APEC PPFS Webinar: Sharing good practices on Sustainable Agricultural Development through the Principle of Sufficiency Economy Philosophy (23-24 May 2022)

Climate Change Adaptation in Agriculture for Enhanced Recovery and Sustainability of Highlands

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From the People of Japan

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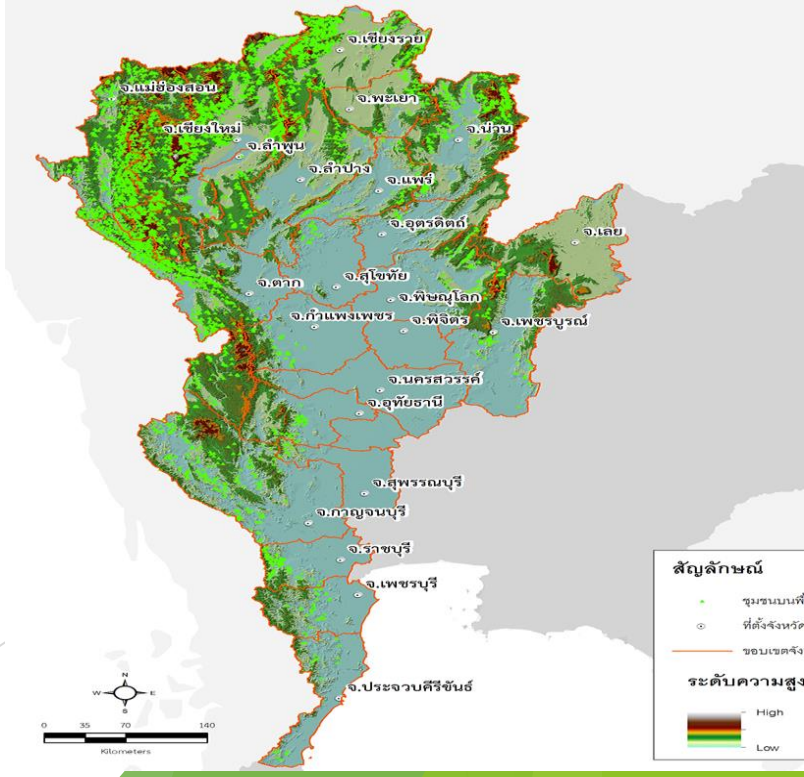
กระทรวงเกษตรและสหกรณ์

สำนักงานเศรษฐกิจการเกษตร

Highlands in APEC Economies and Thailand

- Highlands constitute a significant area in all 21 APEC economies.
- Rugged terrain, inadequate soil and water resources and lack of easy access to markets are common issues of highlands in most APEC economies.
- Agriculture and forestry sector constitutes a main source for economy in highlands.
- Highlands are highly vulnerable to impacts of climate change. For example, almost 50% of current Robusta coffee growing areas, and 60% of Arabica coffee growing areas in highlands will be unsuitable for production by 2050.
- In Thailand, 20 out of 77 provinces have highlands covering 10.76 million hectares (67.2 million rai) with 270,888 households, primarily dependent on farming.



Highland Agriculture in Thailand

CHALLENGES

- Deforestation and forest degradation
- Soil and water degradation (low soil fertility, inadequate water supplies)
- Sloping cultivation (high soil erosion)
- Low levels of crop diversification (monocropping with maize for livestock feed)
- Low levels of farm mechanization
- Low levels of value addition
- Intensive agro-chemical usage (high production cost, debt, soil and water contamination, health problems)
- Increasing frequency and intensity of climate change impacts (droughts and floods)
- Low rates of land ownership

OPPORTUNITIES

- Growing market demand and consumer interest for organic and safe agricultural products in Thailand and abroad
- Increasing knowledge on climate smart agriculture and agricultural product quality improvement
- Opportunities for crop diversification and value addition
- Expansion of digital technology (increased access to Internet, information and markets)
- Availability of alternative and more sustainable livelihood options
- Local/national/international partnerships and collaboration

ADB TA 9993: Climate Change Adaptation in Agriculture for Enhanced Recovery and Sustainability of Highlands

- **Executing Agency:** Ministry of Agriculture and Cooperatives (MOAC)
- **Implementing Agency:** Office of Agricultural Economics, in coordination with Nan province and other line ministries
- **Implementation Support:** Asian Institute of Technology (AIT) in association with Team and Nippon Koei
- **Budget:** $2 million (JFPR: Japan Fund for Prosperous and Resilient Asia and the Pacific)
- **Impact**: Improved agricultural competitiveness in highlands, which is aligned with Thailand's Master Plan on Agriculture under the National Strategy (2018-2037).
- **Outcome:** Enabling environment for adoption of climate-smart agriculture (CSA) in project areas enhanced
- **Objective:** To complement Thailand's efforts to:
  - recover from the socio-economic impacts of the coronavirus disease (COVID-19) pandemic;
  - reduce poverty, income inequality, and vulnerability to climate change; and
  - enhance overall resilience of highland communities and their ecosystems

TA Outputs and Dimensions

Outputs

1. Capacity to assess **climate change vulnerability** of highland agriculture improved
2. **Gender-responsive, climate-smart agricultural** practices prioritized and demonstrated
3. Agricultural product **quality, value addition and market** linkages enhanced
4. Capacity of **local governments and communities** to address climate change strengthened

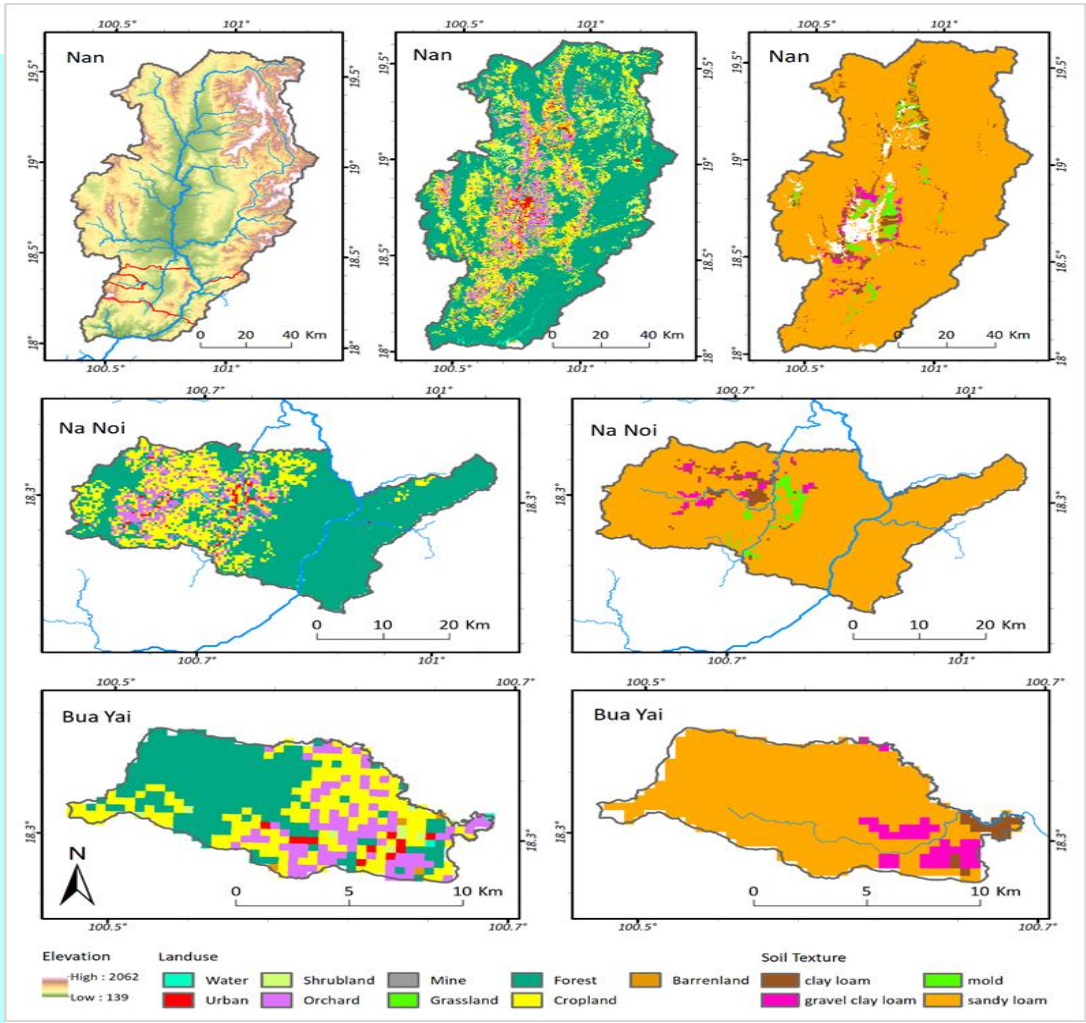
Dimensions

1. Regional Cooperation and Integration Dimension (e.g., Internal and Cross-border Trade)
2. COVID-19 Recovery Dimension (e.g., Job creation, Smallholder Empowerment, Green and Resilient Recovery)
3. Food Security Dimension (Productivity, Quality, Safety, Affordability, Utilization)
4. Climate Change Dimension (Climate-smart Agribusiness Value Chains, GHG Mitigation and Adaptation)
5. Inclusiveness Dimension (Smallholders, Women, Youth, Private Sector)
6. Innovation and Sustainability Dimension (Skill Building, Enabling Policies, Digital technologies)

Output 1: Capacity to assess climate change vulnerability of highland agriculture improved

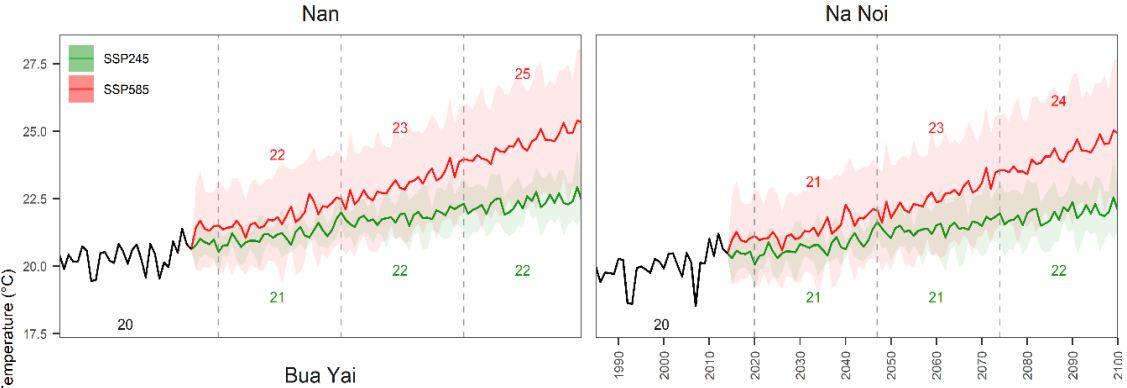
Key activities

1. Determine **factors** contributing to climate change vulnerability of highland agriculture.
2. Analyze **baseline data** and identify capacity needs and gaps on vulnerability in different agriculture subsectors.
3. Strengthen the **capacity** of local government staff to collect data and assess climate change vulnerability.
4. Assess **impacts** of climate change for current and future **scenarios**.
5. Develop knowledge products/**guidance manual** on assessing climate change vulnerability in highlands.

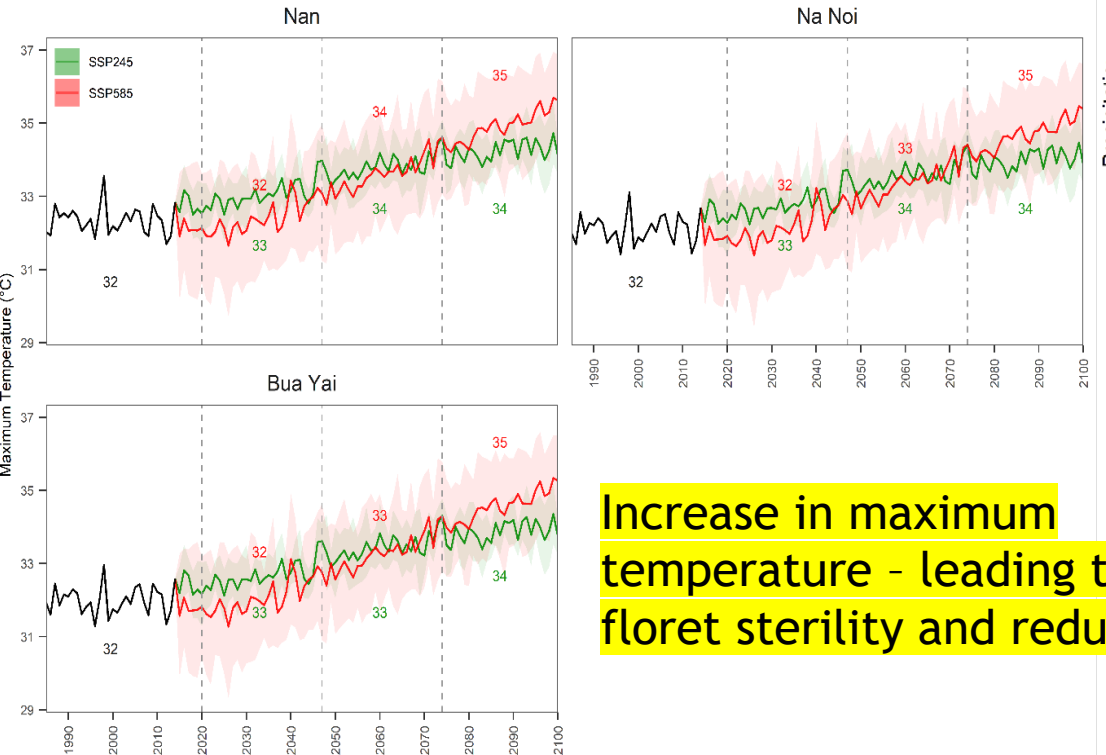


Land-use map, Soil map of Nan River Basin, Na Noi District and Bua Yai Sub District

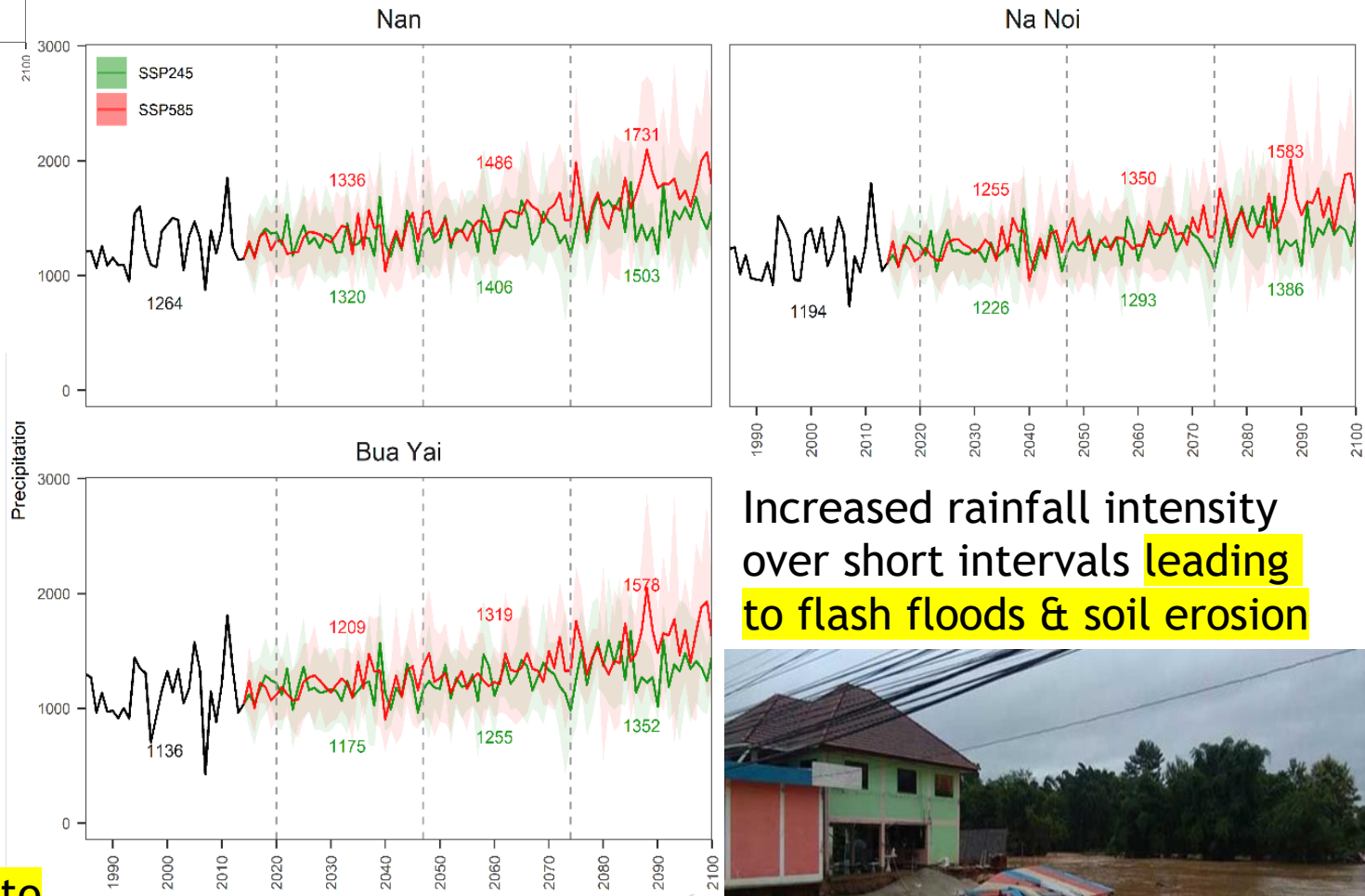
Climate Projections under SSP2-4.5 and SSP5-8.5 scenarios for Nan River Basin



Increase in minimum temperature



Increase in maximum temperature – leading to floret sterility and reduced crop yields



Increased rainfall intensity over short intervals leading to flash floods & soil erosion

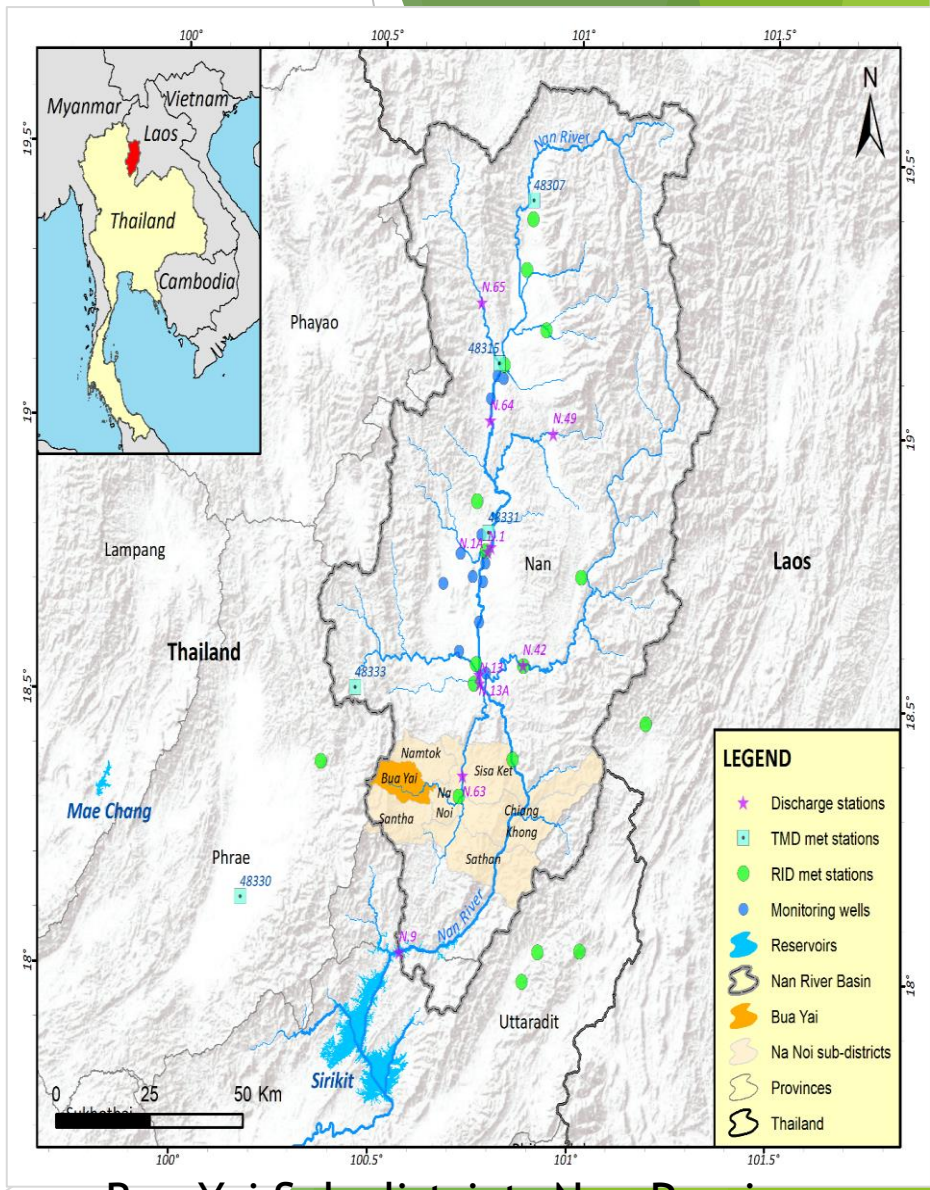
Output 2: Gender-responsive, climate-smart agricultural practices prioritized and demonstrated

Key activities

1. Prepare an **inventory** of gender- and COVID-19-responsive CSA and conduct a multi-criteria assessment to prioritize CSA practices.
2. Conduct a **cost-benefit analysis** of three priority CSA practices.
3. **Demonstrate** most appropriate gender- and COVID-19-responsive CSA practices.
4. Identify and encourage **private sector** companies to deploy CSA practices.
5. Prepare **guidance manual** on CSA demonstration process for highlands.

Community consultations and training on CSA

Farmer growing citronella



Bua Yai Sub-district, Nan Province

Output 2: Gender-responsive, climate-smart agricultural practices prioritized and demonstrated

CSA Demonstrations

Solar Irrigation

https://www.apollopowersystems.com

Keyline Water Management

https://permacultureapprentice.com

Biochar

https://theecologist.org/

Potential CSA Demonstration sites

Output 3. Agricultural product quality, value addition, and market linkages enhanced

1. Identify priority highland agri-food products for quality and safety improvement and value addition by the private sector, including processing, packaging and branding
2. Build capacity of local communities, in an inclusive manner, on grower certification schemes (e.g., participatory guarantee system - PGS), organic farming, and good agricultural practices (GAP)
3. Train local communities and the private sector on agri-food quality and safety improvement and value addition
4. Demonstrate the application of digital technologies for traceability of agri-food products
5. Develop knowledge products on grower certification schemes, quality and safety enhancement, and value addition

Benefit cost analysis of traditional crops and potential alternate crops

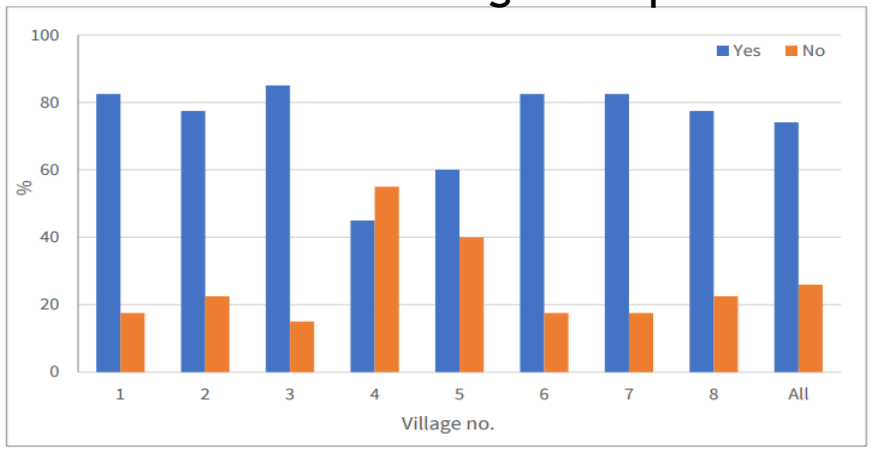
Crops	Yield (kg/rai)	Cost (Baht/rai)	Price (Baht/kg)	Return (Baht/kg)	Net Profit (Baht/rai)
Maize	673	3,405	7.80	5,250-6,057	1,845 to 2,652
Mung bean	117	1,732	24.75	2,888	1,156
Peanut	336	5,317	51.00	17,143	11,826
Ginger	3,016	21,030	43.10	130,000	108,960
Avocado	835	N/A	37	30,913	15,924
Cacao	1,240	21,880	50	62,000	40,120
Sesame	100-150	960	80-100	8-15,000	10,000
Perilla	80	1,200	200	16,000	14,800
Citronella	2,000	300	5	10,000	9,700
Lemon grass	1,700	300	5	8,500	8,200
Organic pumpkin	1,857	1,664	10	18,570	16,906

Output 3. Agricultural product quality, value addition, and market linkages enhanced

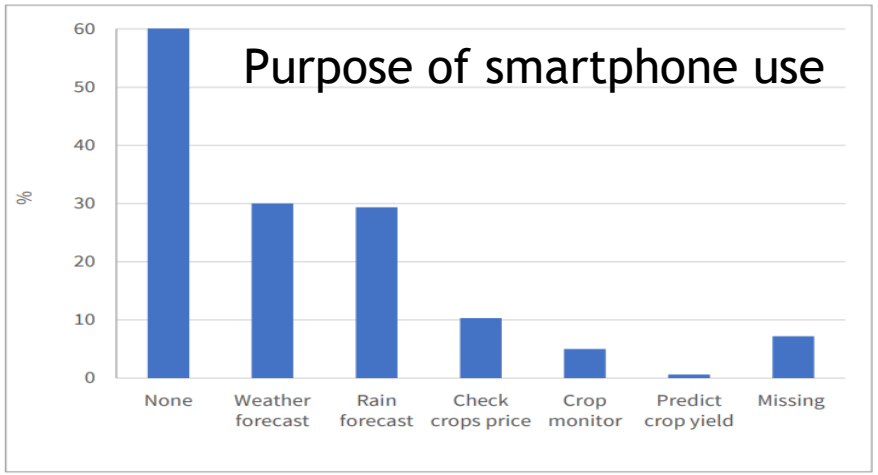
Alternate Crops	Value addition and New market Opportunities
Peanut	• **Dried peanut** for local markets and supermarkets (Central, Lemon Farm) • **Processing** (e.g., peanut butter, roasted peanuts and peanut cookies)
Avocado	• **Fresh avocado** for local markets and supermarkets • **Processing** (e.g., avocado oil, skin care products)
Cacao	• **Fresh cacao** • **Processing** (e.g., cacao power, chocolate)
Lemon grass	• **Fresh lemongrass** • **Processing** (essential oil extraction and sale to contracted company for preparing aromatic products, balm, alcohol and herbal products and sold via online markets)
Pumpkin	• **Fresh pumpkin** (sold via Big C supermarket) • **Processing** (Community organic agriculture enterprise and processing plant to make pumpkin paste for sale to contracted company, home-made pumpkin cake for sale in local markets)

Output 3. Agricultural product quality, value addition, and market linkages enhanced

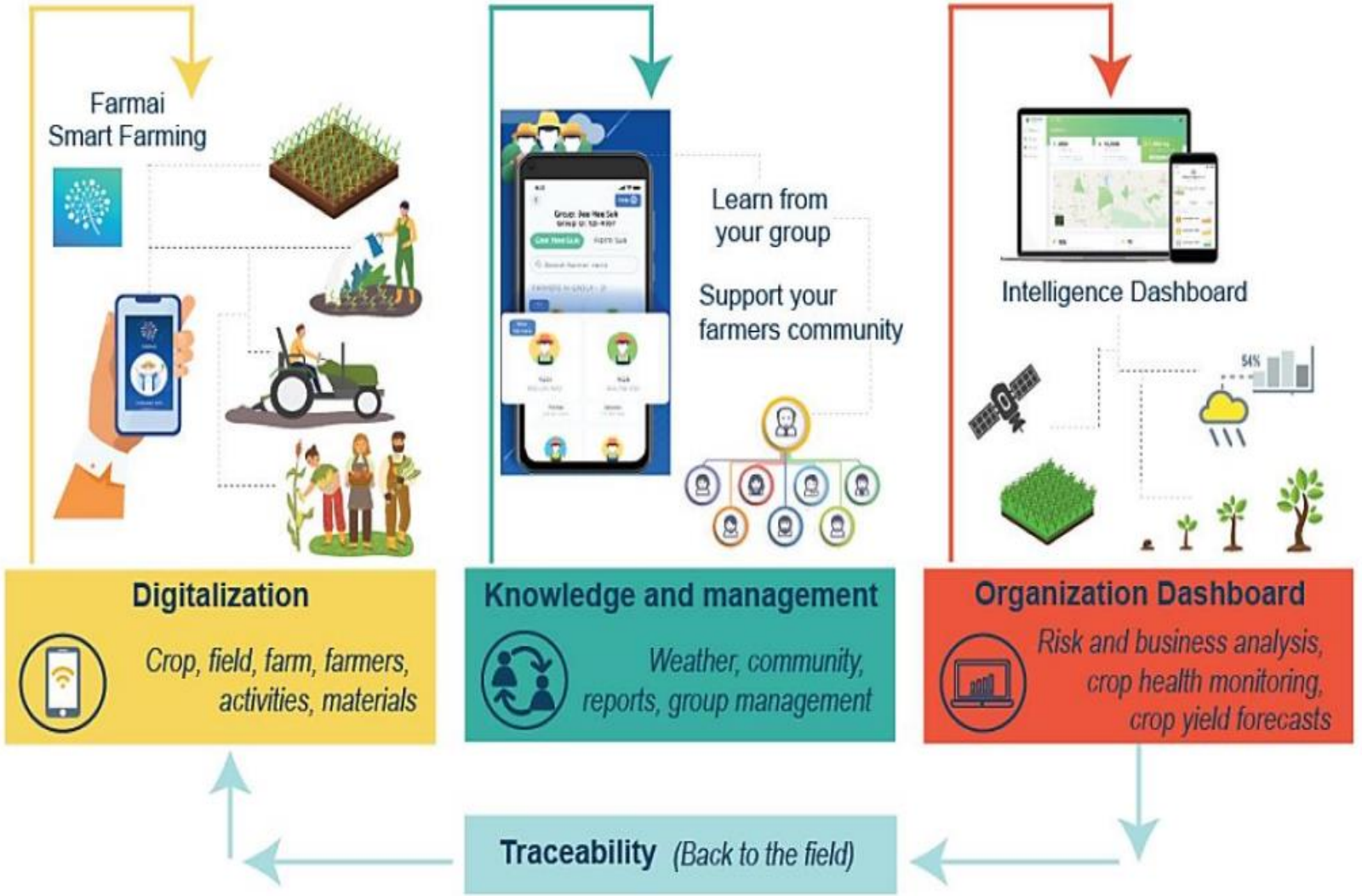
% of farmers using smartphones



Village No.: 1.B. Oi; 2. B. Mai Mongkol; 3. B. Na Haen; 4. B. Tabman; 5. B. Nakai; 6 B. Tong Muang; 7 B. San Payom; 8 B. Nong Ha



Demonstration on Digital Traceability of Agri-Food Products



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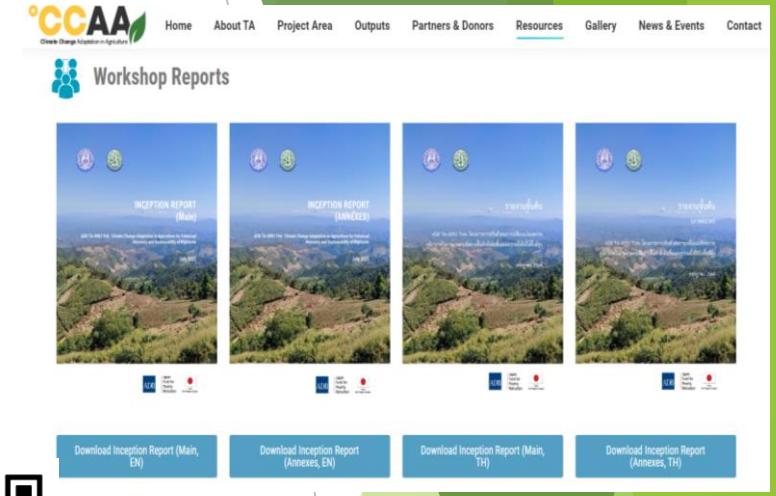
Output 4. Capacity of local governments and farming communities to address climate change strengthened

1. Train staff of local governments on integrating climate change concerns in agricultural development plans at district and provincial levels
2. Raise awareness of farmers, youth, NGOs and private sector on agricultural adaptation and mitigation measures, and alternate livelihood options vital for post COVID-19 economic recovery
3. Conduct field visits to promote “farmer-to-farmer” learning from demonstration sites
4. Prepare knowledge products on CSA demonstrations and alternate livelihood options
5. Organize an international workshop on CSA to disseminate the TA findings



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TA 9993 Website

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Output 4. Capacity of local governments and farming communities to address climate change strengthened

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Summary

Climate Change Adaptation in Agriculture for Enhanced Recovery and Sustainability of Highlands

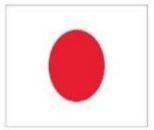
In support of Thailand's efforts to achieve SDGs & nationally determined contributions under the Paris agreement on climate change.

- Build technical and institutional capacities to assess vulnerabilities to climate change, COVID-19 and other stresses
- Demonstrate CSA practices and digital technologies for traceability of agri-food products
- Support local governments to integrate climate change concerns in agricultural planning
- Enhance food security while benefiting from local wisdom

  (on climate resilience/indigenous stress-tolerant crop varieties/value addition)

Concluding Remarks

- Highland Agriculture in APEC economies faces multiple challenges ranging from soil erosion, environmental pollution and low crop productivity. Climate change is exacerbating these problems in many areas. Targeted adaptation and mitigation strategies are therefore critical.
- Mainstreaming climate change concerns in highland agricultural development at both policy and operational levels is still in early stages. Hence targeted measures to strengthen capacity of local government staff is urgent.
- Raising awareness and providing incentives to farmers and local communities for soil and water conservation (e.g., terraced management of soil, keyline water management, biochar application) can help reduce climate vulnerability and carbon footprint and enhance productivity, while contributing to COVID-19 recovery.
- Climate-smart agriculture accompanied by value addition and quality improvement of agri-food products can help enhance livelihoods of highlanders and sustainability of highland ecosystems.



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Thank You