002 occupied many places, particularly along the Mekong River and its tributaries as such ([see table](#)):

1. Vientiane Province, here are five districts affected (1). Hom District is located upstream of Nam Ngum reservoir, in which 1 village and 12 families' equal 122 people were suffered. (2) Mad District is flash flood, 2 villages, 16 families equal 94. (3) Thoulakhom District is located downstream of Nam Ngum reservoir, in which 43 families. (4) Sanakham District is located along the Mekong River, in 1 village, 44 families. (5). Kasi District is located along Nam Niap, here 3 villages and 68 families equal 587 people were suffered.
2. Luangnamtha Province, in this Province is 1 District affected Viengphoukha in which 16 village and 447 family equal 2,974 people were suffered from deluge.
3. Khammouane Province, there are 4 districts affected (1). Ngommalath here 27 villages and 624 families' equal to 3,353 people suffered. (2). Mahaxay here 42 villages and 859 families' equal to 4,507 people suffered. (3) Hinboune was 60 villages and 6,207 families equal 31,171 people suffered. (4) Thakhek District here 51 villages, 860 families (4,558 people).
4. Oudomxay Province, two Districts affected (1). Houne here are 18 villages and 646 families equal to 3,915 people were suffered. (2). Bang here are 19 villages and 301 family equal to 1,622 people was suffered, in which 01 was died by land slide.

5. Borikhamxay Province, in this Province was 5 Districts affected (1) Paksan, here are 15 villages, 706 families (3,175 people suffered). (2) Thaphabath, here are 21 villages, 1,875 villages (8,438 people). (3) Pakkading, 36 villages, 1,801 families (9,198 people). (4) Khamkeuth, 45 villages, 4,812 families (32,013 people), in which 02 persons were died by flash flood and (5) Borikhan, 15 villages, 642 families (3,207 people).
6. Savannakhet Province in this Province was affected more than others there are 7 Districts, (1). Champhone here are 33 villages and 5,418 families equal to 17,184 people suffered, in which 3,437 families are lost. (2). Song Khone: 24 villages and 1,588 families equal to 7,941 people suffered, in which 1,375 families are lost. (3). Sonbouly: 18 villages and 2,167 families equal to 10,837 people suffered, in which 800 families are loss. (4). Saybouly: 16 villages and 1,678 families equal to 4,742 people suffered, in which 948 families are lost. (5). Vilabouly: 17 villages and 580 families equal to 2,900 people suffered, in which 518 families are lost. (6). Sayphouthong: 4 villages and 177 families equal to 884 people suffered, in which 330 families are lost. (7). Khanthabouly: 8 villages and 369 families equal to 1,845 people suffered, in which 98 families are lost.
7. Vientiane Municipality in our capital City are affected 9 Districts such as Pakngum, Saysettha, Saythany, Nasaythong, Sisattanak, Sangthong, Chanthabouly, Hadsayfong, and Sikhottabong
8. Xiangkuang Province in this Province is affected 3 Districts: Phoukout 3 villages, Kham 6 villages and Pek 18 villages, 176 families (556 people suffered).

Due to the above mentioned, I hope that flood hazard mapping will be effective to help the farmers, local communities, local government and others agencies to reduce/mitigate/minimize all loses before and during flooding (human, animals, crops) .

- ✚ The causes of excessive flooding in Laos were a combination of natural and human factors. These factors include early start of rains with fast surface run-off, increasing sedimentation of the riverbeds, tidal effects, and blocking of natural flood plains. However, more investigations in these causes are needed.
- ✚ The existing flood-forecasting system; MRC provides a five-day flood forecast from mid-June to mid-October every year for 18 stations of water level located along the Mekong River from up stream to down stream and daily data from 37 hydrological and 22 rainfall stations.

2.2 The Outline of Present Countermeasure for mitigating Flood Damage in Lao PDR

- ✚ Based on the *policy of Government 2005 to 2020* is very clear how the ministry and line agency concerned to establish them plan as follow:
 - Ministry of Communication Transport Post and Construction will responsible for structure and non structure measure in the City, Urban, and Town
 - Ministry of Agriculture and Forestry will responsible for reducing the slash and burn forestry, reforestation, watershed management, irrigation system and provide data of hydrology and meteorology to all ministries

and line agencies concerned including flood forecast, rainfall forecast and water level forecast on the TV, radio and newspaper. Especially, prepare the second agriculture crop to the farmers and communities after flooding.

- Ministry of Industry and Handicraft is responsible for flood control down stream of dams.
 - National Disaster Management Office under Ministry of Labor, Social and Welfare, consider, prepare and ask donor for relief and flood respond. In some case they will responsible for non structure measure such as flood preparedness in the province, district and communities in inundation areas, produced guide book for elementary school and others ([see the policy 2005, page 2](#)).
 - Prime Ministry's Office responsible for the hold system of flood responsibility.
- ✚ *Flood Early-Warning Systems in the Mekong River* is necessary; this activity is implemented by the Mekong River Commission (MRC), an inter-governmental river basin organization based in Vientiane, Laos. The governments of Cambodia, Laos, Thailand, and Vietnam participate in the USAID/OFDA-funded activities that increase flood forecasting capacity and early-warning information transfer to communities in the Lower Mekong River Basin. The project will strengthen flood warnings by making communities more responsive to the needs of at-risk populations in Cambodia and Laos, and will develop tools, methods, and protocols with community-based partners to enable flood-vulnerable populations to effectively utilize MRC flood information.
- ✚ Hand drawing map is also help people how to evacuate to the high land or safety place by them selves. In pilot study area in Champasack District has damaged by flood two to four weeks (on paddy field), but in the villages only one week and depth of inundation area about 50cm to 80 cm. Some of residents move to high land and some stay at home. If these villages have flood hazard mapping, I think that very helpful and useful for them. The government should dissemination with explanation how to use the FHM for reducing, minimizing and mitigation their agriculture crops and save them live.

2.3 Do you Think Flood Hazard Maps will be useful in Lao PDR

- ✚ For the short term (1 year) I can not give you comment, because we are lack of budget and resources.
- ✚ For long term, Yes, because:
- All curriculum designed for this course were impressive and useful for me, some of them have provided very successful and useful contribution and information in term of materials, process, concept, theory, and practical use in some cases. However, the most impressive to me is lecture and exercise in the class, and of cause the group field survey for making the hazard maps ISE City with group presentation on the Town Watching.
 - The field survey is more importance for me and other participants, because I can see the real situation of flood place with comparing theory that I have studied in class.

- Flood management in Japan is very importance for expertise. The significance of hydrological statistics, flood inundation analysis, calculation of residents evacuation, runoff flood analysis and anticipation of inundation area are key functional of flood hazard map drawing and establishment.

III. THE ALLOCATION OF ROLES IN MAKING FLOOD HAZARD MAPS IN LAO PDR

3.1 Which organization should hold the main responsibility for making a fundamental map such as anticipated inundation area map?

- ✚ Based on the “Water and Water Resources Law” I think that is not so clear because it didn’t write any sentence about which organization should be hold the main responsibility for the making a fundamental map and flood hazard maps also. But told that the topography map is under Department of Topography responsibility. The organization concerned had showed the above (item 2.2).
- ✚ The Mekong River Commission (MRC) did the flood maps for hold the Mekong River Basin. But is not yet completed for each member country. For my idea I think that in the next near future the Lao National Mekong Committee (LNMC) Organization will responsible for this part. Because we have just established the [GIS Unit](#) in my organization and is on going to revise the organization mandate for the next five year strategy plan (2005-2010), and other hand LNMC has crossly coordinate with the MRC.

3.2 Which organization should hold the main responsibility for making and disseminating flood hazard maps?

- ✚ As the above mentioned the Lao National Mekong Committee should hold the main responsibility for making and disseminating flood hazard mapping in Laos with considering establish a team making the flood hazard maps. The team should be consisted from line ministries and line agencies concerned. Because, I think that LNMC has strong enough to lead making in this issue.
- ✚ Other site the Mekong River Commission will support and provide some tools to LNMC to do the Flood Management and Mitigation Program together with member riparian country.

IV. The ACTION PLAN OF MAKING FLOOD HAZARD MAPS IN LAO PDR

4.1 Which area do you choose for the target river basin area and why?

- ✚ This point is very difficult to give you idea which area that I will choose for target river basin area. But in my mine I will continue to finish pilot study in three villages, Champasack District area that I do right now for two years pilot study. In this area we have some data information from National Disaster Management Office and flood maps from Mekong River Commission, but the budget for

implementation this issue is limited because the objectives of pilot study is not including making flood hazard mapping. However, I will try my first best to draw the flood map by hand and put some mark in the map such as way evacuation, how many residents will evacuation and depth inundation area, etc.

- ✚ Second priority I will follow up with the government plan (Bolikhanh District, about 200 km from Vientiane Capital City) and will set up my action plan for year 2006 after go back home. I choose this area because is not so far from central government, that district affect by flood and flash flood every year. But it seems to me with lack of data and no budget for doing site survey. I need take more time and other conditions with appropriated consideration, and should be needed approving from LNMC Chairman.

4.2 Propose own “ Action Plan” within the next five years

item	Description	2006	2007	2008	2009	2010
1	Continue pilot study	██████████				
2	Setting up FHM into GIS Unit	██████████				
3	Data Collection: - Hydrology, meteorology - Topography, drainage - Dike condition - others	██████████	██████████	██████████		
4	Identify inundation area	██████████	██████████			
5	Capacity building strengthening For technical staff	██████████	██████████	██████████	██████████	
6	Fund seeking: - FHM producing - Dissemination & use of map - Monitoring & updating map	██████████	██████████	██████████	██████████	██████████

4.3 What seems a problem in making flood hazard maps in Lao PDR

The Lao Government will support idea, but I seem challenge to me, as follow some points in making flood hazard mapping:

- ✚ No budget for doing and producing flood hazard maps.
- ✚ Lack of resources such as regulation, tools, low technique, and inexperienced staff for doing.
- ✚ Lack of sufficient data (inaccurate data) and which organization should be hold the main responsibility for making flood hazard maps.
- ✚ The condition of flood between Japan and my country is quite difference.

V. CONCLUSIONS

For more than five weeks training course with one week orientation, 30 subjects, 4 exercises, 1 field survey, 1 field trip and 4 times presentation it seem too short time for me, especially during the exercise in class, because:

- ✚ Some days I could not follow up the concept of the exercise (not finished yet). It makes me lose filling with totally new concept and new skills, knowledge for me.
- ✚ For this training has more meaningful lectures should give mark for participant base on question, response, exercises and group work presentation.
- ✚ Concerning to flood hazard mapping the course should have one set completed example (in term of beginning step until the end step such as criteria, standard,...) where participants can apply and compare with their own flood hazard map in his/her country.
- ✚ For the general overview I have found that limit of time to do exercise. Many exercise has run to finish their subject, many steps exercise just show up only with out detail explanations. If organizer/supervisor can solve these problems will make course more and more meaningful and successful in the next near future.
- ✚ I will report to my boss, Director General of LNMC including LNMC Chairman all training subject concerned in this course.

Flood Damages in 2002 (source from Department of Planning, MAF)

No	Province	District	Village	Natural	Family	Family	People		Died	Planted	Affected	Lost
				Disaster	Affected	Damage	Total	Female				
1	Vientiane	Meuang Hom	1	Flood	12		122	49			6,21	3
		Maid	2	Flash	16		94					10
		Thoulakhom		flood	43						323	
		Sanakgham	1	Flood	44							10
		Kasi	3	Landslide	68		587	252			39,5	17
2	Luangnamtha	Vienphoukha	16	Deluge Flood	447		2,974	239		793	283	115
3	Khammouane	Ngommalath	27	Flood	624		3,353	1,381		1,788	696	219
		Mahaxay	42		859					6,721	1,304	261
		Hinboun	60		6,207					6,864	4,709	3,322
		Thakhek	51		859		4,507	2,330		3,989	432	344
4	Oudomxay	Hune	18	Flood	646		3,915				614	403
		Bang	19	landslide	301		1,622		(m,56)1		89	66
5	Borokhamxay	Paksane	15	Flood	705		3,175			8,100	1,283	1,107
		Thaphabath	21		1,875		8,438			3,590	2,304	1,843
		Pakkading	36		1,801		9,198			6,050	2,157	1,088
		Khamkeuth	6	landslide	642		4,010		(m)2	8,320	55	25
		Borikhanh	15		642		3,207			2,800	582	10
6	Savannakhet	Champhone	33	Flood	5,418	3,437	17,184	5,727		18,200	3,265	2,167
		Songkhone	24		1,588	1,375	7,941			24,232	1,509	550
		Sonboully	18		2,167	800	10,837			7,720	2,059	320
		Sauboully	16		1,678	948	4,742			12,562	901	671
		Vilaboully	17		580	518	2,900			6,250	551	207
		Sayphothong	4		177	330	884			9,000	168	132
		Khanthaboully	8		369	98	1,845			7,910	351	39
7	Vientiane Mun.	Pak Ngeum	18	Flood	744		4,871			11,500	2,296	442
		Sisattanak	10		257		1,358			638	15	8
		Sangthong	11		681		3,527			5,346	692	554
		Chanthaboully								550	100	14
		Hadsayfong	28		2,247		10,297			7,850	2,100	1,500

		Saysettha								3,600	831	831
		Saythany	7							14,435	975	295
		Nasaithong	12							7,725	429	152
		Sikhottabong	9		203		1,012			1,895	72	53
8	Luangprabang	Luangprabang	10	Flood	94		496					
		Siengngeun	8		67		319					
9	Champasack	Pakse	31	Flood	712		5,705	2,289		1,468	783	541
		Sanasomboun	33		829		4,075	2,282		12,400	1,432	
		Pathoumphon	58		668		2,849			5,908	1,732	1,589
		Pholthong	53		1,260		9,110	4,689		22,740	2,850	
		Champasack	49		1,525		9,784	4,773		2,431	2,215	1,685
		Soukuma	42		1,075		7,453	3,681		10,800	2,293	1,377
		Moun	59		5,215		51,521	15,997		6,695	2,945	2,045
		Khong	105		3,950		23,575	12,190		11,997	2,7800	2,160
10	Xiengkhuang	Phoukuth	3	Flood								23
		Kham	6									70
		Pek	18		176	1,050	556				232	662
11	Attapeu	Sanamsay	17	Flood	1,186		6,028	3,123		1,469		854
		Phouvong	11		496						429	218
12	Bokeo	Huausai	11	Flood	172		860			4,199	455	
		Tonpheung	9		39		239			4,280	28	
		Pha oudom	11		40		200			1,212	163	
		Meung								595	5	
		Paktha	7		15		75			918	15	
		Khetphatthana	2		7		35			67	3	
13	Phongsaly	Yod Ou	39	Flood	1,265		6,802			2,456		695
		Bounneua	15		525		2,896			1,361		230
		Bountai	4		140		772			833		20
		Mai	10		350		1,935			735		25