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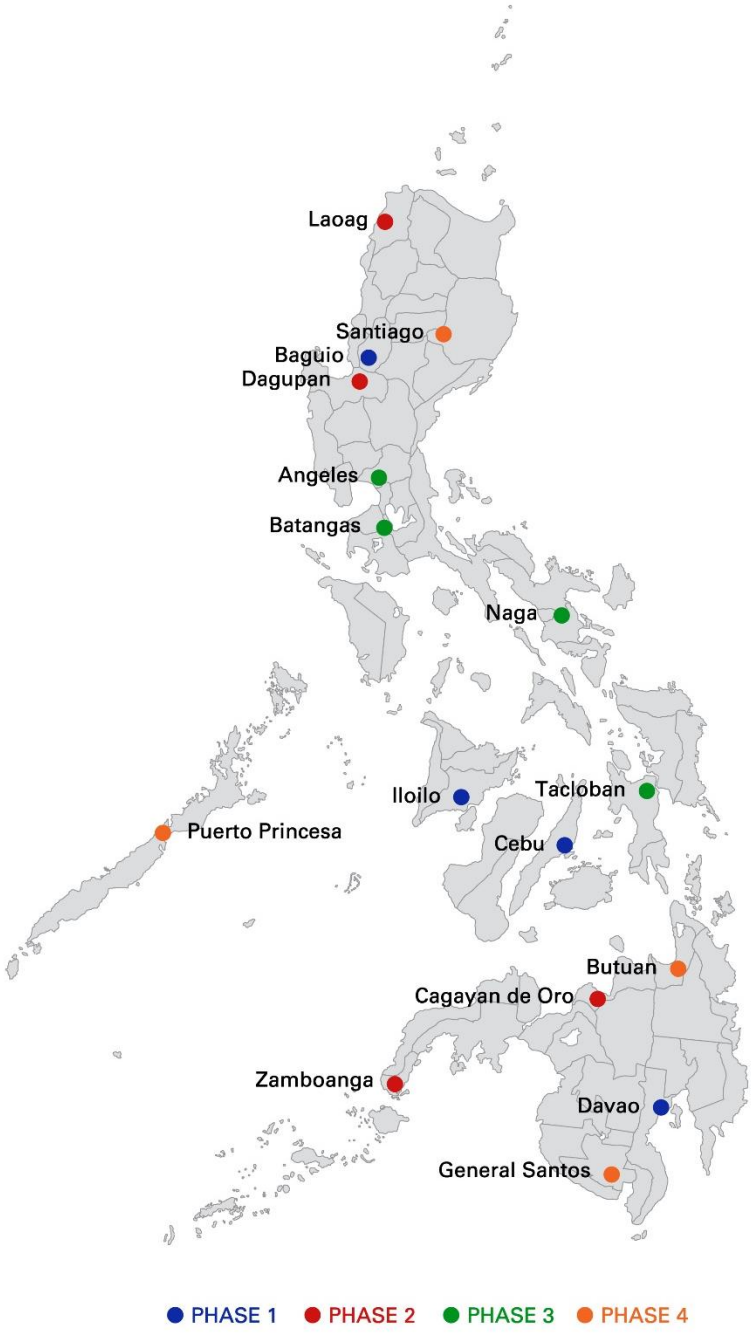
BUSINESS RISK ASSESSMENT AND THE MANAGEMENT OF CLIMATE CHANGE IMPACTS



16 PHILIPPINE CITIES
2014

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ABBREVIATIONS AND ACRONYMS

ACWD	Angeles City Water District
AEC	Angeles Electric Corporation
ANECO	Agusan del Norte Electric Cooperative
ARMM	Autonomous Region on Muslim Mindanao
asl	above sea level
BAS	Bureau of Agricultural Statistics
BCWD	Butuan City Water District
BLIST	Baguio, La Trinidad, Itogon, Sablan, and Tuba
BPI	Bank of the Philippine Islands
BSP	Bangko Sentral ng Pilipinas
CAAP	Civil Aviation Authority of the Philippines
CAR	Cordillera Administrative Region
CALABARZON	Cavite – Laguna – Batangas - Quezon
CASURECO	Camarines Sur Electric Cooperative
CCE	Crime Clearance Efficiency
CCPL	Central Cebu Protected Landscape
CDO	Cagayan de Oro
CEPALCO	Cagayan Electric Power and Light, Inc.
cmd	cubic meter per day
COA	Commission on Audit
CSE	Crime Solution Efficiency
DECORP	Dagupan Electric Corporation
DepEd	Department of Education
DILG	Department of Interior and Local Government
DOT	Department of Tourism
DTI	Department of Trade and Industry
ENSO	El Niño Southern Oscillation
FAD	Fish Aggregating Device
FL	Functional Literacy
GSCWD	General Santos City Water District
GDP	Gross Domestic Product
HDI	Human Development Index
IMDI	Institute for Migration and Development Issues
INEC	Ilocos Norte Electric Cooperative
JICA	Japan International Cooperation Agency
LEYECO	Leyte Electric Cooperative
LGPMS	Local Governance Performance Monitoring Systems
LGU	Local Government Unit
LTO	Land Transportation Office
MCT	Mindanao Container Terminal
MICS	Management Information and Computer Services
MNWD	Metro Naga Water District
MT / mt	metric tons
NLEX	North Luzon Expressway
NSCB	National Statistics Coordination Board
NSO	National Statistics Office

OFW	Overseas Filipino Workers
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PALECO	Palawan Electric Cooperative
PASAR	Philippine Associated Smelting and Refining Corporation
PDIC	Philippine Deposit Insurance Commission
PHILPHOS	Philippine Phosphate Fertilizer Corporation
PHP	Philippine Peso
PNP	Philippine National Police
PPA	Philippine Ports Authority
PPWD	Puerto Princesa Water District
SANWAD	Santiago Water District
SLGR	State of the Local Governance Report
STEEP	Society, Technology, Economics, Environment and Politics
SOCOTECO	South Cotabato Electric Cooperative
UNESCO	United Nations Educational, Scientific and Cultural Organization
USD	US Dollars
WWF	World Wide Fund for Nature
ZAMCELCO	Zamboanga City Electric Cooperative

The Philippines sits at the apex of the Coral Triangle. In May 2009, WWF released a landmark study entitled *The Coral Triangle and Climate Change: Ecosystems, People and Societies at Risk*. Assembled by 20 experts, utilizing inputs from 300 peer-reviewed articles, this report spelled out six likely climate scenarios for this region. These scenarios are:

(1) El Niño Southern Oscillation Events (ENSO) are likely to continue as a significant source of inter- annual climate variability in the Coral Triangle region. Although inter-decadal annual averages may remain relatively constant in some areas, the extreme "peaks and troughs" that characterize ENSO-related phenomena will make it increasingly difficult to accurately predict weather patterns for purposes of planning and normal business operations.

(2) Sea Surface Temperatures are likely to be between 1 to 4 oC warmer by the end of this century. In a pattern similar to ENSO phenomena, evidence from the Philippines already indicates annual 4oC to 5oC spikes above what has long been regarded as normal sea surface temperature. As this continues, the negative impacts on coral reef health as well as demersal fisheries will be profound and systemic. Fish will no longer abound as a wild food. Protein scarcity may emerge as a societal concern.

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(3) Ocean Acidification will likely make the aragonite saturation state "marginal", within the period from 2020 to 2050, for coral reefs and marine life that require calcium carbonate. In essence, this shift in the ocean's Ph levels will lead to widespread coral reef death. Shrimp cannot develop skins. Oysters cannot develop shells. Fish larvae may no longer be able to develop bones.

(4) Sea Levels are likely to rise from +4 to +6 meters due to the possibility of the melting of the large land-based ice sheets in Antarctica and Greenland. In parallel to increases in sea surface temperatures, current data already shows increases in sea surface heights, particularly in El Nino episodes in tropical latitudes – such as the Philippines. This will contribute to sea level rise, as well. The possible timing remains uncertain.

(5) Tropical Cyclones are likely to become more intense. Although there is no clear consensus, whether the location or frequency of tropical cyclones will change in a warming world, tropical cyclo-genesis is already being recorded in areas that had previously been inhospitable for the birth of storms.

(6) Rainfall, River Flow and Flooding are likely to become more extreme. Over the last century, global precipitation data has shown a clear and steady increasing trend. The inter-annual variability of monsoon rainfall in the Philippines is likely to increase. Some parts of country are likely to experience an **upward trend in rainfall**. Inversely, some other parts of the country are likely to experience an **intensification of drought** associated with highly unpredictable rainfall deficits. These two poles of climate will make it increasingly difficult for traditional agriculture and aquaculture to remain viable. All aspects of normal life, for that matter, will become increasingly prone to disruption and dislocation.

Traditionally, the Philippine climate map breaks down our weather into four climate types. This climate map is likely to change. The Philippines sits in a portion of the planet that experiences the strongest and greatest number of tropical cyclones. These storms are another phenomenon that is expected to continue and storms are expected to intensify.

The specific mix of climate impacts will vary from place to place, and from year to year. These impacts will be non-linear. **In a manner echoing El Nino, high inter-annual variability and, therefore, increasingly difficult predictability, will be one cross cutting pattern characterizing climate change in the Philippines.**

Data from the Manila Observatory has predicted that, following historical patterns and inter-decadal trends, there is an indication that the northern portions of the Archipelago are more likely to experience climate impacts relative to an intensification of cyclones and rainfall. In contrast, the southern portions of the Archipelago are more likely to experience intensified climate impacts relative to increased temperatures and drought. This does not mean that the northern portion will stay wet, and the southern portion will go dry. These are multi-decadal trends. The confounding feature of this scenario is that “peaks and troughs” between wet and dry will persist as inter-annual variability. These dramatic swings in weather, from year to year, become increasingly evident or pronounced with time.

In the matter of related effects, cities bound by steep slopes are likely to experience landslides in association with episodes of extreme rainfall and soil saturation.

It has taken more than a century for humankind’s carbon emissions to take us to this tipping point. All indications point to the likelihood that dealing with climate change will be a trans-generational challenge. It is likely these impacts will get worse before they can be addressed at a global scale and allow climatic stabilization.

We have attempted to look thirty years into the future. This study zeroes in on 16 major Philippine cities: Baguio, Cebu, Davao, Iloilo, Cagayan de Oro, Dagupan, Laoag, Zamboanga, Angeles, Batangas, Naga, Tacloban, Butuan, General Santos, Puerto Princesa and Santiago. In order to provide a more comprehensive grasp of likely future trends that (a) build on existing climate studies while (b) distilling city-specific socio economic information, as well as (c) drawing from experiences of local stakeholders, scenario building exercises were used to encourage "out of the box" thinking and generate plausible narratives that could be useful for strategic planning. Defined as a "process of carefully crafting a set of divergent stories about the future to sketch the realm of the possible as means to link the uncertainties of the future to the decisions that must be done today", scenario building can help planners and decision makers understand and deal with the uncertainties that lie before them. At the very least, scenario exercises can serve as a "rehearsal" for communities, giving them an opportunity to anticipate possible futures, as well as points of indication, as they begin to unfold. Good scenarios are relevant, divergent, insightful, and plausible.

THREE VECTOR ANALYSIS

Climate / Environmental Exposure - Utilizing the same parameters as WWF's study on the Coral Triangle & Climate Change, each city-scale assessment starts with a listing of likely local climate scenarios for each city. These scenarios were juxtaposed against city-specific weather information for a 20-year period, from 1990 to 2010. With the above information as basis, a city-specific score was given for each of the six parameters. These scores were then averaged out to generate a Climate / Environmental Exposure rating.

Socio-Economic Sensitivity – In this second portion of the study, a spectrum of variables were utilized to gauge each city's socio-economic sensitivity. These include: Population, Agriculture, Tourism, New and Existing Businesses & Investment, Health and Educational Enrollment. As much as possible, this portion utilized 20-year data, from 1990 to 2010. With the above information as basis, a city-specific score was given for each of the six parameters. These scores were then averaged out to generate a Socio-Economic Sensitivity rating.

Adaptive Capacity – This third portion of the assessment highlights variables that reflect a city's ability to implement adaptation strategies. The data obtained covered a 20-year period, from 1990 to 2010. The variables utilized included: Labor / Work Force, Family Savings, Functional Literacy, City

Revenue / Expenditures / Reserves, Banking Data and the city's scores for LGPMS, Crime Statistics and the Human Development Index. With the above information as basis, a city-specific score was given for each of the six parameters. These scores were then averaged out to generate an Inverse Adaptive Capacity rating.

SCENARIO BUILDING

In order to help further enrich and ground-truth the assessments through generation of local multi-stakeholder input, a scenario building exercise was conducted in each city through the facilitation of Brain Trust Inc. Since climate impacts will be non-linear, each economic sector will have a different (positive or negative) exposure to climate change, depending on its own specific characteristics. Considering their significant stake and critical contribution to the development of the city's economy, key business and local government leaders were invited to participate and get involved in the exercise. In essence, these exercises involved a number of steps.

(a) Local stakeholders selected a list of development drivers. They were asked to reveal what they see as the big shifts coming in society, technology, economics, environment and politics (STEEP) factors. They were encouraged to think about what are causing and driving these factors and select which might be of particular local importance.

(b) This was followed by the development of the scenario logics, first through an uncertainty analysis, whereby the stakeholders were asked to characterize what they were reasonably certain of, or uncertain about the drivers identified.

(c) The next step involved a process where stakeholders were asked to identify and rank the most and least important and influential of these drivers.

(d) Stakeholders were then divided into break-out groups where participants were asked to define / describe the best and worst case scenarios for each development driver.

(e) Returning to plenary, all drivers and their positive/negative manifestations were organized into a four-quadrant matrix containing best-best, best-worst, worst-best and worst-worst scenarios.

(f) This was followed by the division of the all participants into four groups who were each assigned to draw up a storyline, covering a 30-year period (2011-2040), using the characteristics of one of the four scenarios as the skeleton of their script. They were asked to identifying key events that may happen within the timelines. Participants were encouraged to push the storyline towards the most positive or most negative possible outcomes, to provide snapshots of the future, based on the priority drivers identified.

(g) Lastly, each group relayed its story sketches during the closing plenary.

The scenarios built during this exercise can be included in scenario planning, which is a powerful tool to capture the realm of possible developments and providing the basis for proactive options and decision-making. However, planners and decision makers should be mindful and monitor "early warning signs" or indicators that scenarios are unfolding and identify implications that work in all of the scenarios in order to have appropriate strategies and robust plans in place.

INTEGRATION and FINAL ASSESSMENT

Taking inputs from both the Three Vector analysis as well as the Scenario Building Exercise conducted in each city, an integrated assessment was made, and a score was then generated for each city. This could provide an indicative rating of each city's economic vulnerability to climate change impacts.

We know that climate impacts are going to be site-specific, and non-linear. We also know that climate is altering many basic business assumptions, as well as creating a new menu of economic options available to each city.

> **In response to climate / environmental exposure, the opportunity for cities is to make investments in site stabilization initiatives founded on future scenarios that allow unhampered economic activity as well as access to social and environmental services. Consolidation is a crucial first step.**
>
> **In order to minimize socio-economic sensitivity and maintain competitiveness, the opportunity is for cities to encourage pro-active reconfiguration, and steer new investment toward climate-appropriate technology, skills, infrastructure, and systems that deliver on both current and future needs. Needless to say, good governance will be essential, steered by a well-crafted long-term plan that is founded on integrated area development. Population and urbanization trends establish beyond doubt that, as a city's footprint expands, its dependence on external resources increases, as well.**
>
> **No one can define the scope and sequence of climate change with absolute certainty. That being the case, adaptive capacity becomes an essential asset. An investment in societal reserves – in the form of both human and financial capital – provides one reactive buffer to unforeseen circumstances.**

It is hoped that the assessments that emerge from this study serve to provide both the business sector and local governments in these twelve cities with a better understanding of specific activities and sectors that may be steering their economy toward decreased viability and increased vulnerability. It is also hoped that this may be a springboard for new investment incentives in "no regrets" opportunities that could serve to boost each city's competitiveness and sustainability, as we face a climate-defined future.

CITY ASSESSMENTS
2011 Phase

BAGUIO CITY

CLIMATE / ENVIRONMENTAL EXPOSURE

> **As the only inland city on our list, it is unlikely that Baguio City will experience any of the direct coastal impacts of climate change. Baguio sits in a Type 1 Climate zone, with a pronounced wet season from May to October. However, its location in northern Luzon, puts the city well within the Philippine typhoon belt. This clearly establishes that Baguio faces exposure to intensified tropical cyclones and extreme rainfall.**
>
> ***El Nino Southern Oscillation (ENSO) events are a meta-scale phenomenon, spanning several large areas of the planet. All four cities in this study will be exposed to recurrences of ENSO in varying degrees.***

Rain is going to be Baguio's bane. At 3914 mm / year, Baguio City already has the highest average rainfall in the Philippines. In 1910, it established a Philippine record for highest annual rainfall at 9006 mm. In 1911, it garnered the world record (at the time) for highest rainfall in 24 hours at 1168 mm. In 1950, it posted another world record for rainfall in 48 hours, at 2009 mm. And more recently, in 2001, Baguio City registered the Philippine record for highest rainfall in 1 hour, 1085 mm. For purposes of comparison, Ondoy released 585 mm of rainfall over Manila in 12 hours.

Over the last 20 years, average annual rainfall in Baguio City, though exhibiting inter-annual variability, has shown an increasing trend from an average of 4673 mm in 1990 to an average of 6137 mm in 2009. The city sits well within the Philippine typhoon belt. It is not surprising that, over the last 20 years, storms have hit Baguio City, almost annually. **Extreme rainfall** and **intensified tropical cyclones** will continue to define the city's future. It is likely that Baguio will go from wet, to wetter.

There are a number of climate-aggravated effects that Baguio City is exposed to. Aside from being within the path of both heavy rain and storms, Baguio City is criss-crossed by seismic faults. The city sits on a tectonically active area. In an area such as this, rainfall becomes the primary trigger for landslides. These phenomena have long been the scourge of Baguio City. And, with rainfall likely to increase further above current high levels, it is

probable that **landslide risk** will also increase. Earthquakes, though not climate related, make Baguio less accessible, and more vulnerable.

Aggravated by the human footprint, **flooding** is another climate-related effect that is likely to continue to plague Baguio City. Originally established on a grassy marshland, as a city for 30,000 people, Baguio City now hosts a population of more than 300,000 people – on a weekday. This number rises exponentially with the influx of lowland visitors on weekends. Stretched way beyond the original limits it was designed for, Baguio City has allowed extensive land conversion, with its booming population establishing large communities over vast tracks of its hillsides. Now deprived of much of the pine forest that served to recharge Baguio's aquifers, **groundwater supply** is now grossly inadequate, and **runoff** has regularly flooded the city's lowest areas such as the City Camp. Of the city's six watersheds, two have been rendered inoperable due to the unregulated influx of informal settlers. Of the four cities in this study, Baguio City has the highest population density. Unless flooding in the city's low-lying areas are managed effectively, it is likely that we will see further expansion of communities on the city's increasingly unstable slopes.

Extensive real estate development in Baguio City has also led to the conversion of forested hills and previously absorbtive substrates, to impervious surfaces characteristic of poorly planned urbanization. This impedes water recharge into the city's natural aquifers and encourages runoff. Baguio City has a serious water problem. This will get worse if Baguio's population continues to grow at its current rate, and more sustainable solutions for water management are not put in place.

Historical Indicators of Climate / Environmental Exposure

Precipitation shows an increasing mean annual trend from 4673 mm in 1990 to 6137 mm in 2010, with high inter-annual variability

Temperatures show a decreasing mean annual trend from 19.7 C in 1990 to 19.2 C in 2009.

Typhoon Threat remains with near annual storms directly affecting Baguio over the last two decades.

Flooding incidents have been reported in low-lying areas such as the City Camp, Burnham Park, Queen of Peace, Lower Lourdes Extension and Lower Rock Quarry.

SOCIO – ECONOMIC SENSITIVITY

Land Area	**57.49 sq km**
Barangays	**129**
2010 Population	**325,880**
2010 Pop Density	**5,668 / sq km**

Population has increased from 182,142 in 1990 to 325,880 in 2010 (NSO) – an increase of 143,738 inhabitants. Population Density has increased from 3,186 / sq km in 1990, to 5,668 / sq km in 2010. Of the four cities in this study, **Baguio City has the highest population density. For the 20-year period, Baguio's average annual population growth rate, at 2.81%, comes a close second only to Davao City.**

Housing units have increased from 13,471 in 1990 to an estimated 34,247 in 2010. Concrete houses made up 57% of the total in 1990. By 2010, 84% of all houses were made of concrete.

Educational Enrollment has almost doubled, from 88,446 students in 1990 to an estimated 150,814 students in 2010. Tertiary students make up more than 40% of total enrollees.

This data on vegetable production is from Benguet province. Baguio City is an important trading center for produce but it has very little space for agriculture. Total **Annual Vegetable Production**, specifically for cabbage, potatoes, beans, pechay and brocolli has increased by 24.8% over 15 years, from 188,679 MT in 1995 to 235,587 MT in 2010. In contrast, cut flower production has shrunk dramatically from 9,012 metric tons in 1995 to 3,128 metric tons in 2010. Furthermore, the entry of new trading centers in Trinidad have drawn much of the vegetable / flower business away from Baguio City.

Livestock Production has shown a steady decline, as well. From a combined tonnage of more than 16,426 MT of pigs, cows and chickens in 1995, this combined tonnage dropped to 3,576 MT in 2010. This drop has been attributed to the entry of much cheaper processed livestock products from the lowlands. Local livestock producers have not been able to compete with these much lower prices. In the matter of livestock, we are seeing the pattern of diminishing food self-sufficiency and increasing dependence on outside sources. A direct effect of urbanization, this echoes the Iloilo experience.

Tourist Traffic has remained, by large, domestic. Arrivals over the 20-year period have varied considerably – primarily due to the large earthquake in 1990 and the meninggo virus scare in 2005. Arrivals have varied from a low of 480,898 in 1990, to a post-earthquake peak of 948,894 in 2000, then dropping once again to a low of 608,867 in 2005 due to the virus scare, and recovering only marginally to 735,032 by 2010. This, in spite of the fact that the number of **Tourist Rooms** have risen steadily from a low of 2,994 in 1990, to a high of 4,633 in 2008. Occupancy rates have dropped from a high of 40% in 1990 to a low of 32% in 2010.

In terms of **New Business**, Wholesale and Retail investments have shrunk from 51% of the pie of new investments in 1990, to 24% in 2010. Investments in hotels and lodging have also shrunk by half, from 14% of new investments in 1990 to barely 7% in 2010. In contrast, new Real Estate Development has boomed, from 30% of the pie of new investments in 1990, to 58% in 2010. Population growth is driving new investment.

Water Supply remains a serious concern. Utilizing groundwater pumped from the city's six aquifers, a 40% systems loss renders the current supply of 50,000 CMD barely adequate to meet weekday demand of 30,000 CMD. On weekends, this demand increases to 80,000 CMD. In five years, this is expected to exceed 100,000 CMD on weekends. By 2025, Baguio City will likely have the largest water deficit outside Metro-Manila.

ADAPTIVE CAPACITY

Local Governance Performance Monitoring System (LGPMS)
A Self Evaluation by the City Government

Areas of Governance	Baguio City		
	2009	2010	Difference (2010 and 2009)
Administrative Governance			
Local Legislation	3.70	3.42	(0.28)
Development Planning	4.91	4.84	(0.07)
Revenue Generation	4.67	4.67	-
Resource Allocation and Utilization	3.48	4.21	0.73
Customer Service - Civil Applications	4.40	5.00	0.60
Human Resources Management and Development	5.00	5.00	-
Economic Governance			
Support to Agriculture	N/R	N/R	
Support to Fishery Services	N/R	N/R	
Enterpreneurship, Business and Industry Promotion	3.88	3.36	(0.52)
Social Governance			
Health Services	4.68	5.00	0.32
Support to Education Services	4.90	4.80	(0.10)
Support to Housing and Basic Facilities	2.60	1.80	(0.80)
Peace, Security and Disaster Risk Management	4.67	4.67	-
Environmental Governance			
Forest Ecosystem Management	5.00	4.67	(0.33)
Freshwater Ecosystems Management	N/R	N/R	
Coastal and Marine Ecosystems Management	N/R	N/R	
Urban Ecosystems Management	4.38	4.38	-
Valuing Fundamentals of Governance			
Participation	5.00	5.00	-
Transparency	5.00	4.73	(0.27)
Financial Accountability	4.59	4.92	0.33

A self-rating of 5.00 is a perfect score. The Baguio City government gave itself "excellent" ratings in 4 out of 16 criteria that make up the LGPM score sheet, or an **average score of 4.40 for 2010**.

It did not submit self-ratings for four items on the checklist: Support to Agriculture, Support to Fishery Services, Freshwater Ecosystems Management and Coastal & Marine Ecosystems Management.

CRIME SOLUTION EFFICIENCY from July 2010 to June 2011 was reported at 10.35%. In his State of the City address in July 2011, Mayor Mauricio Domogan of Baguio City reported that this score was a 7.2% improvement over the preceding period. For these 12 months, a total of 4,263 index crimes

were committed. In proportion to the city's 2010 population, **this translates to 1,308 index crimes per 100,000 people.** Of the four cities covered by this study, Baguio City has the second highest record of index crimes per 100,000 people, and the second lowest CSE score.

Baguio's **Work Force** has shown dramatic growth, from 80,267 in 1990 to an estimated 222,020 in 2010. There has been some minor shifting between occupations. In terms of Occupational Group, the percentage made up of Professionals, OFWs and Government Staff has increased slightly from 25% of total work force in 1990 to 33% in 2010. In contrast, the groups classified as Non-Professionals and Others, has diminished from 75% to 67%.

Functional Literacy for the Cordillera Administrative Region has shown steady increases, from 85.4% in 2004 to 89.2% in 2008. This Region has the **highest FL scores** among the four areas studied.

Family Incomes have increased and savings have shown **dramatic increases** from average annual incomes of P98,907 with savings of P15,812 per family in 1990, to an estimated average annual income of P495,180 with savings of P142,004 per family in 2010. Family Savings as a percentage of Income, has shown an increase from 16% in 1990 to almost 29% in 2010.

City Revenues registered at P922.8 Million in 2008, and after deducting Expenditures, ended the year with Reserves of P139.1 Million. Broken down, this translates to Reserves of P449 per capita. It may be worthwhile to note that Reserves were P950 per capita in 2004.

In 2010, the 59 banking offices in Baguio City reported **325,770** active accounts representing a deposit value of **P32.86 Billion** – with an average deposit value of **P100,868**.

Benguet Province, where Baguio City is located, registered a **Human Development Index value of 0.787 in 2006**, an improvement from 0.743 in 2003. Of the four locations covered in this assessment, **Benguet Province scored the highest on this indicator**.

LIST OF DEVELOPMENT DRIVERS

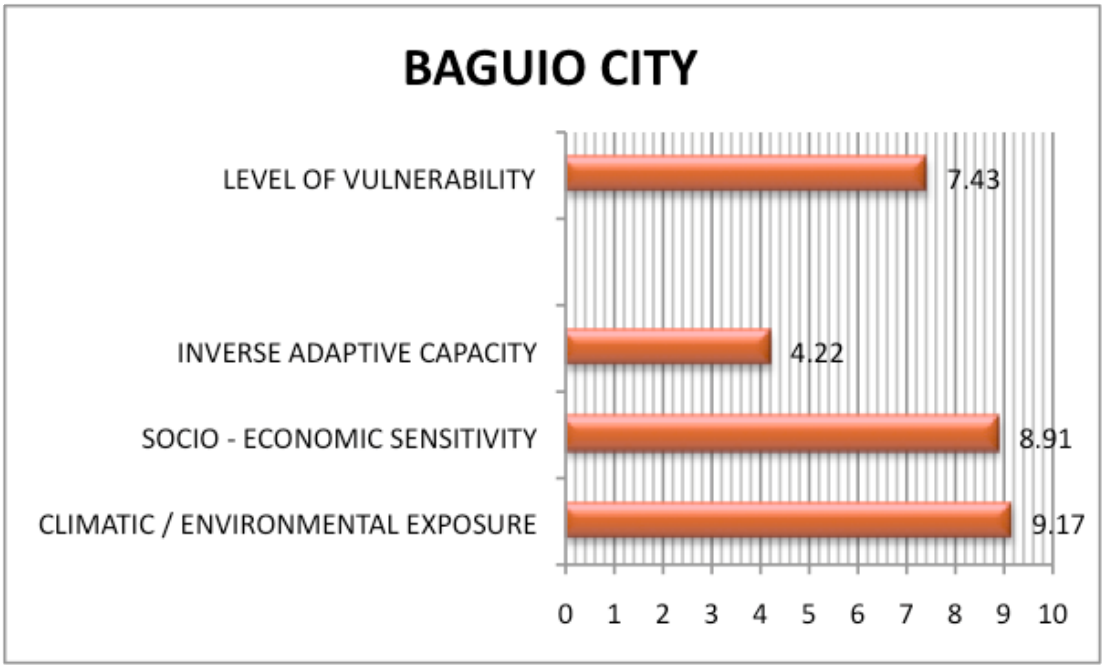
Primary Driver **POLITICS & GOVERNANCE**

Secondary Drivers **INFRASTRUCTURE**
PLANNING

Additional Drivers
ATTITUDE
YOUTH
TOURISM
POPULATION
HEALTH
EDUCATION
AGRICULTURE
TECHNOLOGY

SCENARIOS DEVELOPED

Best case: People Oriented Governance / Sufficient Infrastructure
Mid case A: People Oriented Governance / Insufficient Infrastructure
Mid case B: Self-oriented Governance / Sufficient Infrastructure
Worst case: Self-oriented governance / Insufficient infrastructure



ASSESSMENT & INTEGRATION

At barely 57 square kilometers, Baguio City is the smallest, and most densely populated, city covered by this study. In the scoring process, it also emerged as the most vulnerable to climate change impacts.

All historical records confirm that Baguio City has the highest rainfall in the country, and climate trends indicate that this is likely to get worse. From a climate point of view, the management of urbanization trends and watersheds as well as Baguio's population growth, will play major roles in defining the continued viability of this city's economy.

Baguio City does not have a commercial air link. Its only economic umbilical is confined to land access. Surprisingly, its current top development drivers are real estate development, agricultural production and educational enrollment – all of which depend greatly on new land, appropriate infrastructure and reliable land access via well-maintained mountain roads. Currently, none of these appear to measure up to Baguio's future needs.

Although tourism arrivals remain rather robust, they have not shown a steady growth trend. Baguio is far outstripped by Cebu as a banner destination. Furthermore, its relatively low and declining hotel occupancy rates do not bode well for the city's tourism sector. New investments in tourism have diminished dramatically. Unless something significant happens, tourism seems to be fading away from center stage. The city's economic dependence on land transportation, through routes made frequently inoperable by landslides due to rainfall, will emerge as one of Baguio's most significant development challenges, as intensified precipitation and storms assault and increasingly marginalize these essential economic lifelines.

In the scenario building exercises formulated by Baguio's own stakeholders, Governance, Infrastructure and Planning were selected as the three top development drivers likely to exert a strong influence on the city's future. There is no doubt that Baguio City has expanded way beyond its carrying capacity.

Baguio City's strength lies in its population. Among the four cities, Baguio logged the highest scores, both in Human Development Index and in Functional Literacy. Although probably under-utilized, this asset was flagged by local stakeholders in one scenario. They pictured a city where good things can happen. Though saddled with insufficient infrastructure, that scenario underscored that people-oriented governance, enhanced by Baguio's wealth of human capital and public-private synergies, could make negative elements turn positive. The city's opportunity is to look beyond its boundaries, beyond BLIST, identify its unique competences, then craft a "climate smart" long-term development plan that defines a regional role for the city within CAR and Region 1. If it is to take the city away from the edge of this climate precipice, all efforts should be made to pursue development of a multi-year plan through a participatory process. This program should be doggedly implemented beyond any single political leader or term, in order to establish new, durable foundations for the city's economic resurgence. If the businesses of Baguio City hope to remain competitive and viable, they should focus on striking a sustainable balance between local ambition, demographic facts and the emerging realities of climate change.

CEBU CITY

CLIMATE / ENVIRONMENTAL EXPOSURE

Like Iloilo, Cebu City will be exposed to all six climate scenarios listed in the WWF study. It is the only city on this list situated in a Type 2 Climate zone, with a relatively pronounced wet season from June to early January. Its location, in the central Visayas, between the wet / typhoon prone and dry / hot belts of the Philippines, points to the likelihood that its rainfall challenge will have to do with high variability and a difficulty of prediction, rather than a pronounced increase or decrease of rainfall.

ENSO events are a meta-scale phenomenon, spanning several large areas of the planet. All four cities in this study will be exposed to recurrences of ENSO in varying degrees.

The oldest city in the Philippines, Cebu City sits on a narrow littoral along the eastern coast of Cebu Island's waist. Characterized by narrow coastal plains with rugged mountains and limestone plateaus, barely 15% of the city's total land area sits on flat terrain. With so much of its land area on steep slopes, Cebu City is not an agricultural center. Its uplands are also highly **vulnerable to landslides** from rainfall.

Cebu City is hemmed in by water on three sides. It faces the Mactan Channel in the east, bound by the Subangdaku River in the north, and the Bulacao River in the south. As in the case of Iloilo City, the analysis of rainfall in Cebu City over the last twenty years indicates there has been no significant change in mean rainfall. However, like Iloilo City, it is already evident that Cebu City's climate patterns indicate **high inter-annual variability**, with **extreme weather events** at both ends of the wet-dry spectrum. Like Iloilo, Cebu residents have begun to notice an increased incidence of flooding within certain portions of the city.

Cebu City sits at the lower edge of the typhoon belt. Although storms do not hit this portion of the archipelago with as high a frequency as Luzon, historical data indicates that the city remains vulnerable at certain times of the year. The storms that hit the Cebu are also known to come at a time of year, i.e. November and December, when cyclones can be rather fierce.

Although the city reports that it sits 18 meters above sea level, several districts of the old city are barely 1 to 2 meters ASL. This includes the neighboring island of Mactan where the province's only commercial airport is located. **Saltwater intrusion**, due to excessive groundwater extraction, has long been a problem here. Relatively recent studies indicate that saltwater intrusion has been reported 5 kilometers inshore. With such a large portion of

the city located on slopes inhospitable to agriculture and settlement, Cebu City will likely find itself caught in a "climate sandwich" as **saltwater intrusion** advances further, **sea levels rise** and more **intense typhoons** lash the coastline with **storm surge**.

The fisheries of Cebu have long exceeded maximum sustainable yields. This fact has not diminished the city's value as a regional center for marine products because its main strengths are processing and distribution. However, as **sea surface temperatures increase** and **ocean acidification** advances, the city's supply chains, that source marine products from viable fisheries around the Region, may begin to strain. **Inter-annual variability** and increased consumption fueled by population growth, will only add to this management challenge.

Historical Indicators of Climate / Environmental Exposure

Precipitation in Cebu City has remained statistically constant over the last 20 years at a mean annual level of 1,614 mm. A closer look at the same data reveals, however, **high inter-annual variability**.

Landslides due to Precipitation pose a high threat for 24% and a moderate threat for 16% of Cebu City's barangays.

Typhoon Threat, though present, remains lower than Iloilo City. Over the last 20 years, 21 tropical depressions or storms have crossed Cebu, with 56% of them taking place in the months of November and December.

Flooding is a high threat for 6 barangays and a moderate threat for 18 barangays of Cebu City. This represents 8% and 22% of all barangays, respectively.

SOCIO – ECONOMIC SENSITIVITY

Land Area	**320.10 sq km**
Barangays	**80**
2010 Population	**841,927**
2010 Pop Density	**2,630 / sq km**

Land Area records indicate that Cebu City "expanded" from 284.9 sq km in 1990 to 320.1 sq km in 2010.

Population in Cebu City has grown from 610,417 in 1990 to 841,927 in 2010 – an increase of 231,510 inhabitants. Population Density has increased from 1,907 / sq km in 1990, to an estimated 2,630 / sq km in 2010. Cebu City registered the **lowest population growth rate of the four cities in this study, at 1.41% over the 20-year period.**

Next to Metro-Manila, Cebu City is the **second-largest center of business** in the country. **Business Establishments** have increased by six times, over

the last 15 years, from 536 in 1995 to 3,165 in 2010. The greatest single growth sector is made up of Service Contractors. Following a distant second is the sector made up of Distributors, Retailers and Wholesalers. These sectors now account for almost three fourths of employment within the city.

Shipping is, without doubt, the jewel in Cebu's crown. Over the last two decades, Annual Inbound Volume has increased 7 times from 0.65 Million MT in 1990 to 5.4 Million MT in 2010. Over the same period, Annual Outbound Volume has increased 4 times from 0.76 Million MT in 1990 to 4 Million MT in 2010. Annual Inbound Foreign Cargo Traffic has increased 170% in ten years, from 0.82 Million MT in 2000 to 2.12 Million MT in 2010. Annual Outbound Foreign Cargo Traffic has increased 184% in ten years, from 0.32 Million MT in 2000 to 0.89 Million MT in 2010. In terms of passenger traffic, sea-borne passenger traffic has only increased marginally. This reflects the same experience as Iloilo City. These figures indicate that, as far as shipping is concerned, Cebu City is in the business of cargo, rather than passengers. And the greater bulk of its shipping business remains domestic, rather than international. They also indicate that Cebu City's shipping business is more focused on inbound rather than outbound cargo.

Despite this, Cebu City has delivered strong growth figures for **Foreign Trade** exports and imports. From $396 Million in 1990, Cebu City's foreign trade exports exceeded $1.527 Billion in 2008 – 3.85 times in 20 years. For imports, the city delivered growth from $214 Million in 1990 to $1.260 Billion in 2010 – 5.88 times in 20 years. Among the four cities studied, it remains on top in terms of Foreign Trade.

Like Baguio and Iloilo, Cebu City has encouraged investment in **Tourism** as evidenced by a concerted effort to increase its number of hotel rooms. Over five years, the city's hotel room count has mushroomed from 2,864 rooms in 2005 to 4,126 rooms in 2010. **Tourism Arrivals**, 60% of which are domestic, increased by 58% over five years, from 1.12 Million in 2005 to **1.76 Million in 2010**. Even if Cebu City's hotel occupancy rates have lingered at the lackluster 50% to 54% levels, of the four cities covered by this study, it is clearly the leader.

There is data pointing to the possibility that **Land Classification and Protected Areas** within Cebu City do not comply with generally applied national guidelines for land use. Under Philippine law, only lands with a slope of 18% or less can be classified as alienable/disposable, i.e., areas where human settlements and cultivation of land are allowed. Other lands are to remain as forest or set aside for other special uses.

Only 28 % of Cebu City's land area falls within the range acceptable for human settlement or cultivation. It is a matter of concern, therefore, that about 64% of city lands are classified by the national government as alienable and disposable. 23 of the city's 80 barangays are totally or partially located in four watershed areas. In fact, some lands, classified as timberland, include areas that fall within critical watersheds and other protected areas of the city, such as the Central Cebu Protected Landscape (CCPL). Seeing that water

supply is widely recognized as one of Cebu's chief challenges, this is a glaring socio-economic sensitivity that calls for resolution.

ADAPTIVE CAPACITY

Local Governance Performance Monitoring System (LGPMS)
A Self Evaluation by the City Government

Areas of Governance	Cebu City		
	2009	2010	Difference
Administrative Governance			
Local Legislation	4.64	4.64	-
Development Planning	4.91	3.63	(1.28)
Revenue Generation	5.00	4.00	(1.00)
Resource Allocation and Utilization	2.92	3.92	1.00
Customer Service - Civil Applications	4.80	4.80	-
Human Resources Management and Development	5.00	5.00	-
Economic Governance			
Support to Agriculture	4.24	4.24	-
Support to Fishery Services	4.45	4.45	-
Enterpreneurship, Business and Industry Promotion	4.50	4.50	-
Social Governance			
Health Services	5.00	5.00	-
Support to Education Services	5.00	5.00	-
Support to Housing and Basic Facilities	4.00	4.00	-
Peace, Security and Disaster Risk Management	4.80	4.83	0.03
Environmental Governance			
Forest Ecosystem Management	5.00	5.00	
Freshwater Ecosystems Management	5.00	5.00	
Coastal and Marine Ecosystems Management	5.00	5.00	-
Urban Ecosystems Management	4.63	4.63	-
Valuing Fundamentals of Governance			
Participation	5.00	5.00	-
Transparency	5.00	5.00	-
Financial Accountability	4.92	4.92	-

A self-rating of 5.00 is a perfect score. The Cebu City government gave itself "excellent" ratings in 8 out of 20 criteria that make up the LGPM score sheet, or an **average score of 4.63 for 2010**.

Crime Solution Efficiency for Cebu City was reported at 21% for the first 1st Semester of 2010, with 3,291 index crimes reported for that same six-month period. In proportion to the city's 2010 population, this translates to 390 index crimes per 100,000 people – over a six-month period. All other cities reported comparative crime statistics over a 12-month period. PNP 7 reported an improvement in CSE for the 1st Semester of 2011, with a 32% solution rate.

Functional Literacy in Region 7 logged a score of 86.6% in 2008, an improvement from 81.7% in 2003.

City Revenues registered at P2.96 Billion in 2008, and after deducting Expenditures, ended the year with Reserves of P1.18 Billion. Broken down, this translates to Reserves of P1451 per capita. Of the four cities, these are the highest year-end reserves per capita for 2008.

In 2010, the 204 banking offices in Cebu City reported **926,374** active accounts representing a deposit value of **P168.0 Billion** – with an average deposit value of **P181,352**, the highest of all four cities.

Cebu Province, where Cebu City is located, registered a **Human Development Index value of 0.618 in 2006**, an improvement from 0.608 in 2003. Of the four locations covered in this assessment, **Cebu Province scored the lowest on this indicator**.

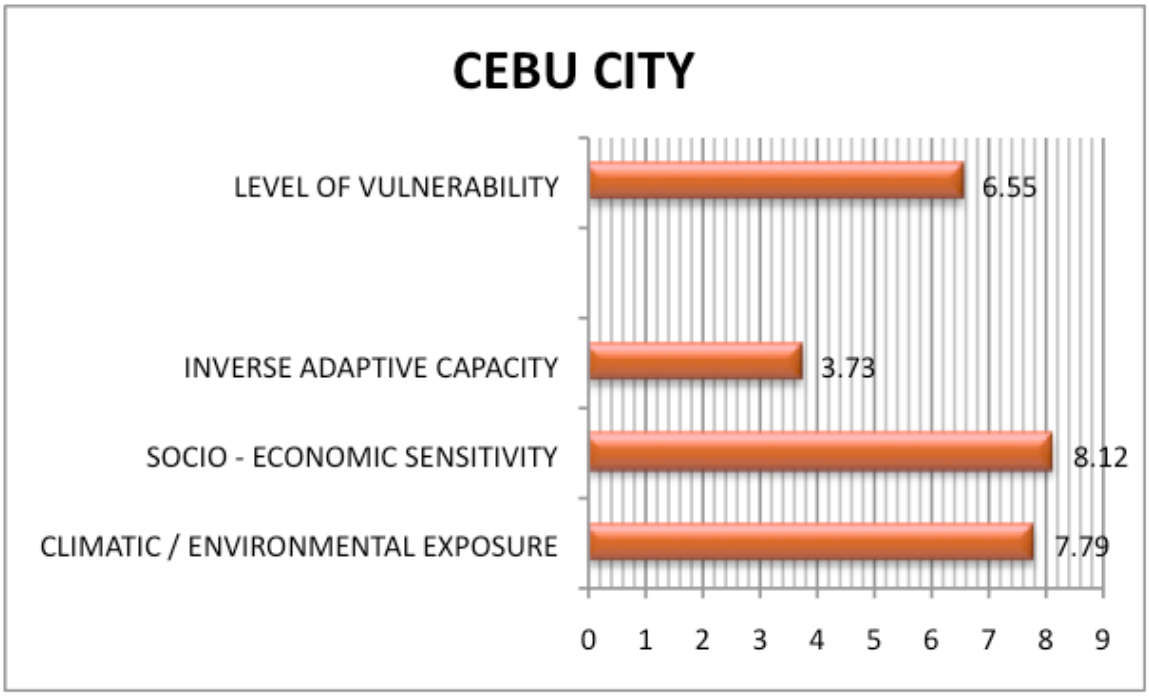
LIST OF DEVELOPMENT DRIVERS

Primary Driver **GOOD GOVERNANCE & POLITICAL WILL**
Secondary Driver **WATER RESOURCE MANAGEMENT**

Additional Drivers
POPULATION
LAND & WATERSHED MANAGEMENT
BUSINESS
PLANNING
EDUCATION
STRATEGIC LOCATION
INFRASTRUCTURE
ENERGY & TECHNOLOGY.

SCENARIOS DEVELOPED

Best case: Pro-active Governance / Sustainable Equitable Water
Mid case A: Pro-active Governance / Disaster
Mid case B: Unsupportive Governance / Sustainable Equitable Water
Worst case: Unsupportive Governance / Disaster



ASSESSMENT & INTEGRATION

Manufacturing, processing and trade are Cebu City's economic lifeblood. It remains the Queen City of the South. This requires extremely reliable infrastructure, efficient land / sea access and cost-competitive utilities, particularly water supply. Over the last 20 years, Cebu City delivered phenomenal growth in both sea-borne cargo and foreign trade receipts. Of the four cities studied, it remains on top in these two categories. To sustain this, however, Cebu must make the decision now, to re-invent itself. It is the best time to re-think, re-work and re-tool. In terms of vulnerability, Cebu City ranked number three, overall. As weather events become more extreme and frequent, Cebu City may find itself increasingly affected by business disruption borne of supply chain issues and workforce dislocation. Among the four cities, Cebu reported the highest year-end reserves per capita, as well as the highest average deposit value. It emerged as the best financially-resourced city to make new investments in re-engineering.

In the scenario building exercises formulated by Cebu's own business stakeholders, they identified Governance and Water Resources Management as the two top development drivers likely to exert a strong influence on the city's future. Cebu's opportunity is to invest in maintaining competent leadership as well as sustainable and cost-effective utilities.

These are the economic "nuts and bolts" that must be in place for centers of processing and trade, such as Cebu City. Government cannot do this alone. In one scenario, "public-private partnerships" were pinpointed as a success variable, as were "business friendly policies and regulations".

In an effort to improve efficiencies and achieve economies of scale, Cebu City has opted to adopt the concentration of business activity as its development model. This also translates to a concentration of climate risk. Unlike Panay, for example, the island of Cebu has no commercial air facility. Their commercial airport sits on Mactan – a highly porous limestone island that practically sits at sea level. If it can be paid for, redundancy in the matter of commercial air links, is a critical "no regrets" option for Cebuanos. If it is to remain competitive, the province of Cebu should consider investing in a second airport. Efforts should also be encouraged toward updating Cebu City's rapidly aging fleet of ships and port facilities. The best strategic location diminishes in value, without ready and affordable access.

Of the four cities covered, although Cebu scored rather well on Functional Literacy, it still ranked the lowest on the Human Development Index. No factory, facility or organization can be expected to operate optimally if its workforce does not receive the benefits that are available elsewhere, or enjoy general well-being. In parallel to infrastructure, equipment and technology, the businesses of Cebu City should consider investing in the elements that make up HDI, i.e., life expectancy, literacy, education and standards of living. As both foreign and local markets move closer and closer toward implementing standard measures of corporate sustainability, all processing and trading centers will have to step up to the plate. Human capital is an adaptive strength that Cebu City needs to build up.

Cebu City's opportunity lies in a long-term plan and development model that will disperse and diffuse climate risk. One scenario flagged "united political leadership" as a key element, along with "effective, efficient, responsible and transparent governance". Cebu will require new investments in "climate smart" infrastructure and technology. It will also require a re-thinking of what it will take to build human capital, improve the well-being of Cebu's workforce, and keep them at the cutting edge. If Cebu City looks "beyond its fences" and forges new development directions leading to global integration in this climate-defined future, it may seize this opportunity to strengthen its economic supply chains within the Region, and maintain its reputation as a center for cost-competitiveness and reliability as a processor or supplier of goods and services.

DAVAO CITY

CLIMATE / ENVIRONMENTAL EXPOSURE

Davao City is the only city on this list that sits in a Type 4 Climate zone, with relatively even year-round rainfall. It does not experience typhoons. As a coastal city in this typhoon-free portion of Mindanao, the city's future will likely involve only 5 of the 6 climate scenarios listed in the WWF study.

ENSO events are a meta-scale phenomenon, spanning several large areas of the planet. All four cities in this study will be exposed to recurrences of ENSO in varying degrees.

Sitting at the southern coastline of Mindanao on coastal plains and valleys extending inland, Davao City sits in a typhoon-free zone. The Manila Observatory climate maps show, that this an area likely to experience increasingly dry and hot weather over the next 50 years. This is the only city of the four in this study that is projected to have an increase in temperature coupled with pronounced periods of decreased rainfall. Recent PAGASA data, however, still does not show such a trend.

Over the last 20 years, rainfall data from PAGASA (covering two or three El Nino episodes) shows a moderately increasing trend for mean annual rainfall – from 1685 mm+ to 1806 mm. Very recently, Davao City has had to deal with extreme rainfall events that have spawned dangerous floods in parts of the city – particularly in areas adjacent to the city's rivers.

Several rivers run through the city, draining into the Davao Gulf. The largest of these watercourses are the Davao and Talomo Rivers. Recent incidents of heavy rain have also given rise to rat infestation in the city's agricultural areas. Unless and until this rainfall trend reverses itself, it is likely that Davao's growing economy will have to manage **increased rainfall**, river flow and flooding.

Davao Gulf is a known center for marine biodiversity. Like Iloilo, Davao City is a hub for both wild-caught fisheries and aquaculture. **Rising sea surface temperatures** and **ocean acidification** are likely to lead to marginalization of coral reefs and sea grass beds, spawning adverse effects for this sector. Increased rainfall and sparse forest cover in Davao's uplands constantly feeds **expansive plumes of sedimentation and pollution** that blanket Davao Gulf's coastal zones. This constant aggravation further diminishes the Gulf's resilience and ability to rebound from high temperature episodes or spikes of acidification.

Sea level rise may create problems for Davao City's ports. Located along the relatively shallow channel between the city and Samal Island, these port

facilities are a nerve center for Davao City's economy, and serve a variety of ships handling both cargo and passengers. Davao has traditionally tapped surface water from its rivers as its main water source. It prides itself in the relatively high quality of its drinking water. However, saltwater intrusion has already been reported in city districts close to shore, especially in portions of the city where groundwater extraction continues. Sea level rise may aggravate this situation.

Historical Indicators of Climate / Environmental Exposure

Precipitation in Davao City has shown an upward trend, average annual rainfall increased by 10%, from 1,685 mm in 1990 to 1,806 mm in 2010 (PAGASA).

Temperature has shown a slight increase, as well, from 27.9 C in 1990 to 28.48 C in 2010.

Typhoon Threat remains nil.

Flooding is a recent but recurring phenomenon, due in part to incidents of extreme rainfall in the uplands of the city.

SOCIO – ECONOMIC SENSITIVITY

Land Area	**2443.61 sq km**
Barangays	**182**
2010 Population	**1,542,425**
2010 Pop Density	**631 / sq km**

Population in Davao City has grown from 850,316 in 1990 to 1,542,425 in 2010 – an increase of 692,109 inhabitants. Population Density has increased from 348 / sq km in 1990, to an estimated 631 / sq km in 2010. Although Davao City enjoys the lowest population density of the four cities in this study, it also shows the **highest average population growth rate at 2.88%, and the highest number of new inhabitants over the 20-year period.**

In parallel with the city's population growth and expansion, the number of **Motor Vehicles** here has exploded by 3.5 times, from 37,378 vehicles in 1990, to 136,283 motor vehicles in 2010. Barring inner city re-development, better traffic management and an improved road network, road congestion and degraded air quality could be a matter for concern.

Agriculture is Davao's largest economic sector with banana, pineapple, durian, mango and papaya as the top five fruit crops in 2010. **Durian** showed the most significant increase in terms of fruit crop production from 3,856 MT in 1990 to 36,822 MT in 2010 – an 855% increase. **Banana** production **– the sectoral leader in tonnage - more than doubled** over 20 years, from 107,932 MT in 1990 to 227,651 MT in 2010. Over the same period, Mango

output increased by only 10%, while Papaya production grew by 30%. Pineapple production dropped by 4%, from 22,502 MT in 1990, down to 21,591 MT in 2010.

In cereals, **Corn production** delivered a robust pattern of growth, more than doubling from 9,837 MT in 1990, up to 20,880 MT in 2010. Areas planted to corn only increased by 15% during that 20-year period. It was in corn yield per hectare where Davao City showed an 84% improvement from 1.03 MT/hectare in 1990, up to 1.91 MT/hectare in 2010. In contrast, **Palay production decreased by nearly 50%,** from 27,337 metric tons in 1990, down to 14,198 metric tons in 2010. This, in spite of an increase in the proportion of irrigated rice land from 47% in 1990 to 52% in 2010; and an improvement in rice yield per hectare from 2.83 MT in 1990 to 3.41 MT in 2010.

In the matter of animal protein, **swine/ hog production decreased** slightly by 3 per cent over the last fifteen years, from a total of 246,380 heads in 1995, down to 238,770 in 2010. In contrast, the **production of poultry increased** by 13% from 2.881 Million heads in 1995 to 3.258 Million heads in 2010.

As in the case of Cebu, **Foreign Trade** trends in Davao have been overwhelmingly positive. Imports increased from $279 Million in 1990 to $1.194 B in 2010 – 4.27 times over 20 years. Exports increased from $55 M in 1990 to $713 M in 2010 – 12.96 times over 20 years. Although imports into Davao continue to exceed exports, and the spurt in export values happened only over the last five years, Davao City's rate of increase in Foreign Trade receipts far exceeds the figures delivered by Cebu.

Shipping and sea-based transport remain a significant growth driver. The volume of cargo discharged and loaded at the city's ports increased from 5.4 Million MT in 1995 to 8.69 Million MT in 2009 - a 61% increase over 15 years. In comparison with Cebu's figures, however, this increase in tonnage shipped from Davao is not as dramatic. Sea-based passengers increased three fold, from 248,542 in 1995 to 809,586 passengers in 2009. Shipping is as important to the Davao City economy as it is to Cebu.

Tourism has shown robust growth, as well. With local / domestic arrivals taking a little more than 90% of the pie, tourist arrivals nearly tripled from 173,298 in 1990 to **682,821 in 2010**. Significant growth took place over the last ten years. In 2010, the total estimated tourist receipts hit P9.55 Billion, based on a 3.5 days average length of stay and an average expenditure of P4,000 per day/tourist.

Over the last five years, the **number of business establishments** registered with the Business Bureau of the Davao City Government increased by 33%, from 24,611 in 2006 to 32,691 in 2010. Capitalization has grown by 70 per cent from P108.96 Billion in 2006 to P184 Billion in 2010.

Educational Enrollment has increased over the 20-year period. Elementary level enrollment almost doubled from 133,324 in 1990 to 216,967 in 2010. High School enrollment also increased from 65,637 in 1990 to 98,380 in 2010.

ADAPTIVE CAPACITY

Local Governance Performance Monitoring System (LGPMS)
A Self Evaluation by the City Government

Areas of Governance	Davao City		
	2009	2010	Difference
Administrative Governance			
Local Legislation	4.75	4.56	(0.19)
Development Planning	4.91	4.91	-
Revenue Generation	4.00	4.00	-
Resource Allocation and Utilization	5.00	5.00	-
Customer Service - Civil Applications	5.00	5.00	-
Human Resources Management and Development	5.00	5.00	-
Economic Governance			
Support to Agriculture	4.90	3.71	(1.19)
Support to Fishery Services	4.90	4.75	(0.15)
Enterpreneurship, Business and Industry Promotion	4.67	4.50	(0.17)
Social Governance			
Health Services	5.00	4.87	(0.13)
Support to Education Services	5.00	5.00	-
Support to Housing and Basic Facilities	5.00	4.00	(1.00)
Peace, Security and Disaster Risk Management	4.83	5.00	0.17
Environmental Governance			
Forest Ecosystem Management	5.00	5.00	
Freshwater Ecosystems Management	5.00	5.00	
Coastal and Marine Ecosystems Management	5.00	5.00	-
Urban Ecosystems Management	4.75	4.63	(0.12)
Valuing Fundamentals of Governance			
Participation	5.00	5.00	-
Transparency	5.00	5.00	-
Financial Accountability	5.00	5.00	-

A self-rating of 5.00 is a perfect score. The Davo City government gave itself "excellent" ratings in 11 out of 18 criteria that make up the LGPM score sheet, or an **average score of 4.75 for 2010**. This represents the highest rating given by a local government to itself.

CRIME SOLUTION EFFICIENCY from July 2010 to June 2011 was reported at 57.6 %. Of the four cities covered by this study, Davao City delivered the **highest CSE score.** In her State of City address in September 2011, Mayor Sara Duterte of Davao City reported that this relatively high score was attained through the adoption of an Anti-Crime Incentive Program for police officers, an integrated patrol plan and more cooperation from witnesses. 6,623 index crimes were reported for the period. In proportion to the city's 2010 population, this translates to **429 index crimes per 100,000 people/year.** Of the four cities covered by this study, Davao City delivered **lowest index crime rate.**

Davao City's labor pool has grown dramatically over the last 15 years. From 434,000 in 1995, the city's work force has expanded to 1,851,000

individuals in 2009. Unemployment rates in the city have dropped from 8.3% in 1995 to 6% in 2009. It is revealing that the city's workforce is significantly higher than its own population.

Functional Literacy in Region 11 has improved from 77.8% in 2003 to 82.6% in 2008.

The Peso value of **Family Incomes / Savings** have increased from average annual incomes of P51,823 with savings of P9,851 in 1990, to incomes of P155,937 with savings of P29,565 in 2010. Family Savings as a percentage of Income, however, remains relatively constant at the 19% level.

City Revenues registered at P3.33 Billion in 2008, and after deducting Expenditures, ended the year with Reserves of P203.46 Million. Broken down, this translates to Reserves of only P139 per capita – the lowest of all four cities. With Davao's high and expanding population, this is no surprise.

In 2010, the 171 banking offices in Davao City reported **757,800** active accounts representing a deposit value of **P85.67 Billion** – with an average deposit value of **P113,050**.

Davao del Sur Province, where Davao City is located, registered a **Human Development Index value of 0.645 in 2006**, an improvement from 0.624 in 2003. Of the four locations covered in this assessment, **Davao del Sur Province ranked #3 for this indicator**.

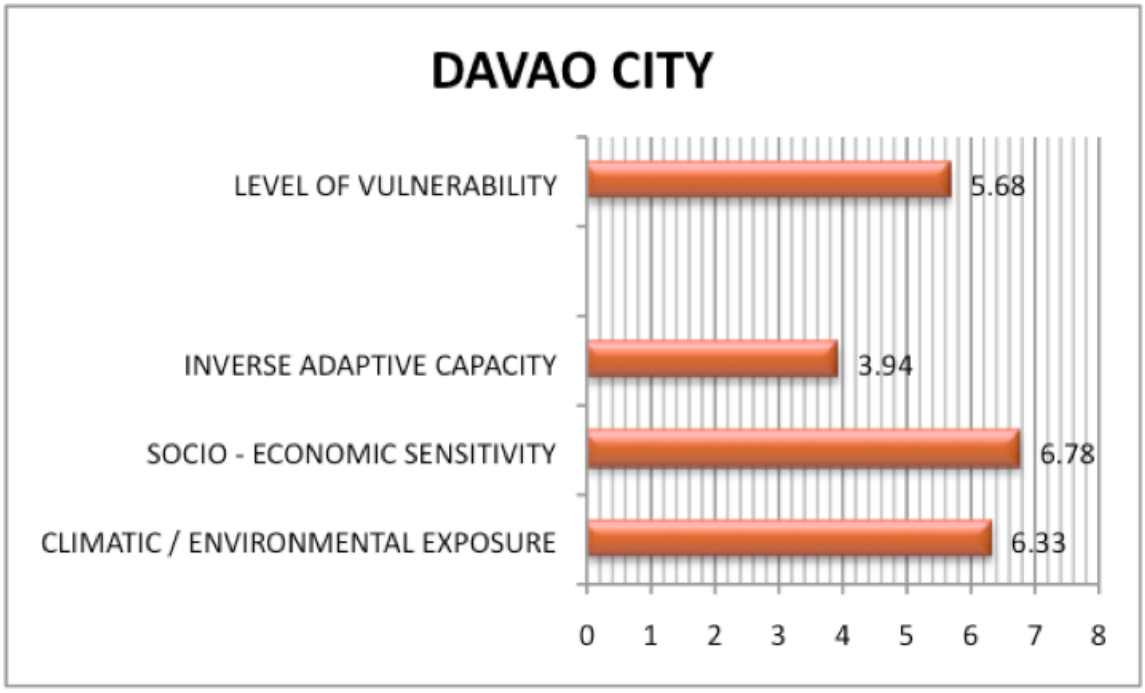
DRIVERS IDENTIFIED / SCENARIOS DEVELOPED

Primary Driver **GOVERNANCE**
Secondary Driver **AGRICULTURE**

Additional Drivers
CULTURAL FACTORS
IT TECHNOLOGY
ENVIRONMENTAL HEALTH
EDUCATION
BUSINESS
R&D
POPULATION
WELL BEING.

SCENARIOS DEVELOPED

Best case: People Oriented Governance / Democratized Agriculture
Mid case A: People Oriented Governance / No Agriculture
Mid case B: Power Oriented Governance / Democratized Agriculture
Worst case: Power Oriented Governance / No Agriculture



ASSESSMENT & INTEGRATION

In terms of land area, Davao is the largest of the four cities in this study. It is no surprise that it has the lowest population density. It has no typhoons. It is the gateway to BIMP-EAGA. And, there is room for sustainable, integrated area development. These are its advantages. In a climate-defined future, these are also its challenges.

It is likely that Davao City will have to deal with climate impacts such as sea level rise, increased sea surface temperatures, ocean acidification, and inter-annual variability of rainfall. It is also likely that Davao will emerge as a site of refuge for an increasing number of migrants. There are indications that this trend has already begun. Over 20 years, Davao logged more than 692,000 new inhabitants – the highest number of all four cities. It also registered the highest population growth rate, at 2.88%. This may be one reason why, in spite of the fact that Davao showed the highest revenues of all four cities, it also ended up the year with the lowest reserves per capita.

Davao City still has significant land area to build new, more livable satellite developments. In this assessment, it emerged as the least vulnerable city, overall. Its opportunity is to do things the right way. In parallel with the intensification of climate impacts, the commercial / residential centers of Davao City will expand, and it is likely

that the city will move further and further away from its traditional role as a major center for industrial-scale agriculture. New opportunities for sustainable development will present themselves in the form of effective and sustained management of essential utilities, i.e., water and power, as well as basic services, food security driven by innovative agricultural formulas, "climate smart" zoning, mass transit, land use and infrastructure, as well as efficient land / sea access to centers of development in Mindanao, and throughout the Philippines.

In the scenario building exercises formulated by Davao's own stakeholders, they identified Governance and Agriculture as the two top development drivers likely to exert a strong influence on the city's future. In the matter of Governance, Davao City delivered top marks on its LGPM Score, Crime Solution Efficiency, as well as the lowest number of index crimes per 100,000 people. The key challenge that faces Davao's voters is how to maintain this over the decades ahead. This key variable was underscored in virtually all scenarios developed. In the matter of Agriculture, although Davao has delivered impressive growth in commercial-scale produce such as banana, durian and corn; its production of rice dropped by 50%. This is a matter of concern. People still have to eat. And, as more than one scenario pointed out, as Davao's population continues to grow in leaps and bounds, equitable but productive formulas will have to be developed vis-à-vis agricultural production and land use. Although Davao runs a close second to Cebu in terms of tonnage shipped through its port, it delivered the better growth rate, in terms of foreign trade receipts. Davao has found its place in the sun. Like Cebu, therefore, the businesses of Davao should take a close look at the city's shipping fleet and port facilities, and take the necessary steps to ensure that they are upgraded to deal with the impacts of climate change.

For Davao City, high population growth and in-migration underscores that strategic development decisions must be made now. More than that, a multi-stakeholder formula for continuity must be set in place if this city is to sustain and re-engineer its agricultural strengths, and avoid the disorganized congestion that characterizes many other cities, emerging as a new center for livability and competitiveness in a climate-defined world.

ILOILO CITY

CLIMATE / ENVIRONMENTAL EXPOSURE

Iloilo City, like Cebu, will be exposed to all six climate scenarios listed in the WWF study. Like Baguio, it sits in a Type 1 Climate zone, with a pronounced wet season from May to early December. Its location, between the wet / typhoon prone and dry / hot belts of the archipelago, may point to the likelihood that it will have to deal with high rainfall variability, rather than a pronounced rainfall increase or decrease.

ENSO events are a meta-scale phenomenon, spanning several large areas of the planet. All four cities in this study will be exposed to recurrences of ENSO in varying degrees.

Sitting on a flat alluvial plain, Iloilo City is perched at the edge of the largest marshland in the Western Visayas. With a geography that is typical of coastal marshes and mangrove forests, four water courses provide the city with natural drainage: the Iloilo River, the Batiano River, the Jaro River and Dungon Creek. Iloilo City is not hemmed in by steep slopes – like Cebu and Baguio. However, the marshlands on which it sits, are flood prone, by natural design. Riverfront properties face the highest flood risk. Within Iloilo City alone, these properties stretch over 113 kilometers.

Located at the southeastern corner of Panay Island, with a 21-kilometer coastline facing the Guimaras Strait, much of Iloilo City's substrate is reclaimed land. It is recorded that much of this land conversion took place during a period of urbanization and industrialization in the late 19th Century.

An analysis of rainfall trends in Iloilo over the last twenty years indicates that there has been no significant change in mean rainfall. However, a closer look at the data reveals **high inter-annual variability** and **extreme weather events** at both ends of the wet/dry spectrum. The crash of the rice crop in 2010 was attributed to drought.

Iloilo City also sits within the typhoon belt. Typhoon Frank, the city's most recent extreme weather event, spawned widespread floods, described locally as "historical" in severity. Though not as frequent in this area as Luzon, storms such as this are likely to recur.

Iloilo City's coastline was originally fringed with extensive mangrove forests. These have long been replaced by fishponds, and are now mostly gone. In parallel to **intensified typhoon cyclones** and **extreme rainfall,** it is likely that Iloilo City's exposed coastline will have to deal with storm surge. Saltwater

intrusion and land subsidence, as a direct result of excessive groundwater extraction, has also been reported here.

Iloilo City has long been known as an educational hub, as well as a center of the seafood and shipping trades. Rising **sea surface temperatures**, as well as **ocean acidification**, will undoubtedly give rise to negative impacts on the city's wild-caught fisheries and brackish water aquaculture fishponds. **Sea level rise**, compounded by storms and floods, could lead to increased economic disruption or dislocation, and eventually marginalize the low lying and reclaimed areas of the city. This could affect shipping, as well.

Historical Indicators of Climate / Environmental Exposure

Although **Precipitation** has remained statistically constant at a mean annual level of 2,106 mm, data from the last twenty years reveals high inter-annual variability.

The **Annual Mean Temperature** has decreased over 20 years, from 28.6C in 1990 to 26.8C in 2010.

Typhoon Threat remains. Over the last 20 years, more than 40 tropical depressions and storms crossed this area. This represents a significantly higher typhoon exposure than Cebu. In more than one instance, flooding has ensued within portions of the city.

SOCIO – ECONOMIC SENSITIVITY

Land Area	**78.34 sq km**
Barangays	**180**
2010 Population	**425,516**
2010 Pop Density	**5,432 / sq km**

Population has increased from 309,505 in 1990 to 425,516 in 2010 – an increase of 116,011 inhabitants. Population density has increased from 3,800+ / sq km in 1990 to an estimated 5,432 / sq km in 2010. **Although Iloilo City comes a close second to Baguio, in terms of population density, its population growth rate ranks only number three, at 1.53% for the 20-year period.**

As a hub for **Education**, Iloilo City has delivered dramatic growth from 220 schools in 1990 to 790 schools in 2010.

Infrastructure has improved. Iloilo City is air linked by a new inland airport, in Santa Barbara. Over the last 20 years, the city nearly doubled its bridge network from 1,139 linear meters in 1990, to 2,132 linear meters in 2010. In contrast, the city's road network has not seen much expansion.

With the city's expansion and development, the number of **Motor Vehicles** here has increased as well, from 26,075 vehicles in 1990, to 61,337 motor

vehicles in 2010. With no apparent parallel expansion of the road network, vehicle density may emerge as a serious concern.

Passenger Traffic to and from Iloilo has grown. Although sea-borne passenger traffic continues its dominance over this sector with an annual volume hovering at a level of 2 Million+ passengers, air-borne passenger traffic has shown a dramatic increase over the last twenty years, from 414,936 passengers in 1990, to over 1.58 Million passengers in 2010 – a 281% increase.

Cargo & Freight in and out of Iloilo City paint a similar picture, although air cargo volumes have shown dramatic increases, shipping remains the dominant mode of transportation. In 1990, annual air cargo volumes at Iloilo City made up merely 1,969 metric tons. By 2010, annual air cargo volumes hit more than 11,820 metric tons – a 500% increase. In comparison, sea-based cargo made up 1.72 Million metric tons in 1990. Although 1995 delivered a dramatic increase in sea cargo, up to 3.487 Million metric tons, this record has dropped steadily over the last 15 years with total volume of sea cargo hitting 3.442 Million MT in 2000, and skidding down further to 2.51 Million MT in 2005 and 2.48 Million metric tons in 2010.

Efforts aimed at boosting **Tourism** have not done as well. From barely 357 tourist rooms in 1990, the city offered 1,133 tourist rooms in 2010. In spite of this, hotel occupancy rates remained relatively modest, from 40% in 1990 to 47% in 2010 – significantly lower than Cebu and Davao. In the three years following El Nino in 1997-98, occupancy dropped to an all time low of 27%. Iloilo has yet to bring in the droves of visitors. There is clearly further room for growth.

Wild Caught Fisheries emerged as another non-growth sector for Iloilo City, reporting a performance of 1,019 metric tons in 1990, to only 1,148 metric tons in 2010. This is probably a reflection of the overfished status of the Visayan Seas.

With increased urbanization and land conversion, the city's **Agriculture** output has crashed. From an annual palay production approximating 7,900 metric tons in 1990, output dropped to barely 1,385 metric tons in 2010. Although the 2010 figure was attributed to drought, the 20-year data shows a steady downtrend. Annual livestock production has also taken a downward turn, though less dramatic. From 10,400 metric tons in 1990, this figure has dropped to slightly less than 8,000 metric tons in 2010. These trends are not unusual. As cities expand, agriculture gives way to more profitable land uses.

In 2010, new and renewed businesses generated P22.382 Billion worth of fresh investment for Iloilo City. Financing, Insurance, Real Estate and Business Services made up 59% percent of this investments pie. Community, social and personal services came in a distant second, making up barely 19%. As in Baguio's case, this investment preference is probably a result of increased urbanization.

ADAPTIVE CAPACITY

Local Governance Performance Monitoring System (LGPMS)
A Self Evaluation by the City Government

Areas of Governance	Iloilo City		
	2009	2010	Difference
Administrative Governance			
Local Legislation	4.11	4.45	0.34
Development Planning	4.24	4.91	0.67
Revenue Generation	5.00	5.00	-
Resource Allocation and Utilization	4.83	4.50	(0.33)
Customer Service - Civil Applications	4.40	4.75	0.35
Human Resources Management and Development	5.00	5.00	-
Economic Governance			
Support to Agriculture	3.81	4.42	0.61
Support to Fishery Services	2.53	4.01	1.48
Enterpreneurship, Business and Industry Promotion	3.83	3.79	(0.04)
Social Governance			
Health Services	4.90	4.97	0.07
Support to Education Services	4.80	5.00	0.20
Support to Housing and Basic Facilities	3.00	5.00	2.00
Peace, Security and Disaster Risk Management	4.12	4.50	0.38
Environmental Governance			
Forest Ecosystem Management	N/R	N/R	N/R
Freshwater Ecosystems Management	N/R	N/R	N/R
Coastal and Marine Ecosystems Management	5.00	4.67	(0.33)
Urban Ecosystems Management	4.13	4.25	0.12
Valuing Fundamentals of Governance			
Participation	4.00	5.00	1.00
Transparency	5.00	5.00	-
Financial Accountability	5.00	4.80	(0.20)

A self-rating of 5.00 is a perfect score. The Iloilo City government gave itself "excellent" ratings in 6 out of 18 criteria that make up the LGPM score sheet, or an **average score of 4.67 for 2010**.

It did not submit ratings for two items on the checklist: Forest Ecosystem Management & Freshwater Ecosystems Management.

Crime Solution Efficiency in 2010 was reported at 8.61%. In 2010, a total of 5,774 index and non-index crimes were recorded in Iloilo City. In proportion to the city's 2010 population, this translates to 1,357 crimes per 100,000 people. **Iloilo logged the highest number of index crimes per 100,000 people and the lowest CSE score**.

In Iloilo City, average annual **Family Incomes increased** from P112,954 in 1991 to P283,604 in 2000 - a 151% increase over a 10-year period. Over the same term, average annual family expenditures increased from P101,962 in 1990 to P266,877 in 2000. **Savings decreased** from 10% of annual family

income in 1991 to 6% in 2000. **No reliable data was available from 2001 to 2010.**

Functional Literacy remained relatively stagnant for Region 6, from 81.5% in 2003 to 81.7% in 2008.

City Revenues registered at P1.16 Billion in 2008, and after deducting Expenditures, ended the year with Reserves of P195.8 Million. Broken down, this translates to Reserves of P467 per capita. This represents a marked improvement from Reserves of P248 per capita in 2004.

In 2010, the 121 banking offices in Iloilo City reported **568,617** active accounts representing a deposit value of **P54.7 Billion** – an average deposit value of **P96,198**.

Iloilo Province, where Iloilo City is located, registered a **Human Development Index value of 0.664 in 2006**, an improvement from 0.622 in 2003. Of the four locations covered in this assessment, **Iloilo Province ranked #2 for this indicator**.

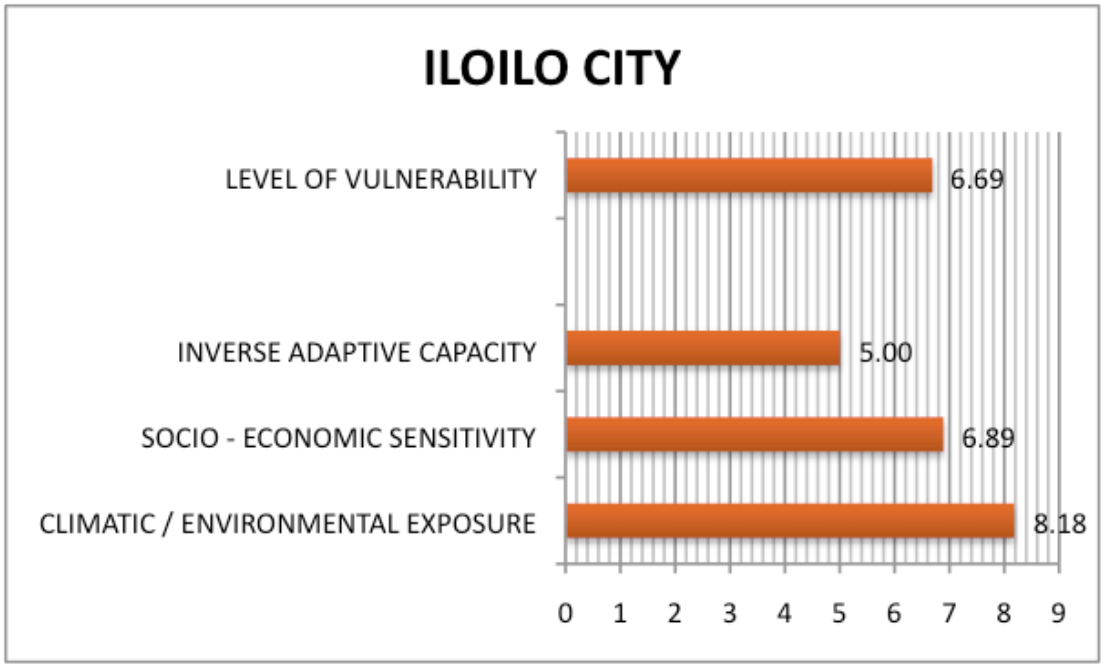
LIST OF DEVELOPMENT DRIVERS

Primary Driver **EDUCATION**
Secondary Driver **POVERTY**

Additional Drivers
CULTURAL/SOCIAL BEHAVIOR
WATER & ENERGY
INVESTMENTS
ENVIRONMENTAL MANAGEMENT
MANUFACTURING TECHNOLOGY
GOVERNANCE
ROADS & TRANSPORT
IN-MIGRATION.

SCENARIOS DEVELOPED

Best case: Peaceful, Orderly Society / High Quality Human Power
Mid case A: Peaceful, Orderly Society / Poor Quality Human Power
Mid case B: Breakdown of Society / High Quality Human Power
Worst case: Breakdown of Soceity / Poor Quality Human Power



ASSESSMENT & INTEGRATION

Iloilo City has the second highest population density of the four cities in this study. Sitting on reclaimed marshland, it also remains highly flood-prone. In combination, these two factors constitute a serious risk. Next to Baguio, Iloilo City emerged as the second most vulnerable city in this study.

If this city is to achieve sustainability and maintain its competitiveness in a climate-defined future, it is clear that a sustained effort to better manage land use, infrastructure, land / sea access as well as flooding, is put in place through a mix of natural and engineered initiatives. With rice production moving out of the city, and the volume of wild caught fish remaining virtually stagnant over 20 years, it is apparent that Iloilo City is increasingly dependent on outside sources for its food supply. The four main areas of new investment, i.e., financing, insurance, real estate and business services, all seem to echo the indication that urbanization is the path that Iloilo has chosen to take. Maintaining good access via land, sea or air will, therefore, be critical.

The island of Panay has four commercial airports. Iloilo City continues to grow. It has the opportunity to ensure the city's economic connectivity and strengthen intra-island access by encouraging strategic investments designed to retrofit and upgrade its road network, shipping and fisheries-related facilities, to better manage the city's flood prone areas and

minimize economic dislocation. This is an advantage that Iloilo should leverage.

As one of the smaller cities in our list of four, Iloilo City logged the lowest Functional Literacy scores. It also registered the highest index crime rate, as well as the lowest crime solution efficiency score. Furthermore, in contrast to all three other cities, Iloilo's Family Savings as a percentage of Revenue shrank over the last 20 years. It is no surprise, therefore, that the Iloilo stakeholders who participated in the scenario building exercises identified Education and Poverty as the two top development drivers likely to exert a strong influence on the city's future. It is worthwhile mentioning that Iloilo was the only city that chose Education, rather than Governance, as their top development driver.

Virtually all the scenarios generated in Iloilo indicate a desire for the city to adopt a clean, climate-appropriate and more equitable development path. In their opinion, this involves providing its populace with the knowledge, skills and support services needed to preserve Ilonggo identity and Iloilo heritage, while retaining its economic role in the Western Visayas. There seemed to be consensus that unless the city shifts to a development model founded on a clearer grasp of the future, the strengths it currently enjoys may diminish. These scenarios described the possible emergence of concerns related to health and life expectancy, labor, food security, literacy, potable water, energy, the cost of living and crime. These are the same concerns that emerge from unbridled urbanization.

In contrast to both Cebu and Davao, that both delivered impressive growth over 20 years, Iloilo City's volume of cargo tonnage shipped has shrunk. This may be a reflection of more fundamental changes that are taking place within the island of Panay, or within the city's economy itself. It is interesting to note that, although ship-borne passenger traffic has remained constant over 20 years, both air-borne passenger traffic as well as air cargo has grown dramatically. This is probably not due to tourism growth. Iloilo came in the lowest in terms of tourism arrivals, significantly lower than the other three cities. This is no surprise, seeing that it also has the least number of hotel rooms available.

The city has managed to keep population growth down at 1.53%, and the number of schools within the city, have risen from 220 to 790. These are bright spots. If Iloilo City has made the strategic decision to position itself, along with Baguio, Cebu and Davao, as an educational center, while

avoiding the problems of congestion and population density, its challenge may, in fact, be re-invention.

The scenarios built by Iloilo stakeholders emphasized the need to make the city more livable, better educated, better managed and more productive in a changing world. Pointing to a strong "cultural" element among city residents, there were participants who suggested that the challenges that face the people of Iloilo City actually go a lot deeper than merely improving governance or building "climate smart" infrastructure.

There is no doubt that well-managed drainage systems, as well as flood-free highways will remain key elements in the drive toward sustainable economic growth. For Iloilo City, however, the question is: will that be enough?

CITY ASSESSMENTS
2012 Phase

CAGAYAN DE ORO CITY

CLIMATE / ENVIRONMENTAL EXPOSURE

Cagayan de Oro is a coastal city located within a Type 3 climate zone. Sitting close to what could be the southernmost rim of the Philippine typhoon belt, the city received 11 typhoon hits over a 20-year period. In a country that regularly receives up to 20 or more tropical storms per year, one event every two years seems relatively insignificant. From 1960 to 2010, official data reports annual rainfall of only 1697 mm – once again, well below the national average of 2400 mm.

City weather data only tells half the story, though. To get a full grasp of things, it is important to take a look at the city's hydrology and topography, as well. Cagayan de Oro was built on a littoral. It is bound in the east and west by the drainage systems of the Tagoloan and Cagayan de Oro Rivers. Boxing in the city, like a parenthesis, these two major river basins of Northern Mindanao are fed by rainfall emanating from the high plateau of Bukidnon. In the uplands above Cagayan de Oro, annual rainfall has been measured at 2800 mm – more than 60% higher than the city's lowlands. A 1998 JICA study submitted to the NWRB made the estimate that - from 2005 to 2025 - Region X will show the highest levels of water available in the country. Water availability is computed, primarily, using rainfall data. As a rapidly expanding urban heat island, facing the Bohol Sea, Cagayan de Oro's city temperatures fuel further enhancement of evaporation, thereby aggravating the buildup of moisture in the hills above the city. This phenomenon creates even more rain. More than typhoon hits, it is the floodwater from extreme rainfall, flowing down the rivers and running off the slopes, from the uplands of Misamis Oriental and Bukidnon that Cagayan de Oro will have to learn how to cope with. The floods of 2009 and 2011 have already provided a tragic illustration of what can happen.

Like the coastal cities of Iloilo and Dagupan, it is likely that Cagayan de Oro will be exposed to all six climate scenarios listed in the 2009 WWF study. As a coastal city, the productivity of its already-declining fisheries, so dependent on Macajalar Bay, will be vulnerable to increases in sea surface temperature, coral bleaching and ocean acidification. Its seaports, serving rapidly increasing volumes of cargo and passenger traffic, were all designed for a time defined by different climate parameters. These port facilities will be essential to sustaining the large businesses of Northern Mindanao, as well as the shipping companies that operate

out of here. With sea level rise, and occasional storm surge, Cagayan de Oro's seaports must make the choice to retro-fit the city's port defenses, or face inadequacy. This is the same challenge that faces Cebu, Davao and the greater majority of Philippine seaports.

SOCIO – ECONOMIC SENSITIVITY

Land Area	**569.66 sq km**
Barangays	**80**
2010 Population	**602,984**
2010 Pop Density	**1,058 / sq km**

Cagayan de Oro's population boomed from 339,598 in 1990 to 602,984 in 2010 – translating to 77% growth, or 263,386 additional residents. Like a computer virus, filling up all available space in a hard drive, the city's population density increased from 596 / sq km to 1,058 / sq km.

This dramatic growth in population fueled increased consumption and expansion of the city in virtually all sectors. The number of new Building Occupancy Permits soared 264% from 384 in 1996 to 1398 in 2009. LGU registered establishments doubled from 7,914 to 15,886 - a 100% increase. The number of schools increased 93%, from 127 to 245 in the same period, with enrollment delivering a 70% increase, from 111027 to 188261.

The same growth trend is reflected in the data for transport and freight. The number of Motor Vehicles registered in the city increased from 22,040 to 44,401, a 101% increase. This translates to a density of 78 vehicles / sq km. Sea-based passage remained the preferred mode of travel, with passengers increasing from 753,185 to 2,178,430, a 189% increase that outstrips domestic expansion rates. Over the same approximate period, air passenger traffic quadrupled from 260,184 to 1,301,502.

The increase in hotel rooms within Misamis Oriental appeared to align with domestic expansion rates, increasing by only 93%, from 605 to 1168; tourist arrivals from 1990 to 2009 increased by 120% from 164,459 to 361,839.

In the matter of trade, there is no doubt that Cagayan de Oro soars above all other cities in this phase. The city's new container terminal, i.e. MCT, has made a significant contribution to the local economy. The number of ship calls doubled from 7,382 in 1990 to 14,868 in 2010. Domestic Cargo Volume increased exponentially from 1,984,835 MT to 5,028,148 - a phenomenal 253% increase. Foreign Cargo Volume, in the old Oro seaport, continued to increase from 797,406 MT to 1,200,881 MT, a 51% increase. It was the new MCT, however, that delivered the winning numbers. At the container terminal, cargo throughput accelerated from 902,376 MT in 2006 to 4,327,392 MT in 2010 - a 380% increase in barely 4 years. Part of this growth was fueled by a customer shift from the old Oro Port to MCT. Starting from a much lower baseline, air cargo traffic, from the old Lumbia airport, showed parallel growth, from 4,701 MT to 16,113 MT, a 242% increase.

Looking at this growth in financial terms, the value of imports at the old Oro Port logged in at PHP 7,041,378,298 in 2002, rose dramatically to PHP 15,126,558,072 in 2005 then dropped precipitously to PHP 4,447,163,780 in 2010. The main factors contributing to this variability were the withdrawal of a major dairy product operation from Cagayan de Oro, as well as the opening of the MCT. In parallel, the value of exports from the Old Oro Port showed a similar pattern. Starting with USD 131,102,961 in 2002, export values leaped to USD 247,918,811 in 2005, then settled at USD 183,795,749 in 2010. Canned Pineapple export value, though beset by inter-annual vagaries, continued to show net growth. From PHP 1.7 Billion in 1991, values dropped down to PHP 1.5 Billion in 1995, then up again to PHP 2.7 Billion in 2000, up further to PHP 4.9 Billion in 2006, and then back down to PHP 3.6 Billion in 2010.

For fisheries, livestock and food production in general, some shifts in preference seem to have taken place, probably due to a reduction in fish catch per unit effort, land availability or market demand. In the fisheries sector, commercial production in Misamis Oriental over a 20-year period decreased by 43% down to the 10,000 MT levels, and Municipal fisheries production decreased by 34%, down to the 7,000 MT levels. This drop in the gross tonnage of wild fish catch echoes the Iloilo City experience. In contrast, aquaculture production in Misamis Oriental, though currently insufficient to offset the decline of wild catch, has grown by 277%, barely 543 MT in 1990 to 2,055 MT in 2010. This shift to farmed fish seems to be happening in Zamboanga, as well. Swine production decreased by 23%, and cattle production decreased by 28%. In contrast, goat production (a much smaller sector) increased by 500% and poultry production increased by 321%. Vegetable production is another growth leader, showing a 214% increase from 2412 MT to 7589 MT.

For cereals, palay production (not really a locally preferred crop) has plunged down further by 50% from 802 MT down to a paltry 397 MT. In contrast, corn production has soared 589% from 1271 MT to 7490 MT – probably fueled by the increase in poultry production. Banana production – a significant, but secondary, contributor – has remained relatively constant over 20 years, hovering between 12302 MT and 13131 MT. For food production within Cagayan de Oro, cattle, swine and rice seem to be headed toward relative insignificance. In contrast, the sunrise sectors appear to be corn, poultry, vegetables and farmed fish.

Despite the dramatic growth delivered by almost all sectors, the growth in energy consumption in megawatts revealed some evidence of improved efficiency with only a 41% increase, from 477,398 MWH to 672,091 MWH, over 20 years.

ADAPTIVE CAPACITY

A self-rating of 5.00 is a perfect score. The Cagayan de Oro City government gave itself “excellent” ratings in 6 out of 20 criteria that make up the LGPM score sheet, or an average score of 4.56 for 2010.

Areas of Governance	Cagayan de Oro		
	2009	2010	Difference (2010 and 2009)
Administrative Governance			
Local Legislation	4.80	4.81	0.01
Development Planning	4.96	4.86	(0.10)
Revenue Generation	4.93	4.59	(0.34)
Resource Allocation and Utilization	2.83	3.92	1.09
Customer Service - Civil Applications	5.00	5.00	-
Human Resources Management and Development	5.00	5.00	-
Economic Governance			
Support to Agriculture	4.36	4.72	0.36
Support to Fishery Services	4.65	4.65	-
Enterpreneurship, Business and Industry Promotion	4.00	4.00	-
Social Governance			
Health Services	3.97	4.35	0.38
Support to Education Services	3.65	3.95	0.30
Support to Housing and Basic Facilities	3.00	4.00	1.00
Peace, Security and Disaster Risk Management	4.47	4.46	(0.01)
Environmental Governance			
Forest Ecosystem Management	5.00	5.00	-
Freshwater Ecosystems Management	5.00	5.00	-
Coastal and Marine Ecosystems Management	5.00	5.00	-
Urban Ecosystems Management	4.15	4.15	-
Valuing Fundamentals of Governance			
Participation	5.00	4.00	(1.00)
Transparency	5.00	5.00	-
Financial Accountability	4.76	4.76	-

From 1990 to 2008, the metric used for monitoring city crime was “Crime Solution Efficiency”. In 2009, this was replaced by another metric called “Crime Clearance Efficiency”. Some cities have both figures. Others have only one figure available.

Crime Solution Efficiency data for Cagayan de Oro City was no longer available for the years 1990 to 2008. Crime Clearance Efficiency scores for the city, though rather low, are reported to be improving from a mere 5% in 2009 to 7.58% in 2011.

Functional Literacy in Region 10 scored 85.9% in 2008, a decline from 92.9% in 1990. This decline is reported by all four cities in this phase. In contrast, the four cities assessed in the previous phase, i.e., Baguio, Cebu, Davao and Iloilo, all reported improving literacy.

City Revenues registered at P1.64 Billion in 2010, and after deducting Expenditures, ended the year with Reserves of P538 Million. Broken down, this translates to Reserves of P892 per capita. Next to Zamboanga, these are the second highest year-end reserves per capita for 2010.

In 2010, the 106 banking offices in Cagayan de Oro City reported 458,532 active accounts representing a total deposit value of P37.1 Billion – with an average deposit value of P80,982. In comparison, the Regional average family savings were reported at P26,000 for 2009. This represents a dramatic 160% increase, from P10,000 in 2003.

Total bank deposits for the Region rose 193% from P24.9 Billion in 2002 to P73 Billion in 2011. In comparison total loans for the Region increased only 58%, from

P13.9 Billion to P21.9 Billion. The regional metric for loans as a percentage of deposits dropped from 55% down to 30%.

Misamis Oriental province, where Cagayan de Oro City is located, registered a Human Development Index value of 0.654 in 2006, a decline from 0.696 in 1997. Among the four cities, this represents the biggest drop in HDI.

SCENARIO BUILDING WORKSHOP

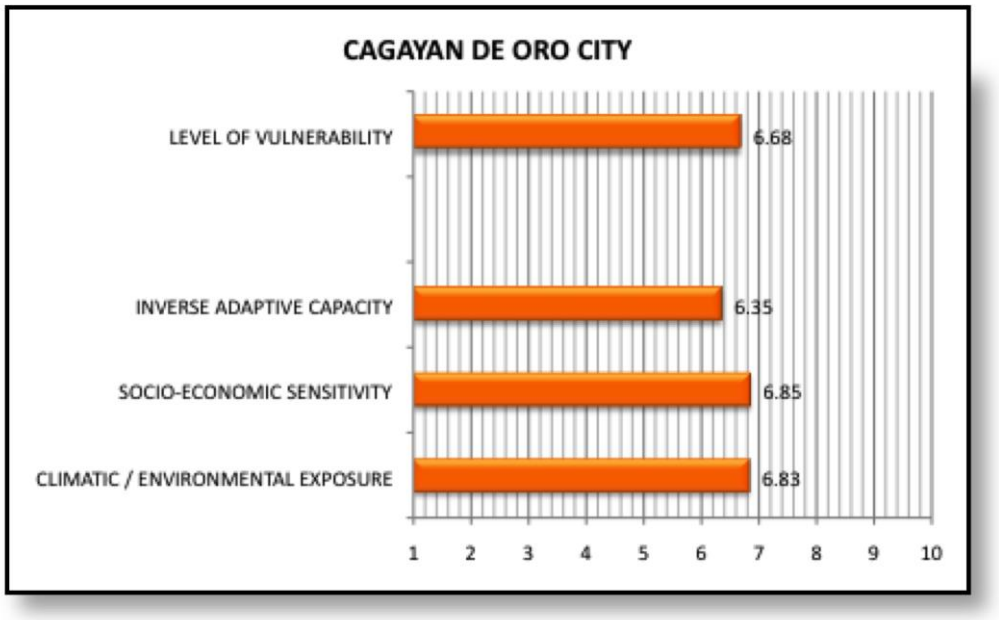
List of Development Drivers

Primary Drivers	**Governance** **Resource Management**
Secondary Drivers	**Land Use** **Education** **Business Development** **Attitude** **Corporate Partnership** **Food** **Human Resource**
Distinctive Scenario Descriptors	"Green businesses" Flood-free CDO "Walay Ligo" Floating Schools War for Water "Baku-bakong kalsada" Survival of the Fittest

SCENARIOS DEVELOPED

Positive Governance / Positive Resource Management
Negative Governance / Positive Resource Management
Positive Governance / Negative Resource Management
Negative Governance / Negative Resource Management

The narratives containing a summary of scenarios developed by Cagayan de Oro stakeholders are provided as an annex.



ASSESSMENT & INTEGRATION

To the unfamiliar, it would seem that Cagayan de Oro is not particularly exposed to climate risk. The reverse is true. Seeing that Cagayan de Oro is at the receiving end of water flowing down steep, now often sparsely forested, grades from Mindanao's central highlands, it is relatively clear that the city's primary climate challenge may have to do with upland rainfall and the management of floods. The city needs to figure out how to steer itself out of harm's way, toward meaningful flood neutral re-development. As evidenced by the serious incidents of flooding in 2009 and 2011, Cagayan de Oro's exposure to climate impacts should be gauged using a larger geographical envelope that includes upstream recharge zones, mid-catchment initiatives as well as downstream drainage. We cannot look at this city's weather in isolation and craft development plans solely on that basis.

Immediately after the last floods, news photos provided evidence of illegal small-scale mining activity in as many as 6 barangays upstream of the city. In what is unquestionably a very destructive practice, high-pressure hoses are used to score the riverbanks, turning the river muddy. Mudflows could, potentially, bring more damage to the city. Clearly, zoning, land use and enforcement will be equally critical parts of the solution. In the Scenario Building Workshop, Cagayan de Oro stakeholders validated this by identifying "governance" and "resource management" as the city's primary development drivers over the next 30 years.

In the 1950s, Iligan City drew in several large investors that were attracted by Maria Cristina Falls, and the lure of cheap electric power. Beyond energy, the reliability, capacity and quality of a city's water supply is expected to grow as a crucial prerequisite for city's seeking to draw in new investment. If engineered in a socially acceptable, economically viable and environmentally benign manner, water may be Cagayan de Oro's pot of gold. What is now seen as a risk, may in fact be transformed into an opportunity. The JICA study establishes that a wealth of water will continue to flow down into this coastal development corridor. Cagayan de Oro controls the faucet. Its challenge is to figure out how to manage the pipes.

To make this happen, the city must look beyond its boundaries and forge alliances with the towns located above the city. In order to work, these river management alliances must be fair, equitable and founded on the synergies that can arise from public-private participation. They should be driven by scientific fact and management reality, rather than political expediency. The scope and structure of these alliances will be defined by the shape and size of the two major river basins that funnel water through the city. Transformation is a complex undertaking that cannot be completed in one or two political terms. Government's role is catalytic, i.e., to get the ball rolling. The private sector's role is continuity, i.e., to stick to the plan, and keep that ball in play. Ultimately, it is the health, management and viability of the upper, middle and lower catchments of these two river basin ecosystems that will define the climate vulnerability of Cagayan de Oro.

In the matter of population, Cagayan de Oro ranks second to Zamboanga, both in terms of total population and population growth. This is worthwhile noting because Zamboanga City's land area is 2.5 times larger. In the matter of population density, Cagayan de Oro comes in second only to Dagupan – a city that covers less than 1/10th of Cagayan de Oro's geographical footprint. In a climate defined future, poorly managed urbanization translates to the concentration of risk. Recognizing the relatively high climate exposure that the city will have to face, Cagayan de Oro should be considering development that will strategically diffuse population concentrations while allowing easy, all-weather movement. Aside from the flood-neutral interventions mentioned earlier, this multi-year process should involve new and appropriate policies, better planned and enforced zoning, new climate smart infrastructure, as well as an efficient system for mass transit and the movement of freight.

The phenomenal growth patterns in the city's transport and freight sectors could be pointing to Cagayan de Oro's emergence as a preferred hub for transients, whether travelers headed for other points in Northern Mindanao, or tourists. Although sea passage remains the transport anchor, air travel seems to be growing very quickly here as the new mode of choice.

A comparison of air/sea passenger data with tourist arrival numbers indicates that passengers to and from Cagayan de Oro are primarily Mindanao residents or businessmen. It might be said, therefore, that the growth in passenger traffic to Cagayan de Oro has followed that old dictum of the transport sector: trade first, tourism follows. This is the same pattern the project unearthed in another boomtown - Cebu City. And, like Cebu, it is Cagayan de Oro's supply chains that will bear the brunt of climate risk.

Good products bring in new customers. To an extent, the successful developments around Lumbia are a manifestation that people are looking for a better deal. Following this, and the stellar performance of the city's new container port, it would not be mere speculation to say that the opening of the international airport at nearby Laguindingan could lead, once again, to some very interesting development prospects both for Cagayan de Oro, and Northern Mindanao. This is another example of how population and climate risk might be diffused through the development of safer and more livable communities. One remaining challenge will be to ensure that the essential transport lifelines to the city are designed to ensure all-weather mobility and limit transaction "downtime".

If the requisites of effective climate adaptation fall into place, Cagayan de Oro has the opportunity to leverage that distinctive advantage, and actively seek to attract more dependable partners into its economic "playing field". Although canned pineapple remains a major, and reliable, export of this city, a dependence on "economic mono-crops" is generally not a good idea. The city's own experience with unforeseen changes in the operations of another major manufacturing player, point to the strategic frailties of having only a few big fish in a city's economic pond. If Cagayan de Oro is to shield itself from this in the future, it must strive to build a more diverse roster of socio-economic contributors.

Cagayan de Oro straddles a belt of land that used to be the operating theater of criminals such as Kuratong Baleleng. Although this is history, it cannot be allowed to happen again. Crime Clearance Efficiency needs to improve considerably.

The slide in literacy must be arrested and reversed. Increasing functional literacy is the performance standard set by Baguio, Cebu, Iloilo and Davao. If the city hopes to get into the fast lane, and stay there, it must make the investment in human capital, and build the skill sets it will need.

The revenue and savings data, both from the city and from the region, indicate that Cagayan de Oro creates wealth. The disparity between bank deposits in the city, and regional family savings tells us, however, that major strides are needed in the matter of building regional equity. A concerted effort to strategically diffuse

development over a broader area may create a platform to spread these economic benefits.

The regional baseline score for loans as a percentage of deposits stood at 55%. This is a positive and distinctive achievement, indicating that a good proportion of Cagayan de Oro's wealth was being plowed back into the city. That score slid down to barely 30% in one decade. If a city's economy is to expand, a good proportion of the wealth it creates should be consciously plowed back to create new opportunity and help increase the local velocity of money. This decline is a matter of concern as it may indicate a weakening of new investor interest, or a "migration" of wealth away from the city.

Echoing the sentiments of Cagayan de Oro stakeholders who participated in this process and built the scenarios for the next 30 years, all this could happen if the climatic impacts that define "new normal" conditions within the city are well understood and effectively managed. Like Baguio, rainfall and water - too much of it - has been a millstone around the city's neck. With the appropriate mix of enlightened political leadership, fueled by public sector catalysts and private sector investments, that are sustained and supported by the people of the city, a bad situation could be turned around into something good. You could never have too much of a good thing. Water could very well become Cagayan de Oro's saving grace.

DAGUPAN CITY

CLIMATE / ENVIRONMENTAL EXPOSURE

The city of Dagupan was built on the water-saturated substrate of a coastal wetland, facing the West Philippine Sea. This historical fact could very well emerge as the main determinant of Dagupan's exposure to climate risk. This could also define and limit the opportunities for re-configuration that are available to the city. Sitting within a Type 1 climate zone, the city is located well within the Philippine typhoon belt. Official data reports 47 typhoon hits over 20 years. That is another given, and with climate change, tropical storms are expected to intensify.

Built at a time when oceans and rivers served as the archipelago's highways, Dagupan's early economy rode on its reputation for producing excellent farmed milkfish. The expansive plains hemming the wetland and the city along its inland boundaries, offered a rich muddy soil that was ideal for rice production. That's the way it was for the longest time. However, things have changed.

Historically, most typhoons that make landfall in Luzon have come from the Pacific Ocean, often dissipating in strength as they move west over the Sierra Madre and Cordillera ranges. However, in the last five years, typhoon and rainfall data seem to indicate an increasing number of tropical storms moving east / northeast from the West Philippine Sea. If this pattern persists, it may add a new layer of climate exposure for the cities and towns along Luzon's western coast that have opted to develop toward the sea, rather than away from it. That will include Dagupan City.

As a coastal city, perched on a wetland, within the typhoon belt, Dagupan City should expect to be exposed to all six climate scenarios described in the WWF study. Along with the cities and towns that line Lingayen Gulf, Dagupan's long-standing reputation as a major production center of fisheries and aquaculture will most likely be affected by increases in sea surface temperature, ocean acidification, as well as the likelihood of more intense storms and the surge that accompanies them. These climate impacts will most certainly expose this sector to risk.

Sea level rise will, in all likelihood, affect the viability of coastal wetlands, along with the human activity that depends on this ecosystem, as well as the infrastructure so essential to the continuation of these activities. From 1960 to 2010, annual rainfall over Dagupan logged in at 2427 mm. This figure is relatively at par with the national average, and so far, city records show no apparent indication of intensification. However, a wetland is a sink. It is the natural receptacle for water that drains into it from a geographical area that extends way beyond it. Located up in the Cordilleras, Baguio has registered close to a 50%

increase in rainfall over the last ten years. It is one of those water sources that drain into Dagupan's wetland.

SOCIO – ECONOMIC SENSITIVITY

Land Area	**44.4643 sq km**
Barangays	**31**
2010 Population	**158,334**
2010 Pop Density	**3,561 / sq km**

Dagupan's population increased from 122,247 in 1990 to 158,334 in 2010 – a 30% increase, translating to 36,087 additional inhabitants. To an extent, this relatively low level of population growth might be attributable to the fact that there is not much more room within Dagupan itself. It is also possible that businesses and families have chosen to set up their offices and homes in less expensive developments in one of the many satellite towns that are contiguous to the city. Population density inched up from 2,749 / sq km in 1990 to an estimated 3,561 / sq km in 2010.

In comparison to the other cities assessed in this phase, it is evident that population growth in Dagupan has slowed down. For primary and secondary school enrollment, for example, only a 16% increase, from 34,232 to 39,803 students was reported over a 20-year period. In comparison, Cagayan de Oro logged a 70% increase with 188,000 students in 2010, Baguio posted a 71% increase with 150,000 students in 2010, and Zamboanga bannered a 93% increase with 215,000 students by 2010. Reflecting the relatively soft population growth trends, energy consumption from 2005 to 2010 moved up by only 10% - from 126 MW to 138 MW.

Milkfish production – the single product for which Dagupan is best known – dropped by 37% from 13417 MT in 2002 to only 8435 MT in 2010. Although Dagupan retains its brand as the milkfish capital of the north, it is said that many fish farms have moved to nearby towns, such as Binmaley. In the same period, swine production nosedived by 89% from 6,259 to 700 heads. Cattle production logged an 82% decrease, from 825 to 150 heads. Carabao production went down by 76% from 135 to barely 32 heads. And, even goat production plunged 75%, from 2040 to only 500 heads. The only exception was in poultry production that yielded a 62% increase.

These mixed economic signals are not necessarily bad news. There are positive manifestations of a business environment in transition. These figures seem to point to a city aggressively re-positioning itself, with investors raring to take the city toward new directions.

In sharp contrast to the enrollment and agriculture data, for example, the number of motor vehicles registered in Dagupan City zoomed up from 17,316 to 58,993, an increase of 341%. This translates to a density of 1341 vehicles / sq km. The number of LGU-registered establishments increased by 205% from 1,829 in 1990 to 5,583 in 2010. The number of new occupancy permits

climbed up by 199%, from 350 in 1991 to 768 in 2010. Another revealing statistic has to do with the number of parcels of land sold. In 1990, the city assessor's records showed that 35,147 parcels of land were involved in transactions, either for sale or for conversion. By 2010, that figure had soared to 57,006 parcels of land. Furthermore, the assessed value of these parcels of land skyrocketed 547%, from PHP 372,632,630 in 1990 to PHP 2,411,473,380 in 2010.

ADAPTIVE CAPACITY

A self-rating of 5.00 is a perfect score. The Dagupan City government gave itself "excellent" ratings in 8 out of 20 criteria that make up the LGPM score sheet, or an average score of 4.11 for 2010.

Areas of Governance	Dagupan City		
	2009	2010	Difference (2010 and 2009)
Administrative Governance			
Local Legislation	4.39	3.20	(1.19)
Development Planning	4.87	5.00	0.13
Revenue Generation	5.00	4.78	(0.22)
Resource Allocation and Utilization	5.00	4.67	(0.33)
Customer Service - Civil Applications	4.75	4.75	-
Human Resources Management and Development	5.00	5.00	-
Economic Governance			-
Support to Agriculture	4.52	2.50	(2.02)
Support to Fishery Services	4.15	3.85	(0.30)
Enterpreneurship, Business and Industry Promotion	4.00	2.08	(1.92)
Social Governance			-
Health Services	4.92	4.68	(0.24)
Support to Education Services	4.20	5.00	0.80
Support to Housing and Basic Facilities	4.00	5.00	1.00
Peace, Security and Disaster Risk Management	4.70	4.23	(0.47)
Environmental Governance			-
Forest Ecosystem Management			-
Freshwater Ecosystems Management	5.00	5.00	-
Coastal and Marine Ecosystems Management	5.00	5.00	-
Urban Ecosystems Management	4.20	2.83	(1.37)
Valuing Fundamentals of Governance			-
Participation	5.00	5.00	-
Transparency	5.00	5.00	-
Financial Accountability	4.73	4.56	(0.17)

From 1990 to 2008, the metric used for monitoring city crime was "Crime Solution Efficiency". In 2009, this was replaced by another metric called "Crime Clearance Efficiency". Some cities have both figures. Others have only one figure available.

Crime Solution Efficiency data for Dagupan City improved from 88.46% in 1990 to 93.81% in 2010. Crime Clearance Efficiency scores for the city, were not available.

Functional Literacy in Region 1 scored 91.3% in 2008, a decline from 95.8% in 1990. For this variable, Region 1 delivered the best scores, despite the apparent drop in skills.

City Revenues registered at P532 Million in 2010, a dramatic 1578% increase from barely P31 Million in 1990. After deducting Expenditures, the city ended the year with Reserves of P11.7 Million. Broken down, this translates to Reserves of P74 per capita. These are the lowest year-end reserves per capita for 2010.

In 2010, the 53 banking offices in Dagupan City reported 206,213 active accounts representing a total deposit value of P21.3 Billion – with an average deposit value of P103,321. To provide a contextual perspective, the Regional average family savings levels were reported at P34,000 for 2009.

Total bank deposits for the Region rose 46% from P69 Billion in 2002 to P100.4 Billion in 2011. It is interesting to note that total loans for the Region increased by a higher rate, i.e. 57%, from P14.9 Billion to P23.5 Billion. The regional metric for loans as a percentage of deposits increased from 21.5% to 23.5%.

Pangasinan province, where Dagupan City is located, registered a Human Development Index value of 0.621 in 2006, virtually at par with the score of 0.622 reported in 1997.

SCENARIO BUILDING WORKSHOP

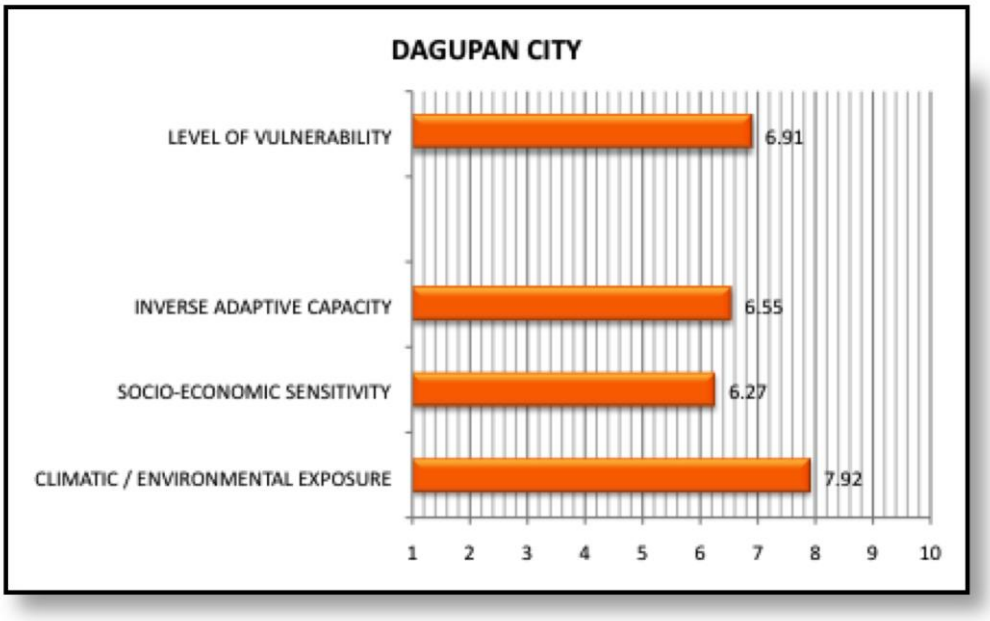
List of Development Drivers

Primary Drivers	**Governance & Politics** **Values & Culture**
Secondary Drivers	**People Participation** **Environmental Concerns** **Urban Planning & Land Use** **Social Concerns** **Education** **Population**
Distinctive Scenario Descriptors	“Tuwid na Landas” God-fearing Community Livable City Tri-City Zero-Waste Floating market seafood basket of the North climate proof

SCENARIOS DEVELOPED

Positive Governance & Politics / Positive Values & Culture
Negative Governance & Politics / Positive Values & Culture
Positive Governance & Politics / Negative Values & Culture
Negative Governance & Politics / Negative Values & Culture

The narratives containing a summary of scenarios developed by Dagupan stakeholders are provided as an annex.



ASSESSMENT & INTEGRATION

In a manner akin to Cebu and Cagayan de Oro, metereological data will not provide enough information for us to pin down the possible impacts of climate change on Dagupan City. The definition of Dagupan's level of climate risk should involve an understanding of its hydrology and topography as well as the expanding footprint of Dagupenos through the years.

As a coastal wetland, the area on which Dagupan sits serves as a natural drainage system both for the water flowing down from the southwestern rim of the Cordilleras, and the northeast quadrant of Luzon's central plain. A cursory glance at Google Earth, illustrates how run-off from the general area of Baguio City ends up in this drainage system. Many parts of the city sit on mud and reclaimed land. In fact, after the great earthquake of 1990, Dagupan became the focus of several research initiatives studying earthquake-induced liquefaction. What may have worked well in Dagupan's early economic history may no longer be an appropriate element of

its future. The city's new elevated bridges and highways provide one example of solutions that may allow the city to "rise above" its historical traditions and geographical realities. Virtually all movement in, out and through the city is by land. These all-weather solutions should be expanded, and dealt with in a much more integrated manner.

If roads and bridges are elevated, then clearly businesses and residences cannot simply be left behind. This is not going to be cheap, quick nor simple. But, there is no need to reinvent the wheel. There is a wide range of formulas for city re-development that have worked in many of the world's cities. Dagupan only has to do its homework, and decide which of these solutions might work.

All cities have three possible natural sources of water: rain, surface water and groundwater. Rainfall should be the first choice. Groundwater should not be tapped, except as a reserve. Like many coastal towns and cities that have established themselves on wetland ecosystems here in the Philippines, the Dagupan water district sources the city's drinking water supplies largely from groundwater. This is an ill-advised practice. Several studies, here in the Philippines, have already shown that this opens the door to deteriorating water quality, saltwater intrusion and land subsidence. This is especially true for coastal wetlands. When these effects of the human footprint happen, a city proceeds to sink. This condition is irreversible.

It is no surprise, therefore, that seven barangays of Dagupan City, occupying up to 40% of the city's land area, are known to be regularly flood-prone, even on sunny days, particularly during high tides. High tides happen twice a day, everyday. Land subsidence and daily flooding are elephants in the room. The continued denial of this daily occurrence only handicaps the city. Tolerance of this unnecessary and avoidable economic disruption, limits a city's potential for productivity and competitiveness. This situation is a virtual photocopy of a number of Philippine coastal cities that are built over wetlands. If this is ignored as a "blind spot", it will certainly continue and is likely to get worse. The impacts on pollution, city health and productivity are clear.

Sea level rise may contribute to the problem. However, the extraction of groundwater is already proven to be the root cause of land subsidence. This outdated practice must stop, and the city water district should be asked to shift to alternative rain or surface water sources, as a start. Simple reclamation is expensive, and has been known to aggravate the problem by altering natural drainage. In a climate-defined future, a city's dependence on single-source water systems are like putting all your eggs in one basket. Like Singapore, Dagupan City should consider a multi-source water plan, that utilizes rain harvesting, surface water

treatment, and even desalination or sewage-to-water options for some areas of the city.

Dagupan City recorded the highest population density in this phase. This comes as no surprise, since, with only 44 sq km, it occupies the smallest land area of the four cities. Furthermore, its vibrance as a business center acts like a magnet for people seeking opportunity. It is true that Baguio, with 57 sq km, reported a much higher population density of 5,668 / sq km while Iloilo, spanning 78 sq km, recorded 5,432 persons / sq km. There are lessons for Dagupan to learn from these two cities, if it hopes to avoid this challenge, and further aggravate the current levels of urban congestion.

These changes in the city's demographics have had an effect on its traditional socio-economic core. Driven by climate reality, expansion imperatives, as well as the city's own geographical constraints, the businessmen of Dagupan have chosen to adjust, rather than wait. Certain economic activities have apparently moved to contiguous, but more appropriate locations. At least in the area of aquaculture or food production, it seems fairly clear that Dagupan best days are past. Rather than being the direct producer, the city has morphed into becoming the best broker of deals.

In the matter of education, it can be argued that although Dagupan continues to be recognized as a provincial center of learning, the numbers that make up its student population are no longer at par with other regional education centers of the country. With the mushrooming of schools throughout Pangasinan, however, we are seeing what is apparently a distribution, rather than a reduction of educational opportunity. Rapid expansion sometimes leads to a diminution in quality control. Although Region 1 continues to lead the pack, the recorded drop in functional literacy tells us that greater attention must be given to improving the quality of education. For learning, function must precede form.

It is tempting to speculate that we may be seeing a form of development inertia that sometimes precedes an economic transition. Some of the city's other variables seem to echo the hypothesis that this city is only shifting gears. The bullish economic data on motor vehicles, and LGU-registered establishments are cases in point.

Real estate is a hot item. Land sales are up. More importantly, despite the fact that Dagupan's land values have increased so dramatically over 20 years, the records of real estate transactions per year have continued to grow.

Dagupan City participants in the scenario building exercise strongly felt that "governance & politics" along with "values &

culture" will be the primary drivers of their city's development over 30 years. Efforts towards improving governance and politics are extremely important. Recognizing that governance and government are two different things, however, the drive to take Dagupan to its next level must be a joint venture between the city's public and private sectors.

The relatively low level of government reserves per capita underscores the need to bolster participation, build revenues, or identify alternative sources of funds. Although, this could reflect efficient government expenditure aimed at maximizing pump-priming activity. On the other hand, "squeezing the towel dry" results in a low reactive reserve, for unforeseen developments – such as extreme weather events. Financially, Dagupan City needs to shore up its savings account. This presents one golden opportunity for local government to encourage public-private partnerships as a way to diversify fund sources and improve governance. The city's vibrant business mood is an opportunity waiting to be tapped.

Like Cagayan de Oro, it is clear that Dagupan City has created wealth. Although a disparity exists between deposit values in the city versus regional savings, the urban-rural gap is smaller than Cagayan de Oro. To an extent, this may be a validation that economic opportunity has spread out. It is good to see the data for loans as a percentage of deposits rising. However, there is much room for further improvement. Dagupan faces a crucial test. As it goes through this important economic transition, it must decide to invest in itself more aggressively.

Dagupenos identified "values and culture" as the next most critical driver of development. This driver, unique to Dagupan, was somewhat unexpected. At first glance, there seemed to be no apparent indication of a broad societal concern to preserve values and culture in this busy center of economic activity. Taking a bird's eye view of things, however, this statement seems to be an expression of Pangasinan pride in what they are, and what they represent. It also seems to represent a desire to remain grounded in what Dagupan City is, even as it embraces the winds of change.

Dagupan seems to be going through exactly what Baguio, Cebu and Davao have experienced. As a regional center now servicing the needs of greater Pangasinan, as well as some portions of northern Zambales, southern La Union and Benguet, the city's core businesses, as well as its socio-economic profile, are changing. This will fuel demand for different services and skill sets. As it strengthens its position as the best regional "broker of deals", it is likely that trade activity, service hub operations, some manufacturing and their crucial support sectors will expand.

If the city is able to work out a new, climate smart development formula, land values in Dagupan will continue to move up. When urbanization expands, agriculture retreats. And, as Dagupan City's footprint extends further outward, its growing needs as a center of business and trade could trigger the need to develop broader networks of supply chains, designed to function well in a climate-defined future. The pieces of this development puzzle have already begun to fall in place. The city is all a-buzz about the possibility that the Alaminos Airport may soon open. A new expressway from Tarlac to Pangasinan is being rushed. In addition, the port at Sual is being upgraded to accommodate international sea traffic. If flood risk has been considered in the design and location of these new facilities, and all-weather land access can be assured, then the ball is firmly in Dagupan's court.

In the scenarios they built describing Dagupan over the next 30 years, local stakeholders expressed the desire for steadfast political leadership and improved governance, grounded in the values that built the city. If both Dagupan's public and private sectors commit to collaborate toward building a fully functional adaptation framework, this may happen. It is a bold aspiration that will require new mindsets and a lot of work. Seeing that the people of Dagupan are no strangers to good ideas nor hard work, its economic re-invention may be right around the corner.

LAOAG CITY

CLIMATE / ENVIRONMENTAL EXPOSURE

A river defines the current spread of Laoag City. To an extent, that same river influences the city's level of climate exposure. Located in broad flatlands, scored only by this watercourse and its delta, the city's gently sloping terrain rises from its lowest point - barely 2 meters above sea level - to distant hills that are only 60 meters high. As a result, Laoag does not share the landslide risk facing Baguio, Cebu, Cagayan de Oro, Zamboanga or some portions of Davao.

Laoag City sits in a Type 1 climate zone, within the Philippine typhoon belt. Of the four cities assessed in this second phase, official data indicates that this city scored the highest number of typhoon hits, i.e., 55 occurrences over 20 years. Like Dagupan, however, it is generally spared from the full brunt of Pacific storms by the weather barriers created by Luzon's great mountain ranges.

Laoag's mildly-rolling, and relatively well-drained, topography, with no significant uplands nearby, makes the risk from landslides or flood run-off negligible. Over a 50-year period, Laoag City logged an annual rainfall of 2117 mm – slightly lower than the national average. Furthermore, a map, generated by the Manila Observatory, indicates that this zone may experience only moderate rainfall increase in the years ahead. Seeing, however, that some portions of the city sit immediately adjacent to the Laoag River, these areas – located along the lower portions of the river's north and south banks, as well as along the Mangato Creek - are exposed to seasonal flooding due to increases in river depth and breadth, especially during the wet season. In terms of vulnerability, Laoag City is directly exposed to only 3 of the 6 climate impacts listed in the 2009 WWF study.

SOCIO – ECONOMIC SENSITIVITY

Land Area	**127.4735 sq km**
Barangays	**80**
2010 Population	**104,904**
2010 Pop Density	**823 / sq km**

Population in Laoag City increased from 83,756 in 1990 to 104,904 in 2010 – a 25% increase, translating to only 21,148 additional inhabitants over 20 years. Population density also increased by a scant 25% from 657 / sq km in 1990 to 823 / sq km in 2010.

Very much in step with this measured pace of growth, LGU-registered establishments increased by only 13% from 4,824 in 1990 to 5,463 in 2010 – with retail and services taking up the top two slots, representing 48% and 15% of the total, respectively. Enrollment nudged up by only 6% from 20,288 in 1990 to 21,475 in 2010.

The city's economy receives significant monthly boosts from Ilocanos working overseas. Their numbers are up 214% in barely three years, from 416 in 2008 to 1308 in 2010. For that same period, OFW remittances throughout Ilocos Norte grew by 46%, from PHP 3.1B in 2008 to PHP 4.6B in 2010. To an extent, this explains in part why motor vehicles increased by 241%, from 12,527 in 1990 to 42,778 in 2010. This translates to a density of 337 vehicles / sq km.

In Laoag City, tourist arrivals increased dramatically by 73%, from 104,642 in 2000 to 181,279 in 2008. Air passengers increased by 64%, from 108,264 in 2001 to 177,339 in 2010. Air cargo increased as well by 72%, from 1.5 Million kilos in 2001 to 2.6 Million kilos in 2010.

Swine production increased 100%, from 6,339 in 1990 to 12,673 in 2010. Cattle production is up 50% from 2,635 to 3,946 heads. Carabao production was down 30% from 1270 in 1990 to 884 in 2010, however, goat production increased 38%, from 3,125 to 4,322 heads in the same period. Like many other cities assessed, poultry production zoomed up 164% from 57,942 in 1990 to 153,108 in 2010. In parallel, corn production has increased 184% from 3,222 MT to 9,141 MT. Palay production is up 20%, from 17,181 MT to 20,674 MT. Tomato production – a specific Ilocano competence - increased by 198% from a low of 1,394 MT in 1990 to 4,161 MT in 2010. Mung Bean production was up 41% from 1243 MT to 1750 MT. The single major agriculture crash came from garlic, another crop for which the Ilocos region was widely known. A victim of unfair competition from low-priced garlic smuggled in from abroad, this crop crashed by 94%, from 3,920 MT in 1990 to barely 237 MT in 2010.

ADAPTIVE CAPACITY

A self-rating of 5.00 is a perfect score. The Laoag City government gave itself "excellent" ratings in 16 out of 20 criteria that make up the LGPM score sheet, or an average score of 4.91 for 2010.

Areas of Governance	Laoag City		
	2009	2010	Difference (2010 and 2009)
Administrative Governance			
Local Legislation	4.92	5.00	0.08
Development Planning	5.00	5.00	-
Revenue Generation	5.00	5.00	-
Resource Allocation and Utilization	3.92	3.92	-
Customer Service - Civil Applications	5.00	5.00	-
Human Resources Management and Development	5.00	5.00	-
Economic Governance			
Support to Agriculture	4.67	4.67	-
Support to Fishery Services	4.25	4.75	0.50
Enterpreneurship, Business and Industry Promotion	5.00	5.00	-
Social Governance			
Health Services	5.00	5.00	-
Support to Education Services	5.00	5.00	-
Support to Housing and Basic Facilities	5.00	5.00	-
Peace, Security and Disaster Risk Management	4.83	5.00	0.17
Environmental Governance			
Forest Ecosystem Management	5.00	5.00	-
Freshwater Ecosystems Management	5.00	5.00	-
Coastal and Marine Ecosystems Management	5.00	5.00	-
Urban Ecosystems Management	4.88	4.88	-
Valuing Fundamentals of Governance			
Participation	5.00	5.00	-
Transparency	5.00	5.00	-
Financial Accountability	5.00	5.00	-

From 1990 to 2008, the metric used for monitoring city crime was “Crime Solution Efficiency”. In 2009, this was replaced by another metric called “Crime Clearance Efficiency”. Some cities have both figures. Others have only one figure available.

Crime Solution Efficiency data for Laoag City was available for only 2 years: 91.8% for 2010 and 95.1% for 2011. Crime Clearance Efficiency scores were not available for Laoag City.

Functional Literacy in Region 1 scored 91.3% in 2008, a decline from 95.8% in 1990.

City Revenues registered at P437 Million in 2010, and after deducting Expenditures, ended the year with Reserves of P64 Million. Broken down, this translates to Reserves of P613 per capita.

In 2010, the 25 banking offices in Laoag City reported 136,503 active accounts representing a total deposit value of P11.73 Billion – with an average deposit value of P85,913. Among the four cities assessed, Regional average family savings topped the list, at P34,000 for 2009.

Laoag belongs to same region as Dagupan. Total bank deposits for the Region rose 46% from P69 Billion in 2002 to P100.4 Billion in 2011. It is interesting to note that total loans for the Region increased by a higher rate,

i.e. 57%, from P14.9 Billion to P23.5 Billion. The regional metric for loans as a percentage of deposits increased from 21.5% to 23.5%.

Ilocos Norte province, where Laoag City is located, registered a Human Development Index value of 0.7 in 2006, an improvement from 0.676 in 1997.

SCENARIO BUILDING WORKSHOP

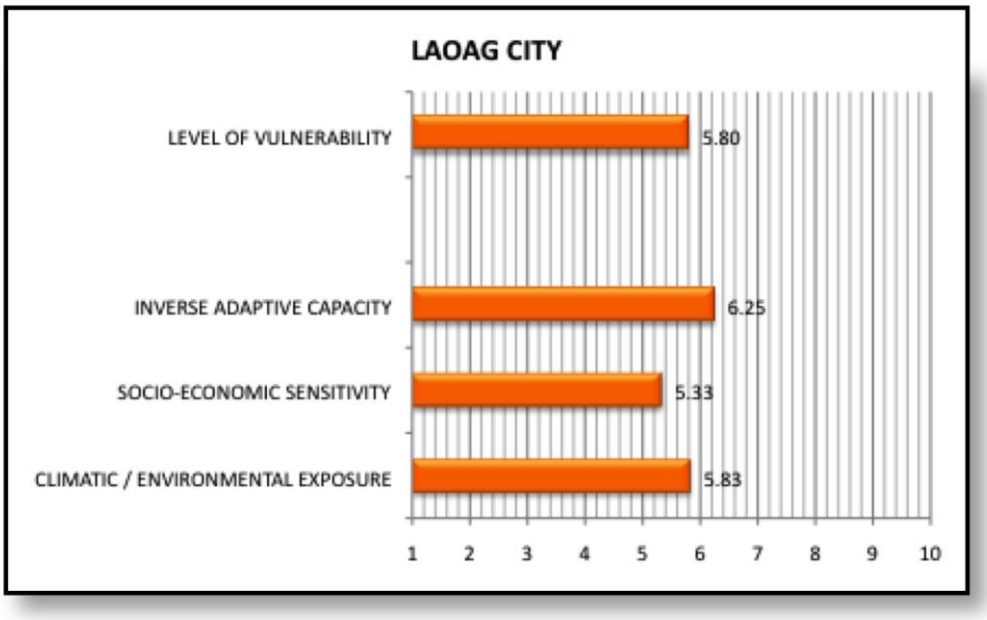
List of Development Drivers

Primary Drivers	**Governance & Partnership** **Education**
Secondary Drivers	**Health** **Values** **Environmental Protection & Mgt** **Economic Development** **Tourism Development**
Distinctive Scenario Descriptors	"Pakbet becomes Kimchi" Healthy & Wealthy Disciplined & Prudent Safe & Livable Elections with Choice

SCENARIOS DEVELOPED

Positive Governance & Partnership / Positive Education
Negative Governance & Partnership / Positive Education
Positive Governance & Partnership / Negative Education
Negative Governance & Partnership / Negative Education

The narratives containing a summary of scenarios developed by Laoag City stakeholders are provided as an annex.



ASSESSMENT & INTEGRATION

Throughout Laoag, there seems to be a soft but palpable hum that fills the air. It is not frenetic. Rather, it is more like the sway of calesas rolling through the gentle Ilocano countryside.
In a sense, Laoag defines how cities should be located in a climate-defined future. Unlike Dagupan, Laoag's city center is situated in gently-rolling, but mostly flat terrain, some 6 kilometers away from the coast. Even as the Pacific Ocean and West Philippine Sea continue to spawn inclement weather, it appears that large portions of Laoag will be much less vulnerable to coastal impacts, such as sea level rise and storm surge. There are no extensive mangrove forests lining the city's coastline. But the broad expanse of sand dunes stretching from Currimao to the north, continue to provide this city with a formidable natural barrier to protect it, and fend off raging seas.

With the possible exception of freak super-typhoons that may hone in on Laoag at sometime in the future, it is primarily river-induced flooding that Laoag City has to deal with in order to pro-actively reduce economic downtime due to extreme weather. Of the four cities assessed, Laoag appears to be the least vulnerable to climate impacts.

Laoag City illustrates how a city can be much easier to take forward, when things are kept at a manageable scale. Laoag scores high as the city with the lowest total population and the lowest population growth rate, among all 8 cities assessed by this project, so far.

With much of Laoag City's cash flow coming in from Ilocanos working abroad, the city benefits from this "export product" without having to deal with the direct footprint of the individuals who generate that income. Tourism, another sector that Laoag seeks to aggressively cultivate, provides additional fresh infusions from outside.

In contrast to the spotty agricultural performance reported from other cities in this phase, Laoag's farm sector appears to be growing in most areas, and seems to be, by and large, rather vibrant. All in all, Laoag's agricultural indicators point to generally high local self-sufficiency in the area of food security. Furthermore, the relatively close proximity of farms to the city, coupled with the province's generally excellent road network, contributes to a better quality of fresh produce, both for local consumers and for tourists. This also tempers the cost of living.

Virtually everyone we spoke to in Laoag expressed some concern over another fairly recent economic activity. River sand is being mined within Ilocos Norte. Yes, the activity takes place outside the city – reportedly in Sarrat - and actual shipment of river sand is handled by trucks generally traveling at night, that offload at the mining firm's private ports in Badoc, south of Currimao. So, why should it concern Laoag residents? Sarrat is immediately upstream of Laoag. Like it or not, they are connected by the river. There is an opportunity here to learn from the experience of Cagayan de Oro, and avoid unnecessary dislocation from ecosystem imbalances spawned by human activity.

In the Philippines, GDP growth remains largely coupled to natural resource use. It is our hope that a concerted effort toward more and more "value added" interventions will change this, allowing us to produce more with less. Acknowledging this, however, cities and towns that share ecosystem benefits – such as a river, a coastline or a watershed – should be encouraged to "bundle" their policies and programs toward more sustainable management of these common resources. The key is to learn how to think "beyond our fences".

At some point, Laoag City – as well as the province's international airport whose airstrip ends at the river - will have to protect themselves and retain a credible third party to determine if this ongoing upstream extraction has an effect on river flows. If there is an indication of negative impacts, then Laoag City, as well as the airport, must, in all fairness, be compensated to allow them to mitigate these impacts. After all, their main vulnerability will come from the river that they share with Sarrat.

Although Laoag is blessed with a well-built international airport that serves businessmen, residents and tourists well, much of its

agricultural output is shipped south to Metro-Manila and the markets of the Central Plains by road. Some portions of the coastal highway passing through Ilocos Sur, La Union and Pangasinan, have become flood prone. Seawalls protecting certain stretches of highway have reportedly been destroyed by storm surge, leaving the highway exposed and easily flooded. In collaboration with these three provinces, it would serve Ilocos Norte well to lobby for a climate smart retro-fit of this critical artery. This is another management challenge that may be more easily addressed by "bundling" resources.

The Laoag stakeholders, who participated in this assessment process, and built the scenarios for Laoag City, identified "governance and partnerships" as the city's lead development drivers over the next 30 years. Unlike some other parts of the country, where the relationship between leaders and followers sometimes resembles the feudal divide between landowners and tenants; here in the Ilocos heartland, that relationship has always been personal and tangibly reciprocal. In order to sustain local development, the Ilocanos (it seems) expect things to remain that way.

Ilocanos are known to work hard, and generally, speak good English. Scoring once again with the highest literacy levels among all four cities, Laoag City, along with Dagupan, seems ideally positioned to continue supplying skilled and literate persons to the global workforce. The Ilocanos who participated in the scenario-building workshop underscored "education" as a second key development driver for the city. If Ilocano leaders are to remain in the good graces of their loyal electorate, the province-wide slippage recorded in functional literacy must, therefore, be managed.

At P34,000 per family, regional average family savings came out on top. Furthermore, the Region delivered the smallest gap between urban deposit values and regional average family savings. This is probably one reason why Ilocos Norte delivered an improvement in Human Development Index scores, and topped the list for this assessment.

A strongly ethno-centric population may be more inclined to make investments aimed at sustaining the status quo – if they generally approve of the way things are. Among the areas assessed, new bank loans were highest in Region 1, and it was the only region where loans as a percentage of deposits actually increased. This is historical. Ilocanos are actually borrowing more money. It is also a positive sign. The frugal spirit that characterizes the people of this region makes them naturally risk averse. To them, it seems that the future they see for Laoag City and Ilocos Norte, are clearly worth the risk.

ZAMBOANGA CITY

CLIMATE / ENVIRONMENTAL EXPOSURE

Zamboanga City can be described as a classic "ridge to reef" ecosystem. This coastal city sits within a Type 3 climate zone, at the southernmost tip of the Zamboanga Peninsula. This is a typhoon-free zone.

With annual rainfall reported at barely 1234 mm, over a 50-year period, Zamboanga City shows the lowest annual average of the four cities evaluated in this phase. The city has 98 barangays. 12 of them have been identified, in Zamboanga's own website, as being drought prone. The Manila Observatory maps confirm that this city is located within an area that should expect to face the risk of temperature increase. In the matter of El Nino exposure – primarily increased heat and below average rainfall - the city sits within one of Mindanao's high-risk zones.

Despite relatively low rainfall, it is surprising that some portions of Zamboanga City have had to deal with floods regularly. Situated by the city's coast or along major rivers and creeks, at least 12 barangays have reported annual seasonal flooding.

Steep slopes characterize the city's uplands. If these areas are to remain stable, this will require prudent watershed and land use management. With the exception of Pasonanca, however, there is a reported lack of effective regulatory mechanisms for 6 of the city's 7 watersheds.

The challenge to the city extends to the condition of its lower catchments. There are 16 identified watercourses that drain through the city into the Sulu Sea and Moro Gulf – the most important of which are the Tumaga, Manicahan, Curuan, Bolong, Culianan and Vitali Rivers in the east and the Ayala River in the west. Zamboanga City sources 80% of its total water production from surface water provided by the Tumaga River. The remaining 20% is drawn from groundwater wells. When there are no forests, run-off will seek its own path. This also affects water availability in agricultural areas. As key surface water sources and drainage zones of the city, rivers, as important functional units of lower catchment areas, will emerge more and more as a significant management concern for Zamboanga City.

Bound on the west by the Sulu Sea, on the east by the Moro Gulf, and on the south by the Basilan Strait and the Celebes Sea, Zamboanga City's future will be intimately linked to the seas. It is likely that sea level rise, heightened sea surface temperatures and ocean acidification will impact the viability of the city's port and the productivity of the fishing fleets that do business here. Except for typhoons, Zamboanga City should prepare to deal with five of the six climate impacts identified in the WWF study.

SOCIO – ECONOMIC SENSITIVITY

Land Area **1483.3849 sq km**
Barangays **98**
2010 Population **807,129**
2010 Pop Density **638 / sq km**

Population-wise, Zamboanga City is the largest of the four cities for this phase of assessments. Registering an 82% increase in population, the number of Zamboanguenos grew from 442,345 in 1990 to 807,129 in 2010. At 2.98%, this population growth rate is the highest among the four cities assessed. Population density increased by 144%, from 298 / sq km to 638 / sq km in the same period.

Fueled by the large increase in population, the number of housing units within the city ballooned by 91% from 78,476 in 1990 to 149,622 in 2007. School enrollment increased by 93% from 111,626 to 215,649. These are the highest enrollment figures for all four cities in this phase. The number of schools went up as well, increasing by 58% from 193 to 304. Energy Consumption rose 193%, from 137,514 MW in 1990 to 403,442 MW in 2010. Finally, motor vehicles increased by 315% from 17,263 in 1990 to a chart-topping 71,708 in 2010. This translates to a density of barely 48 vehicles / sq km, versus Davao's 97 vehicles / sq km.

Amidst all this positive information indicating robust growth and new opportunity, it is puzzling to see the number of LGU-registered establishments remaining virtually stagnant, from 8329 in 1990 to 8385 in 2010. In a similar manner, it is also surprising to see the number of new occupancy permits decreasing by 11%, from 697 in 2000 to 621 in 2010.

Sea-based passengers increased by 111% from 1,265,431 in 1990 to 2,675,114 in 2010. This exceeds Cagayan de Oro's 2.1 Million sea passengers for that year. In comparison, air passenger traffic to and from Zamboanga increased by 82% from 343,436 to 623,593. Air passengers to Cagayan de Oro hit 1.3 Million levels in 2010.

This increased traffic was not confined to passengers alone. The number of ship calls increased 37% from 5,598 to 7,662. Official domestic cargo records show that volumes grew by 76% from 846,455 MT (76% in / 24% out) in 1990 to 1,511,500 MT (64% in / 36% out) in 2010. Foreign cargo volume, followed suit, delivering a 104% increase, from 60,501 MT (57% in / 43% out) to 123,419 MT (99% in, 1% out) in the same period. Not to be left behind, air cargo traffic grew 40% from 4,162 MT in 1990 to 5,817 MT in 2005. Like Cagayan de Oro, sea cargo remains the dominant mode of shipment here. Unlike Cagayan de Oro, the majority of ship-borne cargo in Zamboanga is inbound. For foreign cargo, port records for 2010 state that almost all foreign cargo (99%) was inbound.

Tourism arrivals in Zamboanga have begun to climb. They increased 169% from 129,952 in 1990 to 349,439 in 2009. Although still far behind the 682,000 figure racked up by Davao, the city continues to actively lure tourists. The number of Zamboanga hotels has increased from 10 to 35, and the number of hotel rooms are up from 408 to 963.

The city's exports paint a radically different, and potentially worrisome, picture. Over the last ten years, the city's foreign trade export values have been on a roller coaster. Starting with US$ 272M IN 2000, exports declined year on year to a low of US$ 87M levels by 2006, recovering somewhat to US$ 147M in 2010. Unfortunately, 2011 brought with it another drop to US$ 110M levels.

For agriculture aimed at serving domestic demand, as well as food security, Zamboanga City remains a giant – at least among the four cities assessed. In this field, it has delivered some very positive figures. Growth and leadership are evident in a number of areas. Swine Production is the highest by far among the four cities, increasing 133% from 49,610 in 1990 to 115,673 heads in 2010. Poultry production has also grown by 200%, from 693,226 to 2,082,392 heads – the highest numbers, once again, for all four cities.

BAS data reveals that the output from Commercial Fisheries Production increased by 138% from 116,447 MT in 1995 to 275,688 MT in 2010. The same official source indicates that Municipal Fisheries Production grew as well, delivering an 82% increase from 23,210 MT in 2002 to 42,224 MT in 2010.

Zamboanga's growth achievements - for agriculture aimed at serving primarily domestic demand - keep coming. Vegetable production increased 113% from 9,810 MT (1990) to 20,905 MT (2010). Mango production increased 242% from 4921 MT (1990) to 16850 (2010). Banana production increased 236% from 18336 MT (1995) to 61571 MT (2010). Rubber production is up 209% from 530 MT (1990) to 1638 MT (2010). Corn production, to support the city's poultry farms, is up 127% from 3987 MT (1995) to 9049 MT (2010). Finally, Palay production up by only 5%, from 33227 MT (1995) to 34800 MT (2010).

Yes, there are some rather dark spots. Cattle Production, for example, dropped 32% from 14900 (1990) to 10091 heads (2010). Goat production slowed 20% from 12860 (1990) to 10326 heads (2010). And, seaweed production declined 31% from 85139 MT (1996) to 58755 MT (2010).

ADAPTIVE CAPACITY

A self-rating of 5.00 is a perfect score. The Zamboanga City government gave itself "excellent" ratings in 11 out of 20 criteria that make up the LGPM score sheet, or an average score of 4.68 for 2010.

Areas of Governance	Zamboanga City		
	2009	2010	Difference (2010 and 2009)
Administrative Governance			
Local Legislation	3.89	3.81	(0.08)
Development Planning	5.00	5.00	-
Revenue Generation	4.33	3.67	(0.66)
Resource Allocation and Utilization	3.67	4.67	1.00
Customer Service - Civil Applications	4.55	4.55	-
Human Resources Management and Development	5.00	5.00	-
Economic Governance			
Support to Agriculture	4.86	4.86	-
Support to Fishery Services	4.07	4.07	-
Enterpreneurship, Business and Industry Promotion	4.00	4.67	0.67
Social Governance			
Health Services	5.00	5.00	-
Support to Education Services	5.00	5.00	-
Support to Housing and Basic Facilities	5.00	5.00	-
Peace, Security and Disaster Risk Management	5.00	5.00	-
Environmental Governance			
Forest Ecosystem Management	5.00	5.00	
Freshwater Ecosystems Management	5.00	5.00	
Coastal and Marine Ecosystems Management	5.00	5.00	-
Urban Ecosystems Management	4.25	4.30	0.05
Valuing Fundamentals of Governance			
Participation	4.00	4.00	-
Transparency	5.00	5.00	-
Financial Accountability	5.00	5.00	-

From 1990 to 2008, the metric used for monitoring city crime was “Crime Solution Efficiency”. In 2009, this was replaced by another metric called “Crime Clearance Efficiency”. Some cities have both figures. Others can only provide one figure.

Crime Solution Efficiency data for Zamboanga City shows a decline from 95.7 in 2003, to 89.77 in 2008.

Crime Clearance Efficiency scores for the city were reported to be improving from a mere 8.3% in 2009 to 31.5% in 2011.

Functional Literacy in Region 9 scored 79.6% in 2008, a sharp decline from 85.3% in 1990. These are the lowest scores for all four cities.

City Revenues registered at P2.585 Billion in 2010, and after deducting Expenditures, ended the year with Reserves of P907 Million. Broken down, this translates to Reserves of P1123 per capita. Among the four cities, these represent the highest year-end reserves per capita for 2010.

In 2010, the 54 banking offices in Zamboanga City reported 243,553 active accounts representing a total deposit value of P26.3 Billion – with an average deposit value of P108,359. This figure is unusually high. It has been attributed to the fact that much of the funds of ARMM, as well as the neighboring provinces of Basilan, Sulu and Tawi Tawi are deposited in the

banks of Zamboanga City. In comparison, regional average family savings lingered at P17,000 in 2009.

Total bank deposits for the Region rose 99% from P23 Billion in 2002 to P46 Billion in 2011. It is interesting, once again, to note that total loans for the Region increased by a higher rate, i.e. 107%, from P5.86 Billion to P12.11 Billion. Despite this, the regional metric for loans as a percentage of deposits remained steady at about 26%.

Zamboanga del Sur province, where Zamboanga City is located, registered a Human Development Index value of 0.581 in 2006, although this is an improvement from the low of 0.538 reported in 1997, it is the lowest HDI score reported for these four cities.

SCENARIO BUILDING WORKSHOP

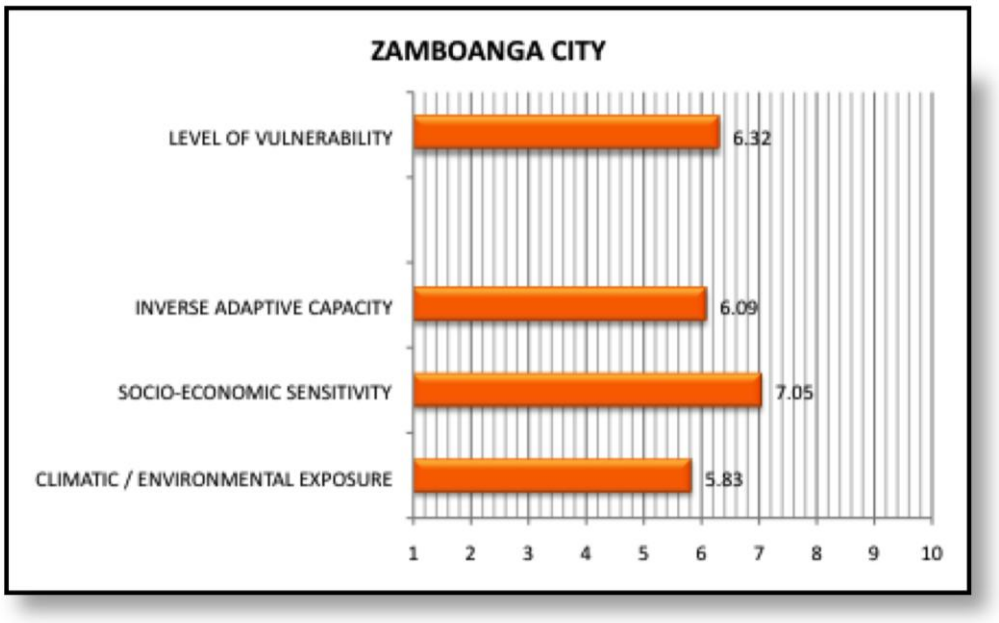
List of Development Drivers

Primary Drivers	**Governance** **Peace & Order / Economic Devt**
Secondary Drivers	**Energy Sufficiency** **Environmental Management** **Education** **Progress** **Food Security** **Values** **Water Sufficiency** **Infrastructure**
Distinctive Scenario Descriptors	"Tiger economy of the Philippines" "Dying city on a living planet" Gun-free Zamboanga Hub to mining Sardines and vegetable capital

SCENARIOS DEVELOPED

Positive Governance / Positive Peace & Development
Negative Governance / Positive Peace & Development
Positive Governance / Negative Peace & Development
Negative Governance / Negative Peace & Development

The narratives containing a summary of scenarios developed by Zamboanga City stakeholders are provided as an annex.



ASSESSMENT & INTEGRATION

Like Davao, Zamboanga City has no typhoons. The similarities between these two southern cities, extends to the fact that Zamboanga City also covers a large land area, over which the city government has direct management control. That is the crux of the matter. It is apparent that many of Zamboanga City's present challenges can be addressed by improved governance. Governance is not the realm of government alone. It is a joint responsibility of both public and private sectors.

This city has the lowest average rainfall of all 8 cities assessed, thus far. It is no surprise that, in this study, Zamboanga contains the only area - spanning 12 barangays - that are drought prone. It is surprising, therefore, that the city has 12 other barangays that are regularly beset by seasonal flooding.

With its highest point sitting at 1200 meters above sea level, the city's topography is dramatic. Characterized mostly by narrow alluvials and coastal landscapes that are subject to daily inundation, Zamboanga City's terrain is for the most part rolling to very steep, with approximately 63% of the city's total land area, having slopes from 18% to more than 50%.

By law, upland areas with slopes more than 18% should be classified as forestlands. If 63% falls under this classification, then only 37% of the city can be alienable and disposable. It defies explanation to find out, from the city's own website, that 48% of its land area (82,700 hectares) is classified as alienable and disposable. There is a logical reason for this rule on land classification. If Zamboanga aims to sidestep avoidable weather-

induced disasters, then this policy dissonance needs to be rectified. This is a management decision.

Unless these two elements, i.e. watershed management and land use classification, are firmly set in place, the incidence of downstream flooding should come as no surprise. Excessive groundwater extraction is proven to cause saltwater intrusion and land subsidence that exacerbates city flooding. Furthermore, Zamboanga may experience what has already happened to Baguio. Informal settlers have invaded substantial swaths of Baguio's forestlands. Two of Baguio's watersheds have actually been rendered inoperable. This problem can be avoided, if Zamboanga makes the right decisions without delay.

Zamboanga's population is going through the roof. The city's population growth rate and density are now at levels that rival Davao. This will increase water demand. In the scenario building exercises, it was said that much of Zamboanga's exceptionally high population growth is spurred by in-migration. If that is true, then, blessed by generally good weather, no typhoons and a large land area, it appears that Zamboanga City (like Davao) may be shaping up to be a migratory sink. This has fueled an upward spiral of consumption. Skyrocketing population growth should not be a given. Once again, there are workable solutions that do not involve rocket science.

Although volumes and numbers remain far below both Cagayan de Oro and Davao, cargo and passenger traffic to and from Zamboanga have grown exponentially. Like Cagayan de Oro, sea passage remains dominant as the mode of choice both for passengers and freight. For the city, dependence on seaborne options may constitute a vulnerability. Like the seaports of Cebu, Iloilo and Davao, Zamboanga City needs to evaluate whether its current port facilities are designed to remain operable despite sea level rise, and possible storm surge. If data shows that these facilities are at risk, then a pro-active retro-fit should be planned and funded without delay. For Zamboanga's economy, seaports are a key contributor that must be given the highest priority.

Much more growth is evident from the data covering housing units, school enrollment, energy consumption and motor vehicles. Growth can be a good thing. However, it must be managed and regulated. Zoning laws, real estate projects, as well as the positioning and specifications applied to new roads and infrastructure should take these risks into consideration. To the extent possible, geographical expansion and population centers should nudged away from rivers, and the sea.

Despite all this growth, LGU-registered establishments have remained stuck at 1990 levels, and the applications for new occupancy permits have actually declined. These statistics run

counter to the patterns of growth that we have seen in other rapidly growing cities. With so many growth indices shooting up, how can there be no new registrations, or applications for occupancy permits?

There is an apparent discrepancy in Zamboanga's foreign cargo data that bears closer examination. This assessment has used foreign cargo data from Cagayan de Oro as a point of comparison.

From 1990 to 2010, the number of ship calls in Cagayan de Oro rose from 7,382 to 14,868. Over that period, the metric tonnage of foreign cargo passing through Cagayan de Oro increased from 1,699,782 MT to 5,528,273 MT. This translates to an average tonnage of approximately 500 to 700 MT per ship.

During the same period, the number of ship calls at Zamboanga port rose from 5,598 to 7,662. Over that period, the metric tonnage of foreign cargo passing through Zamboanga was reported to have increased as well from 60,501 MT to 123,410 MT. However, this translates to an average tonnage of only 11 to 16 MT per ship. The data speaks for itself.

A closer analysis of Zamboanga's export performance reveals another area for concern. Zamboanga port serves as a consolidation point for goods coming from various points within the Region. In 2000, the city's major export products were processed fish (US$ 65M), fresh / frozen fish (US$ 90M) and coconut products (US$ 67M). Together they made up 81% of Zamboanga City whopping US$ 272M exports. All three have taken a steep dive. By 2011, export values of these three products were a shadow of their former selves: coconut products (US$ 17M), processed fish (US$ 1.2M) and fresh / frozen fish (US$ 166K). Coconut production, a long-time Zamboanga export, is up 128% from 93,994 MT (1990) to 213,113 MT (2010). Except for coconut - that staunchly holds its ground as one of the city's top three exports – the two other top export slots have been taken over by copper ore (US$ 69M) and seaweeds (US$ 9.8M). These three products delivered 87% of Zamboanga City's 2011 export record (US$ 147M). There appears to be a significant dissonance between the dollar values reported and the foreign cargo volumes on record.

Seeing that global demand for fresh, frozen and processed fish continues to grow, it is apparent that the issue here is fish supply from the entire Region. Is this the story of the goose that laid that golden egg? As a result of this, the city's export sector has been forced to undergo a major shift. It is certain that this was not a strategic plan. In 1st generation economies, where GDP growth remains coupled to natural resource use without much value added, effective governance – supplied by both the public and private sectors – is crucial.

Why have Zamboanga's fish exports declined so dramatically, when the Bureau of Agricultural Statistics continues to report increases in both commercial and municipal fisheries production? A more in-depth analysis of fisheries information, indicates that there has been a major change in fish catch composition. Yellow fin and skipjack tuna catch have shrank to relative unimportance, and the city's top five fish products are now dominated by smaller, lower trophic species such as sardines and scad.

A pattern such as this, where catch composition has shifted from high value to lower trophic species, can be an indication that the regional fishing fleets that have fueled Zamboanga City's past prominence in fish exports may have already fished-down the regional food web. This could explain the dramatic decrease of fish as an export leader for Zamboanga. Although both commercial and municipal fisheries topped their respective lists for the four cities, the BAS data reveals quite clearly that the types of fish being caught and sold now are very different from barely ten years ago. The markets for these fish are now primarily domestic.

This account tells the tale of another major shift in Zamboanga's socio-economic profile. Armed with a better understanding of Zamboanga's earlier experience with fish exports, should commercial fishing be allowed to operate in and around Zamboanga's region without more stringent regulation? This is a difficult challenge, and the solutions will involve several other local governments. But, it is also a management decision that needs to be made.

A climate-defined future will be a highly variable future. As a result, the economic patterns that define each city, will be rocked by increasing unpredictability. It is the creativity of the human mind that will find workable solutions. Zamboanga's low functional literacy score – the lowest of four cities assessed – badly needs a significant boost. Once again, this is a strategic imperative that begs for better management.

With agriculture now gaining more and more dominance over simple extraction, the city (like Laoag) appears to be better set up to boost local self-sufficiency and domestic food security. The worst is not over, and as population continues to grow, the city will face more pressures that will challenge its mettle. If the city's growth is to be managed and sustained in a better way, it will be important to learn the lessons from past extractive activity, i.e, fishing. These lessons should be applied to resource use, and future extractive activity, i.e. mining. Collectively, the people of Zamboanga have to accept the changing realities that will come with climate change and, together, make the sustainable management decisions that will move the city forward.

CITY ASSESSMENTS
2013 Phase

ANGELES CITY

CLIMATE / ENVIRONMENTAL EXPOSURE

Located just beyond the northern rim of Central Luzon's vast flood catchment, Angeles City is situated inland, far away from the sea. Although the city claims to be historically free from serious flooding, it is located well within a typhoon-affected Type 1 climate zone. Economic activity in and around any river basin is likely to be impacted by the intense storms and extreme rainfall spawned by a changing climate.

Angeles is a relatively young city. Back in 1944, at the end of the Pacific War, the US Army map service generated maps of major Philippine cities. Angeles, despite its proximity to Fort Stotsenberg in Pampanga, was not mapped. It is no surprise, therefore, that 50-year rainfall data was not available for Angeles City itself. More recent records indicate, however, that the city is already experiencing more rain than it is used to. Annual rainfall rose 46% in barely 13 years, from 1663mm in 1998 to 2437mm in 2011.

Angeles City enjoys an average elevation of 90 meters above sea level. It's location, in a relatively high portion of Luzon's Central Plain, is likely to limit its climate exposure to mainly three of the six impacts identified in the WWF climate study. These will include a likely increase in the frequency of extreme storms, intense rainfall / flooding in key access points and areas surrounding the city, and the impacts of El Nino on the city's water supply as well as on agriculture in the farm areas that surround it.

Over a 50-year period, Angeles has been hit by an average of 2 typhoons per year. More recently, however, heavy rainfall spawned by the intensification of the southwest monsoon, has given rise to sudden flooding along the Abacan River that flows through Pampanga, from Angeles to Mexico. These floods seriously marginalized access along a number of minor highways linking the major cities of Pampanga to neighboring provinces and towns. Families have had to be evacuated.

As rainfall intensifies further, Central Luzon's vast flood basin can expect much more water than it has handled in the past. Although the old city center may continue to enjoy relatively flood-free conditions, Angeles is a fast growing city. Unless planned and handled with increased foresight, it may grow into harms way. The main climate-related quandary of Angeles City's businesses will have to do with managing increasingly frequent economic disconnection.

SOCIO-ECONOMIC SENSITIVITY

Land Area 62.173 sq km
2010 Population 326,336
2010 Pop Density 5,249 / sq km
Highly Urbanized City, 1st Class

Population in Angeles City increased by 38% over 20 years, rising from 236,686 in 1990, to 326,336 in 2010. Population Density followed suit, growing from 3,807 / sq km to 5,249 / sq km. This record gets Angeles into our shortlist of cities assessed with very high population density, along with Baguio (5,668 / sq km) and Iloilo (5,432 / sq km). Of the four cities covered by this assessment, Angeles registered the highest population figures.

Population growth was only the impetus. Housing Units within the city followed, yielding a 35% increase from 54,059 in 2000 to 72791 in 2010, an average increase of 3.5% per year.

Angeles is a high-carbon transport hub. For Motor Vehicles, Angeles established a record of sorts. The number of registered vehicles increased 434% over 20 years, from 19,311 in 1991 to 85,475 in 2012. This translates to an average annual increase of 21.7% - the highest of all four cities assessed in this phase. For Angeles City, vehicle density stands at 1,375 vehicles / sq km. This outstrips Dagupan's earlier record of 1,340 vehicles / sq km. Clearly, Angelenos value personal mobility despite the daily grind of traffic. The city's proximity to the North Luzon Expressway, as well as its access to the extensive road network of the Clark Zone, may have something to do with this.

Over 7 years, air passenger traffic, passing through the Clark International Airport, grew by 466% from 232,313 in 2005 to 1,315,757 in 2012. Despite the fact that Clark is an economic zone, hosting a growing number of locators, this growth was not echoed for air cargo. Air cargo remained relatively lackluster, gliding from 56,212 kg in 2002 to 45,738 kg in 2010 – an 18% decrease.

Over the same 7-year period, LGU registered businesses mushroomed, yielding a 42% increase from 7,640 in 2005 to 10,839 in 2012. The city's foreign trade exports showed extremely robust growth, expanding by 1638% over 7 years, from US$ 210,686,476 in 2005 to US$ 3.6 Billion in 2012. Electronics has led this charge, delivering exports of US$53.5 Million in 2005 that grew to US$ 2.9 Billion by 2012.

There is a price to pay for increased economic activity. The city's energy consumption grew 286% from 163,757 mwh in 1990 to 469,130 mwh in 2012. Water consumption grew 390% from 3.1 Million cubic meters in 1995 to 12.1 Million cubic meters in 2012.

Food is a key element in the cultural milieu of Pampanga. Angeles City loves to eat. In this area, the trends are clear. The city is now outsourcing most of its protein. Although palay production grew 96%, from 516 mt in 2008 to 1,010 mt in 2012. Data from the city's slaughterhouses indicate that swine production dropped from 6,539 heads in 2007 to 1,555 heads in 2012. Cattle production dropped as well, from 949 heads in 2007 to 175 heads in 2012. Carabao production echoed the same trends, dropping from 674 heads in 2007 to barely 62 heads in 2012. Goat production dropped from 1132 heads to 472 heads in the same 7 years. Poultry production defied national trends, dropping from 33,500 heads in 2007 to barely 823 heads in 2012.

Data also reveals that the city may be growing less enamored with vegetables, root crops and sugar cane. Although gabi production (taro) logged a 65% increase, from 1,455 mt in 2008 to 2,398 mt in 2012, sweet potato production was relatively flat, yielding a shallow 12% growth from 1,311 mt in 2008 to 1,470 mt in 2012. This performance was echoed by sugar cane, increasing by only 1% from 42,770 mt in 2008 to 43,172 mt in 2012. And, cassava production dropped from 1,817 mt in 2008 to 1,694 mt in 2012. Are new businesses, new jobs and escalating land prices fueling the out-migration of agriculture?

There is an elephant in the room. Despite all this economic growth, the assessed value of taxable lands within Angeles City actually dropped by 2% from P6.4 Billion in 2007 to P6.3 Billion in 2011. The three other cities assessed in this phase have all delivered significant upward revaluation of taxable lands.

ADAPTIVE CAPACITY

A self-rating of 5.00 is a perfect score. The Angeles City government gave itself "excellent" ratings in 12 out of 20 criteria that make up the LGPM score sheet, or an average score of 4.81 for 2011.

Areas of Governance	Angeles City			
	2009	2010	2011	Difference (2011 and 2010)
Administrative Governance				
Local Legislation	4.09	4.09	5.00	0.91
Development Planning	4.73	4.91	4.91	-
Revenue Generation	4.00	4.00	4.00	-
Resource Allocation and Utilization	3.42	4.00	3.50	(0.50)
Customer Service - Civil Applications	5.00	5.00	5.00	-
Human Resources Management and Development	5.00	5.00	5.00	-
Economic Governance				
Support to Agriculture	4.05	4.95	5.00	0.05
Support to Fishery Services	N/R	N/R	N/R	N/R
Enterpreneurship, Business and Industry Promotion	4.50	4.33	5.00	0.67
Social Governance				
Health Services	4.87	4.90	5.00	0.10
Support to Education Services	4.90	5.00	5.00	-
Support to Housing and Basic Facilities	5.00	5.00	5.00	-
Peace, Security and Disaster Risk Management	4.67	4.80	5.00	0.20
Environmental Governance				
Forest Ecosystem Management	N/R	N/R	N/R	N/R
Freshwater Ecosystems Management	5.00	5.00	5.00	-
Coastal and Marine Ecosystems Management	N/R	N/R	N/R	N/R
Urban Ecosystems Management	4.50	4.50	4.63	0.13
Valuing Fundamentals of Governance				
Participation	5.00	5.00	5.00	-
Transparency	5.00	5.00	5.00	-
Financial Accountability	4.59	4.67	4.83	0.16

From 1990 to 2008, the metric used for monitoring city crime was “Crime Solution Efficiency”. In 2009, this was replaced by another metric called “Crime Clearance Efficiency”. Some cities have both figures. Others have only one figure available.

For Crime Clearance Efficiency, Angeles City delivered an improving score, rising from 12.25% in 2009 to 22.86% in 2012.

Over the last few years, the people of Angeles City have built a formidable reserve of both financial and human capital. Throughout Region 3, average annual family savings rose from P14,299 in 1991 to P32,000 in 2009. The employment rate remained high, increasing from 90.3% in 1996 to 90.7% in 2012. Over 9 years, city savings doubled from P84,283,039 in 2003 to P160,239,699 in 2011. By 2011, city savings per capita stood at P480.

Over 5 years, the number of bank branches grew from 66 in 2007 to 87 in 2012. The number of bank accounts followed that growth trend, increasing 49% from 240,202 in 2007 to 357,240 in 2012. During that same period, deposit values grew by 51%, from P26.3 Billion to P39.7 Billion. Over a ten-year period, regional bank deposits boomed by 152%, rising from P106.9 Billion in 2001 to P269.5 Billion in 2011. The regional loans portfolio for that same period doubled, from P35.7 Billion in 2001 to P71.8 Billion in 2011.

Functional literacy, which sat at 87.3% in 1994, rose to 92.1% by 2008. For the province of Pampanga, Human Development Index scores remained relatively flat, inching down from 0.66 in 1997, to 0.65 in 2009. For HDI, Pampanga comes a close second to Batangas in this four-city assessment.

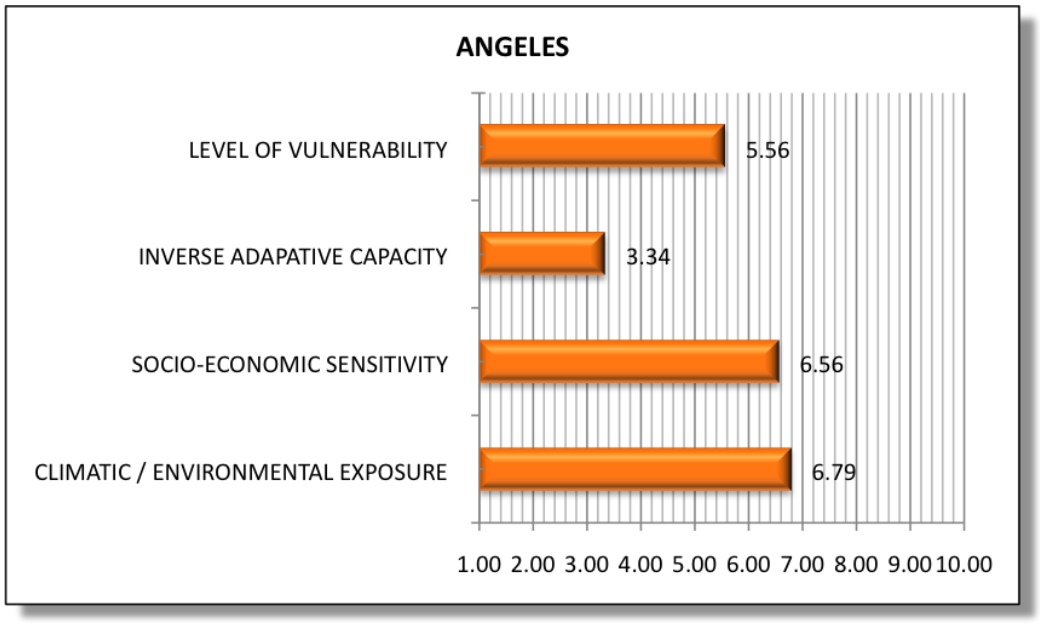
SCENARIO BUILDING WORKSHOP
List of Development Drivers

Primary Drivers	**Governance** **Values**
Secondary Drivers	**Environment** **Infrastructure** **Clark as Growth Center** **Human Resources** **Geopolitics** **Population and Migration** **Tourism** **Competitiveness**
Distinctive Scenario Descriptors	From Triumph to Tragedy Angeles: The City of Your Dreams Abe Abe Agyu Tamu Paradise Lost

Scenarios Developed

Negative Governance / Positive Values
Positive Governance / Positive Values
Negative Governance / Negative Values
Positive Governance / Negative Values

The narratives containing a summary of scenarios developed by Angeles stakeholders are provided as an annex.



ASSESSMENT & INTEGRATION

Through its relatively short history, Angeles City's growth has always been linked to a "parent" that served it as a "generator" of economic activity. Parents, it is said, give their offspring two things (a) an anchor that provides both comfort and a firm foundation, and (b) the wings to fly. In a manner of speaking, the young city built its foundations, as it drew from and grew from the resources and energies of a better-endowed patron.

Angeles City was a "child" of San Fernando. From these humble beginnings as a barrio of a traditional and much older Pampanga town, Angeles City's development directions shifted, in the post-Pacific War period, with the rapid development of the American military camp, Fort Stotsenberg. This facility was later to become Clark Air Base. Serving as a major staging point for American forces in the Vietnam War, Clark was a hubbub of activity. For Angeles City, these were heady and challenging times. After the withdrawal of US bases from the Philippines, in the post-Pinatubo period, Clark went through a period of re-invention. It was recycled from a military base, into an economic zone. Angeles followed suit.

Today, Angeles City is, undoubtedly, a key player in the effort to draw in new investment into Region 3. Together with the towns of Mabalacat and Porac, Angeles City co-hosts the Clark Economic Zone as well as its growing international airport – the closest alternative gateway to Metro Manila. Serving Metro-Manila and other parts of Luzon through the North Luzon Expressway, Angeles City's main climate exposure appears to be the likelihood of disrupted access due to increased flooding along this major regional artery.

In the light of Angeles City's very high population density, it is likely that new developments, whether commercial or residential, will increasingly migrate to surrounding towns or cities. Inter-city access is likely to be vulnerable, therefore, to the impacts of extreme weather events. The Subic-Clark-Tarlac Expressway, for example, feeds into NLEX at the Angeles / Clark junction. Although it appeared to have been designed for all-weather use, the experience of the last two or three years shows that certain portions of this route are not climate ready. What goes for the goose, goes for the gander. It seems apparent that Angeles City's continued viability will be significantly linked to efforts aimed at highway upgrades as well as a series of flood management interventions that seek to eliminate disruptions of movement along this vital trade corridor.

When one speaks of Clark, one must speak of its airport. This air base was designed to handle very large, heavily laden B52 bombers of the Vietnam era. It is Luzon's largest air facility – area-wise, close to four times larger than Manila's airport. In fact, the airstrips here are so

extensive that Clark was reportedly an alternative airstrip for the NASA Space Shuttle. The Clark facility spans over 2400 hectares and boasts an impressive expansion potential, ranging in the thousands of additional hectares. In comparison, the aging Manila airport covers a scant 600 hectares, and it cannot expand further. It already suffers from a negative profile, as well as serious congestion. For air passengers, this is a safety concern. This will also define the shape and scope of our national future.

Clark Airport can provide the millions of air passengers a fresh alternative that can be in step with current and future Asian standards. As an economic zone, designed to fuel and facilitate exports, Clark makes much less sense, if its airport is not strategically upgraded to meet its full potential – both for cargo and for passengers. One way or the other, we must move forward. The primary issue here is national competitiveness.

It is said that history repeats itself. Once, Angeles City's fortunes were intimately linked to a single economic generator – the vast American military complex. Many valuable lessons were learned from that experience. We all know that, if it is our goal to fuel inclusive and sustainable growth, economic "mono-cropping" may not be a wise idea. Strategically, it is always more prudent to create a healthy product mix that draws from the activity of multiple supply chains.

What is happening today? The rapid growth spike in the export business generated by Clark, is attributed, by and large, to a single large electronics manufacturer. Clark needs to alter this situation pro-actively, and more strategically. Otherwise, its dependence on a single major player may emerge as a potential vulnerability for the economic zone as a whole.

There is another cunundrum here that bears consideration. The dramatic increase in Angeles City exports is not reflected in the air cargo data for the same period. From where are these export goods shipped? Apparently, it is common practice for a number of Clark locators to outsource their air cargo needs to agents. If these shipments are made out of Manila, rather than Clark, what happens in extreme rainfall events, when the North Luzon Expressway floods? By passing on this responsibility, aren't Clark and Angeles relinquishing effective control of their supply chains, thereby allowing economic leakage? Seeing that many air cargo shipments are routed via Manila, rather than Clark, and that Angeles City has, apparently, chosen to outsource much of its current protein requirements as well, the importance of constant connectivity goes beyond mere business operations. In an extreme weather event, the issue here could be food security.

Looking back at the relationship this city maintained with the American military complex in years past, the growth triangle of Angeles, Porac and Mabalacat now face a compelling development challenge. If this

area is to be truly prepared for a climate defined future, they need to work more closely and more pro-actively with the Economic Zone. Beyond political mandates, it is their joint opportunity (a) to take the lead on development momentum, (b) to take steps that increase the velocity of money within the Triangle, (c) enhance internal connectivity through wise governance and enlightened urban planning, (d) build all-weather resilience by promoting investment in improved regional access, and (e) ride on the differential advantages offered by Pampanga. The child of San Fernando has come of age. It is time to spread its wings and fly.

BATANGAS

CLIMATE / ENVIRONMENTAL EXPOSURE

Batangas City sits at the coastal edge of a gently sloped and rolling landscape extending from the uplands of Lipa City down to Batangas Bay. With more than 73% of the city's land area located on slopes less than 15%, geo-hazard maps indicate low susceptibility to both floods and landslides. Although it is located within Luzon – an island that suffers from most typhoons moving westward from the Pacific to the West Philippine Sea – Batangas City's western orientation generally protects it from the worst effects of tropical cyclones. The cities and towns of Batangas Bay straddle Type 1 and Type 3 climate zones.

50-year rainfall data shows average annual rainfall at 1834mm, with significant inter-annual variability. This is lower than the national average rainfall of 2400mm per year. For purposes of comparison, more recent records show average annual rainfall rising 23% from 1678mm in 1998 to 2064mm in 2011. Batangas City registered the lowest annual average rainfall of the four cities evaluated in this phase.

Although the city's geo-hazard maps indicate low susceptibility to both landslides and floods, occasional flooding has been reported along the banks of the Calumpang River – specifically, in portions of Pallocan West, Barangay 4, Simlong, Malitam, Wawa, Cuta and Kumintang Ibaba. The southwest monsoon is increasingly cited as the source of heavy rainfall and flooding, especially along the country's western coastlines. Batangas City faces west.

Over a 50-year period, Batangas has been hit by an average of 2 typhoons per year. Although most storms have, historically, moved in from the Pacific, in the east, an increasing number of cyclones now enter the Philippine Area of Responsibility from the West Philippine Sea, in the west. The coastline of Batangas sits in a generally western orientation.

It is likely that sea level rise, storm surge, heightened sea surface temperatures and ocean acidification will impact the viability of the city's port and the productivity of the industrial and fishing activity along the province's coastline.

SOCIO-ECONOMIC SENSITIVITY

Land Area 285.414 sq km
2010 Population 305,607
2010 Pop Density 1,071 / sq km
Component City, 1st Class

Of the four cities assessed in this phase, Batangas City logged in with the highest population growth rate. Over 20 years, the city's population increased 65% from 184,970 in 1990 to 305,607 in 2010. In comparison, the population of Davao's grew by 81%, Baguio's grew by 79%, while Angeles grew by 38%, over the same period. Strangely, school enrollment rose by only 23%. In 2011, Batangas City's student population was recorded at 99,394.

In a manner similar to Angeles, the number of registered vehicles in Batangas increased by 401% over 20 years, from 13,800 in 1991 to 69,090 in 2012. This translates to an average annual increase of 20%. Since this city enjoys a much larger land area than Angeles, its current vehicle density sits at only 242 / sq km.

The number of LGU registered businesses in Batangas increased by 51%, from 2,013 in 1990 to 3,023 in 2010. Of the four cities assessed here, this represents the lowest number of businesses registered. Naga reports twice this number. Angeles City's figure is three times higher.

Like Angeles, Batangas City is a transport hub. Its strength lies in ship-borne passengers and cargo. The number of ship calls logged over the same period grew only by 14%, from 22,341 in 2000 to 25,548 in 2012. For this same period, however, the number of sea-based passengers that passed through Batangas rose 68% from 2,875,241 to 4,839,312. This market is made up overwhelmingly by domestic, inter-island passengers.

These same trends do not seem to hold true for cargo. Domestic cargo, as recorded by the Philippine Ports Authority in Batangas, dropped by 35% from 836,586 mt in 2000, to 564,565 mt in 2012. The trends reported at Batangas port for passengers versus cargo are too disparate to ignore, much less dismiss.

Foreign cargo, recorded by the same source, remained relatively stagnant, from 256,150 mt in 2000 to 276,032 mt in 2012. It was explained to us that foreign cargo handled by the growing number of private facilities, are not recorded by the PPA.

Agricultural data for Batangas City is the exact opposite of what was reported for Angeles. Cereal production is down, with corn output dropping from 1,496 mt in 1995 to 1,216 mt in 2012. Protein production, on the other hand, is up. Over 15 years, swine production has increased by 97%, rising from 72,751 heads in 1995 to 143,629 heads in 2010. The growth of cattle production, though less dramatic, remained positive, growing 9%, from 9,962 heads in 1995 to 10,898 heads in 2010. Goat production expanded by 73%, from 8,080 heads in 1995 to 15,923 heads in 2010. Carabao production grew by 175%, increasing from 259 to 712 heads, over the same period. Poultry production took the top rung on the ladder, delivering 299% growth, from 111,080 heads in 1995, to 443,350 heads in 2010.

The number of real property units (parcels of land) within Batangas City increased by 36% from 75,210 in 2000 to 102,020 in 2012. This is an

indication of healthy interest in real estate transactions. Parallel to this, the assessed value of taxable lands grew 53%, from P1,064,480,470 in 2000 to P1,625,725,162 in 2011.

Despite this, plus the fact that a growing expat and OFW market has reportedly generated a positive effect on real estate demand in Batangas, the city reported the lowest assessed value of taxable lands among the four cities covered in this phase. Tacloban's value was in the P5 Billion range, Angeles was in the P6 Billion range and Naga was the highest of all, in the P46 Billion range.

Energy consumption increased 242%, rising from 64,088 mwh in 1995 to 219,549 mwh in 2012. All things considered, it is curious, therefore, to see building construction permits drop by 20%, from 684 in 1995 to 546 in 2010.

ADAPTIVE CAPACITY

A self-rating of 5.00 is a perfect score. The Batangas City government gave itself "excellent" ratings in 4 out of 20 criteria that make up the LGPM score sheet, or an average score of 4.38 for 2011.

Areas of Governance	Batangas City			
	2009	2010	2011	Difference (2011 and 2010)
Administrative Governance				
Local Legislation	3.61	4.89	4.89	-
Development Planning	4.95	4.91	4.91	-
Revenue Generation	4.33	4.19	4.33	0.14
Resource Allocation and Utilization	4.83	4.58	4.56	(0.02)
Customer Service - Civil Applications	4.50	4.75	4.00	(0.75)
Human Resources Management and Development	5.00	5.00	5.00	-
Economic Governance				
Support to Agriculture	4.10	4.19	4.81	0.62
Support to Fishery Services	4.25	2.44	3.63	1.19
Enterpreneurship, Business and Industry Promotion	4.08	4.08	2.81	(1.27)
Social Governance				
Health Services	4.84	4.44	4.52	0.08
Support to Education Services	5.00	4.40	4.20	(0.20)
Support to Housing and Basic Facilities	3.00	5.00	2.20	(2.80)
Peace, Security and Disaster Risk Management	4.35	4.17	4.50	0.33
Environmental Governance				
Forest Ecosystem Management				
Freshwater Ecosystems Management	5.00	4.67		(4.67)
Coastal and Marine Ecosystems Management	5.00	5.00	4.67	(0.33)
Urban Ecosystems Management	4.40	4.28	4.78	0.50
Valuing Fundamentals of Governance				-
Participation	4.33	4.00	5.00	1.00
Transparency	5.00	5.00	5.00	-
Financial Accountability	4.50	4.50	5.00	0.50

From 1990 to 2008, the metric used for monitoring city crime was "Crime Solution Efficiency". In 2009, this was replaced by another metric called

“Crime Clearance Efficiency”. Some cities have both figures. Others have only one figure available.

For Crime Clearance Efficiency, Batangas City maintained its score, improving slightly from 22.27% in 2009 to 22.86% in 2012.

Like Angeles, Batangas appears to have made good use of the economic whirlwind it finds itself in, and has moved to shore its flanks. Average family savings for Region 4A has climbed 155%, rising from P14,142 in 1991 to P36,000 in 2009. This is the highest growth reported in four cities assessed. The employment rate, though slipping slightly from 1996, remained at a high 90.8% in 2012. This is the highest figure registered for this assessment.

City savings improved by 21%, increasing from P341,548,970 in 2002 to P412,962,008 in 2011. On a per capita basis, this translates to a current savings of P853.67 per city resident. Over the last five years, the number of bank branches has risen slightly, from 45 to 47. The number of bank accounts increased by 46% over the same period, increasing from 185,038 to 270,674. Within the city, the aggregate value of bank deposits has also leaped, in that same time, from P14.9 Billion to P23.5 Billion.

From 2001 to 2011, regional deposits have risen 59%, from P151.152 Billion in 2001 to P366.909 Billion in 2011. Regional loans have also increased by 69%, from P42.050 Billion in 2001 to P70.525 Billion in 2011.

Functional literacy within Batangas province rose from 88% in 1994 to a chart-topping 93.5% in 2008. In comparison, Region 1 delivered a functional literacy score of 91.3% and Cebu’s figure stood at 86.6%. The province also registered .0657 as its Human Development Index score. Both figures represent the highest scores for the four cities assessed in this phase.

SCENARIO BUILDING WORKSHOP

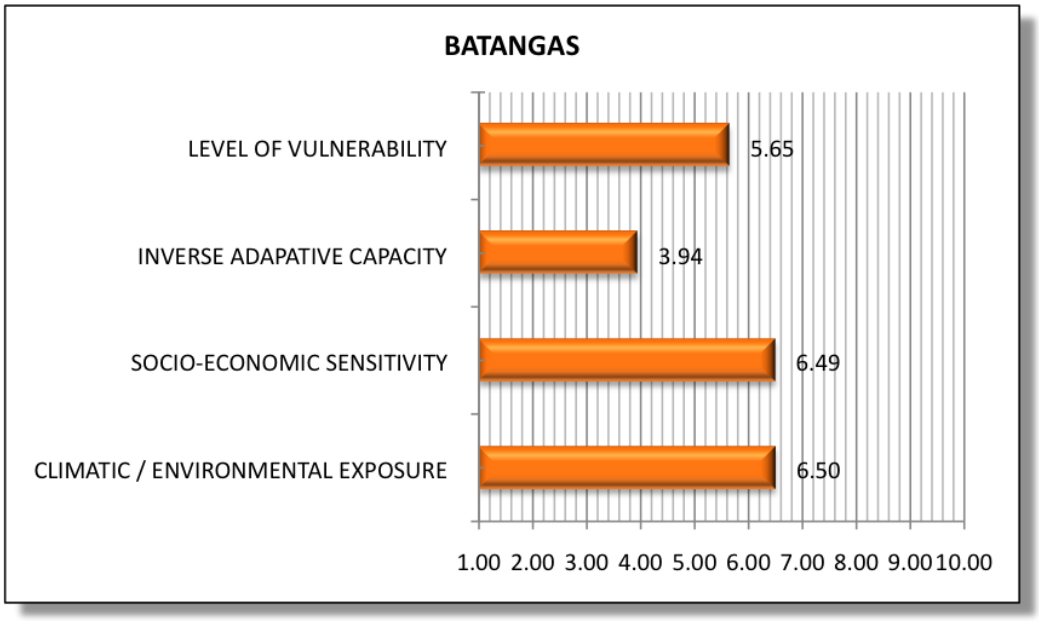
List of Development Drivers

Primary Drivers	**Governance** **Environment**
Secondary Drivers	**Values** **Human Resources** **Economic** **Location** **Peace and Order** **Preparedness**
Distinctive Scenario Descriptors	Batangas, The Place To Be Sin City Batangas City Highlands Untitled Story

Scenarios Developed

Positive Environment / Negative Governance
Positive Environment / Positive Governance
Negative Environment / Negative Governance
Negative Environment / Positive Governance

The narratives containing a summary of scenarios developed by Batangas stakeholders are provided as an annex.



ASSESSMENT & INTEGRATION

Batanguenos have always been known for their fierce, independent spirit. Akin to the singing flash of its balisong blade, and the deep grunt of barako coffee, the city and people of Batangas are in a class all their own. They simply shine.

Batangas City might be described as a key development "magnet" within the CALABARZON area. This is the only Philippine region that has, in terms of population, surpassed Metro-Manila. This tremendous human potential comes with the highest functional literacy scores logged, among the 12 provinces that have been studied so far. For the human development index, relative to the other provinces covered, the province of Batangas has also scored rather well. Human capital is, without doubt, a Batangas plus.

Historically, Batangas City's location is a plus as well. Located at the seaward end of the gently sloped and sprawling Lipa-to-Batangas

corridor, this city seems to have many things going for it. In comparison to some other Philippine coastal cities, Batangas has been relatively sheltered from extreme weather. With an increasing number of storms and tropical depressions coming in from the west, Batangas may soon find itself at the receiving end of extreme weather. Re-engineering of key facilities may prove to be worthwhile.

A United Nations study points out that forced migration will emerge as one of the main impacts of climate change. This is fueled by the movement of populations away from areas of high risk, toward areas perceived to be zones of refuge. Picking up from the lessons learned in Davao and Zamboanga, the combination of comparatively benign weather and available land creates migratory sinks. This will add further to population pressure. Batangas City, and its surrounding towns, appear to fit this profile. Philippine population growth forecasts, for the next three decades or more, corroborate that CALABARZON will continue to hold the distinction as the Philippine region with the highest population.

Next to Manila, Batangas City hosts the second largest seaport in Luzon. It is also home to a growing number of major industrial facilities. This translates to more jobs and, therefore, even more migrants. For the city, these developments can be both strengths and weaknesses. The assessed value of taxable lands within the city has fallen pitifully behind the three other cities assessed in this phase. As migration accelerates, Batangas City needs to step up to the plate soon. Otherwise, it may forego this rare opportunity to allow its longtime residents the benefit of meaningful capital gains, and a better funded city. As Naga City has proven, the assessment of correct land values can be a sweetener, if managed properly.

As the marine gateway to CALABARZON that feeds into Metro-Manila, Batangas now hosts a growing expatriate presence drawn in by new construction and industrial activity along the bayshore. It serves as a major entry point for a range of essential imports such as oil, gas and automobiles. The seaport of Batangas is also the transit point for inter-island RORO vessels serving the nearby provinces of Mindoro, Romblon and, to a lesser extent, Marinduque and Antique.

The city's economic roles and opportunities are evident and crucial. Angeles and Batangas serve a shared responsibility. They are the alternative transport hubs closest to Manila – one for air, and the other for sea. And, in a climate-beleaguered future, redundancy is everything. Every major driver will require a backup option. With sea level rise and increasing incidences of storm surge, will this bay and its seaport remain viable without significant retrofitting? Terminals and transit points remain attractive only if they facilitate the safe and cost-effective management of passengers and cargo. They also have to be managed properly.

For example, it is incongruous, to say the least, that the volume of sea passengers at the Batangas seaport has soared 68%, while cargo volumes have dropped precipitously. Seeing that inter-island RORO operators claim that the bulk of their business comes from cargo, how could they have possibly remained in the black all these years? If the Batangas seaport is to overcome the apparent lack of utility that manifests itself today, and if it is to position this facility to become climate ready, basics such as accurate data have to be maintained. You cannot manage what you do not measure.

Serving Metro-Manila and various other parts of Luzon through the Star Tollway and the South Luzon Expressway, Batangas City's other climate vulnerability will stem from the increased flooding that seems to be hampering access through this major highway during periods of heavy rainfall. Like Angeles in the north, Batangas City's competitiveness as a location and transit point will be intimately linked to the continuing efforts to upgrade and maintain these vital land arteries as flood-free, all-weather corridors. Economic umbilicals create value for the city, only if they remain functional.

Aside from looking inward, Batangas needs to look outward. Bound on the west by the Verde Island Passage, Batangas City's future will be intimately linked to the condition of its seas. This will determine its continued viability as the primary seaport servicing the provinces of Romblon, Mindoro, Marinduque and Antique. At some point, frequent non-delivery can lead to diminished desirability. Before new options emerge, Batangas City should review and re-engineer its primary zones of vulnerability and pro-actively reconfigure itself to deal with all six climate impacts identified in the WWF study.

The people of Batangas have overcome revolutions, pests and wars, coming out stronger and better each time. Their hearts of fire, nurtured by the land and seas that have been so rich and giving, have always shown them the way forward. Yes, climate change will certainly test the mettle of this city. Seeing the host of advantages lying before Batangas City today, who can doubt that this city, and its province will find the resolve and gumption to face all this, and once again, come into flower?

NAGA

CLIMATE / ENVIRONMENTAL EXPOSURE

Naga City is sandwiched between two natural systems that influence its hydrologic cycle - Mount Isarog, to the east, and Southern Luzon's major flood zone, the Bicol River Basin, to the west. Historically, this southernmost section of Luzon, situated within a Type 2 climate zone, is visited by several typhoons a year.

Over a 50-year period, it has been hit by an average of 2.7 typhoons per year. In this third set of city assessments, Naga City appears to have the highest exposure to tropical cyclones. 50-year rainfall data shows average annual rainfall at 2306mm, with significant inter-annual variability. For purposes of comparison, more recent records show average annual rainfall rising only 11% from 1480mm in 1998 to 1653mm in 2011 - the lowest figures of the four cities evaluated in this phase.

Location-wise, Naga City enjoys less of an advantage. The city's proximity to the Bicol River Basin is a reason for concern and improved planning. Geo-hazard maps point out a high susceptibility to flooding. Historical information confirms that Naga's geographical situation has already exposed the city to extended periods of flood-induced isolation.

SOCIO-ECONOMIC SENSITIVITY

Land Area 84.480 sq km
2010 Population 174,931
2010 Pop Density 2,071 / sq km
Independent Component City, 1st Class

Over 20 years, Naga City's population increased by 52%, from 115,329 in 1990 to 174,931 in 2010. Population density stood at 2,071 / sq km in 2010.

In parallel with this, the city registered a 60% increase in housing units, from 19,592 in 1990 to 31,436 in 2007. School enrollment outpaced both population and housing growth, soaring 71%, from 41,904 students in 1992 to 71,521 students in 2011. This is partially due to the fact that the number of schools within Naga grew by 70%, from 89 schools in 1990 to 151 schools in 2011. In contrast, Batangas enrollment increased by 23%, while its population grew by 65%.

For Naga City, agricultural trends appear to be a mixed bag. Palay production dropped 35% from 9,163 mt in 1995 to 5,975 mt in 2012. At the same time,

corn production rose 489%, from 960 mt in 1995 to 5,654 mt in 2012. The local spike in poultry production can probably explain this shift in crop preference. Chickens need feed. Commercial poultry output generated a 1856% increase, from 66,729 heads in 1995, to 1,305,703 heads in 2011. For purposes of comparison, swine production trends remain tentative, sliding down slightly from 29,863 heads in 1998 to 25,561 heads in 2011.

With tourism taking center stage, both the highway and the airport have made positive contributions to Naga City's growth. Tourist arrivals soared by 1731%, leaping from 136,038 in 2004 to 2,491,591 in 2012. Air passenger traffic grew 102% from 104,328 in 1997 to 210,536 in 2011. Tourist facilities share part of that credit. The city's hotels increased by 1844% from barely 9 in 1990 to 175 in 2011. Over the same period, the number of hotel rooms increased from 312 to 3,199. With a robust promotional effort, coupled with improved connectivity, hotel occupancy rates jumped 127% from 32% in 1990 to 73% in 2011. Energy consumption climbed 273% from 53,219 mwh in 1991 to 198,525 in 2012. Water consumption has also increased by 73%, from 8,691,744 cubic meters in 1995 to 15,039,946 cubic meters in 2012.

Although the assessed value of taxable lands rose by 228% in 4 years, from 14.1 Billion in 2007 to P46.3 Billion in 2011, this has proven to be a sweetener, rather than a disincentive. Riding this wave of new development, the number of LGU registered businesses increased by 163%, from 2,426 in 1990 to 6,379 in 2012. New building construction permits increased 185%, from 450 in 1990 to 1,282 in 2012. Building occupancy permits rose by 394%, from 195 in 1990 to 964 in 2012. Despite the dramatic increase in assessed values, the number of land parcels has only increased by 14%, from 56,890 in 2007, to 65,083 in 2011.

Road, rather than air or rail, appears to have emerged as the transport option of choice. The number of registered motor vehicles increased 326% over 20 years, from 9,473 in 1991 to 40,337 in 2012. This translates to an average annual increase of 16.3%, and a current density of 477 vehicles per square kilometer. In contrast, air cargo dropped by a dramatic 65%, falling from 1.1 Million kg in 1997 to 386,406 kg in 2011. Over 4 years, the revenues from rail-borne trade dropped by 68%, from P58.7 Million in 2002 to P18.86 Million in 2006. Local residents explained this by pointing out that land travel has proven to be more reliable. Local weather conditions are often blamed for flight cancellations. And, the recently revived railway has had more than its fair share of teething problems. The city's connectivity needs further improvement.

ADAPTIVE CAPACITY

A self-rating of 5.00 is a perfect score. The Naga City government gave itself "excellent" ratings in 15 out of 20 criteria that make up the LGPM score sheet, or an average score of 4.93 for 2011.

Areas of Governance	Naga City			
	2009	2010	2011	Difference (2010 and 2009)
Administrative Governance				
Local Legislation	4.45	4.45	4.67	0.22
Development Planning	5.00	5.00	5.00	-
Revenue Generation	5.00	4.67	5.00	0.33
Resource Allocation and Utilization	4.00	3.00	5.00	2.00
Customer Service - Civil Applications	5.00	5.00	5.00	-
Human Resources Management and Development	5.00	5.00	5.00	-
Economic Governance				
Support to Agriculture	5.00	5.00	5.00	-
Support to Fishery Services	-	-	-	-
Enterpreneurship, Business and Industry Promotion	4.00	3.75	5.00	1.25
Social Governance				
Health Services	5.00	5.00	5.00	-
Support to Education Services	5.00	5.00	5.00	-
Support to Housing and Basic Facilities	5.00	5.00	5.00	-
Peace, Security and Disaster Risk Management	5.00	5.00	5.00	-
Environmental Governance				
Forest Ecosystem Management	5.00	5.00	5.00	-
Freshwater Ecosystems Management	5.00	5.00	5.00	-
Coastal and Marine Ecosystems Management	-	-	-	-
Urban Ecosystems Management	4.13	3.88	4.25	0.37
Valuing Fundamentals of Governance				
Participation	5.00	5.00	5.00	-
Transparency	5.00	5.00	5.00	-
Financial Accountability	4.67	4.83	4.83	-

From 1990 to 2008, the metric used for monitoring city crime was “Crime Solution Efficiency”. In 2009, this was replaced by another metric called “Crime Clearance Efficiency”. Some cities have both figures. Others have only one figure available.

For Crime Clearance Efficiency, Naga City took the top slot delivering an impressive score, rising from 30% in 2010 to 63% in 2011.

For Naga City, these robust economic shifts have paid dividends. Regionally, the average family savings values have climbed 44%, from P9,362 in 1994 to P16,789 in 2000. City savings have increased 150%, from P62,425,392 in 2003 to P156,182,861 in 2012. City savings per capita logged in at P1,141 per city resident. This figure represents the highest savings per capita of the four cities covered.

From 2007 to 2012, the number of bank branches in the city has increased from 44 to 48. Bank accounts have increased 37%, from 144,430 to 197,671. Aggregate deposit values within the city have also grown by 48%, from P11.595 Billion to P17.194 Billion.

From 2001 to 2011, Regional deposit values have grown 171%, from P23.26 Billion to P63.054 Billion. In parallel, the regional loans portfolio has risen 109%, from P10.337 Billion to P21.723 Billion.

There are two provincial indicators of development that do not reflect the apparently positive results reported above for Naga City. Despite the city’s investment in new schools, functional literacy for the Bicol Region seems to have slipped, from 81.25% in 1994 down to 79.9% in 2008. This bears closer scrutiny. Furthermore, despite the evident “beat of the drum” that fills Naga

today, the province's Human Development Index, sitting at a fair-to-middling 0.572 in 1997, dropped to 0.511 in 2008. If Naga City's achievements and prospects are to be shared with the rest of Camarines Sur & the Bicol Region, economic disjoints need to be managed. Clearly, more work remains to be done.

SCENARIO BUILDING WORKSHOP

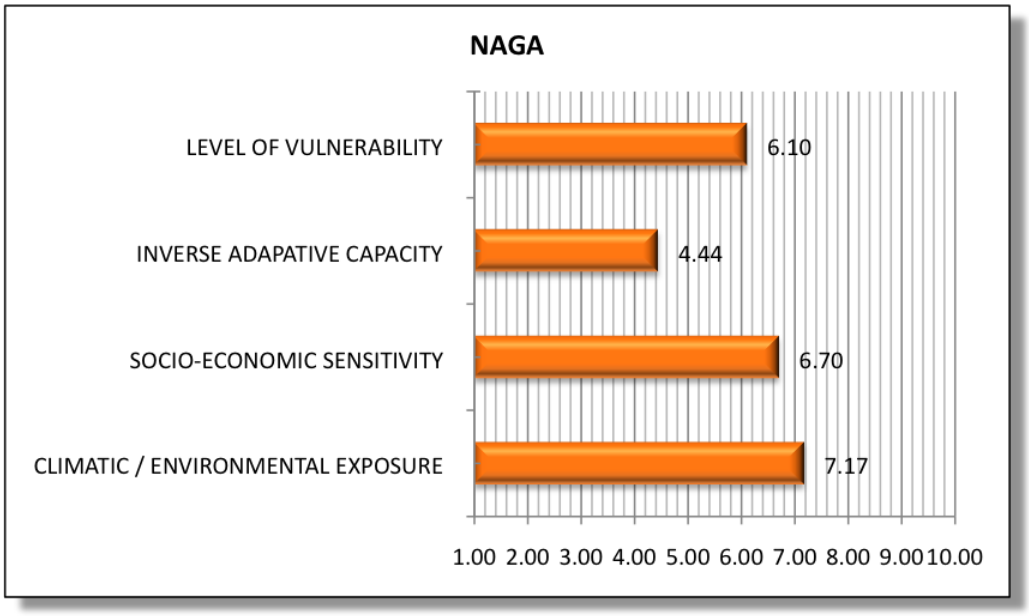
List of Development Drivers

Primary Drivers	**Environment** **Economic Growth**
Secondary Drivers	**Governance** **Urban Planning** **Enabling Business Environment** **Social / Societal Culture** **Human Resources** **Academic Center** **Technological Adaptation** **Institutions** **Civic Mindedness** **In-Migration**
Distinctive Scenario Descriptors	Naga Smiling to the World Mayor John B Resurrects (The World Smiles at John) When Good Economy is Bad…. Towards a Waterworld Salvar Salog (Save the River)

Scenarios Developed

Positive Environment / Positive Economic Growth
Positive Environment / Negative Economic Growth
Negative Environment / Negative Economic Growth
Negative Environment / Negative Economic Growth

The narratives containing a summary of scenarios developed by Naga stakeholders are provided as an annex.



ASSESSMENT & INTEGRATION

Naga City is a pathfinder. Through the last century or more, the people of Naga have played a defining role in establishing paths that opened many new windows to the beating heart of Luzon's Bicol Region.

As a widely acknowledged and highly regarded center for religious pilgrimage, Naga City defined the Bicolano's path to spirituality. Through numerous decades, its stewardship of the Penafrancia devotion, gifted the Bicol Region with a lingering spiritual beacon that draws thousands of Bicolanos, and many more other Filipinos, to return to the way of truth. To this day, millions of religious pilgrims flock to Naga City each year to pay homage to the miraculous image of their mother, Ina, the Virgin of Penafrancia.

As a center of development in a young and growing nation, the city and its people encouraged the creation of conditions that nurtured the quest for learning. This is a groundbreaking city, a city of schools and new thinking. By opening this path to knowledge, Naga has since established itself as the premiere hub for education and academic pursuits in the Bicol Region.

In more recent times, Naga City sired a pioneering Bicolano of note, in the person of Jessie Robredo. Through his years of leadership and personal action, Naga City gained widespread attention as the guiding spirit for good governance, thereby clearing the path toward greater accountability and public service.

As Naga learns how to deal with a climate-defined future, the task of beating new paths, and keeping them viable through innovation and mainstreaming, remains more important than ever. The city should

prepare to deal with at least four of the six climate impacts identified in the WWF study.

Naga City is, effectively, the northern gatekeeper of the Bicol Region. The city straddles the single major land route from Manila. Access and transport data confirm that road travel remains the preferred option for the millions who pass through this city each year.

Unfortunately, this national highway passes right through flood prone sections of the Bicol River Basin. Naga City is bound in the north and south by the flood-prone towns of Milaor and Nabua. In fact, Milaor was formerly called "Milaud" or "may-laud". "Laud" refers to a low-lying area, prone to floods. In an extreme flood, Naga City would become an island. This has happened before.

For decades, both the Public Works and Agriculture departments have grappled with ways to stabilize the management of this major flood catchment. Despite extensive plans and expensive infrastructure, flooding persists. With the intense rainfall that is likely to accompany climate change, water volumes may only increase. To keep the city (and the rest of the Bicol Region) humming, this single, national highway must remain open in all weather. Improved road design and more effective drainage should be set in place. Alternative routes should also be considered.

Within Naga City proper, there is another flood vulnerability that begs for more attention. The city sits at a confluence of rivers. Naga's old business district sits just barely above sea level, well within the catchment area of the Bicol River Basin. The Naga and Bicol rivers, are natural avenues for floodwater, and have been known to overflow. This has, reportedly, become more frequent. The situation is aggravated by conditions that plague many downstream urban areas such as unmanaged siltation and solid waste. It is not unique to Naga, but solutions cannot be allowed to bog down.

Naga, like all portions of the Philippines, should expect changes in the quality, quantity and timing of water, rainfall and floods. There is no doubt that Mount Isarog's watersheds demand better management. The rapidly changing profile of water supply and demand within the city confirms that water recharge rates need improvement. This is not enough, however. More than simply planting trees that could take a decade to grow, it is clear that parallel consideration should be given to engineered interventions that focus on harvesting rain, while better managing and utilizing surface water. These enhancements in the uplands and mid-catchment areas should link up with work to further improve water management in the lower catchments of the Bicol River Basin. This is an ecosystem. It should be managed as a single unit.

For water, single source dependence is not a good idea. The excessive extraction of groundwater, within the city, has reportedly altered the profile of water supply. In the Philippines, groundwater extraction has

been confirmed as a leading cause of land subsidence. In a flood zone, this only makes matters worse. Groundwater use should be stringently regulated, especially within the known flood prone areas of the city. Land subsidence is irreversible.

Naga City's high population density coupled with high average annual rainfall and high susceptibility to flooding points to the imperative that the city maintains a reactive reserve for situations where flooding or high incidence of rainfall warrant moving people – whether to temporary shelters or lower-risk relocation zones. The city could benefit greatly from having an updated land-use plan that pro-actively anticipates climatic exposure by encouraging feasible economic activities in less vulnerable production areas with all-weather access.

It is interesting to note that, in spite of being an area frequently visited by typhoons, tourism has increased dramatically. The city can optimize the benefits arising from this positive development by re-calibrating their tourism calendar to make the most of the drier months of the year in a manner similar to dive or ski resorts that often maintain open and closed seasons.

To identify and deal with the challenges that will arise out of a changing climate, Naga City needs to look within itself and figure out what needs to be done within its boundaries. The city's exemplary performance in past years leaves little doubt that this can and will be addressed. More than that, however, the people of Naga should look beyond their city's fences. The new and highly variable conditions that will characterize the shape and form of climate change call for a renewal of the city's longtime commitment to creating fresh paths and vibrant ways that open new opportunities for the Bicol Region. Vigilance is a gatekeeper's task. Service is a steward's privilege.

TACLOBAN

Due to the destruction the city suffered from Super Typhoon Yolanda/Haiyan, much of the data/analysis for this city are no longer valid. At best, they may serve as a source of historical information.

CLIMATE / ENVIRONMENTAL EXPOSURE

Facing Cancabato Bay in the San Juanico Strait, Tacloban City is located along the northeastern coastline of Leyte Province. A developing urban center among the eastern-most islands and towns of the archipelago, Tacloban is located within a Type 2 climate zone, inside the Philippine typhoon belt.

50-year time series information sets the average annual rainfall within Tacloban City at 2494mm, with significant inter-annual variability. For purposes of comparison, more recent records show average annual rainfall rising a dramatic 257% from 1853mm in 1998 to 4768mm in 2011. This is the highest rainfall, as well as the highest increase in precipitation, for all four cities assessed in Phase 3 of this project. Over a 50-year period, this city has been hit by an average of 2.3 typhoons per year. Over the last five years, we have seen these cyclones getting stronger. It appears that Tacloban weather is likely to get wetter.

Historically, tropical cyclones during the southwest monsoon have brought in much of the rain that fell on Tacloban City. A shifting climate, coupled with the city's location on the archipelago's eastern seaboard now exposes this urban center to a new potential risk. Recently, Tacloban residents reported heightened rainfall accompanying cold fronts during the northeast monsoon, as well. Increasingly frequent flooding has been observed in both monsoons, around low-lying and wetland areas southwest of the city proper.

Tacloban does not need more rain. Rainfall is the primary trigger of landslides. The uplands of Leyte Province are known to be landslide-prone. Geo-hazard maps of Tacloban City reveal high susceptibility to both flooding and landslides. Although the city proper is said to be located well away from most of these unstable areas, recent experience confirms that its upland barangays are certainly vulnerable to landslides.

It is likely that the persistence of El Nino, sea level rise, extreme weather, intense rainfall, heightened sea surface temperatures and ocean acidification will impact the viability of the city's port and the productivity of the fishing activity along the province's coastline. Tacloban City should prepare to deal with all six climate impacts identified in the WWF study.

SOCIO-ECONOMIC SENSITIVITY

Land Area 201 sq km
2010 Population 221,174
2010 Pop Density 1,096 / sq km
Highly Urbanized City, 1st Class

Tacloban's has gambled on a number of development options. Coconuts remain a major economic sector. For many years, copper cathodes were shipped out from the city's port, contributing significantly to exports. The city's coastal zones were, at some time, pegged to become a regional center for mariculture. Some of these investments seem to be paying off. Others have fallen by the wayside.

Over 20 years, the city's population has risen by 62%, from 136,891 in 1990 to 221,174 in 2010. Population density has increased from 679 / sq km in 1990 to 1,096 / sq km in 2010.

Growing by 74% in less than two decades, housing units within Tacloban have increased from 24,149 in 1990 to 41,977 in 2007. Over twenty years, energy consumption has swelled by 419% from 36,816 mwh in 1990 to 187,078 mwh in 2011. Water consumption has increased as well, growing 63% from 8,579,436 cubic meters in 1990 to 13,992,242 cubic meters in 2010. The number of registered motor vehicles ballooned 312% over 20 years, from 10,037 in 1991 to 41,329 in 2012. This translates to a current density of 205 vehicles per square kilometer.

Despite the closure of a major university a few years back, Tacloban continues to be a regional center for education. The last 20 years have seen a 71% increase in the number of schools within the city, from 59 in 1990, to 101 in 2011. Enrollment has grown as well, from 35,757 students in 1990 to 55,772 students in 2011.

As a city by the sea, Tacloban's fortunes are tied in to its port. How is that doing? From 2008 to 2012, ship calls have remained fairly flat, from 531 to 582 per year. Through two decades, the number of sea-borne passengers passing through Tacloban has also remained relatively steady, from 2,713,512 in 1994 to 2,537,256 in 2011. The volume of foreign cargo for this period has followed these relatively constant trends, lingering at between 36,600 mt in 2008 to 32,791 mt in 2012. Domestic cargo volumes seem to be the only bright spot for this sector. They have increased by 63%, from 373,618 mt in 2008 to 609,931 mt in 2012.

How does this performance compare with Ormoc? From 2008 to 2012, ship calls at Ormoc have risen from 3,213 to 3,815 – an 18% increase. Although calls at the private port of PASAR dropped from 426 to 175, for the same period, calls at the private port of PHILPHOS climbed from 438 to 556 – a 27% increase. For sea-borne passengers passing through Ormoc, total passenger headcount has climbed from 860,835 in 2008 to 1,049,509 in 2012 – a 22% increase. The volume of foreign cargo, coming mostly from PASAR and PHILPHOS, declined slightly from 1,672,433 mt in 2008 to 1,502,026 in 2012. Domestic cargo volumes, coming mostly from PASAR and PHILPHOS, rose slightly from 1,352,885 mt in 2008 to 1,408,739 mt in 2012 – an increase of only 4%.

In a nutshell, although Ormoc has more vessels, it still has less passengers. It records much more cargo tonnage, due to the two private ports there. A shift has taken place, though. Although Tacloban has seized a commanding lead on domestic cargo volumes, Ormoc is showing stronger growth in domestic passenger traffic. The driver of all this is, of course, Cebu.

The data for airborne traffic explains where another shift has taken place. Riding the wave of budget airfare options, air passengers to and from Tacloban have increased 199%, from 339,315 in 2000, to 1,015,797 in 2011. Very few of these passengers appear to be tourists, seeing that tourist arrivals dropped dramatically from 143,316 in 2006 to 54,652 in 2011. Corroborating that, hotel occupancy rates in Tacloban have dropped as well, from 48.25% in 2007, down to 39.52% in 2011. Very much like seaborne cargo, air cargo volumes passing through Tacloban have grown 96%, from 3,415,587 kg in 2000, to 6,697,766 kg in 2011.

Tacloban's surprisingly high air cargo volumes stand head and shoulders above all cities assessed in this phase. The Department of Trade and Industry points out that these shipments originate from nearby Samar, and are made up primarily of fresh blue crab, crab fat and processed crabmeat that are air shipped to Cebu, Manila, or other domestic transport hubs, through Tacloban. Blue crab is a wild-caught resource. It is not farmed. It is also demand driven. Citing the previous experience of Western Negros and Northern Palawan, if this trade is not sustainably managed, it can very easily fizzle out.

When it comes to foreign trade, the economic and trade picture that emerges is rather stark. Exports from the city crashed 3822%, from US$ 666,836,463 in 1996 to US$ 17,003,461 IN 2007. Sifting through the bureaucratic jargon of trade records, it is relatively clear that a sunset looms for the city's traditional exports, i.e. coconut and copper. Imports dove as well. From a high of US$ 211,316,797 IN 1996, they sank 25% to US$157,918,826 in 2006.

The city is clearly looking for viable alternatives to its traditional products and services. In the area of LGU registered businesses, Tacloban has logged an impressive 266% growth figure, with business registrations increasing from 3,631 in 2007 to 13,299 in 2012.

For the agricultural sector, a key element in building a city's socio-economic resilience, Tacloban shines in cereals and fisheries. But its gains in other farmed crops remain unclear. Palay production grew by 86% from 801.3 mt in 2005 to 1,487.3 mt in 2012. Corn production followed the same trend, growing close to 500% from 31.27 mt in 2005, to 198.90 mt in 2012. Municipal fisheries reported a 63% increase in catch, from 188 mt in 2008, to 515 mt in 2012. Over four years, aquaculture production has grown by 336%, from 11 mt in 2008, to 48 mt in 2012. The coconut crop continues to dominate as an important contributor to Tacloban's economy. Unfortunately, coconut production has remained virtually flat with an output of 5.961 million coconuts in 2002, rising to a peak of 6.238 million coconuts in 2008, then falling again to 5.770 million coconuts in 2011.

For protein, the data is less promising. Records from the city slaughterhouses report that swine production has decreased from 31,857 heads in 2005 to 25,561 heads in 2011. The same can be said for cattle production that shrank by 23%, from 1,646 heads in 2005 to 1,274 heads in 2011. Carabao production has remained relatively flat, with 2,032 heads in 2005 versus 2,138 heads in 2011. Poultry production has registered a 62% slide from 2,553,145 heads in 2005, down to 978,056 heads in 2012.

The assessed value of taxable lands has risen 238%, from P1,680,816,515 in 1995, to P5,683,299,610 in 2012. Furthermore, the number of real property units has nearly doubled from 48,962 in 2007 to 97,120 in 2012. Like Naga, Tacloban City has set the stage. But, so far, local response remains lackluster. Construction permits dipped 8%, from 401 issued in 2009, to 371 issued in 2012. The number of occupancy permits shrank 32%, from 323 in 1990 to 217 in 2012.

ADAPTIVE CAPACITY

A self-rating of 5.00 is a perfect score. The Tacloban City government gave itself "excellent" ratings in 11 out of 20 criteria that make up the LGPM score sheet, or an average score of 4.77 for 2011.

Areas of Governance	Tacloban City			
	2009	2010	2011	Difference (2011 and 2010)
Administrative Governance				
Local Legislation	3.70	3.70	3.95	0.25
Development Planning	4.94	4.95	5.00	0.05
Revenue Generation	3.93	3.00	4.67	1.67
Resource Allocation and Utilization	4.96	4.75	4.50	(0.25)
Customer Service - Civil Applications	4.30	5.00	5.00	-
Human Resources Management and Development	5.00	3.00	5.00	2.00
Economic Governance				
Support to Agriculture	4.33	4.39	4.78	0.39
Support to Fishery Services	3.78	3.14	4.85	1.71
Enterpreneurship, Business and Industry Promotion	3.69	4.44	3.67	(0.77)
Social Governance				
Health Services	4.59	4.66	5.00	0.34
Support to Education Services	4.05	3.40	5.00	1.60
Support to Housing and Basic Facilities	2.00	4.20	5.00	0.80
Peace, Security and Disaster Risk Management	4.38	4.22	4.58	0.36
Environmental Governance				
Forest Ecosystem Management	5.00	5.00	5.00	
Freshwater Ecosystems Management	5.00	5.00	5.00	
Coastal and Marine Ecosystems Management	5.00	3.67	5.00	1.33
Urban Ecosystems Management	4.25	4.48	4.50	0.02
Valuing Fundamentals of Governance				
Participation	4.33	3.67	5.00	1.33
Transparency	4.87	5.00	5.00	-
Financial Accountability	4.55	4.55	4.80	0.25

From 1990 to 2008, the metric used for monitoring city crime was "Crime Solution Efficiency". In 2009, this was replaced by another metric called

“Crime Clearance Efficiency”. Some cities have both figures. Others have only one figure available.

For Crime Clearance Efficiency, Tacloban City delivered a dramatic improvement in its score, rising from barely 8.9% in 2009 to 31.5% in 2011.

Average annual family savings rose dramatically from barely P4,769 in 1991 to P32,000 in 2009. In contrast to what we have seen in other cities though, city savings dropped from P123,157,886 in 2002 to P82,620,023 in 2011. As a results city savings per capita is the lowest of all four cities at P56.31 / capita in 2011.

The number of bank branches within the city increased from 30 in 2007 to 34 in 2012. The number of bank accounts increased 30%, from 164,964 in 2007 to 214,760 in 2012. Deposit values within Tacloban increased 50%, from P12.817 Billion in 2007 to P19.249 Billion in 2012.

Regionally, deposit values soared 195%, from P16.084 Billion in 2007 to P44.461 Billion in 2011. While the regional loans portfolio grew 176%, from P4.492 Billion in 2007, to P11.137 Billion in 2011.

Despite the increase in school numbers within Tacloban, functional literacy in Region 8 shrank from 75.67% in 1994 to 72.90% in 2008. Once again, this is the lowest score for all Regions assessed. The Human Development Index registered a significant improvement, from 0.377 in 1997 to 0.588 in 2008. This is a noteworthy achievement. For HDI, the Leyte / Samar provinces actually overtook Camarines Sur.

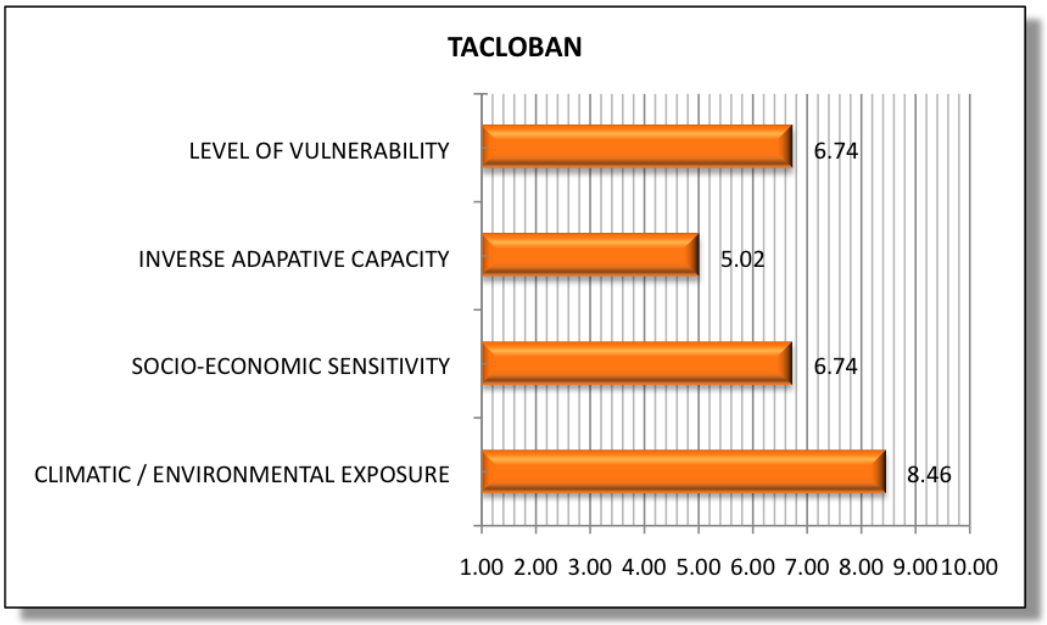
SCENARIO BUILDING WORKSHOP

List of Development Drivers

Primary Drivers	**Governance** **Economic Sector**
Secondary Drivers	**Absolute Poverty** **Infrastructure** **Population** **Education and Communication** **Environment** **Health** **Loyalty**
Distinctive Scenario Descriptors	Economy Boom Ready to Go Bust Tacloban: A City for Every 1 Tinakluban Total Eclipse of the City
Scenarios Developed	

Positive Governance / Positive Economic Sector
Positive Governance / Negative Economic Sector
Negative Governance / Negative Economic Sector
Negative Governance / Negative Economic Sector

The narratives containing a summary of scenarios developed by Tacloban stakeholders are provided as an annex.



ASSESSMENT & INTEGRATION

Tacloban City is a city in flux. Emerging from a fast-declining past defined by coconuts, sugar cane, as well as the shipment of fertilizer and copper processing, it is clearly grappling with formulas that will shape its role in building a more promising future.

The city faces a spectrum of challenges. Some portions of Tacloban sit in low-lying wetlands, prone to flooding. Other upland barangays are landslide prone. It is within the "jaws" of what has been described as a climate sandwich. Like many old Philippine towns that have expanded along no logical pattern, zoning and appropriate land-use need to be addressed.

Tacloban floods. And it faces the Pacific, the direction from which most tropical cyclones come. The upgrading of the city's drainage system has begun. Seeing that Tacloban sits at an average elevation of barely 3 meters above sea level, this effort should certainly be continued and sustained. Beyond drainage, however, the city will need to look carefully at improving the management of its uplands to keep urban vulnerability down.

Much more rain is likely to fall on Tacloban. It is vital, therefore, that more attention is given to stabilizing its uplands and impounding run-off for urban and agricultural use. Like Baguio, it is ironic that a city with so much rain has a water supply / water quality challenge. Increasing rainfall establishes that, for Tacloban, water supply options are virtually infinite. Water supply or quality should not be issues at all. This long running problem needs to be resolved.

As the premiere urban center in this Region, Tacloban City could be the natural attractant for communities displaced by climate impacts. This likelihood should be built into the city's planning processes. In a climate aggravated future, right-sizing a city's infrastructure has to involve the creation of socio-economic buffers to deal with the forced migratory fallout arising out of future extreme weather events. Seeing that Leyte and Samar appear to be getting more than their fair share of rainfall, this is an imperative for urban centers such as Tacloban.

Like Naga, Tacloban City is a major transit and trans-shipment point. Historically, it served as the staging point for significant shipments of coconut and copper cathodes. More recently, the dramatic increases in air passenger traffic, coupled with the astounding volume of air cargo, confirm that this key role can continue to bring significant socio-economic benefits to the city.

The location and exposure of the city's single airport are matters of particular concern. Authorities seem to be aware of this, seeing that a new seawall has been constructed along this facility's shoreline. The dramatic increases in air cargo volume underscores the importance of this facility to Tacloban, and the region. As climate impacts accelerate further, this stop-gap measure may not be sufficient. The airport's situation needs to be studied further.

To retain its status as a major trans-shipment point, Tacloban City's challenges will include stabilization of its ecosystems, re-configuration of its infrastructure and fine-tuning of its internal workings.

By drawing from deep within itself; the city has the opportunity to come together and identify fresh economic drivers to move the city forward and boost its competitiveness, both as a production base and a functional transit point. For example, with all the new coconut-based products that have become available, should the people of Tacloban make the investments now, to secure or expand their presence in this market? The city begs for re-invention. Tacloban's strategic path needs to be defined.

CITY ASSESSMENTS
2014 Phase

BUTUAN CITY

CLIMATE / ENVIRONMENTAL EXPOSURE

> ***Butuan has no dry season. Typical of Type 2 climate zones, its heaviest rains fall from November to April. Over the last six decades, 63 typhoons have tracked through Butuan – an average of one per year. Sitting by the coastline, at the very edge of a major river delta, within the path of last quarter typhoons; Butuan City is likely to experience all 6 climate scenarios listed in the 2009 WWF study.***

Butuanons like to tell their visitors that they should expect weather here to be wet, or wetter. It is no surprise therefore, that, for precipitation, **Butuan logs in with an average rainfall of 2097mm - the highest rainfall figures in this fourth assessment.** Current geo-hazard maps already indicate high flood susceptibility. Showing a highly variable rainfall pattern, a 20-year high of 3269 mm, a low of 1261mm, and what appears to be an increasing trend - it is likely that rainfall and seasonal floods will continue to be main determinants of this city's future.

In comparison to Santiago and Puerto Princesa, the historical frequency of storms visiting Butuan appears to be relatively low. Although Mindanao has never been typhoon-free, tropical cyclones are relatively rare in this part of the Philippines. There is no trend showing a possible increase in the number of storms hitting eastern Mindanao. There is, however, a growing perception (especially in the agriculture sector) that the seasons of Mindanao have changed.

SOCIO-ECONOMIC SENSITIVITY

Land Area **817.28 SQ KM**
2010 Population **309,209**
2010 Pop Density **378 / SQ KM**
Classification - Highly Urbanized City

Over twenty years, the population of Butuan has increased from 227,829 in 1990 to 309,209 in 2010 – a 36% increase, averaging 1.8% per year. Over

the same period, population density has increased from 278 persons / sq km to 378 persons / sq km.

Housing Units in Butuan increased from 48,843 in 2000 to 64,286 in 2010. This 31.6% increase over 10 years translates to a 3.16% average increase per year. Of the four cities in this phase, **these are the lowest growth figures for housing.** At 4.81 persons/unit for 2010, **they also represent the highest density per housing unit for this phase.**

Enrollment data reveals an increase of 53%, over 22 years – from 57,856 in 1990 to 88,680 in 2012. 28.6% of Butuan's population goes to school. With a 2.65% average increase per year, it is heartening to see the increase in school enrollment exceed Butuan's population growth rate. The number of schools in Butuan increased 52% over the same period, rising from 136 in 1991 to 2007 in 2012.

The city's current Total Road Network covers 523.88 kilometers, 37.7% of which is paved. Butuan has 0.24 kilometers of paved road for every square kilometer of land area. **This is lowest paved road / sq km ratio for the cities covered by this fourth assessment.**

Motor Vehicles in Butuan have increased from 7,912 in 1990 to 25,104 in 2013. This 217% increase over 23 years translates to an average annual increase of 9.4% per year. **These figures represent the lowest annual average growth in motor vehicles for this phase.** As of 2013, the city has 43 vehicles per kilometer of roads.

The volume of sea-borne passengers to and from Butuan increased by 71% over a 22 year period, from 587,519 in 1990 to 1,004,235 in 2012. This translates to a 3.22% average increase per year.

Although domestic sea-borne cargo increased over 22 years, foreign sea-borne cargo volumes shrank. The annual volumes of Domestic Cargo grew by 29% over 22 years – from 867,933 metric tons in 1990 to 1,117,981 in 2012 metric tons. This translates to an average growth rate of 1.31% per year. In contrast, the annual volume of Foreign Cargo for the same period dropped from 54,676 metric tons to 19,748 metric tons.

With the entry of budget air travel, aircraft traffic to Butuan increased 138% over 12 years – from 1,862 in 2000 to 4,436 in 2012. This translates to an average increase of 11.5% per year. As a result of increased aircraft options, the number of air passengers to and from Butuan grew by 345% - from 117,915 in 2000 to 524,856 in 2012. This translates to an average increase of 49.2% per year. Air cargo volumes have followed suit, yielding a 136% increase in 12 years – from 2,013,420 kilos in 2000 up to 4,743,571 kilos in 2012. This translates to an average increase of 19.42% per year.

Tourist arrivals increase with improved connectivity. For Butuan, tourist arrivals increased 407% over 22 years, or an average of 18.5% per year – from 50,892 in 1990 to 258,248 in 2012.

To serve these visitors, the number of hotels in the city increased 50% over 12 years – from 36 in 2000 to 54 in 2012. The number of hotel rooms grew as well – from 820 in 2000 to 1,389 in 2012.

In Butuan, the number of LGU registered businesses rose 108% over 7 years – from 4,138 in 2005 to 8,598 in 2012. This translates to an increase of 15.42% per year. **This represents the highest growth figures for business establishments in cities covered by this fourth assessment.**

The provinces around Butuan have long been known for timber and wood products. Those days are over. For lumber, production has crashed from 8.6 Million board feet in 1995, down to barely 61,792 board feet in 2012. For plywood, production has dropped from 62,780 cubic meters in 1995 to only 16,039 cubic meters in 2012. For blockboard, production over 17 years has remained relatively flat – from 17,675 cubic meters in 1995, to 16,039 cubic meters in 2012.

Despite this, Butuan has delivered a 1414% increase in export values from foreign trade, over the last 22 years. **Although significantly lower than General Santos or Puerto Princesa, this growth in exports takes top scores for this phase.** From a level of US$ 9.9 Million in 1990, export values rose to US$ 151 Million in 2012. During this same period, the city's imports have gone down, dropping from US$ 57 Million in 1990, to US$ 36 Million in 2012.

In 2012, Butuan City's top four export earners were: Gold / Silver Dore Bars valued at US$ 80,081,397; Lateritic Nickel Ore valued at US$ 54,446,995; Coconut Products valued at US$ 9,447,992; Crude Palm Kernel Oil valued at US$ 4,760,874. Mining and plantation scale farms have replaced timber.

It is fortunate that growth is evident for all livestock in Butuan, based on data from the city abbatoir. Poultry production rose 225% over 16 years – from 1.597 Million heads in 1996 to 5.183 Million heads in 2012. Swine production rose 32% over the same period – from 39.138 heads in 1996 to 51,756 heads in 2012. Cattle production increased 717% over 16 years, from 927 heads in 1996 to 7,575 heads in 2012. Carabao production increased 34% for the same period, from 1,620 heads in 1996 to 2,178 heads in 2012. Goat production rose 21%, from 2,731 heads in 1996 to 3,291 heads in 2012.

Aquaculture, a relatively small sector, delivered a 36% increase over 12 years, from 627.34 metric tons in 2000, to 855.71 metric tons in 2012.

For grain production, rice dominates the field in Butuan, although corn (with a much lower base figure) delivered much more robust growth figures. Palay production, hovering at 43,416 metric tons in 2000, rose 25% to 54,276 metric tons in 2012. Corn production increased 356% over 12 years – from 1,232 metric tons in 2000 to 5,624 metric tons in 2012.

With the exception of banana, growth remains evident for other agricultural crops over a thirteen-year period stretching from 2000 to 2012. Coconut production increased 389% from 6,297 metric tons to 30,766

metric tons. Cassava production increased by 133% - from 1,696 metric tons to 3,950 metric tons. Camote production delivered a 53% increase, from 2,163 metric tons to 3,305 metric tons. Over the same period, banana production showed a steady decline from 38,191 metric tons in 2000, down to 13,410 metric tons in 2012.

The number of building construction permits issued in Butuan soared 1114% over 22 years, rising from 301 permits in 1991 to 3,654 permits in 2012.

The assessed value of taxable lands increased 120% over 8 years, increasing in value from P2.4 Billion in 2005, to P5.2 Billion in 2013.

The number of real property units in Butuan increased 41% over 9 years, growing from 69,766 in 2005 to 98,048 in 2013.

Energy consumption nearly doubled over 17 years, increasing from 88,224 megawatt hours in 1996 to 175,992 megawatt hours in 2012. Annual electrical consumption is 0.57 mwh per capita. **Of the three cities that provided energy data for this assessment, Butuan showed the lowest energy footprint per capita.**

Water consumption followed the same trend, growing 96% over 17 years – from 3.3 Million cubic meters in 1996 to 6.6 Million cubic meters in 2012. Annual water consumption per capita in Butuan is 21.3 cubic meters.

ADAPTIVE CAPACITY

A self-rating of 5.00 is a perfect score. The Butuan City government gave itself “excellent” ratings in 10 out of 20 criteria that make up the LGPM score sheet, or an average score of 4.77 for 2011.

Areas of Governance	Butuan City			
	2009	2010	2011	Difference (2011 and 2010)
Administrative Governance				
Local Legislation	3.70	3.70	3.95	0.25
Development Planning	4.94	4.95	5.00	0.06
Revenue Generation	3.93	3.00	4.67	0.74
Resource Allocation and Utilization	4.96	4.75	4.50	(0.46)
Customer Service - Civil Applications	4.30	5.00	5.00	0.70
Human Resources Management and Development	5.00	3.00	5.00	-
Economic Governance				
Support to Agriculture	4.33	4.39	4.78	0.45
Support to Fishery Services	3.78	3.14	4.85	1.07
Enterpreneurship, Business and Industry Promotion	3.69	4.44	3.67	(0.02)
Social Governance				
Health Services	4.59	4.66	5.00	0.41
Support to Education Services	4.05	3.40	5.00	0.95
Support to Housing and Basic Facilities	2.00	4.20	5.00	3.00
Peace, Security and Disaster Risk Management	4.38	4.22	4.58	0.20
Environmental Governance				
Forest Ecosystem Management	5.00	5.00	5.00	-
Freshwater Ecosystems Management	5.00	5.00	5.00	-
Coastal and Marine Ecosystems Management	5.00	3.67	5.00	-
Urban Ecosystems Management	4.25	4.48	4.50	0.25
Valuing Fundamentals of Governance				
Participation	4.33	3.67	5.00	0.67
Transparency	4.87	5.00	5.00	0.13
Financial Accountability	4.55	4.55	4.80	0.25

Crime solution efficiency, for Butuan City, hovers between 86% and 87%. Crime clearance efficiency shows an improvement from 21% in 2010 to 42% in 2012.

City savings, over a 12-year period, showed a 949% improvement, from P21 Million in 2001 to P224 Million in 2013. Per capita city savings turned around from a P20 per capita deficit in 2007 to a P1,061 savings per capita in 2010.

Functional literacy for Region 13 improved somewhat from 81% in 2006 to 85.7% in 2008. Employment rate within Butuan City hovers between 90.3 and 90.7 percent. The Human Development Index for Agusan del Norte rose from 0.515 in 1997, to 0.562 in 2009.

Average family savings for Region 13 rose by 194% over 7 years, from P12,000 in 2003 to P24,000 in 2009.

The number of banking offices within Butuan City increased 48% over 5 years, from 25 in 2008, to 37 in 2013. The number of bank accounts increased, as well, rising 36% from 145,209 accounts in 2008 to 198,083 accounts in 2013. Over six years, deposit value within the city increased 112%, from P8.9 Billion in 2008 to P18.9 Billion in 2013.

Total Regional Deposits, over 12 years, rose 316% from P8.9 Billion in 2001, to P37 Billion in 2013. Total Regional Loans rose, as well, though at a much lower rate, from P4.3 Billion in 2001 to P10 Billion in 2013.

SCENARIO BUILDING WORKSHOP

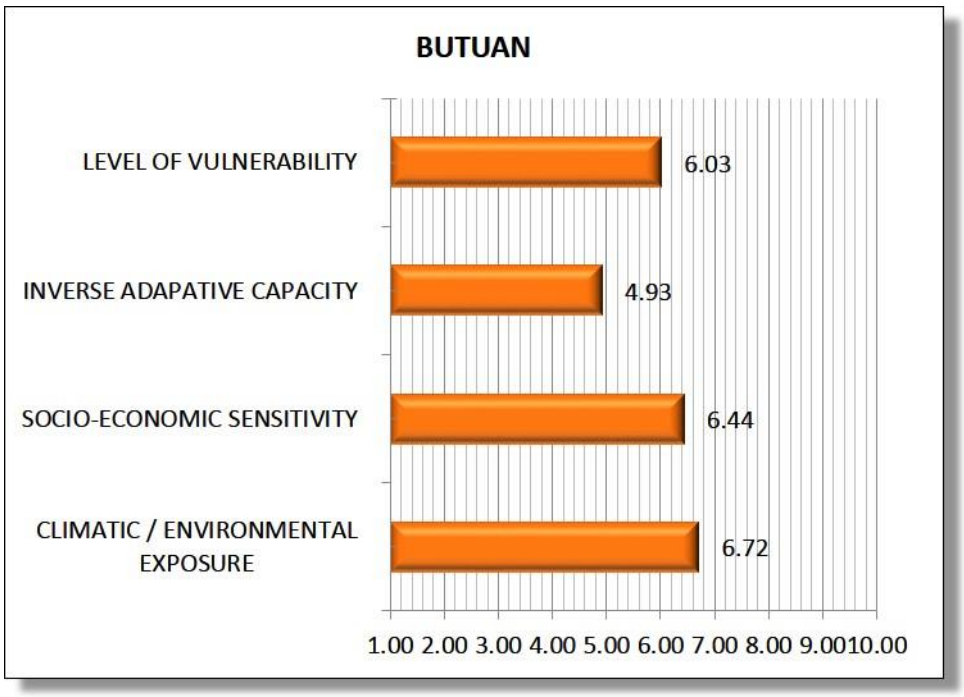
List of Development Drivers

Primary Drivers	**Governance and Politics** **Economics**
Secondary Drivers	**Agro-Forestry (Food Security)** **Power** **Tourism** **Technology** **Natural Resources Management** **Human Resources Development** **Disaster Management** **Values and Culture** **Infrastructure**
Distinctive Scenario Descriptors	Q1: The Hollow Progress of Butuan Q2: Balangay: Soaring High Q3: Ugma sa Butuan (The Future of Butuan) Q4: Butuan Gihibut-an (Butuan Castrated)

Scenarios Developed

Negative Governance and Politics / Positive Economics
Positive Governance and Politics / Positive Economics
Positive Governance and Politics / Negative Economics
Negative Governance and Politics / Negative Economics

The narratives containing a summary of scenarios developed by Butuan stakeholders are provided as an annex.



ASSESSMENT & INTEGRATION

"*Agus*" is the word for flowing water. The country's longest navigable river is Mindanao's Agusan. Much of the rain that falls on this island's eastern half, drains to the sea through this river. Butuan City is located right at its delta – where floods are expected, and rain is daily fare.

There is a phrase – "before Mindanao, there was Butuan". Much of what the city offers visitors today, focuses on a collection of artifacts hinting back to what many believe was a glorious past. Although many of the city's links to an ancient world remain the subject of much discussion, what is clear is that much of what Butuan is today was defined by the river called Agusan.

The Agusan River is fed by upland rainfall through multiple tributaries. Butuan sits at an average elevation of 4 meters above sea level, at the end point of this natural drainage system. To gauge this city's vulnerability to floods, therefore, it will be necessary to look beyond Butuan's boundaries, and study upland precipitation forecasts. This is a core strategy of the Mindanao 2020 plan. Data from the National Water Resources Board indicates that, over the next two decades, the highest water supply - as a function of rainfall - will come from Mindanao's central highlands. This situation is likely to keep the Agusan River Basin very busy. It will certainly influence the severity of flooding in and around Butuan City.

Rivers are conveyor belts, linking the sky to the sea in an unending cycle driven by the sun. This cycle has changed, so will the river, so must Butuan. It is a mistake to plan for the future using averages as a

benchmark. The reality of inter-annual variability points to the wisdom of preparing for extremes, with redundancy as a basic principle.

Historically, typhoons were not commonly associated with Mindanao. The rapidly warming waters of the northwestern Pacific appear to be altering these long standing perceptions. In recent years, the eastern seaboards of both the Visayas and Mindanao have borne the full brunt of fierce last quarter storms emanating from the Pacific. The typhoons locally named Sendong and Pablo left large swaths of Mindanao deeply scarred. Haiyan / Yolanda threw the Dvorak scale out the window.

What are the opportunities that offer themselves to the city in a climate-defined future? It is a fact that Butuan City sits within a high-risk zone. The first opportunity is to diffuse that risk. Since the construction of new housing units appears to be expanding at a faster pace than population growth, it will be important to make climate smart choices about where to allow this. Butuan does not have the broad land areas that Puerto Princesa and Davao are blessed with. If it is the city's ambition to avoid an urban quagmire, then climate-smart land use plans need to be pegged down.

If plausible future scenarios form the basis for land use planning, the city can effectively set the stage to steer its mushrooming population and economic centers out of harms way. What is the sense of investing money, if you stand to lose it all with the first flood? Land conversion should be tempered to move at a measured pace, where zones of residential use, agricultural production, and economic activity, as well as protected areas, are delineated and enforced to ensure that they meet the city's future needs. Learning from Ormoc, Cagayan de Oro and Tacloban, flood zones should always be treated as no-build areas.

Echoing the aggressive expansion of housing, the rise in school enrollment may be indicative of the city's interest in building brains, rather than simply expanding "capacity". To deal with change a city must invest in change. It is innovative thinking and creativity that provide the platforms for leadership. They also keep things interesting and vibrant. A sustained investment in building human capital will certainly serve the city well. The key is to match skills with needs, especially in the tertiary level. It is not enough to train young minds. An effort must also be made to keep them. If the city makes the transformative decision to open up to fresh opportunity and new thinking, it is more likely that young minds will stay and create lives around the place they call home.

Although the increase in motor vehicles registered in Butuan is relatively lower than some other cities covered by this assessment, its network of paved roads already begs for further expansion. Once again, this must be climate smart. Unpaved roads will not survive extreme weather. Butuan City must boost its all-weather connectivity. As rainfall intensifies, the current national practice of elevating highways through the use of embankments will no longer work. By

altering the natural drainage of flood zones, they marginalize roadside communities. Even worse, they threaten food security and local self-sufficiency around agricultural areas. For major arteries criss-crossing a flood-prone delta, best practice tells us that the appropriate technology should involve above-grade structures, such as viaducts. No doubt, these are more expensive. But if government does not cover these costs, the taxpayer-voter will have to bear the brunt of dislocation. The impact on competitiveness will be systemic. This is not right.

The data we have shows that business and tourism are now drawn to Butuan. Although shipping remains the preferred mode of transport, airborne options are growing much faster. More than 520,000 passengers passed through Butuan's airport in 2012. With redundancy as a guidepost, it will be worthwhile for Butuan City to establish all-weather corridors that link its seaport and its airport both to the city and to the national highways. If the city is reluctant to move away from the river, then its other option is to build above flood prone areas. To remain viable, the city must reconfigure itself to maintain its connections with the rest of the country.

Beyond connectivity, the city should take a close look at self-sufficiency – especially in the management of the food-water-energy nexus. This will be a key result area for all cities. Butuan is fortunate that its relatively large land area, coupled with a relatively low population, are still able to provide space for food production. The growing investment in agriculture is a positive development. This should be encouraged in appropriate areas dedicated to sustaining self-sufficiency. Food production cannot be left to chance.

With many rivers at its doorstep, Butuan has the opportunity to urge its Water District to consider investment in a multi-source water system that radically reduces the city's dependence on groundwater and taps surface water instead. Throughout the country, coastal communities who are excessively dependent on groundwater have encountered land subsidence. When a city begins to sink, saltwater intrudes into its wells, forcing local dislocation. Land subsidence is irreversible. Lower elevations increase climate vulnerability.

Where will all this funding come from? The city's current dependence on extractives as the driver of exports creates a temporary opportunity to build city reserves and utilize them for future smart interventions. The city's first imperative is to choose where extractive activity will be allowed and where it must not be done. If political realities make improved regulation difficult, then at the very least, these potentially damaging activities should be closely monitored to avoid unnecessary downstream impact. It makes no sense to shoot oneself in the foot.

The long history of mining throughout the world tells us that extractive activity involves a boom-and-bust cycle. The same can be said for logging. This time around, the fruits of this transient wave of

development should be invested wisely in people, infrastructure and systems before things go bust. If done thoughtfully and in phases that the city can afford, this will certainly prepare Butuan for a future that is likely to be even wetter.

There is a story about a Dutch boy who stuck his finger in a hole in a dike, hoping to save his town. As we face a climate-defined future, there will be many other "holes" in the "dikes" that keep our cities safe. Butuan City cannot do all this alone. Rather than just waiting to be swept away, the city should pro-actively move up the cycle created by sun, sky and sea. The management of water and floods are a collective task. They could involve interventions – both natural and engineered – in the forest, around the farms, in the city itself, along the river and the coast. Together with the surrounding towns and cities of northeastern Mindanao, Butuan should consider taking the lead in strengthening multi-community alliances designed to forge working solutions to these shared challenges.

It is important not to forget the city's past. But we cannot bring back time and the romance of history can sometimes distract us from the realities of the present. A good water supply is a boon for all cities. Without this, all social and economic activity grinds to a halt. Water is the new gold. Learning from the lessons of what it was, while understanding the exigencies that lie ahead, Butuan's stellar opportunity is to transform itself, and move forward along the path toward what it can be.

GENERAL SANTOS CITY

CLIMATE / ENVIRONMENTAL EXPOSURE

General Santos sits within a Type 4 climate zone, with rainfall evenly distributed throughout the year. Of the 16 cities assessed thus far, it has the lowest historical annual rainfall at an annual average of 911mm. Although General Santos has been typhoon free – with only one storm tracking through the city in 40 years - this city is likely to experience the remaining 5 climate impacts listed in the 2009 WWF study. These include El Nino related shifts, increased temperatures, ocean acidification, higher rainfall and sea level rise.

Sitting in the shadow of Mount Matutum, straddling the land of the B'laan, General Santos is a child of the dusty Dadiangas plain. The Manila Observatory forecasts that this southwestern portion of Mindanao is likely to experience future shifts toward heightened temperature.

Looking at the data we have on hand, upward shifts in temperature are already evident. Temperature data over a 50-year period show inter-annual variability with annual averages ranging from a low of 26.1C to a high of 28.4 – a 2 degree C variance. **Temperature data also reveals a clear rising trend.** Heat is going to define this city's future.

The same general patterns define city rainfall. This time, it may be a positive development for General Santos. Despite increasing temperatures, **annual rainfall data over the last 20 years, though characterized by inter-annual variability, shows an upward trend.**

SOCIO-ECONOMIC SENSITIVITY

Land Area 536.06 SQ KM
2010 Population 538,086
2010 Pop Density 1,004 / SQ KM
Classification - Highly Urbanized City

Over a twenty year period, population in General Santos has grown by 113%, from 252,050 in 1990 to 538,086 in 2010, or 5.6% per year. Similarly, population density has increased from 470 / sq km to 1004 / sq km. **Of the four cities in this assessment, these population density figures top the chart.**

Housing Units in General Santos increased from 44,659 in 1990 to 123,722 in 2010. This 177% increase over 20 years translates to an average annual growth of 8.85% per year. For density/housing unit as of 2010, General Santos registered 4.35 persons/ housing unit.

School enrollment in General Santos, over 17 years, shows a 25% increase from 97,386 in 1996 to 121,917 in 2013. Although 22.6% of the city's population is enrolled, this 1.47% annual average increase in school enrollment falls far short of the city's population growth rate. The number of schools in General Santos rose by 28% - from 97 in 1996 to 124 in 2013.

The city's current Total Road Network covers 579.24 kilometers, 27.3% of which is paved. **This is the lowest percentage of paved roads in cities covered by this fourth assessment.** General Santos has 0.30 kilometers of paved road for every square kilometer of land area.

Motor vehicles in General Santos increased from 11,039 in 1991 to 59,726 in 2013. This 441% increase over 22 years translates to an average annual increase of 20%. As of 2013, the city has 78 vehicles per kilometer of roads. **For this phase, General Santos logs in with the highest vehicle density / kilometer of roads.**

Sea-borne passengers to and from General Santos decreased dramatically over 12 years - from 215,039 in 2000 to 53, 593 in 2012. During the same period, there was a parallel decrease in the number of shipcalls – from 1,802 in 2000 to 1,241 in 2012.

Over these same 12 years, the annual volume of domestic cargo shrank slightly, while the figures for foreign cargo ballooned. Domestic cargo volumes dropped 5% - from 1,806,071 metric tons in 2000, to 1,718,774 metric tons in 2012. Foreign cargo volumes grew 88% - from 616,007 metric tons in 2000 to 1,160,122 metric tons in 2012.

The number of aircraft serving General Santos increased 159% over 11 years – from 1,816 in 2001 to 4,696 in 2012. On the average, this translates to an increase of 14.4% per year. Air passenger traffic followed suit, yielding a 217% increase over 12 years – from 207,357 in 2000 up to 657,804 in 2012. This translates to an 18.8% increase per year.

Although the volume of air passengers to and from General Santos is nothing to sniff at, at 18.8% growth, it delivered the lowest percentage increase in air passengers logged of the cities assessed in this phase. To an extent, this is also due to the fact that the base figures for General Santos were higher than all the rest. Over the same period, air cargo volume leaped 69% - from 8,999,900 kilos in 2000 up to 15,247,538 kilos in 2012. **For this indicator, General Santos came in on top.** This was an average increase of 5.7% per year.

Although the number of DOT accredited hotels in General Santos increased from 4 in 2000 to 11 in 2011; and the number of rooms in these accredited

hotels rose from 187 in 2004 to 390 in 2012 – tourist arrivals to General Santos dropped 26% over 12 years. From 87,352 tourist arrivals in 2000, the numbers dropped to 64,731 in 2012.

LGU registered business establishments increased from 3428 in 1995 to 9143 in 2012. This 167% increase over 17 years, translates to an average growth of 9.8% per year.

General Santos remains a major base for exports. Its export values from foreign trade rose 247% over 14 years – from US$ 299 Million in 1997 to US$ 1.03 Billion in 2011. This translates to an average growth of 17.6% per year. Running a close second in export values to Puerto Princesa, General Santos distinguishes itself in that all its top exports focus on food. Although tuna is caught, pineapple and coconut – which make up the majority of its exports - are farmed.

Although General Santos has long been known as the nation's tuna capital, coconut oil has emerged as a significant export product for the city. In 2011, coconut oil was the biggest export earner for General Santos, with a value of US$ 273 Million. Canned tuna came in second with a value of US$ 240 Million, followed by canned pineapple with US$ 217 Million, fresh pineapple with a value of US$ 59 Million and fresh / frozen tuna valued at $34 Million.

Seeing that its top export earners have to do with food, it is no surprise that all forms of livestock production are growing well in General Santos. Poultry production leads the pack, delivering 1374% growth over 16 years from 662,536 heads in 1995 to 9,764,345 heads in 2011. Swine production comes next, with a 156% increase over the same period, growing from 37,302 heads in 1995 to 95,318 heads in 2011. Cattle production grew by 24% from 4,284 heads in 1995 to 5,308 heads in 2011. Goat production follows with a 104% increase, from 495 heads to 1,010 heads. Carabao production shows some growth, with a 13% increase from 801 heads to 907 heads.

General Santos has long been a major fish landing area. **In this sector, the figures are mixed.** Tuna vessels have increased by 19%, over 5 years, from 13,610 in 2008 to 16,260 in 2012. It is expected, therefore, that the volume of tuna unloaded at the General Santos City Fish Port Complex increased 77% during that same period, from 78,890 metric tons to 139,613 metric tons. The volume of tuna family species unloaded at the same port rose by 185% over the same period, from 33,998 metric tons to 97,013 metric tons. Most, if not all of this, comes from outside Sarangani Bay. In contrast, municipal fisheries production, in and around the immediate vicinity of Sarangani Bay, have crashed from 15,235 metric tons in 1995 to barely 1,959 metric tons in 2011. Aquaculture remains a relatively minor player within General Santos, logging a scant 8% increase over three years, from 1,057 metric tons in 2009 to 1,146 metric tons in 2011.

For the grains sector, corn is the dominant player in General Santos. Corn production, though relatively flat with a barely noticeable 4% increase over 17 years, maintained production volumes from 19,266 metric tons in 1995 to

19,959 metric tons in 2012. Palay production increased 175% over the same period, rising from 4,153 metric tons in 1995 to 11,421 metric tons in 2012.

For bananas, the city's farms delivered a 54% increase over 17 years, growing from 31,462 metric tons in 1995 to 48,383 metric tons in 2012. Copra production shrank 5% over 17 years, from 14,794 metric tons in 1995, down to 14,107 metric tons in 2012. Evidently, the coconut oil that now tops the list of exports for General Santos, comes from elsewhere.

Over a 17-year period, the number of building construction permits issued by General Santos increased by 118% - from 443 in 1995 to 966 in 2012.

The assessed value of taxable lands rose by 575% over 20 years, increasing in value from P373 Million in 1993 to P2.5 Billion in 2013.

The number of real property units in General Santos grew by 114% over the same period, rising from 43.098 in 1993, to 92,232 in 2013.

Over 16 years, energy consumption doubled in General Santos, rising from 169,511 megawatt hours in 1995 to 338,234 megawatt hours in 2011. Annual electrical consumption is 0.63 mwh per capita.

Over the same period, water consumption in General Santos increased 1277%, from 481,900 cubic meters in 1995 to 10,094,819 cubic meters in 2013. Annual water consumption per capita in General Santos is 18.76 cubic meters.

ADAPTIVE CAPACITY

A self-rating of 5.00 is a perfect score. The General Santos City government gave itself "excellent" ratings in 6 out of 20 criteria that make up the LGPM score sheet, or an average score of 4.29 for 2012.

Areas of Governance	General Santos City				
	2009	2010	2011	2012	Difference (2009 and 2012)
Administrative Governance					
Local Legislation	3.34	3.78	3.78	3.89	(0.55)
Development Planning	4.84	5.00	4.93	4.91	(0.07)
Revenue Generation	4.19	4.00	2.67	3.02	1.17
Resource Allocation and Utilization	3.67	3.75	3.00	2.17	1.50
Customer Service - Civil Applications	5.00	4.80	4.55	4.80	0.20
Human Resources Management and Development	5.00	5.00	5.00	5.00	-
Economic Governance					
Support to Agriculture	4.67	4.67	4.81	4.81	(0.14)
Support to Fishery Services	4.04	4.25	4.75	4.75	(0.71)
Enterpreneurship, Business and Industry Promotion	4.77	4.00	3.56	3.94	0.83
Social Governance					
Health Services	4.97	4.87	4.90	4.87	0.10
Support to Education Services	5.00	4.90	5.00	5.00	-
Support to Housing and Basic Facilities	2.80	5.00	5.00	5.00	(2.20)
Peace, Security and Disaster Risk Management	4.53	4.30	4.74	4.67	(0.14)
Environmental Governance					
Forest Ecosystem Management					
Freshwater Ecosystems Management	5.00	5.00	5.00	5.00	-
Coastal and Marine Ecosystems Management	5.00	5.00	5.00	5.00	-
Urban Ecosystems Management	4.38	4.00	4.28	4.13	0.25
Valuing Fundamentals of Governance					-
Participation	4.33	5.00	4.00	5.00	(0.67)
Transparency	5.00	5.00	5.00	5.00	-
Financial Accountability	4.85	4.76	5.00	4.92	(0.07)

Crime solution efficiency for General Santos hovered at between 94.1% and 97.26% from 2002 to 2008. Crime clearance efficiency rose 554%, from 6.25% in 2009, to 40.88% in 2012.

City savings improved by 2158%, over 9 years, from P21.4 Million in 2001, to P484 Million in 2010. Per capita city savings, over a 4-year period, increased as well, from P246 per capita in 2007, to P900 per capita in 2010.

Functional literacy in Region 12 ranged between 77.1 and 78.3 percent from 2003 to 2008. Total employment in Region 12 grew 21% over 7 years, from 1.4 Million to 1.7 Million. The Human Development Index for South Cotabato rose dramatically over 12 years, from 0.377 in 1997 to 0.636 in 2009. **Of the cities covered by this assessment, General Santos has delivered the highest HDI scores.**

Over a 9-year period, from 2000 to 2009, average family savings held steady at between P21,000 and P22,000.

From 2008 to 2013, the number of banking offices in General Santos increased from 45 to 52. The number of bank accounts grew by 51%, over the same period, from 179,549 to 270,621. The deposit value rose 77% from P15.7 Billion to P27.9 Billion.

Total Regional Deposits, from over 11 years, rose 177% from P16 Billion in 2001 to P44.6 Billion in 2013. Total Regional Loans rose by 147%, from P4.4 Billion to P11.1 Billion.

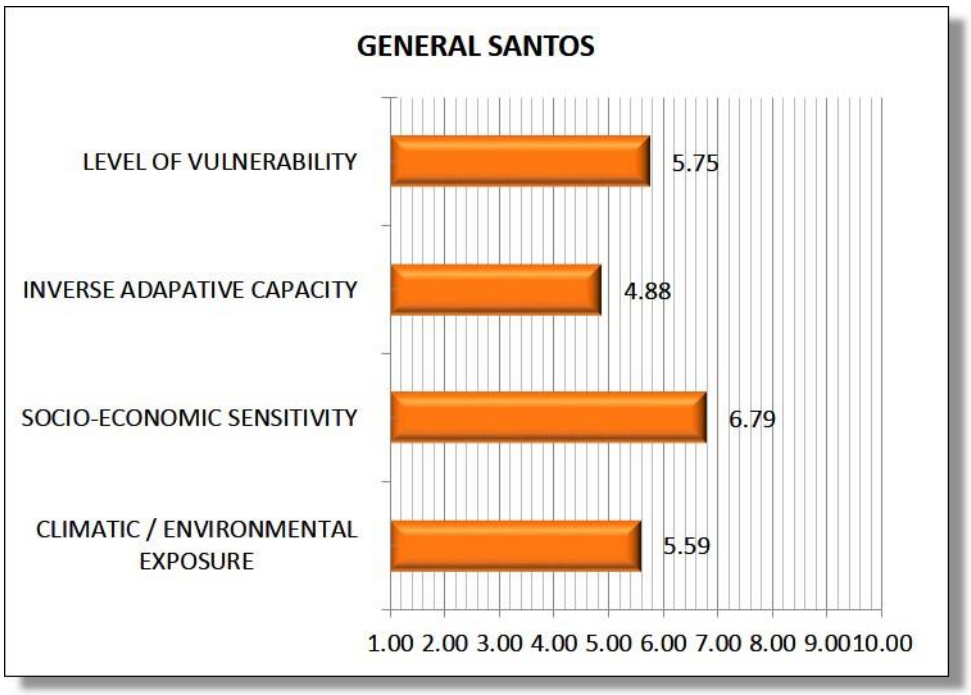
SCENARIO BUILDING WORKSHOP
List of Development Drivers

Primary Drivers	**Governance and Politics** **Peace and Security**
Secondary Drivers	**Human Resources** **Education** **Economic** **Technology** **Health** **Migration** **Environmental Management**
System	**Natural Resources** **Values** **Mindset** **Infrastructure**
Distinctive Scenario Descriptors	Q1: Generals' Power Q2: Shine Bright WOW General Santos Q3: Nightmare in Prosperity Q4: Dooms Day Gensan

Scenarios Developed

Negative Governance and Politics / Positive Peace and Security
Positive Governance and Politics / Positive Peace and Security
Positive Governance and Politics / Negative Peace and Security
Negative Governance and Politics / Negative Peace and Security

The narratives containing a summary of scenarios developed by General Santos stakeholders are provided as an annex.



ASSESSMENT & INTEGRATION

The city of General Santos fills in the geographical "polygon" created by Sarangani Province in southwestern Mindanao. With Alabel in the east, Malungon and Polomolok in the north, T'boli in the west and Maasim in the south; the city sits at the edge of a great volcanic plain, hugging the coastline of Sarangani Bay.

This is migrant country, where lives start afresh. A little more than 70 years ago, an intrepid group of settlers (led by General Paulino Santos) disembarked from the steamship, Basilan, with a mission to "industriously cultivate" this region. Through the decades, re-engineering has been central to the pioneering spirit that characterized the early development of General Santos.

Most Philippine cities are expecting more rain. General Santos has the lowest average rainfall of the 16 cities assessed. Although average rainfall over the city appears to be slowly increasing, historical data also seems to show higher temperatures on the horizon. General Santos must learn how to cope with hotter days and nights.

In combination, heat and moisture make a potent cocktail. Together with nutrients, they are the formula for red tides. They also create conditions that encourage the growth of bacteria, mold and a host of other pathogens. Such a development is not good news for an area where farming and the processing of agricultural / fish products are major economic drivers. This must be addressed.

Although significantly lower than Baguio, Iloilo and Cebu, the population density of General Santos was the highest in this assessment. It now approximates the density of Cagayan de Oro, and has more people per square kilometer than the cities of Davao, Zamboanga and Butuan. This is a primary driver of land conversion, as well as consumption.

Fish aggregation devices (FADs) are laid out in deep water zones to create what fish see as areas of refuge and food. They are designed to attract fish, and make the fishing effort more efficient. In a sense, General Santos has emerged as the primary FAD for southwestern Mindanao.

When too many FADs are clustered around a single spot, they can boost catch to the point where this alters the natural movements of predator and prey and, ultimately, fish down the food web. If this intervention is not managed wisely, a short-term boom in catch can quickly translate into a longer-term bust.

While the city's population has grown, over two decades, at an average of 5.6% per year, school enrollment has only increased by 1.5% per year. If re-engineering will continue to be the platform for "industrious cultivation" of this region, more young people need to go to school. General Santos has one school for every 4,339 people. Functional literacy in Region 12 is in the mid to high 70% levels. In comparison, Butuan has one school for every 1,493 Butuanons with functional literacy in the mid 80% levels.

Nurseries and seed banks provide renewed vigor. Without them, all efforts at sustaining farm productivity tend to fade with time. The same principle applies to a city's work force. A city cannot expect to sustain or boost productivity unless it doggedly supports the development of human capital and innovative thinking. It is not enough to simply retain what you have. A growing city needs to recruit new minds that are given the opportunity to contribute to its development. Thoughtful innovation gives a city bounce.

Increased temperatures also fuel thermal expansion of the oceans – a major contributor to sea level rise. A front line report, though anectodal, describes how in April of 2010, sea levels at General Santos' PPA port rose dramatically. This pier was designed to sit 2.5 meters above sea level, at the highest high tide. In the summer of 2010, the seas rose to within 0.5 meters of the pier's surface. Satellite altimetry data from NASA confirms that, for 2010, the areas in the northwest Pacific that experienced the highest sea level rise were in and around the Philippines.

Seeing that seaports play a crucial role in the General Santos economy, sea level rise is a vulnerability that requires serious attention. The same attention should be given to the major land routes that connect the city to Davao and Cotabato. When access is marginalized, socio-economic

activity is disrupted. If a furnace is shut down, it takes some time to get it back into the mainstream. Current geo-hazard maps from the DENR indicate that some portions of the city are highly susceptible to floods.

Fortunately, General Santos' average elevation sits 22 meters above sea level. Getting from one point within the city to another will, however, require forward thinking and constant funding. There is no doubt that General Santos has very good roads. But, with its fast growing population and the highest density of vehicles per kilometer of roads in this assessment, it is evident that the city will need even more paved roads.

Aside from improving intra-city connectivity, pavement offers a city the largest areas where it can harvest rain. Almost all Philippine cities simply allow water to drain out to the sea. Water is precious. Is it right to treat it as waste? For a rain challenged area, such as General Santos, where water consumption has increased 1277% over 23 years, the appropriate intervention may be to detain water, rather than to simply drain it. When exposed to heat, open detention ponds evaporate. They can also become breeding areas for mosquitos. The city has an opportunity to install underground cisterns at key points by the roadside to detain water that can serve a variety of community uses. A multi-source water supply is best practice. Groundwater should be the city's last option.

For passengers, air travel to and from General Santos has emerged as the transport mode of choice. In 2012, more than 650,000 passengers passed through the city airport. Although shipping continues to dominate the movement of domestic cargo, it has not grown. The volume of air cargo is fast catching up. This is a positive development. The city airport, up in Buayan, sits safely at 150 meters above sea level. For General Santos, this facility will be crucial.

Despite the doubling of commercial flights, as well as the wide availability of budget airfares and the tripling of DOT accredited hotels in the city, tourist arrivals have declined. Public perception can be a tough nut to crack. Tourism can be a fickle customer. There is a saying that no wine should be served before its time. Maybe this is the time for General Santos to focus on doing business. For some places it has proven wise to promote trade first, and simply allow tourism to follow. Why not?

For years, General Santos has been a major export base. It is also recognized as the tuna capital of the Philippines. For the longest time, yellow fin tuna was a gold mine. But, as the flash of yellow faded from poorly regulated extraction in Philippine waters, General Santos' fishing fleets were forced to look further afield. Back in 1939, the settlers who first landed here heeded the call to go south. The tuna fleets did the same. Utilizing special licenses, joint ventures and a host of other creative formulas, they fished the waters off a range of other Asia Pacific countries who offered them ways to stay in business.

At that point, General Santos' commercial tuna business changed. They were no longer the source of yellow fin. They simply became a landing point and a processing center for fish that were caught elsewhere. As national fleets from other countries grew, and they decided to catch, process and export their own fish, General Santos' regional larders for yellow fin contracted. Although trade remains the option of choice for resource scarce economies, this cannot last forever.

The great distance of travel affects the quality, and price of yellow fin. A growing number of yellow fin stocks in the region face marginalization. The Western Central Pacific Fishing Commission has yet to introduce truly transformative management interventions. With climate change, it is thought that there may be shifts in the range, behavior and productivity of remaining stocks. Beneath the scourge of inclement weather, oceans will also pose new challenges to shipping. All of this is likely to translate to increased costs, diminished return and decreased viability. A roller-coaster ride is the least efficient way of growing a business, or a local economy.

The export tonnage of fresh / frozen / whole yellow fin tuna, over the last 15 years, already show unpredictability. Average tonnage of commercial tuna unloaded at General Santos for this period was reported at 18.9 Million kilos per year. The inter-annual peaks and troughs, however, ranged from as high as 42 Million kilos in one early year, to as low as 8 Million kilos in another more recent one.

Canned tuna utilizes skipjack, a smaller fish that remains in fairly abundant supply. In contrast, the city's fresh yellow fin trade is way past its boom years. A quick comparison of the export tonnage for canned skipjack versus fresh / frozen / whole yellow fin reveals how close the yellow fin bubble is to deflating. In 2011, canned skipjack remained robust, making up close to 24% of General Santos' export business. In contrast, fresh / frozen / whole yellow fin made up barely 3% of the city's burgeoning export trade.

Seeing that Sarangani Bay is a national protected area, and should be a mother lode of marine wealth, why are smaller-scale municipal fisheries doing so poorly? Is local enforcement so effective that fishing output is rigorously curtailed? Or, have stocks within the Bay already been fished down? The marine environment is the social security system of small-scale fishermen. Are small-scale fishing efforts a "sunset" sector? This calls for a clear and urgent evaluation. It also begs for a meaningful response.

While the yellow fin tuna sector was biting its nails, sustained growth figures in the city's livestock and agriculture sectors indicate that the city has not been sitting idle. As municipal fisheries continued their nose dive, the production of poultry, swine and cattle led an aggressive charge for sources of protein. Aquaculture has emerged as a new player of promise. Palay and Banana delivered robust growth over an

18-year span, while Corn and Copra held steady. For General Santos, new foundations appear to be generally in place, for enhanced self-sufficiency and food security.

Within the city, the number of bank accounts and deposit values grew bullishly over the last six years. In parallel, the city's financial reserves have risen more than 2000% over the last decade. Although average family savings in General Santos were relatively high, they have remained relatively flat over that same period. In contrast, average family savings have risen 40% in Puerto Princesa, 194% in Butuan and 268% in Santiago.

Economic formulas have a limited shelf life. As social needs change, so do markets. A city's business models should be founded on strategic awareness of opportunity sets that fuel continuous investment in the drivers of future competitiveness.

A climate-defined future will spawn non-linear, highly variable patterns. Management of a city will require complex thought that government cannot handle on its own. This is especially true for cities, like General Santos, that depend on trade for growth. The greater private sector – both rich and poor - have important roles to play. To build a sense of local ownership, all these collaborative efforts must be founded the creation of shared value. General Santos is at a turning point, and this is the city's new frontier.

PUERTO PRINCESA CITY

CLIMATE / ENVIRONMENTAL EXPOSURE

Puerto Princesa is located within a Type 3 climate zone – characterized by relatively dry weather from November to April, becoming generally wet for the rest of the year. Over the last 52 years, 98 typhoons have tracked through Puerto Princesa. Like Butuan, Puerto Princesa is exposed to all 6 climate impacts listed in the 2009 WWF study on the Coral Triangle and Climate Change.

For both rainfall and temperature, Puerto Princesa data indicates clear upward trends. Over the last 20 years, the city's annual rainfall shows pronounced inter-annual variability, with an annual average of 1543mm, a high of 2594mm, and a low of 986mm. **The 20-year trend line shows that Puerto Princesa's annual rainfall is increasing.** Annual average temperatures in the city have logged a high of 28.4C, and a low 26.8C. **These annual average temperatures are increasing, as well.**

Puerto Princesa is certainly not typhoon free. Over five decades, 98 storms have tracked through the city - an average of two storms per year.

SOCIO-ECONOMIC SENSITIVITY

Land Area 2539.82 SQ KM
2010 Population 222,673
2010 Pop Density 88 / SQ KM
Classification - Highly Urbanized City

Puerto Princesa's population has increased 142% over two decades – translating to a booming 7.1% per year. **Of the four cities covered by this assessment, the city has registered the highest rate of population growth.** With such a large land area, the city (like Davao) is clearly emerging as a migratory sink. Population density remains relatively low, although it has increased from 36 persons / sq km to 88 persons / sq km. **Of the four cities in this phase, these are the lowest population density figures.**

Housing Units in Puerto Princesa grew from 17,616 in 1990 to 50,669 in 2010. This 187% increase translates to an average annual growth of 9.38%. **Of the four cities in this assessment, these are the highest average annual growth figures for housing units.** For density per housing unit as of 2010, Puerto Princesa registered 4.31 persons/unit.

No enrollment or school data was available for Puerto Princesa.

The city's current Total Road Network covers 1826.76 kilometers, 74.7% of which is paved. **This represents the highest percentage of paved roads for this fourth assessment.** Puerto Princesa has 0.54 kilometers of paved road for every square kilometer of land area.

Motor Vehicles in Puerto Princesa have increased from 6,013 in 1991 to 39,731 in 2013. This 560% increase over 22 years translates to an average annual increase of 25% per year. **Among the four cities in this assessment, Puerto Princesa has registered the highest average annual increase in motor vehicles.** As of 2013, the city had 22 vehicles per kilometer of roads. Due to the city's extensive road network – both paved and unpaved - **Puerto Princesa registered the lowest vehicle density in this phase.**

Echoing the General Santos experience, sea-borne passengers to and from Puerto Princesa decreased by 55% over 12 years - from 213,046 in 2000 to 96,728 in 2012. The number of shipcalls to the city also dropped from 3,648 in 2000, down to 1,089 in 2012.

In contrast, the annual volume of domestic cargo rose 108% over 22 years – from 418,241 metric tons in 1990, up to 872,003 metric tons in 2012.

The boom in aircraft traffic and budget fare options made Puerto Princesa what it is today. Over 11 years, air passenger traffic skyrocketed 598% from 189,412 in 2001 to 1,322,925 in 2012. This translates to a phenomenal 54% per year increase on the average. **Of all the cities covered by this assessment, Puerto Princesa takes the top slot both for the number of air passengers as well as growth of air passenger traffic.** Air cargo volumes grew as well, increasing 182%, or 16.5% per year, from 3,885,907 kilos in 2001 to 10,938,901 kilos in 2012. These performance figures underscore the crucial importance of all-weather airports for Puerto Princesa.

As a consequence of all this, tourist arrivals in Puerto Princesa broke all records – setting new standards for tourism growth at 8892% over 22 years – from 7,707 in 1991 to 692,982 in 2013.

With the upturn in tourism, the number of hotels in Puerto Princesa boomed 136% in barely three years - from 99 in 2011 to 234 in 2013. From 1,896 rooms in 2011, the number hotel rooms in the city leaped to 3,808 in 2013.

The number of LGU registered business establishments in Puerto Princesa increased from 6762 in 2009 to 8682 in 2013. A 28% increase over 5 years translates to an average growth of 5.6% per year.

As the economic gateway of the province, much of Palawan's exports are booked through, or recorded in the Bureau of Customs at Puerto Princesa. These export values from foreign trade have risen by 130% over 5 years – from US$ 466 Million in 2009 to US$ 1.07 Billion in 2013.

In 2013, the major export earners for the province of Palawan, as booked through Puerto Princesa, were: Malampaya Condensate valued at US$ 399,791,219; Nickel Cobalt (Mixed Sulfide) valued at US$ 290,461,219; Nickel Ore valued at US$ 237,813,696 and Palawan Light Crude Oil valued at US$ 142,384,743.

Although Puerto Princesa tops the list for export values, edging out General Santos in this phase, all its major export earners are extractives and can only be sustained for a limited term.

For livestock, Puerto Princesa's figures are a mixed bag. Poultry production, over 18 years, has grown by 200% - from 515,118 heads in 1996 to 1,542,855 heads in 2013. In sharp contrast, swine production is lackluster, sliding down from 37,180 heads in 1996 to 34,989 heads in 2013. Cattle production has decreased from 3,339 heads in 1996, down to 2,390 heads in 2013. Goat production dove 50% down, from 1,595 heads in 1996 to 795 heads in 2013.

Puerto Princesa's fisheries do not bring good news. Commercial fisheries production has remained flat for 5 years. Although Palawan's seas continue to be recognized as one of the most productive in the country, commercial output has remained pegged at 1,245 metric tons. Municipal fisheries production has dropped 49% for the same period, sliding down from 2,863 metric tons in 2009, to 1,469 metric tons in 2013. Aquaculture, though a extremely small player in this sector, delivers the only good news for Puerto Princesa, with a 726% increase over five years, rising from barely 5.6 metric tons in 2009 to 46.57 metric tons in 2013.

Grain production figures are mixed as well. Palay production grew 58% from 3,434 metric tons in 1996 to 5,420 metric tons in 2013. In contrast, Corn production fell 88%, crashing from 1,757 metric tons in 1996 to barely 195 metric tons in 2013.

For other agricultural crops, vegetable production emerges as a bright spot, increasing 2703% over 14 years, from 68.2 metric tons in 2000 to 1,912 metric tons in 2013. Mango production, a traditional Palawan crop, has muddled through with an extremely modest increase of barely 12% over 18 years. Mango output has struggled from 1,311 metric tons in 1996 to 1,470 metric tons in 2013.

The number of building construction permits issued by Puerto Princesa each year, increased by 163% over 19 years, from 170 in 1995 to 447 in 2013.

The assessed value of taxable lands has risen 2737% over 24 years from P145 Million to P4.1 Billion.

The number of real property units within Puerto Princesa has increased 205% over 24 years - from 15,794 in 1990 to 48,133 in 2013.

Energy consumption within Puerto Princesa has increased 118% over 14 years, from 64,268 megawatt hours in 2000, to 140,204 megawatt hours in 2013. Annual electrical consumption is 0.63 mwh per capita.

Water consumption has grown much more. Rising 159% over 24 years, from 3.1 Million cubic meters in 1990 to 7.96 Million cubic meters in 2013. Annual water consumption per capita in Puerto Princesa is 35.9 cubic meters. **Of the four cities covered, Puerto Princesa consumes the most water per capita.**

ADAPTIVE CAPACITY

A self-rating of 5.00 is a perfect score. The Puerto Princesa City government gave itself "excellent" ratings in 17 out of 20 criteria that make up the LGPM score sheet, or an average score of 4.90 for 2011.

Areas of Governance	Puerto Princesa City				
	2009	2010	2011	2012	Difference (2012 and 2011)
Administrative Governance					
Local Legislation	4.06	4.89	4.89	5.00	0.94
Development Planning	4.91	5.00	5.00	5.00	0.09
Revenue Generation	3.33	3.67	3.67	3.00	(0.33)
Resource Allocation and Utilization	4.00	5.00	5.00	5.00	1.00
Customer Service - Civil Applications	4.55	5.00	5.00	5.00	0.45
Human Resources Management and Development	5.00	5.00	5.00	5.00	-
Economic Governance					
Support to Agriculture	4.67	4.71	4.81	5.00	0.33
Support to Fishery Services	4.75	4.80	4.80	5.00	0.25
Enterpreneurship, Business and Industry Promotion	3.67	4.83	4.83	5.00	1.33
Social Governance					
Health Services	4.93	5.00	5.00	5.00	0.07
Support to Education Services	4.80	5.00	5.00	5.00	0.20
Support to Housing and Basic Facilities	3.00	5.00	5.00	5.00	2.00
Peace, Security and Disaster Risk Management	4.75	5.00	5.00	5.00	0.25
Environmental Governance					
Forest Ecosystem Management	4.33	5.00	5.00	5.00	0.67
Freshwater Ecosystems Management	5.00	5.00	5.00	5.00	-
Coastal and Marine Ecosystems Management	5.00	5.00	5.00	5.00	-
Urban Ecosystems Management	4.75	4.78	4.88	5.00	0.25
Valuing Fundamentals of Governance					
Participation	5.00	5.00	5.00	5.00	-
Transparency	5.00	5.00	5.00	5.00	-
Financial Accountability	3.44	4.48	4.76	4.92	1.48

Puerto Princesa's scores, both for crime solution efficiency and crime clearance efficiency were not available.

Over 11 years, City Savings in Puerto Princesa increased 179%, from P285 Million in 2002 to P795 Million in 2013. Per capita city savings, for a 4-year period, rose from P241.70 per capita in 2007 to P1,877 per capita in 2010. **Of the four cities assessed here, Puerto Princesa shows the highest reserves per capita.**

The employment rate for Region 4B, over a 17-year period, rose from 92.9% in 1996 to 96% in 2013. Functional literacy for the Region dipped from 88% in 1994 down to 83.9% in 2008. The Human Development Index for the province of Palawan declined from 0.517 in 1997 down to 0.498 in 2009.

Average family savings for Region 4B increased by 190% over an 21-year period, from P14,142 in 1991 to P41,000 in 2012.

The number of banking offices in Puerto Princesa increased 82% over a 6-year period, from 17 in 2008 to 31 in 2013. The number of bank accounts increased as well, rising 24% for the same period, from 100,600 in 2008 to 124,562 in 2013. Deposit values for the period rose 108%, from P5.9 Billion in 2008 to P12.3 Billion in 2013.

For Region 4B, total regional deposits grew 235% over 12 years, from P10.6 Billion in 2002 to P35.4 Billion in 2013. Total Regional Loans rose 126%, over the same period, from P4.2 Billion in 2002 to P9.5 Billion in 2013.

SCENARIO BUILDING WORKSHOP

List of Development Drivers

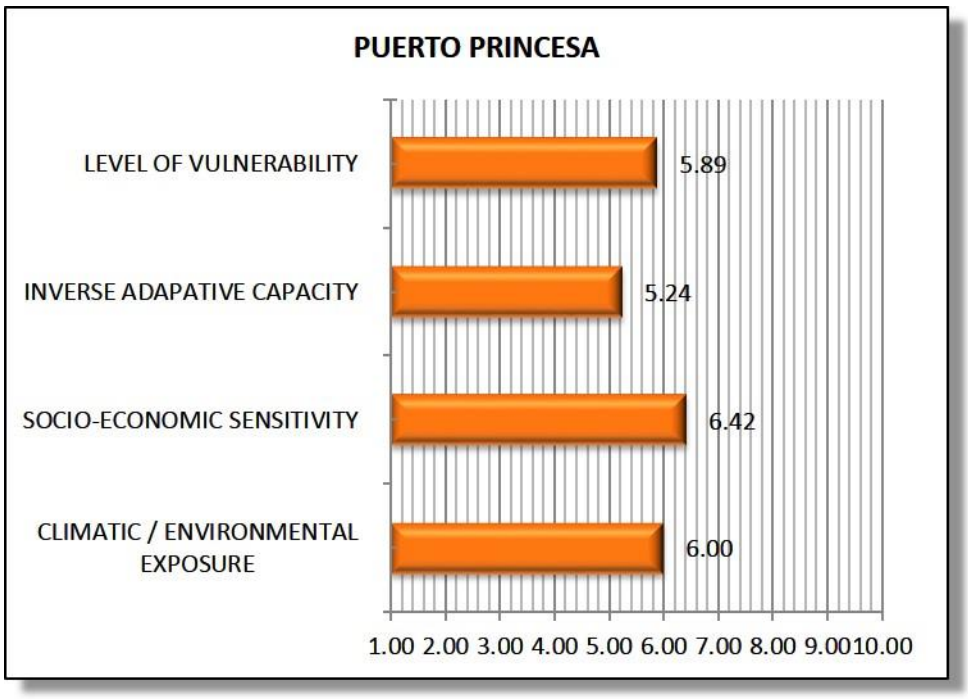
Primary Drivers	**Natural Resources Management** **Governance**
Secondary Drivers	**Energy** **Education** **Tourism** **Values** **Economic** **Demographic** **Waste Management** **Politics** **Infrastructure** **Peace, Order and Security**
Distinctive Scenario Descriptors	Q1: Palawan Gising! Bangon!Aksyon Agad! (Palawan, Wake Up! Rise Up! Act Fast!) Q2: Puerto Princesa: Paradise ofAsia Q3: Angat Puerto Princesa (Rise Puerto Princesa) Q4: The Ghost City

Scenarios Developed

Negative Natural Resources Management / Positive Governance
Positive Governance / Positive Natural Resources Management
Positive Governance / Negative Natural Resources Management

Negative Governance / Negative Natural Resources Management

The narratives containing a summary of scenarios developed by Puerto Princesa stakeholders are provided as an annex.



ASSESSMENT & INTEGRATION

The city of Puerto Princesa sits at the waistline of a long and slender island. In many ways, it exists in a world all its own.

Perched on a separate geological plate stretching out toward the westernmost reaches of the Philippine archipelago, the province of Palawan is entirely surrounded by the sea. It is the only major Philippine island that is earthquake free. It is this isolation that made Palawan a very special place. It is also this isolation that will define the island's climate-related challenges.

Puerto Princesa was founded in gentler times – when rivers were roads and the sea was a highway. Named after a daughter of the Spanish queen, Isabela, the city developed in the embrace of a sheltered bay, along Palawan's eastern coast. Hemmed in by large swaths of mangrove and upland forest, Puerto Princesa faces the vast Sulu Sea.

Although the city has had to deal with its fair share of typhoons, most storm impacts felt here have come from peripheral effects, rather than from the extreme violence surrounding a typhoon's eyewall. In the relatively rare instance of a direct hit, most Pacific storms that track through here have already been robbed of energy by their passage over

the Visayas or Mindanao. Over 20 years, typhoon-related disruption hovered at less than 11 days per year.

In recent years, however, the seas just west of Palawan have warmed up sufficiently to fuel occasional cyclo-genesis. These incidents have remained few and far between. This is one possible development, however, that Puerto Princesa should keep track of.

Although the city's average elevation is 20 meters above sea level, its very crucial airport and seaport are right by the sea. The same can be said for several of the city's main arteries and highways that keep it connected to northern and southern towns of the province. They will be vulnerable to the winds and rainfall that accompany intense storms, not to mention, storm surge. The city's historical dependence on imported goods is likely to face challenging times.

Although current geo-hazard maps indicate a low susceptibility to flooding, heavier rainfall and sea level rise may alter that equation, especially for the city's lower portions. Coral reefs that fringe the city's coastal zones, as well as the artisanal fisheries that rely on reef productivity, will be exposed to El Nino related phenomena, such as rising sea temperatures. Back in 2010, the first reported spike of ocean acidification came from Palawan's waters. Tourism has become important to the city. Most new hotels are within the relatively-flat city center, and almost all resorts are by the sea. When all this comes to play, that fast growing sector will not be left unscathed.

High population growth is thickening Palawan's waistline. Although Puerto Princesa recorded an average population growth of 7.1% per year - the highest of the four cities in this assessment - its land area is huge. As a result, population density sits at barely 88 persons per square kilometer. This represents the lowest figures for all 16 cities assessed thus far. Like Davao and Zamboanga, it is a migratory sink. In alignment with population growth, Puerto Princesa delivered the highest increase in housing units over 20 years – approaching 10% per year. It also recorded the highest increase in motor vehicles – averaging 25% per year. Despite this, the city still boasts the lowest density of vehicles per kilometer in this phase, due to its extensive road network. Vacuums fill up quickly. This is no time for Puerto Princesa to rest on its laurels.

Like General Santos, shipborne passengers and cargo, to and from Puerto Princesa, have shown a sharp decline. To a great extent, the city thrives today due to increased airborne options, and budget fares. There are 22 flights per day, to and from the city, from various parts of the country. Back in 2012, more than 1.3 Million passengers passed through this airport. These figures continue to grow.

The province of Palawan is the hub for a host of superlative natural attractions. The entire island is a UNESCO Man and Biosphere Reserve. No major heavy industries are allowed here. The Underground River and Tubbataha Reef are both UNESCO World Heritage Sites. A new

concrete highway, connecting the city to the province's northern tourism zones - El Nido and Taytay - is due for completion soon. Unlike General Santos, tourism in Puerto Princesa has boomed over 23 years. In this phase, the number of hotels and rooms within the city stand head and shoulders above everyone else. There is simply no comparison.

Beyond tourism, Puerto Princesa serves as Palawan's economic gatekeeper. All of the province's exports are booked here. For a province that is widely known as one of the "greenest" in the country, it may be surprising to find out that Palawan's top foreign exchange earnings come from the extractives sector. This is one of Palawan's little-known secrets. Records from the Bureau of Customs show that the province's main exports are Natural Gas Condensate from Malampaya, Nickel Cobalt, Nickel Ore and Palawan Light Crude Oil. Collectively, revenues from these sectors place Puerto Princesa as the top export earner for this assessment, edging out General Santos by a hair's breadth.

Traditionally, Palawan has relied heavily on imports to keep its population supplied and fed. And, with the tourism boom, import reliance is not going to help keep costs attractive. This may be changing. Over the last decade and a half, poultry, palay and vegetable production in and around Puerto Princesa have yielded phenomenal increases. Aquaculture, though still a relatively small sector, is following suit. Data on the city's wild catch fisheries indicate that, at least within the city itself, this will not remain viable for much longer. The high prices of wild caught fish in the city's market provide further evidence that demand may already be outstripping supply. Seeing that the number of residents and transients within Puerto Princesa continue to leap upwards, ecologically-certified fish farms may be the only way for the city to sustainably produce more with less. Puerto Princesa continues along this long road to self-sufficiency. This is positive, and must be encouraged. Unless you really like chicken, however, much more needs to be done.

The effects of Puerto Princesa's rapid increase in population – both resident and transient – are evident on both energy and water consumption. The recent multi-stakeholder initiative to craft an innovative energy development plan for the whole province will soon provide a stable, and cost-effective, multi-technology platform to address this growing need.

Over the last two-decades, the people of Puerto Princesa have supported the effort to protect and renew the city's watersheds in Irawan. As the need for water increases, this investment will yield untold benefits. Puerto Princesa should keep this going. The people of the city have everything to gain by advocating multi-sourced options that make use of both rain and surface water. Groundwater should be a last option.

In more ways than one, Puerto Princesa sits on precious land. Over 23 years, the assessed value of taxable lands in the city increased by 28 times its original value. This is the highest increase of all four cities assessed. As of 2013, taxable lands in Puerto Princesa had an aggregate value of P4.1 Billion – the highest value of all cities in this phase. Looking back at the social and economic milestones that this city has driven past, one can guess why this is all happening. Puerto Princesa has been "discovered", and a variety of players are jockeying for position.

Puerto Princesa appears to be well-positioned, for now. However, there are a number of elements that still need to be put in place, if the city seeks to sustain growth, remain viable and aim to thrive despite a climate-defined future.

In recent history, many areas in Palawan, as well as in other parts of the country, that have suffered through storms and their related impacts, have reported these phenomena generally blow in from the east. Unless this historical pattern shifts, the city should take a long hard look at its western options. Although Puerto Princesa straddles both the east and west coasts of Palawan, most development is confined to its eastern geographies. This is concentrated risk. There are advantages to being on a skinny island. One side is always on the lee. And, the west is not far away. Seeing Puerto Princesa's high dependence on air and sea transport, it may serve the city well to explore the possibility of diffusing risk by creating redundant land, air and sea options on both coastlines of the city.

Over a multi-decade term, the city's current economic drivers are not sustainable. Extractives only last for so long. Mining comes and goes. Although prices for natural gas and oil are expected to increase over the next two decades, the markets for renewable self-sufficiency are growing at a much faster rate. If you were in the business of whale oil today, virtually no one would be interested in your product.

Tourism can be here today, and gone tomorrow. While it is here, however, it can provide a development cushion that can generate reserves to fund development alternatives. But, tourism must be managed properly to ensure that crucial environmental services are sustained, and the revenues from tourism must be invested judiciously and strategically.

Both sectors are vulnerable to shifting market preferences arising out of climate change. Puerto Princesa needs to look at these two economic sectors as transient platforms that both the city and the province can use to forge a more stable and sustainable future. As a city on an island that sits alone, out in the west, Puerto Princesa should aim to be self-sustaining and self-sufficient. When push comes to shove, it must be able to fend for itself. For Puerto Princesa, the fundamentals are in place. The challenge is to keep the ball in play.

SANTIAGO CITY

CLIMATE / ENVIRONMENTAL EXPOSURE

Santiago is located at a confluence of climate types. Although city itself sits at the southern tip of a Type 3 climate zone, the geography just east of the city falls climate Type 4, while the provinces west of Santiago fall under climate Type 1. Over the last 20 years, 66 typhoons have tracked through Santiago. As an inland city, far away from the ocean, sea level rise and ocean acidification are unlikely to directly affect Santiago. However, it is vulnerable to the remaining four impacts including El Nino related phenomena, rising temperatures, destructive storms and intense rainfall.

In this fourth set of assessments, **Santiago appears to have the highest exposure to typhoons, averaging slightly more than three per year over the last 50 years.** This comes as no surprise since the northeast coast of Luzon sits right along the Philippines' typhoon alley during the months of the southwest monsoon.

Fortunately, Santiago sits in the "wind shadow" of the mountain ranges that hem the city, providing it some level of storm protection. Rainfall, in and around Santiago, exhibits inter-annual variability, an annual average rainfall of 1693mm, a high of 2858mm, and a low of 1056mm. Although current geo-hazard maps indicate a susceptibility to some flooding, this may change as the city's **20-year rainfall records show a clear upward trend.**

Historically, the northern Cagayan Valley has logged some of the hottest temperatures registered in the Philippines. 30-year temperature data from Santiago shows a different pattern. Though manifesting inter-annual variability – with an annual average high of 28.6C and a low of 25.2C - **average temperatures in and around the city appears to be relatively stable.**

The Cagayan River drains water from three mountain ranges. Through the years, this river has become increasingly shallow. The increasingly deforested hillsides of these three ranges will most certainly reduce their capacity for water absorption. This will also fuel increased run-off. **These factors will pose challenges for the drainage capacity of the Cagayan River, leading to the greater probability of floods.**

Sea levels do not rise uniformly. Sea level spikes are likely to spawn further changes in the depth, breadth and salinity of the Cagayan River. Such an occurrence may spawn systemic marginalization of an increasing number of farms that line the river, leading to indirect social and economic impacts for Santiago City.

SOCIO-ECONOMIC SENSITIVITY

Land Area 274.06 SQ KM
2010 Population 132,804
2010 Pop Density 485 / SQ KM
Classification - Independent Component City, 1st Class

Over a 20-year span, the population of Santiago has grown 46% from 90,787 to 132,804. This translates to barely 2.3% per year. Population density has increased from 331 per sq km to 485 per sq km.

Housing Units within Santiago increased from 17,451 in 1990 to 30,823 in 2010. This 77% increase over 20 years translates to a relatively low 3.85% average annual growth for housing units. Despite this relatively low growth rate in total units, **Santiago logged in with 4.31 persons/unit - the lowest density per housing unit for 2010.**

Within Santiago, school enrollment grew by only 3% over a five-year period, from 40,311 in 2008 to 41,449 in 2012. Relatively speaking, this is a young city, with 31.2% of Santiago's population enrolled in school. Despite these relatively high enrollment figures, it is surprising to see a 0.6% growth per year in enrollment. This represents barely a quarter of the city's population growth rate.

The city's current Total Road Network covers 440.08 kilometers, 49.1% of which is paved. Santiago has 0.79 kilometers of paved road for every square kilometer of land area. **Exceeding Puerto Princesa, this is the highest paved road / sq km ratio for the cities covered by this fourth assessment.**

Motor vehicles in Santiago increased from 4,580 in 1995 to 19,667 in 2013. This 329% increase over 18 years translates to an average annual increase of 18%. As of 2013, the city had 45 vehicles per kilometer of roads.

Historically, air travel was not the transport mode of choice for Santiago. However, with the advent of budget fares and many more aircraft, this has changed. Air passenger traffic to Santiago (via Cauayan) increased 385% over 11 years - from 9,254 in 2001 to 44,908 in 2012. This is an average increase of 35% per year. Unlike the three other cities covered by this assessment, however, air cargo volumes increased only slightly by 21% over 11 years – from 235,548 kilos in 2001 to 284,919 kilos in 2012. For cargo, land transport to and from Santiago may remain the mode of choice.

No data on tourist arrivals, number of hotels or hotel room figures were available for Santiago.

The number of LGU registered business establishments increased from 3080 in 2011 to 3318 in 2013. A 7.7% increase over three years translates to an average growth of 3.85% per year. **This represents the lowest growth rate for LGU registered businesses in this fourth phase.**

When it comes to cereals, or grain production, the province of Isabela has few peers. Over 23 years, Palay production in Isabela Province grew by 60%, from an already astronomical base of 781,685 metric tons in 1990 to 1,249,873 metric tons in 2013. Corn production delivered even better growth figures. From a starting figure of 458,868 metric tons in 1990, corn production grew 157%, hitting 1,177,200 metric tons in 2013.

Livestock production growth remained in the positive realm, with the exception of carabaos. Swine production increased 15% over 8 years, growing from 31,906 heads in 2006 to 36,829 heads in 2013. Cattle production did better, increasing 44% over the same period, from 2,163 heads in 2006 to 3,113 heads in 2013. Carabao production dropped from 3,002 heads in 2006 to 1,088 heads in 2013.

Over 6 years, the number of building construction permits issued in Santiago remained relatively flat – hovering between 185 in 2008, to 182 in 2013.

The assessed value of taxable lands increased 204% over 10 years, rising from P279 Million in 2004, to P848 Million in 2013.

The number of real property units increase nominally over 10 years, growing from 30,225 units in 2004, to 38,445 units in 2013.

Water consumption rose 44% over 5 years, growing from 1.6 Million cubic meters in 2009 to 2.2 Million cubic meters in 2013. Annual water consumption per capita in Santiago is 16.5 cubic meters. **Of the four cities covered by this assessment, Santiago has lowest water footprint per capita.**

ADAPTIVE CAPACITY

A self-rating of 5.00 is a perfect score. The Santiago City government gave itself “excellent” ratings in 7 out of 20 criteria that make up the LGPM score sheet, or an average score of 4.37 for 2012.

Areas of Governance	Santiago City				
	2009	2010	2011	2012	Difference (2012 and 2009)
Administrative Governance					
Local Legislation	4.45	4.92	4.92	4.92	0.47
Development Planning	5.00	5.00	5.00	5.00	-
Revenue Generation	3.59	3.59	3.50	2.93	(0.66)
Resource Allocation and Utilization	4.88	5.00	5.00	5.00	0.12
Customer Service - Civil Applications	4.80	5.00	5.00	5.00	0.20
Human Resources Management and Development	4.60	4.60	5.00	5.00	0.40
Economic Governance					
Support to Agriculture	NA	NA	4.71	4.71	-
Support to Fishery Services	NA	NA	NA	NA	NA
Enterpreneurship, Business and Industry Promotion	4.48	4.11	4.33	4.04	(0.44)
Social Governance					
Health Services	5.00	4.81	4.84		(5.00)
Support to Education Services	4.10	4.40	4.75	4.75	0.65
Support to Housing and Basic Facilities	5.00	5.00	5.00	5.00	-
Peace, Security and Disaster Risk Management	5.00	5.00	5.00	4.76	(0.24)
Environmental Governance					
Forest Ecosystem Management	NA	NA	NA	NA	NA
Freshwater Ecosystems Management	NA	NA	NA	5.00	-
Coastal and Marine Ecosystems Management	NA	NA	NA	NA	-
Urban Ecosystems Management	4.88	4.05	4.75	4.63	(0.25)
Valuing Fundamentals of Governance					
Participation	4.00	4.00	4.00	4.00	-
Transparency	4.87	5.00	5.00	5.00	0.13
Financial Accountability	4.80	4.64	4.64	4.63	(0.17)

Santiago City's scores, both for crime solution efficiency and crime clearance efficiency were not available.

City savings over an 11-year period remained relatively stable, from P119 Million in 2002, to P131.6 Million in 2012. Per capita city savings, over a 4-year period, remained at healthy levels, rising 84% from P1017 per capita in 2007 to P1,868 per capita in 2010.

For Region 2, the employment rate over a 17-year period though relatively flat, remained high, rising 11% from 97.1% in 1996 to 96.7% in 2013. Functional literacy rates teetered between 86.6% in 1994 to 86.1% in 2008. The Human Development Index for the province of Isabela increased slightly, from 0.568 in 1997, to 0.603 in 2009.

Average family savings for Region 2 grew strongly over an 21-year period, rising 406% from P10,859 in 1991 to P55,000 in 2012. **Of the four cities assessed, Santiago has delivered the highest average family savings.**

The number of banking offices in Santiago City grew by 21% over 6 years, from 24 in 2008 to 29 in 2013. The number of bank accounts increased by 42% for the same period, rising from 91,097 to 129,165. Deposit values grew by 56%, increasing from P7.9 Billion to P12.4 Billion.

Total Regional Deposits for Region 2 rose 236% from P19.1 Billion in 2001 to P64 Billion in 2013. Total Regional Loans, for the same period, rose 152% from P8.6 Billion in 2002, to P21.7 Billion in 2013.

SCENARIO BUILDING WORKSHOP

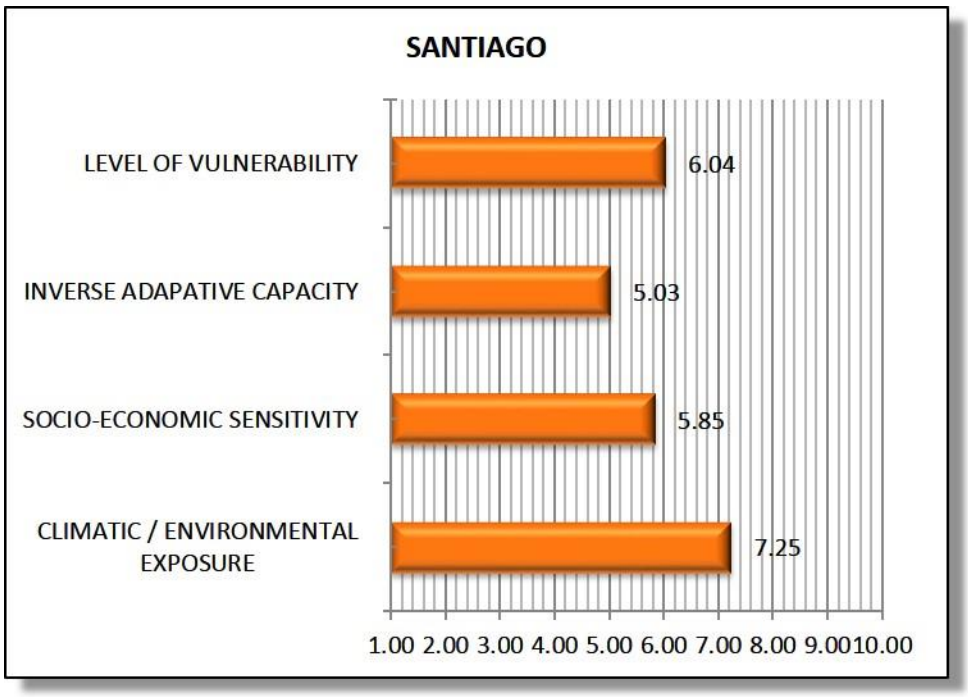
List of Development Drivers

Primary Drivers	**Education** **Politics and Governance**
Secondary Drivers	**Values** **Environment** **Technology** **Economics** **Health** **Infrastructure**
Distinctive Scenario Descriptors	Q1: SINtiago Blooms Q2: Santiago City: Booming Economy in the Country Q3: Boom Panes: Boom sa Education, Panes sa Governance Q4: From Chalk to Uling

Scenarios Developed

Negative Education / Governance and Politics
Positive Education / Positive Governance and Politics
Positive Education / Negative Governance and Politics
Negative Education / Negative Governance and Politics

The narratives containing a summary of scenarios developed by Puerto Princesa stakeholders are provided as an annex.



ASSESSMENT & INTEGRATION

Spread out in the western lee of the Sierra Madre mountain range, the sprawl of Cagayan Valley dominates northeastern Luzon. Sitting just north of Dalton Pass, a crucial trade artery that cuts through the Caraballo Range, Santiago serves as the southernmost gateway to this major granary of rice and corn. This city is both a production area and a primary economic link connecting the farms and traders of Isabela province with the booming markets of southern Luzon.

Storms, particularly in the third quarter, will continue to bedevil this region. Although temperature data reveals no rising trend, more episodes of intense rainfall are likely.

Santiago is situated amid multiple confluences. This is where three climates types meet and three mountain ranges touch, allowing many cultures to interact through history. This is a place where deals are made.

More than simply just another farming community, Santiago City is a center of trade. The bulk of outbound commodities that fuel the city's economy come from Cagayan Valley. Rice and corn production define the Valley. Historically, the great Cagayan River has provided conditions conducive to the cultivation of many crops, particularly grain. But weather patterns are changing.

Sea levels will rise. Although Santiago sits far away from the sea, the Cagayan River drains into the Babuyan Channel at Aparri. As oceans rise, this river may find itself shifting from an outlet of fresh water, to an inlet for seawater. Changes in salinity will, no doubt, impact the viability

of rice and corn farms located along its banks. This will affect supply. It will also affect trade.

With a land area that is comfortably-sized, and a population growth rate that is only slightly higher than national averages, Santiago appears to be developing "within its means". The growth data on housing, motor vehicles, livestock production and the number of registered businesses seem to corroborate this.

The introduction of budget fares and more commercial aircraft has energized activity in nearby Cauayan Airport. This revived access point for the city, as well as the province, breaks the mold of moderation. Here, rapid expansion is apparent.

Santiago City's road network is exceptional. It scores high for this phase, with 0.79 kilometers of roads per square kilometer, 49% of which are paved. After all, the delivery of rice and corn depend on roads. And, this region's core business is precisely that.

With over a third of the city's land area dedicated to palay production, it is no surprise that Santiago logged in with the highest production figures for this phase. Butuan came in second. Although Santiago's palay output makes up less than 5% of Isabela's total palay production, its production figures from 8 years ago were already higher than Butuan's current palay output.

Corn production for the province is expanding even faster. Topping the list with an output of 1.177 Million metric tons in 2013, Isabela was miles ahead of second runner, General Santos, whose output was only in the area of 20,000 metric tons. Over 24 years, corn production in the province, has increased by an average of 11% per year.

IRRI has said that, for wet paddy cultivation, it takes close to 4000 liters of water to grow one kilo of rice. Over the last 5 years, Santiago's population grew at an average of 2.3% per year, and yet, water consumption rose at an annual average of 8.8% for the same period. No forests? No water. No water? No rice. If the timing, quantity and quality of water are to become a bane, then the management of fresh water emerges as a priority imperative for Santiago city. Too much is at stake here, and Luzon has to eat.

With all this increased economic activity, are the people of Santiago making money? Apparently, yes. For 16 years, employment rates for Region 2 were reported at the 97% levels. For this assessment, Santiago topped the list for average family savings, as well as the growth rate for average family savings. This is reflected in the increases registered both for bank accounts and deposit values. For the province, the human development index climbed from .558 in 1997 to .627 in 2009. Despite the relatively moderate public and private investments made in key socio-economic variables, this new wealth is not reflected in the level of city reserves. If government is to take on a lead role in steering

Santiago toward resilience and competitiveness, this matter should be addressed.

Some old Spanish maps referred to the eastern coast of Isabela as La Contra Costa – the far coast. In those days, waterways were much more important than they are today. The rivers of Pampanga and Bulacan served Manila and its ship-borne cargoes rather well. Flat surfaces were easier to deal with than slopes. And so, much early development shifted west, to the Central Plain of Luzon. This geographical focus left Cagayan, Isabela and the provinces of the east to their own devices.

Roads have long since been replaced rivers as conveyors of commerce. With the realization that more rainfall is to be expected over Luzon, and that the island's broad central expanse is really the flood basin that will drain increasing volumes of water into Manila Bay; the long-term viability of the North Luzon Expressway has come into question. If Manila is to maintain its social and economic linkages with the north of Luzon, an alternative highway must be built, veering away from these known flood zones. Tracking north, while staying away from the sea, this new trade artery must take advantage of the protection provided by Luzon's eastern geography along an inland route. Once again, this will not be cheap. But, if the Cagayan Valley is to embrace this opportunity to position itself as a major contributor to food security in Luzon, it has to be done.

Although this new possibility looms for Nueva Ecija, Nueva Vizcaya, Isabela and Cagayan, major new roads can be objectively justified only if they connect centers of economic activity. If Santiago is able to sustain its lead economic role, this road will have to go through the city. To make this happen, then Santiago, along with the major population and business centers of the east, have to collaborate on a formula for sustained economic growth, in a climate-defined future.

How might the Cagayan River be managed to mitigate floods and forestall saltwater intrusion? How might the forests of the Sierra Madre, Cordillera and Caraballo be restored to fuel aquifers through better absorption of rain while reducing run off? How might the roads of the Region be re-configured to allow all-weather movement of goods and services – particularly rice and corn? These are difficult challenges that Santiago cannot address alone. Lasting solutions will have to come from a community of cities and towns who share an interest in the future of this Region. They will need a convenor.

Within Isabela, Santiago has always been a point of confluence, where people and ideas came together in convergent and mutually beneficial action. This impending challenge may be the city's signal opportunity to draw on its historical strengths and assemble a community of the willing to collectively draw up and invest more thoughtfully in a forward-looking regional socio-economic strategy.

Climate change poses new threats. It also offers new opportunities for a city to plan, to prepare, to position. Despite many dire predictions, life in the Valley must go on. And, it will. What better place to open that door than at the gateway itself?

REFERENCES

BAGUIO CITY

Variable	Source of Data
Total Annual Amount of Precipitation	PAGASA, 1990-2010
Annual Mean Temperature	PAGASA, 1990-2010
Total Annual Number of Typhoons	PAGASA, 1990-2011
Total Annual Population	Office of the City Planning and Development Coordinator, 1990-2010
Total Annual Population Density	Office of the City Planning and Development Coordinator, 1990-2011
Total Annual Number of Housing Units	National Statistics Office, 1990-2010
Total Annual Number of Enrolled Students	Office of the City Planning and Development Coordinator, 1990-2010
Total Annual Production Volume of Vegetables and Cut Flowers	Bureau of Agricultural Statistics, 1995-2010
Total Annual Production Volume of Livestock and Poultry	Bureau of Agricultural Statistics, 1995-2010
Total Annual Number of Tourist Traffic	Office of the City Planning and Development Coordinator, 1990-2010
Total Annual Number of Rooms	National Statistical Coordination Board, 1999-2008
Annual Mean Occupancy Rate	National Statistical Coordination Board, 1990-2010
Total Annual Value of Investments	City Treasury Office, 1990-2010
Local Governance Performance Monitoring System	Department of Interior and Local Government, 2009-2010
Total Annual Number of Employed	National Statistics Office, 1990-2010
Total Annual Number of Employed by Occupation Group	National Statistics Office, 1990-2010
Annual Mean Functional Literacy in CAR	National Statistics Office, 2003 & 2008
Annual Mean Value of Family Income	National Statistics Office, 1990-2010
Total Audited Annual City Income, Expenditure, and Savings per Capita	Commission on Audit, 2004-2008
Total Annual Number of Banking Offices, Number of Accounts and Deposits	Philippine Deposit Insurance Commission, 2009-2010
Annual Mean Human Development Index Value	Human Development Network, 2003-2006

CEBU CITY

Variable	Source of Data
Total Annual Number of Typhoons	PAG-ASA, 1990-2009
Total Annual Number of Typhoons	PAG-ASA, 1990-2009
Total Annual Population	National Statistics Office, 1990-2010
Total Annual Population Density	National Statistics Office, 1990-2011
Total Annual Number of Business Establishments	Cebu City Management Information and Computer Services, 1995-2010
Total Annual Volume of Cargo Discharged and Unloaded at the Ports	Cebu Ports Authority, 1990-2010
Total Annual Value of Foreign Trade	National Statistics Office, 1990-2008
Total Annual Number of Hotel Rooms	Department of Tourism, 2005-2010
Total Annual Number of Tourist Arrivals	Department of Tourism, 2005-2010
Total Annual Hotel Occupancy Rate	Department of Tourism, 1990-2010
Local Governance Performance Monitoring System	Department of Interior and Local Government, 2009-2010
Total Annual City Revenue, Expenditure, Savings and Reserve per Capita	Commission on Audit, 2007-2008

Functional Literacy Rate of Population 10-64 Years Old, Region and Sex	National Statistics Office, 2003-2008
Total Annual Number of Banking Offices, Number of Accounts and Deposits	Philippine Deposit Insurance Commission, 2009-2010
Human Development Index	Human Development Network, 2003-2006

DAVAO CITY

Variable	Source of Data
Average Annual Rainfall	PAG-ASA, 1990-2009
Average Annual Temperature	PAG-ASA, 1990-2010
Total Annual Population	National Statistics Office, 1990-2010
Annual Population Density	National Statistics Office, 1990-2010
Total Annual Number of Registered Motor Vehicles by Type	National Statistics Coordination Board (NSCB), 1990-2005
Total Annual Banana Production	Bureau of Agricultural Statistics, 1990-2010
Total Annual Production of Other Selected Fruit Crops	Bureau of Agricultural Statistics, 1990-2010
Total Annual Corn Production	Bureau of Agricultural Statistics, 1990- 2010
Total Annual Palay Production	Bureau of Agricultural Statistics, 1990- 2010
Total Annual Swine/Hog and Poultry Production	Bureau of Agricultural Statistics, 1995- 2010
Total Annual Value of Foreign Trade	National Statistics Coordination Board (NSCB), 1990-2010
Total Annual Volume of Cargo Discharged and Loaded at the Port	National Statistics Coordination Board (NSCB), 1995-2009
Total Annual Number of Embarking and Disembarking Sea-based Passengers	National Statistics Coordination Board (NSCB), 1995-2009
Total Annual Tourist Arrivals by Type	National Statistics Coordination Board (NSCB), 1995-2009
Total Annual Number of Business Establishments and Value of Investments	National Statistics Coordination Board (NSCB), 2006-2010
Total Annual Number of Elementary and Secondary Enrollees	National Statistics Coordination Board (NSCB), 1990-2010
Functional Literacy Rate of Population 10-64 Years Old	National Statistics Office, 2003-2008
Local Governance Performance Monitoring System	State of Local Governance Performance Report -Davao City, 2009 and 2010
Total Annual Number of Employed Persons and Employment Rate	National Statistics Coordination Board (NSCB), 1995-2009
Total Annual Family Income, Expenditure and Savings	National Statistics Coordination Board (NSCB), 1990-2006
Total Annual City Income, Expenditure and Reserve per Capita	Commission on Audit, 2003-2008
Total Annual Number of Banking Offices, Number of Accounts and Deposits	Philippine Deposit Insurance Commission, 2009-2010
Human Development Index	Human Development Network, 2003-2008

ILOILO CITY

Variable	Source of Data
Total Annual Amount of Precipitation	PAGASA, 1990-2010
Annual Mean Temperature	PAGASA, 1990-2010
Total Annual Number of Tropical Cyclones	PAGASA, 1990-2010
Total Annual Population	National Statistics Office, 1990-2010
Annual Population Density	National Statistics Office, 1990-2010
Total Annual Length of Bridges	City Planning and Development Office, 2010
Total Annual Number of Registered Motor Vehicles	City Planning and Development Office, 2010
Total Annual Number of Passenger Traffic by Type	City Planning and Development Office, 2010
Total Annual Amount of Cargo by Type	City Planning and Development Office, 2010
Total Annual Number of Rooms	Department of Tourism, 1990-2010
Annual Mean Occupancy Rate	Department of Tourism, 1990-2010
Total Annual Number of Wild Caught Fisheries	Bureau of Agricultural Statistics, 2010
Total Annual Production Volume of Palay	Bureau of Agricultural Statistics, 2010
Total Annual Production Volume of Livestock and Poultry	Bureau of Agricultural Statistics, 2010
Local Governance Performance Monitoring System	Department of Interior and Local Government, 2009-2010
Annual Mean Value of Family Income	City Planning and Development Office, 2010
Annual Mean Functional Literacy in Western Visayas	National Statistics Office, 2003 & 2008
Total Audited Annual City Income, Expenditure, and Savings per Capita	Commission on Audit, 2004-2008
Total Annual Number of Banking Offices, Number of Accounts, and Deposits	Philippine Deposit Insurance Commission, 2009-2010
Human Development Index	Human Development Network, 2003-2008

CAGAYAN DE ORO CITY

Variable	Source of Data
Total Annual Rainfall Volume	PAGASA,1960-2010.
Total Annual Average Temperature	PAGASA,1960-2010.
Total Annual Number of Typhoons	PAGASA,1991-2011
Total Annual Population	National Statistics Office (NSO), 1990, 1995, 2000, 2007, 2010
Total Annual Population Density	National Statistics Office (NSO), 1990, 1995, 2000, 2007, 2010
Total Annual Educational Enrollment	City Planning and Development Office, 1990-2011
Total Annual Number of Schools by Level	City Planning and Development Office, 1990-2010
Total Annual Motor Vehicles Registered	City Planning and Development Office, 1990-2010
Total Annual Volume of Sea-based Passengers	City Planning and Development Office, 1990-2010
Total Annual Volume of Cargo Discharged and Unloaded at the Ports	City Planning and Development Office, 1990-2010
Total Annual Volume of Container Throughput at the Mindanao Container Terminal (MCT)	Phividec Industrial Authority, 2006-2010
Total Annual Number of Air Passengers and Volume of Air Cargo	City Planning and Development Office, 1990-2009
Total Annual Number of Tourist Arrivals	City Planning and Development Office, 1990-2009
Total Annual Hotel Occupancy Rate	National Statistics Coordination Board, 1999-2010

Variable	Source of Data
Total Annual Number of Hotel Rooms	National Statistics Coordination Board, 2000-2009
Total Annual Number of Business Establishments by Major Industry Division	City Planning and Development Office, 1990-2009
Total Annual Volume and Value of Exports and Imports at the Port of Cagayan de Oro	City Planning and Development Office, 2002-2010
Volume and Value of Canned Pineapple Exports	City Planning and Development Office, 1990-2010
Chicken Production	City Planning and Development Office, 1990-2010
Cattle Production	City Planning and Development Office, 1990-2010
Hog Production	City Planning and Development Office, 1990-2010
Goat Production	City Planning and Development Office, 1990-2010
Total Commercial Fisheries Production - Misamis Oriental	Bureau of Agricultural Statistics, 1990-2010.
Total Municipal Marine Fisheries Production - Misamis Oriental	Bureau of Agricultural Statistics, 1990-2010.
Total Aquaculture Production - Misamis Oriental	Bureau of Agricultural Statistics, 1990-2010.
Palay Production	City Planning and Development Office, 1991-2010
Corn Production	City Planning and Development Office, 1991-2010
Coconut Production	Bureau of Agricultural Statistics, 1990-2010.
Banana Production	City Planning and Development Office, 1990-2010
Vegetable Production	City Planning and Development Office, 1990-2010
Total Number of Building Occupancy Permits Issued	Office of the City Building Official - Cagayan de Oro City, 1996-2009
Total Annual Energy Consumption by Type of Consumer of CEPALCO	National Statistics Coordination Board, 2001-2010
Local Governance Performance Monitoring System	Department of Interior and Local Government, 2009-2010
Annual Crime Clearance Efficiency Rate	National Statistics Coordination Board, 2003-2010
Annual Family Income and Expenditure	City Planning and Development Office, 1994-2009
Annual Total Number of Employed Persons	City Planning and Development Office, 1991-2003
Total Annual City Revenue, Expenditure and Savings	Commission on Audit. Annual Financial Reports for Local Governments. 2003-2010
Functional Literacy Rate of Population 10-64 Years Old, Region and Sex (Regional)	National Statistics Office,1990-2008
Total Annual Number of Banking Offices, Number of Accounts and Deposits	Philippine Deposit Insurance Corporation, 2009-2011
Regional Distribution of Deposit Liabilities – Region X	Bangko Sentral ng Pilipinas, 2002-2011
Regional Distribution of Loan Portfolio - Region X	Bangko Sentral ng Pilipinas, 2002-2011
Human Development Index - Misamis Oriental	Philippine Human Development Network, 1997-2006

DAGUPAN CITY

Variable	Source of Data
Total Annual Volume of Rainfall	PAGASA, 1960-2010
Annual Mean Temperature	PAGASA, 1960-2010
Total Annual Number of Typhoons	PAGASA, 1990-2009
Total Annual Population	National Statistics Office, 1990, 1995, 2000, 2007, 2010
Total Annual Population Density	National Statistics Office, 1990, 1995, 2000, 2007, 2010
Total Annual Number of Enrollees by Level	Department of Education, 1995-2010
Total Annual Number of Registered Motor Vehicles	Land Transportation Office, 1991-2010
Total Annual Number of LGU-Registered Business Establishments	Business Permits and Licensing Office, 1990-2010
Total Annual Number of DTI-Registered Business Establishments	Department of Trade and Industry, 1997-2010
Total Annual Value of DTI-Registered Investments	Department of Trade and Industry, 1997-2010
Total Annual Milkfish Production	Bureau of Agricultural Statistics, 2002-2010
Total Annual Milkfish Production and Area by Culture Environment, Dagupan City	Provincial Agriculture Office, 2002-2010
Total Annual Number of Poultry	City Veterinary Office, 1990-2010
Total Annual Number of Hogs	City Veterinary Office, 1990-2010
Total Annual Number of Cattle	City Veterinary Office, 1990-2010
Total Annual Number of Carabaos	City Veterinary Office, 1990-2010
Total Annual Number of Goats	City Veterinary Office, 1990-2010
Total Annual Number of Building Permits Issued	City Engineer's Office, 1991-2010
Total Annual Volume of Electricity Required & Sold	Dagupan Electric Corporation, 2005-2010
Total Annual Assessed Value of Properties	City Assessor's Office, 1990-2010
Total Annual Number of Parcels	City Assessor's Office, 1990-2010
Local Governance Performance Monitoring System (LGPMS)	Department of Interior and Local Government, 2009-2010
Annual Crime Solution Efficiency Rate	Philippine National Police, 1990-2010
Average Annual Family Income and Expenditure	National Statistics Office, 1991-2009
Annual Labor Workforce Rates	National Statistics Office, 1996-2010
Functional Literacy Rate of Population 10-64 Years Old, Region and Sex	National Statistics Office,1990-2008
Total Annual Number of Banking Offices, Number of Accounts and Deposits	Philippine Deposit Insurance Corporation, 2009-2010
Regional Distribution of Loan Portfolio	Bangko Sentral ng Pilipinas, 2002-2011
Regional Distribution of Deposit Liabilities	Bangko Sentral ng Pilipinas, 2002-2011
Annual Mean Human Development Index Value	Philippine Human Development Network, 1997, 2000, 2003, 2006

LAOAG CITY

Variable	Source of Data
Total Annual Volume of Rainfall	PAGASA, 1960-2010
Annual Mean Temperature	PAGASA, 1960-2010
Total Annual Number of Typhoons	PAGASA, 1990-2009
Total Annual Population	National Statistics Office, 1990, 1995, 2000, 2007, 2010
Total Annual Population Density	National Statistics Office, 1990, 1995, 2000, 2007, 2010
Total Annual Number of Enrollees by Level	Department of Education, 1995-2010
Total Annual Registered Motor Vehicles	Land Transportation Office, 1991-2010

Variable	Source of Data
Total Annual Number of Tourist Arrivals	City Planning and Development Office, 2000-2008
Total Annual Number of Air Passengers	Civil Aviation Authority of the Philippines, 2001-2010
Total Annual Volume of Air Cargo	Civil Aviation Authority of the Philippines, 2001-2010
Total Annual Number of New and Renewed Business Permits	Business and Licensing Office, 2005-2010
Total Annual Number of Poultry	Bureau of Agricultural Statistics, 1990-2010
Total Annual Number of Hogs	Bureau of Agricultural Statistics, 1990-2010
Total Annual Number of Cattle	Bureau of Agricultural Statistics, 1990-2010
Total Annual Number of Carabaos	Bureau of Agricultural Statistics, 1990-2010
Total Annual Number of Goats	Bureau of Agricultural Statistics, 1990-2010
Total Annual Palay Production	City Agriculture Office, 1995-2010
Total Annual Corn Production	City Agriculture Office, 1995-2010
Total Annual Tomato Production	City Agriculture Office, 1995-2010
Total Annual Mongo Production	City Agriculture Office, 1995-2010
Total Annual Garlic Production	City Agriculture Office, 1995-2010
Total Annual Number of Overseas Filipino Workers	Institute for Migration and Development Issues, 2004-2006
Total Annual Value of Remittances	Institute for Migration and Development Issues, 2004-2006
Total Annual Volume of Electricity Sold	Ilocos Norte Electric Cooperative, 2005-2010
Local Governance Performance Monitoring System (LGPMS)	Department of Interior and Local Government, 2009-2010
Annual Crime Solution Efficiency Rate	City Planning and Development Office, 2010-2011
Average Annual Family Income and Expenditure	National Statistics Office, 1991-2009
Total Annual City Revenue, Expenditure, Savings and Reserve per Capita	Commission on Audit, 2003-2010
Annual Labor Workforce Rates	National Statistics Office, 1996-2010
Functional Literacy Rate of Population 10-64 Years Old, Region and Sex	National Statistics Office,1990-2008
Total Annual Number of Banking Offices, Number of Accounts and Deposits	Philippine Deposit Insurance Corporation, 2009-2010
Regional Distribution of Loan Portfolio	Bangko Sentral ng Pilipinas, 2002-2011
Regional Distribution of Deposit Liabilities	Bangko Sentral ng Pilipinas, 2002-2011
Annual Mean Human Development Index Value	Philippine Human Development Network, 1997, 2000, 2003, 2006

ZAMBOANGA CITY

Variable	Source of Data
Total Annual Volume of Rainfall	PAGASA, 1960-2010.
Total Annual Average Temperature	PAGASA, 1960-2010.
Total Annual Population	National Statistics Office, 1990, 1995, 2000, 2007, 2010
Total Annual Population Density	National Statistics Office, 1990, 1995, 2000, 2007, 2010
Total Annual Number of Housing Units	National Statistics Office, 1997, 2007
Total Annual Number of Enrollees by Level	National Statistics Coordination Board, 1990-2010
Total Annual Number of Schools by Level	National Statistics Coordination Board, 1990-2010
Total Annual Motor Vehicles Registered	National Statistics Coordination Board, 1990-2010

Variable	Source of Data
Total Annual Number of Embarking and Disembarking Sea-based Passengers	Philippine Ports Authority - Zamboanga Port Management Office, 1990-2011
Annual Volume of Cargo Discharged and Unloaded at the Ports	Philippine Ports Authority - Zamboanga Port Management Office, 1990-2011
Total Annual Number of Tourist Arrivals	National Statistics Coordination Board, 1990-2011
Total Annual Number of Hotel Rooms	National Statistics Coordination Board, 1990-2002
Total Annual Number of Air Passengers and Volume of Air Cargo	National Statistics Coordination Board, 1990-2011
Total Annual Export and Import Performance	Bureau of Customs - Port of Zamboanga), 2000-2011
Swine Production	Bureau of Agricultural Statistics, 1994-2011.
Cattle Production	Bureau of Agricultural Statistics, 1994-2011.
Goat Production	Bureau of Agricultural Statistics, 1994-2011.
Poultry Production	Bureau of Agricultural Statistics, 1994-2011.
Total Annual Commercial Fisheries Production	Bureau of Agricultural Statistics, 1994-2011.
Commercial Fisheries Production - Top Seven Species	Bureau of Agricultural Statistics, 2002-2011.
Total Annual Marine Municipal Fisheries Production	Bureau of Agricultural Statistics, 1990-2010.
Municipal Marine Fisheries Production - Top Five Species	Bureau of Agricultural Statistics, 2002-2011.
Total Annual Seaweed Production	Bureau of Agricultural Statistics, 1996-2010.
Total Annual Palay Production	Bureau of Agricultural Statistics, 1994-2010.
Total Annual Corn Production	Bureau of Agricultural Statistics, 1990-2010.
Total Annual Coconut Production	Bureau of Agricultural Statistics, 1990-2010.
Total Annual Banana Production	Bureau of Agricultural Statistics, 1990-2010.
Total Annual Mango Production	Bureau of Agricultural Statistics, 1990-2010.
Total Annual Rubber Production	Bureau of Agricultural Statistics, 1990-2010.
Total Annual Vegetables Production	Bureau of Agricultural Statistics, 1990-2010.
Total Annual Vegetables Production - Top 5 Crops	Bureau of Agricultural Statistics, 1990-2010.
Total Number of New Building Units Granted Locational Clearances	National Economic Development Authority (NEDA), 2000-2010
Total Annual Energy Consumption by Type of Consumer of ZAMCELCO	National Statistics Coordination Board, 1990-2002 /Zamboanga City Electric Cooperative (ZAMCELCO) - 2003-2010
Local Governance Performance Monitoring System (LGPMS)	Department of Interior and Local Government. Local Governance Performance Monitoring System, 2009-2010
Annual Crime Solution Efficiency Rate	National Statistics Coordination Board, 2003-2008

Variable	Source of Data
Annual Crime Clearance Efficiency Rate	National Statistics Coordination Board, 2009-2011
Annual Family Income and Expenditure	National Statistics Coordination Board, 1994-2009
Annual Total Number of Employed Persons by Industry Group	Zamboanga City Planning and Development Office, 2000-2003
Total Annual City Revenue, Expenditure, Savings and Reserve per Capita	Commission on Audit, 2003-2010
Functional Literacy Rate of Population 10-64 Years Old, Region and Sex - Region IX	National Statistics Office,1990-2008
Total Annual Number of Banking Offices, Number of Accounts and Deposits	Philippine Deposit Insurance Corporation, 2009-2011
Regional Distribution of Loan Portfolio - Region IX	Bangko Sentral ng Pilipinas, 2002-2011
Regional Distribution of Deposit Liabilities - Region IX	Bangko Sentral ng Pilipinas, 2002-2011
Human Development Index - Zamboanga del Sur	Philippine Human Development Network, 1997, 2000, 2003, 2006

ANGELES CITY

Variable	Source of Data
Total Annual Volume of Rainfall	PAGASA, 1998-2011
Average Annual Temperature	PAGASA, 1998-2011
Total Annual Number of Typhoons	PAGASA, 1948-2010
Total Annual Population	National Statistics Office, 1990, 1995, 2000, 2007, 2010
Total Annual Population Density	National Statistics Office, 1990, 1995, 2000, 2007, 2010
Total Annual Number of Housing Units	National Statistics Office, 1997, 2007
Total Annual Number of Registered Motor Vehicles	Land Transportation Office, 1991-2012
Total Annual Air Passenger Traffic	Clark International Airport Corporation, 2005-2012
Total Annual Air Cargo Traffic	Clark International Airport Corporation, 2005-2012
Total Annual Number of Registered Business Establishments	Angeles City Business Permits and Licensing Office, 2005-2012
Total Annual Value of Exports	Clark Development Corporation, 1995-2012
Total Annual Energy Consumption	Angeles Electric Cooperative, 1990-2012
Total Annual Water Consumption	Angeles City Water District, 1995-2012
Total Annual Palay Production	Angeles City Agriculture Office, 2008-2012
Total Annual Swine Production	Angeles City Agriculture Office, 2008-2012
Total Annual Cattle Production	Angeles City Agriculture Office, 2008-2012
Total Annual Carabao Production	Angeles City Agriculture Office, 2008-2012
Total Annual Goat Production	Angeles City Agriculture Office, 2008-2012
Total Annual Gabi Production	Angeles City Agriculture Office, 2008-2012
Total Annual Sweet Potato Production	Angeles City Agriculture Office, 2008-2012
Total Annual Sugarcane Production	Angeles City Agriculture Office, 2008-2012
Total Annual Cassava Production	Angeles City Agriculture Office, 2008-2012
Total Annual Assessed Value of Taxable Lands	Angeles City Assessors Office, 2005-2012
Local Governance Performance Monitoring System (LGPMS)	Department of Interior and Local Government. Local Governance Performance Monitoring System, 2009-2011
Total Annual Crime Clearance Efficiency Rate	Philippine National Police, 2009-2012
Average Annual Family Income, Expenditure and Savings – Region III	National Statistics Office, 1991-2009

Variable	Source of Data
Total Annual City Revenue, Expenditure, Savings and Savings Per Capita	Commission on Audit, 2003-2011
Total Annual Number of Banking Offices, Number of Accounts and Deposits	Philippine Deposit Insurance Corporation, 2007-2011
Regional Distribution of Loan Portfolio - Region III	Bangko Sentral ng Pilipinas, 2001-2011
Regional Distribution of Deposit Liabilities - Region III	Bangko Sentral ng Pilipinas, 2001-2011
Functional Literacy Rate of Population 10-64 Years Old, Region and Sex - Region III	National Statistics Office, 1994-2008
Human Development Index - Pampanga	Philippine Human Development Network, 1997, 2000, 2003, 2006, 2009

BATANGAS CITY

Variable	Source of Data
Total Annual Volume of Rainfall	PAGASA, 1976-2010.
Average Annual Temperature	PAGASA, 1976-2010
Total Annual Number of Typhoons	PAGASA, 1948-2011
Total Annual Population	National Statistics Office, 1990, 1995, 2000, 2007, 2010
Total Annual Population Density	National Statistics Office, 1990, 1995, 2000, 2007, 2010
Total Annual Number of Enrollees by Level	Department of Education, 2005-2011
Total Annual Number of Registered Motor Vehicles	Land Transportation Office, 1991-2012
Total Annual Number of LGU-Registered Business Establishments	Batangas City Permits and Licensing Office, 1990-2010
Total Annual Number of Shipcalls	Philippine Ports Authority-Batangas Port Management Office, 2000-2012
Total Annual Sea-based Passenger Traffic	Philippine Ports Authority-Batangas Port Management Office, 2000-2012
Total Annual Volume of Domestic Cargo	Philippine Ports Authority-Batangas Port Management Office, 2000-2012
Total Annual Volume of Foreign Cargo	Philippine Ports Authority-Batangas Port Management Office, 2000-2012
Total Annual Corn Production	Batangas City Agriculture Office, 2002-2012
Total Annual Swine Production	Batangas City Veterinary Office, 1995-2010
Total Annual Cattle Production	Batangas City Veterinary Office, 1995-2010
Total Annual Goat Production	Batangas City Veterinary Office, 1995-2010
Total Annual Carabao Production	Batangas City Veterinary Office, 1995-2010
Total Annual Poultry Production	Batangas City Veterinary Office, 1995-2010
Total Annual Number of Land Parcels	Batangas City Assessors Office, 2000-2012
Total Annual Assessed Value of Taxable Lands	Batangas City Assessors Office, 2000-2012
Total Annual Energy Consumption	MERALCO, 1992-2012
Total Annual Number of Building Construction Permits Issued	Batangas City Office of the City Planning and Development Coordinator – Zoning Division, 1995-2010
Local Governance Performance Monitoring System (LGPMS)	Department of Interior and Local Government. Local Governance Performance Monitoring System, 2009-2011

Variable	Source of Data
Total Annual Crime Clearance Efficiency Rate	Philippine National Police, 2010-2012
Total Annual Labor Workforce Rates	National Statistics Office, 1996-2012
Average Annual Family Income, Expenditure and Savings – Region IV-A	National Statistics Office, 1991-2009
Total Annual City Revenue, Expenditure, Savings and Savings Per Capita	Commission on Audit, 2002-2011
Total Annual Number of Banking Offices, Number of Accounts and Deposits	Philippine Deposit Insurance Corporation, 2007-2012
Regional Distribution of Loan Portfolio - Region IV-A	Bangko Sentral ng Pilipinas, 2001-2011
Regional Distribution of Deposit Liabilities - Region IV-A	Bangko Sentral ng Pilipinas, 2001-2011
Functional Literacy Rate of Population 10-64 Years Old, Region and Sex - Region IV-A	National Statistics Office, 1994-2008
Human Development Index - Batangas	Philippine Human Development Network, 1997, 2000, 2003, 2006, 2009

NAGA CITY

Variable	Source of Data
Total Annual Volume of Rainfall	PAGASA, 1976-2010.
Average Annual Temperature	PAGASA, 1976-2010
Total Annual Tropical Cyclone Occurrences	PAGASA, 1948-2011
Total Annual Population	National Statistics Office, 1990, 1995, 2000, 2007, 2010
Total Annual Population Density	National Statistics Office, 1990, 1995, 2000, 2007, 2010
Total Annual Number of Housing Units	National Statistics Office, 1997, 2007
Total Annual Number of Enrollees by Level	National Statistics Coordination Board, 1990-2011
Total Annual Palay Production	Naga City Agriculture Office, 1995-2012
Total Annual Corn Production	Naga City Agriculture Office, 1995-2012
Total Annual Chicken Production	Naga City Agriculture Office, 1995-2011
Total Annual Number of Swine Slaughtered at the City Abattoir	Naga City Veterinary Office, 1998-2011
Total Annual Tourist Arrival	Department of Tourism – Region 5, 1990-2011
Total Annual Air Passenger Traffic	National Statistics Coordination Board – Region 5, 1997-2011
Total Annual Number of Hotels	National Statistics Coordination Board – Region 5, 1990-2011
Total Annual Hotel Occupancy Rates	Department of Tourism – Region 5, 2003-2011
Total Annual Energy Consumption	National Statistics Coordination Board – Region 5, 1991-2011
Total Annual Water Consumption	Metro Naga Water District, 1995-2012
Total Annual Assessed Value of Taxable Lands	Naga City Assessors Office, 2007-2012
Total Annual Number of New Building Construction Permits	Office of the City Building Official – Naga City, 1990-2012
Total Annual Number of Building Occupancy Permits	Office of the City Building Official – Naga City, 1990-2012.
Total Annual Number of Land Parcels	Naga City Assessors Office, 2007-2012
Total Annual Registered Motor Vehicles	Land Transportation Office, 1992-2012
Total Annual Air Cargo Volume	National Statistics Coordination Board – Region 5, 1997-2011.
Local Governance Performance Monitoring System (LGPMS)	Department of Interior and Local Government. Local Governance Performance Monitoring System, 2009-2011

Variable	Source of Data
Total Annual Crime Clearance Efficiency Rate	Philippine National Police, 2010-2011
Average Annual Family Income, Expenditure and Savings – Region V	National Statistics Coordination Board – Region 5, 1997-2011.
Total Annual City Revenue, Expenditure, Savings and Savings Per Capita	Commission on Audit, 2003-2011
Total Annual Number of Banking Offices, Number of Accounts and Deposits	Philippine Deposit Insurance Corporation, 2007-2011
Regional Distribution of Loan Portfolio - Region V	Bangko Sentral ng Pilipinas, 2001-2011
Regional Distribution of Deposit Liabilities - Region V	Bangko Sentral ng Pilipinas, 2001-2011
Functional Literacy Rate of Population 10-64 Years Old, Region and Sex - Region V	National Statistics Office, 1994-2008
Human Development Index – Camarines Sur	Philippine Human Development Network, 1997, 2000, 2003, 2006, 2009

TACLOBAN CITY

Variable	Source of Data
Total Annual Volume of Rainfall	PAGASA, 1976-2011
Average Annual Temperature	PAGASA, 1976-2011
Total Annual Tropical Cyclone Occurrences	PAGASA, 1948-2011
Total Annual Population	National Statistics Office, 1990, 1995, 2000, 2007, 2010
Total Annual Population Density	National Statistics Office, 1990, 1995, 2000, 2007, 2010
Total Annual Number of Housing Units	National Statistics Office, 1997, 2007
Total Annual Energy Consumption	National Statistics Coordination Board, 1990-2011
Total Annual Water Consumption	National Statistics Coordination Board, 1990-2010
Total Annual Number of Registered Motor Vehicles	Land Transportation Office, 1991-2012
Total Annual Number of Schools	National Statistics Coordination Board, 1990-2011
Total Annual Number of Enrollees	National Statistics Coordination Board, 1990-2011
Total Annual Number of Shipcalls at the Port of Tacloban	Philippine Ports Authority – PMO Tacloban, 2008-2012
Total Annual Sea-based Passenger Traffic at the Port of Tacloban	Philippine Ports Authority – PMO Tacloban, 2008-2012
Total Annual Volume of Domestic Cargo Loaded / Unloaded at the Port of Tacloban	Philippine Ports Authority – PMO Tacloban, 2008-2012
Total Annual Volume of Foreign Cargo Loaded / Unloaded at the Port of Tacloban	Philippine Ports Authority – PMO Tacloban, 2008-2012
Total Annual Number of Shipcalls at the Port of Ormoc	Philippine Ports Authority, 2008-2012
Total Annual Number of Shipcalls at the Port of PASAR	Philippine Ports Authority, 2008-2012
Total Annual Number of Shipcalls at the Port of PHILPHOS	Philippine Ports Authority, 2008-2012
Total Annual Sea-based Passenger Traffic at the Port of Ormoc	Philippine Ports Authority, 2008-2012
Total Annual Volume of Domestic Cargo at the Port of PASAR	Philippine Ports Authority, 2008-2012
Total Annual Volume of Domestic Cargo at the Port of PHILPHOS	Philippine Ports Authority, 2008-2012
Total Annual Volume of Foreign Cargo at the Port of PASAR	Philippine Ports Authority, 2008-2012

Variable	Source of Data
Total Annual Volume of Foreign Cargo at the Port of PHILPHOS	National Statistics Coordination Board – Region 5, 1997-2011.
Total Annual Air Passenger Traffic	National Statistics Coordination Board, 2000-2011
Total Annual Tourist Arrival	Department of Tourism, 2006-2010
Total Annual Hotel Occupancy Rate	Department of Tourism, 2007-2010
Total Annual Air Cargo Traffic	National Statistics Coordination Board, 2000-2011
Total Annual Value of Exports	National Statistics Coordination Board, 1996-2006
Total Annual Value of Imports	National Statistics Coordination Board, 1996-2006
Total Annual Number of LGU-Registered Business Establishments	Tacloban City Business Permits and Licenses Division, 2007-2012
Total Annual Palay Production	Tacloban City Agriculture Office, 2005-2011
Total Annual Corn Production	Tacloban City Agriculture Office, 2005-2011
Total Annual Aquaculture Production	Tacloban City Agriculture Office, 2008-2012
Total Annual Municipal Fisheries Production	Tacloban City Agriculture Office, 2008-2012
Total Annual Coconut Production	Philippine Coconut Authority-Leyte, 2002-2011
Total Annual Number of Swine Slaughtered at the City Abattoir	Tacloban City Veterinary Office, 2005-2012
Total Annual Number of Cattle Slaughtered at the City Abattoir	Tacloban City Veterinary Office, 2005-2012
Total Annual Number of Carabao Slaughtered at the City Abattoir	Tacloban City Veterinary Office, 2005-2012
Total Annual Number of Chicken Slaughtered at the City Abattoir	Tacloban City Veterinary Office, 2005-2012
Total Annual Assessed Value of Taxable Lands	Tacloban City Assessors Office, 1996-2012
Total Annual Number of Building Construction Permits Issued	Office of the City Building Official-Tacloban City, 2009-2012
Total Annual Number Building Occupancy Permits Issued	Office of the City Building Official-Tacloban City, 2009-2012
Total Annual Number of Land Parcels	Tacloban City Assessors Office, 1997-2012
Local Governance Performance Monitoring System (LGPMS)	Department of Interior and Local Government. Local Governance Performance Monitoring System, 2009-2011
Total Annual Crime Clearance Efficiency Rate	Philippine National Police, 2009-2011
Average Annual Family Income, Expenditure and Savings – Region VIII	National Statistics Coordination Board – Region 5, 1997-2011.
Total Annual City Revenue, Expenditure, Savings and Savings Per Capita	Commission on Audit, 2002-2011
Total Annual Number of Banking Offices, Number of Accounts and Deposits	Philippine Deposit Insurance Corporation, 2007-2011
Regional Distribution of Loan Portfolio - Region VIII	Bangko Sentral ng Pilipinas, 2001-2011
Regional Distribution of Deposit Liabilities - Region VIII	Bangko Sentral ng Pilipinas, 2001-2011
Functional Literacy Rate of Population 10-64 Years Old, Region and Sex - Region VIII	National Statistics Office, 1994-2008
Human Development Index – Leyte	Philippine Human Development Network, 1997, 2000, 2003, 2006, 2009

BUTUAN CITY

Variable	Source of Data
Precipitation	PAGASA, 1981-2012.
Temperature	PAGASA, 1951-2012.
Typhoon Occurrence	PAGASA,1948-2011
Population	National Statistics Office (NSO), 1990-2010
Population Density	National Statistics Office (NSO), 1990-2010
Housing	National Statistics Office (NSO), 2000- 2010
Enrollment	Office of the City Planning & Development Coordinator, Butuan City, 1990-2012
Number of Schools	Office of the City Planning & Development Coordinator, Butuan City, 1990-2012
Motor Vehicle	Land Transportation Office, 1991-2013
Total Road Network	National Competitiveness Council, 2011-2013
Sea-Based Passenger Traffic	Office of the City Planning & Development Coordinator, Butuan City, 1990-2013
Sea-Based Cargo Traffic	Office of the City Planning & Development Coordinator, Butuan City, 1990-2013
Aircraft Traffic	Office of the City Planning & Development Coordinator, Butuan City, 2005-2012
Air Passenger Traffic	Office of the City Planning & Development Coordinator, Butuan City, 2005-2012
Air Cargo Traffic	Office of the City Planning & Development Coordinator, Butuan City, 2005-2012
Tourist Arrivals	Office of the City Planning & Development Coordinator, Butuan City, 1990-2012
Number of Hotels	Office of the City Planning & Development Coordinator, Butuan City, 2000-2012
Number of Hotel Rooms	Office of the City Planning & Development Coordinator, Butuan City, 2000-2012
Number of Business Establishments	Office of the City Planning & Development Coordinator, Butuan City, 1993-2012
Top Exports	Office of the City Planning & Development Coordinator, Butuan City, 1996-2012
Total Exports	Office of the City Planning & Development Coordinator, Butuan City, 1990-2012
Total Imports	Office of the City Planning & Development Coordinator, Butuan City, 1995-2012
Poultry Production	Office of the City Planning & Development Coordinator, Butuan City, 1996-2012
Livestock Production	Office of the City Planning & Development Coordinator, Butuan City, 1996-2012
Palay Production	Office of the City Planning & Development Coordinator, Butuan City, 2000-2012
Corn Production	Office of the City Planning & Development Coordinator, Butuan City, 2000-2012
Coconut Production	Office of the City Planning & Development Coordinator, Butuan City, 2000-2012
Banana Production	Office of the City Planning & Development Coordinator, Butuan City, 2000-2012
Rootcrops Production	Office of the City Planning & Development Coordinator, Butuan City, 2000-2012
Lumber Production	Office of the City Planning & Development Coordinator, Butuan City, 1995-2012
Plywood (Veneer) Production	Office of the City Planning & Development Coordinator, Butuan City, 1997-2012
Plywood (Veneer) Production	Office of the City Planning & Development Coordinator, Butuan City, 1997-2012

Variable	Source of Data
Blockboard Production	Office of the City Planning & Development Coordinator, Butuan City, 1998-2012
Total New Building Construction Permits	Office of the City Planning & Development Coordinator, Butuan City, 1991-2012
Total Assessed Value of Taxable Lands	Butuan City Assessors Office, 2005-2013
Total Annual Number of Land Parcels	Butuan City Assessors Office, 2005-2013
Energy Consumption	Office of the City Planning & Development Coordinator, Butuan City, 1996-2012
Water Production	Office of the City Planning & Development Coordinator, Butuan City, 1996-2012
Local Governance Performance Monitoring System (LGPMS)	Department of Interior and Local Government, 2009-2012
Crime Solution Efficiency	Office of the City Planning & Development Coordinator, Butuan City, 2008-2009
Crime Clearance Efficiency	Office of the City Planning & Development Coordinator, Butuan City, 2009-2011
Family Income and Expenditure	National Statistics Office (NSO), 1994-2009
City Finances	Bureau of Local Government Finance (BLGF), 2001-2013
Functional Literacy	National Statistics Office (NSO), 2006-2008
Banking	Philippine Deposit Insurance Corporation, 2008-2013
Regional Loans and Deposit Portfolios	Bangko Sentral ng Pilipinas, 2001-2013
Human Development Index	Philippine Human Development Network, 1997-2009

GENERAL SANTOS CITY

Variable	Source of Data
Precipitation	PAGASA, 1981-2012
Temperature	PAGASA, 1951-2012
Typhoon Occurrence	PAGASA, 1970
Population	National Statistics Office (NSO), 1990-2010
Population Density	National Statistics Office (NSO), 1990-2010
Housing	National Statistics Office (NSO), 1990-2010
Enrollment	National Statistics Coordination Board (NSCB) - Region 12, 1996-2013
Number of Schools	National Statistics Coordination Board (NSCB) - Region 12, 1996-2013
Motor Vehicle	Land Transportation Office, 1990-2013
Road Network	National Competitiveness Council, 2011
Sea-Based Passenger Traffic	Philippine Ports Authority, 1990-2012
Sea-Based Cargo Traffic	Philippine Ports Authority, 2000-2012
Number of Shipcalls	Philippine Ports Authority, 2000-2012
Aircraft Traffic	National Statistics Coordination Board (NSCB) - Region 12, 2001-2012
Air Passenger Traffic	National Statistics Coordination Board (NSCB) - Region 12, 2001-2012
Air Cargo Traffic	National Statistics Coordination Board (NSCB) - Region 12, 2001-2012
Tourist Arrivals	National Statistics Coordination Board (NSCB) - Region 12, 2001-2012
Number of Hotels	National Statistics Coordination Board (NSCB) - Region 12, 2004-2011

Variable	Source of Data
Number of Hotel Rooms	National Statistics Coordination Board (NSCB) - Region 12, 2004-2011
Number of Business Establishments	Office of the City Planning & Development Coordinator, General Santos City, 1995-2012
Top Exports	Department of Trade and Industry NERBAC - Region 12, 1997-2011
Total Exports	Department of Trade and Industry NERBAC - Region 12, 1997-2011
Poultry Production	Office of the City Planning & Development Coordinator, General Santos City, 1995-2011
Livestock Production	Office of the City Planning & Development Coordinator, General Santos City, 1995-2011
Municipal Fisheries Production	Office of the City Planning & Development Coordinator, General Santos City, 1995-2011
Aquaculture Production	Office of the City Planning & Development Coordinator, General Santos City, 1995-2011
Palay Production	Office of the City Planning & Development Coordinator, General Santos City, 1995-2012
Corn Production	Office of the City Planning & Development Coordinator, General Santos City, 1995-2012
Copra Production	Office of the City Planning & Development Coordinator, General Santos City, 1995-2012
Banana Production	Office of the City Planning & Development Coordinator, General Santos City, 1995-2012
Tuna Vessels	Philippine Fisheries Development Authority, 2008-2012
Tuna Unloadings	Philippine Fisheries Development Authority, 2008-2012
Tuna Family Unloadings	Philippine Fisheries Development Authority, 2008-2012
Total New Building Construction Permits	Office of the City Planning & Development Coordinator, General Santos City, 1995-2012
Total Assessed Value of Taxable Lands	General Santos City Assessors Office, 1993-2013
Total Annual Number of Land Parcels	General Santos City Assessors Office, 1993-2013
Energy Consumption	Office of the City Planning & Development Coordinator, General Santos City, 1995-2011
Water Production	General Santos City Water District (GSCWD), 1990-2013
Local Governance Performance Monitoring System (LGPMS)	Department of Interior and Local Government, 2009-2012
Crime Solution Efficiency	National Statistics Coordination Board (NSCB) - Region 12, 2002-2008
Crime Clearance Efficiency	National Statistics Coordination Board (NSCB) - Region 12, 2009-2012

Variable	Source of Data
Family Income and Expenditure	National Statistics Coordination Board (NSCB) - Region 12, 2000-2009
Labor Workforce	National Statistics Coordination Board (NSCB) - Region 12, 2003-2012
City Finances	Bureau of Local Government Finance (BLGF), 2001-2010
Functional Literacy	National Statistics Office (NSO), 2003-2008
Banking	Philippine Deposit Insurance Corporation, 2008-2013
Regional Loans and Deposit Portfolios	Bangko Sentral ng Pilipinas, 2001-2013
Human Development Index	Philippine Human Development Network, 1997-2009

PUERTO PRINCESA CITY

Variable	Source of Data
Rainfall	PAGASA, 1960-2011.
Temperature	PAGASA, 1960-2011.
Tropical Cyclone Threat	PAGASA, 1960-2011.
Population	National Statistics Office,1990- 2010.
Population Density	National Statistics Office,1990- 2010.
Housing	National Statistics Office,1990- 2010.
Motor Vehicle	Land Transportation Office (LTO), 1991-2013.
Road Network	National Competitiveness Council (NCC), 2011-2013.
Sea Passenger Traffic	Philippine Ports Authority (PPA), 2000-2012.
Shipcall	Philippine Ports Authority (PPA), 2000-2012.
Shipping Cargo	Philippine Ports Authority (PPA), 2000-2012.
Air Passenger Traffic	Civil Aviation Authority of the Philippines (CAAP), 2001-2012.
Air Cargo Traffic	Civil Aviation Authority of the Philippines (CAAP), 2001-2012.
Tourist Arrival	Tourism Product Planning and Development Section, 1991-2013.
Hotel	Tourism Product Planning and Development Section, 2011-2013.
Hotel Room	Tourism Product Planning and Development Section, 2011-2013.
Occupancy Rate	Tourism Product Planning and Development Section, 2011-2013.
LGU - Registered Business Establishments	Business Permits and Licensing Office, 2009-2013.
Export	Bureau of Customs (BoC), 2009-2013.
Poultry Production	City Veterinary Office, 1996-2013.
Hog Production	City Veterinary Office, 1996-2013.
Cattle Production	City Veterinary Office, 1996-2013.
Goat Production	City Veterinary Office, 1996-2013.
Rice Production	City Agriculture Office, 2008-2012.
Corn Production	City Agriculture Office, 2008-2012.
Vegetable Production	City Agriculture Office, 2008-2012.
Mango Production	City Agriculture Office, 2008-2012.
Commercial Fishery	Bureau of Agricultural Statistics (BAS), 2009-2013.

Variable	Source of Data
Municipal Fishery	Bureau of Agricultural Statistics (BAS), 2009-2013.
Aquaculture	Bureau of Agricultural Statistics (BAS), 2009-2013.
Total New Building Construction Permits	Office of the City Engineer, 1995-2013.
Total Assessed Value of Taxable Lands	Office of the City Assessor, 1990-2013.
Total Annual Number of Land Parcels	Office of the City Assessor, 1990-2013
Energy Consumption	Palawan Electric Cooperative (PALECO), 2000-2013.
Water Consumption	Puerto Princesa Water District (PPWD), 2000-2013.
Local Governance Performance Monitoring System (LGPMS)	Department of Interior and Local Government (DILG), 2009-2012.
Family Income and Expenditure	National Statistics Office (NSO), 1991-2012.
City Finances	Commission on Audit, 2002-2013.
Labor Workforce Rates	National Statistics Office (NSO), 1996-2013.
Functional Literacy	National Statistics Office (NSO),1994-2008.
Banking	Philippine Deposit Insurance Corporation (PDIC), 2008-2013.
Loans	Bangko Sentral ng Pilipinas (BSP), 2002-2013.
Deposits	Bangko Sentral ng Pilipinas (BSP), 2002-2013.
Human Development Index	Philippine Human Development Network, 1997- 2009.

SANTIAGO CITY

Variable	Source of Data
Rainfall	PAGASA, 1977-2013.
Temperature	PAGASA, 1977-2013.
Tropical Cyclone Threat	PAGASA, 1960-2011.
Population	National Statistics Office,1990- 2010.
Population Density	National Statistics Office, 1990- 2010.
Housing	National Statistics Office, 1990- 2010.
Enrollment	Department of Education (DepEd), 2008-2013.
Motor Vehicle	Land Transportation Office (LTO), 1991-2013.
Road Network	National Competitiveness Council (NCC), 2011-2013.
Air Passenger Traffic	Civil Aviation Authority of the Philippines (CAAP), 2001-2012.
Air Cargo Traffic	Civil Aviation Authority of the Philippines (CAAP), 2001-2012.
LGU - Registered Business Establishments	Business Permits and Licensing Office, 2011-2013.
Hog Production	City Veterinary Office, 2006-2013.
Cattle Production	City Veterinary Office, 2006-2013.
Carabao Production	City Veterinary Office, 2006-2013.
Rice Production	Bureau of Agricultural Statistics (BAS), 1990-2013.
Corn Production	Bureau of Agricultural Statistics (BAS) 1990-2013.,
Total New Building Construction Permits	Office of the City Engineer, 2008-2012.

Variable	Source of Data
Total Assessed Value of Taxable Lands	Office of the City Assessor, 2004-2013.
Total Annual Number of Land Parcels	Office of the City Assessor, 2004-2013.
Water Consumption	Santiago City Water District (SANWAD), 2009-2013.
Local Governance Performance Monitoring System (LGPMS)	Department of Interior and Local Government (DILG), 2009-2012.
Family Income and Expenditure	National Statistics Office (NSO), 1991-2012.
City Finances	Commission on Audit, 2002-2012.
Labor Workforce Rates	National Statistics Office (NSO), 1996-2013.
Functional Literacy	National Statistics Office (NSO),1994-2008.
Banking	Philippine Deposit Insurance Corporation (PDIC), 2008-2013.
Loans	Bangko Sentral ng Pilipinas (BSP), 2001-2013.
Deposits	Bangko Sentral ng Pilipinas (BSP), 2001-2013.
Human Development Index	Philippine Human Development Network, 1997- 2009.

LIST OF FIGURES

Annex 1. BAGUIO CITY

Vector	Variable	Scale
1. Climate/Environmental Exposure	1. Precipitation	City
	2. Temperature	City
	3. Typhoon Threat	City
	4. Flooding	
2. Socio-Economic Sensitivity	1. Population	City
	2. Housing Units	City
	3. Educational Enrollment	City
	4. Vegetable and Cut Flower Production	Provincial
	5. Livestock and Poultry Production	City
	6. Tourist Traffic	City
	7. New Business	City
	8. Water Supply	City
3. Adaptive Capacity	1. Local Governance Performance Monitoring System	City
	2. Crime Solution Efficiency	City
	3. Work Force	City
	4. Functional Literacy	Regional
	5. Family Income	City
	6. City Revenue	City
	7. Banking	City
	8. Human Development Index	Provincial

Annex 2. CEBU CITY

Vector	Variable	Scale
1. Climate/Environmental Exposure	1. Precipitation	City
	2. Landslides	City
	3. Typhoon Threat	City
	4. Flooding	City
2. Socio-Economic Sensitivity	1. Population	City
	2. Population Density	City
	4. Business Establishments	City
	5. Shipping	City
	6. Foreign Trade	City
	7. Number of Hotel Rooms	City
	8. Tourist Arrivals	City
	9. Hotel Occupancy Rates	City
	10. Land Classification and Protected Areas	City
3. Adaptive Capacity	1. Local Governance Performance Monitoring System (LGPMS)	City
	2. Crime Solution Efficiency	City
	3. City Revenues	City
	4. Functional Literacy	Regional
	5. Banking	City
	6. Human Development Index	Provincial

Annex 3. DAVAO CITY

Vector	Variable	Scale
1. Climate/Environmental Exposure	1. Precipitation	City
	2. Temperature	City
	3. Typhoon Threat	City
	4. Flooding	City
2. Socio-Economic Sensitivity	1. Population	City
	2. Population Density	City
	3. Motor Vehicles	City
	4. Banana Production	City
	5. Other Fruit Crops Production	City
	6. Corn Production	City
	7. Palay Production	City
	8. Poultry and Swine Production	City
	9. Foreign Trade	City
	10. Shipping	City
	11. Sea-based Passengers	City
	12. Tourist Arrival	City
	13. Tourist Receipts	City
	13. Business Establishments	City
	14. Enrollment	City
3. Adaptive Capacity	1. Local Governance Performance Monitoring Systems (LGPMS)	City
	2. Crime Solution Efficiency	City
	3. Labor Pool	Regional
	4. Functional Literacy	Regional
	5. Family Income / Savings	City
	6. City Revenues	City
	7. Banking	City
	8. Human Development Index	Provincial

Annex 4. ILOILO CITY

Vector	Variable	Scale
1. Climate/Environmental Exposure	1. Precipitation	City
	2. Temperature	City
	3. Typhoon Threat	City
2. Socio-Economic Sensitivity	1. Population	City
	2. Infrastructure	City
	3. Motor Vehicles	City
	4. Passenger Traffic	City
	5. Cargo Traffic	City
	6. Tourism	City
	7. Wild Caught Fisheries	City
	8. Agriculture	City
	9. Investment	City
3. Adaptive Capacity	1. Local Governance Performance Monitoring System	City
	2. Crime Solution Efficiency	City
	3. Functional Literacy	Regional
	5. Family Income	City
	6. City Revenue	City
	7. Deposit Value	City
	8. Human Development Index	Provincial

Annex 5. CAGAYAN DE ORO CITY

Vector	Variable	Scale
1. Climate / Environmental Exposure	1. Precipitation	City
	2. Temperature	City
	3. Typhoon Threat	City
2. Socio-Economic Sensitivity	1. Population	City
	2. Population Density	City
	3. Enrollment	City
	4. Number of Schools	City
	5. Motor Vehicle	City
	6. Sea-Based Passengers	City
	7. Shipping	City
	8. MCT Container Throughput	Provincial
	9. Air Traffic	City
	10. Tourist Arrivals	City
	11. Hotel Occupancy Rates	Regional
	12. Number of Hotel Rooms	Provincial
	13. Number of Business Establishments	City
	14. Foreign Trade	City
	15. Canned Pineapple Exports	City
	16. Poultry Production	City
	17. Cattle Production	City
	18. Hog Production	City
	19. Goat Production	City
	20. Commercial Fisheries Production	Provincial
	21. Municipal Marine Fisheries Production	Provincial
	22. Aquaculture Production	Provincial
	23. Palay Production	City
	24. Corn Production	City
	25. Coconut Production	City
	26. Banana Production	City
	27. Number of Building Occupancy Permits Issued	City
	28. Energy Consumption	City
3. Adaptive Capacity	1. Local Governance Performance Monitoring System (LGPMS)	City
	2. Crime Solution Efficiency	City
	3. Family Income and Expenditure	Regional
	4. City Finances	City
	5. Labor	City
	6. Functional Literacy	Regional
	7. Banking	City
	8. Regional Deposits Portfolio	Regional
	9. Regional Loans Portfolio	Regional
	10. Human Development Index	Provincial

Annex 6. DAGUPAN CITY

Vector	Variable	Scale
1. Climate/Environmental Exposure	1. Rainfall	City
	2. Temperature	City
	3. Tropical Cyclone Threat	City
2. Socio-Economic Sensitivity	1. Population	City
	2. Population Density	City
	3. Enrollment	City
	4. Motor Vehicle	City
	5. LGU - Registered Business Establishments	City
	6. DTI - Registered Business Establishments	City
	7. DTI - Registered Investments	City
	8. Milkfish Production - Pangasinan	Provincial
	9. Milkfish Production - Dagupan City	City
	10. Poultry Production	City
	11. Hog Production	City
	12. Cattle Production	City
	13. Carabao Production	City
	14. Goat Production	City
	15. New Building Construction Permits Issued	City
	16. Energy Consumption	City
	17. Assessed Value	City
	18. Number of Parcels	City
3. Adaptive Capacity	1. Local Governance Performance Monitoring System (LGPMS)	City
	2. Crime Solution Efficiency	City
	3. Family Income and Expenditure	Regional
	4. City Finances	City
	5. Labor Workforce Rates	Regional
	6. Functional Literacy	Regional
	7. Banking	City
	8. Regional Loans	Regional
	9. Regional Deposits	Regional
	10. Human Development Index	Provincial

Annex 7. LAOAG CITY

Vector	Variable	Scale
1. Climate/Environmental Exposure	1. Rainfall	City
	2. Temperature	City
	3. Tropical Cyclone Threat	City
2. Socio-Economic Sensitivity	1. Population	City
	2. Population Density	City
	3. Enrollment	City
	4. Motor Vehicle	City
	5. Tourist Arrival	City
	6. Air Passenger Traffic	City
	7. Air Cargo Traffic	City
	8. LGU - Registered Business Establishments	City
	9. Poultry Production	City
	10. Hog Production	City
	11. Cattle Production	City
	12. Carabao Production	City
	13. Goat Production	City
	14. Palay Production	City
	15. Corn Production	City
	16. Tomato Production	City
	17. Mongo Production	City
	18. Garlic Production	City
	19. Overseas Filipino Workers	Provincial
	20. Remittances	Provincial
	21. Energy Consumption	City
3. Adaptive Capacity	1. Local Governance Performance Monitoring System (LGPMS)	City
	2. Crime Solution Efficiency	City
	3. Family Income and Expenditure	Regional
	4. City Finances	City
	5. Labor Workforce Rates	Regional
	6. Functional Literacy	Regional
	7. Banking	City
	8. Regional Loans	Regional
	9. Regional Deposits	Regional
	10. Human Development Index	Provincial

Annex 8. ZAMBOANGA CITY

Vector	Variable	Scale
1. Climate/Environmental Exposure	1. Precipitation	City
	2. Temperature	City
	3. Typhoon Threat	City
2. Socio-Economic Sensitivity	1. Population	City
	2. Population Density	City
	3. Housing	City
	4. Enrollment	City
	5. Number of Schools	City
	6. Motor Vehicle	City

Vector	Variable	Scale
	7. Sea-Based Passengers	City
	8. Shipping	City
	9. Tourist Arrivals	City
	10. Number of Hotel Rooms	City
	11. Air Traffic	City
	12. Number of Business Establishments	City
	13. Foreign Trade	City
	14. Exports	City
	15. Swine Production	City
	16. Cattle Production	City
	17. Goat Production	City
	18. Poultry Production	City
	19. Commercial Fisheries Production	City
	20. Commercial Fisheries Production - Top Seven Species	City
	21. Municipal Marine Fisheries Production - Top Five Species	City
	22. Seaweed Production	City
	23. Palay Production	City
	24. Corn Production	City
	25. Coconut Production	City
	26. Banana Production	City
	27. Mango Production	City
	28. Rubber Production	City
	29. Vegetable Production	City
	30. Vegetable Production - Top 5 Crops	City
	31. Building Units Granted Locational Clearances	City
	32. Energy Consumption	City
3. Adaptive Capacity	1. Local Governance Performance Monitoring System (LGPMS)	City
	2. Crime Solution Efficiency	City
	3. Crime Clearance Efficiency	City
	4. Family Income and Expenditure	Regional
	5. Labor	City
	6. City Finances	City
	7. Functional Literacy	Regional
	8. Banking	City
	9. Regional Deposits	Regional
	10. Regional Loans	Regional
	11. Human Development Index	Provincial

Annex 9. ANGELES CITY

Vector	Variable	Scale
1. Climate/Environmental Exposure	1. Rainfall	City
	2. Temperature	City
	3. Tropical Cyclone Threat	City
2. Socio-Economic Sensitivity	1. Population	City
	2. Population Density	City
	3. Housing Units	City
	4. Motor Vehicle Registration	City
	5. Air Passenger Traffic	City
	6. Air Cargo Traffic	City
	7. Number of LGU-Registered Business Establishments	City
	8. Value of Exports	City
	9. Value of Imports	City
	10. Energy Consumption	City
	11. Water Consumption	City
	12. Palay Production	City
	13. Swine Production	City
	14. Cattle Production	City
	15. Carabao Production	City
	16. Goat Production	City
	17. Gabi Production	City
	18. Sweet Potato Production	City
	19. Sugarcane Production	City
	20. Cassava Production	City
	21. Assessed Value of Taxable Lands	City
3. Adaptive Capacity	1. Local Governance Performance Monitoring System (LGPMS)	City
	2. Crime Clearance Efficiency	City
	3. Family Income and Expenditure	Regional
	4. City Finances	City
	5. Functional Literacy	Regional
	6. Banking	City
	7. Regional Loans	Regional
	8. Regional Deposits	Regional
	9. Human Development Index	Provincial

Annex 10. BATANGAS CITY

Vector	Variable	Scale
1. Climate/Environmental Exposure	1. Rainfall	City
	2. Temperature	City
	3. Tropical Cyclone Threat	City
2. Socio-Economic Sensitivity	1. Population	City
	2. Population Density	City
	3. Number of Enrollees	City
	4. Motor Vehicle Registration	City
	5. Number of LGU-Registered Business Establishments	City
	6. Number of Shipcalls	City
	7. Sea-based Passenger Traffic	City
	8. Domestic Cargo Volume	City
	9. Foreign Cargo Volume	City
	10. Corn Production	City
	11. Swine Production	City
	12. Cattle Production	City
	13. Goat Production	City
	14. Carabao Production	City
	15. Poultry Production	City
	16. Number of Land Parcels	City
	17. Assessed Value of Taxable Lands	City
	18. Energy Consumption	City
	19. Building Construction	City
3. Adaptive Capacity	1. Local Governance Performance Monitoring System (LGPMS)	City
	2. Crime Clearance Efficiency	City
	3. Labor Workforce	Regional
	4. Family Income and Expenditure	Regional
	5. City Finances	City
	6. Functional Literacy	Regional
	7. Banking	City
	8. Regional Loans	Regional
	9. Regional Deposits	Regional
	10. Human Development Index	Provincial

Annex 11. NAGA CITY

Vector		Variable	Scale
1. Climate/Environmental Exposure	1	Rainfall	City
	2	Temperature	City
	3	Typhoon Threat	City
	4	Flood and Landslide Susceptibility	City
2. Socio-Economic Sensitivity	1	Population	City
	2	Population Density	City
	3	Housing	City
	4	Enrollment	City
	5	Number of Schools	City
	6	Motor Vehicle	City
	7	Air Traffic	
	8	Tourist Arrivals	City
	9	Number of Hotels	City
	10	Number of Hotel Rooms	City
	11	Hotel Occupancy	City
	12	Number of LGU-Registered Business Establishments	City
	13	Value of Investments	City
	14	Exports	Provincial
	15	Total Rail Trade	Regional
	16	Total Inbound Rail Trade	Regional
	17	Total Outbound Rail Trade	Regional
	18	Poultry Production	Regional
	19	Swine Production	City
	20	Palay Production	City
	21	Corn Production	City
	22	Coconut Production	City
	23	Number of Building Construction Permits	City
	24	Number of Building Occupancy Permits	City
	25	Assessed Value of Taxable Lands	City
	26	Total Number of Parcels	City
	27	Energy Consumption	City
	28	Water Consumption	City
3. Adaptive Capacity	1	Local Governance Performance Monitoring System (LGPMS)	City
	2	Crime Solution Efficiency	City
	3	Crime Clearance Efficiency	City
	4	Family Income and Expenditure	Regional
	5	Labor	City
	6	City Finances	City
	7	Functional Literacy	Regional
	8	Banking	City
	9	Regional Deposits	Regional
	10	Regional Loans	Regional
	11	Human Development Index	Provincial

Annex 12. TACLOBAN CITY

Vector		Variable	Scale
1. Climate/Environmental Exposure	1	Precipitation	City
	2	Temperature	City
	3	Typhoon Threat	City
2. Socio-Economic Sensitivity	1	Population	City
	2	Population Density	City
	3	Housing	City
	4	Enrollment	City
	5	Number of Schools	City
	6	Motor Vehicle	City
	7	Sea-Based Passengers	City
	8	Shipping	City
	9	Air Traffic	City
	10	Tourist Arrivals	City
	11	Hotel Occupancy Rate	City
	12	Number of Business Establishments	City
	13	Foreign Trade	City
	14	Exports	City
	15	Chicken Slaughtered	City
	16	Swine Slaughtered	City
	17	Cattle Slaughtered	City
	18	Carabao Slaughtered	City
	19	Municipal Fisheries Production	City
	20	Aquaculture Production	City
	21	Palay Production	City
	22	Corn Production	City
	23	Coconut Production	City
	24	Total New Building Construction Permits Issued	City
	25	Total New Building Occupancy Permits Issued	City
	26	Total Assessed Value of Taxable Lands	City
	27	Total Number of Land Parcels	City
	28	Energy Consumption	City
	29	Water Consumption	
3. Adaptive Capacity	1	Local Governance Performance Monitoring System (LGPMS)	City
	2	Crime Solution Efficiency	City
	3	Crime Clearance Efficiency	City
	4	Family Income and Expenditure	Regional
	5	Labor	City
	6	City Finances	City
	7	Functional Literacy	Regional
	8	Banking	City
	9	Regional Deposits	Regional
	10	Regional Loans	Regional
	11	Human Development Index	Provincial

Annex 13. BUTUAN CITY

Vector		Variable	Scale
1. Climate/Environmental Exposure	1	Precipitation	City
	2	Temperature	City
	3	Typhoon Threat	City
2. Socio-Economic Sensitivity	1	Population	City
	2	Population Density	City
	3	Housing	City
	4	Enrollment	City
	5	Number of Schools	City
	6	Motor Vehicle	City
	7	Road Network	City
	8	Sea-Based Passengers	City
	9	Shipping	City
	10	Air Traffic	City
	11	Tourist Arrivals	City
	12	Hotel Occupancy Rate	City
	13	Number of Business Establishments	City
	14	Foreign Trade	City
	15	Exports	City
	16	Chicken Slaughtered	City
	17	Swine Slaughtered	City
	18	Cattle Slaughtered	City
	19	Carabao Slaughtered	City
	20	Municipal Fisheries Production	City
	21	Aquaculture Production	City
	22	Palay Production	City
	23	Corn Production	City
	24	Coconut Production	City
	25	Total New Building Construction Permits Issued	City
	26	Total New Building Occupancy Permits Issued	City
	27	Total Assessed Value of Taxable Lands	City
	28	Total Number of Land Parcels	City
	29	Energy Consumption	City
	30	Water Consumption	
3. Adaptive Capacity	1	Local Governance Performance Monitoring System (LGPMS)	City
	2	Crime Solution Efficiency	City
	3	Crime Clearance Efficiency	City
	4	Family Income and Expenditure	Regional
	5	City Finances	City
	6	Functional Literacy	Regional
	7	Banking	City
	8	Regional Deposits	Regional
	9	Regional Loans	Regional
	10	Human Development Index	Provincial

Annex 14. GENERAL SANTOS CITY

Vector		Variable	Scale
1. Socio-Economic Sensitivity	1	Population	City
	2	Population Density	City
	3	Housing	City
	4	Enrollment	City
	5	Number of Schools	City
	6	Motor Vehicle	City
	7	Road Network	City
	8	Sea-Based Passengers	City
	9	Shipping	City
	10	Air Traffic	City
	11	Tourist Arrivals	City
	12	Number of Hotels	City
	13	Number of Hotel Rooms	City
	14	Number of Business Establishments	City
	15	Exports	City
	16	Chicken Slaughtered	City
	17	Livestock Slaughtered	City
	18	Carabao Slaughtered	City
	19	Municipal Fisheries Production	City
	20	Aquaculture Production	City
	21	Palay Production	City
	22	Corn Production	City
	23	Copra Production	City
	24	Number of Tuna Vessel at the General Santos Fish Port Complex (GSCFC)	City
	25	Volume of Tuna Unloadings at GSCFC	City
	26	Volume of Tuna Family Unloadings at GSCFC	City
	27	Total New Building Construction Permits Issued	City
	28	Total Assessed Value of Taxable Lands	City
	29	Total Number of Land Parcels	City
	30	Energy Consumption	City
	31	Water Consumption	City
2. Adaptive Capacity	1	Local Governance Performance Monitoring System (LGPMS)	City
	2	Crime Solution Efficiency	City
	3	Crime Clearance Efficiency	City
	4	Family Income and Expenditure	Regional
	5	Labor	City
	6	City Finances	City
	7	Functional Literacy	Regional
	8	Banking	City
	9	Regional Deposits	Regional
	10	Regional Loans	Regional
	11	Human Development Index	Provincial

Annex 15. PUERTO PRINCESA CITY

Vector		Variable	Scale
1. Climate/Environmental Exposure	1	Precipitation	City
	2	Temperature	City
	3	Typhoon Threat	City
2. Socio-Economic Sensitivity	1	Population	City
	2	Population Density	City
	3	Housing	City
	4	Motor Vehicle	City
	5	Road Network	City
	6	Sea-Based Passengers	City
	7	Shipcalls	City
	8	Shipping Cargo	City
	9	Air Passenger Traffic	City
	10	Air Cargo Traffic	City
	11	Tourist Arrivals	City
	12	Number of Hotels	City
	13	Hotel Occupancy Rate	City
	14	Number of Business Establishments	City
	15	Exports	City
	16	Chicken Slaughtered	City
	17	Hog Slaughtered	City
	18	Cattle Slaughtered	City
	19	Goat Slaughtered	City
	20	Palay Production	City
	21	Corn Production	City
	22	Vegetable Production	City
	23	Mango Production	City
	24	Commercial Fisheries Production	City
	25	Municipal Fisheries Production	City
	26	Aquaculture Production	City
	27	Total New Building Construction Permits Issued	City
	28	Total Assessed Value of Taxable Lands	City
	29	Total Number of Land Parcels	City
	30	Energy Consumption	City
	31	Water Consumption	City
3. Adaptive Capacity	1	Local Governance Performance Monitoring System (LGPMS)	City
	2	Family Income and Expenditure	Regional
	3	City Finances	City
	4	Labor	Regional
	5	Functional Literacy	Regional
	6	Banking	City
	7	Regional Deposits	Regional
	8	Regional Loans	Regional
	9	Human Development Index	Provincial

Annex 16. SANTIAGO CITY

Vector		Variable	Scale
1. Climate/Environmental Exposure	1	Precipitation	City
	2	Temperature	City
	3	Typhoon Threat	City
2. Socio-Economic Sensitivity	1	Population	City
	2	Population Density	City
	3	Housing	City
	4	Enrollment	City
	5	Motor Vehicle	City
	6	Road Network	City
	7	Air Passenger Traffic	City
	8	Air Cargo Traffic	City
	9	Number of Business Establishments	City
	10	Hog Slaughtered	City
	11	Cattle Slaughtered	City
	12	Carabao Slaughtered	City
	13	Rice Production	Provincial
	14	Corn Production	Provincial
	15	Total New Building Construction Permits Issued	City
	16	Total Assessed Value of Taxable Lands	City
	17	Total Number of Land Parcels	City
	18	Water Consumption	City
3. Adaptive Capacity	1	Local Governance Performance Monitoring System (LGPMS)	City
	2	Family Income and Expenditure	Regional
	3	City Finances	City
	4	Labor	Regional
	5	Functional Literacy	Regional
	6	Banking	City
	7	Regional Deposits	Regional
	8	Regional Loans	Regional
	9	Human Development Index	Provincial

The **Business Risk Assessment and the Management of Climate Change Impacts Project** is a partnership between WWF-Philippines and BPI Foundation aimed at helping city planners and decision-makers assess climate change impacts, identify opportunities and decide on a sustainability strategy, site-specific intervention and standards of next practice that will allow the city to retain economic viability and respond more competitively in a climate-defined future.