Earth Observation and GIS Utilization for ADB Projects

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ASIAN DEVELOPMENT BANK

APRSAF-25
Singapore, 8 November 2018
ADB at a Glance

What is Asian Development Bank?

**ABOUT ADB**

ADB is an international development finance institution. We provide loans, grants, and expertise to our developing member countries to help them alleviate poverty and create a world in which everyone can share in the benefits of growth.

<table>
<thead>
<tr>
<th>President</th>
<th>Headquarters</th>
<th>Founded</th>
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<tbody>
<tr>
<td>Takehiko Nakao</td>
<td>Manila, Philippines</td>
<td>1966</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Members</th>
<th>Regional members</th>
<th>Nonregional members</th>
<th>Field offices</th>
<th>Total employees</th>
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</thead>
<tbody>
<tr>
<td>67</td>
<td>48</td>
<td>19</td>
<td>31</td>
<td>3,105</td>
</tr>
</tbody>
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**2017 COMMITMENTS**

- **$20.1 B** Loans, Grants, and Others
- **$201 M** Technical Assistance
- **$11.9 B** Cofinancing, including Trust Funds
ADB’s Project Cycle

The potential use of EO and GIS in ADB projects

Country Partnership Strategy/ Regional Cooperation Strategy

Strategical design support

ADB Project Cycle

Preparation
- Safeguard assessment
- Project design

Approval

Implementation

Progress monitoring

Supplement indicator

Completion/ Evaluation

Implementation

Approval

Implementation

Completion/ Evaluation
ADB’s Projects Using EO and GIS

- GEO: Urban Services Improvement Investment Program
- PAK: Balochistan Water Resources Development Project
- PRC: Chongqing Urban-Rural Infrastructure Development Demonstration Project
- THA: Accelerating the Implementation of the Core Agriculture Support Program
- PHI: Applying Space-Based Technology and ICT to Strengthen Disaster Resilience
- VIE: Innovative Data Collection Method for Agricultural and Rural Statistics
- India: Kerala Sustainable Development Project
- INO: Institutional Strengthening of Integrated Water Resources Management in the Six Cis River Basin Territories
- Pacific: Strengthening the Capacity of the Pacific DMCs to Respond to Climate Change
Water Resource Management

TAJ: Water Resources Development Project in Pyanj River Basin
(PPTA -> $12.35 million: Loan + JFPR Grant + JFPR TA)

**Vegetation index** (Landsat, 30m grid)  
April – October, 2014

**Water Use Ratio** (Landsat, 100m grid)  
Cotton + Wheat

Evapotranspiration index (Landsat, MODIS) for irrigation performance assessment:
(i) irrigation efficiency assessment at the system level
(ii) irrigation optimality assessment at the on-farm level
Traditionally, data on agricultural land size is collected through farmer self-reports in surveys, which has been shown to vary significantly from more accurate estimates derived from Global Positioning System (GPS). However, using GPS introduces significant time and financial costs. This paper proposes using Google Earth for land area measurement and compares estimates with GPS and farmer self-reports. Results show that Google Earth-based land area estimates are very similar to GPS measures, but reduce fieldwork costs by nearly 38%. As remotely sensed data becomes publicly available, it may become a less expensive alternative to link to survey data than rely on GPS measurement.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to a large share of the world's poor. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

Rice Mapping Software (INAHOR-AD)

- Estimate rice planted area and growing stage
- JAXA provided ALOS-2 data
- Extracted information was used in ADB economic report

Water Resource Management

PAK: Balochistan Water Resources Development Project
(PPTA -> $107 million: Loan + HLTF Grant + JFPR TA)

Water Resources Information System (WRIS) for efficient integrated water resource management in irrigation area

- Web-GIS system
- Satellite data (ex. AMSAR2, GSMaP, MODIS and Landsat) with thematic and sectoral data
Disaster Risk Management

REG: Applying Space-Based Technology and ICT to Strengthen Disaster Resilience (ARM, BAN, FIJ and PHI)

Development of ICT and SBT applications for DRM

• Mobile apps for map update/validation and crisis report by community
• Web-based GIS platform to manage building and hazard information
• Policy guidelines for sustainable use and cooperation with satellite emergency observation framework (Sentinel Asia)

http://www.geoinfo.ait.ac.th/resilience/
Urban Development

Spatial Data Analysis Explorer (SPADE)

- Disaster risk assessment
- Climate change risk assessment

- EO data: JAXA, ESA
- Climate change simulation: DIAS, UoT, ICHARM
- Socioeconomic data: Mobile app

SPADE: ADB Web-GIS Platform

- Support climate resilience urban planning
- Funded by Urban Climate Change Resilience Trust Fund
- Piloted 5 cities (Bangladesh and Vietnam)
- Open source based system (ex. Geonode)
Urban Development

IND: Kolkata Environmental Improvement Investment

EO4SD Urban supported ADB by providing...

- Flood Extent (inventory)
- Flood Hazard (susceptibility)
- Product 3: Flood Risk (vulnerability)
- Climate change Impact Maps (coastal storm surge and sea level rise)

EO4SD: An ESA initiative to support the uptake of EO-derived information in sustainable development
Knowledge Partnership

Toward effective and sustainable use of EO and GIS in DMCs

Collaboration with…

• JAXA: Use of earth observation in water resources, food security and disaster risk management

• ESA: Use of earth observation in urban, water resources and food security

• University of Tokyo: climate change and disaster risk assessment

• UNESCO-IHE: Remote sensing for water accounting and productivity

ADB to promote local capacity building as part of ADB projects together with space agencies and research institutes
ADB strategy 2030

What is the ADB’s 2030 vision

Prosperous, Inclusive, Resilient, Sustainable
Asia and the Pacific

- Fragile and conflict-affected situations
- Small island developing states
- Low-income and lower middle-income countries
- Upper middle-income countries

ADB strategy 2030

What operational areas will ADB focus on?

Addressing remaining poverty and reducing inequalities
- human development and social inclusion, quality jobs, education and training, better health, social protection

Tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability
- low greenhouse gas emissions
- development, approach to building climate and disaster resilience, environmental sustainability, water-food-energy security nexus

Promoting rural development and food security
- market connectivity and agricultural value chain linkages, agricultural productivity and food security, food safety

Fostering regional cooperation and integration
- connectivity and competitiveness, regional public goods, cooperation in finance sector, subregional initiatives

Accelerating progress in gender equality
- scaled-up support for gender equality; women’s economic empowerment; gender equality in human development, decision-making, and leadership; reducing time poverty for women; strengthening women’s resilience to shocks

Making cities more livable
- integrated solutions, funding for cities, inclusive and participatory urban planning, climate resilience and disaster management

Strengthening governance and institutional capacity
- public management reforms and financial sustainability, service delivery, capacity and standards
Summary

- ADB has conducted TA projects with earth observation and GIS technologies, including the new web-GIS platform (SPADE), and some applications were adopted in loan projects (ex. Tajikistan and Pakistan).

- Knowledge partners (JAXA, ESA, UoT and UNESCO-IHE) have supported ADB to accelerate the utilization of earth observation GIS in ADB projects and capacity building in DMCs.

- In ADB strategy 2030, ADB will focus on 7 operational priorities, and earth observation and GIS are expected to strengthen ADB projects and support the evaluation in the 7 priorities.
Thank you.