Product Delivery Report for K&C Phase 3

Establishment of Sustainable Forest Resource Information Platform for Monitoring REDD+

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Project objectives

The objective of this project was to utilize the PALSAR mosaic dataset to obtain a grasp of the current status of forest distribution in order to contribute to REDD+ activities in Mozambique.

However, as a result of the period of substantive activities for K&C Phase 3 being short, the following review was conducted for Phase 3 activities.

(1) Characteristics of Radar and Optical Satellite Imagery for Forest Sites

(2) Forest-cover Change Detection using Mutli-temporal PALSAR

Data in use

(A) Study area

Pilot Provinces

Cabo Delgado Province (Northern part)
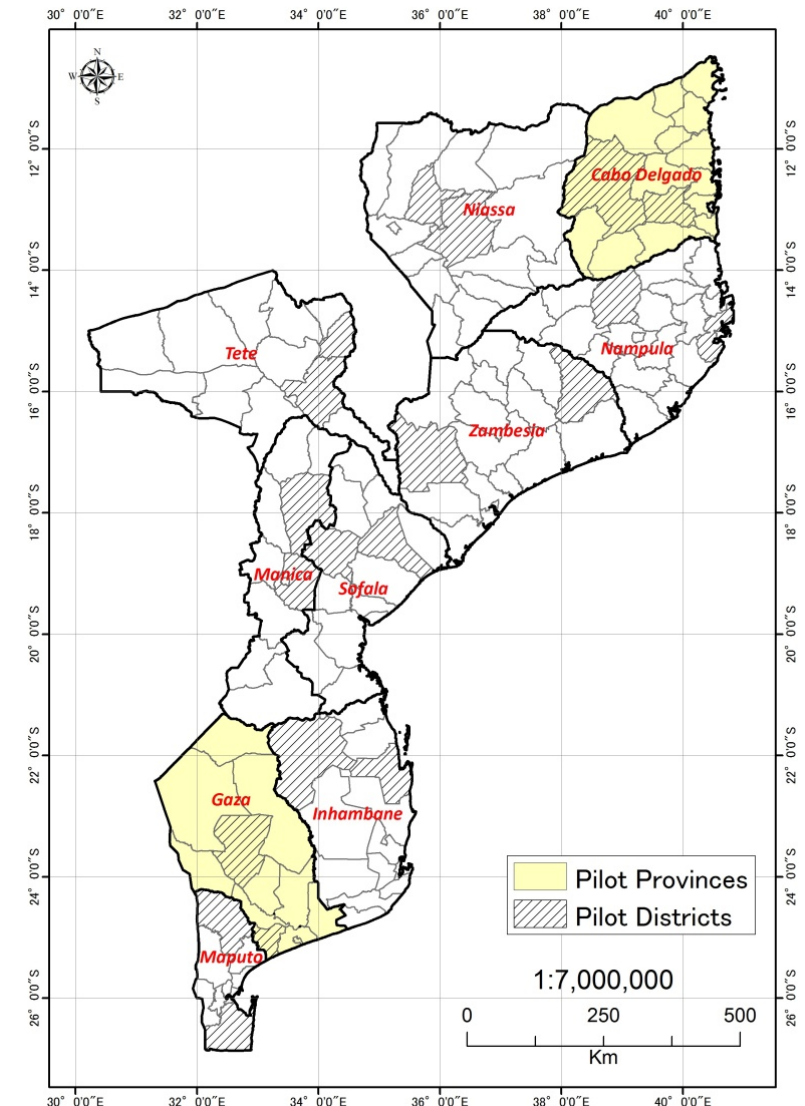
- Miombo forest

Gaza Province (Southern part)

- Mopane forest

Many of deforestation sites are found

Pilot Districts

Two districts from each of ten provinces were also selected as a pilot study area
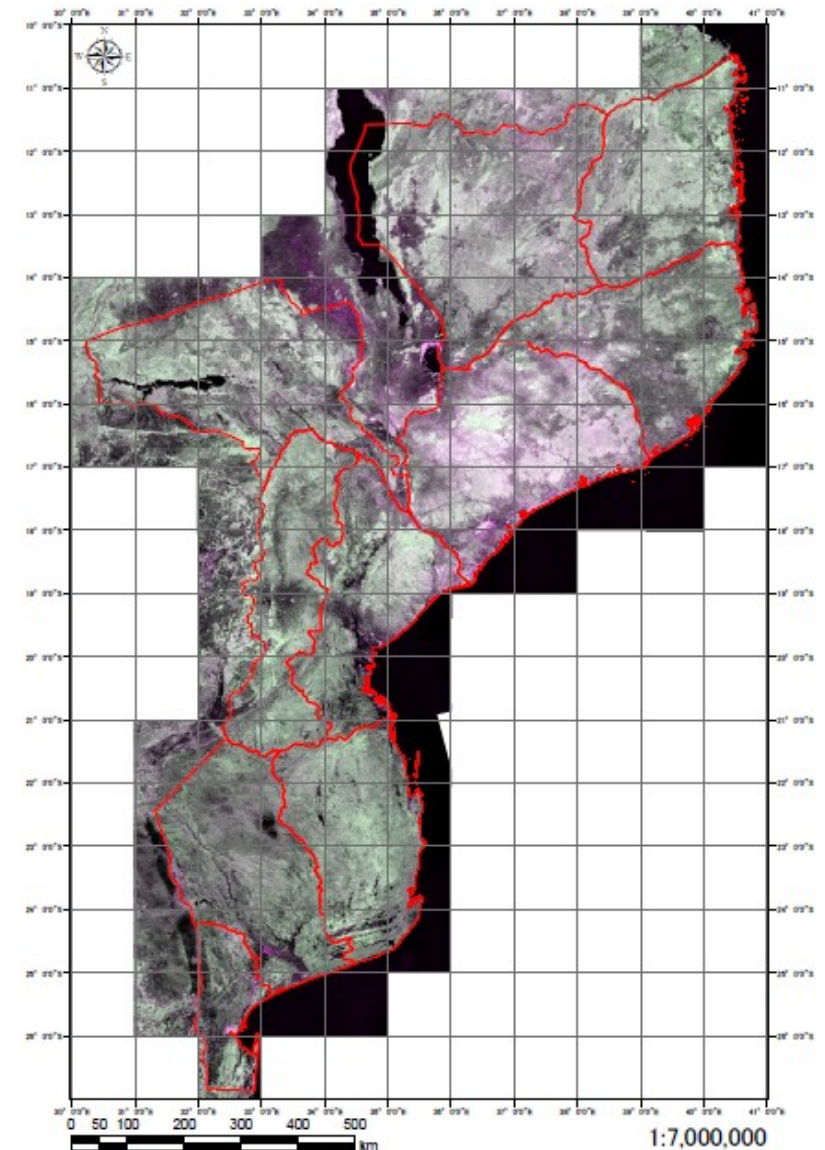
Data in use

(B) Satellite data

Radar imagery

- ALOS/PALSAR FBD mosaic data with 25m spatial resolution

- In 2007, 2008, 2009 and 2010

- 104 one-mesh tiles to cover the whole country

Optical imagery

ALOS/AVNIR-2 data that were provided as a part of the Japan Grant Aid Program were also used as reference.

Data in use

(C) Ground truth data

For ZAE project (Agro Ecological Zoning), a total of 3,099 sample plots was set up and the sample were distributed by land use and land cover stratum.

LOCALIZACAO					ATRIBUTOS DE COBERTURA DA TERRA -ficha nr 3		
X COORD2	y COORD2	Altitude	Localidade	Regulado	Tipo Principal	Tipo Secundario	Tipo Terciario
450990	7029405	144	Manhoca	Tsalane	2FD		
475923	7030922	41	Dlovo	Dlovo	2GCT		
488261	7031522	51	Ponta de Ou	Ponta de Ouro	5BU		
464373	7034012	87	Manhoca	Phueza	2FD	2SD	
465301	7034408	42	Manhoca	Phueza	2GCT	2WD	
425835	7035065	63	Ndlala	_	2WD	2SD	
456592	7035322	122	Manhoca	Manhoca	2WD		
434358	7035321	51	Chucha	_	2WD	5BU	
445549	7036954	72	_	_	2WD		
483905	7037111	41	Matxinatxina	_	2FE	4HVP	
451895	7037710	76	Manhoca	Gueveza	2WD	2SD	
475813	7038191	36	Dlovo	_	2GCS		
441655	7038269	39	_	_	4HVP		
482578	7041279	70	Zitundo Sede	Zitundo_Sede	5BU		
487063	7042526	16	_	_	4HVP		
419654	7045396	95	_	_	2GCS		
489698	7045911	14	Ponta Mamo	Ponta Mamoli	4HVP		
478947	7046183	23	Zitundo	Zitundo	1TCW		
453345	7047344	109		_	2WD		
479548	7048667	18	Malambane	_	2GCT		

Results

(A) Characteristics of Radar and Optical Satellite Imagery for Forest Sites

In the context of REDD+, it is important to first understand forest type distribution patterns across the country.

PALSAR can make it possible to understand the most part of Mozambique.

However, most of DIRN technical staffs have not used radar satellite imagery.

Radar and optical satellite imagery's different characteristics for forest sites were further examined.
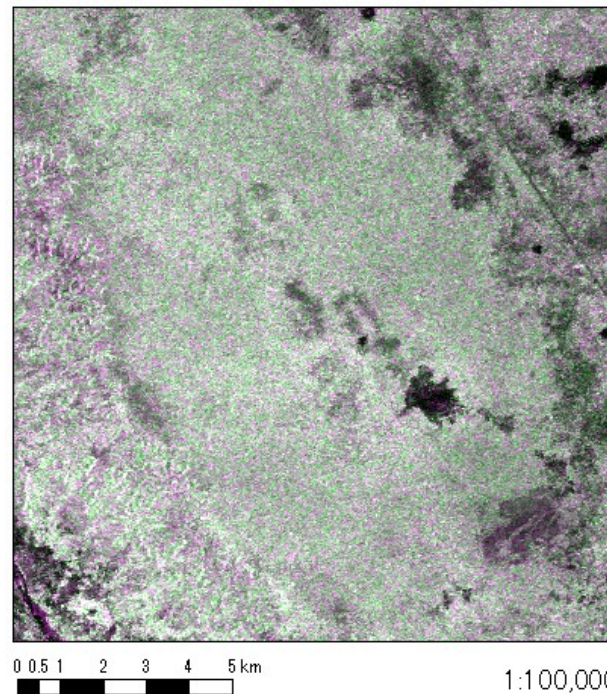
Results

(A) Characteristics of Radar and Optical Satellite Imagery for Forest Sites

Mopane forest

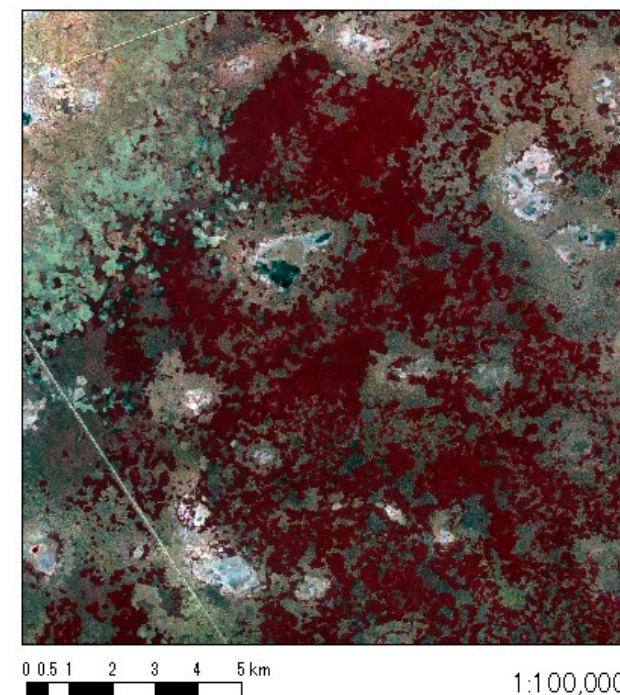- HV pol. is strong.
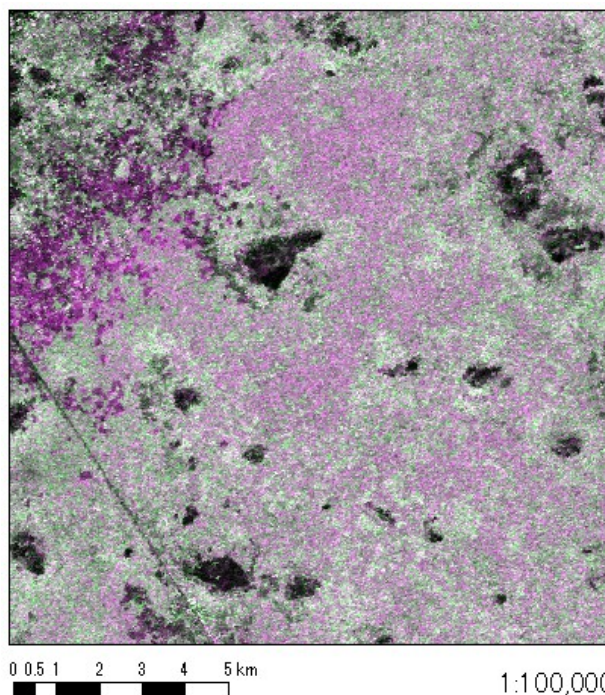
- Reflection of near-infrared is weak.

Radar and Optical Satellite Imagery Data

for Mopane Forests in Gaza Province

Results

(A) Characteristics of Radar and Optical Satellite Imagery for Forest Sites

Mecrusse forest

- HH pol. is strong.

- Reflection of near-infrared is also strong.

Radar and Optical Satellite Imagery Data

for Mecrusse Forests in Gaza Province

Results

(B) Forest-cover Change Detection using Mutli-temporal PALSAR

Of all the mosaic data, PALSAR mosaic data for 2007 and 2010 were used to create a color composite imagery.

This imagery showed areas where forest-cover changes due to deforestation and expansion of agriculture lands occurred between 2007 and 2010.

Prior to the examination, information about potential driving factors of deforestation in each target province and district, such as locations, main reasons, concerned actors, and time of the occurrence, were discussed and gathered.

Results

(B) Forest-cover Change Detection using Mutli-temporal PALSAR

Palma district

- LNG has been developed

- Deforestation occurred due to the infrastructure improvement
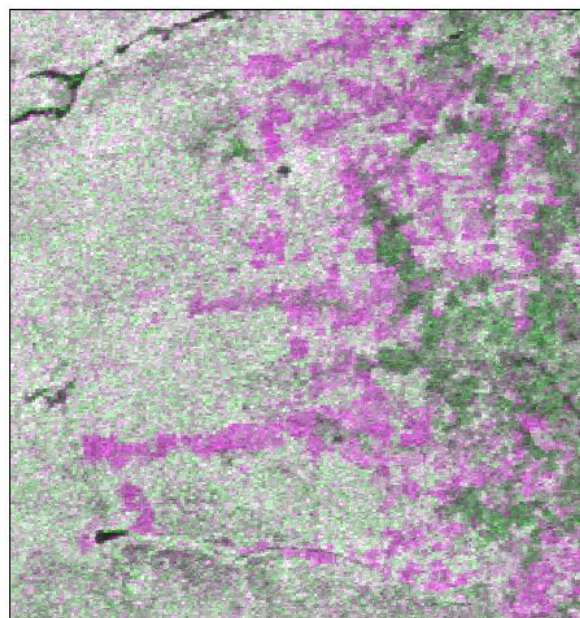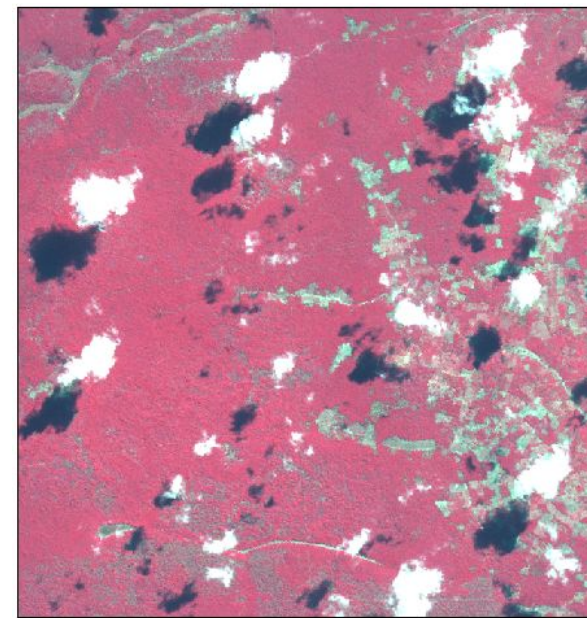
Forest-cover Change from 2007 to 2010

in Palma District, Cabo Delgado Province

Results

(B) Forest-cover Change Detection using Mutli-temporal PALSAR

Ancuabe district

- Shifting cultivation

- Regrowth is happening in the fallow land
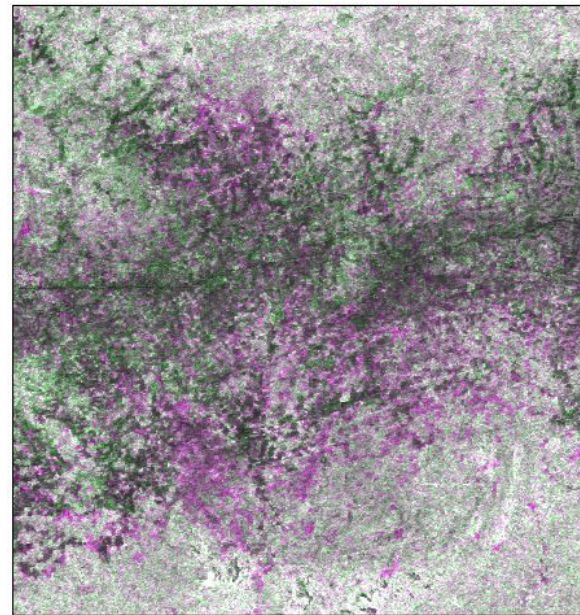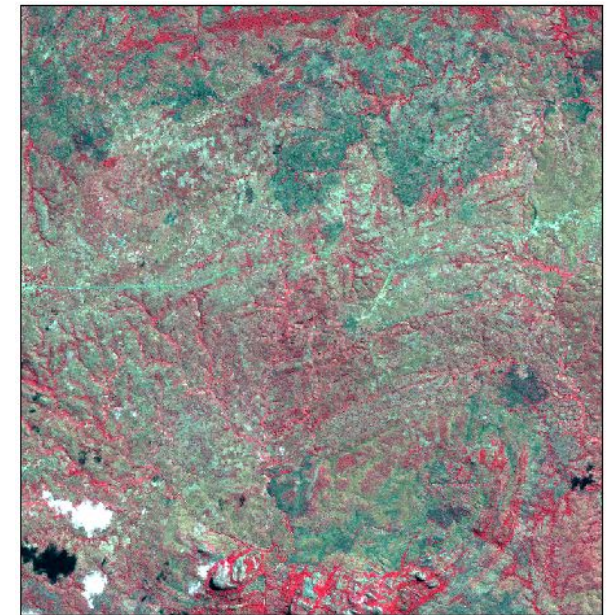
Forest-cover Change from 2007 to 2010

in Ancuabe District, Cabo Delgado Province

Deliverables –

**Data sets and Thematic products
(mosaics, classification maps etc.)**

1. Completed and Delivered to JAXA

- Result of Ground Truth data for ZAE project
- A total of 3,099 sample plots was set up and the sample were distributed by land use and land cover stratum

Deliverables –
Data sets and Thematic products (mosaics, classification maps etc.)

Sample of Ground Truth data for ZAE project

ID_Amostra	AMOSTRA			REALIZACAO			LOCALIZACAO					ATRIBUTOS DE COBERTURA DA TERRA -ficha nr 3			Cobertura arborea/arbustiva (Estrutura de cobertura)						
	Real	Aux	Extra	SEMANA	DATA	EQUIPA	X COORD2	y COORD2	Altitude	Localidade	Regulado	Tipo Principal	Tipo Secundario	Tipo Terciario	Arvores altas (>15m)	Arvores baixa (5-15m)	Arbustos altos (2-5m)	Arbustos baixos (<2m)	Trepadeiras lenhosas	Ervas altas	Ervas baixas
MAP_1	Real			6	09/10/2013	2	450990	7029405	144	Manhoca	Tsalane	2FD				(50-65%)					(30-50%)
MAP_2	Real			6	10/10/2013	2	475923	7030922	41	Dlovo	Dlovo	2GCT					((15%)				(>65%)
MAP_3	Real			6	10/10/2013	3	488261	7031522	51	Ponta de Ou	Ponta de Ouro	5BU									
MAP_4	Real			6	09/10/2013	2	464373	7034012	87	Manhoca	Phueza	2FD	2SD			(50-65%)	(30-50%)		(30-50%)		
MAP_5	Real			6	09/10/2013	2	465301	7034408	42	Manhoca	Phueza	2GCT	2WD			(15-30%)					(50-65%)
MAP_6	Real			6	09/10/2013	3	425835	7035065	63	Ndlala		2WD	2SD			(30-50%)		(15-30%)			(<15%)
MAP_8	Real			6	09/10/2013	2	456592	7035322	122	Manhoca	Manhoca	2WD				(15-30%)					(30-50%)
MAP_7	Real			6	09/10/2013	3	434358	7035321	51	Chucha		2WD	5BU			(30-50%)					(<15%)
MAP_9	Real			6	09/10/2013	3	445549	7036954	72			2WD				(30-50%)		(15-30%)			(<15%)
MAP_10	Real			6	10/10/2013	3	483905	7037111	41	Matxinatxina		2FE	4HVP		(>65%)						(>15%)
MAP_11	Real			6	09/10/2013	2	451895	7037710	76	Manhoca	Gueveza	2WD	2SD			(30-50%)	(<15%)				(15-30%)
MAP_12	Real			6	10/10/2013	2	475813	7038191	36	Dlovo		2GCS					(<15%)				(>65%)
MAP_13	Real			6	09/10/2013	3	441655	7038269	39			4HVP									
MAP_14	Real			6	10/10/2013	3	482578	7041279	70	Zitundo Sede	Zitundo_Sede	5BU									
MAP_15		Aux		6	10/10/2013	3	487063	7042526	16			4HVP								(50-65%)	
MAP_16	Real			6	08/10/2013	3	419654	7045396	95			2GCS						(15-30%)			(30-50%)
MAP_17		Aux		6	10/10/2013	3	489698	7045911	14	Ponta Mamo	Ponta Mamoli	4HVP								(50-65%)	
MAP_18	Real			6	10/10/2013	2	478947	7046183	23	Zitundo	Zitundo	1TCW			(>65%)						
MAP_19	Real			6	09/10/2013	3	453345	7047344	109			2WD				(30-50%)	(15-30%)				(<15%)
MAP_20	Real			6	10/10/2013	2	479548	7048667	18	Malambane		2GCT				(<15%)					(50-65%)
MAP_21	Real			6	10/10/2013	2	472723	7049455	15			2GCT				(<15%)					(50-65%)
MAP_22	Real			6	08/10/2013	3	419031	7050591	118	Munhangane		5BU	1FCR								
MAP_23	Real			6	10/10/2013	2	478104	7052079	13			2FD	2SD			(30-50%)	(30-50%)		(50-65%)		
MAP_24		Aux		6	10/10/2013	1	489382	7049659	32	Ticobanine		2FE				(50-65%)					(<15%)
MAP_25	Real			6	10/10/2013	2	475739	7056884	19			1TCW				930-50%)					(30-50%)
MAP_26	Real			6	08/10/2013	3	418467	7059594	115							(15-30%)		(15-30%)			(30-50%)
MAP_27	Real			6	11/10/2013	1	438455	7064743	89			2FD			(50-65%)						(<15%)
MAP_28	Real			6	10/10/2013	1	472410	7065542	18			1TCW			(30-50%)						(<15%)
MAP_29	Real			6	10/10/2013	3	469248	7066174	42			2WD	2SD			(30-50%)	(15-30%)				(15-30%)
MAP_30	Real			6	08/10/2013	4	471964	7068196	19	Bela Vista		2WD	1TCW			(30-50%)					(15-30%)

Conclusions

(A) Summary

In this study, because the K&C 3 cooperative agreement between DNTF and JAXA was concluded after the JICA project's implementation phase started, PALSAR mosaic data were not available at the beginning of the project.

Within four months from December 2013 to March 2014, however, the PALSAR mosaic data were well examined, and this study revealed that PALSAR mosaic data has a great potential to conduct the forest-cover change detection in Mozambique.

In order to periodically carry out real-time monitoring using ALOS-2 data in the future, it is planned that radar imagery analysis training intended for DNTF technical staff members will be continued using PALSAR archive data.

Conclusions

(B) Future Perspectives

(i) Deforestation Sites Detection (Continued)

During the first project year that partially corresponded to the K&C 3 program period, deforestation sites detection using PALSAR archive data was conducted only for a limited study area.

For the second project year, it is planned to continue this exercise and, when appropriate, expand a study area to the remaining parts of the pilot provinces. The deforestation sites detection exercises will be continued based on information about major driving factors of deforestation found in the country.

It is further planned to examine outcomes of radar imagery analysis to effectively contribute to future REDD+ activities.

Conclusions

(B) Future Perspectives

(ii) Regular, real-time forest monitoring using ALOS-2 data

ALOS-2, which is also known as PALSAR-2, has launched in May, 2014.

After the launch and initial operation check are successfully completed as scheduled, the K&C cooperative program is continued, and ALOS-2 data will be also provided within the K&C 4 cooperative agreement.

Conclusions

(B) Future Perspectives

(iii) Forest inventory

With the JICA project, DNTF will conduct ground truth and inventory surveys in the two pilot Provinces and sixteen pilot districts (two districts per each eight province).

The collected data will be used as sample data for the development of forest-cover maps and the REL/RL setting.

Within the future cooperation framework, DNTF will provide the above-mentioned field surveys' results to JAXA, and radar imagery data provided to DNTF.