



CARDI



ព្រះរាជាណាចក្រកម្ពុជា  
ព្រះបរមរាជវាំង  
ក្រុមប្រឹក្សាភិបាលក្រសួងកសិកម្ម រុក្ខាប្រមាញ់  
និង ត្រីមាតិកា (ក.ក.ត.)



Food and Agriculture  
Organization of the  
United Nations

**Regional Inception Workshop for TCP/RAS/3602 on Creating Enabling Environments  
for Nutrition-Sensitive Food and Agriculture to Address Malnutrition**

# **Selected NUS and Preliminary proposed sites option for field survey in Cambodia**

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and OUK Makara

March 30, 2017

# Geography of Cambodia



- Total area: 181,035 km<sup>2</sup>
  - Distance from East to West: 580 km
  - Distance from North to South: 450 km
  - Latitudes : 10° and 15° north
  - Longitudes : 102° and 108° east
- \* Border:**
- West with Thailand and Gulf of Thai
  - North with Thailand and Laos PDR
  - East and South with Vietnam

# Climate and Season

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## ❖ Average daily temperature range

- 1920-1970: 23-33<sup>0</sup>C
- 2000-2009: 23-35<sup>0</sup>C
- 2014-2015: 21-35<sup>0</sup>C

## ❖ Climate

- April : Hottest
- December: Coolest

## ❖ Evaporation: 2230mm/year

- September : Lowest
- March : Highest

## ❖ Rainfall ranges: From 1250mm to 2500mm

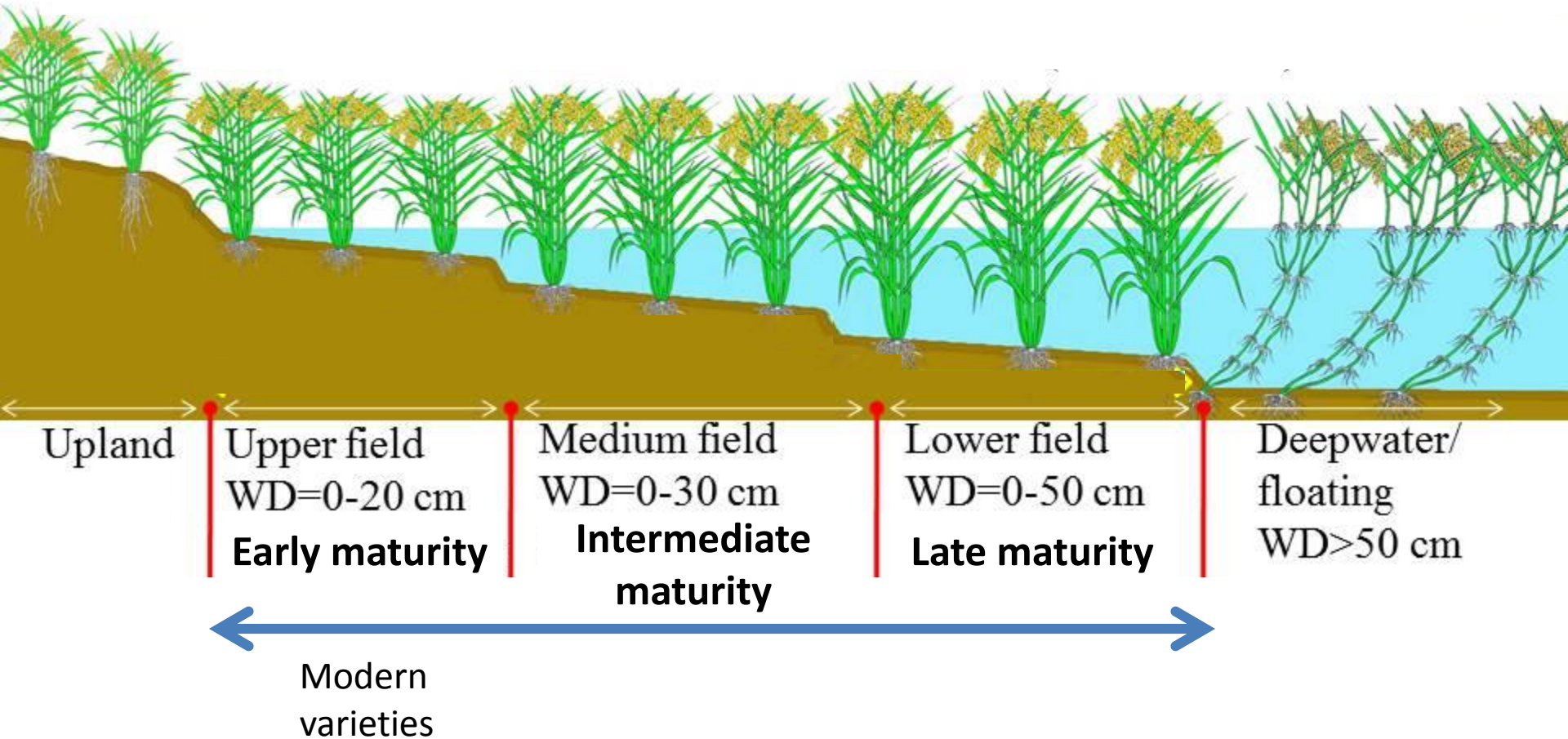
## ❖ Day length: 11h – 13h

- December : Shortest
- June : Longest

## ❖ Monsoon climate:

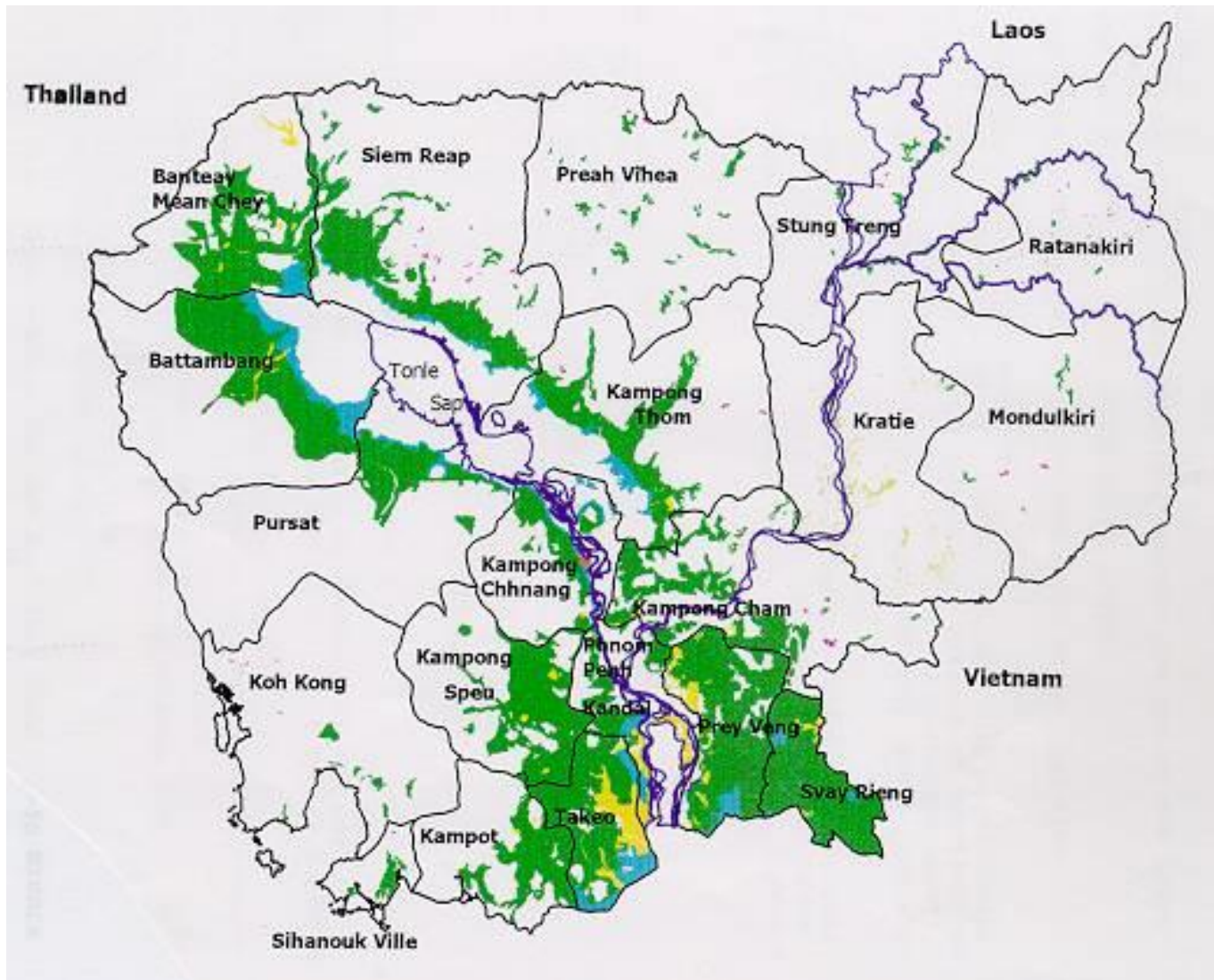
- Dry season: November to April
- Wet season: May to October

# Rice Ecosystem of Cambodia




Rainfed lowland


# Rice Ecosystem of Cambodia



 Rainfed lowland: 80.2 %

 Irrigated (Dry season): 14.5 %

 Deep water/Floating: 3.4 %

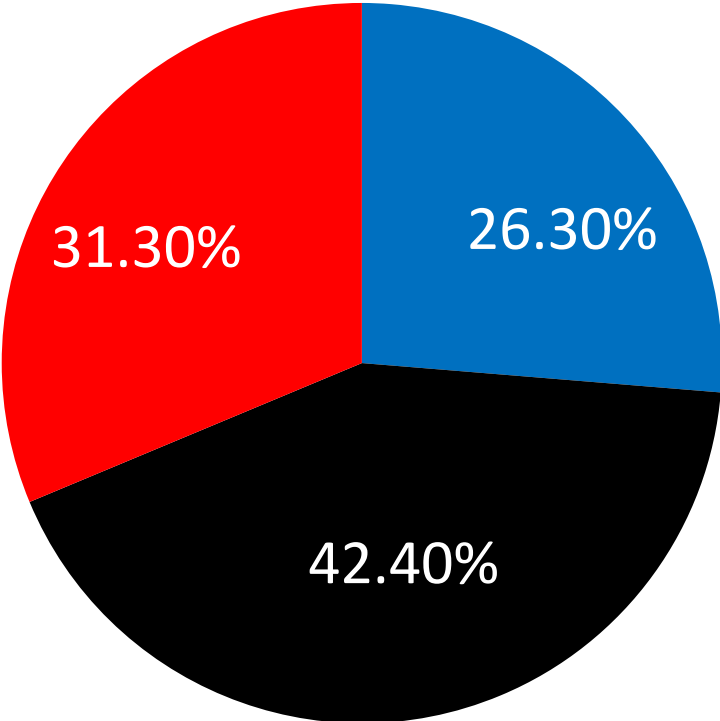
 Upland: 1.9 %

# Agricultural Production Area, 2014-2015 (MAFF, 2015)

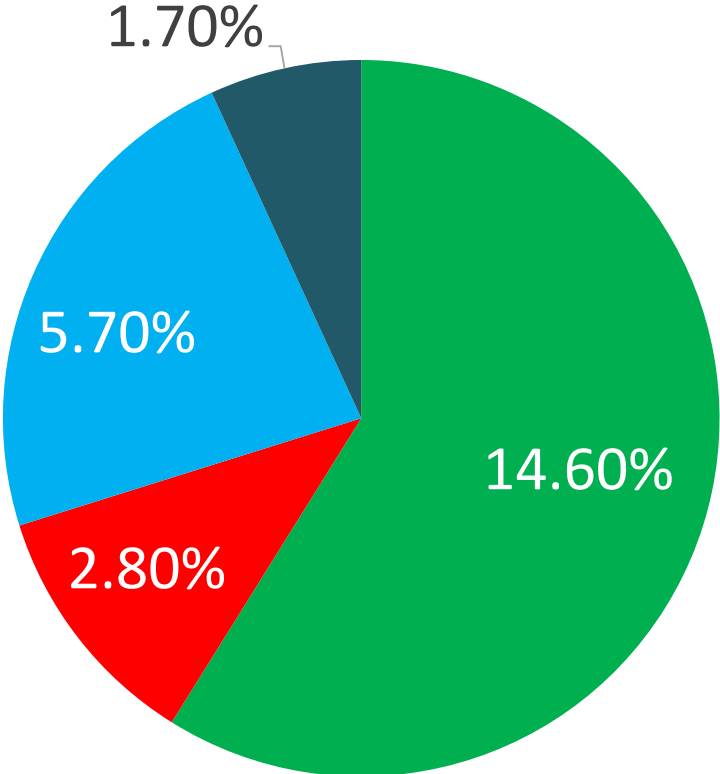
Crop	Area (ha)
Rice	3,055,507
Cassava	521,459
Maize	143,517
Mungbean	53,294
Vegetable	51,637
Sugarcane	48,357
Sesame	28,170
Peanut	17,818
Tobacco	10,727
Jute	192
<b>Total</b>	<b>4,009,104</b>



# Contribution of Agriculture to GDP in 2016



■ Agriculture  
■ service



■ crops      ■ livestock  
■ fisheries   ■ forestry

# Food Plant Species in Cambodia

Cambodians habitually utilized at least **931 species** of Cambodia's **2,304 plant species**. Of the **849 species** for which life forms are described:

- 34.8% are trees of various sizes,
- 21.7% herbs (including bamboo and bananas) and
- 15.1% shrubs
- 28.4% include shrubs, palm trees, lianas and ferns...Habitats are known for 62.7% of these species.



Food plants constitute 37.9% (353 species) of the total number (2,304 species) . These plants are used daily though dependency may be greater during months when there is food deficit in an area. Food plants include species of vegetables, fruits, nuts, leaves, flower, roots, tuber, etc” (Derleth in Aswell, 1997).

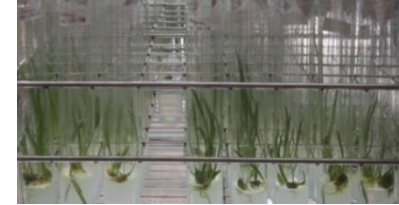


# Plant genetic resources conservation in Cambodia



CAMBODIAN AGRICULTURAL RESEARCH AND DEVELOPMENT  
INSTITUTE (CARDI)

# Collection and conservation of endangered species in Cambodia



**យុវកម្មជំនាញស្រូវ**  
 ចំនួន : ៣៦៣ បង្កើត/សំណាក  
 ថ្ងៃសារ : ០៩-០៩-១៩ ថ្ងៃស្រុង : ៣១-០៩-១៩  
 កម្រិតជី : ២០ : ៣០ : ៣០ គឺ N : P<sub>2</sub>O<sub>5</sub> : K<sub>2</sub>O

No.	Crops	Collected in 2014	Acc/ Sample	No.	Crops	Collected in 2014	Acc/ Sample
1	Rice	661	6621/363	16	Purple yam	-	1
2	Wild rice	-	291	17	Damlong Dai Khla	-	1
3	Maize	-	52	18	Taro	-	7
4	Mungbean	1	13	19	Papaya	-	1
5	Soybean	-	12	20	Tomato	-	35
6	Peanut	4	16	21	Chili	-	48
7	Wild vigna	-	118	22	Winter melon	-	10
8	Sesame	2	12	23	Pumpkin	-	18
9	Watermelon	-	8	24	Cucumber	-	12
10	Mango	-	26	25	Dishrag gourd	-	7
11	Fruit tree	-	30	26	Egg plant	-	21
12	Banana	-	153	27	Bottle gourd	-	3
13	Sugarcane	3	30	28	Bitter gourd	-	2
14	Reju- cassava	-	28	29	Po Pay	-	2
15	Sweet potato	23	36	30	Ornamentals	-	5
<b>Total</b>						<b>694</b>	<b>7619</b>



# Facility of PGR management

By 2015, a total of 7,943 accessions/samples of 33 crops are being conserved at CARDI by three types of conservation methods:

- Gene bank: Cereal, Legume and vegetable.
- On-field: Fruit tree and root crops.
- *In-vitro*: Ornamental plant, banana, potatoes.



# Germplasm collection in upland area

- **Mondulkiri province** (2015).
- A total of 31 rice samples were collected from 9 villages.



# Germplasm collection in upland area

- **Ratanakiri province**

- Second collection was conducted in April 2015.
- A total of 36 rice samples were collected from 12 villages.



# Neglected Underutilized Species (NUS) in Cambodia

- Neglected Underutilized Species (NUS) always suffered from the negative perception of the people.
- The role of underutilized crops is often ignored or underestimated by crops researchers, planners and policy makers, donor agencies, public and private investors, extension services and economists.
- Minority area: local/landrace/traditional varieties known as underutilized crops have not been completely replaced with improved varieties (biodiversity hotspot of Cambodia).



Rice is the main crop following by maize, cassava and cashew, however the Phnong indigenous people have experienced food shortages due to lack of rice production and the many challenges they face. Therefore, underutilized crops play an important role in food security, nutrition and income generation for their livelihood strategies.





Underutilized crops play a fundamental role in the livelihoods of poor rural communities, representing a source of income, nutrition and medicinal remedies managed using traditional knowledge.





Family gene bank of NUS

# Trends, Challenges and Opportunities of Underutilized Crops in Cambodia

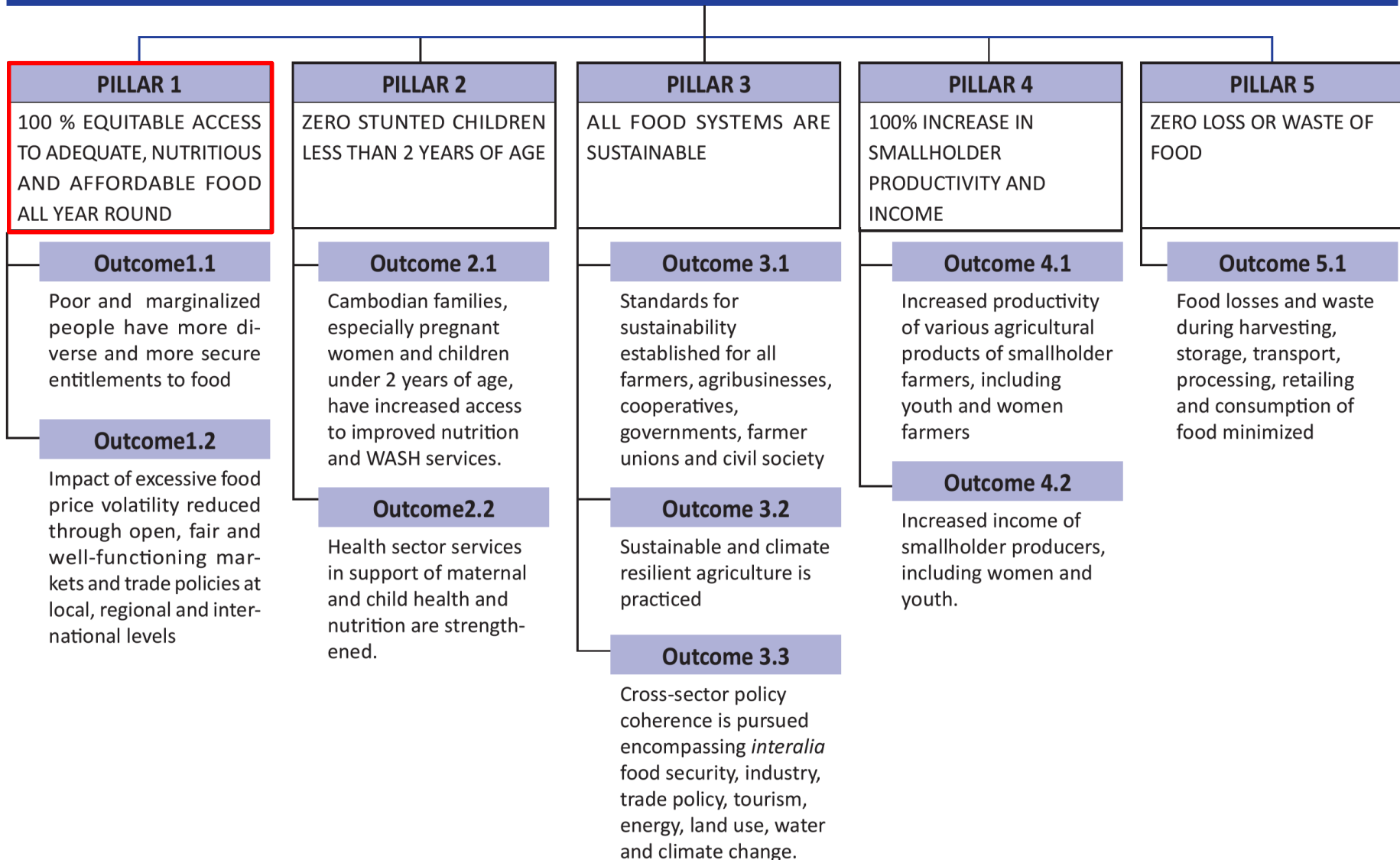
Underutilized crops have a potential that needs to be exploited to our benefit

- Do not require high inputs
- Can be grown in marginal and degraded lands
- Contribute to increased agricultural production
- Crop diversification and a better environment
- Will help in conserving and using the genetic resources of underutilized crop species.
- Underutilized crops are fundamental resources for agricultural diversification
- Indigenous farming knowledge and modern agro-ecological research can provide useful conceptual and technical tools for agricultural diversification

# National Action Plan for the Zero Hunger Challenge in Cambodia

## GOAL

### Hunger and Malnutrition Free Cambodia by 2025



# List of Criteria to Assess and Select Underutilized Crops

Criteria	Including the following aspects
Economic and agronomic competitiveness	Potential generated income, changing abiotic and biotic conditions (e.g. climate, pests), attractive traits, lack of market/poor commercialization
Local and national use, cultural acceptance	Attractive traits
Traditional knowledge	Knowledge on cultural practices, propagation techniques, knowledge on uses
Scientific Knowledge	Research on genetic diversity, propagation techniques, knowledge on uses
Policy & legislation	Extension and research activities by Government and NGO's, favorable policies or government support
Opportunities for national/export niche market	

# Priority Underutilized Crops in Cambodia Listed by Agrofolio Project

Species name	Family Name	English name
<i>Anacardium occidentale</i>	<i>Anacardiaceae</i>	cashew
<i>Arachis hypogea</i>	<i>Leguminosae</i>	groundnut, peanut
<i>Citrus spp.</i>	<i>Rutaceae</i>	citrus
<i>Colocasia esculenta</i>	<i>Araceae</i>	taro
<i>Cymbopogon citratus</i>	<i>Gramineae</i>	lemon grass
<i>Ipomoea batatas</i>	<i>Convolvulaceae</i>	sweet potato
<i>Musa spp.</i>	<i>Musaceae</i>	Yellow, sugar, and green banana
<i>Zingiber officinale</i>	<i>Zingiberaceae</i>	ginger
<i>Piper nigrum</i>	<i>Piperaceae</i>	black pepper
<i>Cocos nucifera</i>	<i>Arecaceae</i>	coconut
<i>Durio zibethinus</i>	<i>Bombacaceae</i>	durian
<i>Vigna radiata</i>	<i>Leguminosae</i>	mungbean
<i>Nephelium lappaceum</i>	<i>Sapindaceae</i>	rambutan

Source: Agrofolio- Benefiting from an Improved Agricultural Portfolio in Asia, 2010

# Mekong Institute

Research Working Paper Series 2012



Identification and Documentation of Underutilized Crops  
in Mondulkiri Province with Emphasis on Socio-Economic Aspects

Ra Thorng



## The Top 10 of Underutilized Crops that Contribute to Income Generation in Mondulkiri province

Rank	Underutilized crops	Scientific name	N° of households	Percentage (%)
1	Banana	<i>Musa spp.</i>	46	53.5
2	Papaya	<i>Carica papaya</i>	44	51.2
3	Sweet Potato	<i>Ipomoea batatas</i>	42	48.8
4	Pumpkin	<i>Cucurbita moschata</i>	42	48.8
5	Winter melon	<i>Benincasa hispida</i>	38	44.2
6	Taro	<i>Colocasia esculenta</i>	36	41.9
7	Cucumber	<i>Cucumis sativus</i>	28	32.6
8	Long bean	<i>Vigna unguiculata</i>	25	29.1
9	Cow pea	<i>Vigna unguiculata</i>	22	25.6
10	Avocado	<i>Persea americana</i>	18	20.9

Source: Thorng Ra, 2012

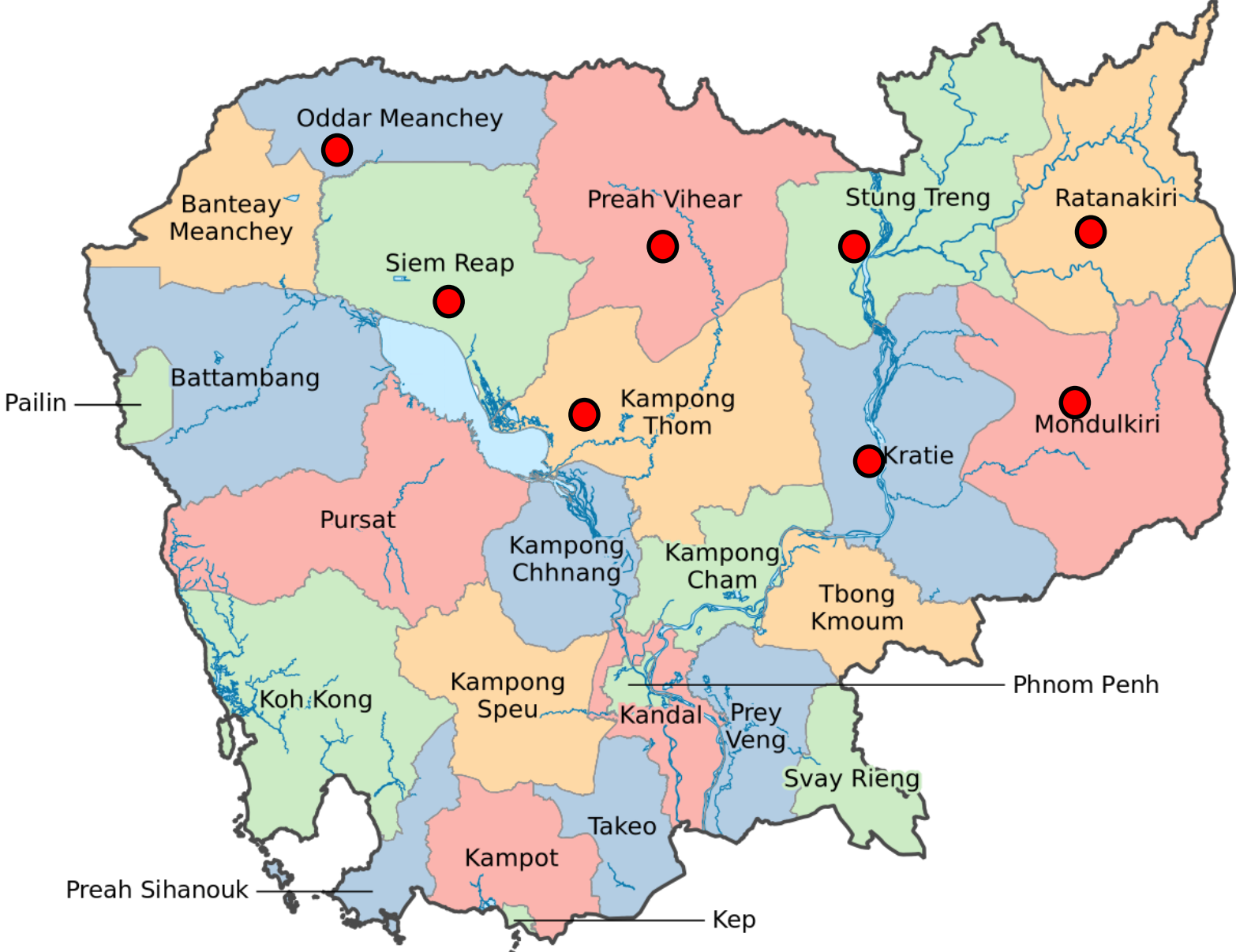
## Selected NUS for field survey in Cambodia

- **Grain crops** : wild vigna, mungbean, sorghum, foxy millet.
- **Roots and Tubers**: Sweet potato, Taro, yam.
- **Nuts** : Cashew nut and peanut.
- **Horticulture**: bitter gourd
- **Others** : Banana, mangoes, milk fruit, *Coccinia grandis* (Sleuk Bash), *acacia pennata*, avocado, papaya.

Total

16 items

# Preliminary proposed sites option for field survey

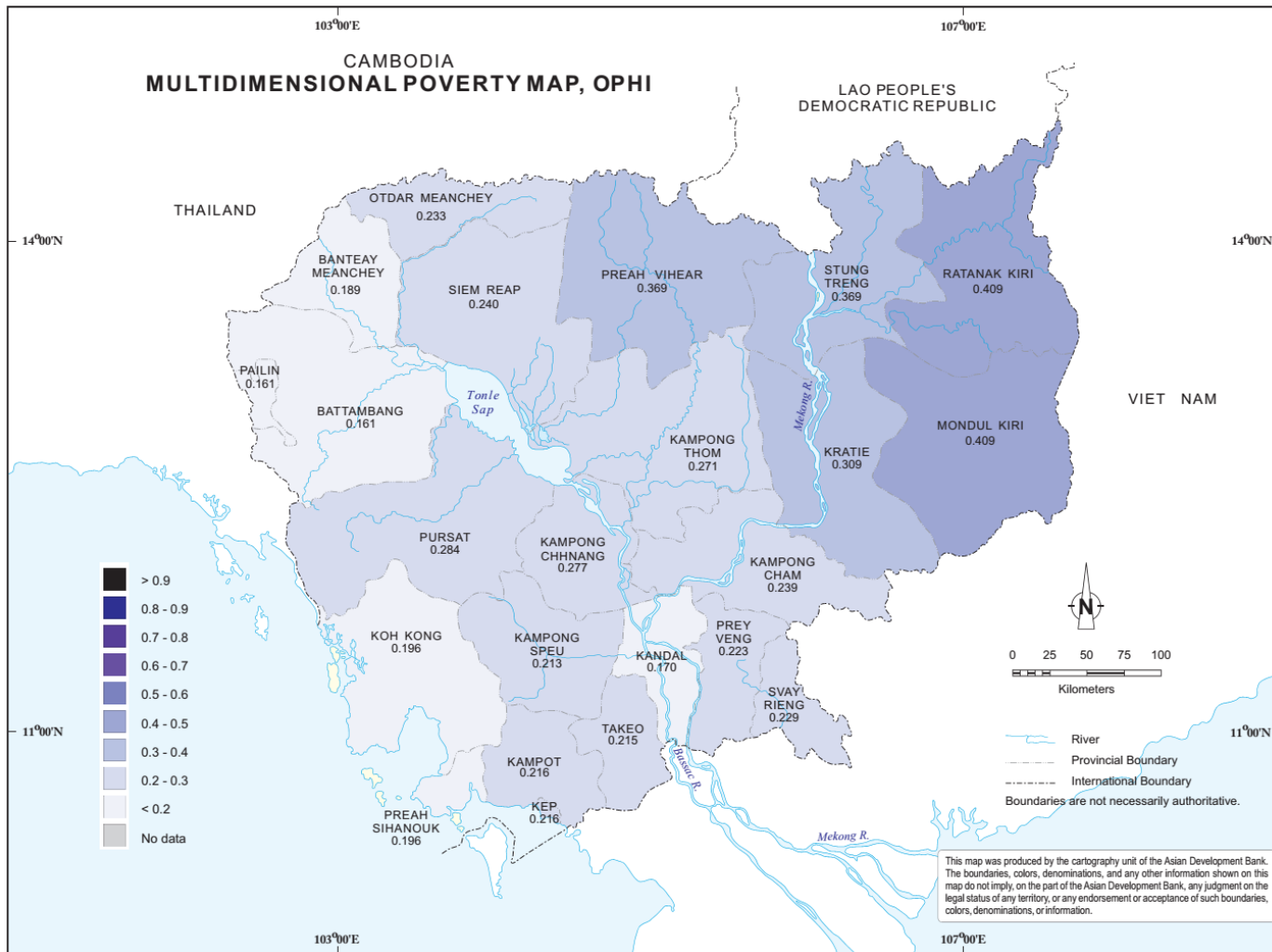


# The 10 Poorest Provinces in Cambodia, by Data Source

Rank	Province	CDB 2012 (%)	Province	IDPoor 2009–2011 (%)	Province	MPI 2010* (%)
1	<b>Preah Vihear</b>	37	Koh Kong	44	Mondulkiri	44
2	<b>Stung Treng</b>	37	<b>Kampong Chhnang</b>	37	Rattanakiri	44
3	Rattanakiri	36	<b>Kratie</b>	36	<b>Preah Vihear</b>	39
4	Oddar Meanchey	34	Battambang	34	<b>Stung Treng</b>	39
5	Mondulkiri	33	<b>Pursat</b>	34	<b>Kratie</b>	29
6	<b>Kratie</b>	29	<b>Preah Vihear</b>	32	<b>Pursat</b>	25
7	<b>Kampong Thom</b>	28	Pailin	32	<b>Kampong Thom</b>	24
8	<b>Siem Reap</b>	29	<b>Siem Reap</b>	31	<b>Kampong Chhnang</b>	23
9	<b>Pursat</b>	28	<b>Kampong Thom</b>	31	Kampong Cham	20
10	<b>Kampong Chhnang</b>	28	<b>Stung Treng</b>	30	<b>Siem Reap</b>	19

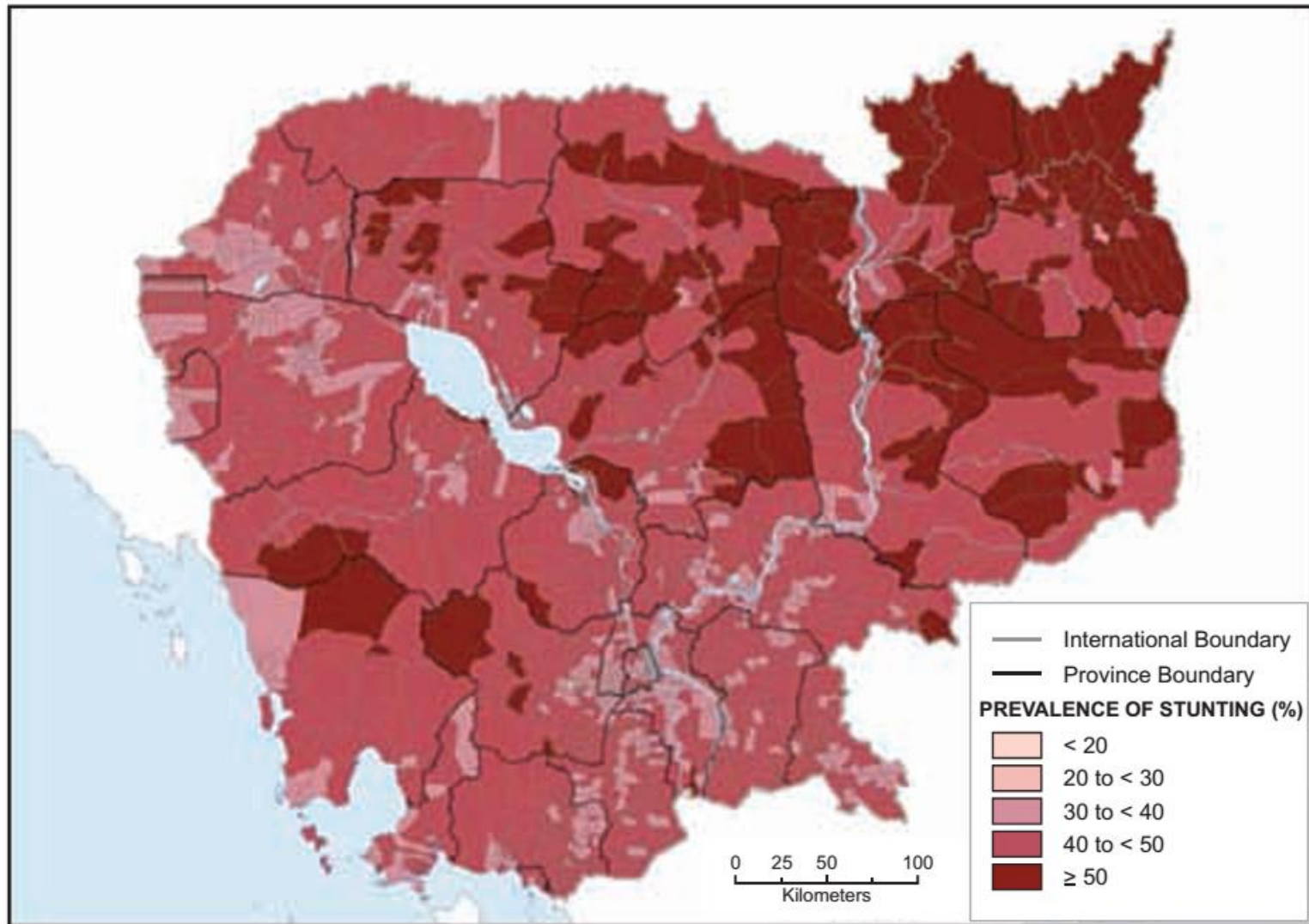
Sources: Ministry of Planning and United Nations Development Programme (2012)

# Multidimensional Poverty Map of the Oxford Poverty and Human Development Initiative



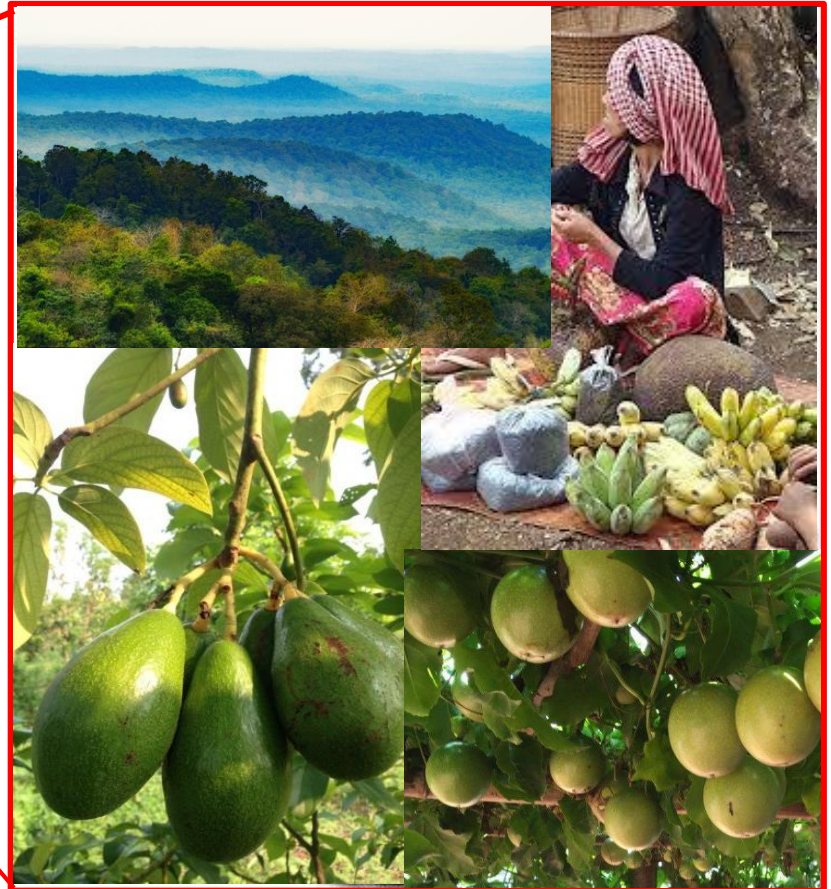
Source: Oxford Poverty and Human Development Initiative (OPHI). 2013. Country Briefing: Cambodia. Multidimensional Poverty Index Data Bank. University of Oxford: OPHI.

# WFP Small Area Estimates of Stunting



Source: World Food Programme. 2013. Small-Area Estimation of Poverty and Malnutrition in Cambodia. Phnom Penh: Ministry of Planning

# Preliminary proposed site and NUS for field survey



## Selected NUS for field survey in Mondulkiri province

**Cereals :** wild vigna, sorghum

**Roots and Tubers:** Sweet potato, Taro, yam.

**Nuts and Pulses :** Cashew nut and peanut.

**Horticulture:** passion fruit

**Others :** Banana, avocado, papaya.

- Malnutrition : high
- Weather vulnerability : medium

# Preliminary proposed site and NUS for field survey



## Selected NUS for field survey in steung treng province

**Cereals** : wild vigna,

**Roots and Tubers**: Sweet potato, Taro, yam.

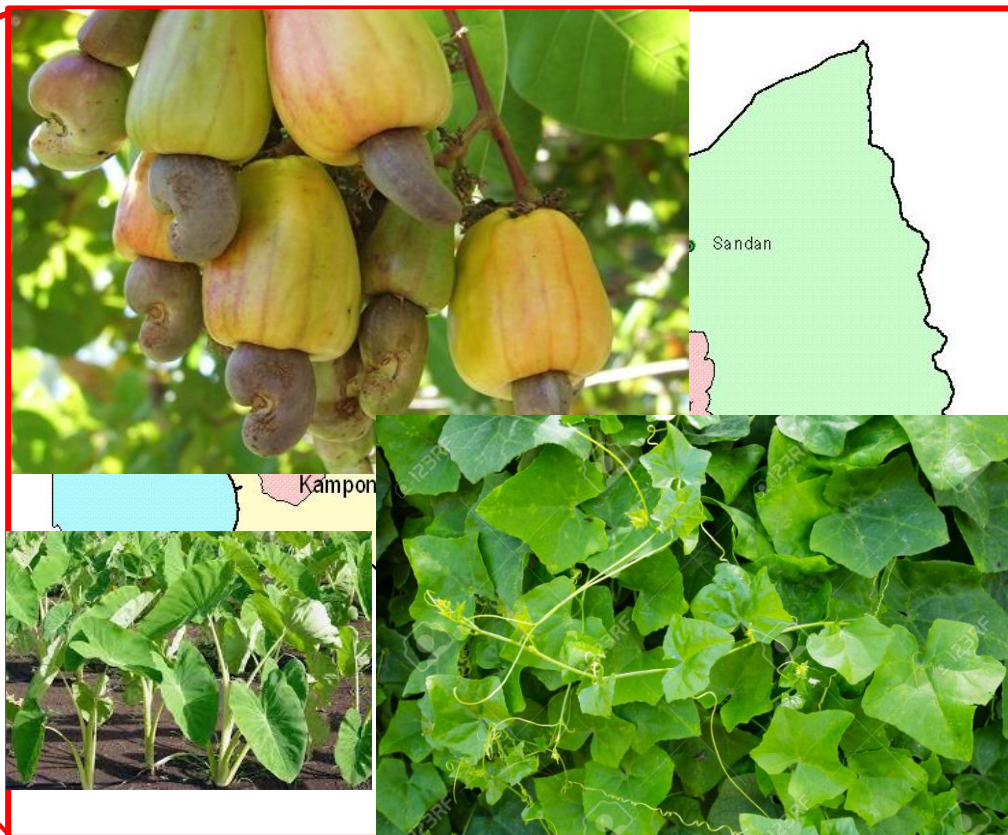
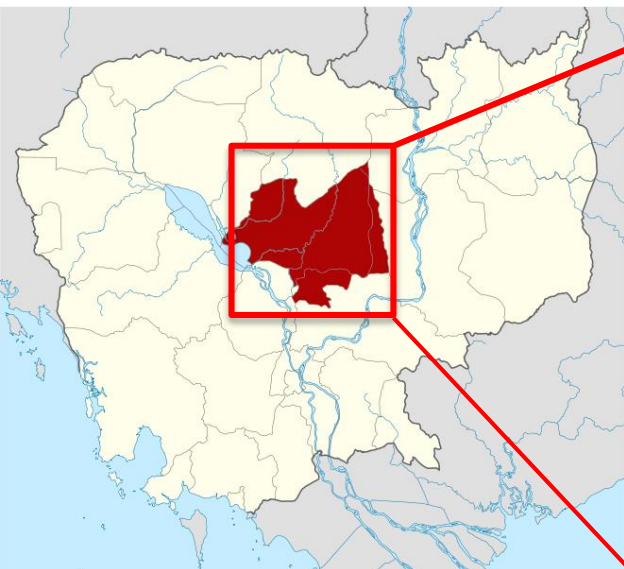
**Nuts and Pulses** : Cashew nut.

**Horticulture**: bitter gourd

**Others** : Banana, papaya.

- Malnutrition : high
- Weather vulnerability : medium

# Preliminary proposed site and NUS for field survey



## Selected NUS for field survey In Kampong Thom province

**Cereals** : rice, sorghum.

**Roots and Tubers**: Sweet potato, Taro, yam.

**Nuts and Pulses** : Cashew nut.

**Horticulture**: bitter gourd.

**Others** : Banana, *Coccinia grandis*.

- Malnutrition : high
- Weather vulnerability : high

**Your discussion today will benefit our  
future livelihood**





**Thank you very much for  
your attention**