



**Increasing food security by using  
satellite-enhanced crop insurance  
and disaster management**

*Michael Anthony, Global Project Manager RIICE;  
Vienna, February 2016*



Acting on the Sustainable Development Goals. The Swiss contribution.

2 ZERO HUNGER



*SDC commits to “a world free of hunger and malnutrition to which smallholders contribute with healthy food accessible to all while increasing their income and safeguarding the environment”.*

*It “also engages in a flexible and selective manner in public-private development partnerships with Swiss or internationally based global private sector stakeholders...”*





A **SWISS** initiative to promote  
food security



Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

Swiss Agency for Development  
and Cooperation SDC



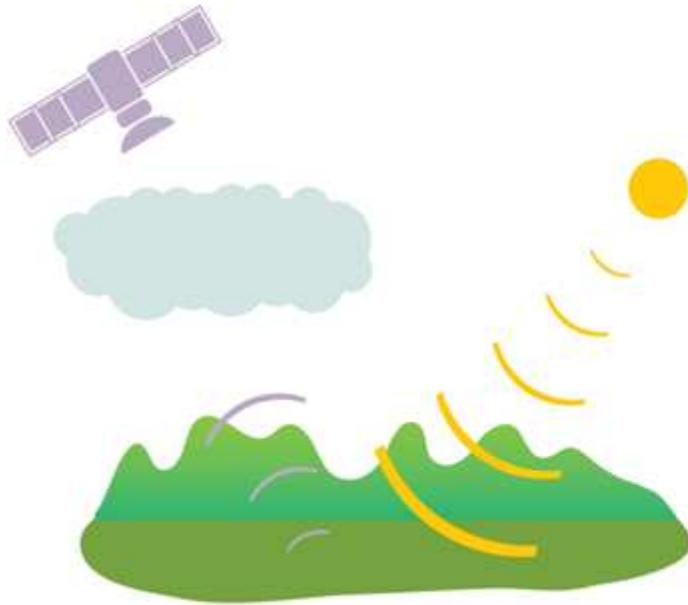
....committed to  
the Sustainable  
Development  
Goals, among  
them the goal to  
eradicate hunger  
and poverty.

...a Swiss software  
company,  
committed to better  
risk management  
of Earth resources

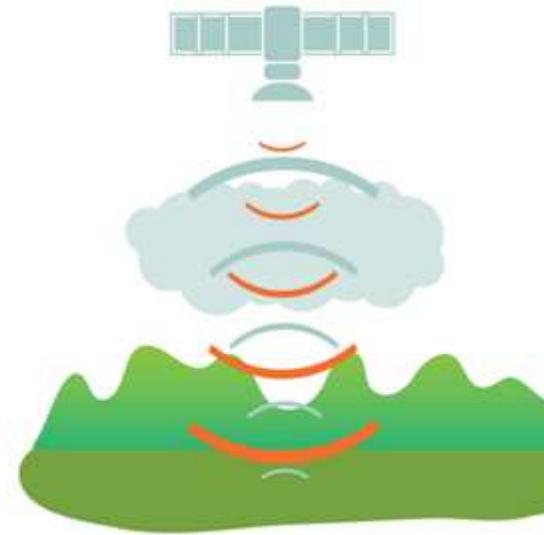
...the carrier of the  
Sentinel satellite  
mission, providing  
earth observation  
data free of  
charge, every six  
days.

## How are Sarmap and Sentinel observing the earth?

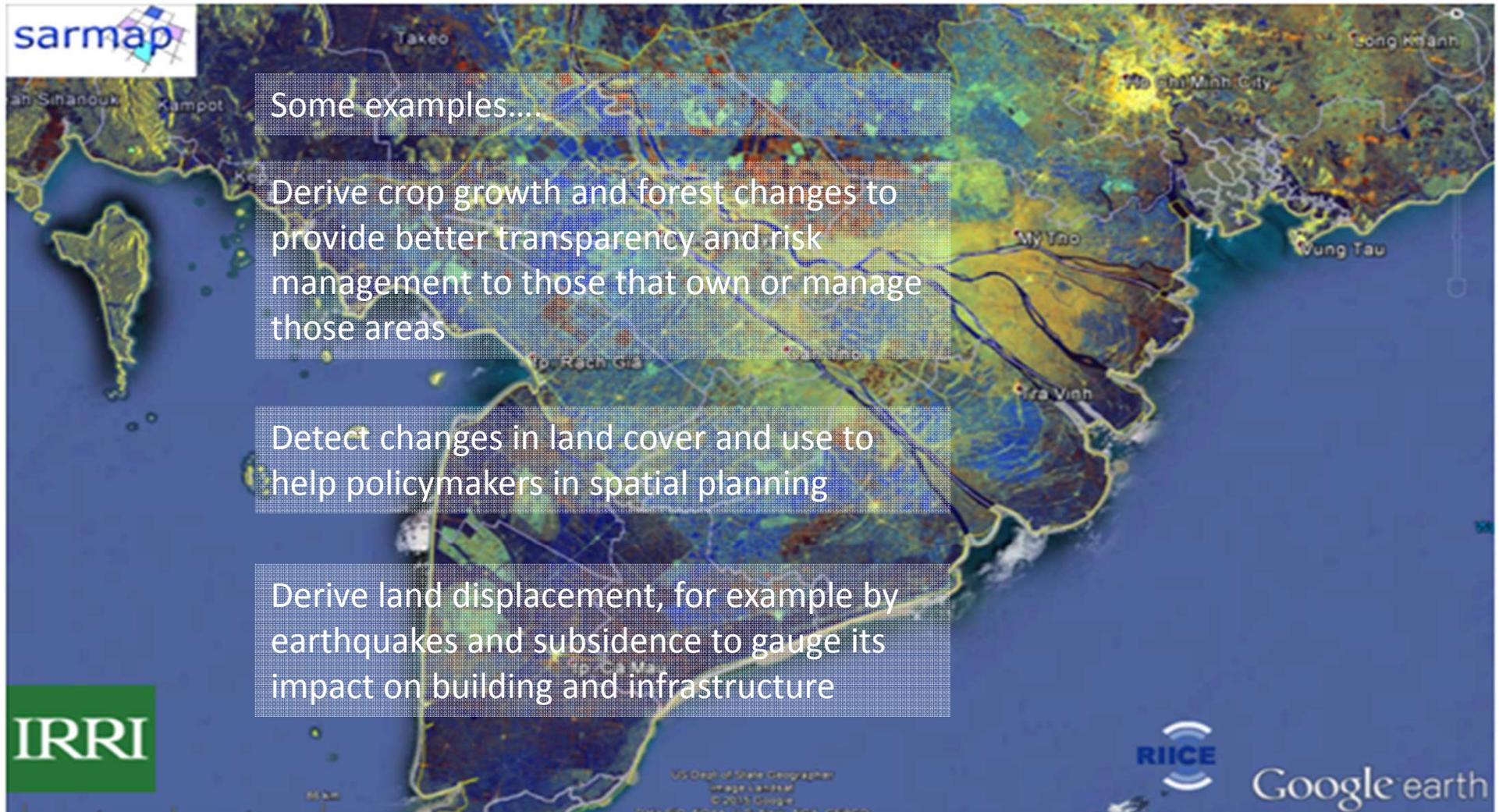
optical remote sensing



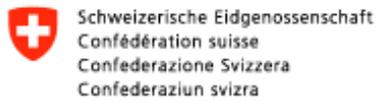
synthetic aperture radar (SAR)



Systematic **satellite** acquisitions of the earth surface is the basis for better managing its risks



A **SWISS** initiative with many local and international **partners**



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Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH



Tamil Nadu Agricultural University



Agricultural Insurance Company of India



Philippine Rice Research Institute



Philippine Crop Insurance Corporation



Thailand Rice Department



Geo-Informatics and Space Technology Development Agency



Indonesian Center for Agricultural Land Resources Research and Development



Cambodia Agricultural Research and Development Institute



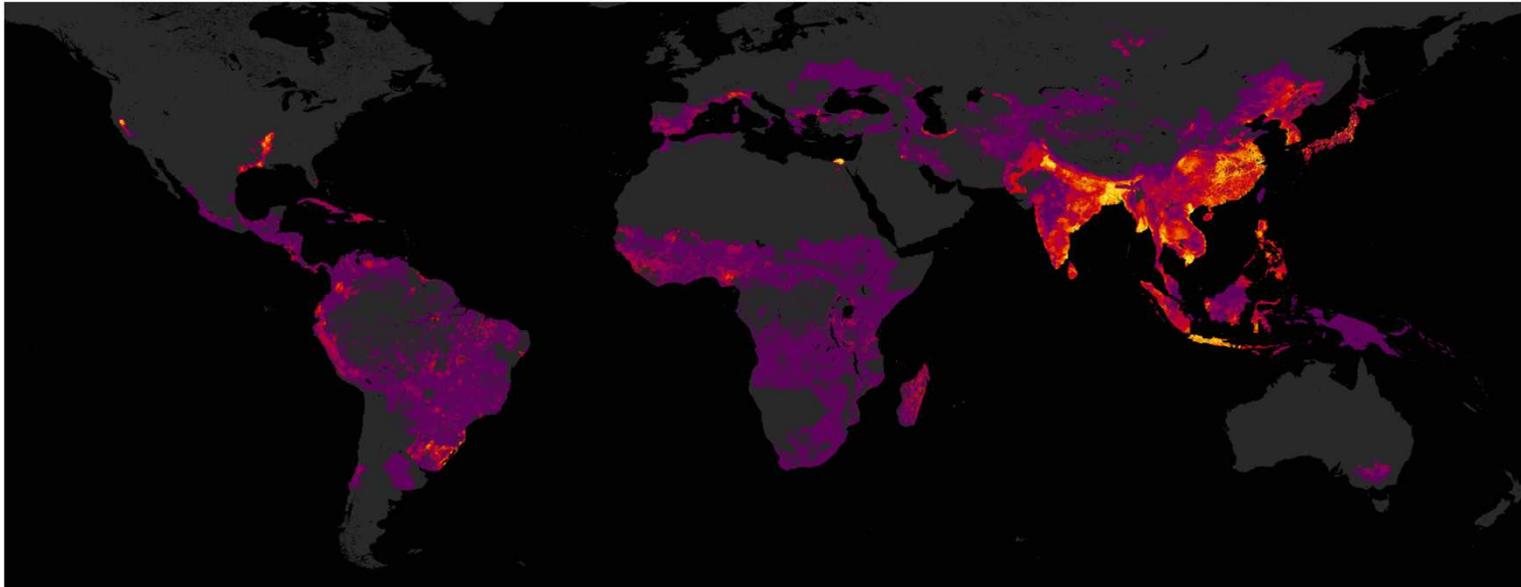
Can Tho University



Institute of Meteorology, Hydrology & Environment



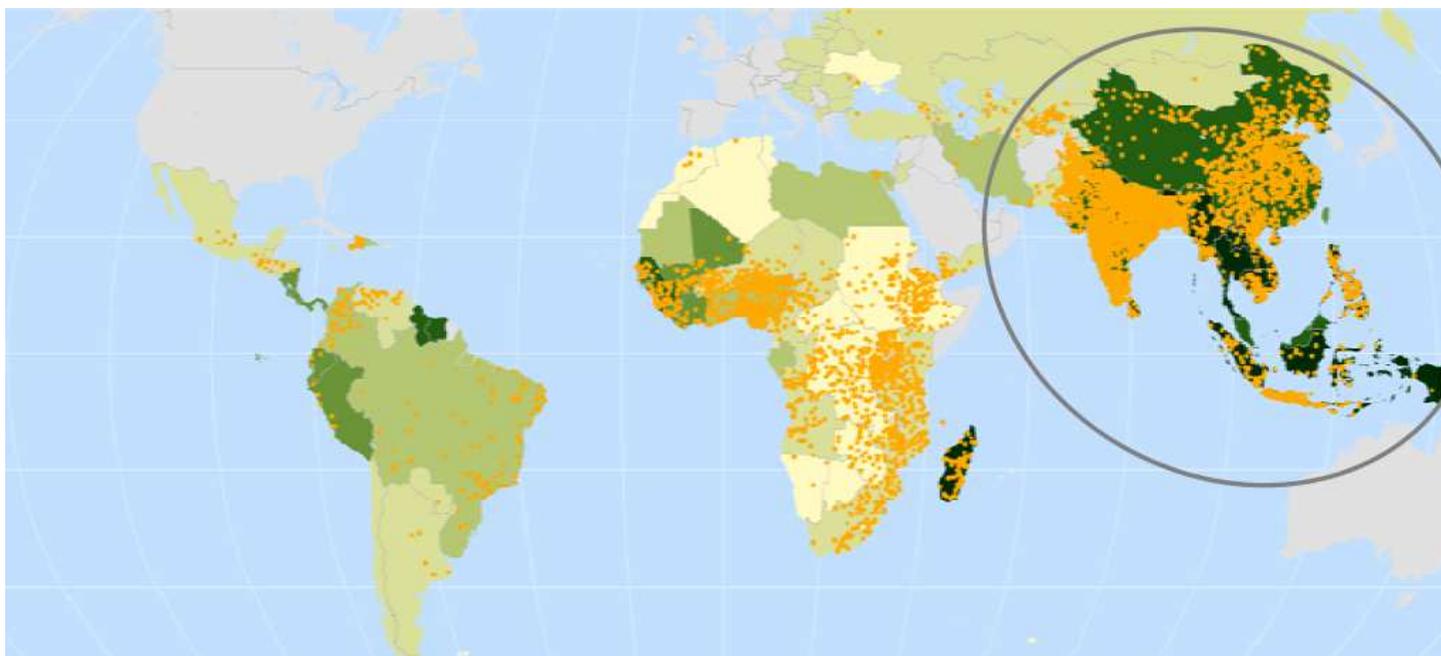
Rice in Asia: the **most important crop**.  
Rice alone accounts for over 30 % of the total crop value in Asia.



Value of rice production in USD per hectar



90% of **the world's rice** is produced and consumed in Asia.  
Over 70% (900 million) of the world's poor are in Asia.



### Rice Consumption

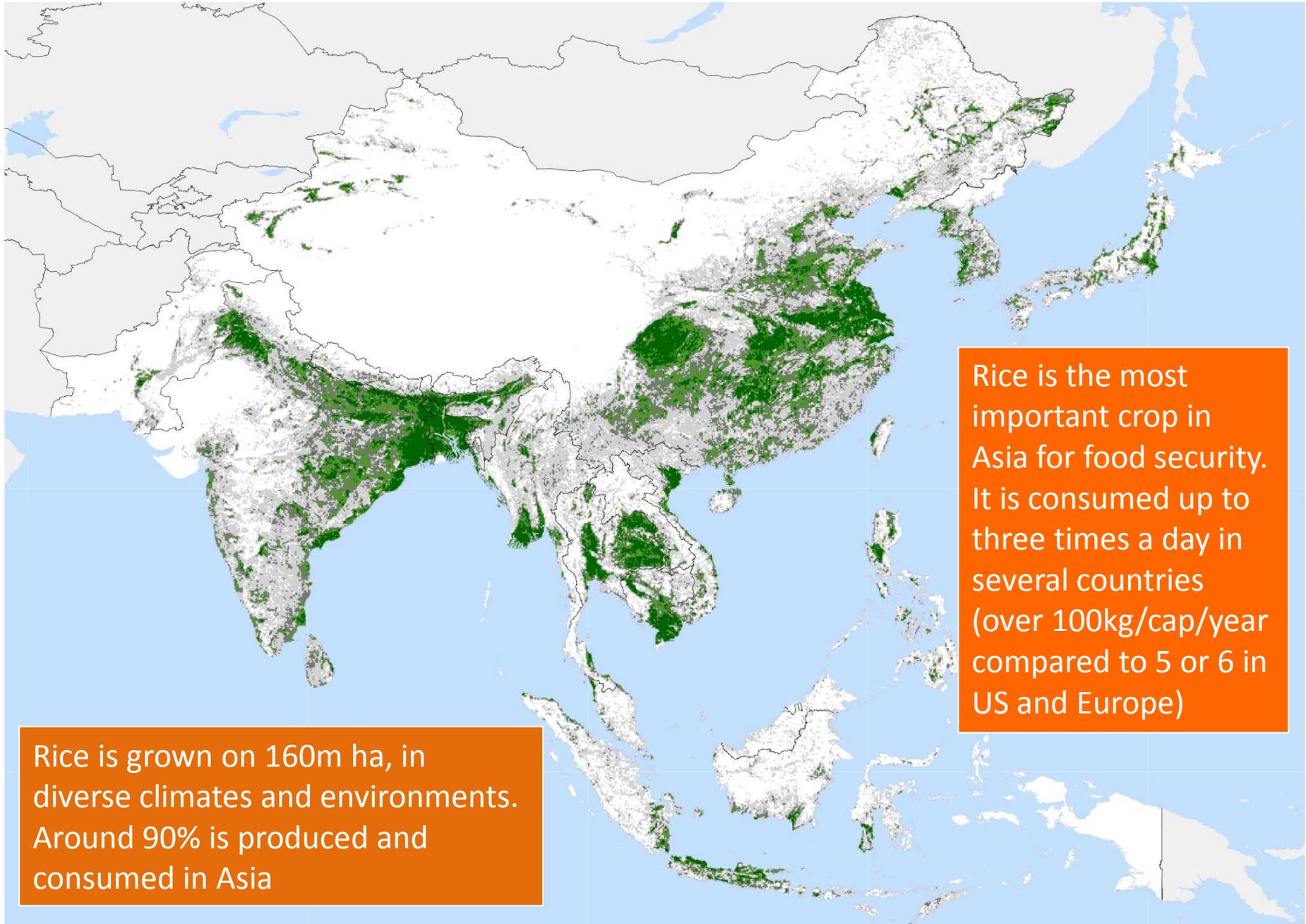
Annual consumption per capita



### Poverty

● = 250,000 people living on less than \$ 1.25 a day (2005)

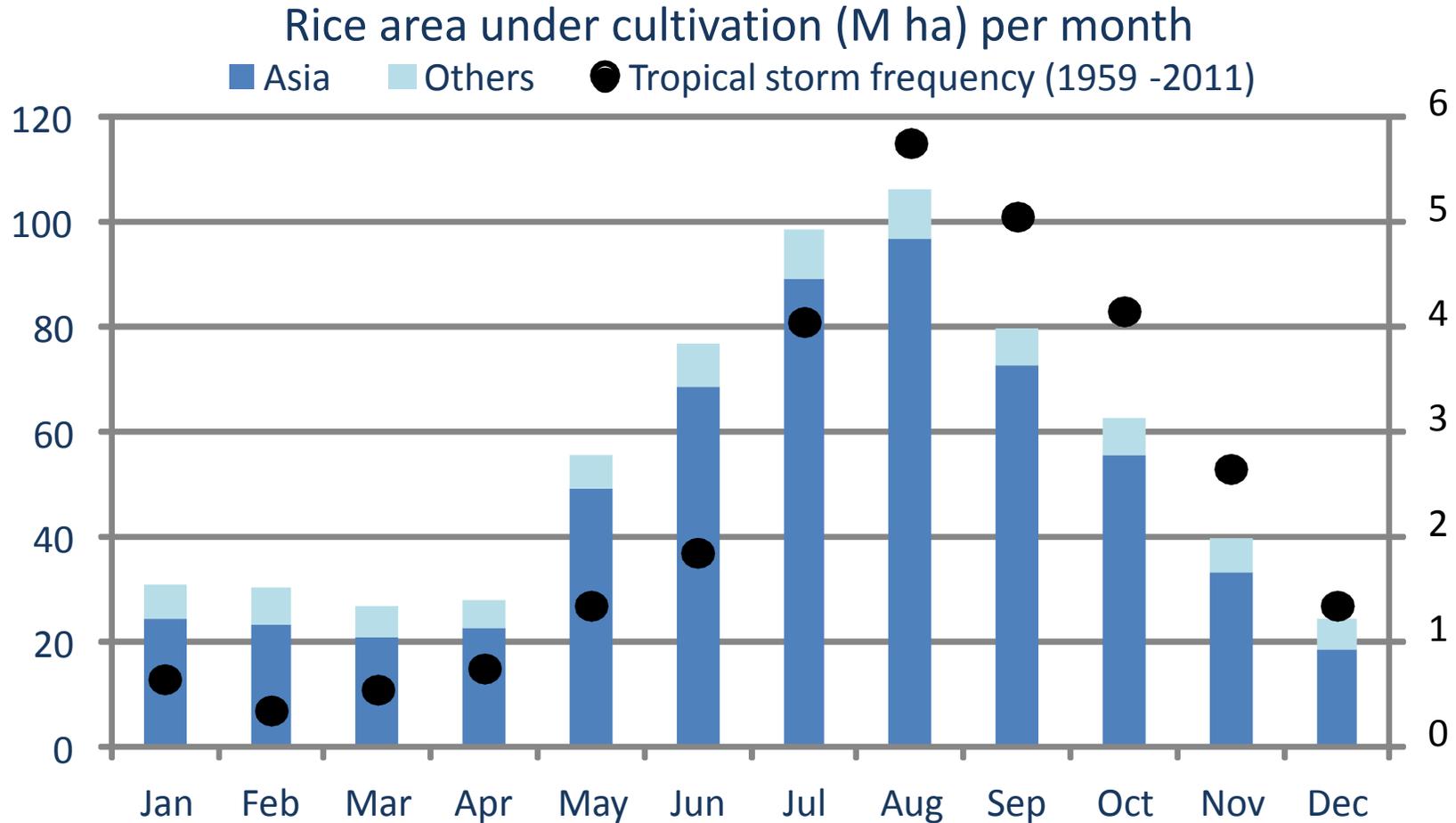
Rice growing areas of Asia. Green areas are the most intensely cultivated regions.



Rice is the most important crop in Asia for food security. It is consumed up to three times a day in several countries (over 100kg/cap/year compared to 5 or 6 in US and Europe)

Rice is grown on 160m ha, in diverse climates and environments. Around 90% is produced and consumed in Asia

Rice growth is **concentrated in the monsoon** season and harvests are jeopardised by floods.



*Preliminary rice crop calendar developed by GRiSP.*

*Storm frequency from the Joint Typhoon Warning Center (2011). United States Navy, United States Air Force.*

Only **few information is available** on where it is grown and the yields it is delivering. Despite its economic weight.



**Better information on rice areas as well as actual and forecasted yields is the basis for effective food security policy and risk management measures.**

**Remote sensing technology can achieve that...**



## Sensing how rice is growing from space



*We've come a long way since the beginning of the 20th century:*  
Julius Neubroner had the idea of stripping a 75-gram camera to a pigeon. This technique was not only used in the art context but also by the military.

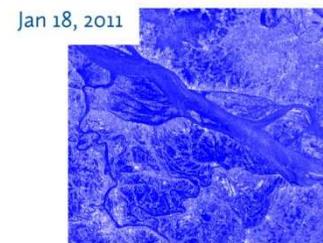
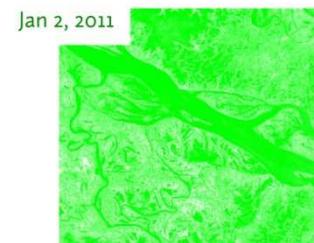
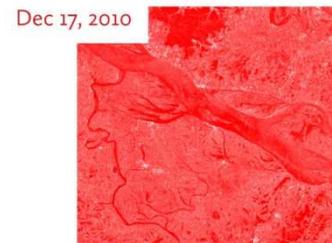
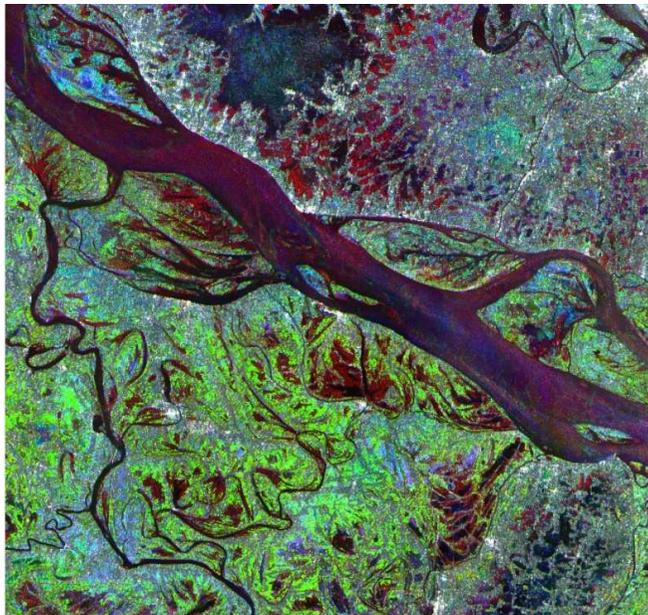
### What is remote sensing?

The ability to detect and interpret change on the earth's surface without direct observation various wavelengths across the visible and infrared parts of the spectrum – usually using satellite or airborne images.



Bildquelle: esa – 2004 – P. Carril

Regular observations with satellites provide valuable information to be used in **policy planning**

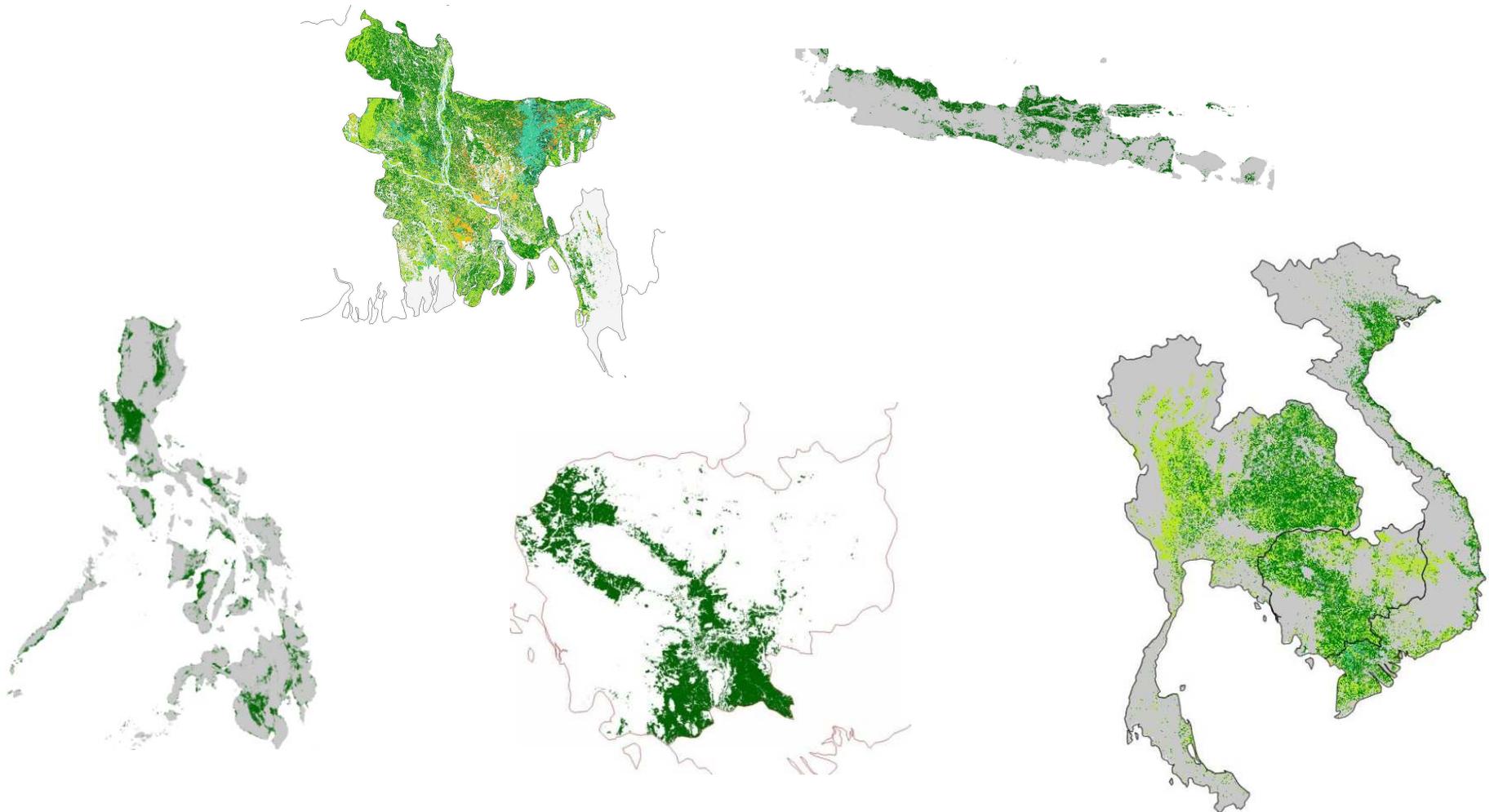


Use for land planning.

Use of irrigation improvements or pest & disease control

Use for yield forecasts and assessments

Deliverables of the RIICE project, include **maps** and **yield forecasts** for rice in several Asian countries



## Can satellites help to mitigate government and farmer risks?

### Government' Needs

1 Fiscal security



2 Income provision to farmers



3 Protection to farmers



### Farmers' risks

1 flood



2 drought



3 lack of irrigation

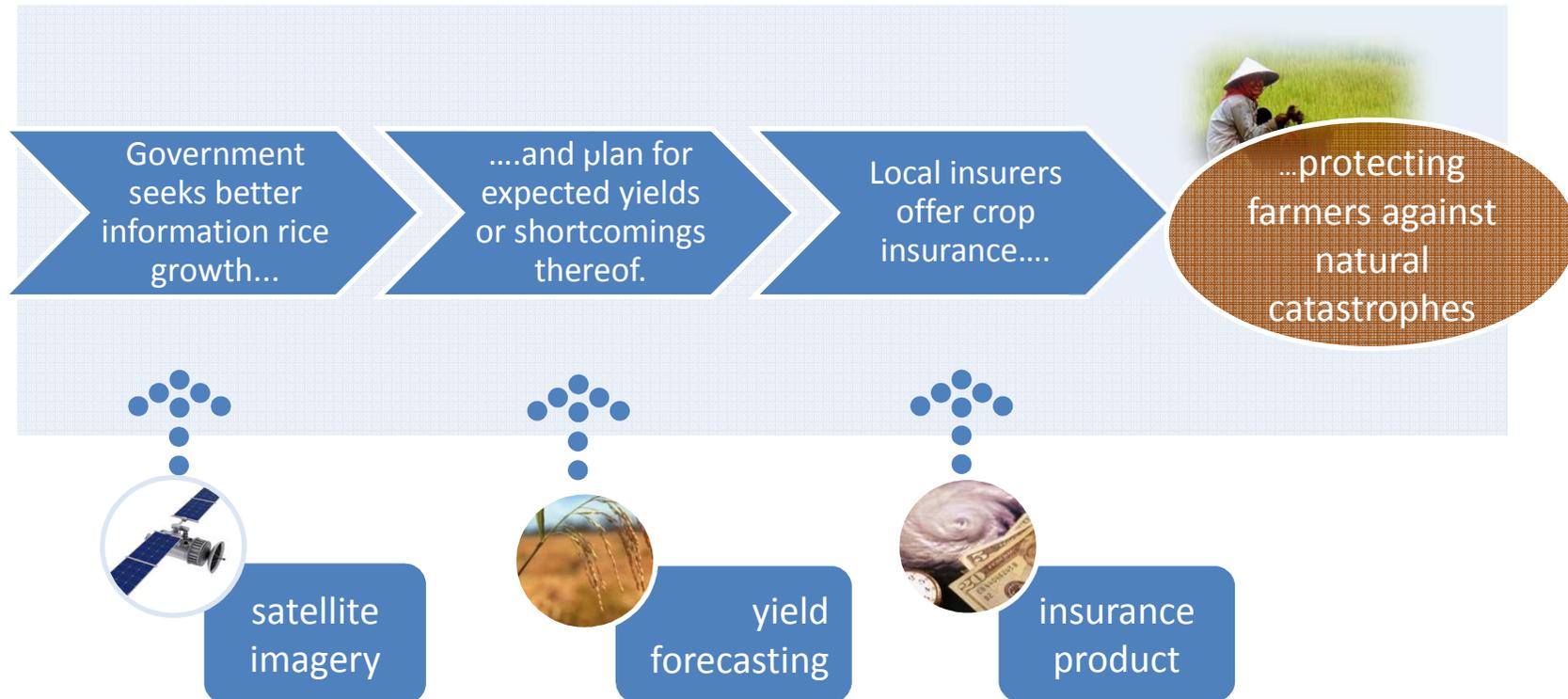


4 pest and diseases

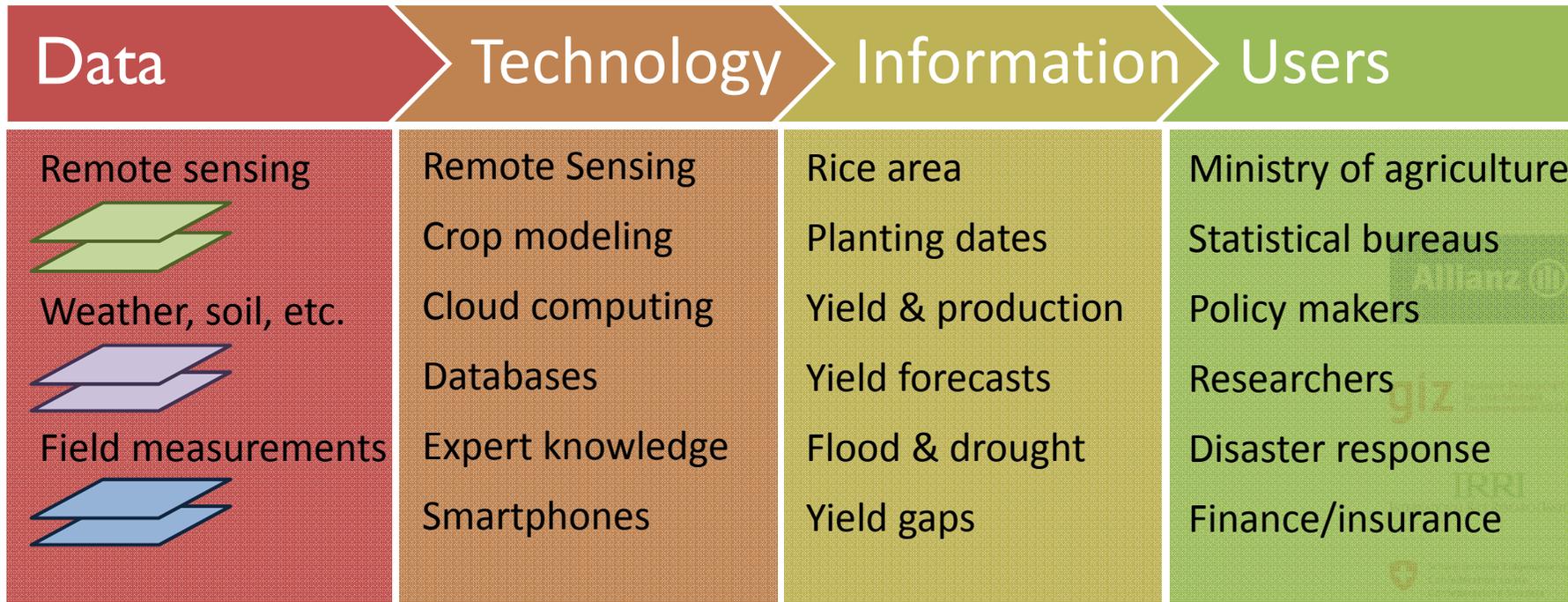


\* Data provided by GIZ Philipines, 2010

RIICE operational model for delivering **risk management** through technology



# Both projects aim to develop sustainable rice crop monitoring systems operated by national partners



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Multi-stakeholder projects work differently



**Push & Pull: Partners need a solution, not a technology**

Stakeholder engaged in risk mitigation strategies look for a solution. Pitching a particular project does not meet their needs.



**Irrationality of client needs:  
The best solution can still lose out to politics**

Governments decide for a solution for political reasons, not necessarily to address a particular scientific challenge. Politics is the gatekeeper.

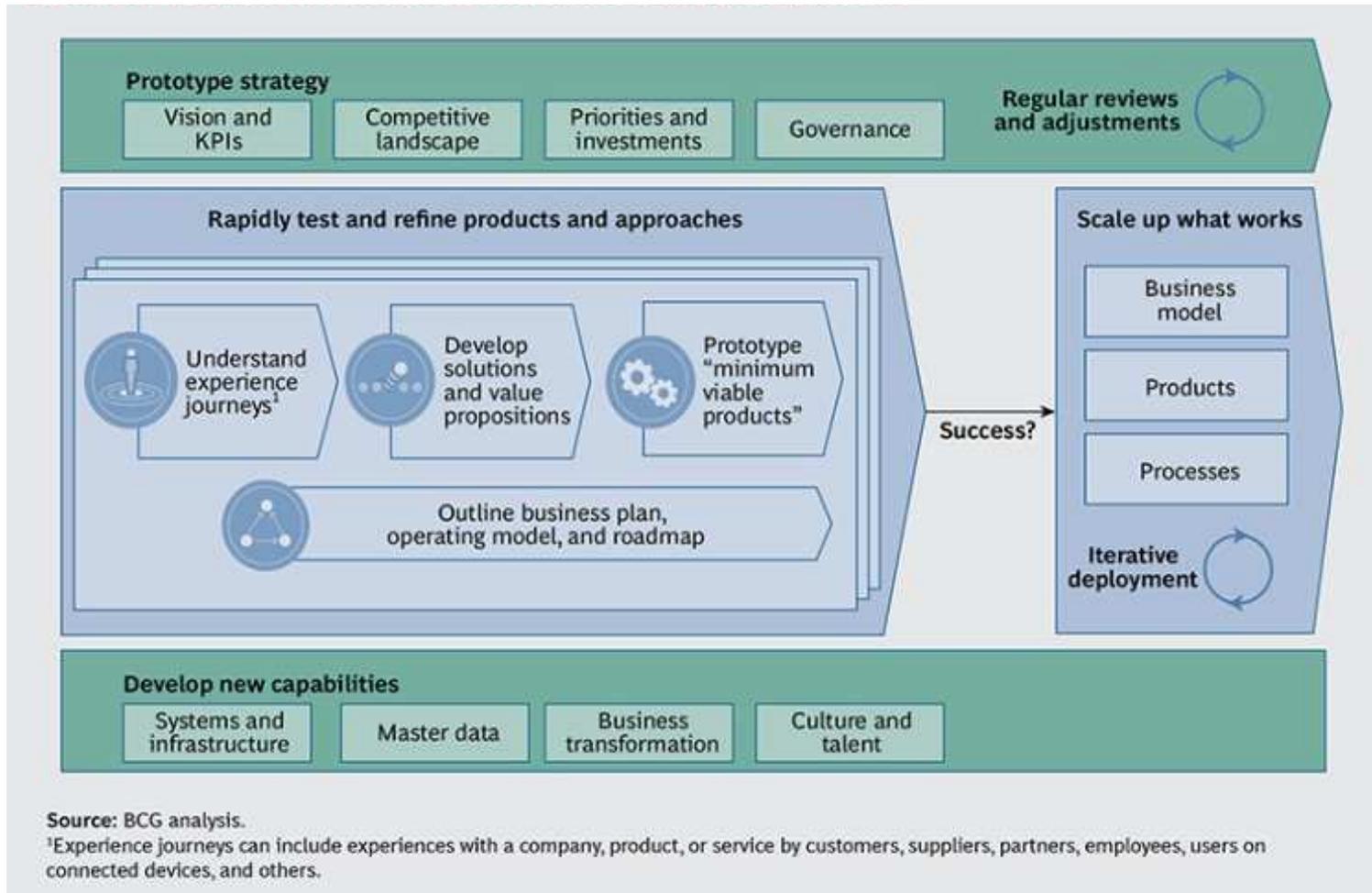
News to use: Eventually **all will be public**



Open source will be the order of the day

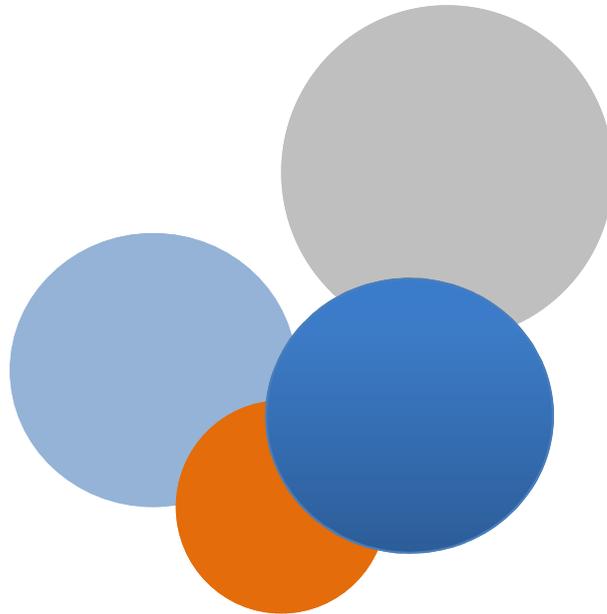
- Private partners will find it more difficult to hold on to exclusivity
- Governments will have to make public the results of development work

# Technology-adaptation is **complex**



Partners have competing **agendas**  
and **ecosystems**

Private sector  
gears up for  
public sector  
business



Public sector  
guarantees scale

Donors as facilitators: But do  
they screen private partners for  
additionality and squeeze  
governments for co-funding  
sufficiently?

Tech companies can be  
transmitters and incubators of  
tech-driven technology.



Public sector and big business bring scale;  
start-ups and NGOs bring innovation and effectiveness



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[www.giz.de](http://www.giz.de)



[www.irri.org](http://www.irri.org)



[www.sdc.admin.ch](http://www.sdc.admin.ch)



[www.sarmap.ch](http://www.sarmap.ch)





Making **crop insurance** part of an integrated RIICE risk management approach.

Government's and farmers options

- Disaster relief programmes
- More productive crops
- Better information on yield
- Insurance

FARMERS' BENEFITS

- Stabilized income and hence worthy for agricultural credits
- Less vulnerability and hence more money available for securer life
- Less likely to migrate to cities