

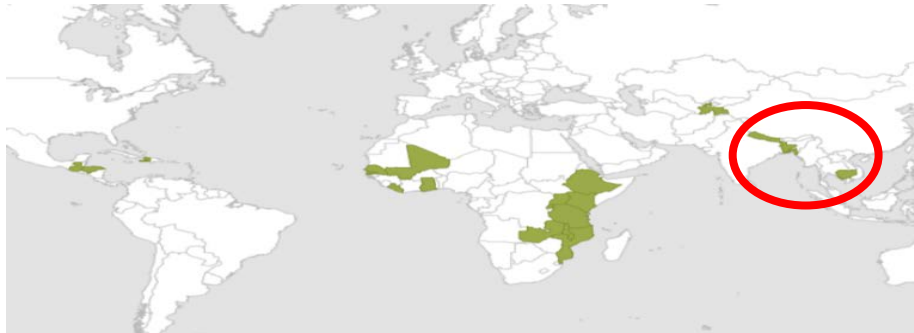
Our resilient future
is not written for us

Horticulture Innovation Lab
Regional Center at Kasetsart University
in Thailand

May 9, 2018

Poon Kasemsap
Kasetsart University

Horticulture Innovation Lab Regional Center at Kasetsart University



Where we work:
Bangladesh, Cambodia, and Nepal

Primary goals of the centers:

- Researching, innovating and disseminating horticultural technologies
- Training farmers, horticultural stakeholders, extension agents and researchers
- Building capacity among local institutions



Meeting food needs and improving nutrition and human health in the developing world
Providing opportunities for increasing income, economic and social advancement

Able to withstand or recover quickly from difficult conditions

Difficult conditions faced by the small scale producers

- ▶ **Normally** caused by several limiting factors
- ▶ **Need** to make the right choice: **issue**, solution, innovation, et

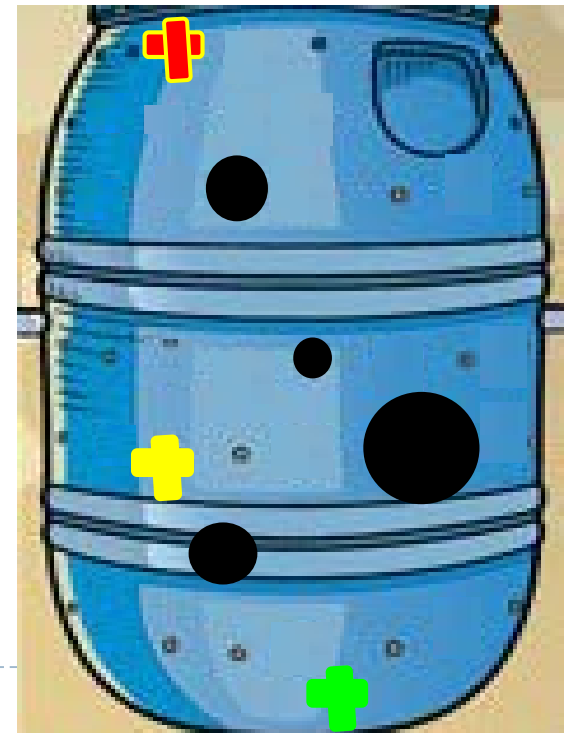
- Sustainable prod
- postharvest

Other issues

- ▶ Marketing
- ▶ Financing
- ▶ Information
- ▶ Policies
- ▶ etc ...

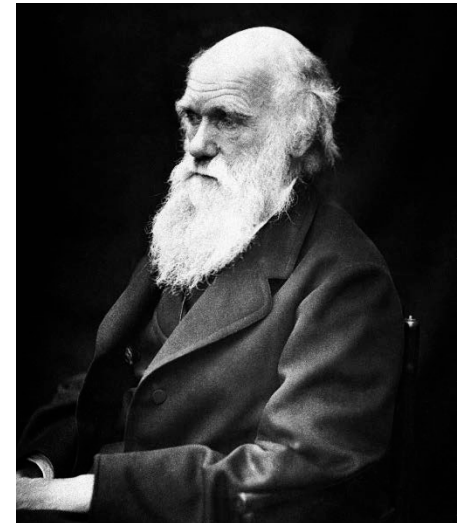


-or-



*“In the long history of humankind (and animal kind, too) those who learned to **collaborate** and **improvise most effectively** have prevailed.”*

Charles Darwin



Change, challenges  Crisis

"The Chinese use two brush strokes to write the word "crisis."

危机

**One brush stroke stands for danger,
the other for opportunity.**

**In a crisis, be aware of danger ---
but recognize the opportunity."**

John F. Kennedy

WealthyGlobe.com



Changes Challenges

- ▶ Climate changes
- ▶ Demand, supply changes
- ▶ Changes in competitions

- ▶ Disruptive technologies:
 - ▶ Advance genomics & phenomics, gene editing
 - ▶ Advance robotics, artificial intelligence
 - ▶ Precision agriculture, remote sensing
- ▶ **Renewable energy & storage + ...**

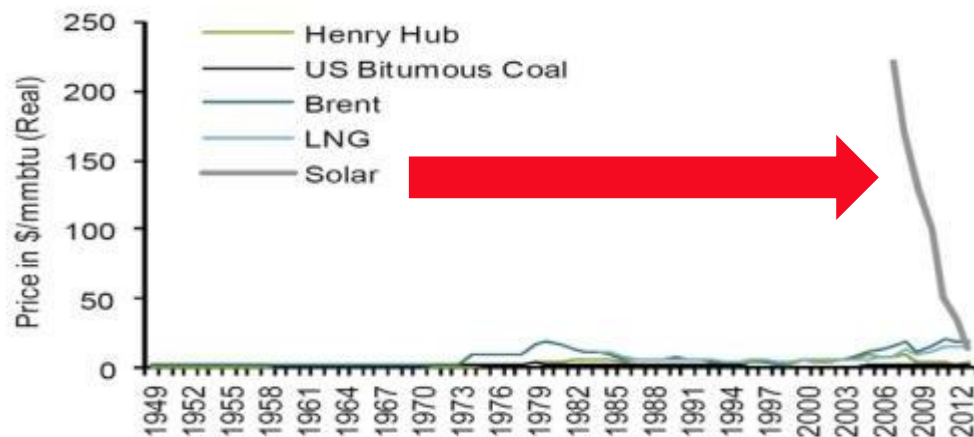


“Stone age did not end for lack of stones”
the Oil Age will end long before the world runs out of oil

Sheikh Zaki Yamani, former oil minister of Saudi Arabia

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Saudi Arabia Gets Cheapest Bids for Solar Power in Auction

By **Anthony Dipaola**

October 3, 2017, 8:19 PM GMT+7 *Updated on* October 4, 2017, 4:00 AM GMT+7

From **Climate Changed**

- Masdar, EDF offer to supply power for 1.7 cents/Kilowatt hour
- Plant to be first in \$50 billion plan to expand renewables

**1.7 cents/KWh
(300 MW)**

Saudi Arabia received offers to supply solar electricity for the cheapest prices ever recorded, marking the start of a \$50 billion program to diversify the oil producer's domestic energy supplies away from fossil fuels.



TEP to Power 21,000 Homes with New Solar Array for Historically Low Price

May 22, 2017 10:00 AM Eastern Daylight Time

4.5 ¢/KWh

TUCSON, Ariz.--(BUSINESS WIRE)--Tucson Electric Power (TEP) will buy solar energy at a historically low price from a new local system large enough to power 21,000 homes.

"In addition to clean, low-cost energy, this project will create good-paying jobs and increased tax revenue for the state and local community."

The new 100-megawatt (MW) solar array and an accompanying 30-MW energy storage system are expected to be in service by the end of 2019. Together with a planned 100 MW wind project, the new system will give TEP a renewable portfolio that produces enough clean energy each year to serve the annual electric needs of nearly one out of every three Tucson homes. Excluding the cost of storage, TEP will buy the system's output for 20 years for less than three cents per kilowatt hour – less than half as much as it agreed to pay under similar contracts in recent years.

"This new local system combines cost-effective energy production with cutting edge energy storage, helping us provide sustainable, reliable and affordable service to all of our customers for decades to come," said Carmine Tilghman, Senior Director of Energy Supply and Renewable Energy for TEP.

**100-megawatt (MW) solar array and
an accompanying 30-MW energy storage system**

“Stone age did not end for lack of stones”

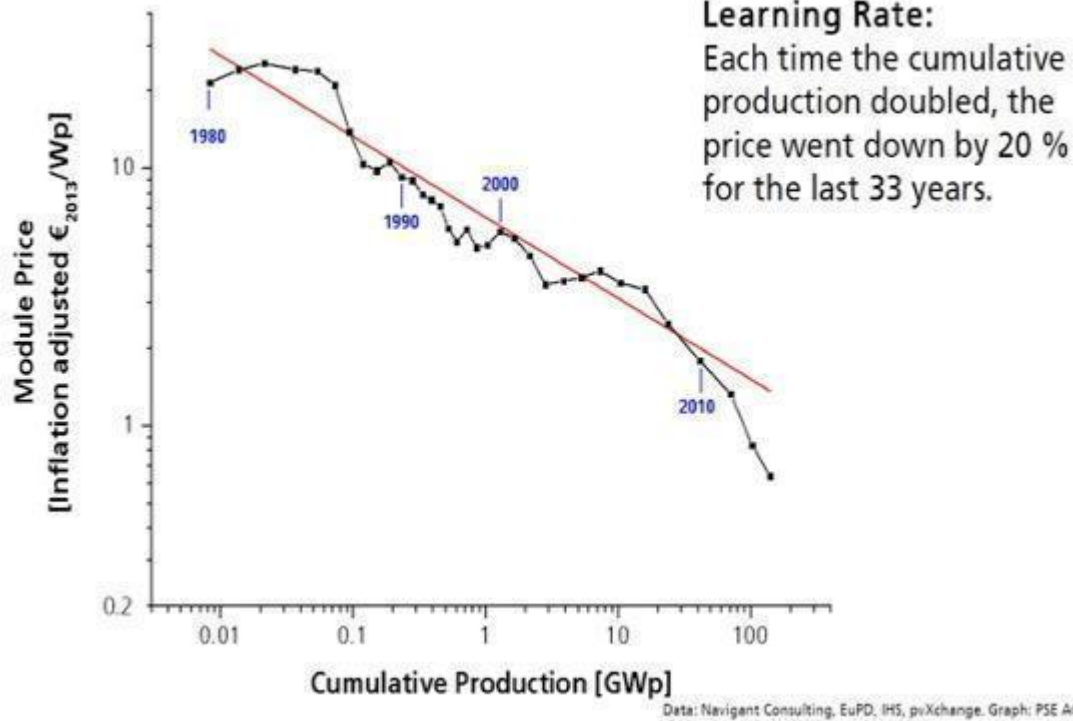
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DANGER !!!

sugarcane, cassava, rubber

Solar panels a cheap commodity



Dubai's DEWA solar project: US2.99 cents/kWh
Chile's solar project: US2.91 cents/kWh

More light gives families more time for leisure, learning and chores.



PayGo solar panels



Opportunities

1.2 billion with no access to electricity.

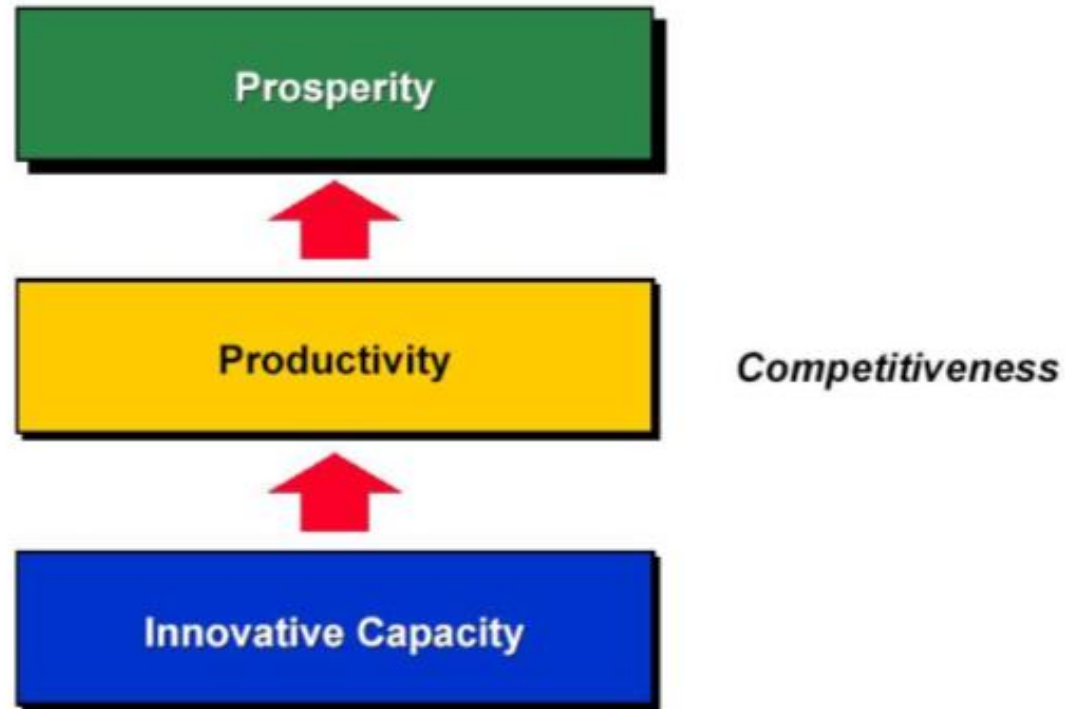
A pay-per-use irrigation service that uses a portable solar pump



2015 Powering Agriculture Award.

Use innovation to increase competitiveness

Innovation and Competitiveness



- Innovation is **more than just scientific discovery**
- There are **no low-tech industries**, only low-tech firms

Increase productivity & reduce risk

- Increase the **value** of products and services:
 - uniqueness, quality, ...
- Increase the **efficiency** with which they are produced:
 - Labor
 - Water, fertilizer
 - Resources
 - Etc
 - Seed system & germplasm
 - Sustainable production
(Soil, irrigation, PEN, etc)
 - Drying technologies
- Reduce losses & risks
 - Tomato grafting
 - Reducing postharvest losses
 - Improving food safety
 - Advancing nutrition

Cool room monitoring & warning system




Specification	Online version	Offline version	SMS warning
Temperature	6 (outside, inside x 5)	6 (outside, inside x 5)	1 (inside)
RH	2 (outside, inside)	2 (outside, inside)	-
Voltage	DC 0 to 24V.	DC 0 to 24V.	DC 0 to 24V.
Current	DC/AC 0 – 25A.	DC/AC 0 – 25A.	-
Door status	Open/Close + timestamp	Open/Close + timestamp	-
Data logging	Every 1 min with time stamp	Every 1 min with time stamp	-
Communication	GSM UTMS (2 MB data per month)	-	GSM with SMS (60sms/month)
Real time viewing	LED screen, Website	LED screen	-
Warning system	T, Voltage Buzzer and e-mail	T, Voltage Buzzer	T, Voltage SMS



Site Name	Last Update	Status	Temp in1	Temp in2	Temp in3	Temp in4	Temp in5	Temp out	Hi In	Hi out	Current	Voltage	Door Open/Time	Time/Sec
Hot 4 (Davao)	2018-05-13 14:30:50	OK	33.5	27.6	33.5	31.3	31.4	31.5	27	45.7	0.91317	8.55	0	0
Hot 25 (Kasart) BU	2018-05-13 14:30:40	OK	33.5	27	33.5	31.3	31.4	31.5	27	45.7	0.91317	8.55	0	0

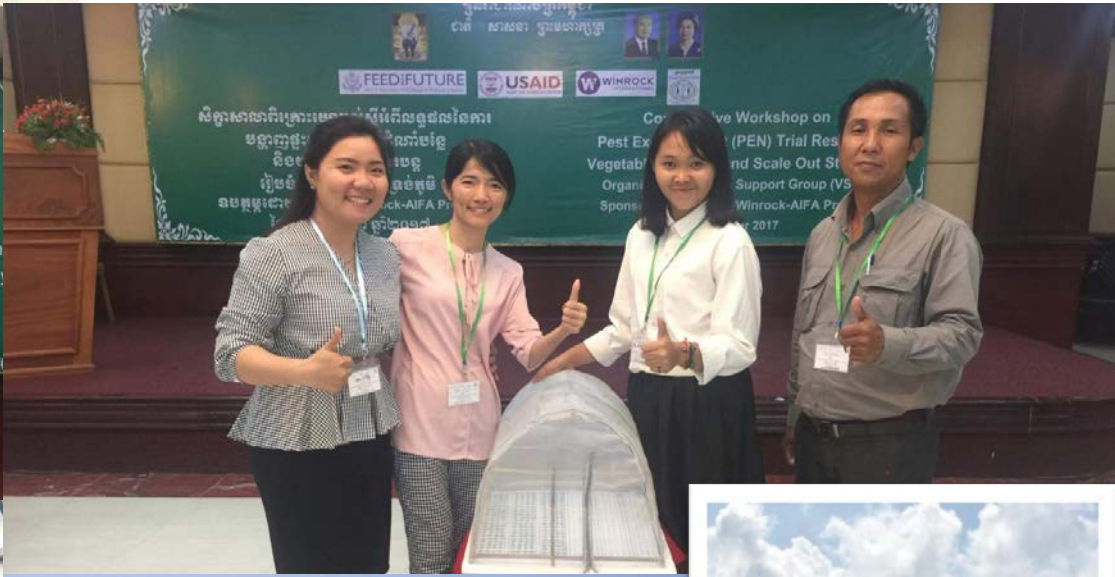
Should I use pest exclusion nets?

7 tips from Sun Tzu's *The art of war*.

- The greatest victory is that which requires no battle.
(The supreme art of war is to subdue the enemy without fighting.)
- Know thy self, **know thy enemy**,
A thousand battles, a thousand victories.
- Every battle is won before it is fought.
- Opportunities multiply as they are seized. 
- Move only if there is a real advantage to be gain.
- If a battle cannot be won, do not fight it.



Collaborate & improvise



Our resilient future is not written for us, **but by us.**



มหาวิทยาลัยเกษตรศาสตร์ Kasetsart University



Kasetsart University

Knowledge of the Land

Prosperity of the nation

