

# Circulating and Ecological Sphere (CES) Concept for Advancing Resilient Development in Udon Thani City Region

Climate & SDGs Conference

20-21 July 2022 United Nation University (Tokyo)



The Institute of Global  
Environmental Strategies  
(Japan)



START International, Inc. Visvesvaraya National  
Environmental Strategies (USA) Institute  
(Japan) of Technology in Nagpur  
(India)



Thammasat University  
Research Unit in Urban Futures  
& Policy (Thailand)



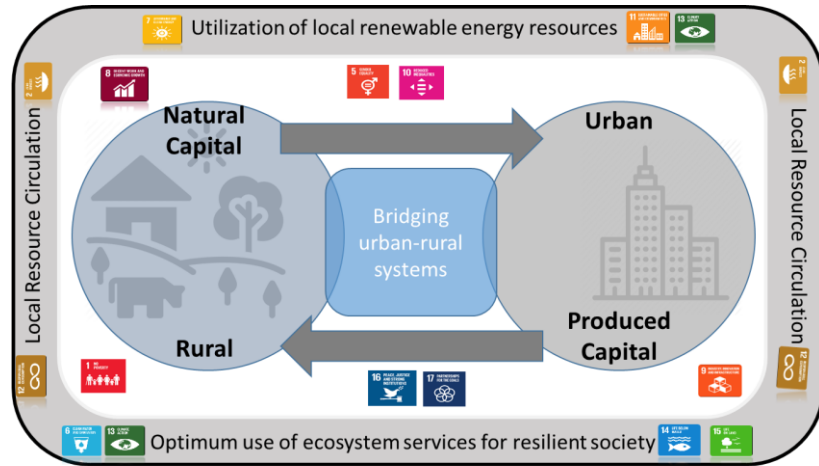
Assoc. Prof Dr. Wijitbusaba (Ann) Marome (TU)  
Ms. Pimnara Rodkul (TU)  
Dr. Bijon Kumer Mitra (IGES)  
Dr. Rajarshi Dasgupta (IGES)  
Ms. Yatsuka Kataoka (IGES)

ACTIVITIES  
2021-2022

- **Stocktaking** on trend of urbanization, drivers of urbanization and visible impacts.
- **Conducting in-depth interview** with key stakeholders
- **Conducting household survey** to understand urban-rural relationship/dependency at the socio economic level, natural resources management and collective resilience.
- **Data collection for Ecosystem services (ES) Modeling** and spatial characterization of ES Supply and Demand Spatial Analysis
- Coordinating and organizing a **stakeholder consultation workshop**
- **Knowledge utilisation:** translating knowledge into action

# Circulating and Ecological Sphere

## Climate Change & SDGs



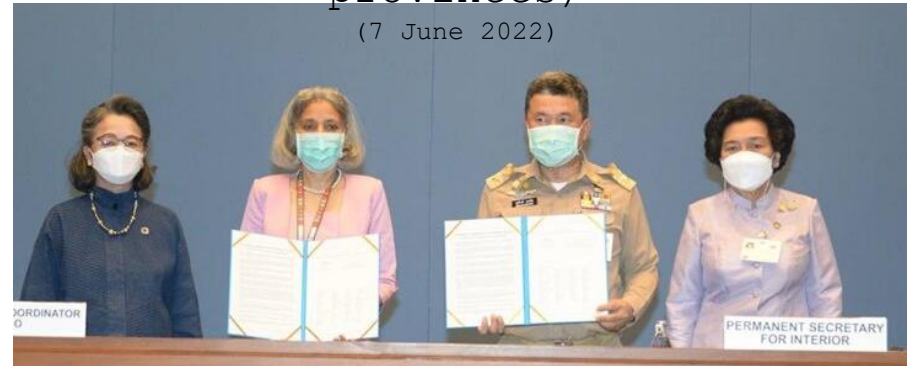
Source: IGES

# Statement of Commitment to Sustainable Thailand

"change for good"

UN and Ministry of Interior (76 provinces)

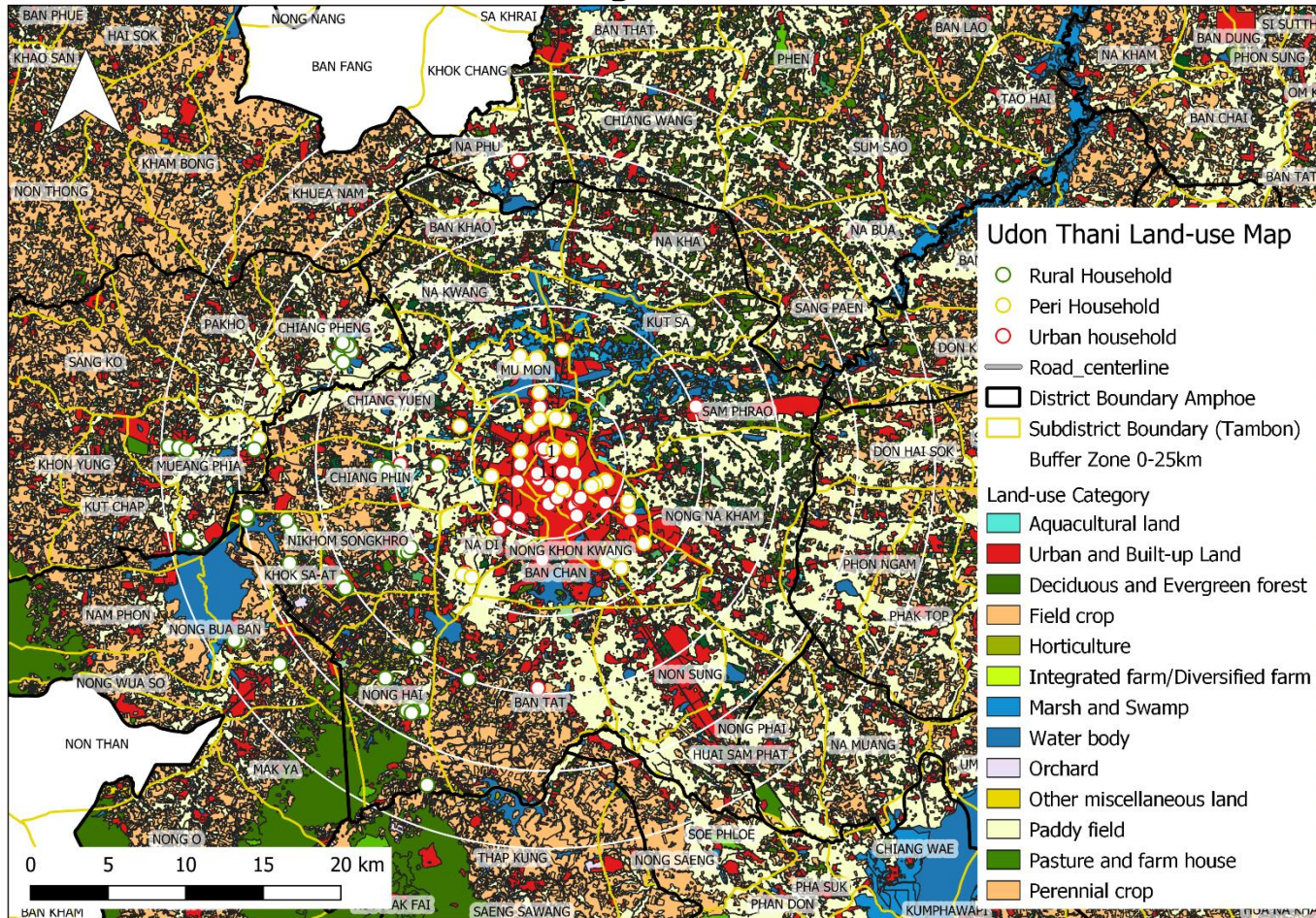
(7 June 2022)



Source: Matichon, ThaiGov



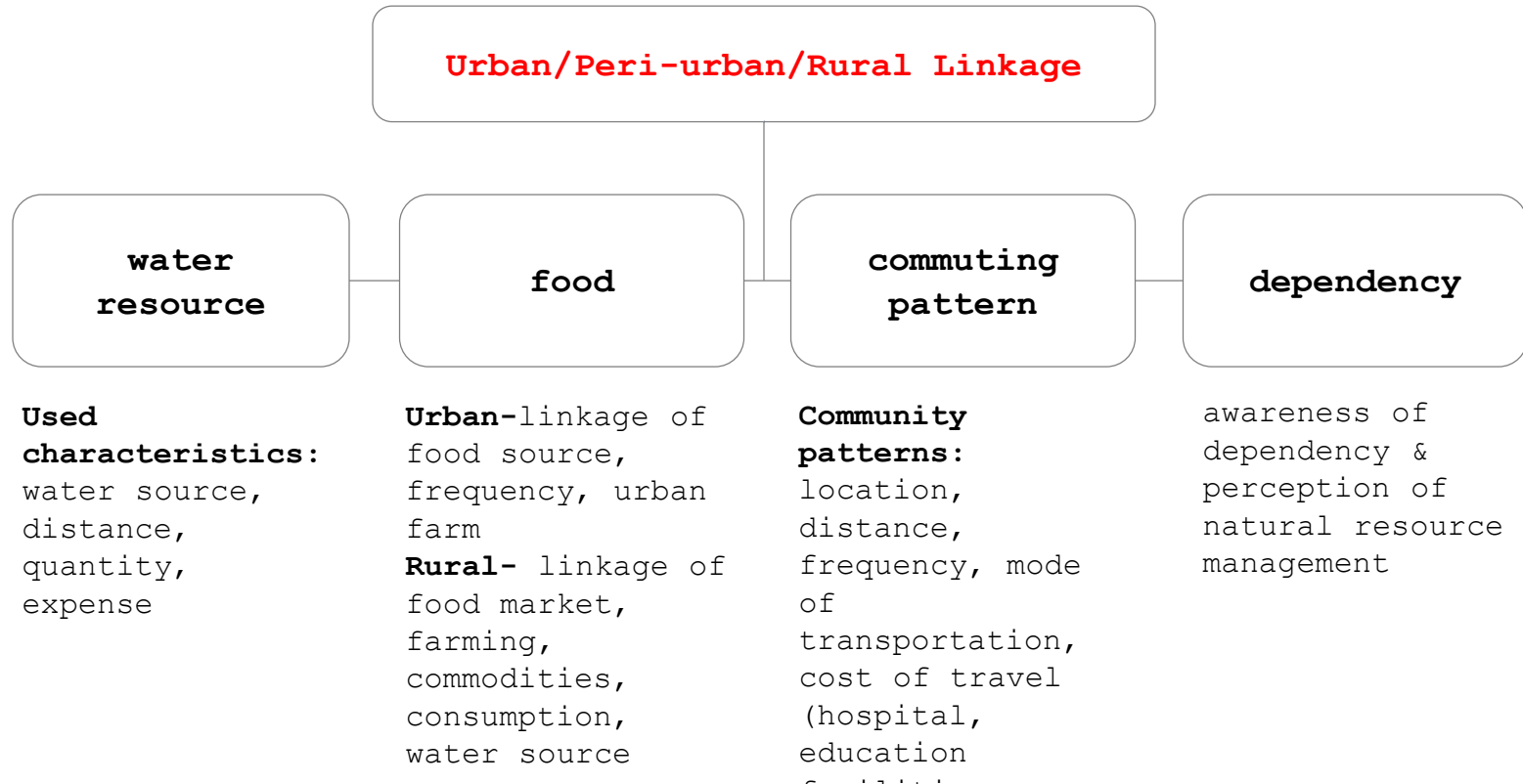
# Methodologies for Household Selection



## Conducting household questionnaires survey (500)

- Urban, Peri-Urban and Rural areas on the related ecological corridors, Hua Luang Reservoir
- 250 households for
  - Urban areas (0-5 Km.)
  - Peri-urban area (5-10 Km.)
- 250 households for Rural areas (10-25 Km.)

# HOUSEHOLD RESOURCE CONSUMPTION AND PERCEPTION



# SOCIAL NETWORK ANALYSIS

Urban/Peri-urban/Rural Linkage

**Natural Resource:** water supply source, food, agricultural areas

**Public Services & Activities:** health, education, work, leisure

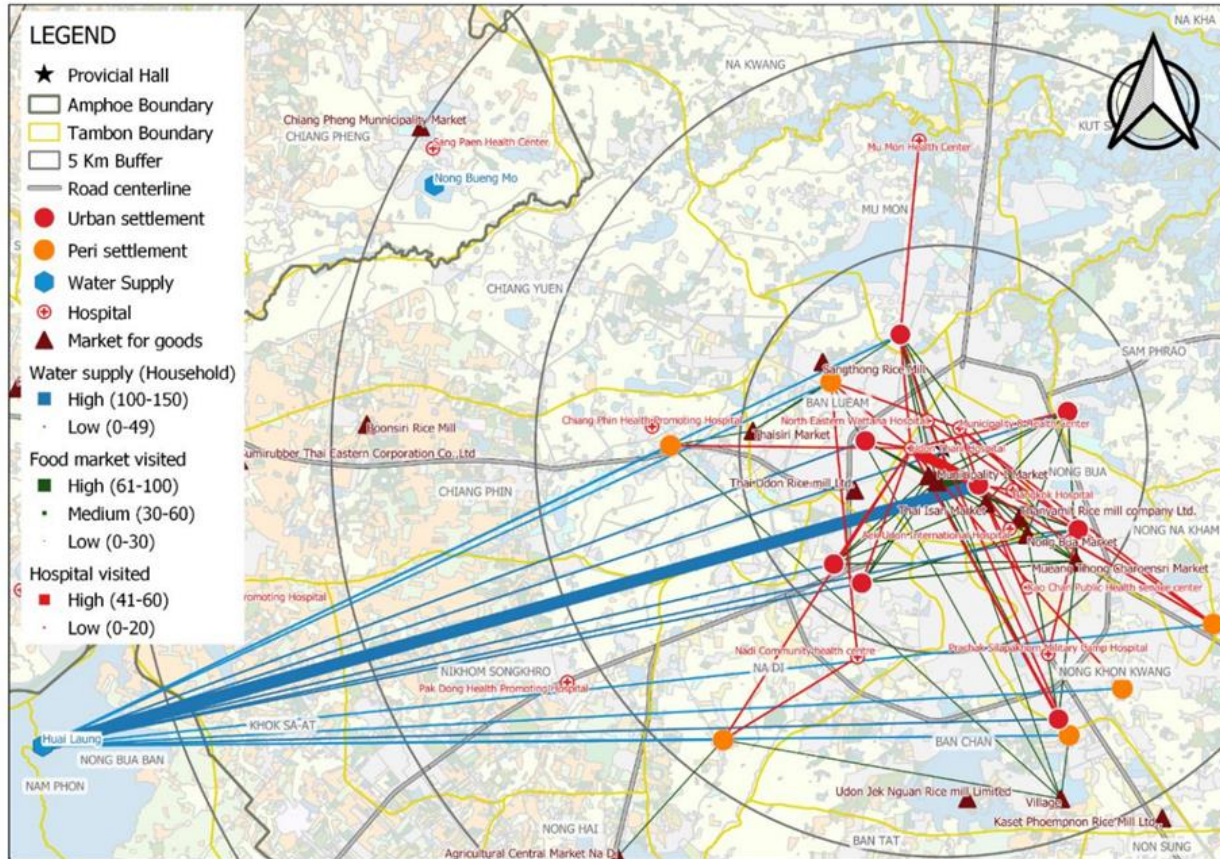
location

distance

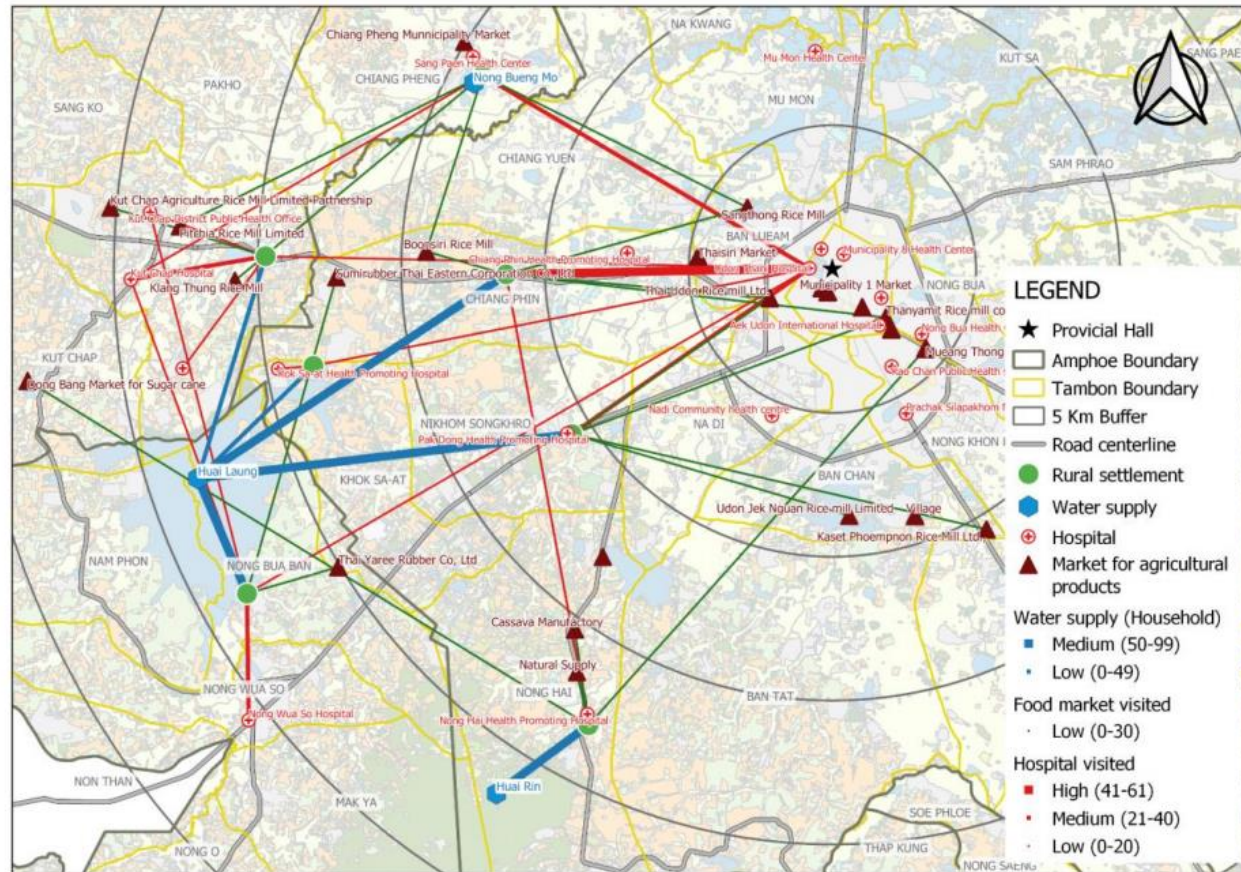
frequency



# Resource flows of food and water and hospital of urban and peri-urban households

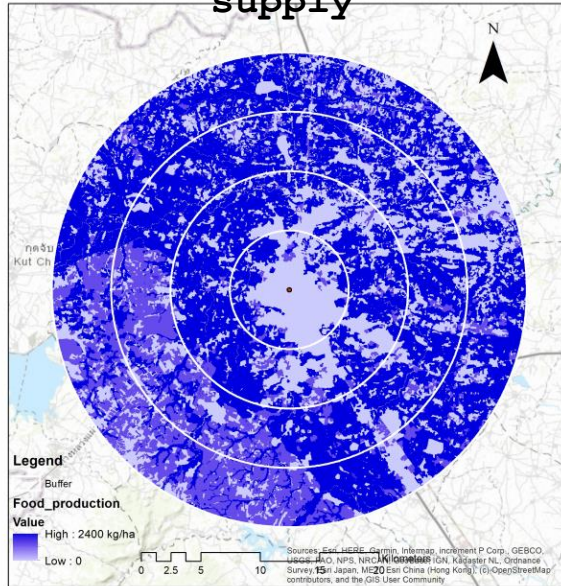


# Resource flows of food, water and hospital of rural households

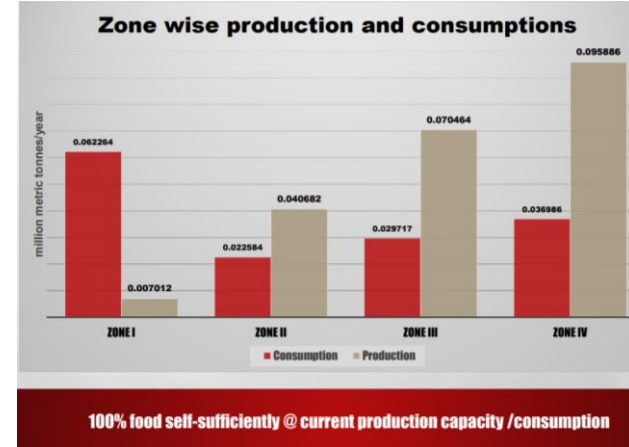
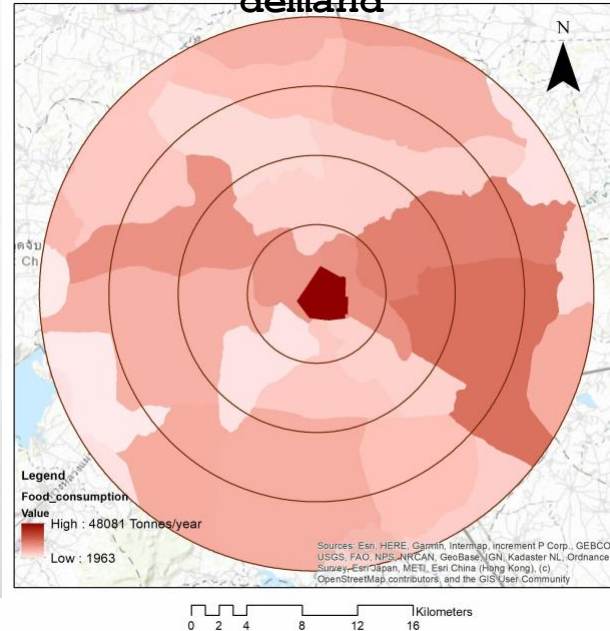




## Mapping local food supply



## Mapping local food demand

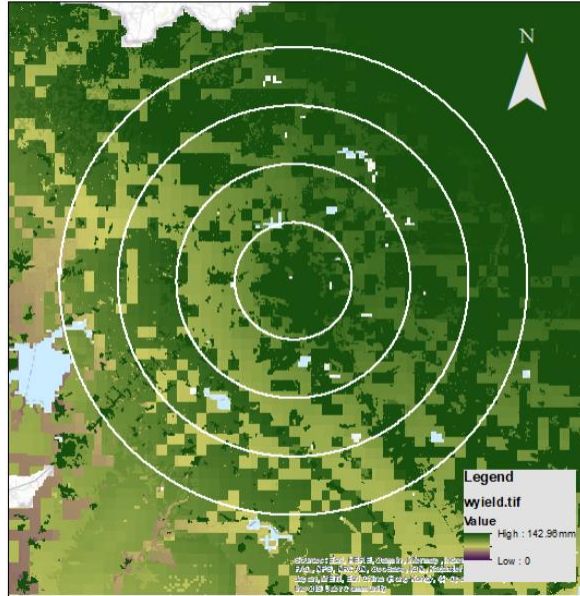


**100% food self-sufficiently @ current production capacity /consumption**

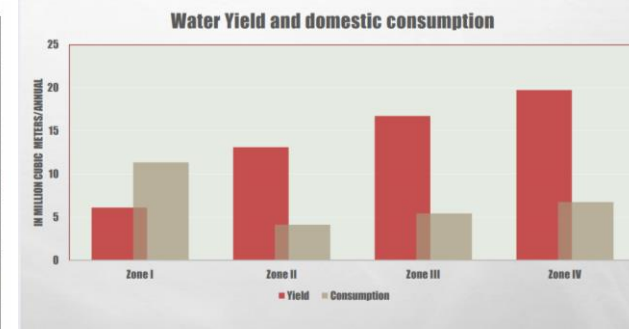
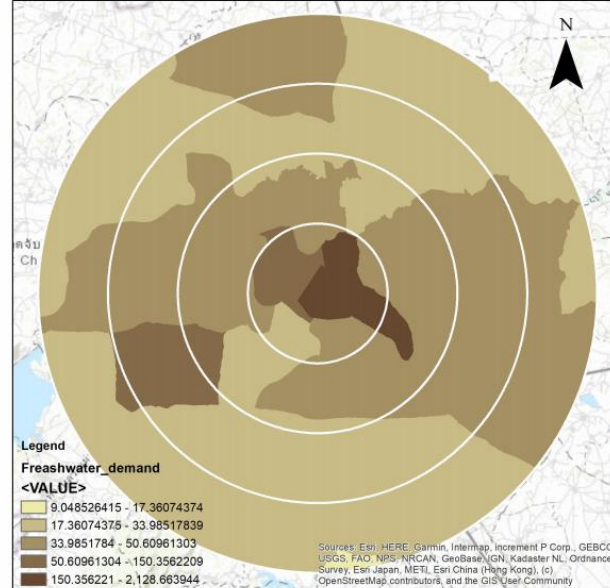
Total production capacity or potential is approximately in 20km radius is about 0.21 million metric tonnes/year

- Calculated at the district level
- Rice consumption per capita reached 178 kg/y in 2017 (FAO).
- We considered 200kg/y,

## Annual Water Availability Modelling



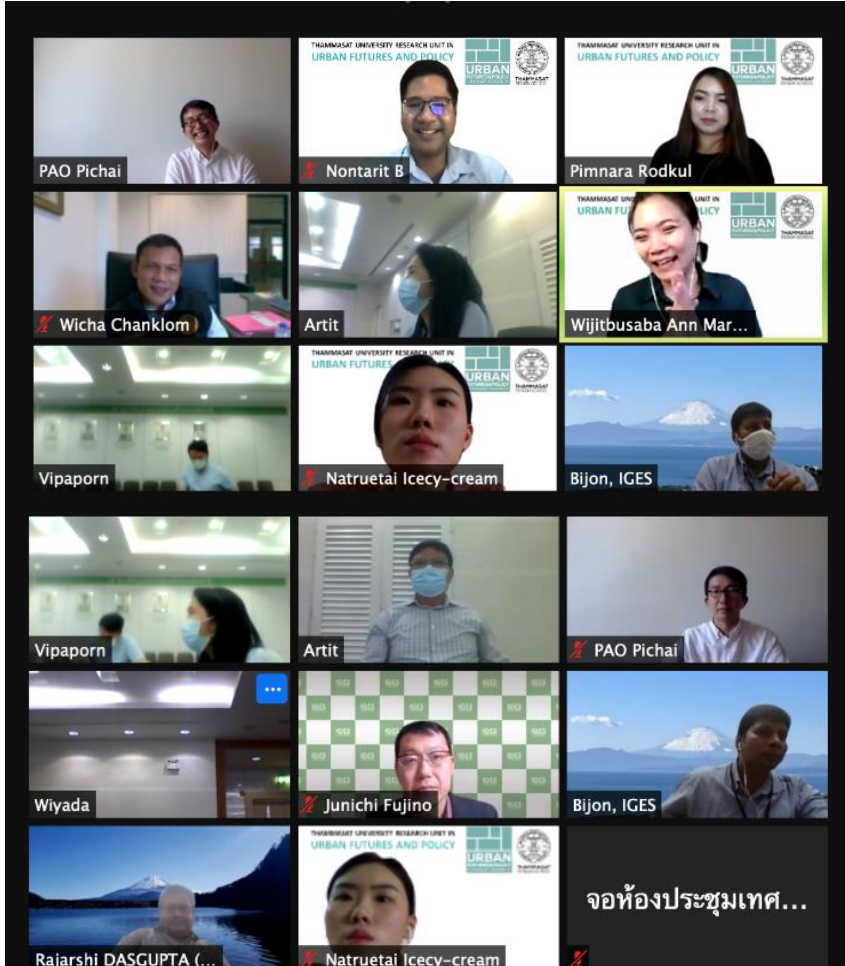
## Mapping of annual domestic water demand



- Water yield demonstrates the relative contribution of water from different parts of the landscape.
- We used the InVEST's Water Yield model.
- The input data includes root depth, annual precipitation, Plant Available Water Content (PAWC), average annual evapotranspiration (AET), land-use and

- Calculated at the district level
- Water consumption was considered uniform at 220 lpcd/day

Awareness and willingness of respondents in the urban area towards natural resources and their management	Yes	No
Are you aware that the water supplied to your area is augmented from the Huai Luang reservoir?	110 (79%)	30 (21%)
Are you aware that many rural and forest areas are dependent on the same source?	80 (58%)	57 (42%)
Are you aware of the water issues in forest and rural areas adjoining Udon Thani city?	76 (56%)	59 (44%)
<i>If yes, how?</i>		
a. through visual media	68 (64%)	
b. through print media	11 (10%)	
c. through personal visit	20 (19%)	
d. others (specify)	7 (7%)	
Do you feel that increased water demand in the city is contributing to crisis situations in forest & rural areas?	126 (91%)	12 (9%)
Are you aware that rural areas are supplying food to urban areas?	84 (88%)	11 (12%)
<del>Do you feel urban areas must contribute to the betterment of these forests and rural areas?</del>	<del>119 (90%)</del>	<del>13 (10%)</del>
Are you practising any water conservation measures at household/ community level?	111 (83%)	22 (17%)
Which type of development do you support?		
a. Sustainable Rural	11 (7%)	
b. Sustainable Urban	13 (9%)	
c. Sustainable Urban-Rural	127 (84%)	
Are you willing to contribute and take part in natural resource management activities?	107 (83%)	22 (17%)
<i>If yes, how?</i>		
a. Watershed development measures	23 (14%)	
b. Operation and maintenance	22 (13%)	
d. Conservation	78 (47%)	
4. Awareness creation/ Knowledge sharing	42 (25%)	
<i>If not, who else should contribute to water resource management?</i>		
a. Community waterworks	29 (18%)	
b. Provincial Waterworks	51 (31%)	
c. Irrigation department	37 (23%)	
d. NGO	23 (14%)	
e Community and related organisations	22 (14%)	



## Stakeholder Workshop (18 June 2021)

**WATER - FOOD - ENERGY**

### Udon-Thani City Region CES Platform

Core Team

Governance  
Team

Technical  
Team

- Udon Thani Nakorn Municipality
- Udon Thani Provincial Administrative Organisation

- Udon Thani Province

- UFP, Thammasat
- Udon Thani Rajabhat University

- Provincial Plan



# In-depth Interview with Local Governments

(2022)



**PROVINCE:**

**Mr. ViCha Chanklom**

Director, Strategy and Information for  
Provincial Development Unit  
Udon Thani Province



**URBAN:**

**Mrs Vipaporn Theeratham**

Chief of the Local Development Plan  
Monitoring and Evaluation

Subdivision

Udon Thani Municipality

**RURAL:**

**Mr. Jirapong Khotchompoo**

Director, Division of Public

Works

Nong Hai Subdistrict

Administrative



**PERI URBAN:** **Mr. Jantabarn Ayuwat**

Mayor of Nong Samrong Town

Municipality

# Translating knowledge into action

(22 June 2022 at Udon Thani Provincial Office)

