

**INNOVATIONS IN
DISASTER RISK REDUCTION AND
CLIMATE CHANGE ADAPTATION
Albay Province, Philippines**

**DEPARTMENT OF ENVIRONMENT AND
NATURAL RESOURCES
AND THE
PROVINCIAL GOVERNMENT OF ALBAY**

(PHILIPPINES)



THE CHALLENGE

- Multi-hazards: climate and geological
- Persistent poverty

ALBAY PROVINCE



LEGASPI CITY, ALBAY



Disaster Risk and Vulnerability of Albay

- ❑ **19 to 21 typhoons** per year in the Philippines with 3-5 major direct hits on Albay.
- ❑ About 198,000 houses threatened by **wind** destructions and at least 350,000 people have to evacuate.
- ❑ **Mayon Volcano Eruption** threatens 3 cities and 5 municipalities
- ❑ 127 villages or 11,000 to 12,000 families threatened by **landslides**
- ❑ About 300,000 population out of 1.2M threatened by **tsunami**
- ❑ Eight municipalities and two cities threatened by **floods**.

Major Disaster Events in Albay Province 1994-2010: Zero Casualty in 16 years except 2006

Calamities	Date	Classification	Casualty	Damage Cost
1. Typhoon Rosing	Nov. 3, 1995	Destructive	ZERO	P 1.7 B
2. Typhoon Loleng	Nov. 2, 1008	Destructive	ZERO	7.1 B
3. Mayon Eruption	Feb. 2000	Explosive	ZERO	284 M
4. Mayon Eruption	June 2001	Explosive	ZERO	300 M
5. Mayon Eruption	July 2006	Explosive	ZERO	50.5 M
6. Typhoon Milenyo	Sept. 27 2006	Destructive	14 dead	1.3 B
7. Typhoon Reming	Nov. 30, 2006	Destructive	604 dead 419 missing	3.7 B
8. Typhoon Mina, Lando and Nonoy	Nov. 2007	Destructive	ZERO	
9. TECF, Monsoon Rains	Feb. 2008	Destructive	ZERO	127 M
10. Typhoon Dante	April 2009	Destructive	ZERO	
11. Typhoon Ondoy	Sep. 2009	Destructive	ZERO	
12. Typhoon Peping	Oct. 2009	Destructive	ZERO	
13. Mayon Eruption	Dec. 14, 2009 – Jan. 2, 2010	Explosive	ZERO	

THE INNOVATIONS

- ☑ Institutionalized DMO, Climate Office and MDG Office
- ☑ Risk Mapping
- ☑ Geostrategic Intervention
- ☑ Relocation
- ☑ Community-Based DRR
- ☑ Engineering Interventions
- ☑ Capacity Build-up
- ☑ Disaster Response
- ☑ Cluster Approach to Early Recovery

Institutionalized DRRMO

- Created by a Provincial Ordinance since 1994
- Strengthened with 25 regular personnel including emergency research and disaster specialists.
- Managed and survived disasters
- Funded thru regular allocation from the annual provincial budget (IRA)
- Access to calamity fund for the operations 5% of IRA
- Intermittent but steady flow of technical and logistical assistance from NG Agencies, NGOs and INGOs for capacity building and skills training

Institutionalized the Center for Initiatives and Research on Climate Change Adaptation (CIRCA)

- **Created by a Provincial Ordinance in 2007**
- **Implement MDG-F JP**
 - **Localized climate scenario**
 - **Climate-proof CLUP**
 - **Integration of climate change into education curriculum (Gr 4 to 4th year)**
- **Advocacy and knowledge management**
 - **National Conference on Climate Change Adaptation (2007, 2009)**
 - **LGU Summit (2010)**
 - **Climate Change Academy**
 - **Disaster City**
 - **Climate sciences center at Bicol University**

Institutionalized the Center for Initiatives and Research on Climate Change Adaptation (CIRCA)

Sources of Funds

- Regular allocation from the annual provincial budget (IRA)
- P16M from MDG-F JP
- Intermittent but steady flow of technical and logistical assistance from NG agencies, NGOs and INGOs for capacity building and skills training

Risk Reduction: Risk Mapping

- **Risk mapping : is a common resource to all phases of DRR**

- **PHIVOLCS**

- Earthquake mapping
- Volcanic Hazard Mapping
- Tsunami

- **PAGASA**

- Flood Mapping

- **Mines and Geo-Sciences Bureau**

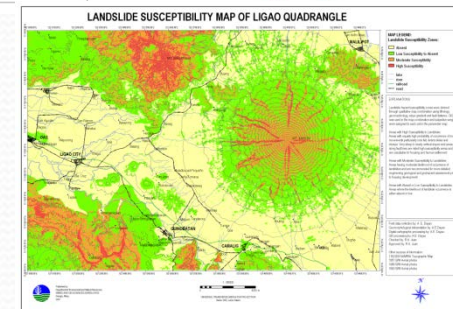
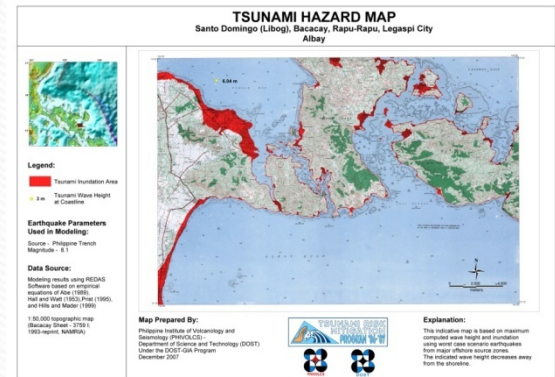
- Landslide mapping

- **Manila Observatory**

- Mudflow (Lahar) mapping

- **LGU**

- Population and Resource Mapping
- Comprehensive Land Use Plan



ALBAY PUBLIC SAFETY AND EMERGENCY MANAGEMENT OFFICE

Provincial Disaster Operation Center

Legazpi City

SUMMARY OF RISK ANALYSIS BY: CITY/MUNICIPALITY

As of December, 2009

NAME OF CITY/ MUNICIPALITY	FLOODING			LANDSLIDE			MUDFLOW / LAHAR			STORM SURGE & TSUNAMI			WIND			MAYON ERUPTION			REMARKS
	No. of Bgys Affected	Families Affected	Population	No. of Bgys Affected	Families Affected	Population	No. of Bgys Affected	Families Affected	Population	No. of Bgys Affected	Families Affected	Population	No. of Bgys Affected	Families Affected	Population	No. of Bgys Affected	Families Affected	Population	
1. TIWI	17	1987	10281	9	934	4794				11	1644	8550	25	1856	9649				
2. MALINAO	26	2991	15544	12	1874	5547				4	298	1552	29	1678	8721				
3. TABACO CITY	40	1062	5535	2	122	645	11	5134	28008	14	2392	12457	47	3477	18085	8	3213	15538	
4. MALILIPOT	17	608	3173	4	134	719	3	1476	7298	3	595	3150	18	1406	7313	3	1479	6976	
5. BACACAY	53	715	3718	7	451	2396	1	2505	6980	34	2345	12190	56	1339	6961				
6. STO. DOMINGO	22	746	3085	4	42	226	5	2990	12834	8	329	1722	23	1908	9919	9	5427	28281	
7. LEGAZPI CITY	66	16353	83930	8	175	932	8	5348	23814	17	5686	27342	70	2379	12370	12	7760	32761	
8. RAPU-RAPU	33	623	3285	5	522	2643				28	4215	21885	34	755	3926				
9. MANITO	15	1923	10049	11	556	3350				7	346	1988	15	985	5121				
10. DARAGA	26	2122	10344	3	534	2769	17	10431	47888				54	686	3563	6	3045	11816	
11. CAMALIG	23	4895	25634	8	485	2480	7	3220	16075				50	2646	13759	6	1842	8128	
12. GUINOBATAN	22	1926	10015	4	14	84	8	4545	18948				44	1849	9610	5	2199	10344	
13. JOVELLAR	13	917	4555										23	855	4447				
14. LIGAO CITY	33	772	4014	17	1928	10054	7	2080	10820	3	239	1250	55	1543	8023	7	1213	6299	
15. PIODURAN	10	794	4528	5	134	699				9	2993	16643	33	1479	7687				
16. OAS	21	1256	6531	9	1691	8819				5	831	4578	53	1728	8983				
17. POLANGUI	26	7525	39130	12	1104	5720							44	1391	7231				
18. LIBON	45	3896	8623	6	1340	5282				6	2808	15444	47	4924	25605				
TOTAL	508	51111	251974	126	12040	57159	67	37729	172665	149	24721	128751	720	32884	170973	56	26178	120143	

Sources:
CDCCs/MDCCs
NSO 2007
Barangays

NOTE: Some of the population threatened by Mayon Volcano eruption are also threatened by other hazards like flood and lahar due to weather hazards

Prepared by:

APPROVED

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Risk Reduction: Relocation

RELOCATION PROGRAM

- Program being undertaken under Albay MDG Office
- 10,076 households in high risks areas already provided with developed lots in safer locations
- Lots are already sufficient, but has shelter gap of 5,454
- Funded by central government (NHA, DSWD) and international aid (USAID, Habitat for Humanity) and local NGO (GK)
- Site is provided by the Provincial Government of Albay

Relocation Areas



Risk Reduction: Land Use Planning and Zoning

Comprehensive Land Use Plan

- Against disaster: science-based adaptation
- Integration of climate and disaster risks into zoning ordinance with 3 cities and 18 municipalities trained
- Funded under the **UNDF MDGCF (USD 400K)**

Community-Based Disaster Risk Reduction

Continuous Training and Education

- **Household/Community preparedness (first responder capacity)**
- **LGU preparedness (first integrator)**
- **Skills development for government and volunteers**
- **Warning System Communication Protocol and Evacuation Procedures**
- **Evacuation and Community Kitchen Management**

Community-Based Disaster Risk Reduction

Continuous Training and Education

- Critical Incidence Stress Debriefing
- Community Risk Mapping and Contingency Planning
- Education-On-Air with local broadcast media
- Conduct of drills and exercises in schools, hospitals, hotels, malls and communities to pre-test the hazard specific contingency plan on volcanic eruption, earthquake typhoon and fire
- Regular annual provincial budget

Community Training and Seminar



TAGAS	
VULNERABILITY	CAPABILITY ASSESSMENT
<ol style="list-style-type: none"> 1. FLOOD PRONE AREA - YAWA RIVER 2. MORE OR LESS 30 DISABLED RESIDENTS 3. PRONE TO TRAFFIC ACCIDENTS DUE TO LACK OF TRAFFIC LIGHTS 4. LACK OF STREET LIGHTS 5. INADEQUATE DRAINAGE SYSTEM 6. LACK OF WATER FACILITIES FOR DRINKING & HYGIENE 7. THICKETS OF RUBBER TREES TO LANDSLIDE PREVENTION 8. JOURNALS DEPENDENCY 9. WITH CARE OF MALNUTRITION 10. SOME FARMS WITH IRRIGATION AND SYSTEM 	<ol style="list-style-type: none"> 1. MOST RESIDENTS HAVE CELLPHONES AND OTHER MEANS OF COMMUNICATION 2. MOST RESIDENTS WERE ABOVE AVERAGE IN INCOME LEVELS 3. PRESENCE OF VARIOUS BUSINESS ESTABLISHMENTS 4. NEAR THE TOWN PROPER 5. CENTER OF HEALTH SERVICE RESIDENTS PHYSICIAN AND 1 HEALTH WORKERS 6. CENTER OF RELIGIOUS SERVICE 7. NEAR TO THE AIRPORT 8. WITH 2 STOREY BARBERS HALL 9. HAS MOBILE PHONES 10. SUFFICIENT IN BRICK

Community Drills



Institutionalized Training of Emergency Paramedics Units



Training of Rescue Volunteers



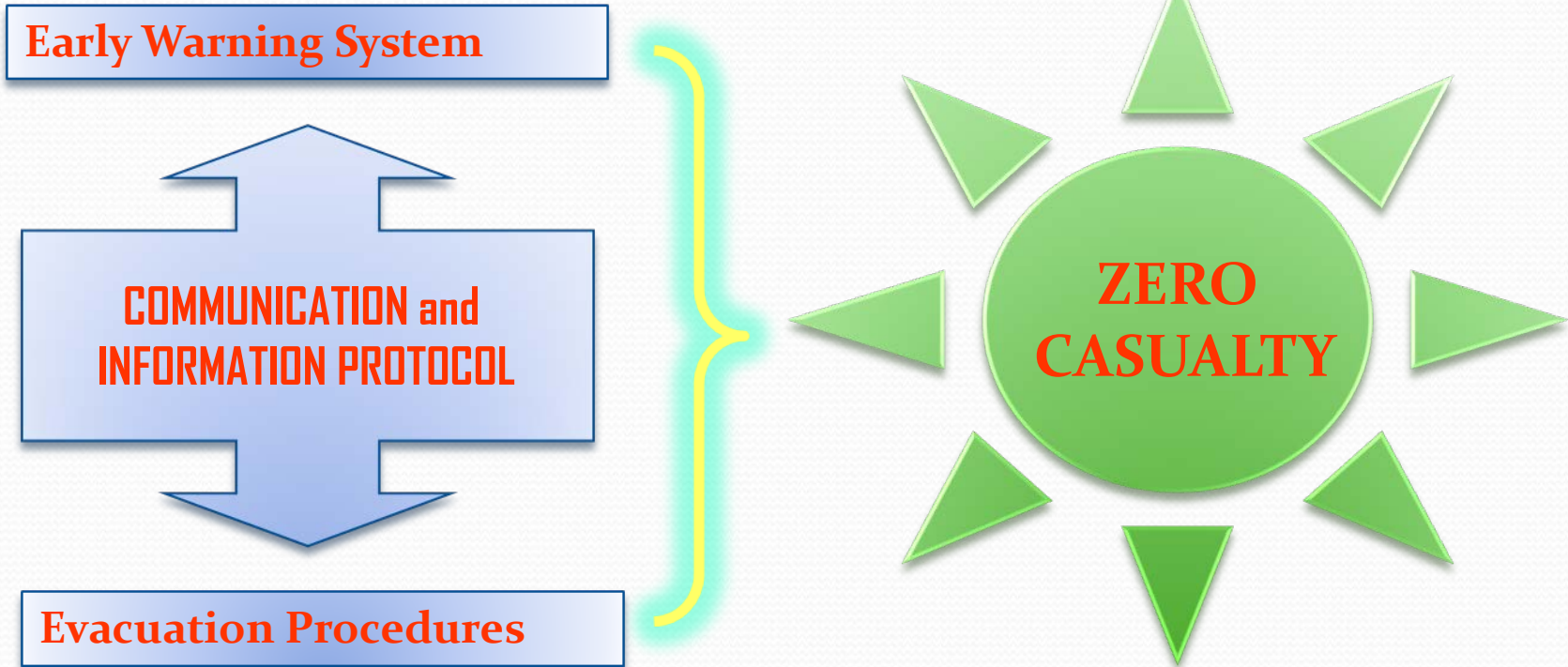
CHILDREN DRR THROUGH GAMES



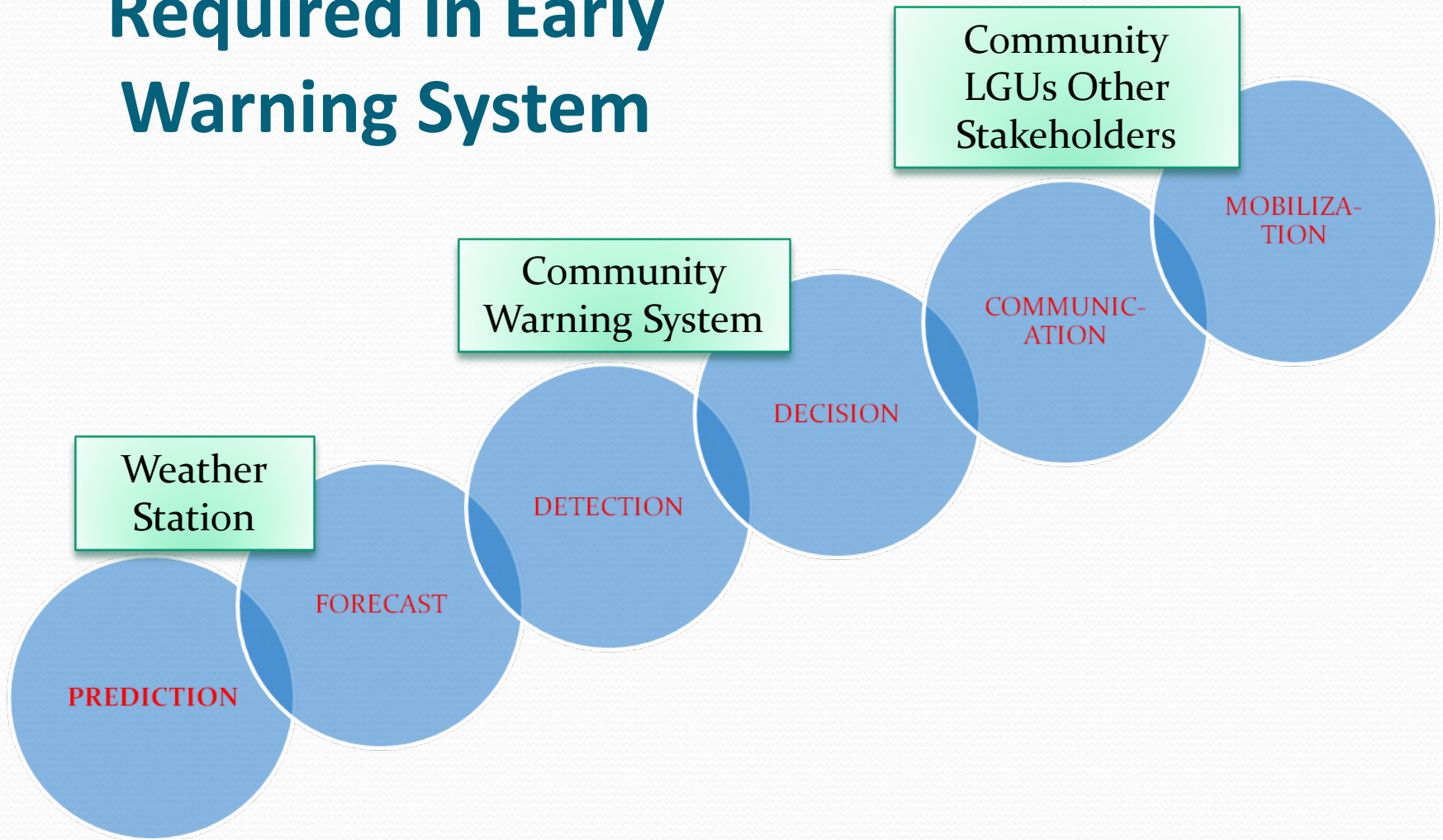
CHILDREN DRR THROUGH MAGIC



The CBDRR (Zero Casualty Formula)



Basic Elements Required in Early Warning System



Mudflow Warning Plan

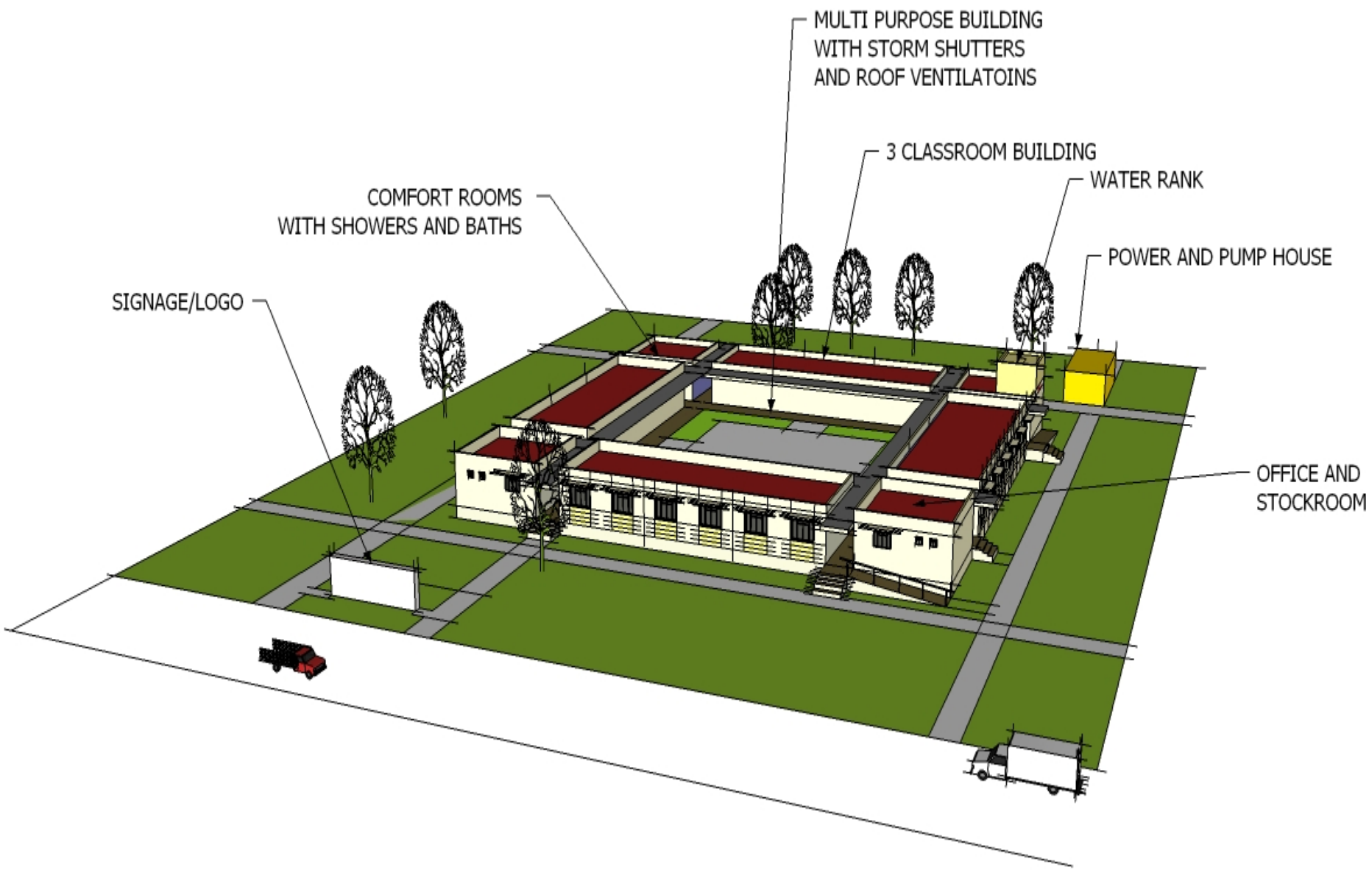
Warning Level	Criteria	Interpretation	Required Actions
0	No Rain	Normal	Normal Community Activities
1	Rain at 10-15 mm per hour	Alert Stage	Monitoring of rainfall
2	Rain at 25-30 mm per hour	Preparedness Stage	Local Authorities and Community are preparing to evacuate
3	Rain at 35-40 mm per hour	Evacuation Stage	Execution of Evacuation Plan

Flood Warning Plan

Warning Level	Criteria	Interpretation	Required Actions
0	No Rain	Normal	Normal Community Activities
1	Rain at 1-2.5 mm per hour	Alert Stage	Monitoring of rainfall
2	Rain at 2.5-4mm per hour	Preparedness Stage	Local Authorities and Community are preparing to evacuate
3	Rain at 4-5.5mm per hour	Evacuation Stage	Execution of Evacuation Plan

Landslide Warning Plan

Warning Level	Criteria	Interpretation	Required Actions
0	No Rain	Normal	Normal Community Activities
1	Antecedent Rain of 100mm	Alert Stage	Monitoring of rainfall
2	Antecedent Rain 150 mm	Preparedness Stage	Local Authorities and Community are preparing to evacuate
3	Antecedent Rain of 180 to 200mm	Evacuation Stage	Execution of Evacuation Plan



MULTI PURPOSE BUILDING
WITH STORM SHUTTERS
AND ROOF VENTILATOINS

3 CLASSROOM BUILDING

WATER RANK

POWER AND PUMP HOUSE

COMFORT ROOMS
WITH SHOWERS AND BATHS

SIGNAGE/LOGO

OFFICE AND
STOCKROOM

School Building Insurance

- P750 per P300,000 coverage of schoolbuildings negotiated with GSIS-GIF
- $\frac{1}{4}$ of 1% premium per year
- 6,500 school buildings at P5.6m
- In 3 years, P16.8M versus 2006 repairs of P478M
- Funded by the Provincial Government of Albay

Preemptive Healthcare

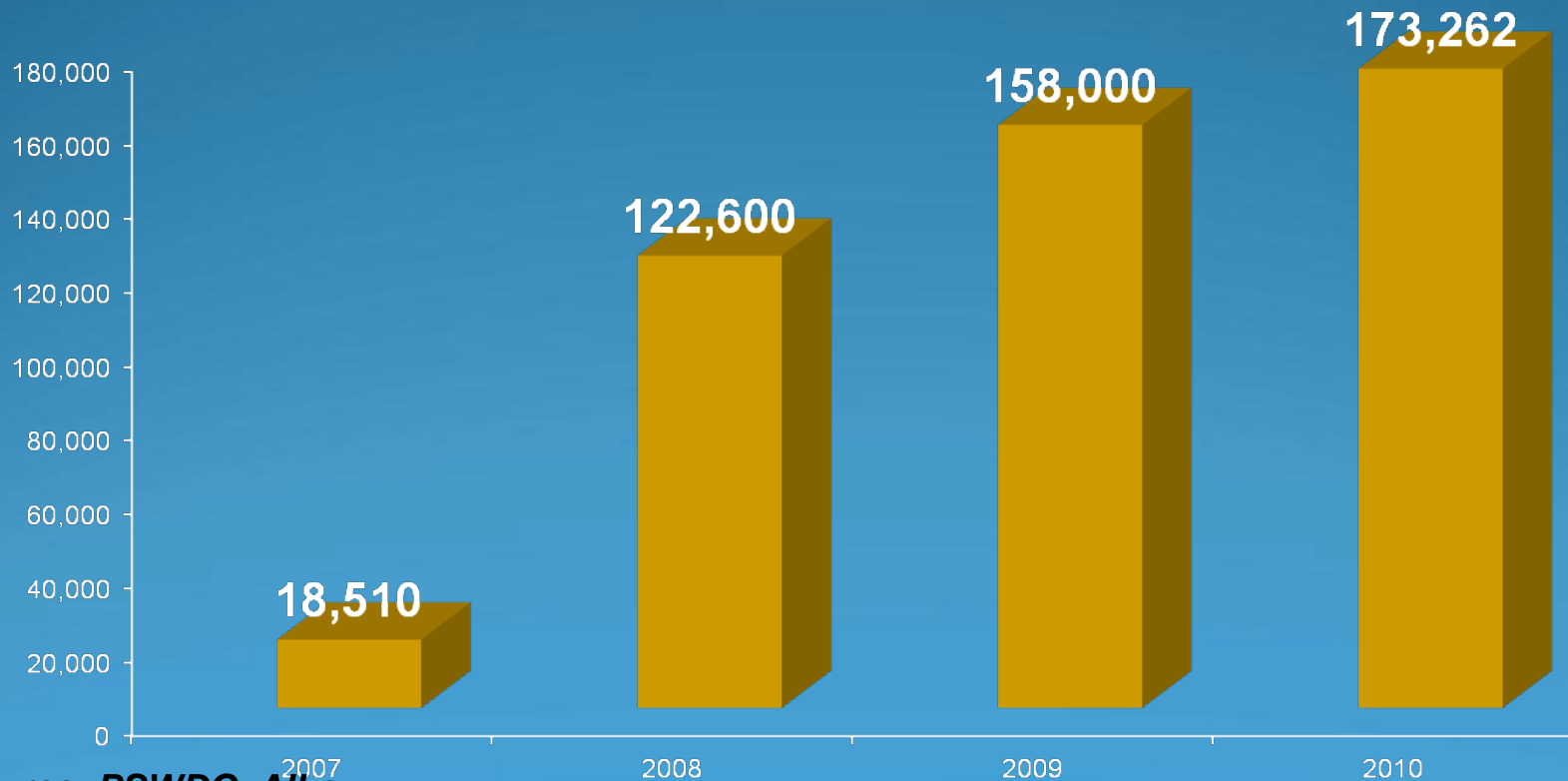
Pre-emptive Healthcare

- Universal health coverage esp targeted at indigent families
- Regular medical missions in high risk areas prior to disaster season
 - For typhoons, ahead of disaster season
 - Mayon eruption targeted at 56 barangays
 - affords sufficient leeway and could be done only when alert status is raised
- Funded thru the public health programs of Provincial Health Office, PCSO, DOH, Medical missions of civic organizations, e.g. Rotary Club of Legazpi

Initiatives

Universal Phil Health Coverage: 2007-2010

Number of Families Enrolled



Source: PSWDO, Albay



THE OUTCOMES

- ☑ Zero casualty in 16 years
- ☑ Surge in private investments
- ☑ Fastest growth among regions
- ☑ MDGs achieved ahead of 2015
- ☑ Two national laws enacted used Albay model

