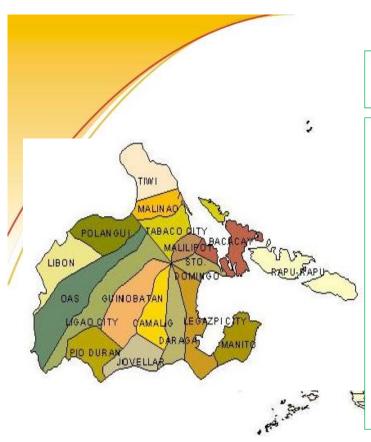
# The Challenge of Building Resilient Communities in the Ring of Fire

"Adaptation most aptly embodies the idea of the human endeavor that enables development to proceed in the midst of risks"

PECC-SINCPEC-PPECC Conference on "Achieving Inclusive Economic Growth in the New Normal" Orchard Hotel, SINGAPORE 26-27 February 2015

Governor Joey Sarte Salceda
Climate Change Academy - DRRM Training Institute
Province of Albay, Philippines





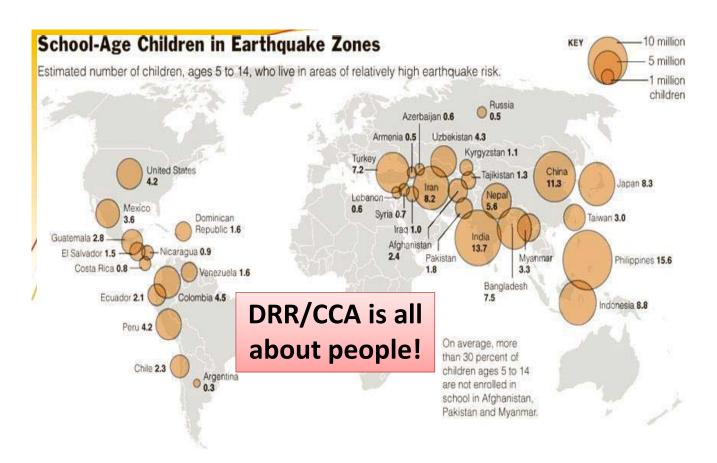
#### **Province of ALBAY**

- Land Area = 2,566 sq. km.
- Population = 1,233,432(May 2010)
- ☐ Households = 231,750
- 3 legislative districts; 3 cities, 15 municipalities
- 2<sup>nd</sup> largest Province in the Bicol Region
- 4 major islands (CRaBS)
- Total coastline of 364 kms with 149 coastal barangays and 128,751 people

## KNOW YOUR RISKS

- 19 to 21 occurrences of typhoon per year in the Philippines of which 3-5 major direct hits on Province of 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

  Vatican of Disasters
- 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.



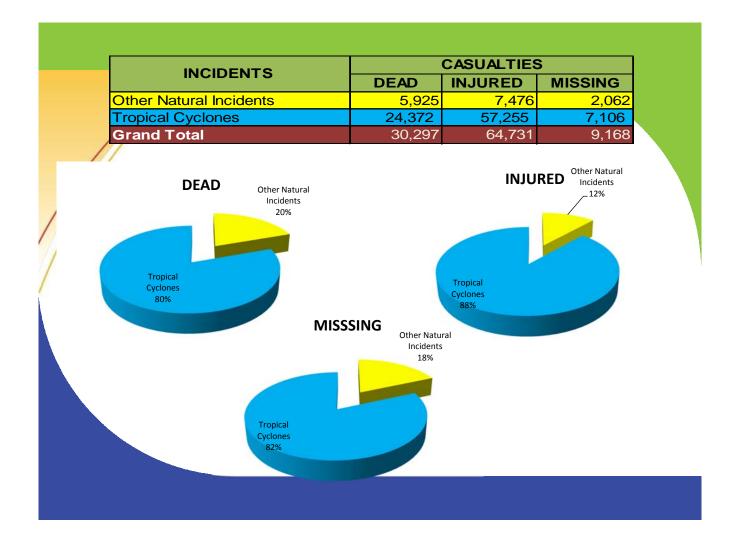
Sources: Susana Adamo and Maria Muñiz, Center for International Earth Science Information Network, Columbia University. Population estimates are based on data from the 2005 Gridded Population of the World data set and from the United Nations (with the exception of China, which is based on the Statistical Yearbook of the Republic of China, 2006). Earthquake hazard estimates are based on data from the Global Seismic Hazard Program.

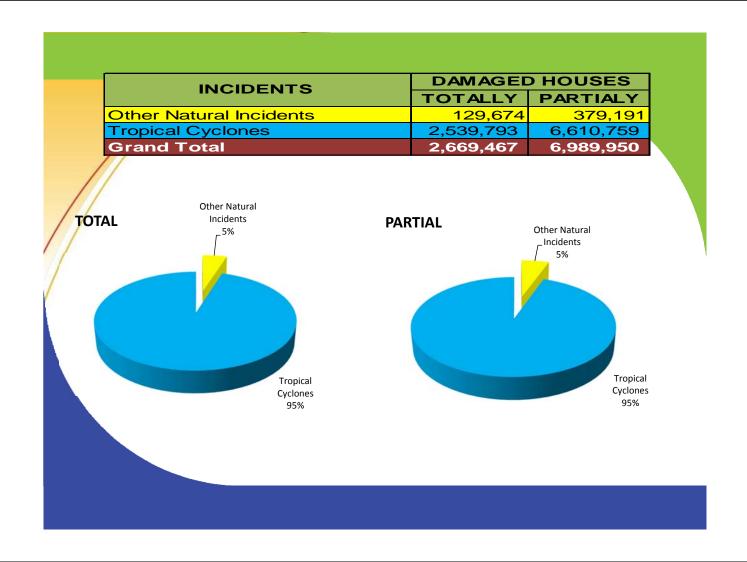
THE NEW YORK TIMES

# **Total Disaster Damages to GDP**

		TOTAL DAMAGES (Pm)	GDP (Pm)	Damages to GDP
/	1990	27,212.0	1,193,528	2.28%
/	1991	17,746.0	1,382,738	1.28%
/	1992	10,898.0	1,497,464	0.73%
	1993	21,340.3	1,633,630	1.31%
	1994	5,245.9	1,875,690	0.28%
	1995	19,001.6	2,111,705	0.90%
	1996	1,678.4	2,406,388	0.07%
	1997	3,556.7	2,688,718	0.13%
	1998	28,368.0	2,952,762	0.96%
	1999	6,728.0	3,244,197	0.21%
	2000	9,775.8	3,580,714	0.27%
	2001	9,223.0	3,888,801	0.24%
	2002	3,534.5	4,198,345	0.08%

	TOTAL DAMAGES (Pm)	GDP (Pm)	Damages to GDP
2003	5,345.0	4,548,102	0.12%
2004	13,841.8	5,120,435	0.27%
2005	3,445.6	5,677,750	0.06%
2006	21,938.6	6,271,157	0.35%
2007	4,532.1	6,892,721	0.07%
2008	23,512.6	7,720,903	0.30%
2009	45,222.0	8,026,143	0.56%
2010	25,281.5	9,003,480	0.28%
2011	25,294.3	9,703,333	0.26%
2012	50,022.8	10,567,336	0.47%
2013	105,458.9	11,548,191	0.91%
2014	70,318.4	12,634,062	0.56%
Total	558,521.6	_	0.52%





INFRA         AGRI         PVT           Other Natural Incidents         28,838.311         54,736.283         6,450.050           Tropical Cyclones         131,424.360         228,641.009         67,916.235           Grand Total         160,262.671         283,377.292         74,366.285	INCIDENTS	DAMAGED F	PROPERTIES (I	VILLIONS)
Tropical Cyclones Grand Total  INFRA Other Natural Incidents 18%  Tropical Cyclones 82%  Other Natural Incidents 18%  Tropical Cyclones 82%	IIIOIDEITTO	INFRA	AGRI	PVT
INFRA Other Natural Incidents 18%  Tropical Cyclones 82%  Other Natural Incidents 18%  Other Natural Incidents 18%  Tropical Cyclones 81%	Other Natural Incidents	28,838.311	54,736.283	6,450.050
INFRA Other Natural Incidents 18%  Tropical Cyclones 82%  Tropical Cyclones 81%	Tropical Cyclones	131,424.360	228,641.009	67,916.235
Other Natural Incidents 18%  Tropical Cyclones 82%  Other Natural Incidents 19%	/ Grand Total	160,262.671	283,377.292	74,366.285
Cyclones 82% Cyclones 81%	Other Natur Incidents	al	AGR	Other Natura Incidents
	Cyclones		Cyclones	5

## **Albay Outcomes**

- ✓ Zero casualty in 18 of 20 years
- ☑ Fastest growing region in 2013 posting 9.4% GDP growth, vs national (7.2%)
- Despite weather disturbances, rice production rose from 147,900 mt in 2008 to 228,080 in 2014 through proper utilization of water resources
- ✓ Investments in environment increased ecotourism attraction with foreign tourists rising from 8,700 (2006) to 339,000 (2013)
  - More water for our aquifers feeding our rivers allowing river rafting and sustaining our waterfalls
  - ➤ More breeding ground for food fish which attracted 150 dolphins for the past 6 months and more *butandings* (whale sharks)
- Environmental Protection: Forest cover increased by 88%
   and Mangrove by 4x

## Albay Outcomes

- ✓ National Achievement Test ranking rose from No.

  177<sup>th</sup> in 2007 to 19<sup>th</sup> in 2012
- **☑** UNICEF-PIDS: 98% participation rate & dropout rate of 0.3%
- College grads from 34,000 to 188,000 with 77,137 assisted since 2007
- **☑** Philhealth from 17,000 to 172,000
- ☑ Health MDGs achieved: MMR of 33 versus 224 national or only 9 mother deaths out of 26,826 live births
- ☑ Population: +66,580 in 7 years from 1.2m to 1.26m or less than 10,000 pa

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- ✓ Land use plans are instrument for identifying and avoiding risks
- New townships in safer locations
- Rehabilitation is best opportunity to reduce risks
- ☑ Risk based rehabilitation
- ☑ Targeting policies critical in ensuring the vulnerable are emancipated

#### **GEOSTRATEGIC INTERVENTION**

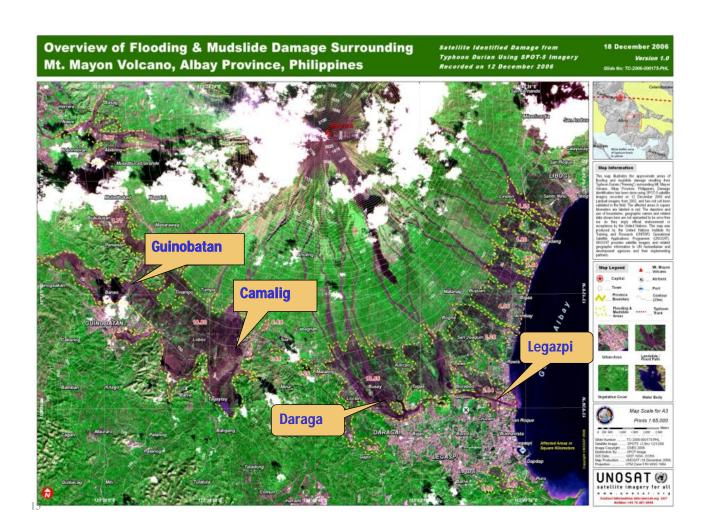
# PLUC deliberating STO. DOMINGO CLUP

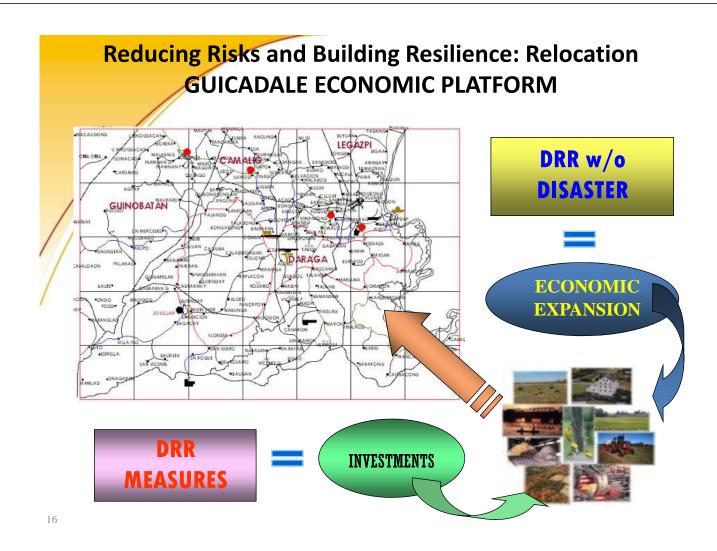


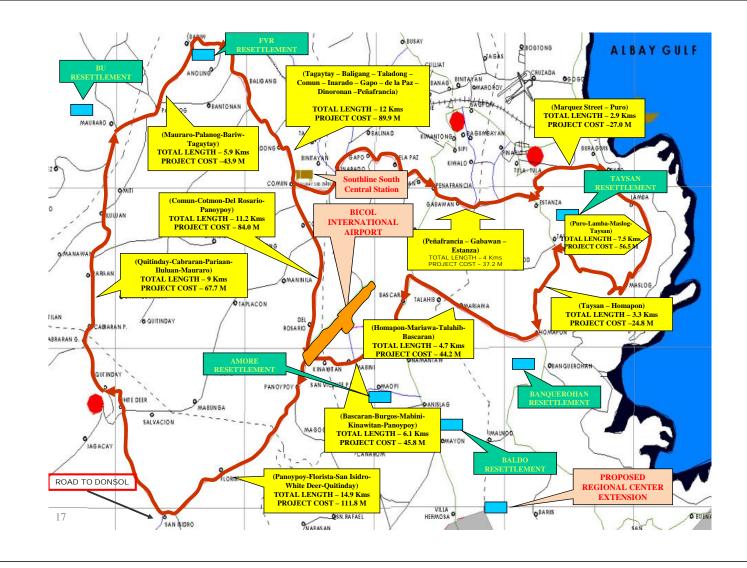
13

# Reducing Risks and Building Resilience: Geostrategic Intervention – New Albay

- Geostrategic Intervention: Guicadale Economic Platform
  - Both the flagship economic project and main DRR strategy of Albay
    Redirection of centers of business and residential activities towards safe
    - area
  - Components:
    - Relocation of 10,076 households in high-risk areas
      - Cost- P2bn for 8 resettlement sites
      - Source of Funding- NHA, province, INGOs
    - New international airport (ongoing)
      - Cost- P4.9bn
      - Source of Funding- DOTC national government
    - Road networks
      - Cost-P1.3bn
      - Source of Funding- Organic annual budget of DPWH, national transfers, JICA, multi-year from 20% economic development fund of the province
    - New government center
      - Cost- P176m
      - Source of Funding- province to acquire via long term loan from Philippine Veterans Bank







#### Relocation with sustainable ecosystem

- Community initiated
- > Beneficiary-led
- Site is 25 mins away from previous source of livelihood

## **RISK REDUCTION: RELOCATION**

#### **Model Relocation Sites (WB 2013, Oxford University)**

- ☐ Taysan (Legazpi City)
- Banquerohan (Legazpi City)
- ☐ Sta. Monica (Legazpi City)
- ☐ Anislag Phases 1, 2,3 (Daraga)
- Baldo 1 (Daraga)
- Baldo 2 (Daraga)
- ☐ Amore (Daraga)
- ☐ Bascaran (Daraga)
- ☐ Penafrancia (Daraga)
- Pandan (Daraga)
- Cullat (Daraga)
- ☐ Balinad (Daraga)
- ☐ Banadero (Daraga)
- ☐ Tagaytay (Camalig)
- Baligang (Camalig)
- ☐ St. Francis of Assisi (Camalig)
- ☐ Mauraro (Guinobatan)
- Quitago (Guinobatan)
- ☐ Minto (Guinobatan)
- ☐ Tuburan (Ligao)
- ☐ Lanigay (Polangui)
- ☐ San Andres phases 1 & 2 (Sto. Domingo)













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#### **☑** Flood Control

Phase 1 of Legazpi Flood Control already approved for DPWH funding in 2012 GAA: P575m out of total P2.1bn

#### Bicol River Basin and Watershed Project

- Flood control for flood plains
- > Watershed protection and reforestation
- > Irrigation rehabilitation
- Multi-year P3.4bn

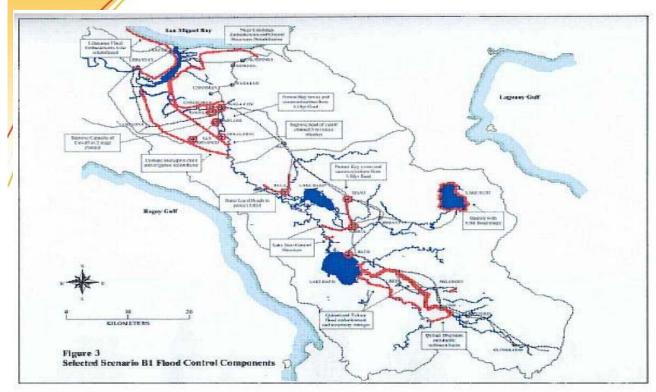
#### **☑** Source of Funds

World Bank country assistance with NG counterpart

### **ENGINEERING INTERVENTIONS**

23

## **Bicol River Basin Flood Control**



## **Engineering Interventions: Biggest Gap**







25

- Risk mapping and risk assessment
- **☑** Safe evacuation centers and safe routes
- **☑** Preemptive evacuation: before the risk
- **☑** Sphere's standard

## **EVACUATION**

## Jan 2014 Risk Assessment

		EL 005:	110			<u></u>	84	)	ALIAD
		FLOODI			LANDSLI		MUL	DFLOW / I	
NAME OF CITY/	No. of	Families	Population		Families	Population	No. of	Families	Population
MUNICIPALITY	Bgys	Affected		Bgys	Affected		Bgys	Affeected	
	Affected			Affected			Affected		
1. T/W/	17	1987	10281	8	934	4794			
2. MALINAO	26	2991	14589	12	1874	5547			
3/ TABACO CITY	40	1062	5535	2	122	645	11	5134	28008
4. MALILIPOT	17	608	3173	6	209	942	3	1476	7298
5, BACACAY	53	1193	6207	7	451	2396	1	2505	6980
6. STO. DOMINGO	15	644	2936	5	446	2087	5	2965	12158
7. LEGAZPI CITY	66	16372	84182	10	305	1611	8	5348	23814
8. RAPU-RAPU	33	1392	7993	5	522	2643			
9. MANITO	12	958	5802	13	1063	6376			
10. DARAGA	26	2393	11584	6	669	3450	17	10431	47888
11. CAMALIG	23	4604	24105	10	822	4228	7	3220	16075
12. GUINOBATAN	18	2923	15214	4	14	84	8	4545	18948
13. JOVELLAR	13	302	1603	3	54	282			
14. LIGAO CITY	29	897	4608	21	1928	10052	7	2080	10820
15. PIODURAN	17	3291	16375	9	134	699			
16. OAS	28	2597	17263	11	399	1876			
17. POLANGUI	23	5742	29124	25	3781	10844			
18. LIBON	28	7465	38822	8	819	3345			
					·				
TOTAL	484	57,421	299,396	165	14,546	61,901	67	37,704	171,989

Source: CDCCs/MDCCs/NSO 2007/BDCCs

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# Jan 2014 Risk Assessment

									-
	STORM	SURGE 8	k TSUNAMI		WIND		M.A	YON ERU	IPTION
NAME OF CITY/	No. of	Families	Population	No. of	Families	Population	No. of	Families	Population
MUNICIPALITY	Bgys	Affected		Bgys	Affected		Bgys	Affected	
	Affected			Affected			Affected		
1. TIWI	12	1644	8550	25	1856	9649			
2. MALINAO	4	298	1552	29	1678	8721			
3/ TABACO CITY	17	2559	13196	47	3477	18085	8	3230	15555
A. MALILIPOT	3	595	3150	18	1406	7313	3	1527	7168
5. BACACAY	34	2345	12190	56	1339	6961			
6. STO. DOMINGO	8	402	1946	23	2649	12186	9	5541	25941
7. LEGAZPI CITY	20	5816	28019	70	2379	12370	12	7658	32757
8. RAPU-RAPU	28	4215	21885	34	755	3926			
9. MANITO	7	346	1988	15	985	5121			
10. DARAGA				54	686	3563	6	3222	12841
11. CAMALIG				50	2646	13759	6	1842	8128
12. GUINOBATAN				44	1849	9610	5	2222	10460
13. JOVELLAR				23	855	4447			
14. LIGAO CITY	3	239	1250	55	1543	8023	7	1209	6367
15. PIODURAN	10	5240	25500	33	1479	7687			
16. OAS	5	647	4652	53	4985	25858			
17. POLANGUI				44	10844	54224			
18. LIBON	6	2808	15444	47	4924	25605			
TOTAL	157	27,154	139,322	720	46,335	237,108	56	26,451	119,217

Source: CDCCs/MDCCs/NSO 2007/BDCCs

# **Community-based Risk Mapping**





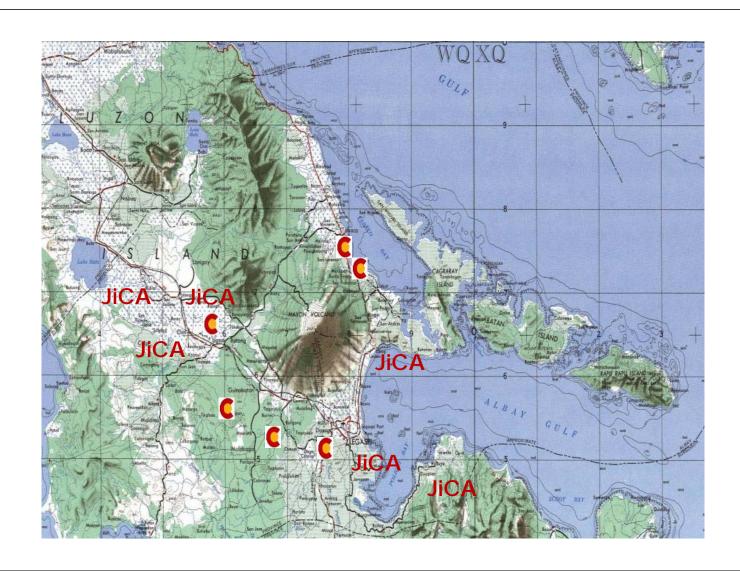








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## **Model Evacuation Centers (JICA)**



## **Model Evacuation Centers (AECID)**



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#### 

- Household and 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
- Mountain Survival and compass reading
- 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
- Continuous and Periodic Education and Training

#### SOCIAL PREPARATIONS

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# Community-based Disaster Preparedness and Response Activities (Organizing, Education and Trainings)







Training of Emergency Paramedics

Training of Rescue Teams

Community Drills









## **STARTING THEM EARLY**



## **CHILDREN DRR THROUGH GAMES**



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## **CHILDREN DRR THROUGH MAGIC**



#### ☑ Close coordination with warning agencies

- Pagasa is sole authority
- Establishment of Regional Weather Bureau in Legazpi
  - Upper air balloon to improve detection
- JICA Reming assistance: Doppler radar in Virac

#### Community-based warning system

- Rainfall monitoring at village level
- > Continuous training
- **☑** Doppler Radar and Satellite Imagery

#### **EARLY WARNING SYSTEM**

30

## **Community-Based Early Warning**



Warning Agencies

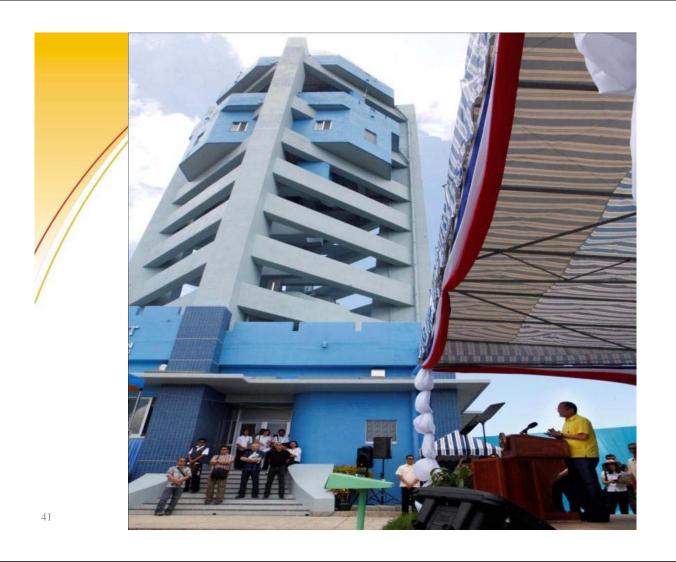


**APSEMO** 

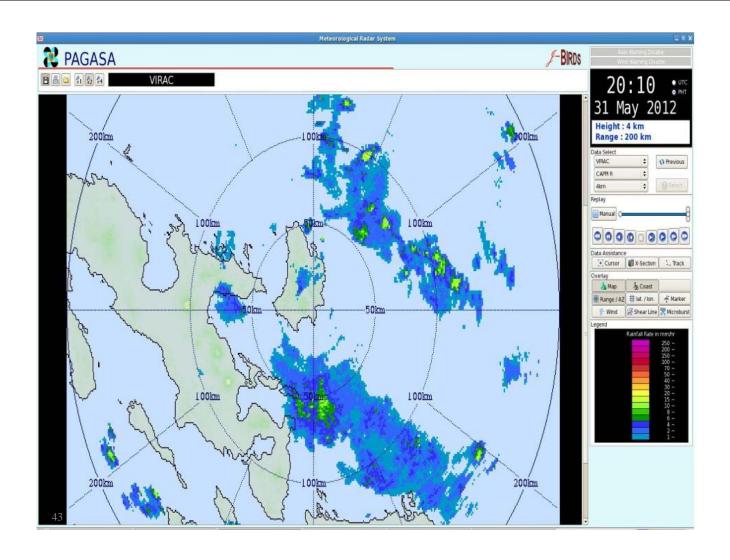






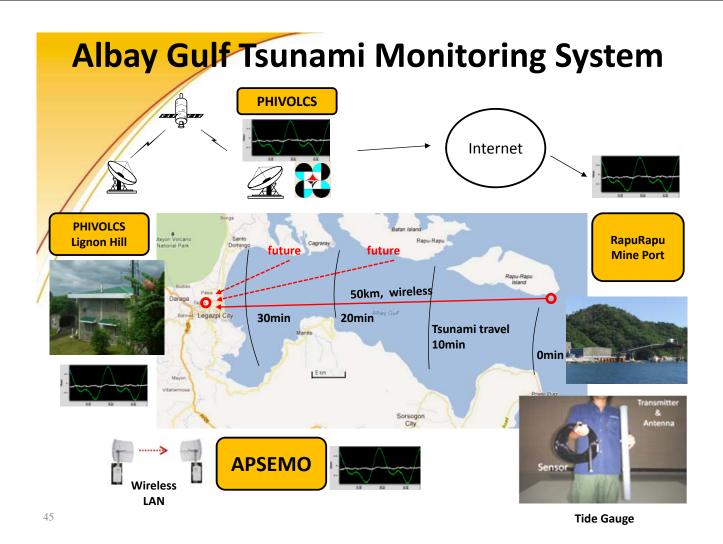


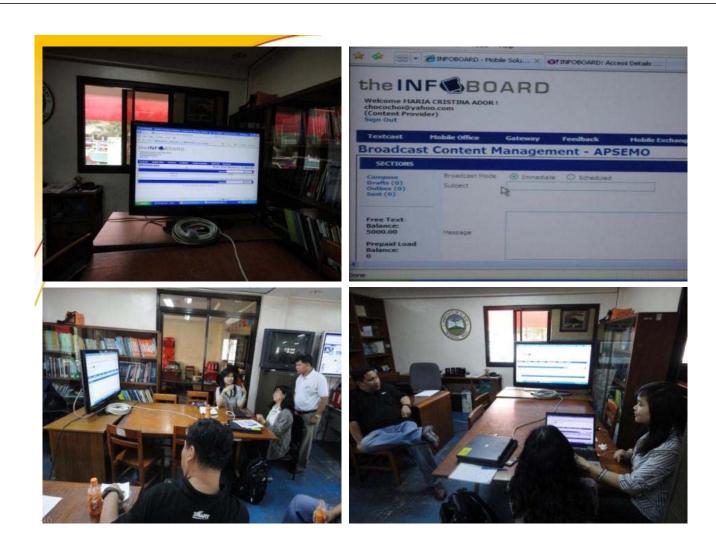




✓ Tsunami Warning CommunicationSystem✓ SMART Infoboard✓ PINDOT Apps

WARNING COMMUNICATION SYSTEM

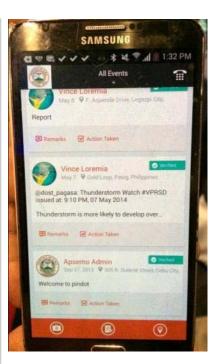




#### **Resources for Warning Communications - PINDOT**



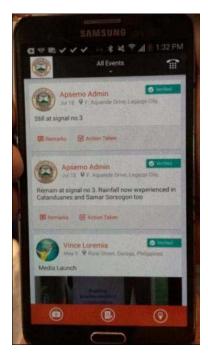




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#### **Resources for Warning Communications - PINDOT**





Provincial Information Network on Disaster Occurrences and Threats (PINDOT)



#### **Major Disaster Events in Albay Province 1994-2014:**

Zero Casualty in 18 years except 2006 and 2011

		Affected Po	opulation	Damage Cost
Calamities	Date	Persons	Dead	(Php)
Typhoon Mameng	Sep 28 1995	10,126	0	71,499,797
Typhoon Rosing	Nov 1 1995	440,372	0	539,599,785
Typhoon Pining	Nov 12 1997	1800	0	37,663,000
Typhoon Loleng	Oct 15 1998	201,834	0	303,950,141
Typhoon Sendang	Nov 7 1999	1,122	0	110,000
Mayon Volcano Eruption	1999	68,626	0	284,076,061
Mayon Volcano Eruption	2001	46,914	0	11,937,460
Typhoon Dindo	May 13 2004	33,892	0	226,712,081
Typhoon Unding	Nov 14 2004	1744	0	42,394,231
Typhoon Yoyong	Dec 4 2004	18,372	0	50,590,299
Tropical Storm Caloy	May 9 2006	47,065	0	99,346,841
Mayon Volcano Eruption	2006	40,451	0	50,590,299
Typhoon Milenyo	Sep 25 2006	698,460	14	1,665,316,133
Typhoon Reming	Nov 28 2006	1,060,875	618	3,230,435,702
Typhoon Mina	Nov 21 2008	214,734	0	22,800,000
Typhoon Frank	Jun 18 2008	138,937	0	21,789,000
Typhoon Dante	May 1 2009	49,712	0	238,316,148
Typhoon Pepeng	Oct 9 2009	89,926	0	9,000,719
Typhoon Santi	Oct 30 2009	671,314	0	6,510,000
Mayon Volcano Eruption	July 2009	47,563	0	16,659,000
TS Chedeng	May 25 2011	221,094	0	5,710,768
TS Falcon	June 22 2011	107,253	0	46,762,630
TY Glenda	July 15 2014	711, 490	0	9,117,017,374

#### Gross Regional Domestic Product, 2011 to 2013 Growth Rates, in Percent (at constant 2000 prices)

	REGION	2011-12	2012-13
PHILIP	PINES	6.8	7.2
NCR	METRO MANILA	7.0	9.1
CAR	CORDILLERA	1.0	6.0
I	ILOCOS	5.2	7.7
II	CAGAYAN VALLEY	8.1	6.6
III	CENTRAL LUZON	6.5	4.3
IVA	CALABARZON	7.3	6.7
IVB	MIMAROPA	4.8	1.7
٧	BICOL	6.9	9.4
VI	WESTERN VISAYAS	7.7	4.1
VII	CENTRAL VISAYAS	9.4	7.4
VIII	EASTERN VISAYAS	(6.4)	5.7
IX	ZAMBOANGA PENINSULA	12.9	4.3
X	NORTHERN MINDANAO	7.2	5.6
ΧI	DAVAO REGION	7.4	6.8
XII	SOCCSKSARGEN	8.0	8.4
XIII	CARAGA	10.7	7.8
ARMM	MUSLIM MINDANAO	1.1	3.6

Source: Philippine Statistics Authority



#### REPUBLIC OF THE PHILIPPINES

## PHILIPPINE STATISTICS AUTHORITY NATIONAL STATISTICAL COORDINATION BOARD

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#### Gross Regional Domestic Product - Press Release



Regional Accounts Main Page

**GRDP Main Page** 

#### Press Release

Highlights

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**Data and Charts** 

Publication

Press Release

Bicol Region's economy posts fastest growth in 2013

(PSA-PR-20140731-SN1-01, Posted 31 July 2014)

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Bicol Region's economy recorded the fastest growth among the country's 17 regions in 2013. It grew by 9.4 percent in 2013, surpassing its growth of 6.9 percent in 2012. It was followed by: National Capital Region (NCR) with 9.1 percent; SOCCSKSARGEN, 8.4 percent; Caraga, 7.8 percent; and Ilocos Region, 7.7 percent.

On the other hand, the economy of MIMAROPA posted the lowest growth rate at 1.7 percent in 2013, slower than its 4.8 percent in 2012. The Autonomous Region in Muslim Mindanao (ARMM) was second lowest with 3.6 percent in 2013 – an improvement from its 1.1 percent growth in 2012. Western Visayas closely followed with 4.1 percent growth in 2013 which is relatively lower as compared to its 7.7 percent growth in 2012.

#### Seven regions record accelerated growth

Out of the country's 17 regions, seven regional economies recorded accelerated growth from 2012 to 2013.

51

### MDGs: Achieved ahead of 2015 exc. MDG 7

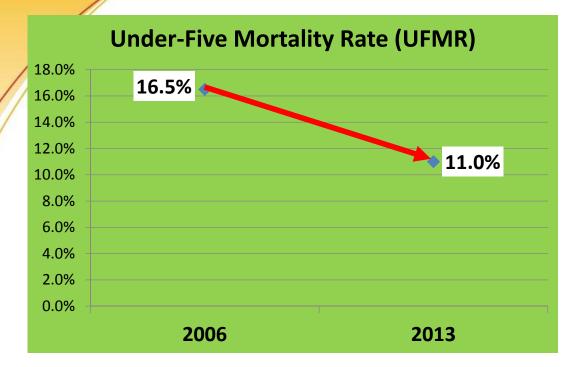
	Goal	Indica	tor	Bicol Region	Albay
	1	Poverty Incidence	MDCs.bass	М	Н
		Subsistence Incidence	MDGs have	Н	Н
9		Underweight (IRS)	been achieved	Н	Н
	2	Participation - Elementary	early through	L	Н
/		Cohort survival - elementary		М	М
	3	Gender parity - elementary	ownership of	Н	Н
	4	Under-five mortality	beneficiaries	Н	Н
		Infant mortality	Deficitionalies	Н	Н
		Proportion of fully-immunized ch	nildren	М	Н
	5	Maternal mortality rate		L	Н
		Contraceptive prevalence rate		L	M
		Condom use rate		L	M
	6	Deaths due to TB		L	Н
		Malaria positive cases		Н	Н
	7	Household with access to sanitar	ry toilets	Н	L
		Household with access to safe dr	inking water	Н	Н

Legend

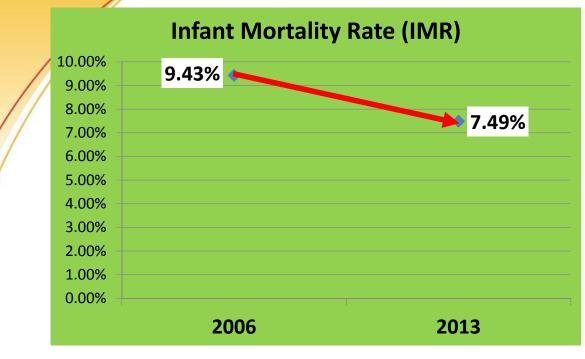
53

L low probability		Н	high probability
M	medium probability		no data





Under-Five mortality rate (UFMR)	16.5% (357/1,000 live births)	11% (295 / 1,000 live births)	27/1,000 Live births	Achieved
--	----------------------------------	----------------------------------	-------------------------	----------



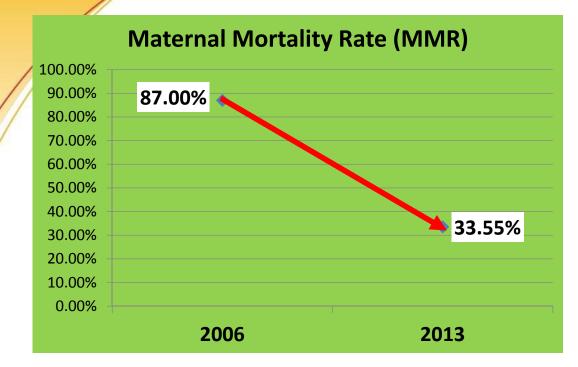
Infant mortality rate (IMR)

9.43%
(237 deaths / 25,132 live births) \* 1,000

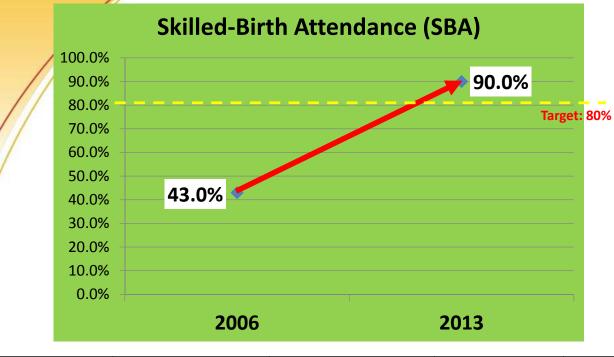
7.49%
(201/26,826 live births) \* 1,000

Live births

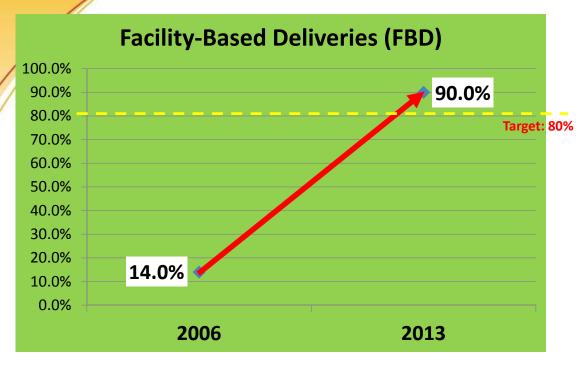
Achieved



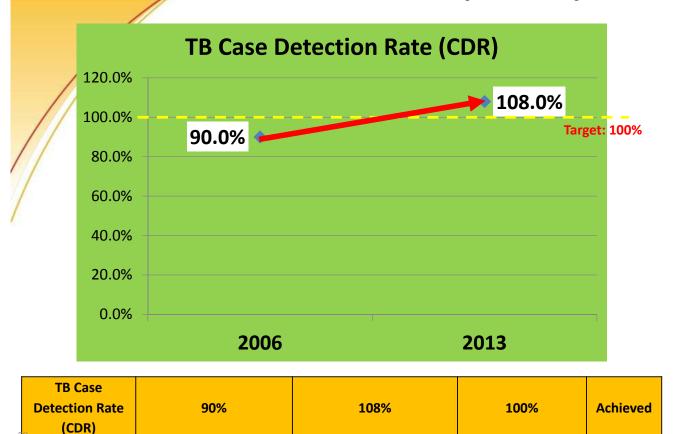
	Maternal	87%	33.55%	F2/100 000	
	mortality rate	(22 / 25,132 live	(9 / 26,826 live	52/100,000	Achieved
4	(MMR)	births) * 100,000	births) * 100,000	Live births	

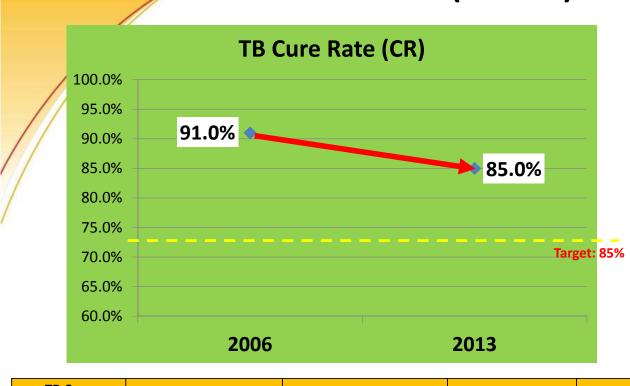


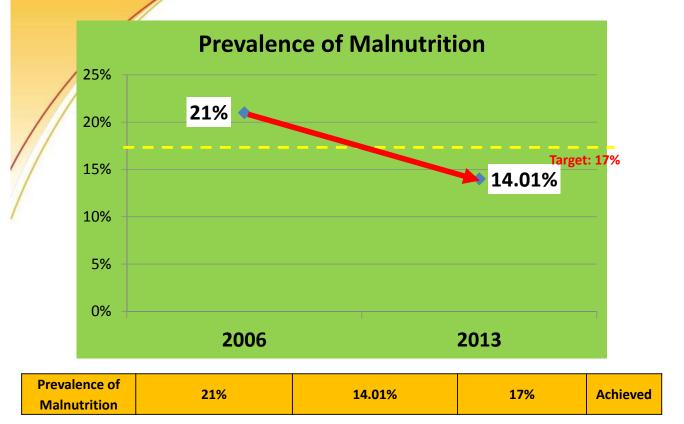
	Skillad Birth	43%	90%		
Skilled-Birth	(10,922 / 25,132 live	(24,316 / 26,826 live	80%	Achieved	
-	Attendance (SBA)	births) * 100	births) * 100		



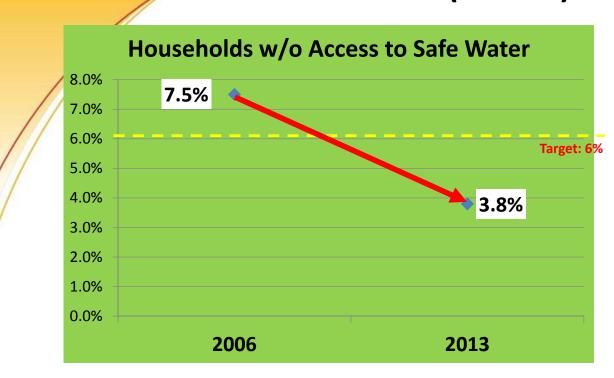
Facility-Based Deliveries (FBD)	14% (3,483 / 25,132 live	90% (24,117 / 26,826 live	80%	Achieved
50	births) * 100	births) * 100		



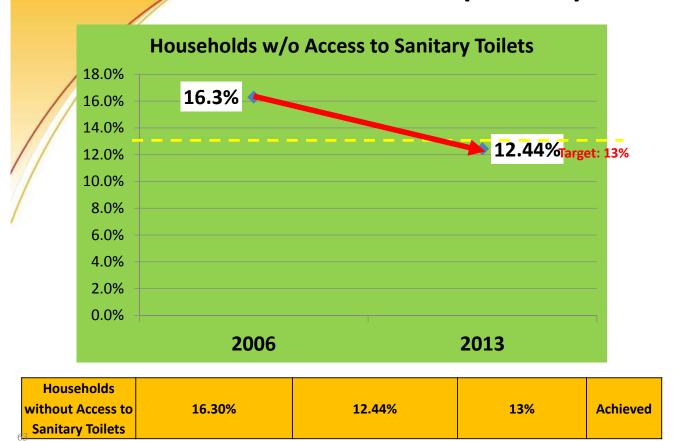


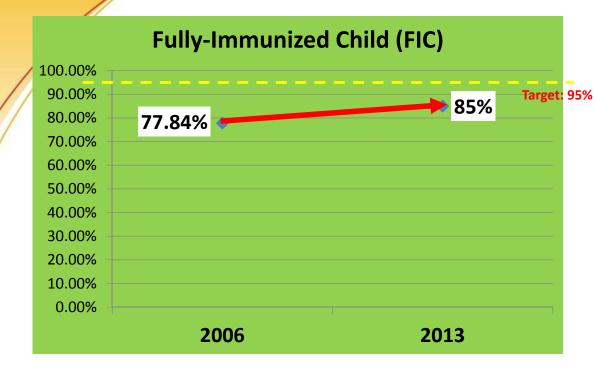


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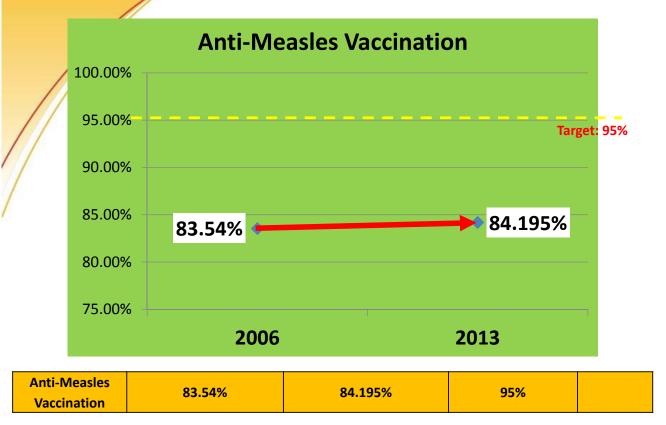


Households				
without Access to	7.5%	3.8%	6%	Achieved
Safe Water				



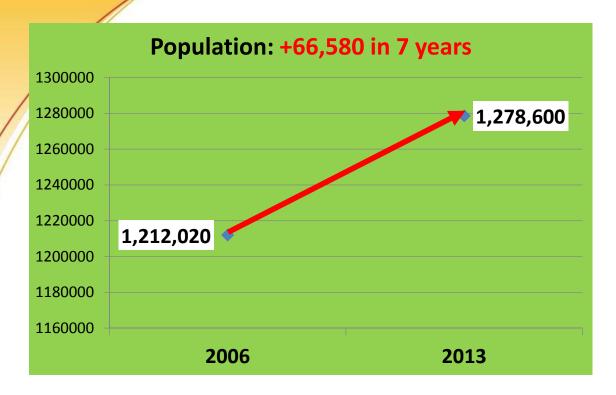


Fully-Immunized	77.84%	85%	95%	
Child (FIC)	77.04%	05/0	95/6	



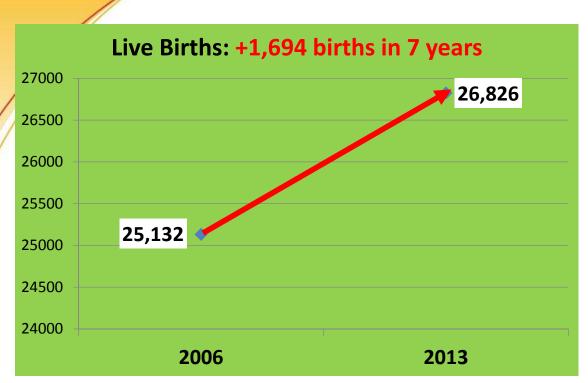
#### **HEALTH PHILHEALTH Enrolment** 173,262 18,510

## **HEALTH**



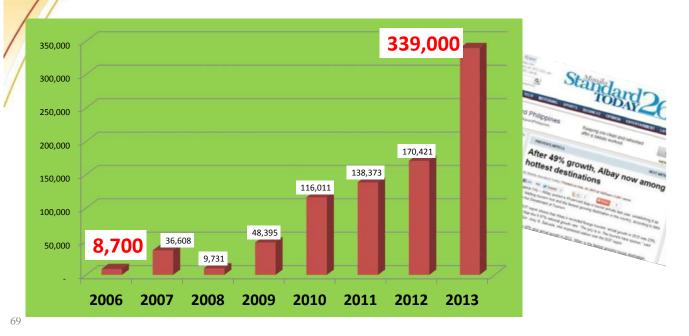
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## **HEALTH**



### **TOURISM**

Albay is the center of tourism boom in the Philippines, Albay foreign arrivals are now at 339,000 of which 300,000 were added from 2010-2013.



88% increase in Forest Cover in 7 years from 26,000 hectares to 44,000



Salceda leads tree planting in