

# **CONCLUDING REPORT**

**IN**

## **“Roadmap toward Effective flood Hazard Mapping in Lao PDR”**

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**Title:**

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**A. “The role of flood Hazard maps to mitigate flood damages in Lao PDR”**

**A-1. The Flood status in Lao PDR,**

Excessive flooding is a worldwide problem, which in many countries results in loss of life and extensive damage to infrastructure and agricultural production. In addition, Flooding of the Mekong River and its tributaries is a recurrent event and each year causes damage, in varying degrees, to agricultural production, rural infrastructure and human settlements.

So far, the floods in the LMB recalled as being the most serious for the entire lower basin are the ones from 1961, 66, 71, 78, 95 and 96. Since 1961. This paper is mainly focused on how important flood management could be mitigating flood damages to infrastructure and agriculture production in area along the Mekong Basin. This appears particularly true for the Lao PDR, given its strong economic dependence on agriculture. In a developing and landlocked country, its reliance on natural resources, particularly water and related resources, is uncomfortably high. Given the topography of this country, it is very much at risk.

This report also shows how flood can be took its toll one the country, there are a number of people powerless, and often hungry for the sufficient food become inundated. A flood statistic has been showed as in 1995 during the flooding periods, 102,912 hectares of Vientiane plain was under a range of 0.5-0.8 meter of water in the period of 8 weeks. Therefore, 153,398 people affected by flooding in the Vientiane Plain (out of a total population of 653 013 persons), 26,603 households, or 427 villages.

**The table shows damages from flooding in the Vientiane Plain, 1995.**

**Persons affected: 153 398. Households affected: 26 603 Villages affected: 427**

Land use	Damage	Percentage
Transplanted area	42,337 ha	41.14%
Stream, swamp, bamboo, grassland	10,140 ha	9.85%
Clear forest, hill and pasture area	31,354 ha	30.47%
Residential and other areas	19,081 ha	18.54%
Total flood area	102,912 ha	100%

	Rice crop	Other crops
Total area	61,142 ha	17,167 ha

Flood affected	34,471 ha	7,866 ha
Damaged	30,962 ha	4,313 ha

Obviously, agricultural and rural development is a high priority for the government of the Lao PDR, and it is the policy of the Lao Government as the Lao National Mekong Agreement strives to uphold, in accordance with the Socio-economic Development Plan. Furthermore, national interests must be balanced with more regional interests, or specifically for the Lao National Mekong Committee (LNMC), with the Lower Mekong countries namely: Thailand, Cambodia and Vietnam, by upholding the 1995 *Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin*.

### A-2. The present countermeasures for mitigating flood damages in Lao PDR

The solutions to overcome the effect of the floods can be found at different levels in different sectors, involves cooperation and coordination at international, national, provincial and field levels and can be classified as follows:

#### - Countermeasure for National level

At national level a better understanding is required of the flood behavior and the various options to manage and regulate more effectively excess waters. Such national flood management plans and strategies will include:

- an assessment and classification of areas effected by regular flooding;
- a monitoring system to assess on a continuous basis the areas each year effected by floods; and
- an overall flood control management plan to manage recurrent and exceptional floods and to have in place emergency measures to reduce and overcome the damage of exceptional floods.

**Table shows Flooding depths, duration and areas in 1995 and 1996**

Province/Prefecture	Depth (m)		Duration (weeks)		Flooded Area (field survey)		Flooded Area (DOI data)	
	1995	1996	1995	1996	1995	1996	1995	1996
<b>Vientiane Province</b>	0.5–8	0	1–6	0	14,005	Negligible	12,358	131

<b>Vientiane Prefecture</b>	0.5–8	0	1–8	0	24,800	Negligible	18,565	200
<b>Bolikhambxay Province</b>	2–8	1–5	2–8	1–4	9,154	4,276	13,452	6,069
<b>Khammouane Province</b>	1–6	1–6	1–7	1–7	8,958	9,470	17,378	17,266
<b>Savannakhet Province</b>	1–8	1–8	1–8	1–6	3,965	14,950	11,411	7,684
<b>Champassak Province</b>	1–5	1–4	1–3	1–6	11,211	19,336	12,970	16,647
<b>TOTAL</b>					<b>72,093</b>	<b>48,032</b>	<b>86,137</b>	<b>47,997</b>

There are variety actions from Lao Government in term of mitigating flood damages in some provinces, which have been inundated regularly from time to time as show below:

**- Flood Control proposed project in Bolikhambxay Province**

- flood protection dike and control gates on the Nam Xan River,
- flood protection dike and gates on the Mekong River, and,
- flood protection dike and control structure on the Nam Kadan river and the closure (by flap gates) of selected culverts on Road 13 in the area.

**-Vientiane Plain flood protection: urgent phase**

The project, Vientiane Plain Flood Protection, Urgent Phase, was financed by a grant from the European Commission (EC) of the European Union. The project objective was to implement urgently required flood protection works to reduce the risk of the Mekong River flooding Vientiane and adjacent areas of the Vientiane Plain.

- Rehabilitation existing flood protection dikes and associated structures and constructed new dikes
- a 420 m reach of river bank protection works located in front of the Hat Dokkeo
- the intermediate Casier Sud section, 25.3 km long. This was an existing dike, which protects an important agricultural area, including a number of irrigation systems, which is a major supplier of agricultural products to Vientiane. The dike is also an important rural road and finishes at the LaoStar Earth Satellite Station on the Thadeua Road; and

- the downstream Thanaleng to Dong Phosey section, 8.2 km long, which consisted of two entirely new reaches of dike located on either side of the Thai-Lao Friendship Bridge over the Mekong River.

### **A-3. The usefulness of Flood Hazard Map and the reasons in Lao PDR**

In terms of flood hazard maps in Lao PDR is not well known for all government, private sector and local community. However, the government of Lao PDR has realized the importance and the usage of flood hazard Mapping. The government has set up the organization as Flood management Unit, Irrigation Department, to work properly with MRC and LNMC. that is our good starting point to achieve the benefit from flood hazard mapping. Therefore there might be a number of positive outcomes from flood hazard map in mitigation of losses of agriculture land and agriculture production as showed belows:

#### ***In terms of resident action, resident, and villager participation and usage:***

- FHM Shows the historical flood maps from the past to the local residents especially farmer. Therefore, farmer could prepare and protect their own agriculture land, agriculture production by their own capability at the beginning stage. For example, local agriculture committee should have a responsibility to build a small irrigation system to release amount of water in case heavy rain occur by encouraging local residents, villager to get involved with government corporation and assistance;
- FHM to identify flood level marks to the residents in the reason of preparing themselves for the event. For instance, farmer or local residents should experience a level of flooding and they should level up the agriculture production storage house in the high elevation level in case of flooding. Therefore, agriculture production would be protected from flooding.
- FHM to be guideline for flood fighting by local community itself for instance, a build small dike by the local community, build up sand bag wall to protect flooding (emergency countermeasure).

#### ***In terms of provincial and central government action, usage:***

- To make the resident reaction as above mentioned, National government, Province government should contribute some kind of small equipment, material to the local resident and local resident would work as labor based system, (in some cases local resident might get paid in the reasonable unit cost, which is the best option for providing a better income for the local resident and also for mitigating the damages from flooding.
- Use the Map as a part feasibility study stage or evaluation stage for constructing flood control system such Dams, Dike, Levee, water storage, Irrigation system,

etc; In addition, central government should focus on some provinces which have been flooded frequently and make a priority project of construction flood control for the most urgent circumstance.

**B. “The allocation of roles in making flood Hazard maps in Lao PDR”**

**B-1. Organization should hold the main responsibility for making a fundamental map such as an anticipated Inundation area map and making disseminating flood hazard maps**

Government has set up the flood Management Organization as show as chart below:

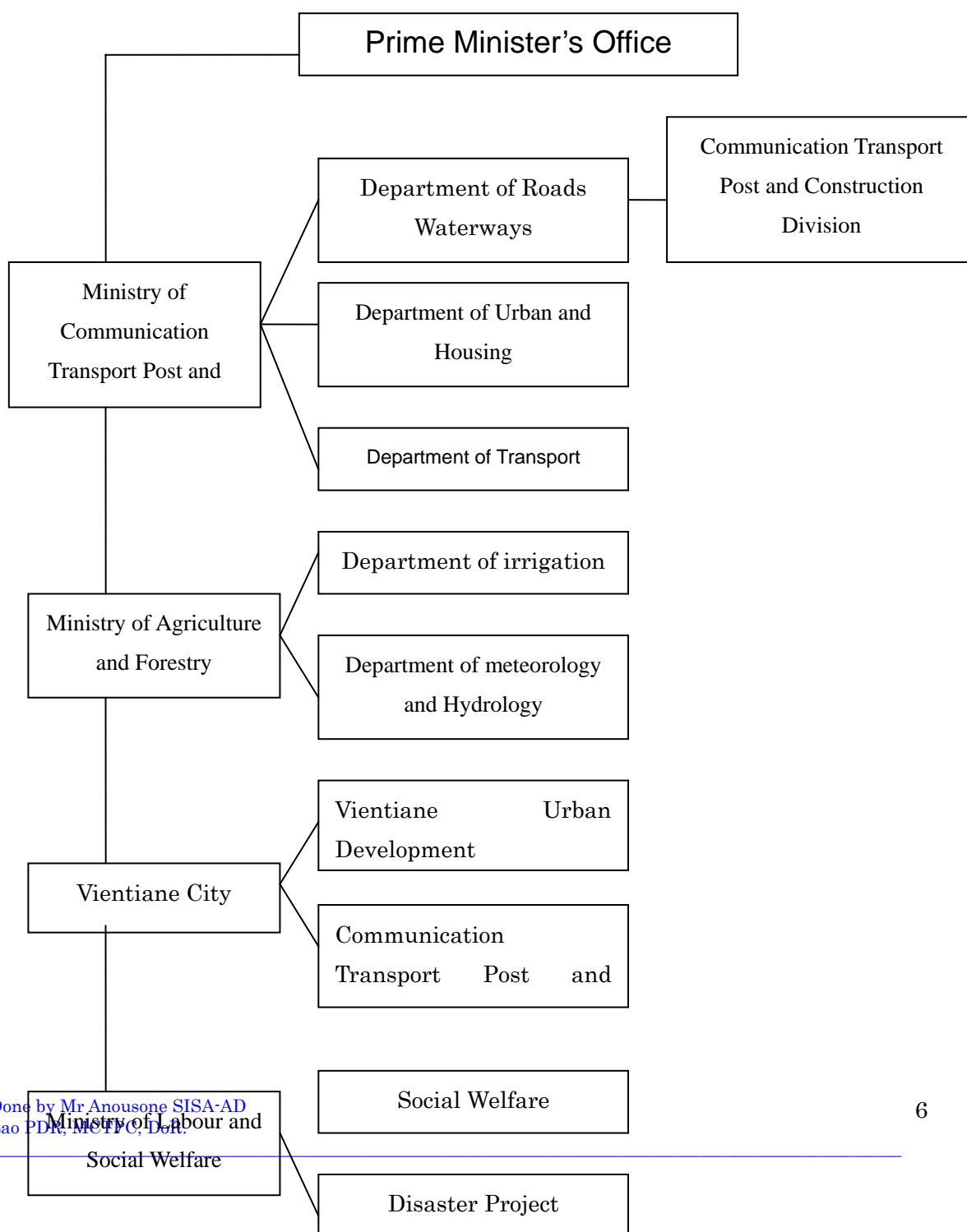
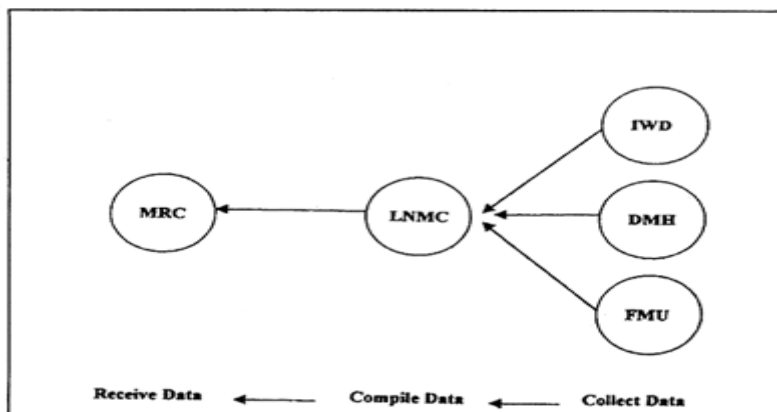


FIGURE 1

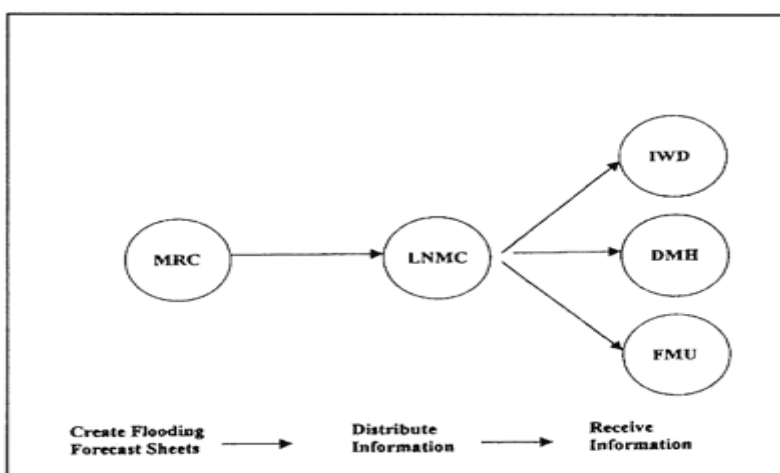
**Data flows from Lao PDR line ministries to the MRC**



This grouping represents the cross-sectional interests involved in Mekong development. It is, therefore, the role of the LNM to act as the coordinating mechanism between the MRC, currently based in Bangkok, and the relevant line ministries of the Lao Government. In all our activities, national interests must be balanced with regional interests, which ultimately serve us all. So, to take flooding as the case in point, Lao government policies will be fed into MRC projects related to flood management, irrigation, hydrology, environment, monitoring, mapping and so on.

FIGURE 2

**Information flows from the MRC to the Lao PDR line ministries**



With regard to flood issues in Laos, the main departments the LNM coordinates with are:

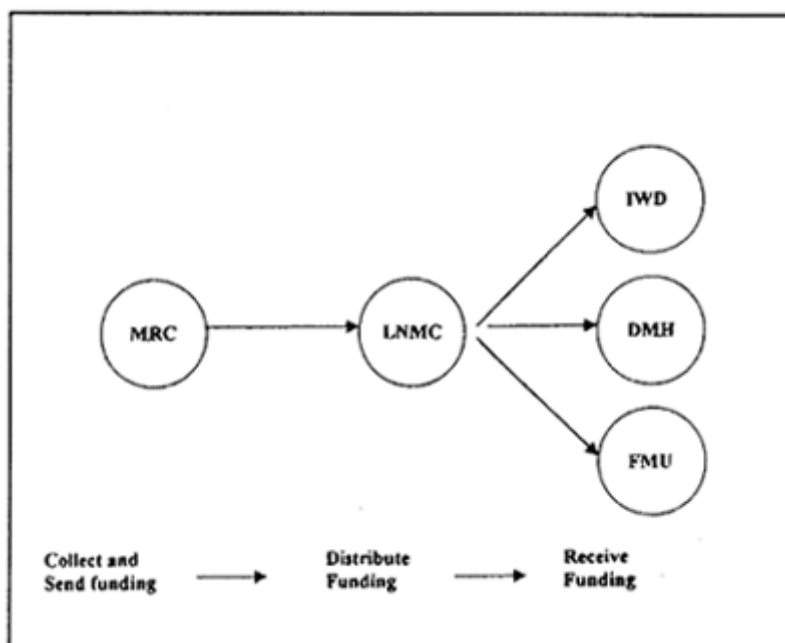
- the Department of Meteorology and Hydrology, Ministry of Agriculture and Forestry, responsible for collecting data regarding tributaries of the Mekong in Laos;



- the Inland Waterways Division, Department of Communication under the Ministry of Communications, Post, Transport and Construction, responsible for collecting data on the mainstream; and
- the Flood Management Unit of the Department of Irrigation, also within the Ministry of Agriculture and Forestry, shares information with the LNMC.

FIGURE 3

**Financial flows from the MRC to the Lao PDR line ministries**



The main transfers that take place are:

- data from line ministries (departments) to the MRC (Figure 1);
- information from the MRC to departments in the line ministries;
- funding and financial flows from the MRC to various flood-forecasting projects in Lao PDR (such as flood protection dykes). The only exception would be if funding has been arranged bilaterally between a department or ministry, and a donor.

**E. “The “Action Plan” of making flood hazard maps in my country”**

**C-1. Which area do you choose for the target river basin area? Why?**

Lao PDR constitutes a major part of the Lower Mekong Basin (LMB), which comprises as well Thailand, Viet Nam and Cambodia. The LMB has always been prone to yearly recurrent flooding in the period from June to October. The flooding pattern is never sudden and mainly characterized by slow but steady rising of the water level and inundation of the alluvial plains. Therefore, this paper focused on all the agriculture, land use and infrastructure long Mekong

River and also nearby the sub river around country.

**C-2. What do you think is necessary to make flood hazard maps in the chosen area?**

Government could use FHM as one component for making priority project of flood control system that mean FHM could identify which area are the most urgent to make a improvement and to construct flood control system namely Dyke, water gate control, Irrigation, etc, in the reason of mitigating damages, losses of land use, agriculture field and agriculture production.

Secondly, in term of resident action based on local committee and villager participation, local resident and farmer would use FHM to analyze the flood level that would be occurred. Therefore, local committee and residents need to work together for constructing flood protection using “Labour Based Method” which note that provincial government need to support them by basic payment or material usage and local resident could work as man-hour and also in the case of flood fighting.

**C-3. Propose your own “Action Plan” within the next five years,  
Do you have data, maps, or budgets necessary for making flood hazard maps?**

**General:**

- Flood Management Unit, Department of Irrigation, Ministry of forestry and agriculture should have a project proposed as local community participation for disaster management;
- Participant required:
  1. Two persons from central government especially from FMU, MFA.
  2. 1 person from provincial level, relevant to flood management
  3. 1 person from district level, relevant to flood management (focus on 1 serious district of flooding)
  4. In chosen district, selecting 5 to 6 villages to participate the meeting.
  5. Each village has to send 5 person or more in deferent criteria concerning an gender, relevant work responsibility, head of village, and woman union.

**Action Plan:**

- Set up the project as local Community participation based disaster Management;
- Sector focus: Flood Hazard preparedness and Mitigation;
- Special focus: District and Community level;

**Questionnaire: (local residents or villager participation)**

- What are the damages and losses from flood disaster? (List them all)
- What are the most urgent damage and loss? (Make a priority)

- Try to ask them what they could act to help themselves first?
- Name the proper solution based on their requirement
- Write a project proposal such as small dike, Irrigation as local residents and villager participation) and 80% finding a fund resource by government or international agency.

**Objectives:**

- Building government institutional capacity at provincial and district level;
- Develop and strengthening village level organization for risk management;
- Develop flood warning system;
- Building small Irrigation (using Labour based);
- Develop more various agriculture system better adapted to recurrent flood

**Implement;**

*A. Define groups of community*

- Training will be focused on government and village leaders and professionals
- Create a series of village communities
  6. Village disaster Protection unit;
  7. Farmer's group;
  8. Small irrigation and Dam management community;
  9. Village health worker group;

*B. Define problems and solution (individual participant)*

- Make a group discussion;
- Try to find problems by everyone participation (water level estimating and recording)
- Participatory mapping (Maps are produced showing hazards of flooding area and safe area);
- Maps are displayed on the wall of the temple of villages and in the village head's house in one;

**Action**

- Introduce about flood early warning (announcement and massaging river flow measurement by trained village worker who report approaching flood hazards to media and through district;
- Local community work along with small Irrigation and dike management for building it or repair it for handling flood;

**C-4. What seems to be a problem in making flood hazard map in Lao PDR;**

FHM is quite difficult to make in the short period of time. Therefore, the proposed project as local community participation for disaster management is an ideal plan for mitigating flood disaster and also other disaster at the same time. However. There is still variety of problem remaining the organization itself. Below are some of the problems identified:

- As a project “Local Community participation for disaster management” needs to be approved by the relevant Ministry. Therefore, the budget allowance available for running the work.
- Need all participated person from vary type of all government level, local resident, villager as mentioned above to be participate to full time for the meeting.
- Persons who are from central Government and provincial level needs to have deeply understand about disaster management. Therefore, they could contribute the sufficient knowledge to the local resident and villager;
- Those people above-mentioned have to prepare a schedule of working task for the resident and villager and also district level. (Need official information letter sign by minister of relevant ministry)