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BUSINESS RISK ASSESSMENT AND THE MANAGEMENT OF CLIMATE CHANGE IMPACTS

EIGHT PHILIPPINE CITIES
2012

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ABBREVIATIONS AND ACRONYMS

ARMM	Autonomous Region on Muslim Mindanao
asl	above sea level
BAS	Bureau of Agricultural Statistics
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
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
FL	Functional Literacy
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
LGPMS	Local Governance Performance Monitoring Systems
LGU	Local Government Unit
LTO	Land Transportation Office
MCT	Mindanao Container Terminal
MICS	Management Information and Computer Services
MT	metric tons
NSCB	National Statistics Coordination Board
NSO	National Statistics Office
OFW	Overseas Filipino Workers
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PDIC	Philippine Deposit Insurance Commission
PHP	Philippine Peso
PNP	Philippine National Police
PPA	Philippine Ports Authority
SLGR	State of the Local Governance Report
STEEP	Society, Technology, Economics, Environment and Politics
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, such as Baguio, Cebu and Davao, are likely to experience landslides in association with episodes of extreme rainfall and soil saturation. This is not the case for Iloilo, surrounded by relatively flat or gently sloping terrain.

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 eight major Philippine cities: Baguio, Cebu, Davao, Iloilo, Cagayan de Oro, Dagupan, Laoag and Zamboanga. 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. 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 four 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.**
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> ***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**

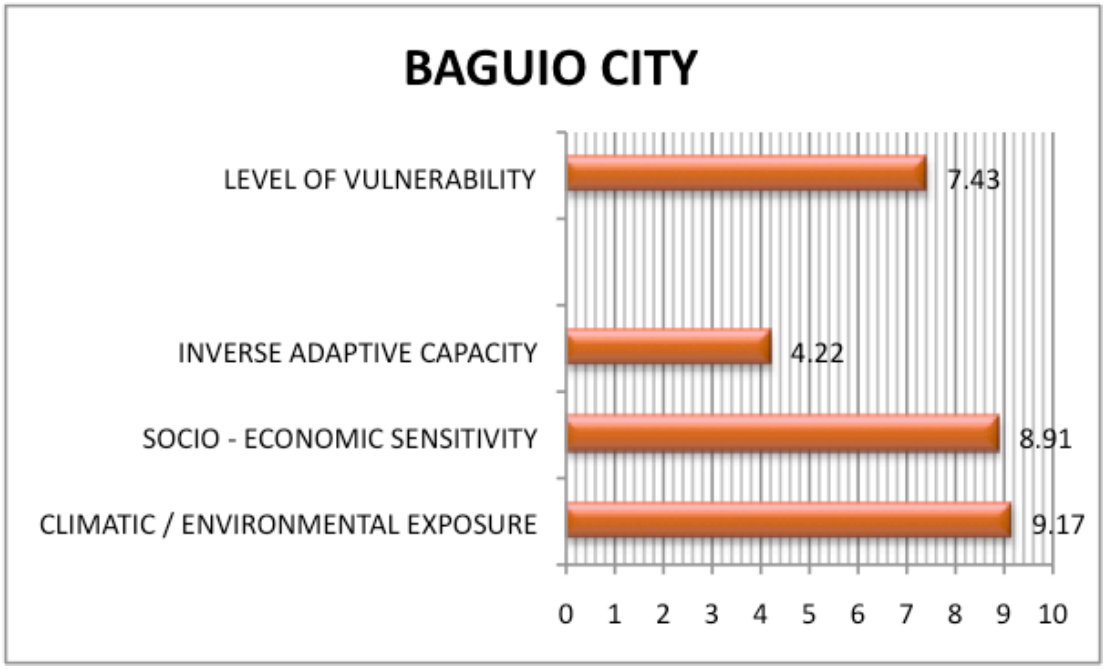
Secondary Drivers **INFRASTRUCTURE**
PLANNING

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**.

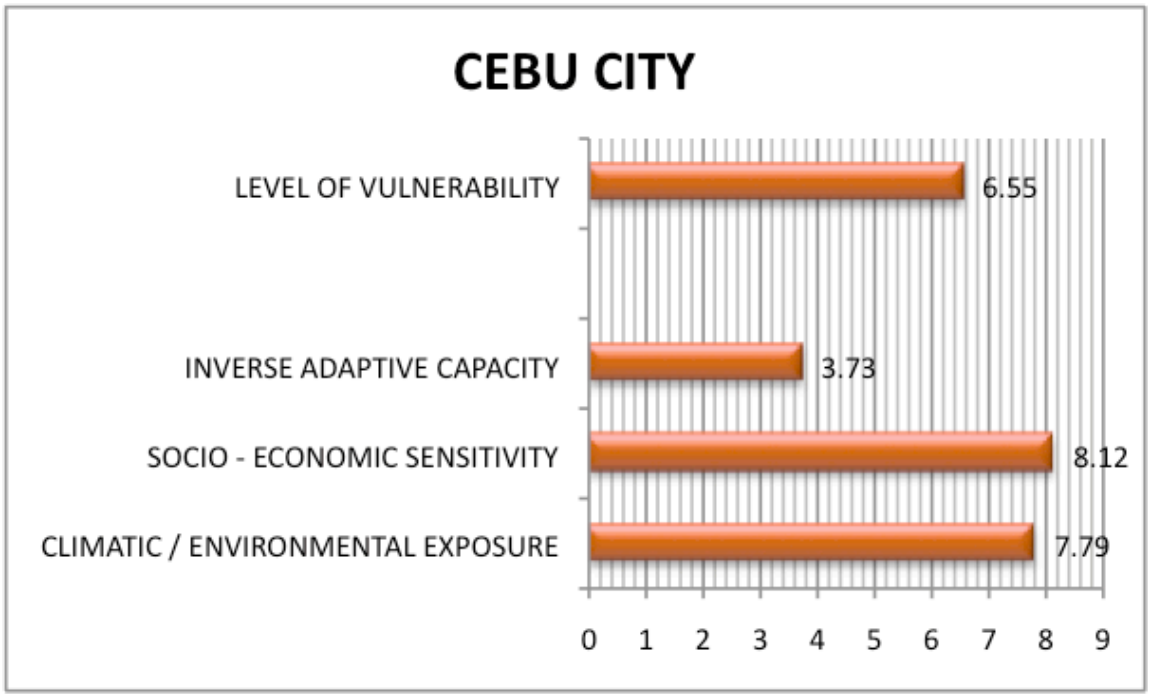
LIST OF DEVELOPMENT DRIVERS

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



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**.

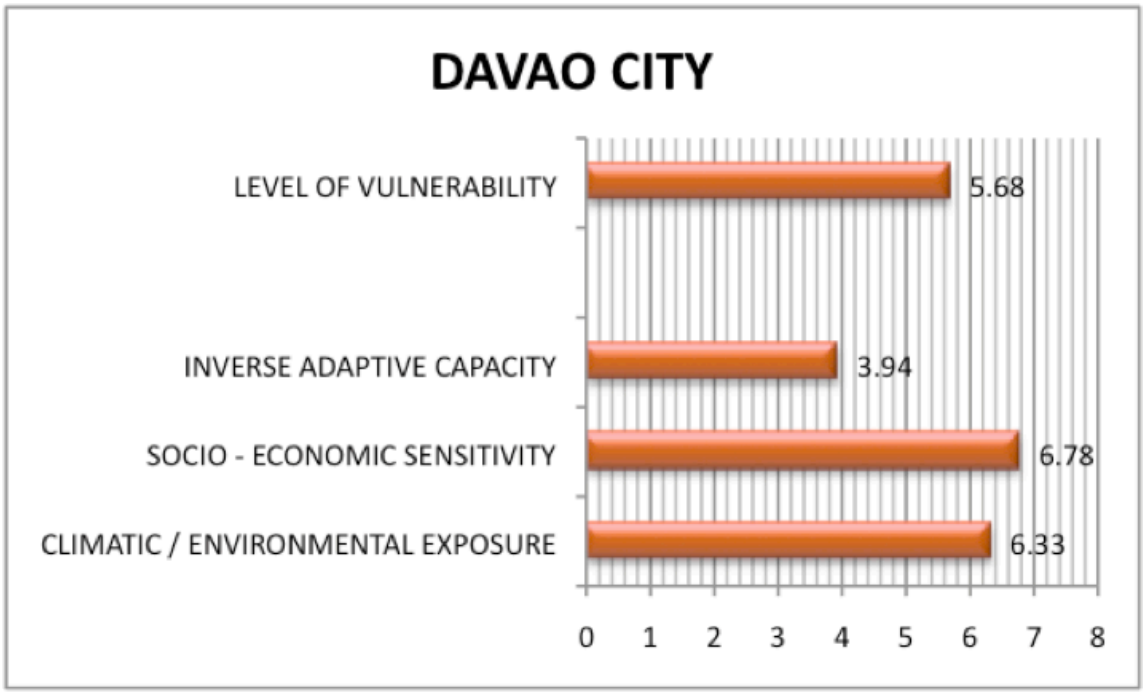
DRIVERS IDENTIFIED / SCENARIOS DEVELOPED

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



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**.

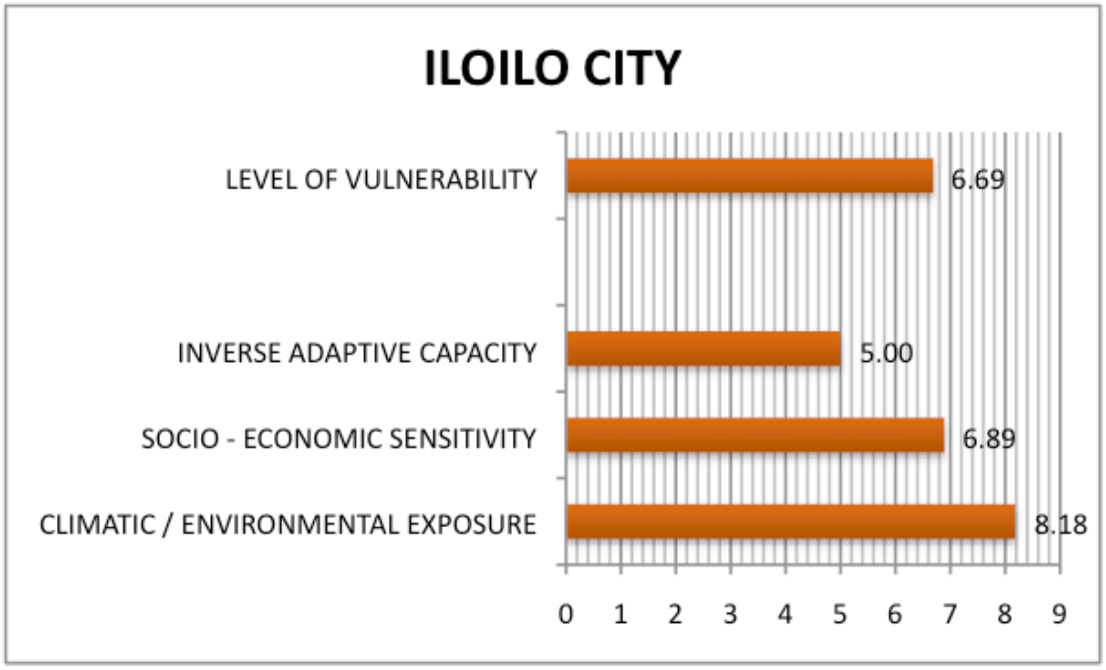
LIST OF DEVELOPMENT DRIVERS

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



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 build up 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

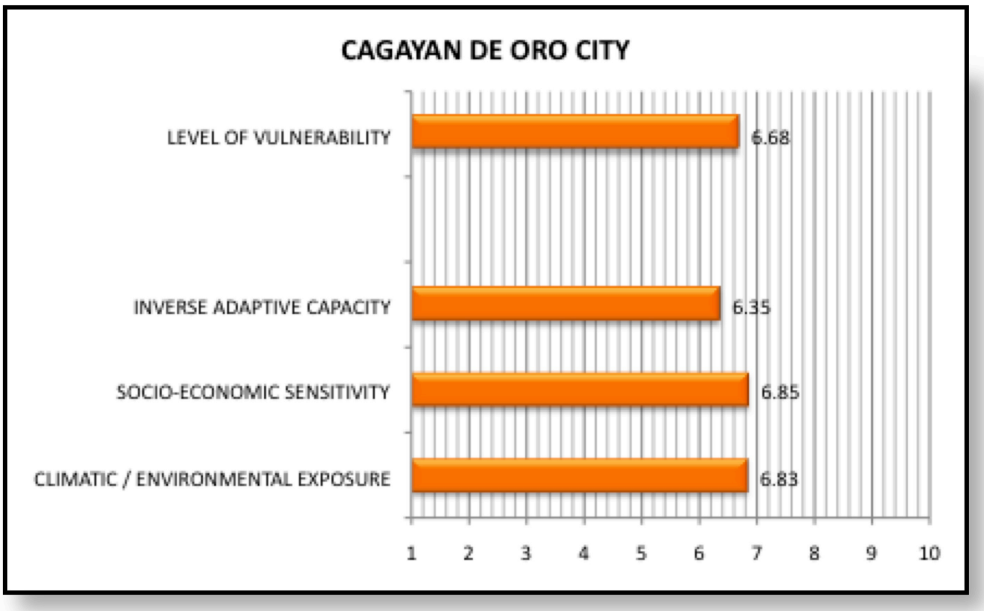
List of Development Drivers

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 harms 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

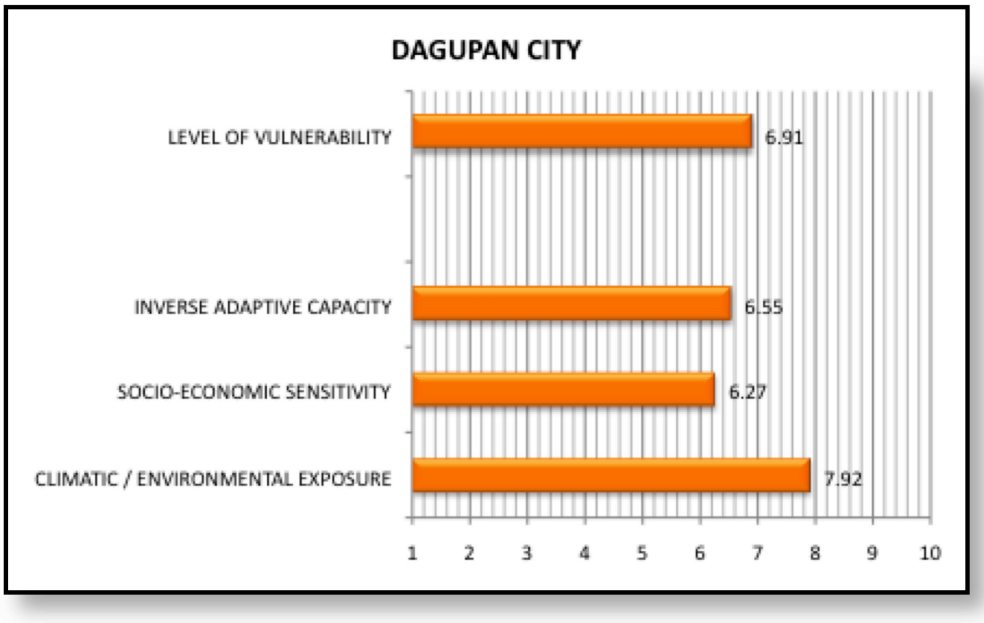
List of Development Drivers

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

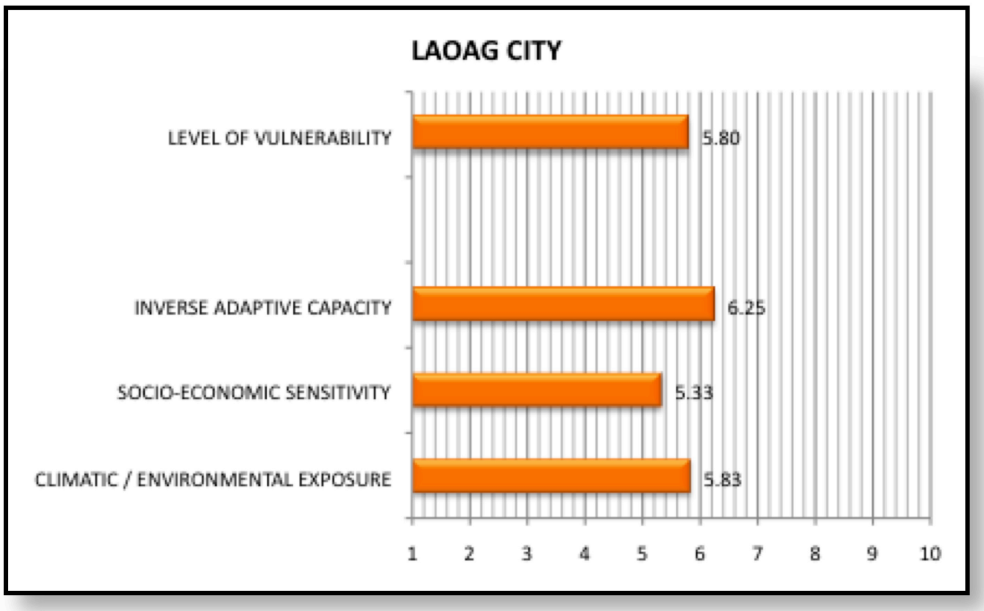
List of Development Drivers

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

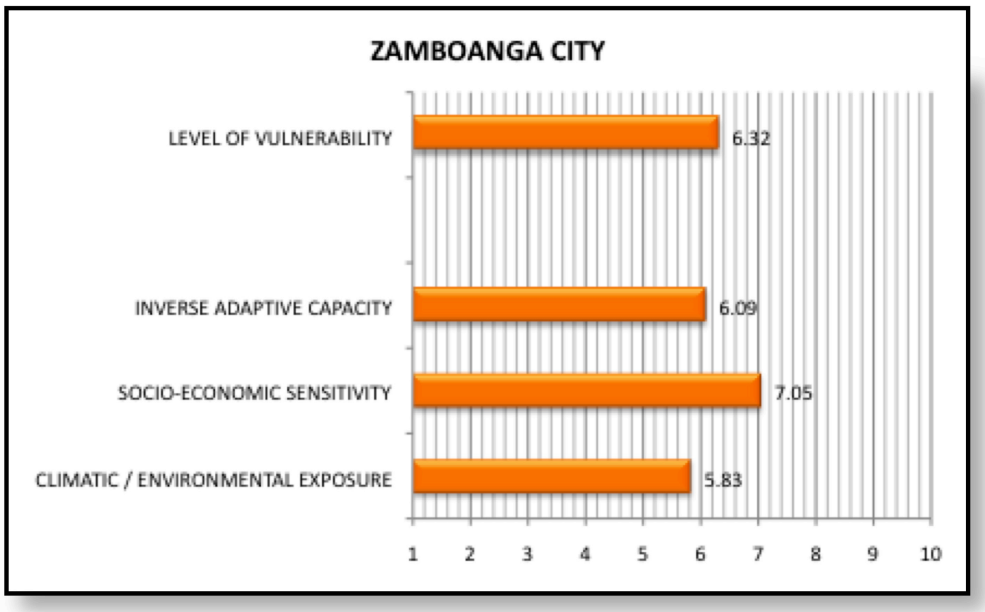
List of Development Drivers

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.

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

Variable	Source of Data
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

Variable	Source of Data
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
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 Number of 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
Total Annual Number of Embarking and Disembarking Sea-based Passengers	Philippine Ports Authority - Zamboanga Port Management Office, 1990-2011

Variable	Source of Data
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
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

Variable	Source of Data
Human Development Index - Zamboanga del Sur	Philippine Human Development Network, 1997, 2000, 2003, 2006

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	City
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	Provincial
	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	Provincial
	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. Typhoon Threat	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	City
	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
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	City
	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	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	City
	4. Family Income	City
	5. City Revenue	City
	6. Deposit Value	City
	7. Human Development Index	Provincial

Annex 1. 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 2. 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 3. 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 4. 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

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 interventions and standards of next practice that will allow the city to retain economic viability and respond more competitively in a climate-defined future.