



# 6<sup>th</sup> Asia/Oceania Meteorological Satellite User's Conference (AOMSUC)

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Presented by  
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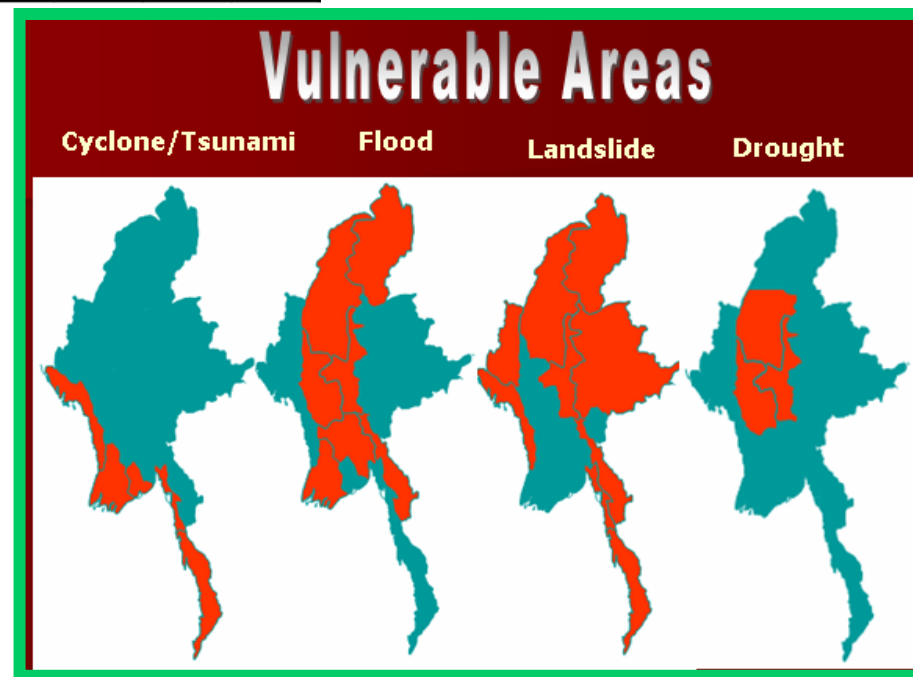
# Myanmar



- Myanmar, Agricultural based developing Country.
- Application of weather and Climate factors play an important role for the Rice and other Food production, Irrigation and Water Resource, Transportation and other socio-economic sectors.
- It enjoys the Southwest Monsoon. Most of the areas receive 90% of annual rainfall by Southwest Monsoon season.
- Area: 677,000 square kilometer-ranging 936 kilometers (581 miles) from east to west and 2,051 kilometers from north to south.
- Population 51.4 Million (April 2014)

# Meteorological Hazard Calendar

Hazards	J	F	M	A	M	J	J	A	S	O	N	D
Cyclone				Apr-May						Oct-Nov		
High Temperature			Mar-May									
Low Temperature	Jan-Feb										Nov-Dec	
Drought			Mar-Sept									
Squalls			Mar-Oct									
Thunderstorm			Mar-Oct									
Heavy Rain					May-Sep							
Monsoon Depression					May-Sep							
Hail			Mar-May									KLO



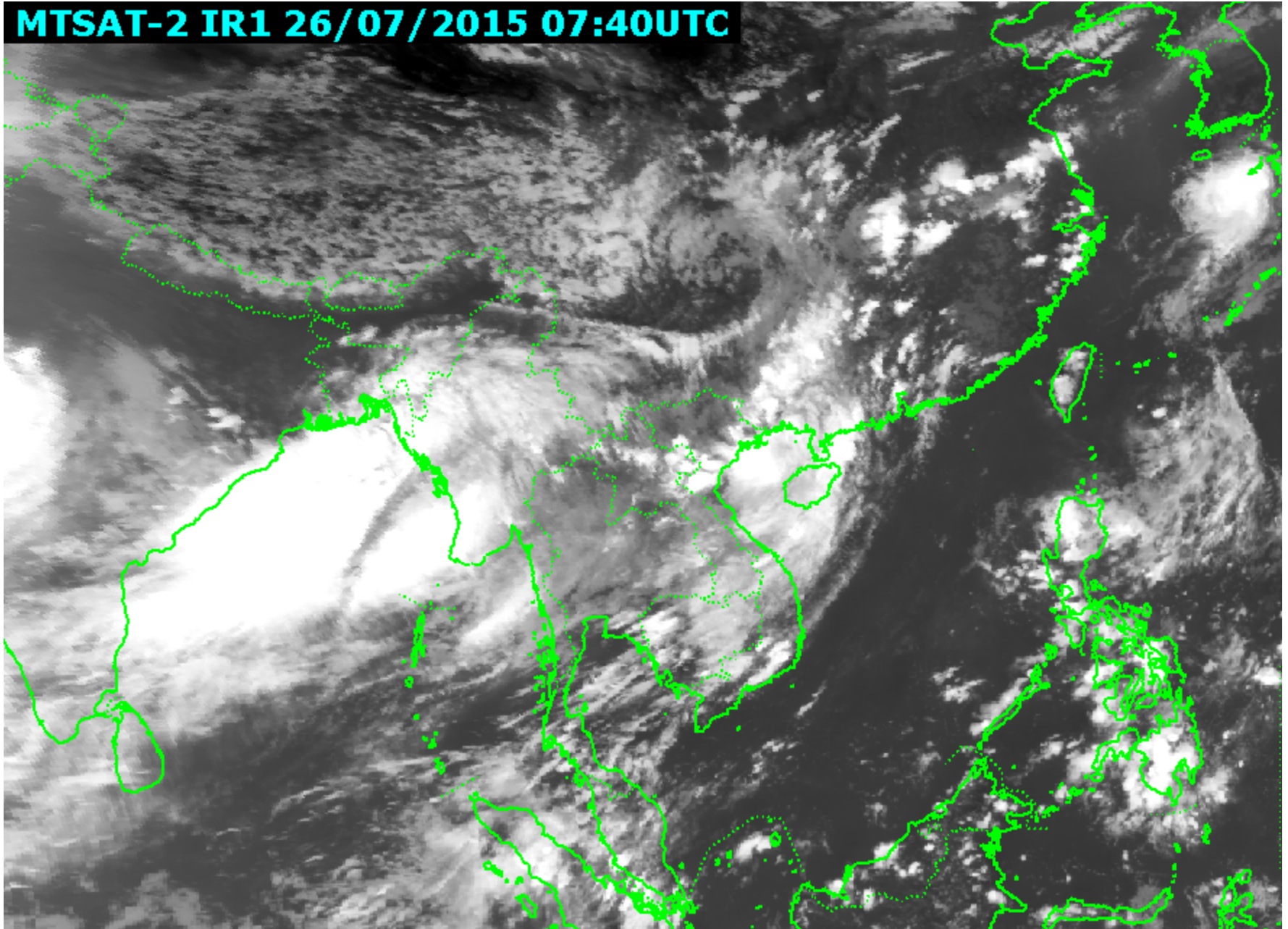
# DMH's top three hazards that can be monitored by satellite

## ➤ **Hazard 1: Tropical Cyclones**

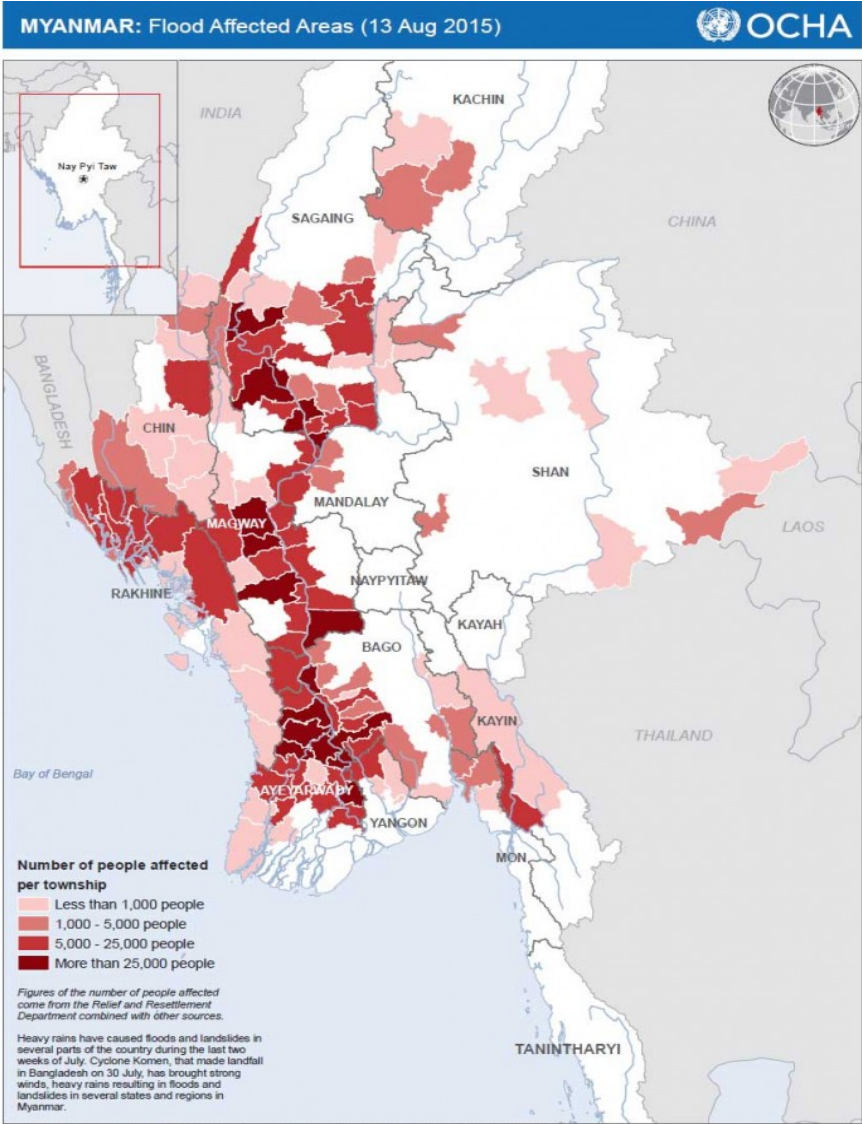
- Cyclonic Storm “Komen” (July, 2015)
- 100 people dead and 1.6 million people have been affected by floods and landslide, 423,208 houses affected and 39,419 houses damaged. (source from RRD & OCHA)
- Myanmar's Ministry of Agriculture reported that more than 1.29 million acres of farm land have been inundated and 687,200 acres damaged.

# Cyclonic Storm "Komen"

MTSAT-2 IR1 26/07/2015 07:40UTC



# Map of Flood Affected Areas in Myanmar, August 2015



The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.  
 Creation date: 14.8.2015    Glide number: FL-2015-000089-MMR    Sources: RRD, MIMU. Feedback: ochayanmar@un.org, www.reliefweb.int

# Images of Flood affected areas

Kalay



Kawlin



Kalay city hall



Sagaing Region





**Flooded villages in Kawlin, Sagaing Region**



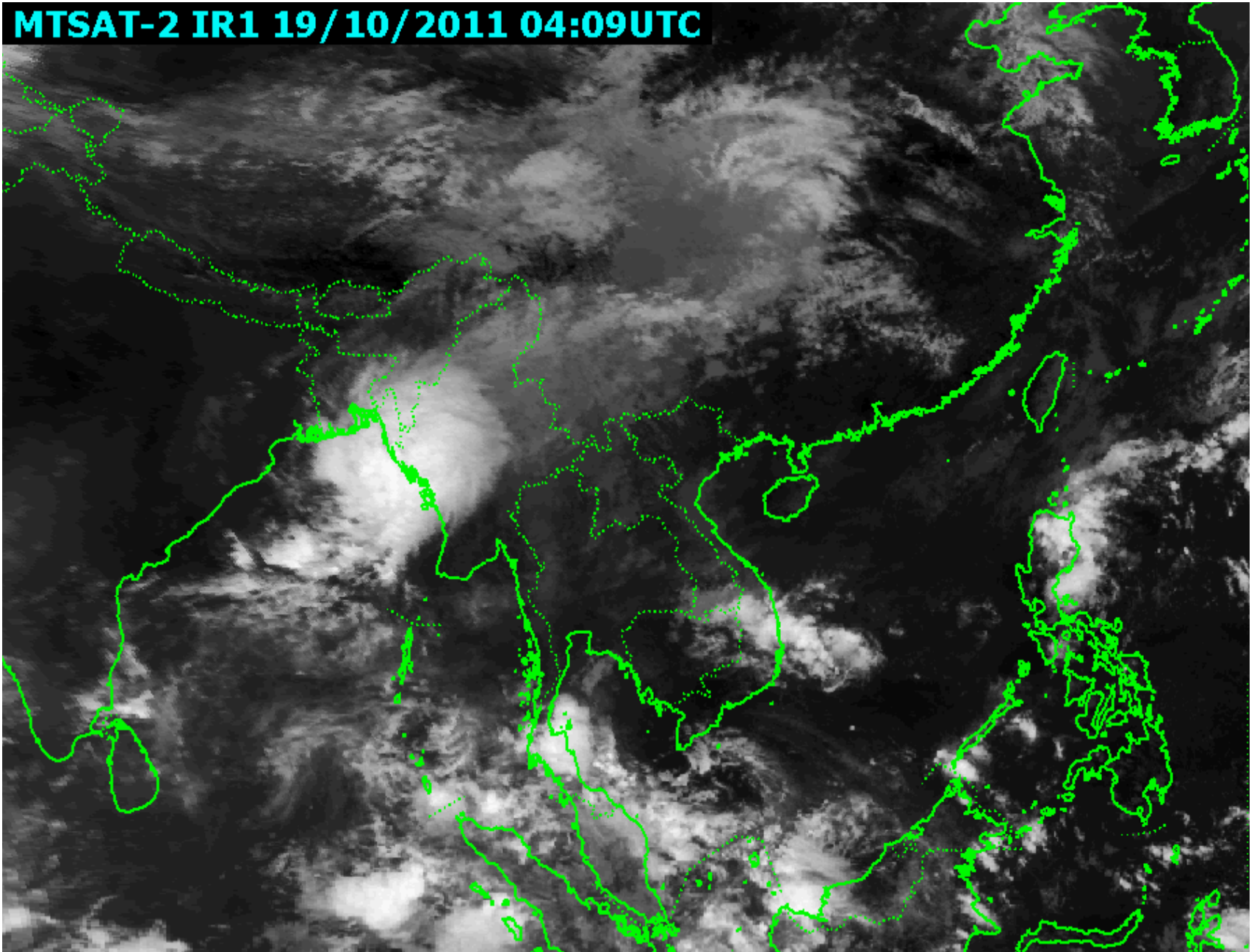


## ➤ Hazard 2: Torrential rain

- BOB 04, Deep Depression (Oct, 2011)
- Flash Flood caused by heavy rain or torrential rain in Mandalay, Magway and Sagaing Regions on 19 October. Authorities indicated that some 35,000 people were effected, and 78 either killed or missing. (Source from OCHA)
- Magway Region was the worst effected by the floods. There, some 26,000 people living in five Townships of Pakokku District lost their houses and belongings.
- The water flow in the local streams raised and washed away 2,123 houses and flooded an additional 8,000 affected, approximately 75% of the houses.

# BOB 04, Deep Depression

MTSAT-2 IR1 19/10/2011 04:09UTC





Myanmar Information Management Unit  
Overview of the Flood Situation in Myanmar  
As of 21 October 2011



Disclaimer: The names shown and the boundaries used on this map do not imply official endorsement or acceptance by the United Nations.

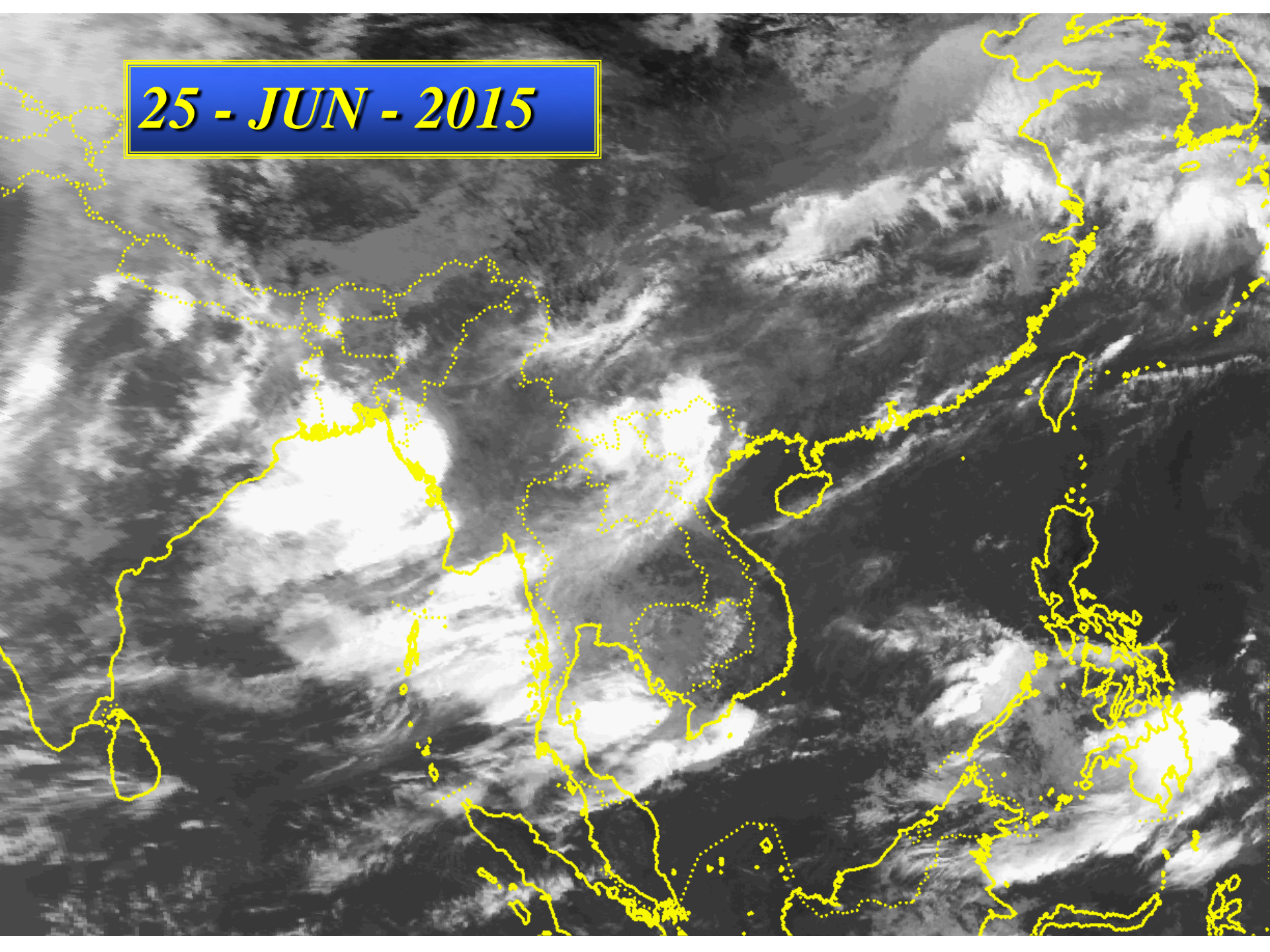
# *Shwechaung Flash Flood at Pakokku (20-10-2011)*



## ➤ Hazard 3: Monsoon Activity

- Strong monsoon (June, 2015)
- Heavy rain which caused Flood by Strong Monsoon in Taninthayi, Bago and Ayeyarwady Regions, Rakhine and Kayin States on 25 to 27 June.
- 185 households affected in Rakhine State (Buthitaung, Ann, Thandwe, Maungdaw, Gwa and Taungkok).
- 56 households affected in Taninthayi Region (Dawei).
- 72 households affected in Kayin State (Hlainbwe).
- 136 households affected in Ayeyarwady Region (Ngaputaw).
- 12 households affected in Bago Region (Padaung).

***25 - JUN - 2015***



## **Heavy falls warning**

(Issued (15:30) hrs MST on 24- 6-2015)

According to the observations and analysis of meteorological conditions at (15:00) hrs MST today, **under the influence of strong monsoon in the Andaman Sea and Bay of Bengal**, rain or thundershowers will be widespread in the following Regions and States with regionally and isolated heavy falls during the next (3) days commencing afternoon today.

During (24) hours, Rain are likely to be above (3) inches, (77)mm in **Bago, Yangon, Ayeyarwady and Taninthayi Regions, Chin, Rakhine, Kayin and Mon States.**

Advisory for the people that living near high land areas, small rivers and streams to avoid landslide and suddenly rise the river level.



## Actual Rainfall from 25 to 27 June, 2015 due to Strong Monsoon

STATES /REGIONS	STATIONS	Dates		
		25	26	27
CHIN	MINTAT	6	23	12
	HAKHA	11	16	20
	PALATWA	<b>182</b>	<b>107</b>	<b>102</b>
RAKHINE	MAUNGDAW	<b>270</b>	<b>336</b>	<b>168</b>
	KYAUKTAW	<b>248</b>	<b>170</b>	<b>110</b>
	SITTWE	<b>56</b>	<b>377</b>	<b>208</b>
	KYAUKPYU	<b>125</b>	<b>355</b>	<b>198</b>
	THANDWE	<b>205</b>	<b>166</b>	<b>256</b>
	GWA	<b>62</b>	<b>225</b>	<b>181</b>
	ANN	<b>205</b>	<b>327</b>	<b>350</b>
	TAUNGKOK	<b>167</b>	<b>237</b>	<b>231</b>
	MYAUK U	<b>157</b>	<b>189</b>	<b>193</b>
	MANAUNG	<b>73</b>	<b>219</b>	<b>110</b>
BAGO	PYAY	1	<b>86</b>	<b>89</b>
	TAUNGGU	17	43	7
	ZAUNGTU	<b>98</b>	<b>67</b>	26
	BAGO	25	<b>91</b>	12
	SHWEGYIN	<b>89</b>	43	41
	THARRAWADY	57	<b>110</b>	18

YANGON	HMAWBI	34	<b>71</b>	3
	MINGALARDON	42	38	16
	KABAAYE	51	48	34
	C-YANGON	54	50	26
	KHAYAN	43	28	22
	COCOISLAND	0	75	49
AYEYARWAD	HINTHADA	51	<b>187</b>	14
Y	MAAUBIN	33	54	34
	PHYARPON	47	<b>165</b>	25
	PATHEIN	44	<b>103</b>	52
	MYAUNGMYA	16	<b>91</b>	23
KAYIN	HPAAN	<b>91</b>	57	<b>115</b>
	HLAINEBWE	<b>139</b>	75	32
MON	THATON	60	<b>93</b>	39
	MAWLAMYINE	<b>100</b>	<b>164</b>	<b>119</b>
	YAY	<b>150</b>	<b>133</b>	<b>87</b>
	MUDON	<b>182</b>	<b>138</b>	63
	KYEIKKHAME	<b>79</b>	<b>136</b>	<b>90</b>
	BELIN	63	61	40
	THIEINZAYET	75	57	19
TANINTHAYI	DAWEI	<b>232</b>	<b>102</b>	<b>98</b>
	MYEIK	<b>91</b>	<b>105</b>	52
	KAWTHUNG	35	39	5

# The flooded town of Ann, located in Rakhine State



## Flooding in the streets of Dawei, 26 June 2015.



Going by boat due to the heavy rain which caused flood in Hpa-an

၁၃ လက်မ၊ လောင်းလုံးမြို့တွင် ၇  
ဒသမ ၀၅ လက်မ၊ မောင်တောမြို့တွင်  
၆ ဒသမ ၆၂ လက်မ၊ ကြာအင်းဆိပ်

အမ်း

ရခိုင်ပြည်နယ် ကျောက်ဖြူခရိုင်  
အမ်းမြို့၌ ဇွန် ၂၄ ရက်ကစတင်၍

ရွာနယ်များတွင် ရေကြီးမှုကြောင့်  
ကာ လှိုင်းဘွဲ့ချောင်းရေ မြင့်တက်  
လာမှုကြောင့် အနိမ့်ပိုင်းရပ်ကွက်များ  
ရေကြီးနှစ်မြုပ်ခဲ့ကြောင်း သိရသည်။  
ရေကြီး နှစ်မြုပ်ခဲ့သော(က)



ဘားအံမြို့၌ မိုးသည်းထန်ပြီး ရေကြီးမှုကြောင့် လှေဖြင့်သွားလာနေသည်ကို တွေ့ရစဉ်။ (မြို့နယ်ပြန်/ဆက်)

ကြီးမြို့တွင် ၅ ဒသမ ၈၃ လက်မ၊ မိုးသည်းထန်စွာ အဆက်မပြတ်



ကျောက်ဖြူမြို့တွင် မိုးသည်းထန်စွာရွာသွန်းမှုကြောင့် မုန်းချောင်းရေလှည့်ပြီး မုန်း-ဆုတ်မြစ်ကားလမ်း ရေလွှမ်းမနေသည့်တိုင်းတွေ့ရစဉ်။ မတ်ဂို (၀၅၅)

# နိုင်ငံတစ်ဝန်း မိုးသည်းထန်စွာရွာသွန်းမှုကြောင့် ရေကြီးမှုများဖြစ်ပွား

မေပြည်တော် ၈၆ ၂၇

နိုင်ငံတစ်ဝန်းရှိဒေသအမျိုးမျိုးတွင် ဇွန် ၂၄ ရက်ကစ၍ မိုးသည်းထန်စွာ အဆက်မပြတ်ရွာသွန်းမှုကြောင့် လူနေအိမ်များ၊ စာသင်ကျောင်းများနှင့် အထူးပြေးကားလမ်းများ ရေကြီးရေလှည့်ခြင်းနှင့် ရေကောက်ခြင်းတို့ ခြစ်ပေါ်လျက်ရှိသည်။ ယနေ့ (ဇွန် ၂၇ ရက်) မိုးလေဝသခန့်မှန်းချက်တွင် မန္တလေးတိုင်းဒေသကြီးနှင့် နေရာကွဲကွဲ စာမျက်နှာ ၁၁ ကော်လံ ၁ \*

# DMH's expectations of new series of satellites for hazard monitoring

Major hazard	Features of new generation GEO met. satellite
Hazard 1: Tropical Cyclones	<p data-bbox="801 454 1226 496"><b>Multi-spectral bands:</b></p> <p data-bbox="801 511 1835 725">New products derived from multi-spectral-band observations will support issuance of more effective warnings. It will be very useful for monitoring Tropical cyclone.</p> <p data-bbox="801 796 1265 839"><b>High spatial resolution:</b></p> <p data-bbox="801 853 1825 1068">The new generation of geostationary meteorological satellites (Himawari 8) spatial resolution is better than the MTSAT. So we can see detail cloud information and issue more effective warnings.</p>

## Major hazard

## Features of new generation GEO met. satellite

Hazard 2: Torrential Rain

### **Multi-spectral bands:**

New signals derived from multi-spectral band observation before extremely heavy rainfall are expected to be useful.

### **Rapid scanning:**

Data from rapid scanning observation of 10 minutes interval can monitor with timely the development of cloud formation.

### **High spatial resolution:**

High spatial resolution data will also provide the additional data necessary address the feature classification of the atmosphere.

Major hazard	Features of new generation GEO met. satellite
Hazard 3: Monsoon activity	<p data-bbox="799 189 1224 232"><b>Multi spectral bands:</b></p> <p data-bbox="799 247 1837 404">New products will be derived from multi-spectral band observation data, which will help to issue heavy rainfall warning due to strong monsoon.</p> <p data-bbox="799 475 1309 518"><b>High spectral resolutions:</b></p> <p data-bbox="799 532 1837 689">Data from High spatial resolution bands will also provide the additional data necessary address the feature classification of the atmosphere.</p>

# DMH's requirements to get desired benefits from the new generation of satellites

Major hazard	Features of new generation GEO met. satellite
Hazard 1: Tropical cyclones	<p data-bbox="784 508 1818 665"><b>Easy-to-understand product:</b> DMH would like to use the new product made with multi-spectral band data to monitor tropical cyclone.</p> <p data-bbox="784 736 1760 951"><b>Training in imagery analysis:</b> It will support how to analyze the retrieval of new signals from multi-spectral and high spatial resolution bands observation.</p> <p data-bbox="784 1022 1808 1236"><b>Training in the basics of multi-spectral observation:</b> From this training, we can know how to use and interpret all products from the new generation of satellite.</p>



Major hazard	Features of new generation GEO met. satellite
<p>Hazard 2: Torrential rain</p>	<p><b>Easy-to-understand product:</b> To identify the heavy rain cloud by using new signals (RGB).</p> <p><b>Training in imagery analysis:</b> It will support how to analyze the retrieval of new signals from multi-spectral and high spatial resolution bands observation.</p> <p><b>Training in the basics of multi-spectral observation:</b> From this training, we can know how to use and interpret all products from the new generation of satellite.</p> <p><b>Training in product development:</b> It will provide to improve satellite product usage and also to promote the accuracy of those product.</p>
<p>Hazard 3: Monsoon activity</p>	<p><b>Training in the basics of multi-spectral observation:</b> From this training, we can know how to use and interpret all products from the new generation of satellite.</p>

# DMH's plans/expectations for utilization of new-generation geostationary meteorological satellite data

- To upgrade our forecast accuracy by using high spatial resolution and multi-spectral bands.
- To do the research such as Tropical cyclones, Heavy rain, etc by using new generation satellite data and imagery.
- To upgrade our Capacity building for Satellite Meteorology (short and long term training).
- To use Tools (for eg. Advance Dvorak Technique (ADT)) for the Tropical Cyclone Forecasting.

# Thanks For Your Attention

