Workshop on Strategic Planning for Agricultural and Rural Statistics

Session 4
Experience in Undertaking Methodological Research in Agricultural and Rural Statistics in Asia and the Pacific

Dalisay S. Maligalig

18 March 2015

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Outline of Presentation

- Background information

- Process for undertaking research

- Some Research Results

- Issues that were encountered

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Background Information

- In 2011 ADB President accepted ESCAP and Committee on Statistics' invitation to actively support the Global Strategy to Improve Agricultural and Rural Statistics.

- Two technical assistance projects were processed – one in 2011, another in 2013 and are being implemented to support the Global Strategy.

- ADB Management decided not to comingle ADB's funds with the Global Fund because of differences in accounting and output requirements.

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# How were methodological research identified?

- Intensive consultations with major stakeholders
- Development of country action plan
- Dialog with implementing agencies

Approach: Country driven, consultative; through government hierarchy and existing institutions and organizations; ADB provided technical advice and funding support when requested

Methodological Studies (1)

- Bhutan Living Standard Survey 2003, 2007 and 2012: A Comparative Analysis of Rural and Urban Households

- Examining the Available Data Sources for Agriculture Statistics in Bhutan

- Examining the Existing Agriculture Data Sources in Lao PDR

- Improving Agricultural Data Collection Systems in Lao PDR

- Adoption of **A**gricultural **L**and **I**nformation **S**ystem (ALIS) for Agricultural Area Estimation in the Philippines

- Improving the Design of Livestock Production Probability Surveys in Viet Nam

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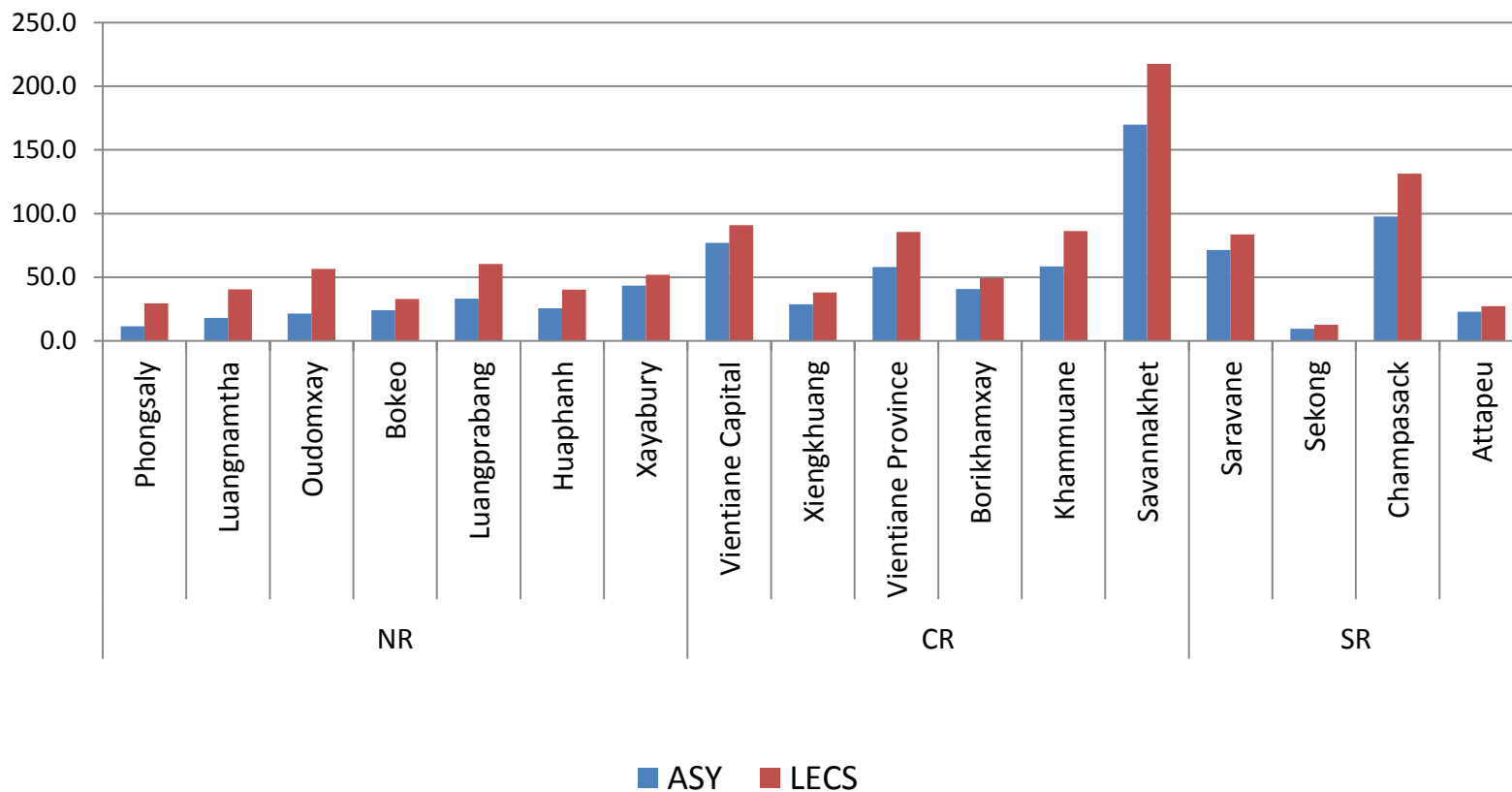Comparison of MoAF and BLSS Data on Number of Cattle Owned by Households
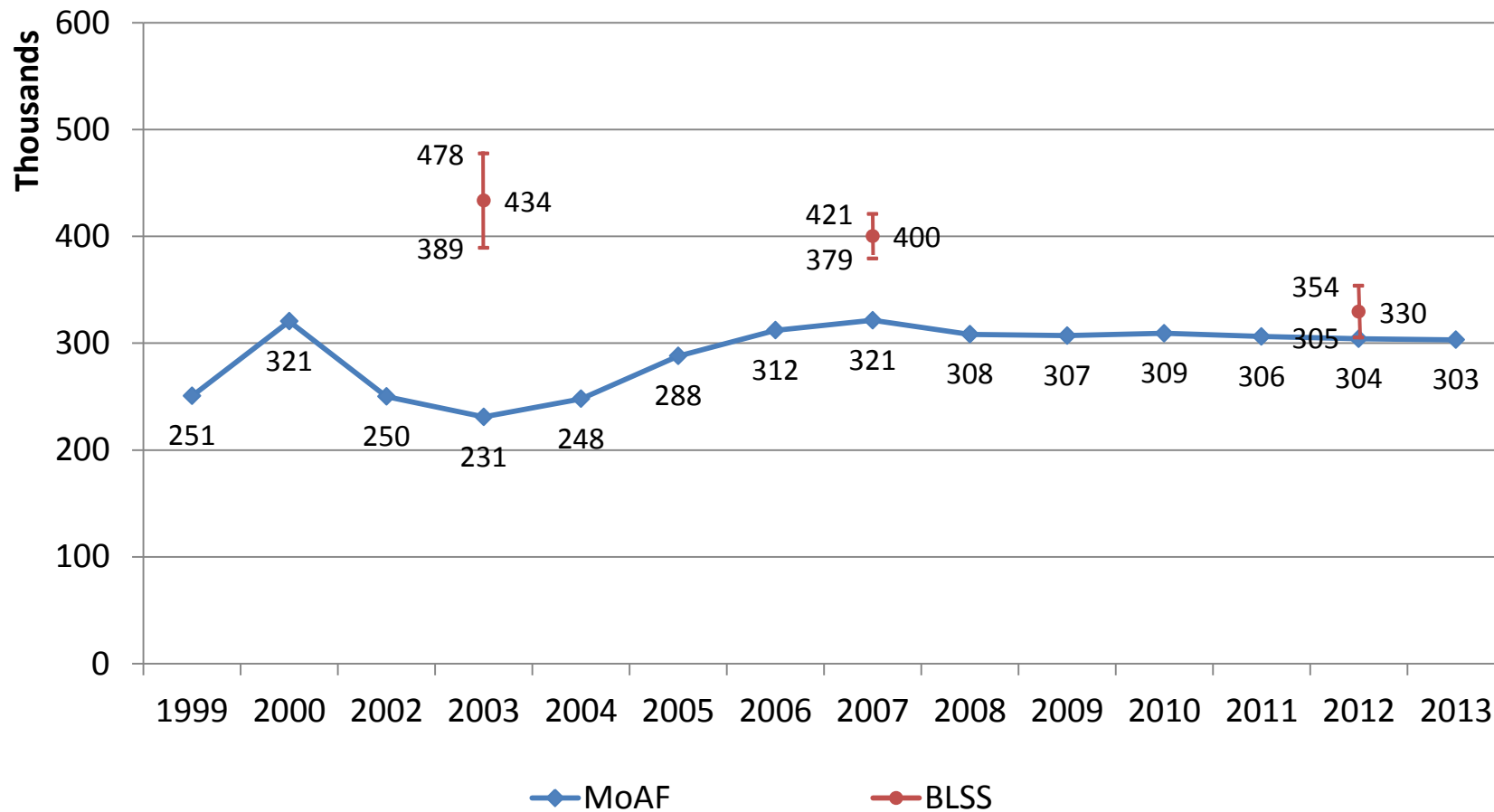
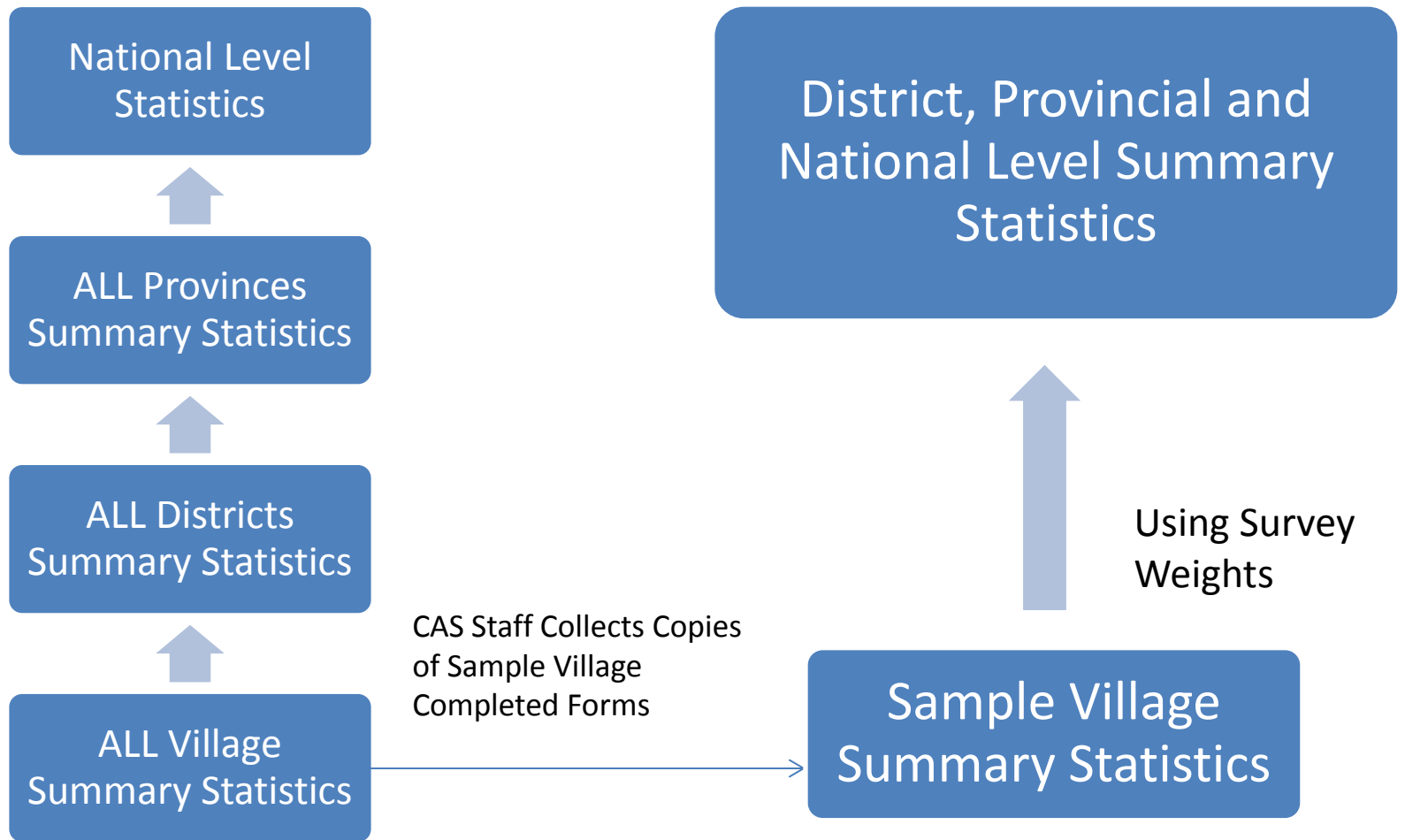**Rice Production ('000 tons), 2007**
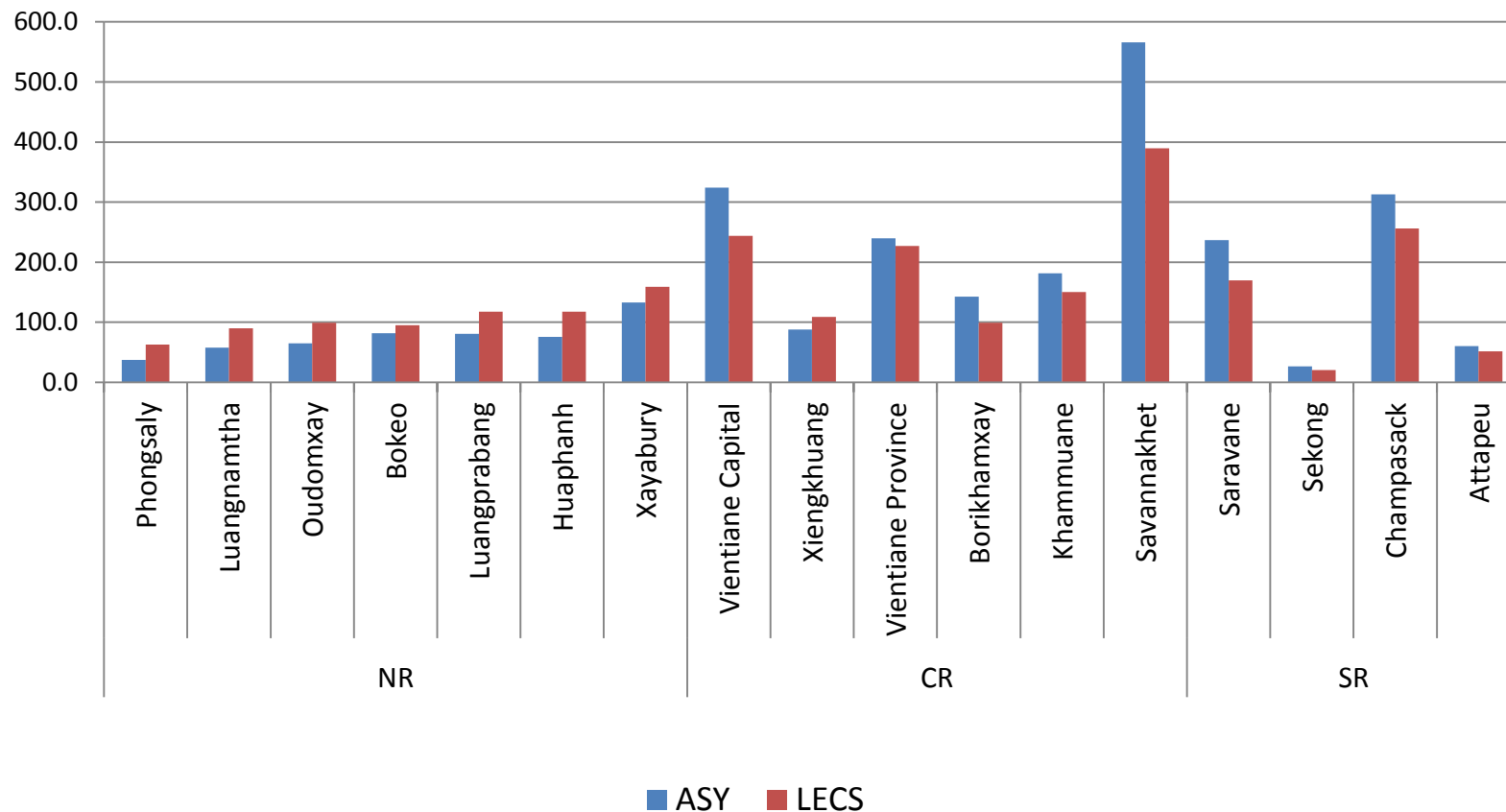
Sources: ASY 2007 and LECS 2007/2008

Research Results: Lao PDR

Area Planted with Rice ('000 ha), 2007

Sources: ASY 2007 and LECS 2007/2008

Improving the Data Collection System

National Level Statistics

ALL Provinces Summary Statistics

ALL Districts Summary Statistics

ALL Village Summary Statistics

District, Provincial and National Level Summary Statistics

Using Survey Weights

CAS Staff Collects Copies of Sample Village Completed Forms

Sample Village Summary Statistics

Statistics for Dynamic Policy Making

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Philippines: Agricultural Land Information System

Map mesh registration
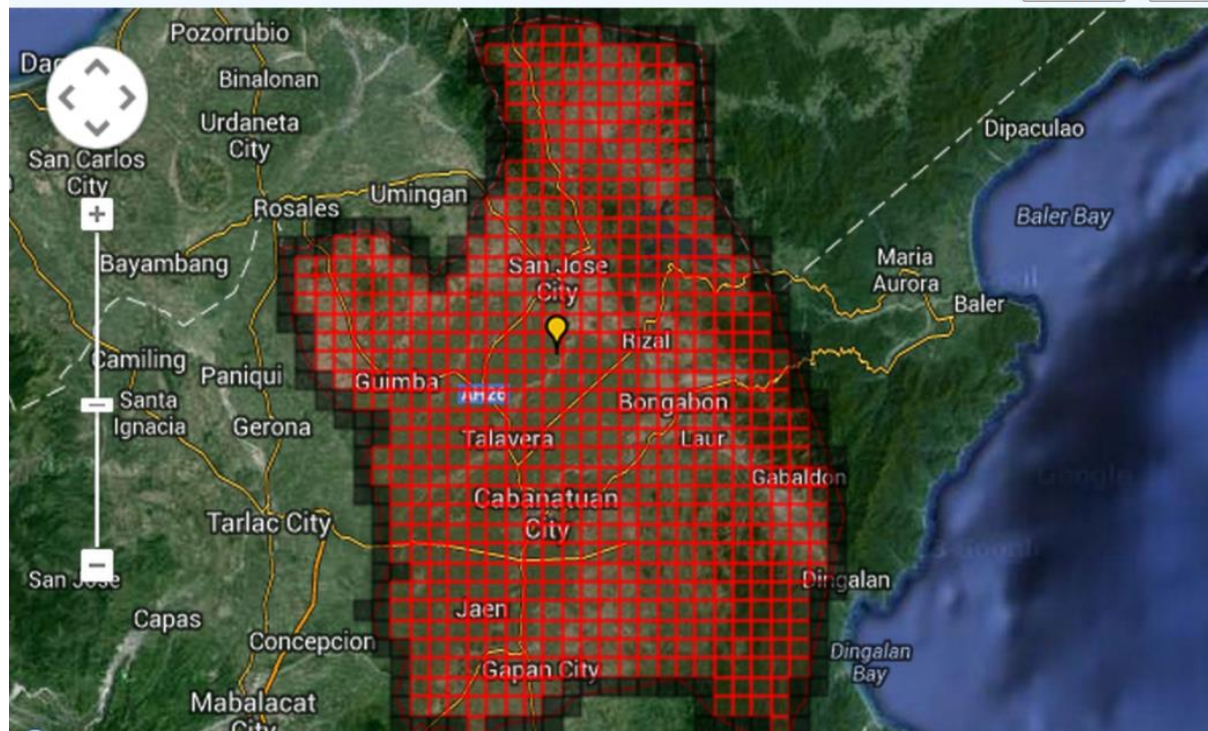
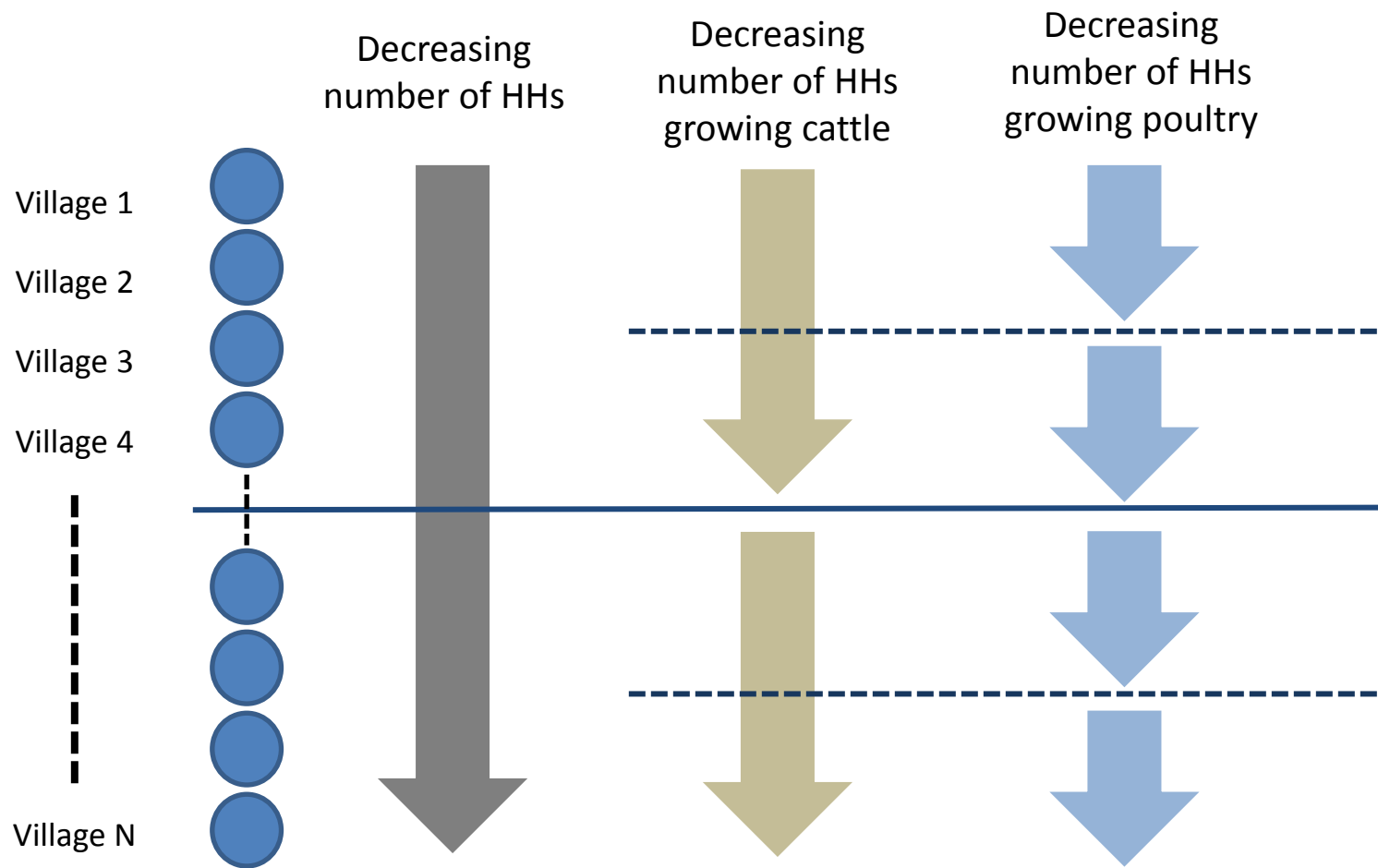# Field validation: Survey map verification
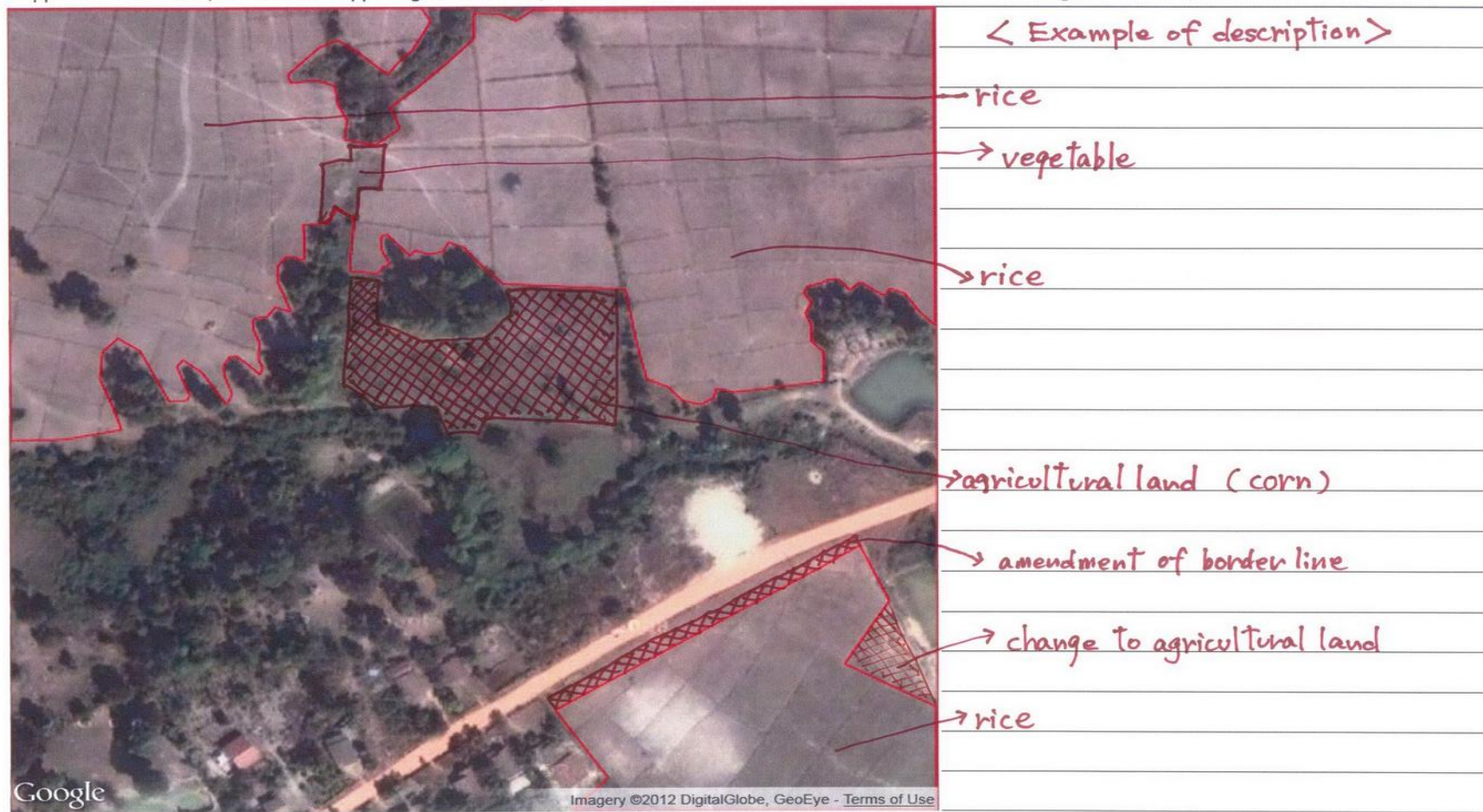
Results

Crop Planted Area Estimates by Type of Crop, Nueva Ecija
(in hectares)

Type of Crop	Value	Share (%)	Standard Error	Coefficient of Variation
Rice	176,445.92	78.09	7,015.47	3.98
Maize	333.57	0.15	225.74	67.68
Cassava	573.95	0.25	430.57	75.02
Others	48,597.03	21.51	5,833.48	12.00

Illustration of Sampling Frame Construction for Livestock Survey

Decreasing number of HHs

Decreasing number of HHs growing cattle

Decreasing number of HHs growing poultry

Village 1

Village 2

Village 3

Village 4

Village N

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Research Results: Viet Nam

Assessment of Prospective Sampling Design for Livestock Survey

Characteristics of Interest	Population			Systematic Sample			SRS	Deff
	N	Mean	Var	Mean	Var(Mean)	CV	Var(Mean)	
Number of Households	3220	213.7584	31394.83	213.76	40.90	2.99	87.75	0.47
No. of buffalo growing households	3220	18.70963	636.2589	18.71	1.19	5.82	1.78	0.67
No. of cattle growing households	3220	53.07081	5175.173	53.07	1.96	2.64	14.46	0.14
No. of goat growing households	3220	0.443478	3.967913	0.44	0.01	16.31	0.01	0.47
No. of sheep growing households	3220	0	0	0.00	0.00			
No. of pig growing households	3220	88.73478	7185.012	88.73	11.64	3.85	20.08	0.58
No. of chicken growing households	3220	128.3842	11858.6	128.38	11.28	2.62	33.15	0.34
No. of duck growing households	3220	24.45466	1069.732	24.45	1.65	5.26	2.99	0.55
No. of swan/goose growing households	3220	9.35528	365.1723	9.36	0.28	5.63	1.02	0.27
No. of buffalos	3220	27.34472	1749.111	27.34	3.85	7.18	4.89	0.79
No. of cattle	3220	103.4944	30366.18	103.49	16.44	3.92	84.87	0.19
No. of goats	3220	5.193168	553.7639	5.19	1.25	21.50	1.55	0.81
No. of sheep	3220	0	0	0.00	0.00			
No. of pigs	3220	455.5407	368710	455.54	1030.64	7.05	1030.56	1.00
No. of chicken	3220	5814.884	75258458	5814.88	124474.21	6.07	210349.73	0.59
No. of ducks	3220	1212.034	5183001	1212.03	3624.86	4.97	14486.65	0.25
No. of swans/geese	3220	192.4242	188152.6	192.42	631.48	13.06	525.89	1.20

Challenges in Undertaking the Methodological Studies (1)

- Coordination between agricultural data producing agencies (national statistics offices and agriculture ministries)

- Technical reports, documentation, questionnaire in local language only

- Inadequate technical skills to adapt statistical methods

- Data are in different formats, location

- Availability of counterpart staff in implementing agencies
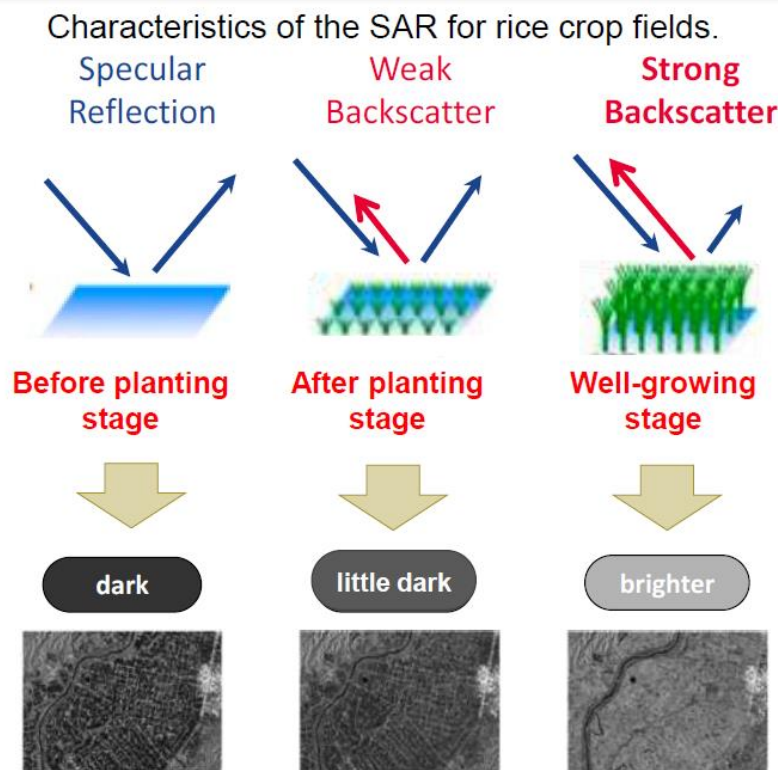
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Approach to Overcome the Challenges (1)

- Advocacy through high level meetings and consultation workshops

- Frequent discussions between ADB Project Team and implementing agencies

- Documentation, technical reports were translated to English

- Conduct joint training programs for staff from national statistics offices and agriculture ministries

- Training materials, discussions during training sessions are designed according to the skill level of participants

- Interpreter during training programs

Methodological Studies (2)

- Estimating Rice Crop Area and Production using Space-based Technology

  – Lao PDR, Philippines, Thailand and Viet Nam

  – Radar and optical satellite data will be used

  – Software for reading satellite data and transforming it to rice crop area (INAHOR)

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Innovative Data Collection Methods for Agricultural and Rural Statistics

Basic concept for detecting rice crop planting area

Characteristics of the SAR for rice crop fields.

Specular Reflection	Weak Backscatter	Strong Backscatter
Before planting stage	After planting stage	Well-growing stage
dark	little dark	brighter

Can detect rice planting area by differentiating the dark areas in planting stage and the bright areas in well-growing stage

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Innovative Data Collection Methods for Agricultural and Rural Statistics

Basic concept for detecting rice crop area
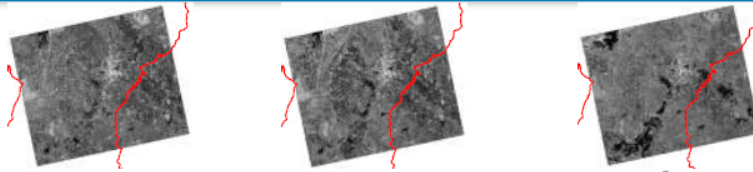
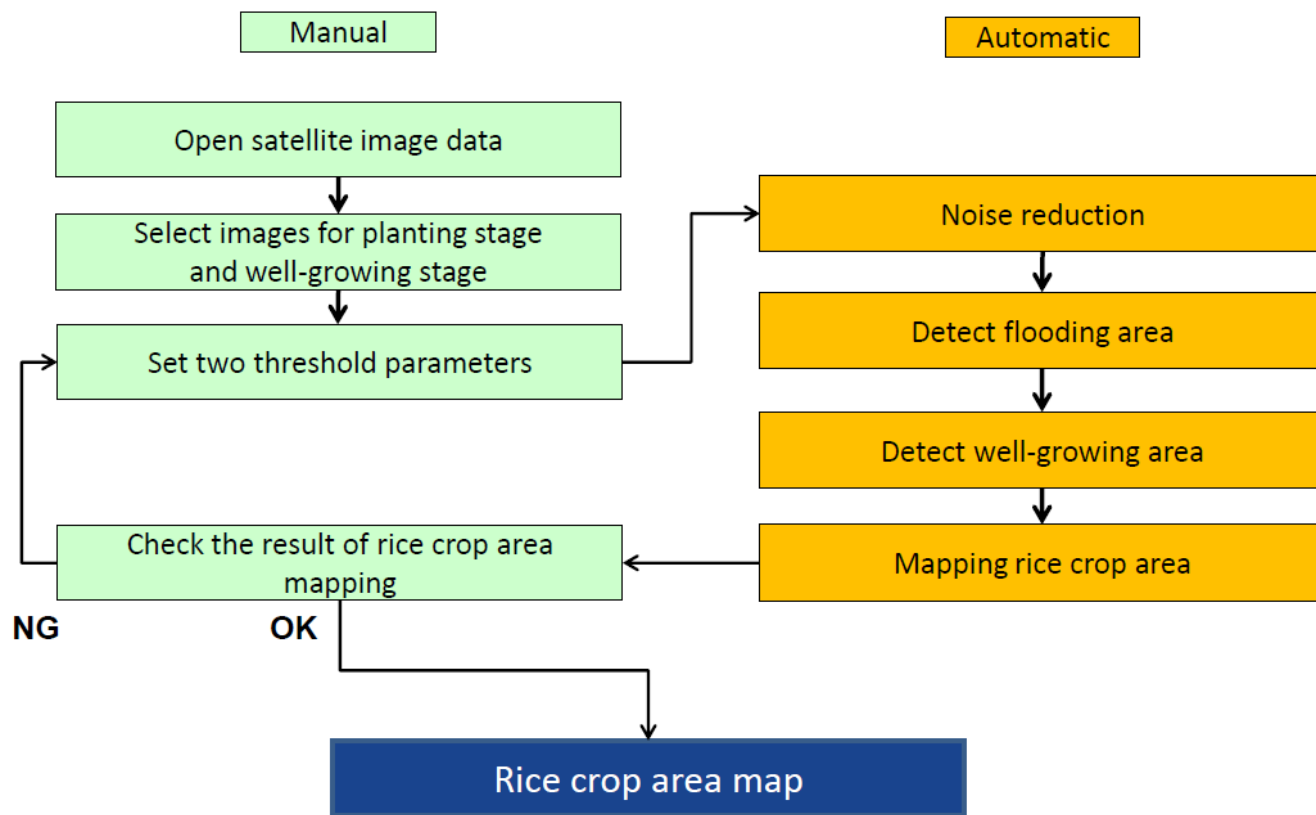You need two threshold (min and max) to detect rice crop area by using INAHOR.

T1 is threshold for detecting flooding areas at planting stage (dark – min).

$\Delta T2$ is threshold for detecting well-growing area for growing stage (bright – max).

Khonkean   [p482, f310]

Field 1
Field 2
Field 3
Field 4
Field 5

$\Delta T2$

T1

$\sigma\ 0[dB]$

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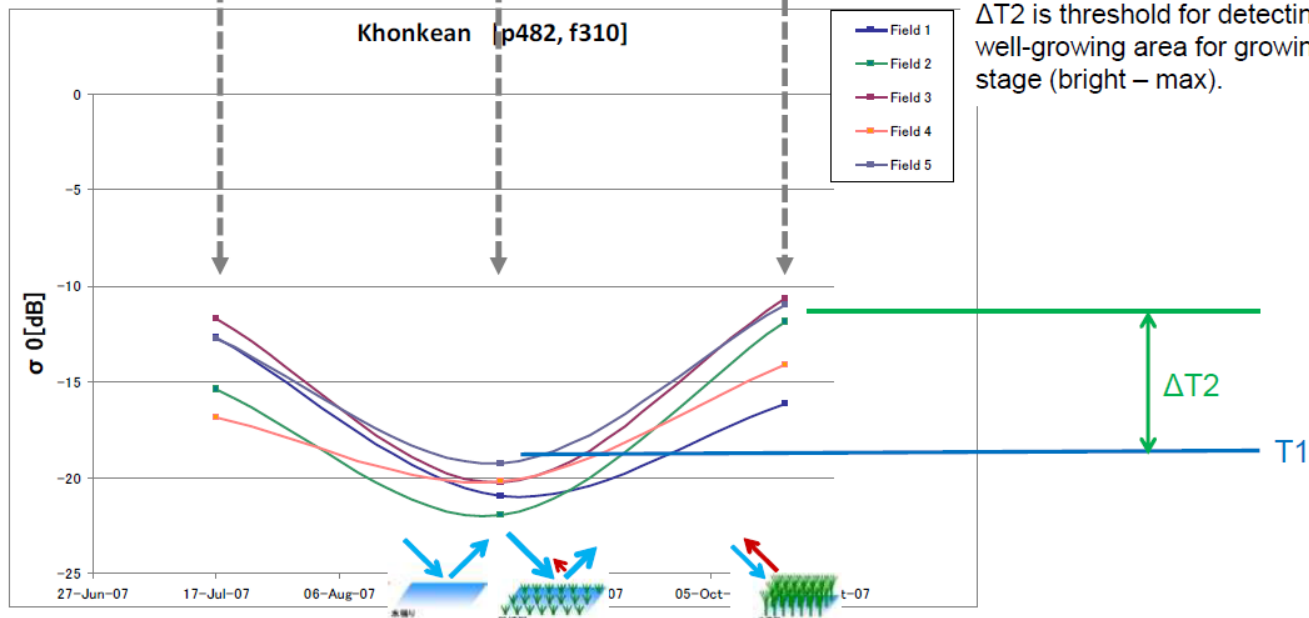
Innovative Data Collection Methods for Agricultural and Rural Statistics

Flowchart of rice crop area mapping

Manual

Automatic

Open satellite image data

Select images for planting stage and well-growing stage

Set two threshold parameters

Noise reduction

Detect flooding area

Detect well-growing area

Mapping rice crop area

Check the result of rice crop area mapping

NG   OK

Rice crop area map

Finally, you can get production by multiplying the rice crop area and yield per unit.

Innovative Data Collection Methods for Agricultural and Rural Statistics
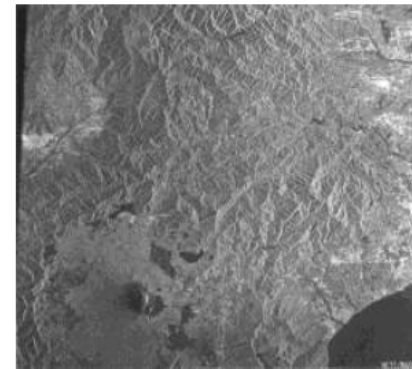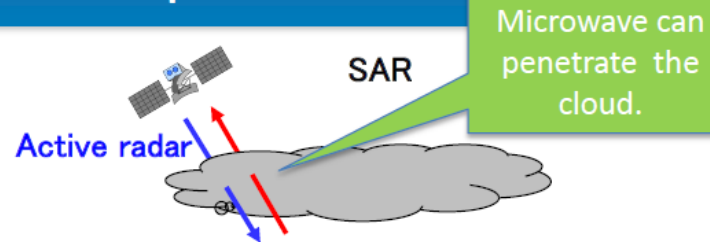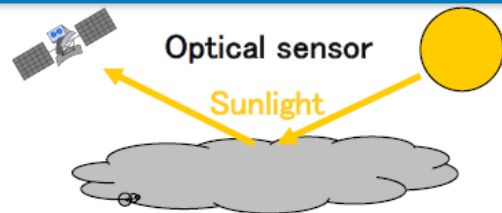
Innovative Data Collection Methods for Agricultural and Rural Statistics
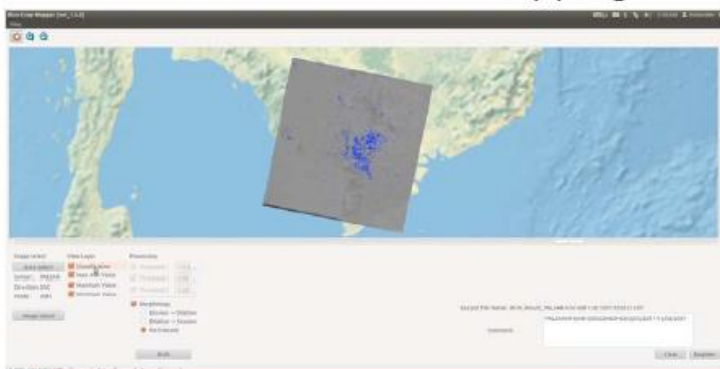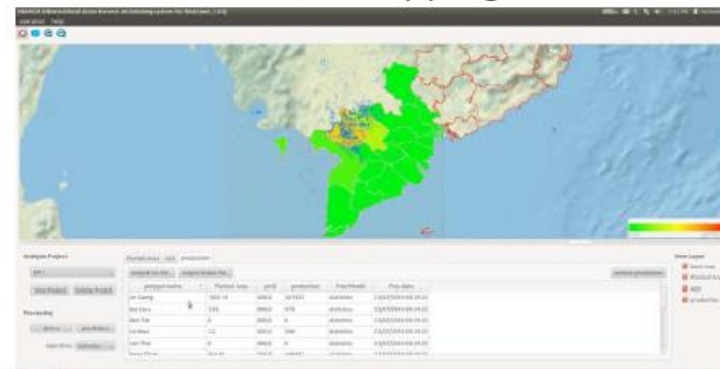

1. Main Window
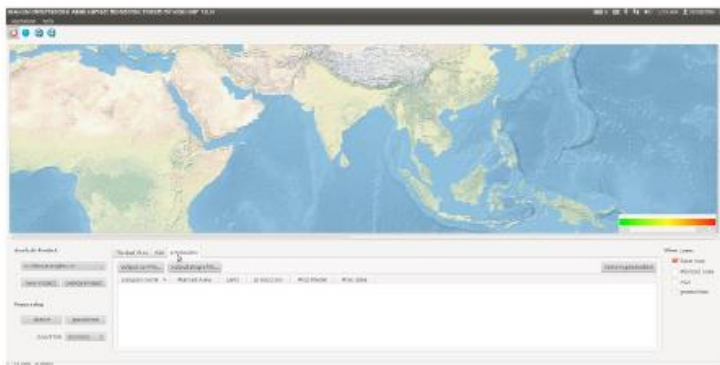
2. Select SAR data for Processing
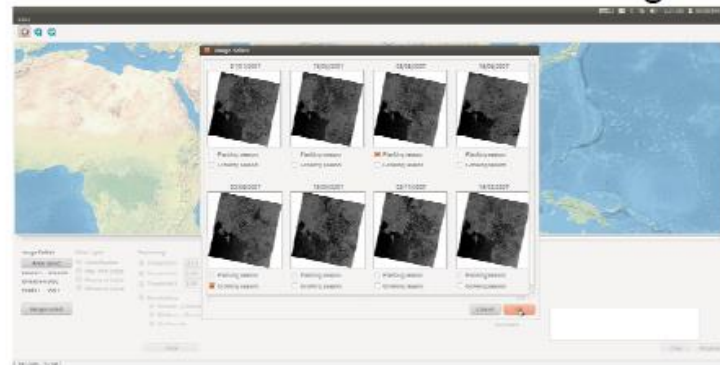
3. Rice Cultivated Area Mapping

4. Calculate Mapping Area

This software enables to map rice cultivated area easily from time-series SAR data.

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Challenges in Undertaking the Methodological Studies (2)

- Statisticians are not familiar with satellite-based technology
  - Technical skills are not available in ADB and in implementing agencies staff
  - Learning and applying new technology on-the-job can be challenging
- Ensuring that new technology and method will be cost effective even after project life
  - Getting open access to software and low cost satellite data
- Mindset of major stakeholders
  - Differences in perspective between statisticians and remote sensing specialists

Approach to Overcome the Challenges (2)

- Established partnerships with relevant agencies who developed the software and methodologies
  - Partnership agreement with JAXA on the use and modification of INAHOR and special priced satellite data
  - Tripartite agreement with the International Rice Research Institute (IRRI) and the Philippine Rice Research Institute (PhilRice) for the conduct of crop cutting exercises
- Modification of INAHOR software for use of statisticians
  - User friendly features
  - Data and meta-data management
  - Integrated software applications (INAHOR, MultiSpec, QGIS)

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Approach to Overcome the Challenges (3)

- Designed a series of training programs to upgrade the skills of implementing agencies staff on the use of satellite-based technology and on the new methods
  - Training materials are designed according to the skill level of participants and translated to local language
  - Interpreter is available during training programs
  - More hands-on sessions and interaction with trainers
- Regular communication with implementing agencies, technical advisers and remote sensing specialists through WebEx meetings and teleconferences

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For More Information:
dmaligalig@adb.org
http://cars.adb.org
(**C**ommunity for **A**gricultural and **R**ural **S**tatistics)

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