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GLOBAL LEARNING AND EVIDENCE EXCHANGE
CLIMATE-SMART AGRICULTURE

DECEMBER 5–9, 2016 // SIEM REAP, CAMBODIA

Climate Outlook for Southeast Asia and Its Impact on Agriculture and Food Security

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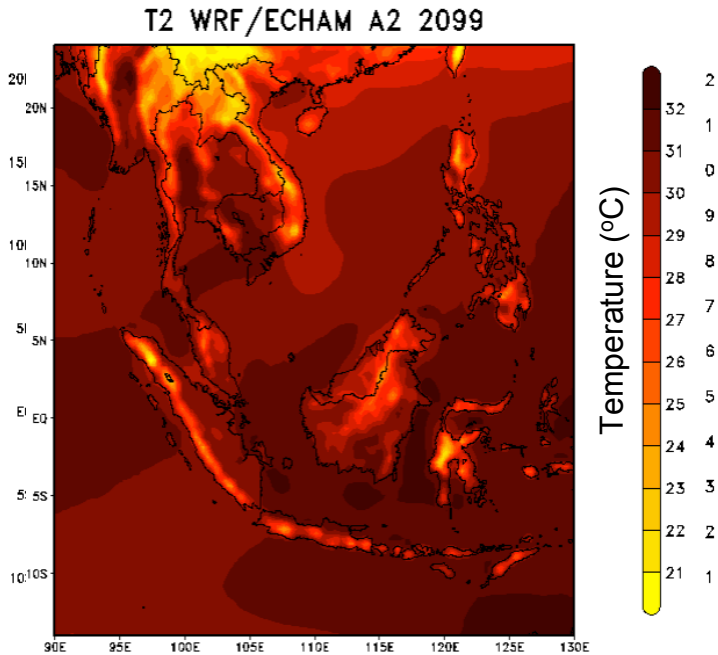
LEARNING OBJECTIVES

1. An update on the current climate change science, including climate models/predictions, potential extreme weather events and a vulnerability assessment for Southeast Asia.

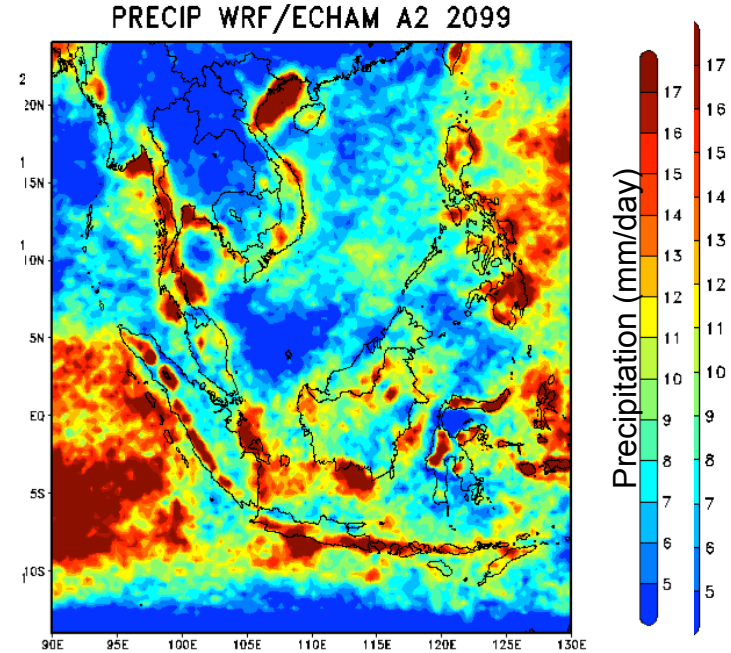
2. An overview of the spatial and temporal implications of climate change to agriculture—both challenges and opportunities.

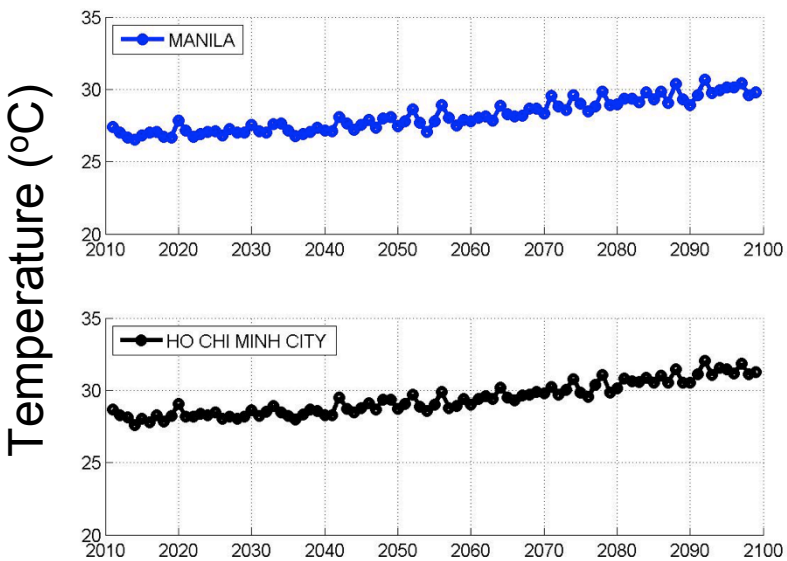
3. An overview of climate and weather services available in the region.

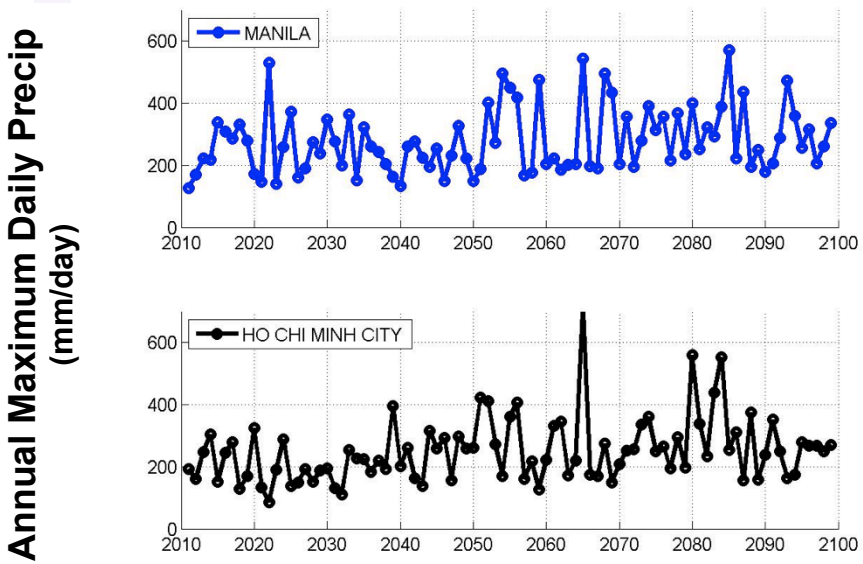
Projected Temperature



Projected Precipitation

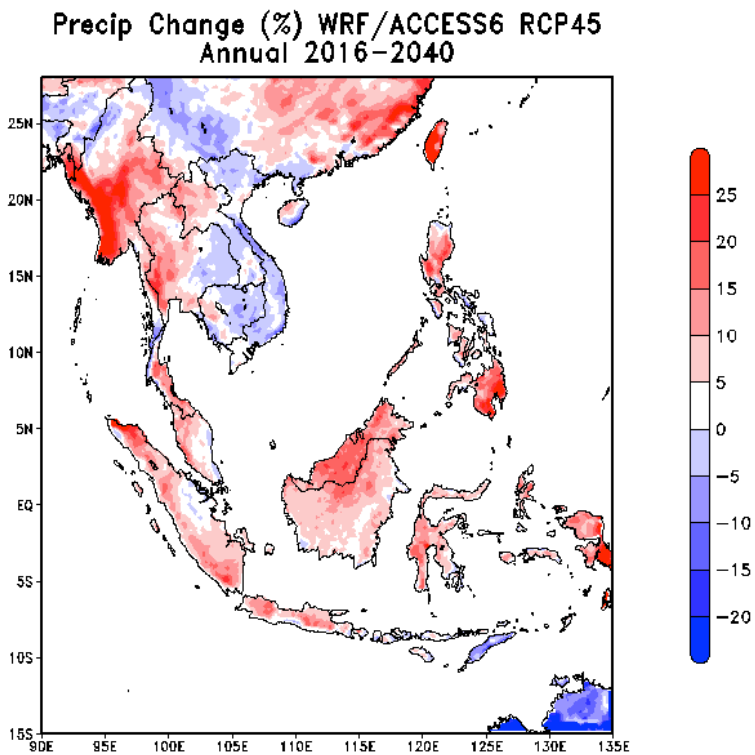


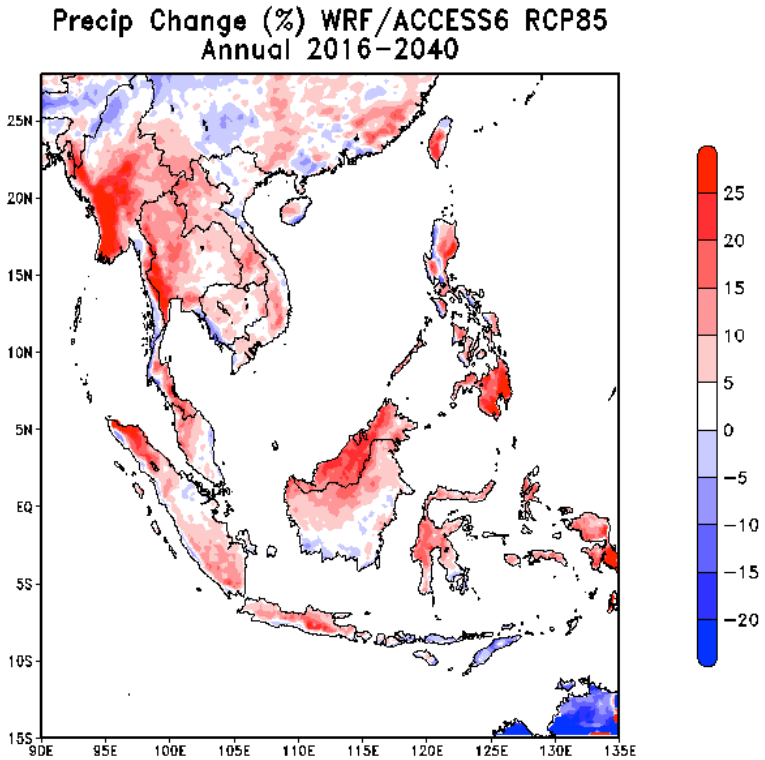




Source: Work done by Tropical Marine Science Institute, NUS

UNCERTAINTIES IN RAINFALL





Source: Work done by Tropical Marine Science Institute, NUS, 2016.

CLIMATE HAZARD HOTSPOTS AND DOMINANT HAZARDS

Climate hazard hotspots	Dominant hazards
Northwestern Vietnam	Droughts
Eastern coastal areas of Vietnam	Cyclones, droughts
Mekong region of Vietnam	Sea level rise
Bangkok and its surrounding area in Thailand	Sea level rise, floods
Southern regions of Thailand	Droughts, floods
The Philippines	Cyclones, landslides, floods, droughts
Sabah state in Malaysia	Droughts
Western and eastern area of Java Island, Indonesia	Droughts, floods, landslides, sea level rise

Source: Yusuf and Francisco. 2009. Economy and Environment Program for Southeast Asia.

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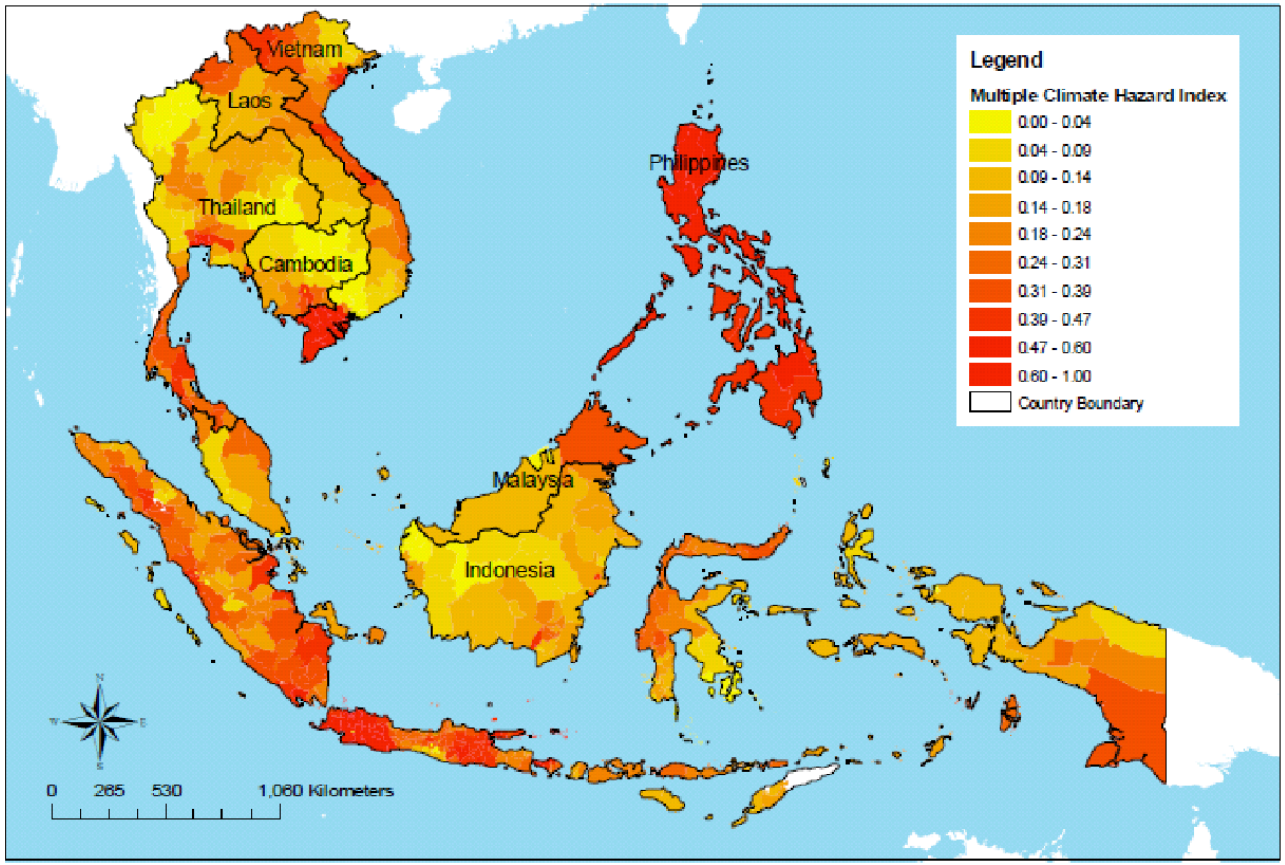
CLIMATE VULNERABILITY OVER SOUTHEAST ASIA
(FLOODS, DROUGHTS, SEA LEVEL RISE, LANDSLIDES AND CYCLONES)



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Source: Yusuf and Francisco. 2009.
Economy and Environment Program for Southeast Asia

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WINNERS AND LOSERS OF PROGRESSIVE CLIMATE CHANGE

Predicted climate-suitability change for **Maize - *Zea mays* (L.)**

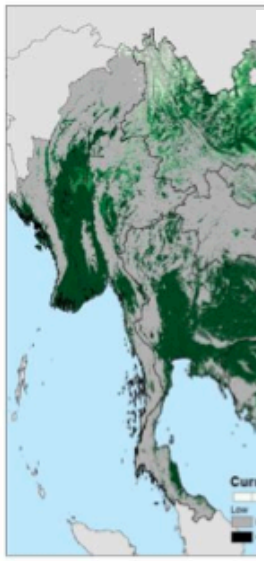

Figure 57: Current climate-suitab distributio

Predicted climate-suitability change for **Cassava**

Figure 21: Current clim

Predicted climate-suitability change for **Rice Paddy-** *Oryza sativa* L.ssp.Indica

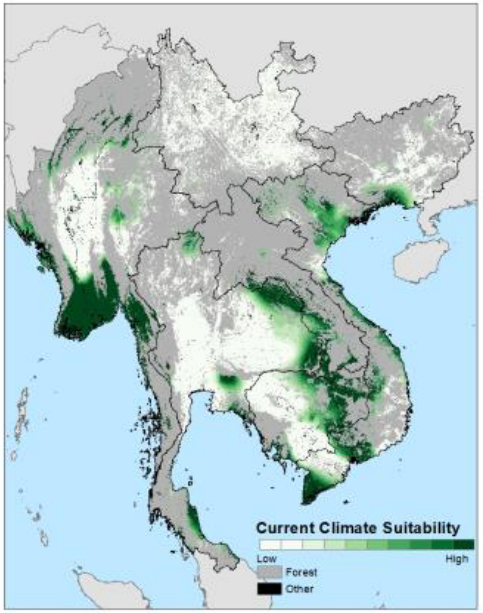

Figure 69: Current climate-suitability and potential rice paddy distribution.

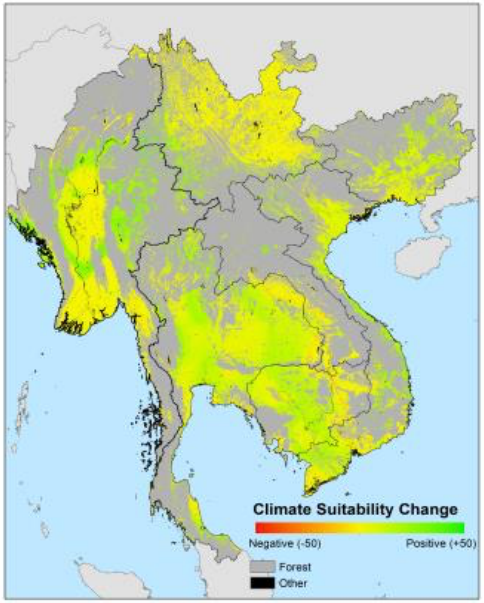

Figure 70: Predicted climate-suitability change for rice paddy by 2050 (avg of 32 GCMs from RCP8.5).

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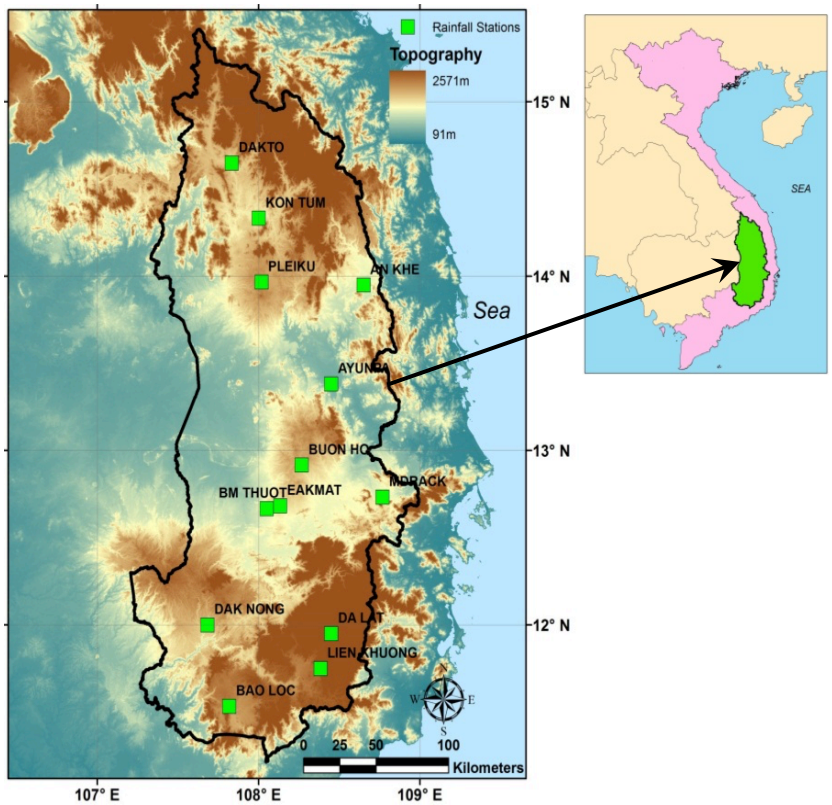
DOWNSCALING REGIONAL CLIMATE MODEL

(REGIONAL CLIMATE MODEL AND SPI INDEX TO ASSESS DROUGHT OVER A CLIMATE VULNERABLE REGION)

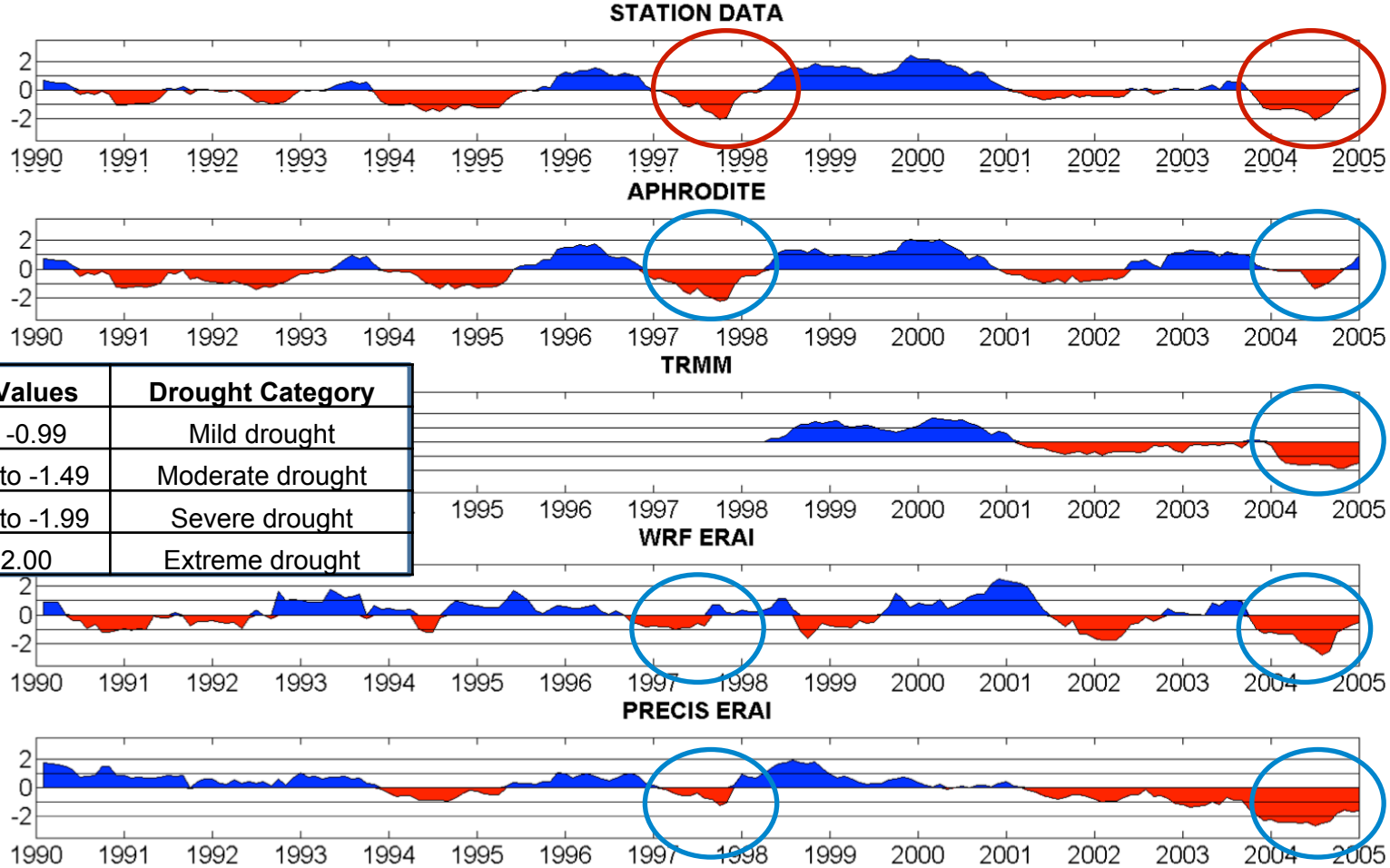


Study Region:
Central Highland, Vietnam

- Very vulnerable to climate change
- Prone to drought; recorded severe events in 1998 and 2005
- Two rivers are tributaries of Mekong River
- Perennial crops: coffee, rubber, cashew, pepper, tea
- Annual crops: rice, maize, cassava
- 13 stations

Source: Vu et al., 2015. Journal of Hydrology, 526:265-273.

SPI INDICES AT ALL STATION; PERIOD 1990-2005



SPI Values	Drought Category
0 to -0.99	Mild drought
-1.00 to -1.49	Moderate drought
-1.50 to -1.99	Severe drought
≤ -2.00	Extreme drought

Source: Vu et al., 2015. Journal of Hydrology, 526:265-273.

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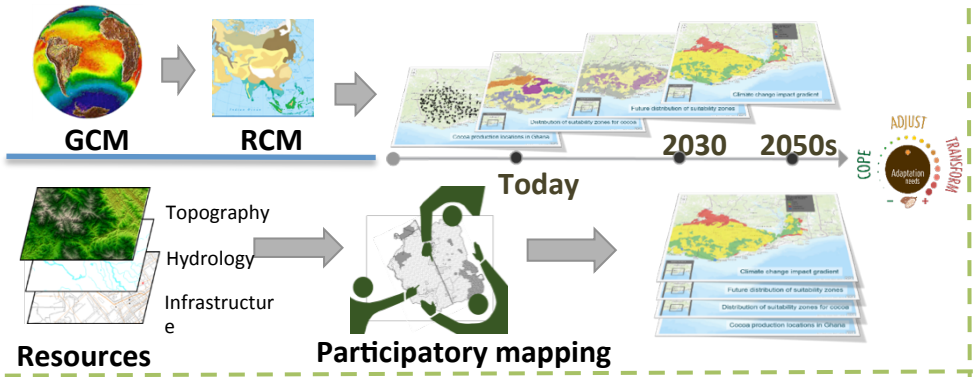
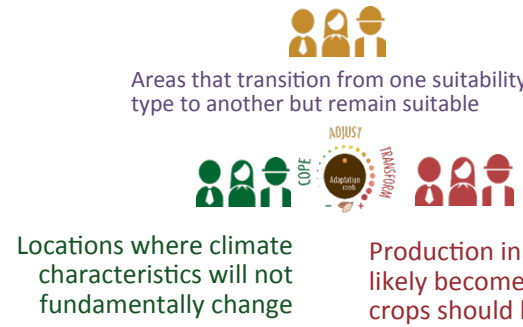
INCORPORATING TO THE VALUE CHAINS

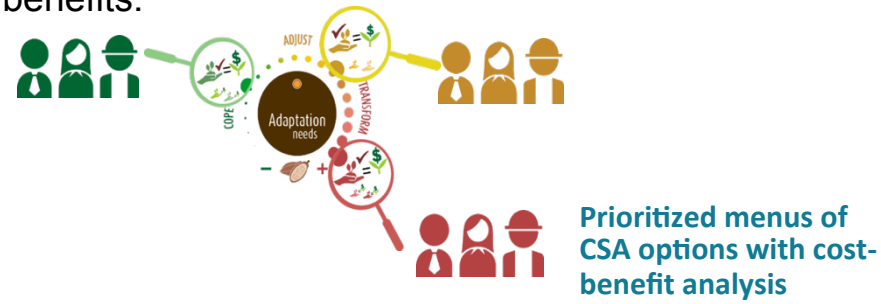
1 Map the impact gradient to understand the risk of climate change over time.



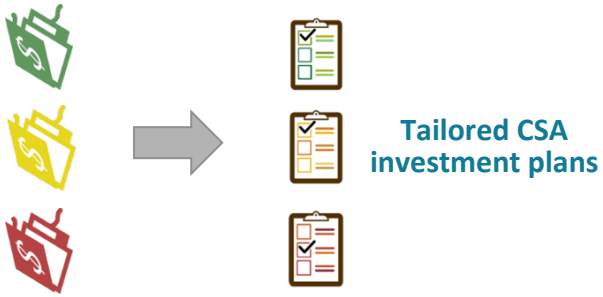
2 Convene value chain actors along the exposure gradient.



3 Identify and prioritize relevant CSA packages by exposure gradient and analyze costs and benefits.



4 Construct exposure specific portfolios of priority CSA packages for different investors.



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Modified from Lundy, M. 2016

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CLIMATE SERVICES

SEACLID/CORDEX-SEA

APN ASIA-PACIFIC NETWORK FOR GLOBAL CHANGE RESEARCH

SEACLID/CORDEX SEA—Southeast Asia Regional Climate Downscaling/ Coordinated Regional Climate Downscaling Experiment Southeast Asia funded by APN

The 4th Workshop of the Southeast Asia Regional Climate Downscaling (SEACLID)/ CORDEX Southeast Asia Project & Discussion on the Formation of Empirical-Statistical Downscaling (ESD) Group in CORDEX Asia

Hanoi, Vietnam

23-25 November 2016

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TAKE HOME

1. There are dominant hazards in Southeast Asia that are location-specific. Appropriate CSA measures (preparation) can be taken to cope with these hazards.

2. There will be winners and losers as climate changes. Some crops will become less adapted to their existing growing area while getting more adapted in other areas.

3. Downscaling regional climate models is very much needed to reduce uncertainties in the projections. This will allow more specific applications of projections into adaptation and policy decisions.

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- Eitzinger, A., Läderach, P., Giang, L., Ng'ang'a, K. 2014. Project Report: Overview of climate variability and likely climate change impacts on agriculture across the Greater Mekong Sub-region (GMS). CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark. Available online at: ww.ccafs.cgiar.org

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RESEARCH PROGRAM ON
Climate Change, Agriculture and Food Security

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