

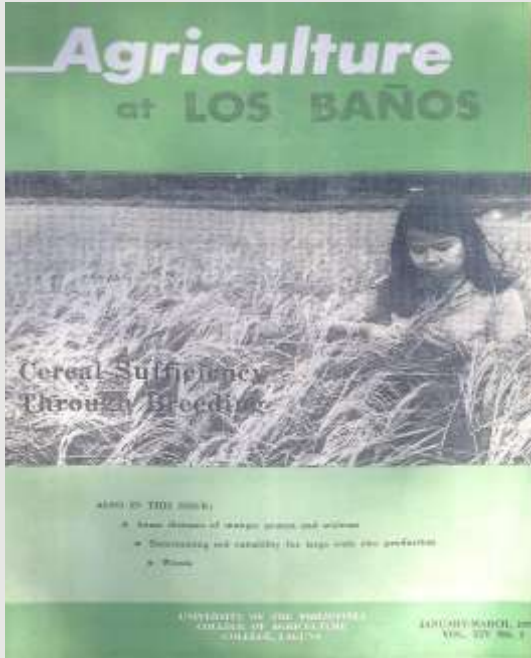
Digital Inclusion Policy & Digital Tools to Drive Agricultural Development in SE Asia

John Garrity

SEARCA - ADSS

November 6, 2018

A Long (Family) History With UPLB & SEARCA



Professional Background



Topics Today

- 1) Internet Connectivity & Information and Communications Technologies (ICTs)
- 1) Application to Agricultural Development in Southeast Asia

Key Takeaways:

How can digital tools support your work in agricultural development?

What can this community do to support digital ecosystem development in the region ... to foster the utilization of digital tools in agriculture?

Is internet connectivity an enabler or a prerequisite, when it comes to agricultural development?

Why Discuss the Digital Economy re: Agricultural Development?

"In today's world, when we talk about rural transformation, my best example is that the youngsters need to make sure WhatsApp is working. This is almost non-negotiable."

- *Gilbert Houngbo, President of the International Fund for Agricultural Development (IFAD) and former PM of Togo*



Definitions

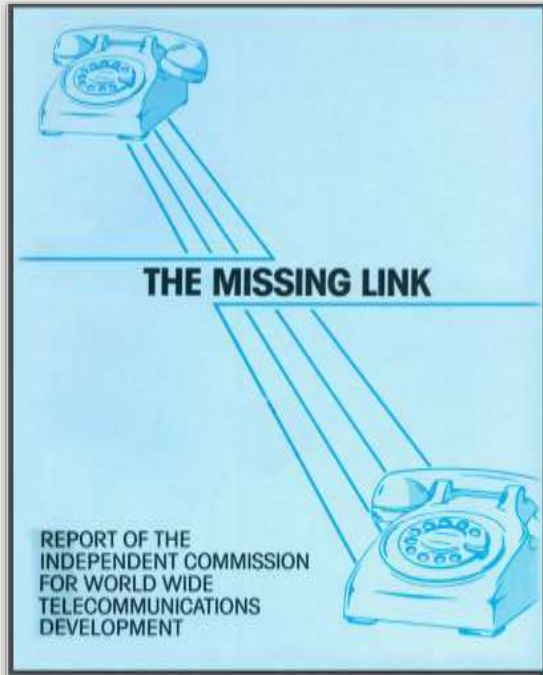
Information and Communications Technology (ICT):

Information Technology (IT), which covers digital computing technologies plus a focus on communications, such as the internet, telephony (fixed and wireless), and other communications mediums (including radio, etc.).

Digital Technologies:

“The internet, mobile phones, and all the other tools to collect, store, analyze, and share information digitally.” (World Bank WDR 2016)

Information & Communications Technology (ICT) Adoption as a Global Goal (1)

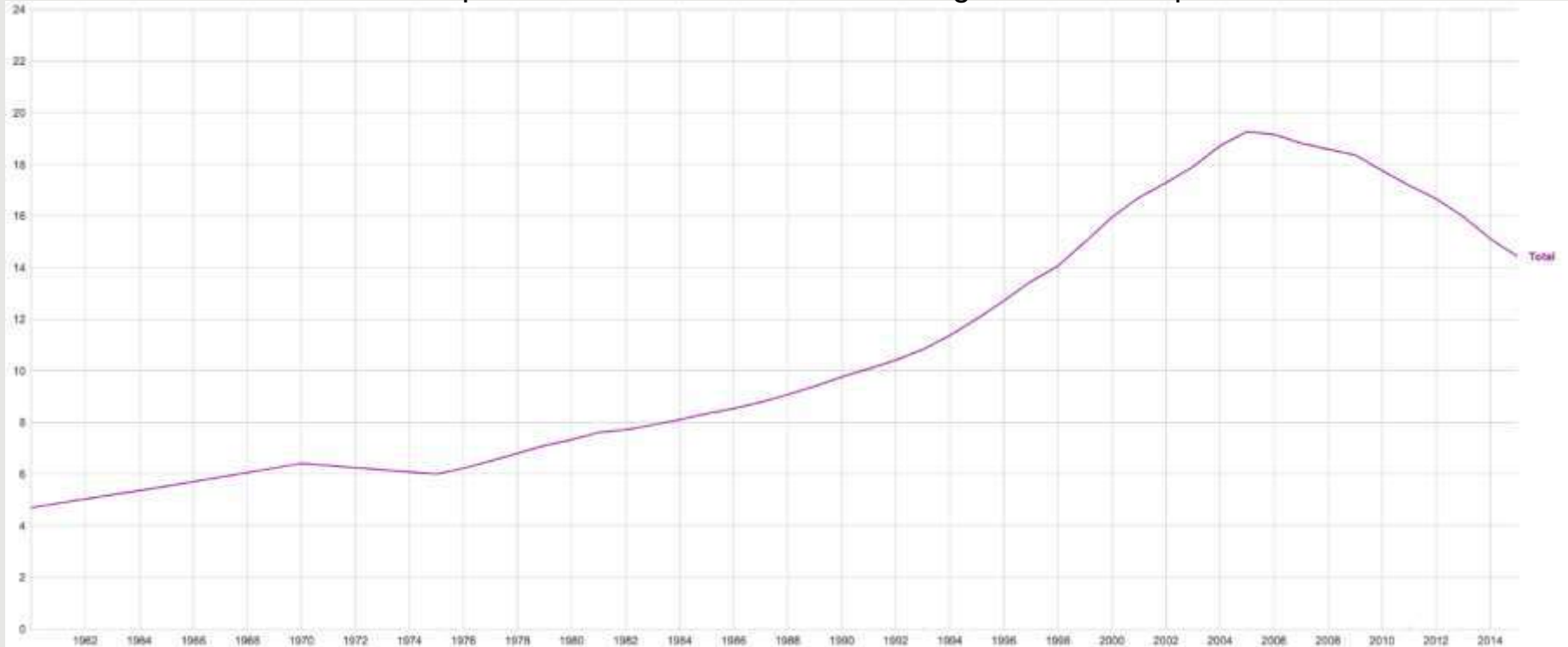


“There is no good reason why by the early part of the next century, virtually the **whole of mankind should not be within easy reach of a telephone** and of all the benefits this can bring.”

- UN ITU ‘Maitland Report’, 1984

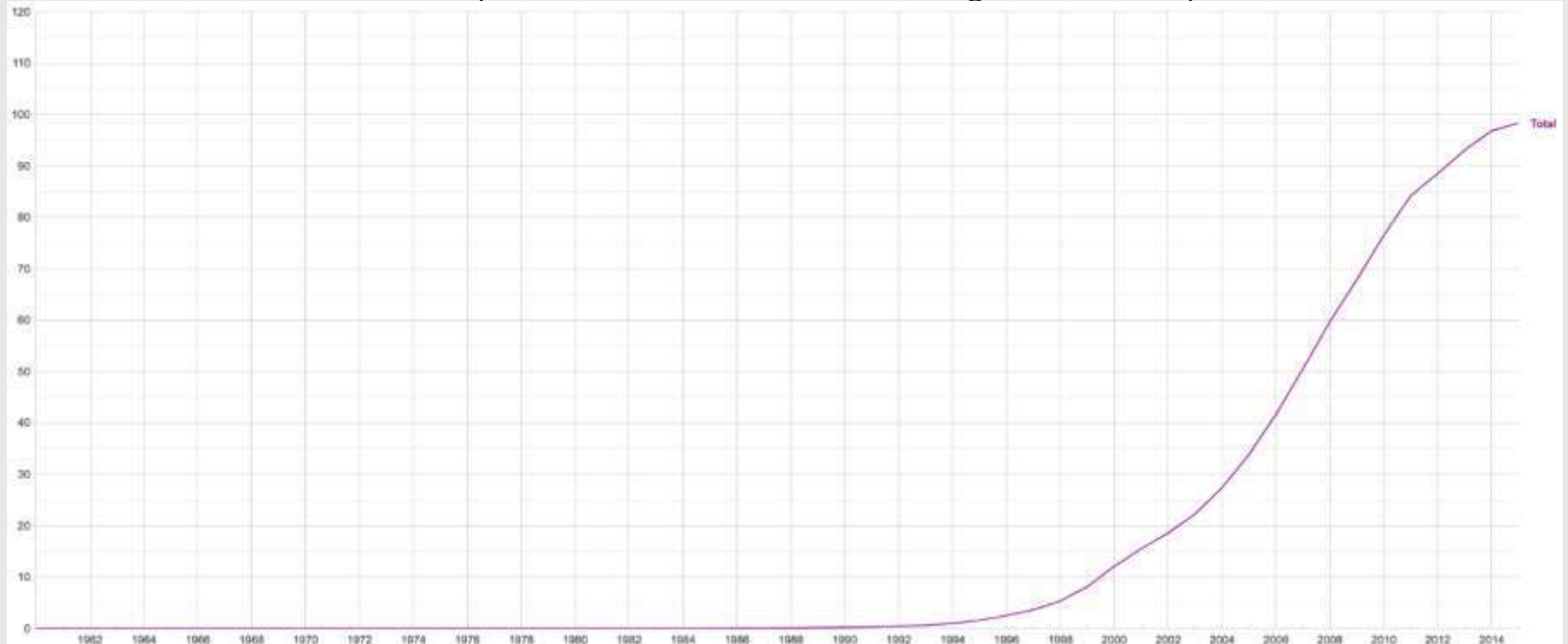
How did the global community do on telephony?

Fixed Telephone Subscribers* as a Percentage of Global Population



On Mobile Telephony

Mobile Telephone Subscribers* as a Percentage of Global Population



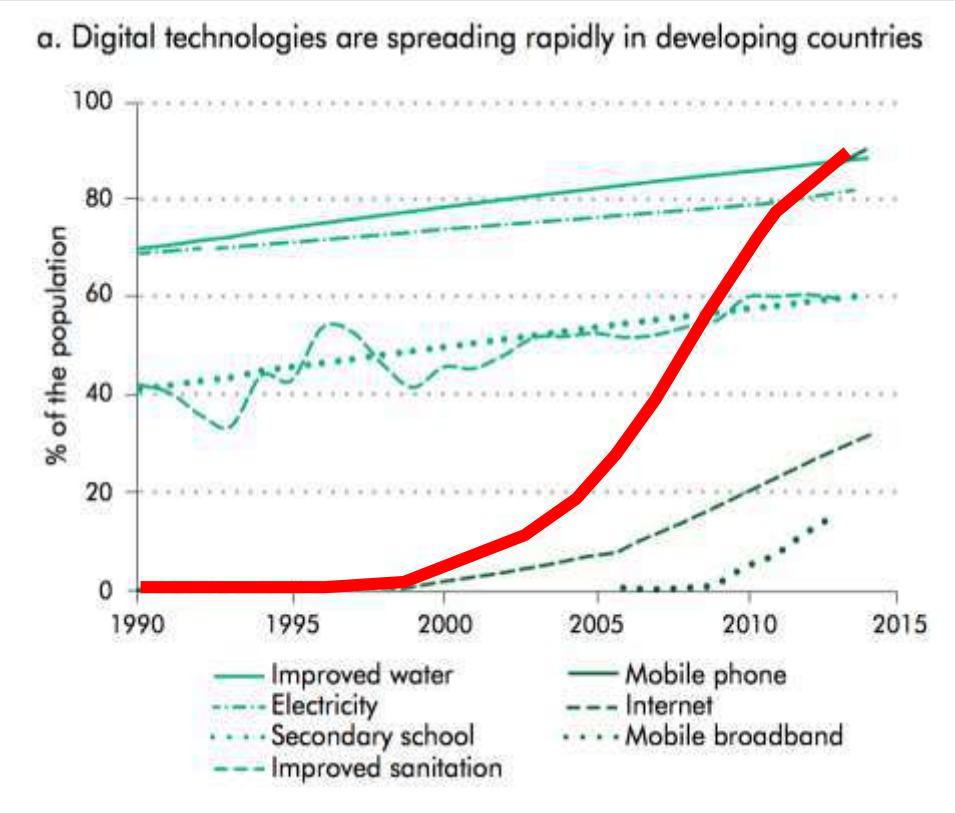
Internet Connectivity as a Global Goal



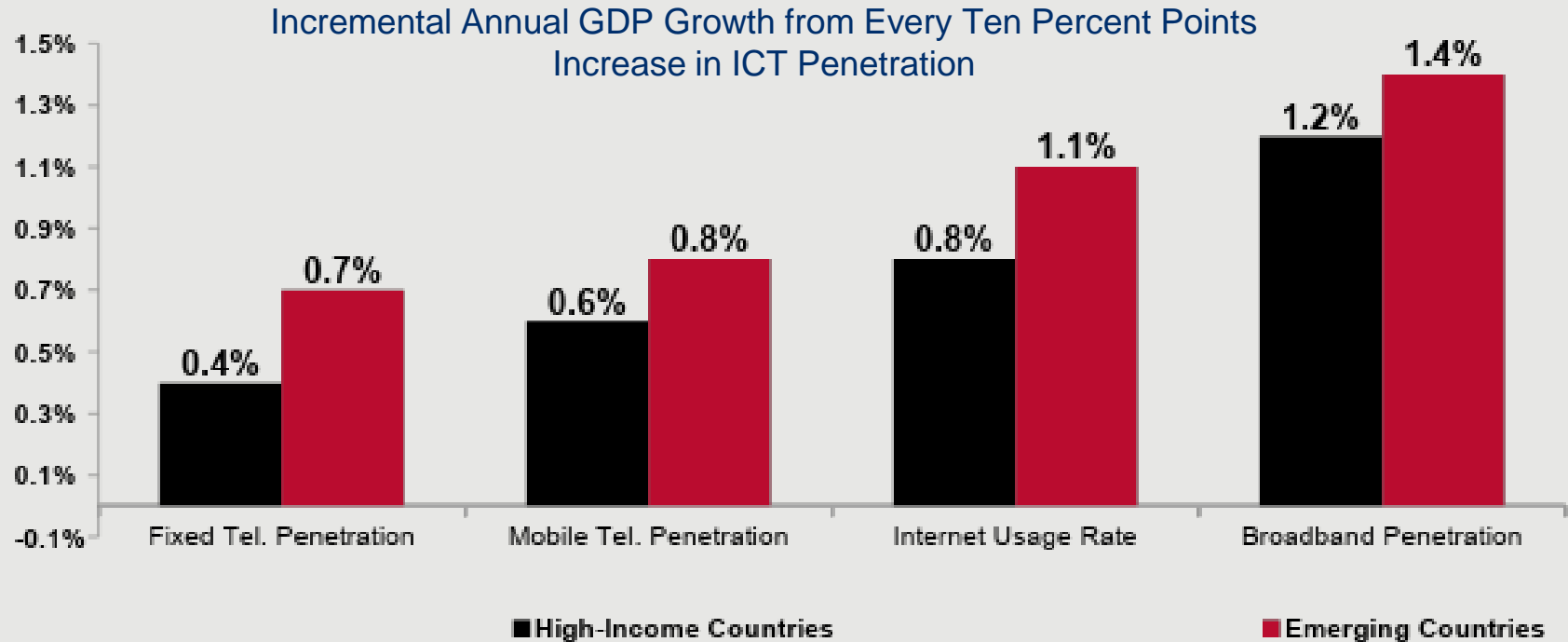
SDG 9c:

Significantly increase access to information and communications technology and strive to **provide universal and affordable access to the Internet in least developed countries** by 2020

Digital Technologies as a Channel for Service Delivery



Macroeconomic Growth Impact of ICTs

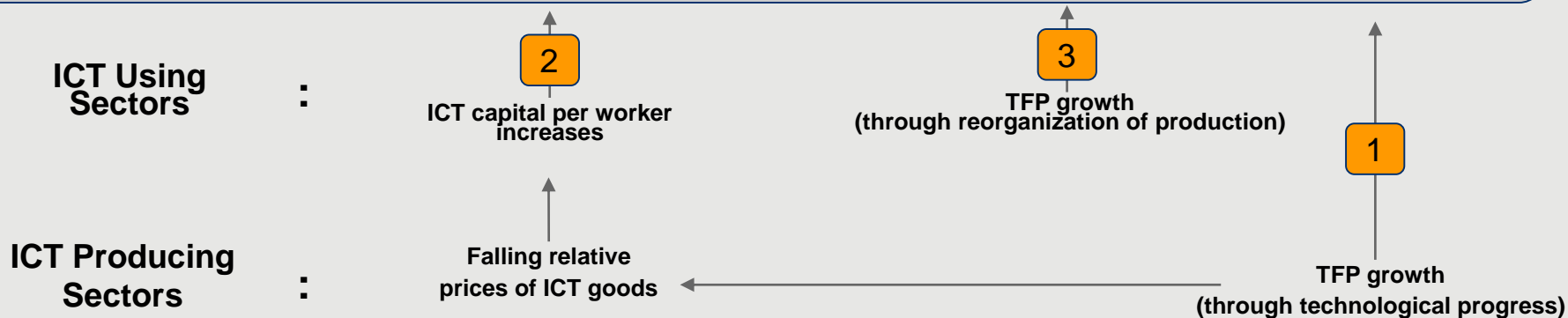


How ICTs Contribute to Economic Growth

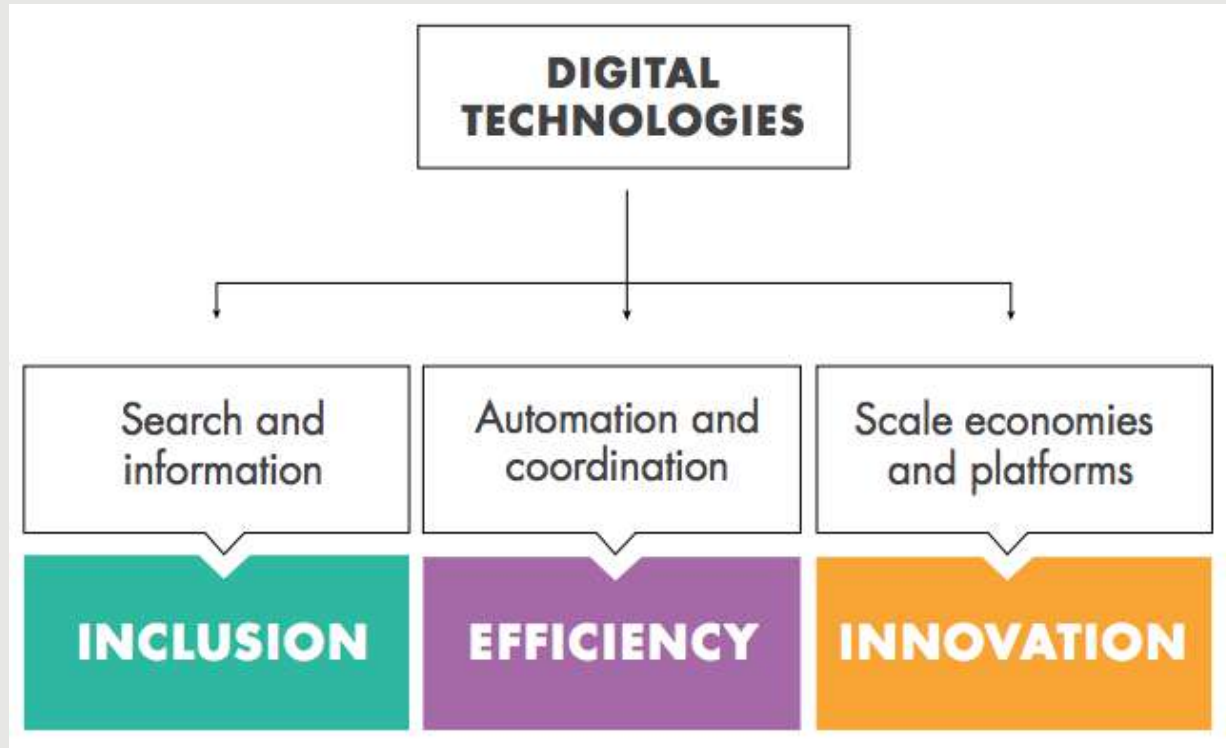
ICT leads to labor productivity gains through three channels:

1. Total Factor Productivity growth in sectors producing ICT
2. Capital Deepening
3. Total Factor Productivity growth through reorganization and ICT usage

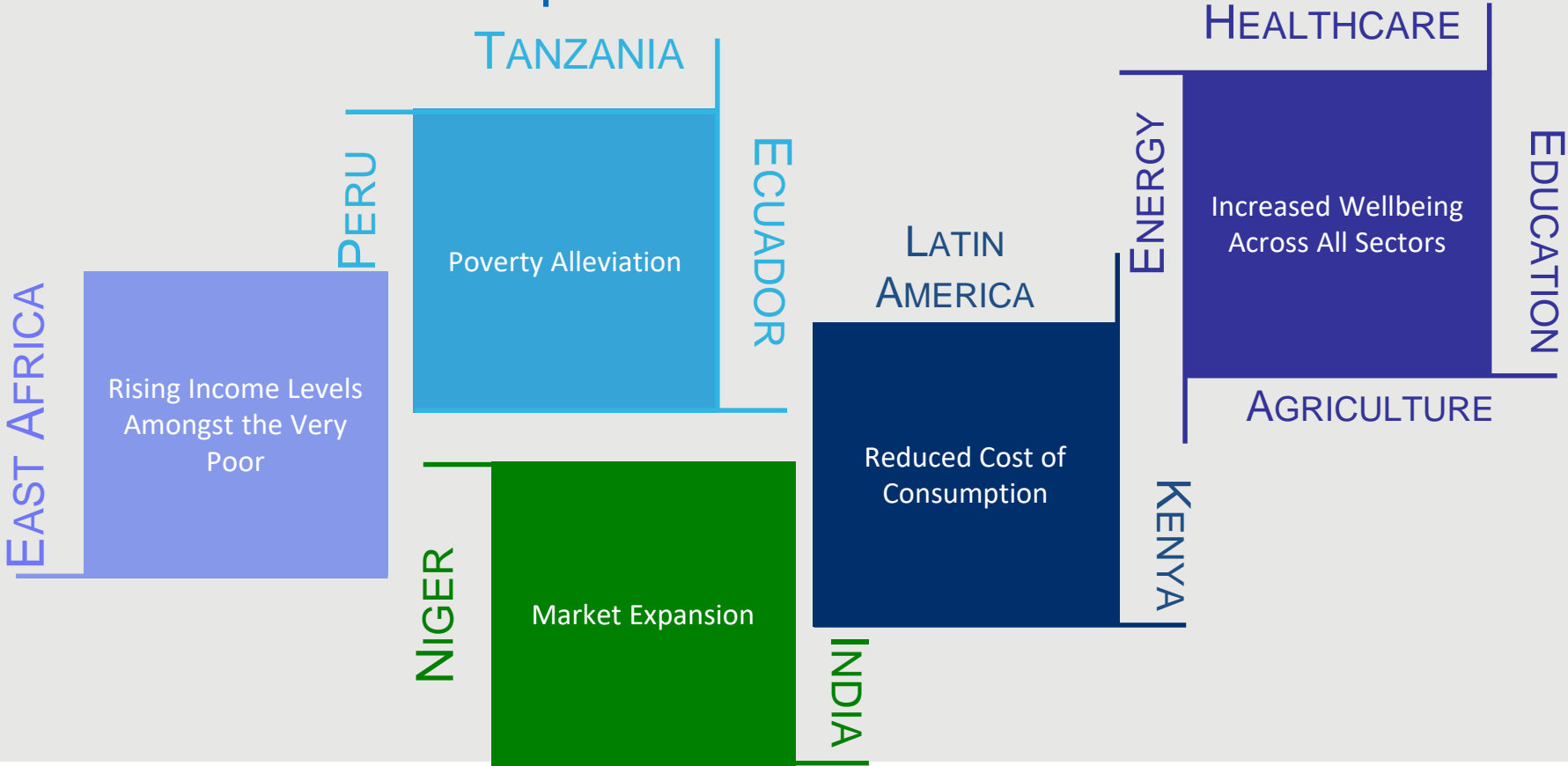
$$\text{Labor Productivity} = \text{Capital Deepening} + \text{Total Factor Productivity Growth}$$



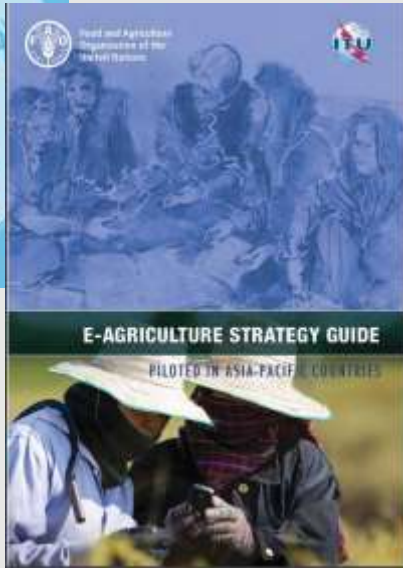
Advancing Development Through Three Main Mechanisms



Microeconomic Impacts of ICTs



Digital Technologies in Agriculture have the potential to:



- **Help achieve SDG2:** End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- Revolutionize **farmer organizations**
- Put African smallholder **farmers squarely as part of the solution** and not just as part of the problem
- **Empower rural women and youth** and activate participation in agriculture
- **Lower barriers and distance to markets** for isolated smallholders
- **Revamp traditional extension** models
- Foster better, **two-way and real time feedback loops**
- Improve **farmer decision-making** and competitive advantage.

One of the first RCTs in Telecommunications Provision



VBTS-CoCoMoNets

North-South Collaboration

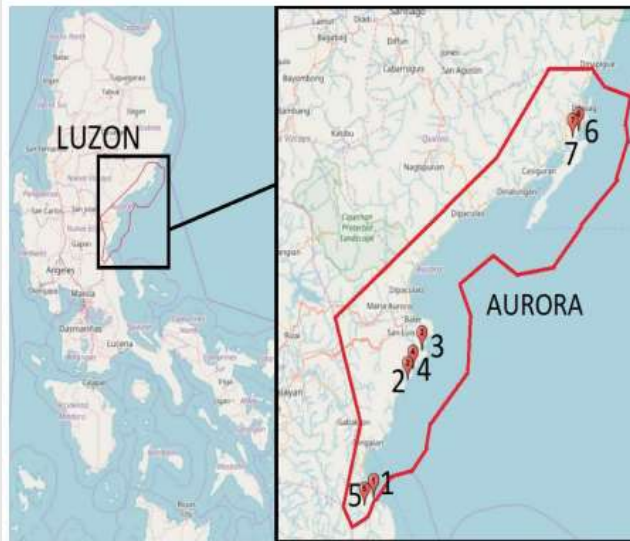
- University of the Philippines
- University of California Berkeley
- University of Washington
- Aurora State College of Technology

VBTS



Interdisciplinary Collaboration

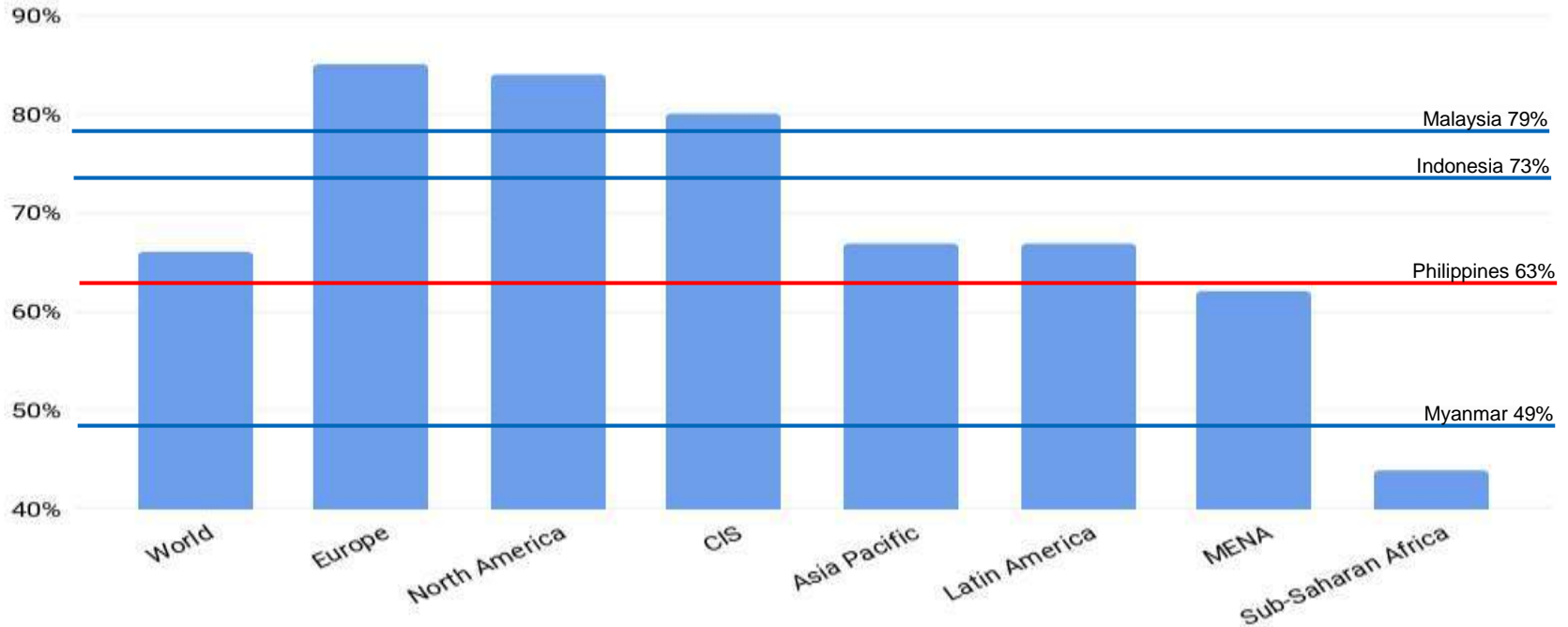
- Engg – EEE, Comp Sci
- Soc Sci – Sociology, Political Science



- Isolated coastal communities in coves
- Access is mainly by boat
- No concrete road network
- Off-grid power
- No cellular signal but some residents have cellphones
- 80% of land area are protected areas
- Mainly agricultural towns
- Access to social services limited to basic level services

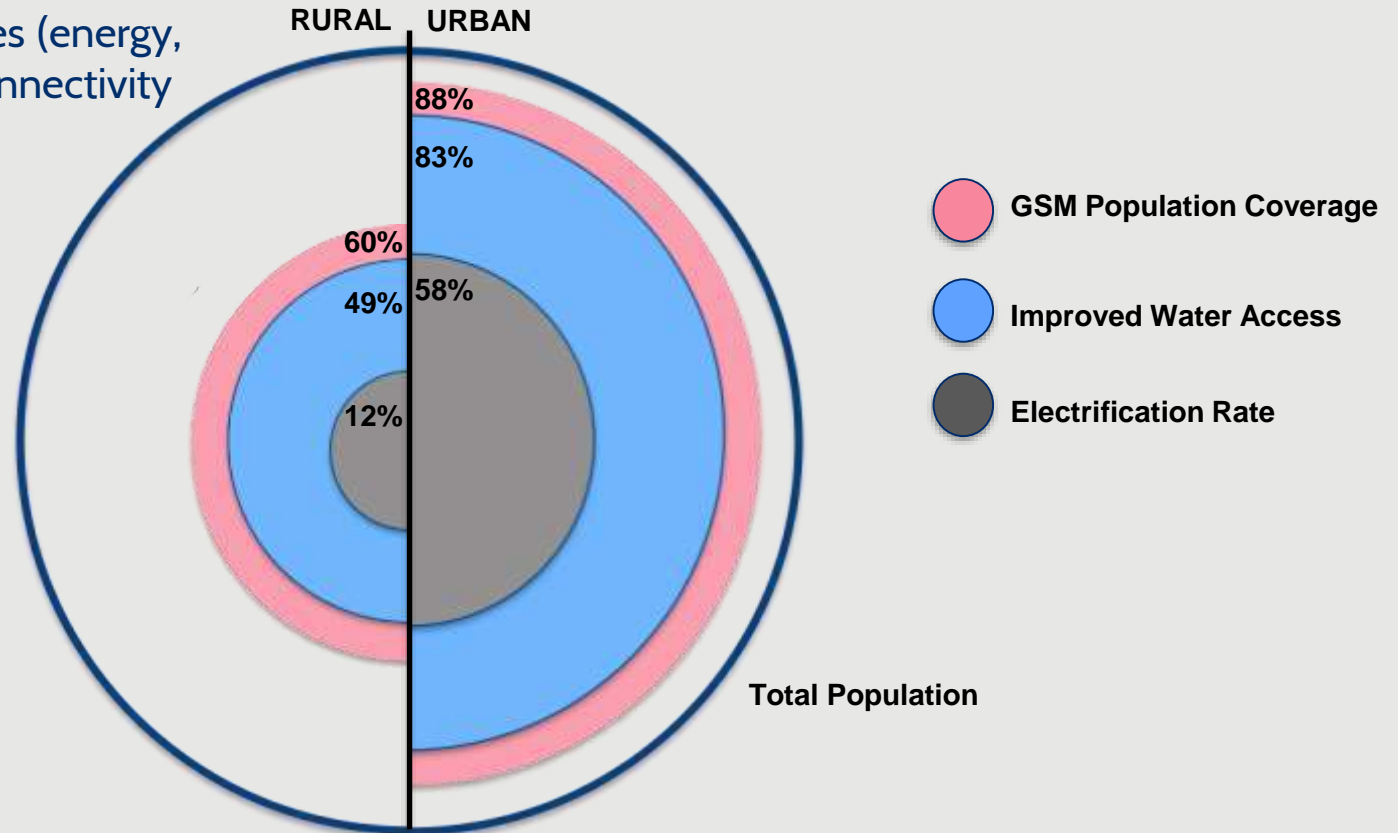
Constraints to Digital Tool Adoption: Big Gaps in Mobile Adoption

Unique Mobile Subscribers as a Percent of the Population

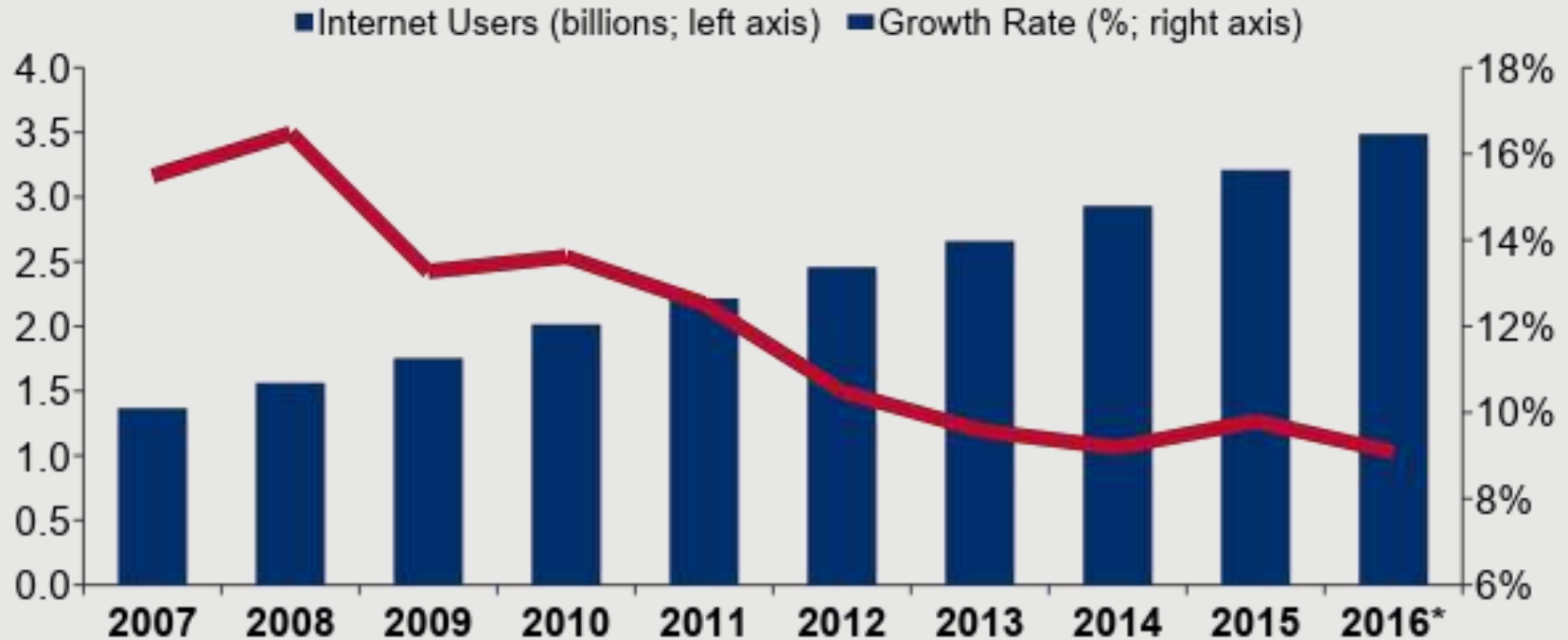


Constraints to Digital Tool Adoption: Gaps between Urban vs Rural

Access to basic services (energy, water) versus basic connectivity (GSM)

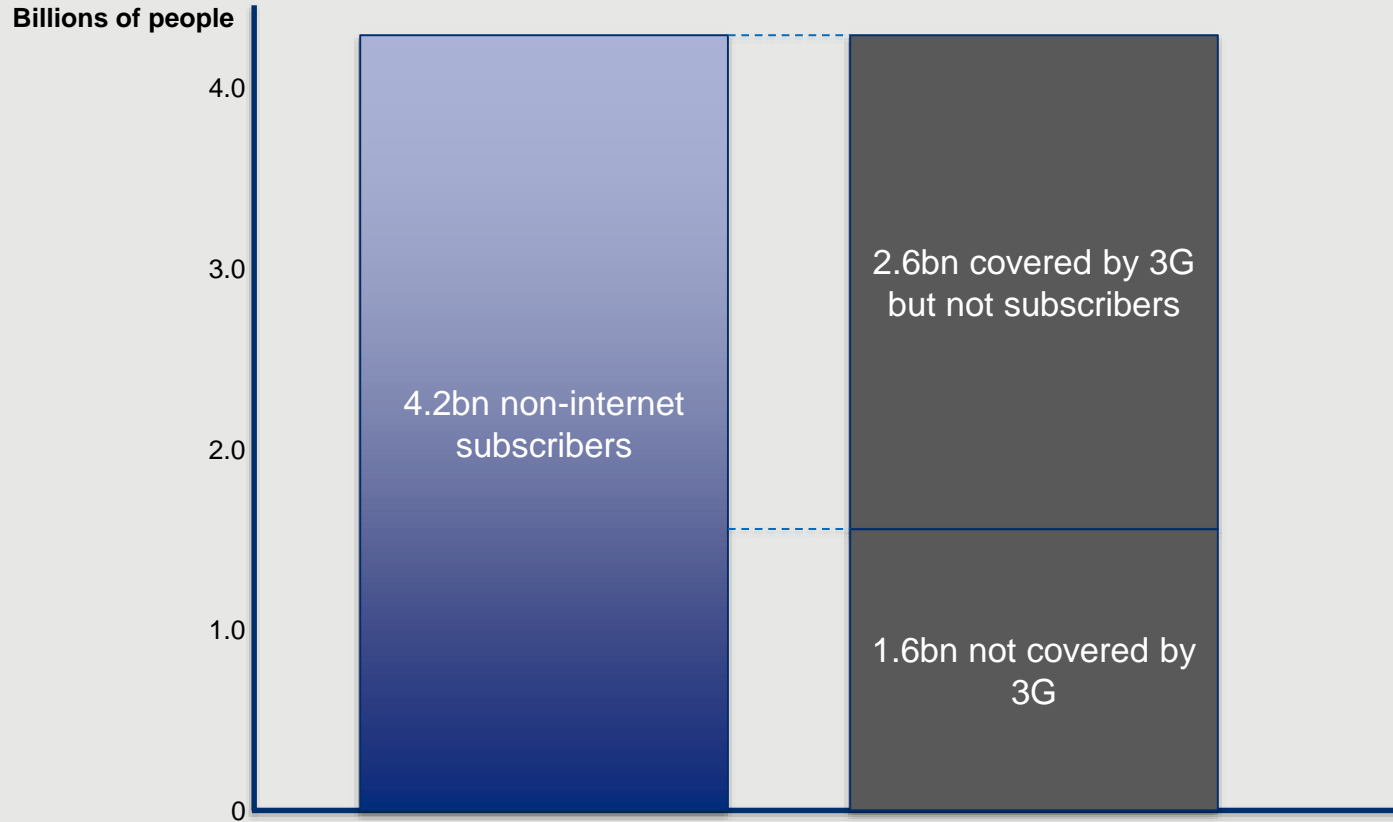


Constraints to Digital Tool Adoption: Slowing Internet User Growth



The Alliance for Affordable Internet estimates that target 9c will only be reached in 2042, 22 years after the target.

Constraints to Digital Tool Adoption: Limited Network Availability and Affordability

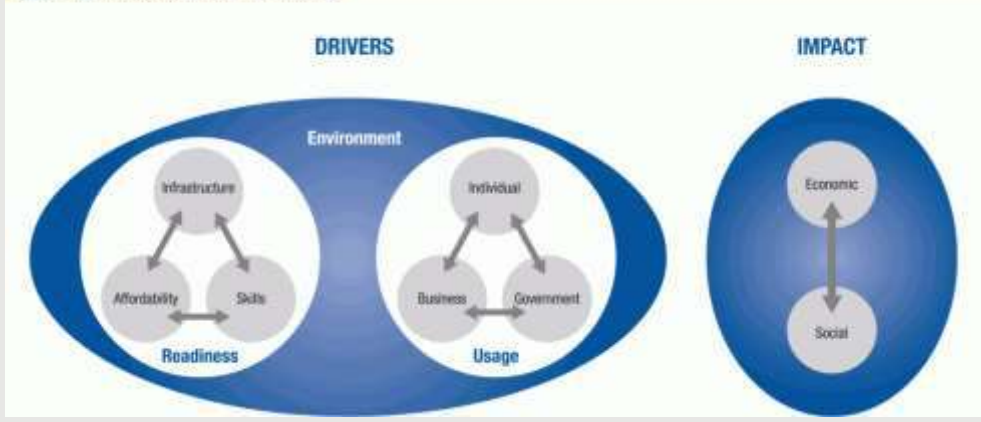


Frameworks for Assessing National Digital Ecosystem



WEF's Networked Readiness Index

Figure 1: Networked readiness framework:



Inclusive Internet Index (EIU / Facebook)



The Philippines: Strengths and Opportunities in the I3

The Philippines places 54th out of 86 overall, in the lower half of the standings for Asia, and 9th out of 23 lower-middle-income countries. The country's overall ranking suffers from low Affordability: its competitive environment stands at 81st in the world. However, Readiness ranks 43rd globally.

Rank out of 86 countries (1=best; 86th=worst)

Availability	46th	Affordability	71st	Relevance	54th	Readiness	43rd
Usage	48th	Price	51st	Local Content	62nd	Literacy	38th
Quality	56th	Competitive Environment	81st	Relevant Content	43rd	Trust & Safety	16th
Infrastructure	37th					Policy	60th
Electricity	57th						

Supply Side Challenges: Network Coverage Limitations

10k out of 42k barangays (villages) still do not have cellular coverage

- Most do not have stable grid power supply
- Geographically isolated, without safe and reliable transportation infrastructure
- Small potential subscriber populations



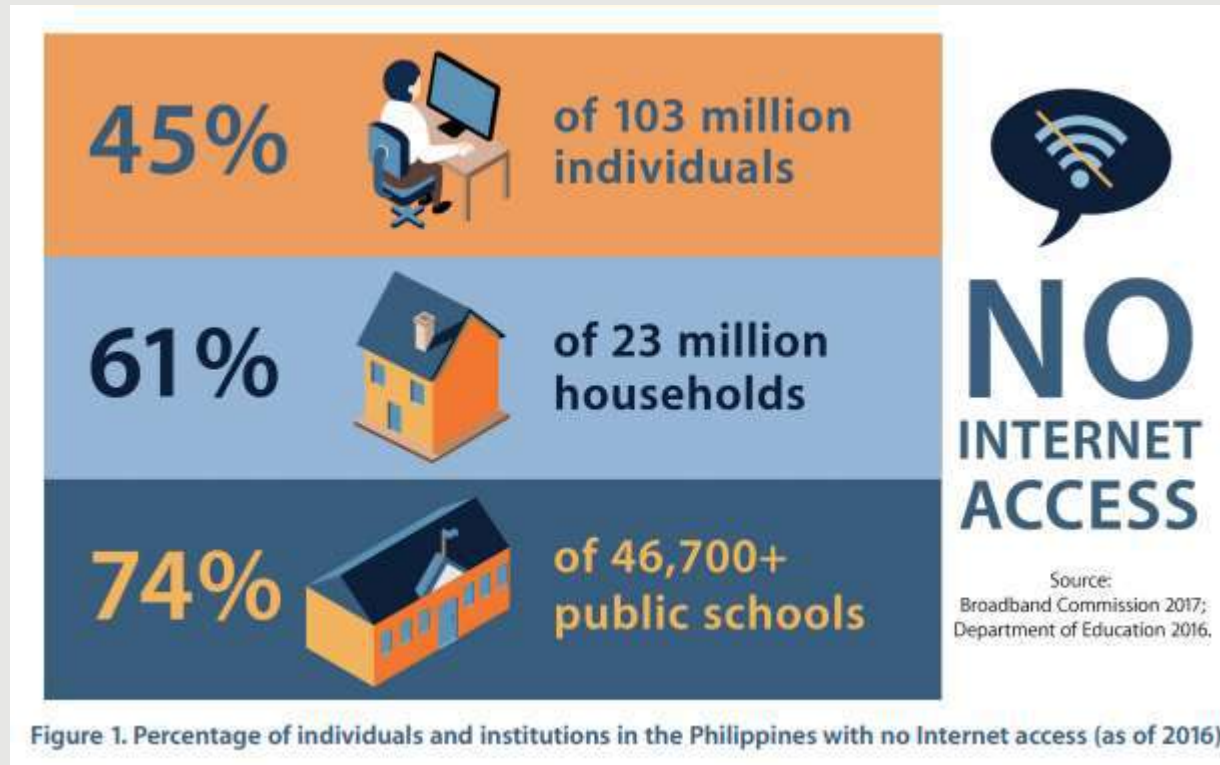
Supply Side Challenges: Competition and Affordability

Rank out of 86 countries (1=best; 86th=worst)

Competitive Environment	81st
<i>Wireless operators' market concentration</i>	<i>66th</i>
<i>Broadband operators' market concentration</i>	<i>45th</i>

Price	51st
<i>Smartphone cost (handset)</i>	<i>54th</i>
<i>Mobile phone cost (prepaid tariff)</i>	<i>59th</i>
<i>Mobile phone cost (postpaid tariff)</i>	<i>55th</i>
<i>Fixed-line monthly broadband cost</i>	<i>62nd</i>

Supply Side Challenges: Limited Subscriber Base



Demand Side / “Readiness” Strengths

Rank out of 86 countries (1=best; 86th=worst)

Readiness	48th
<i>Level of literacy</i>	<i>34th</i>
<i>Educational Attainment</i>	<i>41st</i>
<i>Support for digital literacy</i>	<i>1st</i>
<i>Level of web accessibility</i>	<i>44th</i>

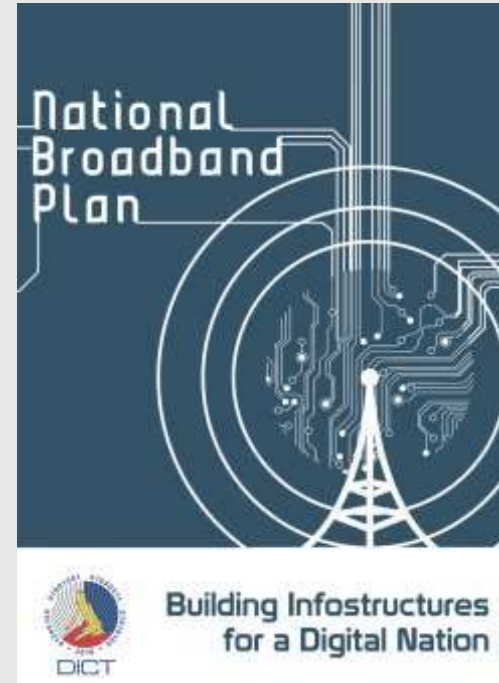
Trust and Safety	16th
<i>Privacy regulations</i>	<i>1st</i>
<i>Trust in online privacy</i>	<i>43rd</i>
<i>Trust in government websites and apps</i>	<i>17th</i>
<i>Trust in non-government websites and apps</i>	<i>17th</i>
<i>Trust in information from social media</i>	<i>19th</i>
<i>e-Commerce safety</i>	<i>63rd</i>

Policy	60th
<i>National female e-inclusion policies</i>	<i>33rd</i>
<i>Government e-inclusion strategy</i>	<i>1st</i>
<i>National broadband strategy</i>	<i>1st</i>
<i>Funding for broadband rollout</i>	<i>79th</i>
<i>Spectrum policy approach</i>	<i>1st</i>
<i>National digital identification system</i>	<i>76th</i>

A Supply Side Approach: Components of the DICT National Broadband Plan

Five main components:

- 1) International bandwidth / capacity:
FB's Luzon Bypass
- 2) National backbone / NGCP dark fiber
- 1) Third telco license: New Major Telcom Player (NMP)
- 1) Connectivity to all barangays
- 1) Satellite overlay for backhaul



Transformative potential of ICTs in Agriculture



Web pages



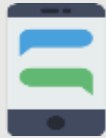
Mobile Apps



Video Clips



Databases



Text Messages



Sensors and Drones

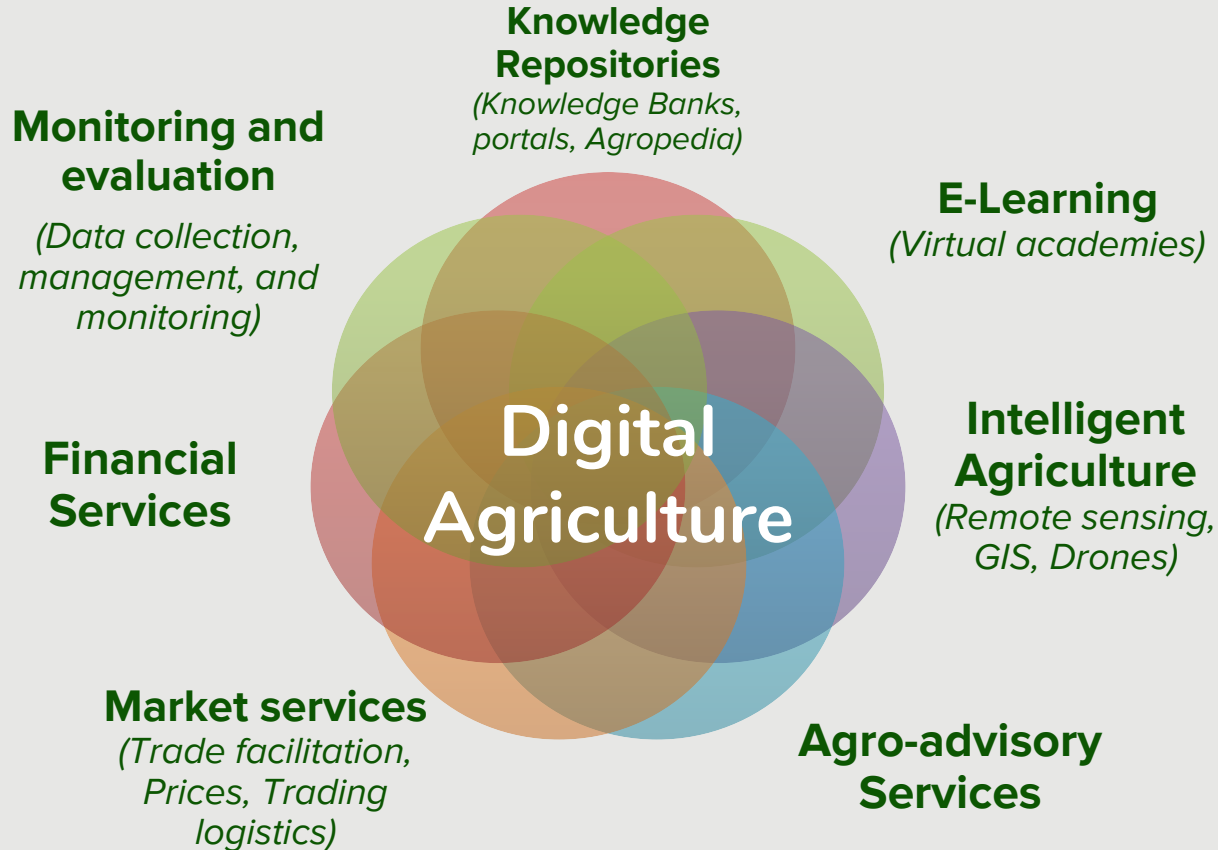


Radio Broadcasts



E-Learning Materials

Topics Under the e-Agriculture:



WHY - Digitize the Agricultural Value Chain



PLANNING

- Help farmers plan **what, when to plant**
- Tighten relationship with **buyers, processors**
- Provide data for farmers to make **business decisions** on cash flow and maximizing profit



INPUTS

- **Reduce costs** and risks for buyers
- Increase access to **quality inputs**
- Provide convenient and secure ways for farmers to purchase, save, and receive **credit inputs**



ON-FARM PRODUCTION

- Help **extension services** reach more farmers
- Use **behavior change** media to promote best practices among farmers



STORAGE

- Improve links between **farmers, processors**
- Inform **harvest practices** to reduce post harvest losses



POST-HARVEST

PROCESSING

- Increase farmer **negotiating power** by providing market prices
- Track governance for **supply chain optimization** and grading



TRANSPORT

- **Reduce costs** of transport
- **Increase choice** of different types of transport for farmers



ACCESS TO MARKETS

- **Increase market information** available to farmers so that they have more choices

WHERE TO - Digitize the Agricultural Value Chain



PLANNING

INPUTS

ON-FARM PRODUCTION

POST-HARVEST

STORAGE

PROCESSING

TRANSPORT

ACCESS TO MARKETS

DATA COLLECTION

- Farm mapping
- Climate change predictive models

- Seeds
- Pesticides/fertilizers
- Payments
- Soil/water testing

- Pesticides/fertilizers
- Weeding
- Soil/water
- Weather information

- Warehousing
- Pests
- Preservation

- Crop varieties, quantities planted
- Timing of planting, harvesting

- Preservation
- Climate control
- On-demand transport/selling services

- Sales
- Payments
- Quality control
- Market prices

TRANSACTIONS

- Savings
- Basic credit
- Insurance premiums

- Merchant payments
- Subsidies
- Savings and layaway plans
- Basic credit

- Payments for information services (vaccinations, certifications)
- Salary payments

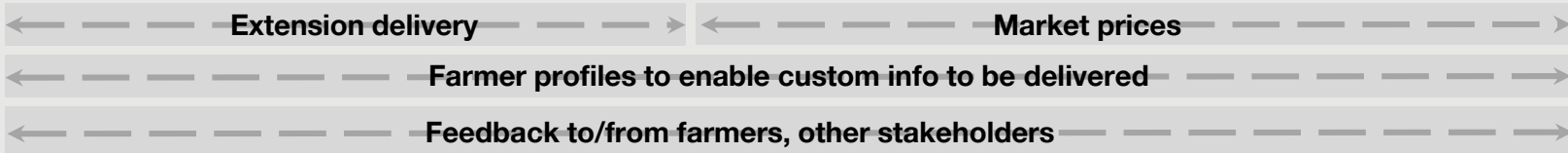
- Warehouse receipts
- Certifications
- Additional inputs
- Loans

- Farm mapping
- Climate change predictive models

- Transport fees
- Coop fees

- Payments from buyers to producers
- Savings
- Layaway

INFORMATION EXCHANGE



RISK MANAGEMENT

- Seeds
- Fertilizers
- Counterfeiting

- Weather insurance
- Better agriculture practices
- Market prices

- Traceability

- Traceability

- Traceability

Example of Information Support Tools: Rice Knowledge Bank

The screenshot shows the homepage of the Rice Knowledge Bank. At the top left is the logo with the text "Rice Knowledge Bank" and the tagline "Your information source for rice farming". To the right of the logo is a "Country Search" dropdown menu with "Select your country" and a search box with a magnifying glass icon. Below the logo is a green navigation bar with the following menu items: HOME, STEP-BY-STEP PRODUCTION, AGRONOMY GUIDES, DECISION TOOLS, and TRAINING. The main content area features a large background image of a farmer in a blue shirt and a conical hat working in a rice field. On the left side of this image is a vertical orange "feedback" button. In the center of the image, the text "Learn about best practices in rice farming" is displayed above three white buttons labeled "Pre-planting", "Growth", and "Postproduction". At the bottom of the page is a dark grey footer containing three icons: a person reading a book labeled "GUIDES", a ruler and pencil labeled "TOOLS", and a person at a computer labeled "TRAINING". To the right of these icons is a paragraph of text: "Rice Knowledge Bank showcases rice production techniques, agricultural technologies, and best farming practices based on International Rice Research Institute's pool of knowledge from research findings, learning and media resources, and in-country projects." Below this text is a link that says "Read more »".

knowledgebank.irri.org

Example of Decision Support Tools



Crop Manager

Rice Crop Manager is a computer- and mobile phone-based application that provides farmers with advice on crop management matching their particular farming conditions



Rice Doctor

Diagnostics tool that will help you to identify problems in your crop and provide actionable advice how to manage them



Weed Identification

Weed Identification tool helps identify the major weeds of rice and also gives additional information such as management and geographical distribution



Important management factors by growth stage

An interactive diagram that describes the critical factors associated with the growth stages of the rice plant.

Example of ICTs for Integrated Services: InfoLadies (Bangladesh)



- Young women reach the remotest villages to provide health, agricultural, and information technology services.
- Nominal fees for their services
- Are both entrepreneurs and public service providers

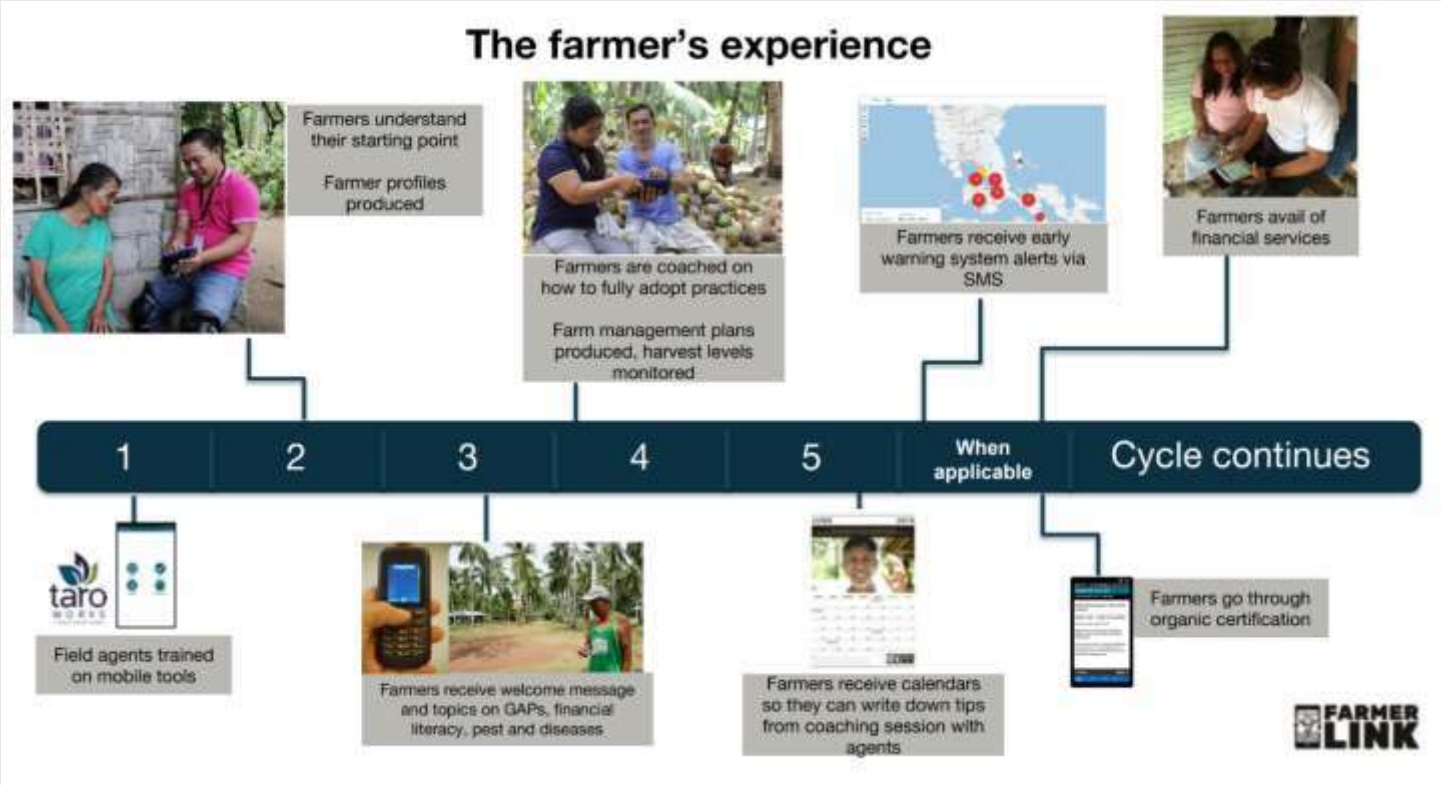
Example of ICTs for Integrated Services: Farmerlink (Grameen)

Our Digital Innovations in Agriculture

- Design financial services for smallholder farmers
- Train farmers in good agricultural practices
- Use data to develop individualized farm management plans
- Alert farmers to weather extremes and pest outbreaks
- Connect farmers to price information, buyers and markets



Example of ICTs for Integrated Services: Farmerlink (Grameen)



Considerations for Planning Integration of ICTs for Smallholder Agriculture



Content

Capacity

**Cost and Cost-
recovery**

Connectivity



Principles *for* Digital Development



Design with the User



Understand the Existing
Ecosystem



Design For Scale



Build For Sustainability



Be Data Driven



Use Open Standards, Open Data,
Open Source and Open Innovation



Reuse and Improve



Address Privacy and Security



Be Collaborative



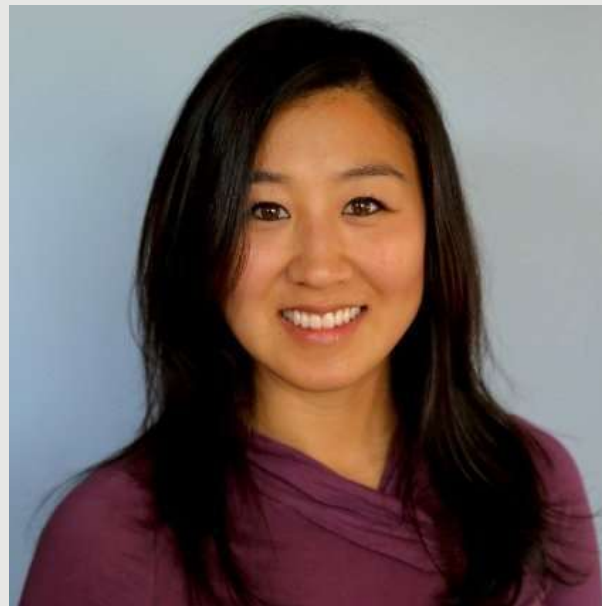
For more on specific digital tools in agriculture:

Carolyn Florey

Technology for Development Lead

IRRI

c.florey@irri.org



Other Considerations

The ICT & Income Inequality Paradox: Falling Global Inequality & Rising Within Country Inequality

INTERNATIONAL

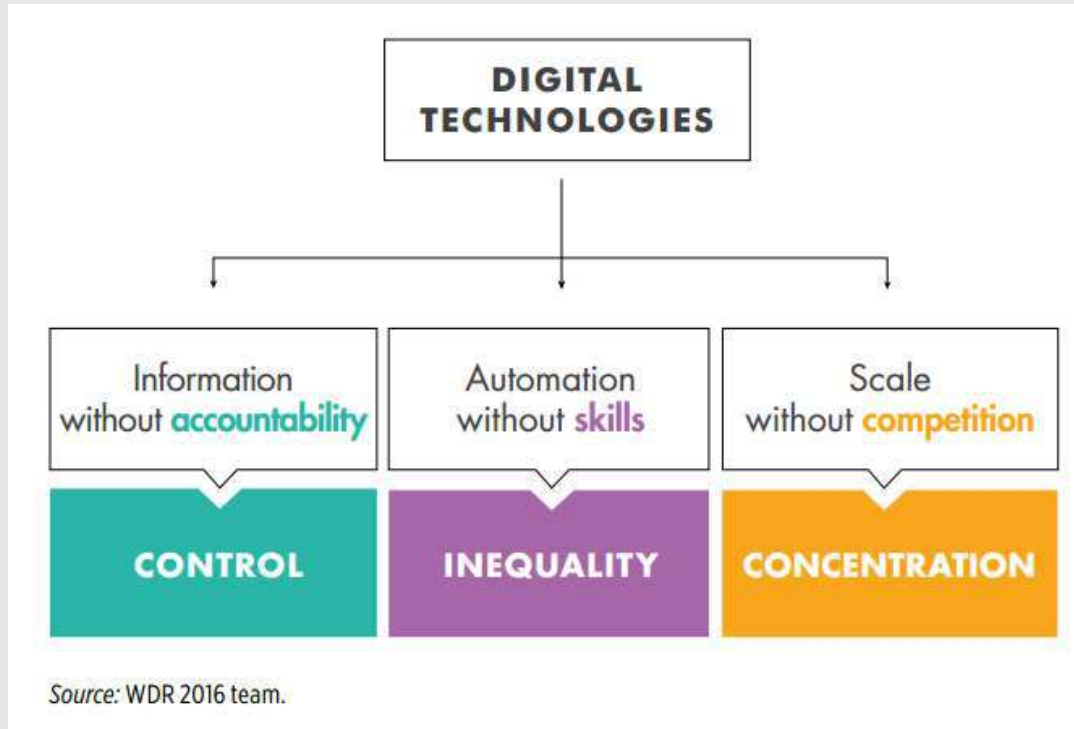
Income inequality
is on the decline



INTRANATIONAL

Income inequality
is persistent

Downside risks to digital technologies and unchecked digital technologies



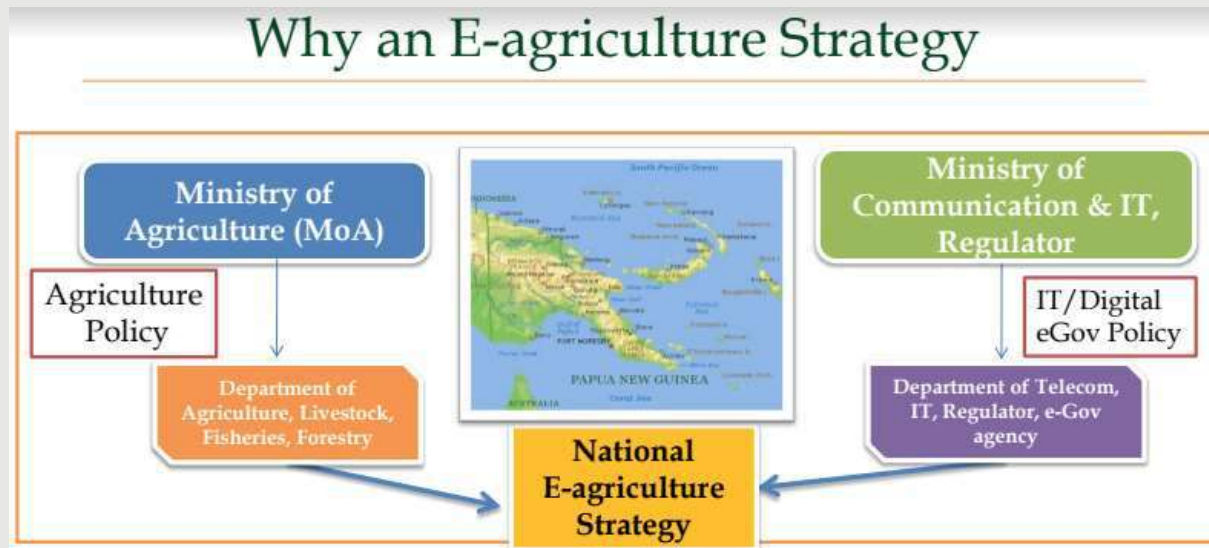
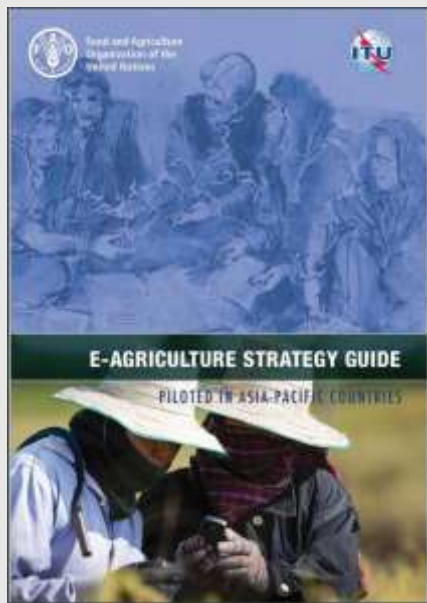
Policy / “Analog complements” for a digital economy

- 1) Regulatory policy - “A business environment where firms can leverage the internet to compete and innovate for the benefit of consumers”
- 1) Skills development - “Workers, entrepreneurs, and public servants who have the right skills to take advantage of opportunities in the digital world”
- 1) Strong institutions - “An accountable government that effectively uses the internet to empower its citizens and deliver services.”

“Core elements of the development agenda—business regulations that ease market entry, education and training systems that deliver the skills that firms seek, and capable and accountable institutions—are becoming more important with the spread of the internet.”

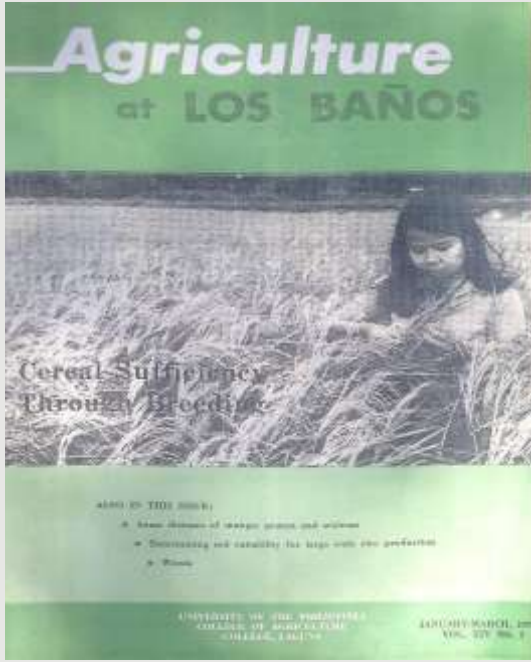
Is internet connectivity an enabler or a prerequisite, when it comes to agricultural development?

The Need to Engage Across Departments / Ministries



<http://www.fao.org/3/a-i5564e.pdf>

A Long (Family) History With UPLB & SEARCA (continued)



Contact info:

jd Garrity@gmail.com

<https://www.linkedin.com/in/jd Garrity/>