Analytics Solutions for Philippine Challenges in Disaster Preparedness, Agriculture and Healthcare

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Big data has become ubiquitous and continues to grow exponentially

Each day, the world creates 2.5 quintillion bytes of data

There are numerous examples:

- 4.75 billion pieces of content shared daily[2]
- 200 billion tweets per year[3]
- 200MB of data per cow per year[4]
- 13 billion ad impressions per day[5]
- 24 petabytes processed daily[6]
- $118,000 transaction every minute[7]

And it is only just the beginning

By 2020

There will be over 200 billion connected devices[8]

There will be over 12 billion machine-to-machine devices[9]

Machine generated data will be 42% of all data[10]

4x more digital data than all the grains of sand on earth[11]

Governments face intensifying mission and business challenges
Across all levels and segments

Pressure for transparency and accountability

"Open government is a global and societal megatrend. Neither the potential benefits nor the change implications should be ignored." *

Increased threats to public safety

- **In addition to threats by foreign intelligence entities, insider threats will also pose a persistent challenge *****
- **Violent crime rose in the United States in 2012 for the first time in six years ******

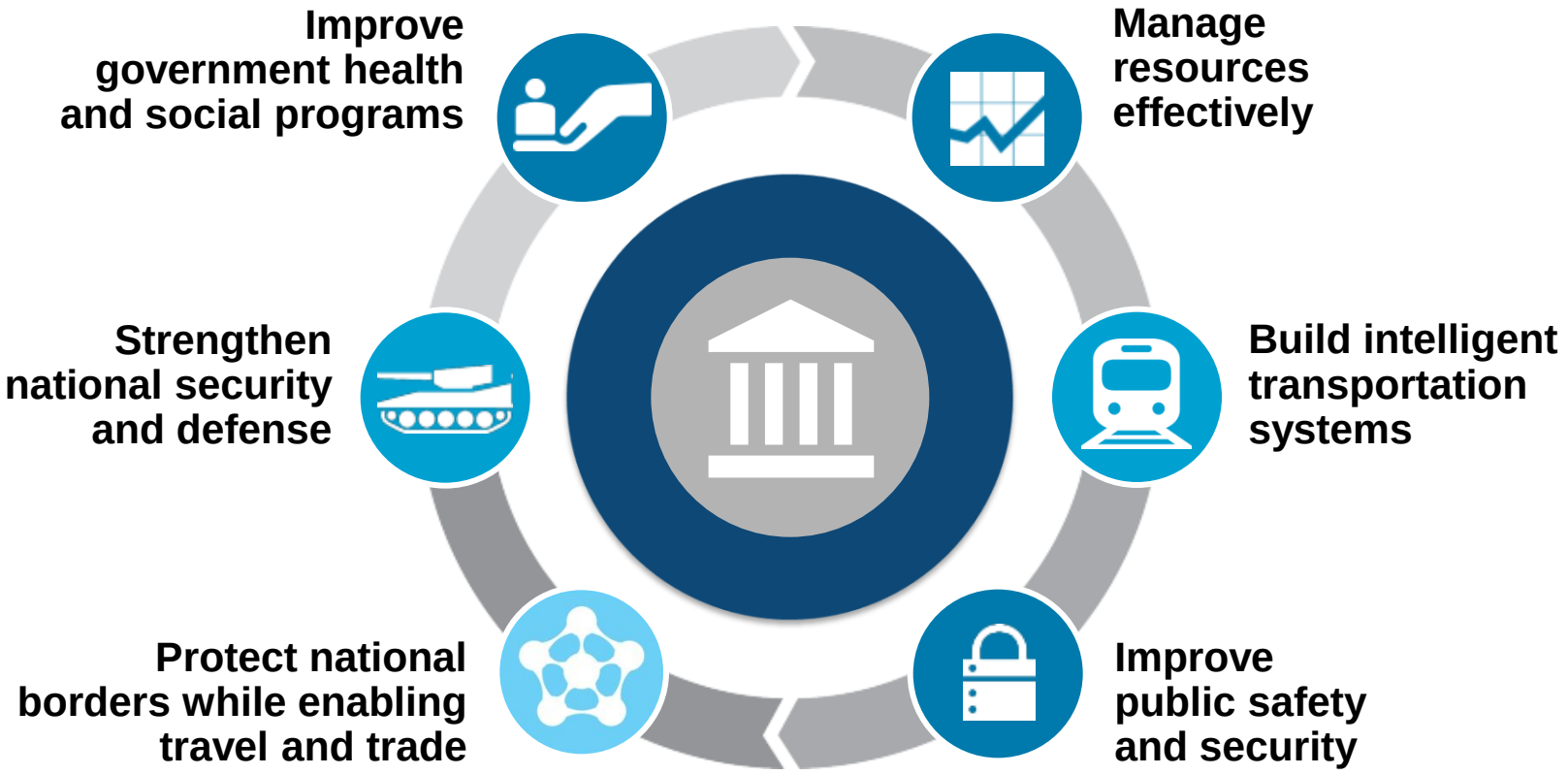
Continued economic and budgetary pressures

"Structural changes in the economy are likely to leave Governments facing budget deficits of around 4% of GDP for at least the next decade." **

Consumers are seizing control

Millennials say government has the greatest potential to address society's biggest issues but is overwhelmingly failing to do so *****

Leading government agencies are acting around their key imperatives



IBM R&D

- The result of IBM's response to the requests of Philippine President Aquino for IBM's technical assistance to address some of the most pressing challenges faced by Philippine society

- The R&D Lab will apply high performance computing, analytics, and other best practices to evolve comprehensive solution sets to these challenges.

IBM R&D Initiatives in the Philippines

Smarter Weather Forecasting

Data assimilation and weather forecasting

- *Use of high performance computing (HPC), real-time analytics and predictive analytics techniques*
- *DOST, ASTI, PAG-ASA, UP*

Smarter Agriculture for Farmers

Extension of our Smarter Weather Forecasting project to enable farmers

- *Expand to climate modeling*
- *Use of high performance computing (HPC), real-time analytics and predictive analytics techniques*
- *Platform to determine where, what and when to plant*
- *Information dissemination platform*
- *WWF, ISU, USAID, UP-IESM, DOST-ASTI*

Smarter Healthcare

- *PBSP on their Analytics Technology Roadmap for their tuberculosis project*
- *ADMU, ASMPH, DOST and DOH on Syndromic Surveillance*

Smarter Cities and Relief Operations

Intelligent Operations Center (IOC) for Emergency Management

- *For nationwide disaster response management*
- *Scalable and modular*
- *ADMU, DOST, ICTO, NDRRMC, DSWD*

IBM's Intelligent Operations Center (IOC)

Active Workflows:

Roles & Permissions

Event Mgt.

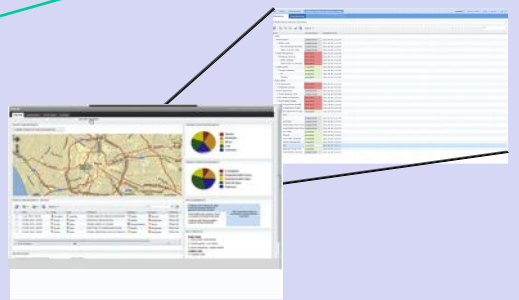
Unified Communications

GIS Integration

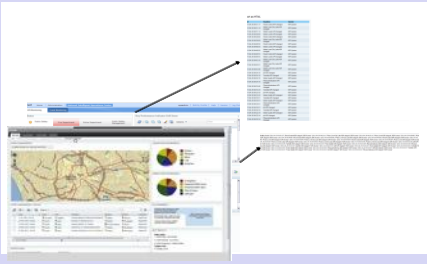
Mouse over Pop-ups

Intelligent Operations Center

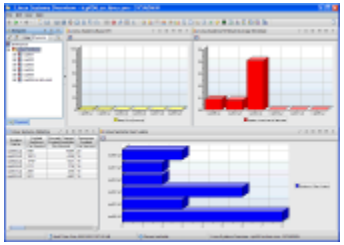
Data drill down



Data Exporting



Integrated System Monitoring



Click to Action

Progress Reporting

Adapting to Climate Change using Smarter Agriculture

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Climate Change

Greatly affect smallholder farmers particularly rainfed farmers

50% yield reduction by 2020

Overall 10% reduction in production yield for every 1° C temperature increase

Altieri, M. A., & Koohafkan, P. (2008). *Enduring farms: Climate change, smallholders and traditional farming communities* (Vol. 6). Third World Network (TWN).. Available Online: http://sa.indiaenvironmentportal.org.in/files/Enduring_Farms.pdf. Retrieved: May 2015

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Shahid Afghan and Muhammad Jamil (2014). *Climate Change Impact on Sugar Industry of Pakistan- An Overview.* Annual Convention Pakistan Society of Sugar Technologists (Vol. 47). Available at http://www.researchgate.net/publication/267453686_Climate_Change_Impact_on_Sugar_Industry_of_Pakistan-_An_Overview

Photo 1: http://www.bworldonline.com/content.php?section=Economy&title=sugar-braces-for-el-ni&241o-with-wells-cloud-seeding&id=116609

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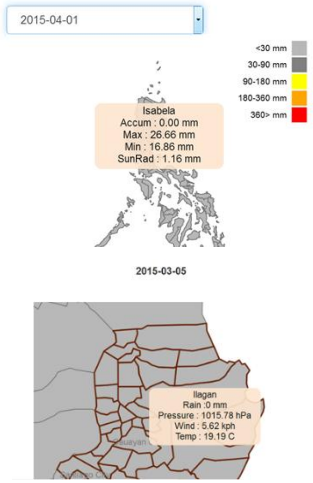
Suggested Solutions to Address Climate Change

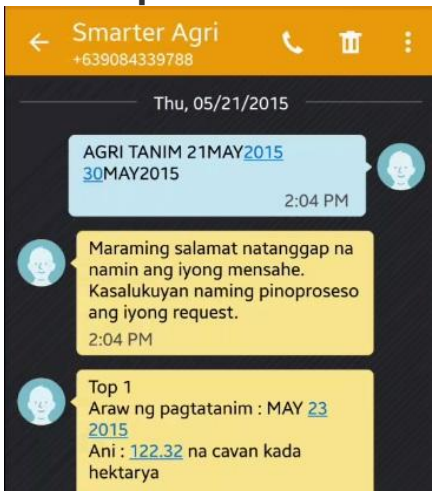
Crop simulation models



Utilize meteorological stations; More accurate weather and climate forecasts

Translate information into an easily understood format

And in local language when possible



Reyes, C., Domingo, S., Mina, C. and Gonzales, K. (2009). Climate Variability, SCF, and Corn Farming in Isabela, Philippines: A Farm and Household Level Analysis. Philippine Institute for Development Studies. Series No. 2009-06. Available onine: http://www.eaber.org/node/22689. Retrieved: May 2015.

Key Points

- **It is possible to Envision, Enable and Empower Smarter and Resilient Societies:**
  - Smarter (instrumented, interconnected, intelligent) systems
  - Cross-disciplinary (domain experts – disaster, agriculture, healthcare, etc.; engineering, science, social sciences, IT)
- **Lots of research opportunities**
  - Sensors: cost, accuracy, size, resiliency, power, security
  - Network: need for larger and larger bandwidth, cost, peer-to-peer, cooperation, last mile connectivity costs, resiliency
  - IT: real-time, predictive techniques, autonomic computing, machine learning, emphatic computing, cognitive computing
  - Security, privacy and governance
- **What are the critical success factors?**
  - **Collaboration** is key
  - **Sustainability**: How to sustain the systems and solutions we developed?

Maraming Salamat Po!
Thank you!

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