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Technical report

Land cover and forest type mapping for National forest inventory in Viet Nam

Hanoi and Joensuu, October 2012

Ministry of Agriculture and Rural Development (MARD)

in cooperation with

Food and Agriculture Organization (FAO)

Compiled by
Eugene Lopatin, Ngo Van Tu

With technical assistance from the FAO-Finland Forestry Programme, Forestry Department, FAO

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Contents

List of Figures

List of Tables

Abbreviations

CART	Classification and regression trees
DEM	Digital Elevation Model
DMC	Disaster Management Constellation
FAO	Food and Agricultural Organization
FIPI	Forest Inventory and Planning Institute
FORMIS	Development Of Management Information System For Forestry Sector
FRA	Forest Resources Assessment Programme
GHG	Green House Gas
GIS	Geographic Information Systems
GO	Governmental Organization
GPS	Global Positioning System
KIA	Kappa coefficient of inter-rater agreement
MARD	Ministry of Agriculture and Rural Development
METLA	Finnish Forest Research Institute
MONRE	Ministry of Natural Resources and Environment
NFA	National Forest Assessment (Project)
NFI	National Forest Inventory
NGO	Non-governmental Organization
NWFP	Non-wood Forest Product
NRSC	National Remote Sensing Center
PDA	Personal Digital Assistant, mobile device
PSP	Permanent Sample Plot
REDD	Reducing Emissions from Deforestation and Forest Degradation
SFM	Sustainable Forest Management
ToF	Trees Outside of Forests
UTM	Universal Transverse Mercator
VNFOREST	Vietnam Administration of Forestry
VN2000	Vietnamese Coordinate System

Acknowledgements

The FAO-Viet Nam National Forest Assessment (NFA) Project's report is the combined product of the efforts of a large number of people and institutions. It is also a continuation to the four previous National Forest Inventory (NFI) programmes implemented in Viet Nam during 1990–2010.

The project report compilers would initially like to extend their gratitude to all contributors to the development of the forest inventory and in particular the below mentioned.

Thanks to all FIPI staff involved in the development of the approaches for forest mapping using remote sensing data and in their efforts in further developing data specifications and definitions.

Definitions

Abiotic: Pertaining to the non-living parts of an ecosystem, such as soil particles bedrock, air, and water.

Afforestation: The establishment of a forest or stand in areas where the preceding vegetation or land use was not forest.

Agroforestry: A collective name for land-use systems and practices in which trees and shrubs are deliberately integrated with non-woody crops and (or) animals on the same land area for ecological and economic purposes.

Biotic factor: Any environmental influence of living organisms (e.g., damage by animals) in contrast to inanimate (i.e., abiotic) influences.

High-precision GPS: GPS receiver capable to process real-time differential correction (DGPS) in the field.

Permanent Sample Plot (PSP): PSPs will be periodically remeasured sample plots. They will provide data of changes in land use, forest stocking, volume and carbon. The locations of PSPs are measured using high-precision GPS.

Shrub: Shrubs are woody perennial plants, generally of more than 0.5 m and (usually) less than 5 m in height on maturity and with many stems and branches.

Tree: A tree is at least 1.35 m perennial wooded plant with distinct stem capable of reaching 5 meters height *in situ*. Cactuses and palms are regarded as trees in the data collecting phase, but distinguished in the data analysis phase. Bamboos and shrubs are not recorded as trees. Climbers such as *Ficus* are treated as tree.

Tree height: Tree height is the distance along the stem axis between the seeding (base) point and the tree tip. If the seeding point is higher than the ground level (e.g. in case where a tree growing on the top of a stone), the tree height is measured from the seeding point. See more explanations and special cases in the section *Tree height measurements.*

Undergrowth: Undergrowth includes small trees, bushes, herbs and grasses growing beneath taller trees in the forest.

1. Introduction

National Forest Inventory, Monitoring and Assessment Programme (NFIMAP) of Vietnam have been implemented since 1991. Since then, four cycles of the NFIs have been conducted for the periods of 1990-1995, 1996-2000, 2001-2005, and 2006-2010. As the summary, the NFI has had the following main objectives:

- Deliver statistics and assess the current state of the forest resources;
- Analyzing and evaluating changes in Vietnam's forest resources between the inventory cycles;
- Developing and improving the system of ongoing inventory, assessing and monitoring changes in forest resources across the country;
- Assessing the trend of forest cover changes and advising the State to enhance the effective and sustainable management and use of forest resources;
- Improving of methods, and building capacity of staff carrying out the forest inventory and application of scientific advances to improve the accuracy of survey results.

NFIs have also provided the following results:

- Completing a number of works for forest inventory and forest planning (such as Forest Survey handbook, volume tables, volume tables of some species for plantation);
- Application of advanced techniques (such as GIS, GPS, digital image processing. etc) in forest inventory, developing forest resources map;
- Improving the capability of staff in forest inventory.

The four cycles of NFIs have met the primary objectives. However, the Vietnamese authorities have expressed the willingness to enhance the forest inventory system, and the FAO-Viet Nam NFA project aims contribute to this task though providing this report for further developing the national level forest inventory.

The remote sensing techniques have been used to map the forest cover in northern Vietnam since the 1970s (McNally, 2009; Pham, 2012). During this time 1:25 000 aerial photos were used, with forest cover maps created at the same scale. By the end of 2007, the country used a ground receiving station that can both receive and process images. The government mandated the National Forest Inventory, Monitoring and Assessment Programme (NFIMAP) to take place every five years. This inventory, which was initiated in 1991, is presently in the fourth cycle (2006 – 2010) and all forested areas of Vietnam have been sampled. Each round of the NFIMAP has used different remote sensing instruments with later cycles using images with progressively better spatial and/or spectral resolution.

For the NFI cycle 1991-1995 the hard copies of the Landsat TM images were used. During the other NFI cycles (i.e. 1996-2000, 2001-2005, 2006-2010) the digital images of SPOT, Landsat ETM and SPOT 5 were used. The forest stands on the images were delineated and classified by means of digital classification and visual image interpretation. The interpretation keys were developed and used by experts to assign certain forest classes to each stand.

One of the objectives of FAO-Viet Nam NFA project is to improve the efficiency and accuracy of image interpretation through capacity building of the FIPI in the area of digital remote sensing data processing. In September 2011 the eCognition software training course was organized to provide support in the implementation of the National Forest Assessment (NFA) project in order to build up

capacity at project stakeholder organizations in Vietnam. Trainees were 18 professionals from FIPI, MARD/VNFOREST. The course was delivered in English with translation into Vietnamese. The course was aimed to introduce the eCognition software to the local remote sensing experts. Totally 5 days (12 – 16.09.2011) of lectures and practical exercisers were organized in the class room. Additionally 1 day (19.09.2011) in the field was aimed for collecting the ground truth data and accuracy assessment. The course was based on trial version of the software with limited data processing capacity. The course level was 'Basic', i.e. during the course development it was assumed that the course participants do not have experience of working with eCognition software. During the course the need for developing image processing approach taking in to account the conditions of Vietnam was identified. This report was prepared to support the capacity building of the experts in Vietnam in the area of forest resources mapping.

Accurate and economically efficient forest resources mapping is crucial for the NFA project to meet its goals. This includes preparation of guidelines and documentation on image processing steps to enable GIS experts to produce relevant and comparable data for the project. The purpose of this report is to provide the inventory staff with structured information on the forest mapping techniques that will lead to the achievement of the intended output. This report contains the description of the case studies implemented in Bac Kan and Ha Tinh provinces. The aim of the study was to develop a method for automatic land cover and forest type mapping serving the requirements of NFA in Vietnam. The sub aims of the study were:

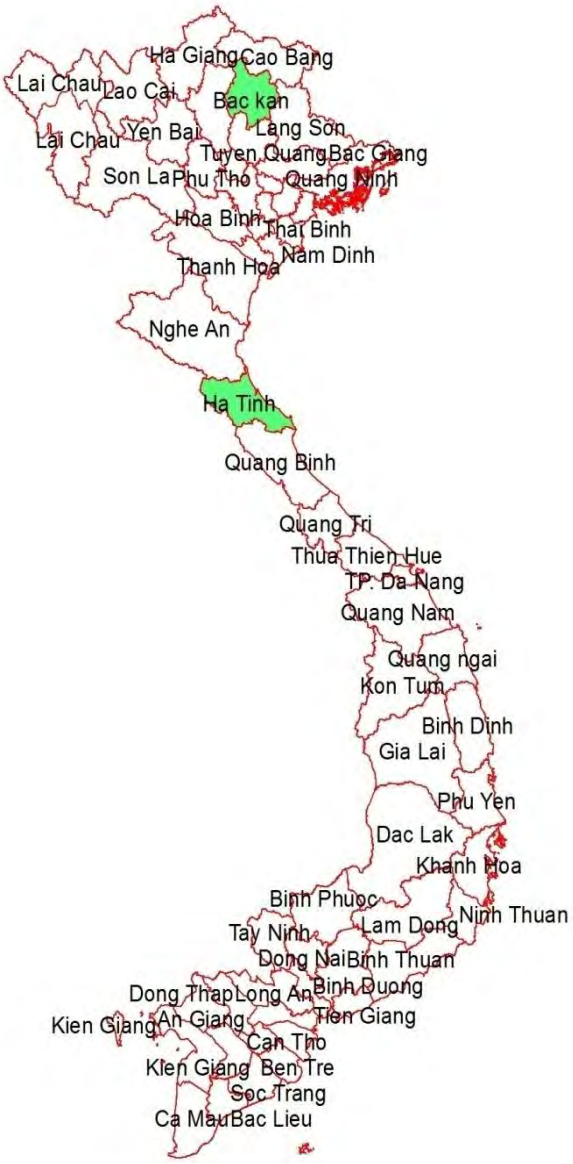
1. To develop SPOT5 satellite images processing algorithm in eCognition to produce a land use and forest cover classification for the study area
2. To identify and test other potential satellite imagery data to be used for forest cover mapping and monitoring in Vietnam
3. To analyze the accuracy and efficiency of using different spatial resolution remote sensing data
4. To prepare the instructions on SPOT5 image processing for land cover and forest type mapping using eCognition software

2. Material and methods

2.1 Study area

For the development and verification of the mapping method two districts were selected in two provinces: Bac Kan and Ha Tinh (Figure1). The provinces were selected by FIPI as a pilot area for the improvement of the methods used in NFA. The Bac Kan Province was selected as a pilot area to test new sample plots design within FAO-VN NFA project. The main purpose of Bac Kan pilot inventory was to find out the usefulness of the new proposed inventory design (Nguyen Phu Hung, 2012).

Figure 1. Study areas



The Bac Kạn province of Vietnam is located in the north-eastern part of the country, due north of the capital Hanoi. The province covers an area of 4859.4 km^2 and as of 2008 it had a population of 308,900 people according to General Statistic Office of Vietnam (2008a). The province is located in

the northeast midland mountainous area of Vietnam. Its terrain has the highest altitude among the 11 provinces of the region. Forest area dominates more than 95% of the province. The remaining part is available for agricultural and other uses. Due to this rugged and forested topography, development of water resources has been limited resulting in exploitation of its forest resources; this has caused degradation of the forests. The topography is highly variable, varying from 1640 metres (highest point in the Khie Thiouing mountains in the province) to the lowest point of 40 metres (130 ft) in the Cho Moi district. There are numerous rivers and streams flowing through the province, each with small catchment areas. However, most of them have steep slopes and short lengths. Out of the total population, 83% are dependent on agriculture. The climatic condition of the province is typically tropical monsoonal, which exhibits two distinct seasons namely, the rainy season from May to October accounting for about 88-90% of the annual rainfall and dry climatic conditions between November and April. This results in water shortage conditions during the dry months (Asian development Bank, 2010). The ChoMoi district located at the southern part of Bac Kan province was selected as a study area. Cho Moi is a rural district of Bac Kan province. As of 2003 the district had a population of 37665. The district covers an area of 606 km² (Statoids, 2003).

Another selected study area was Ha Tinh province which is located in the northern part of central Vietnam, about 340 km south of Hanoi, facing Nghệ An Province to the north, Quảng Bình Province to the south, Laos to the west, and the Eastern Sea to the east. Ha Tinh is among the poorest provinces of Vietnam with 2008 GDP 420 USD/person/year. The poverty can be attributed to the harsh natural conditions with severe coldness in winter and extreme heat in summer, floods and storms every fall and unfavourable soil and natural resources. Agriculture, forestry and fishery takes up 35.5 percent of total GDP and the province's GDP accounts for 0.7 percent of Vietnam's GDP. Ha Tinh takes slow steps in economic reforms though better signs in recent time are incentive (Poverty alleviation in Ha Tinh Province, 2008b). The Houng Son district was selected as a study area. The district consists of three communes and city: Phố Châu (a district capital), Tây Sơn (a town in the west of district), Sơn Kim. As of 2003 the district had a population of 125 308. The district covers an area of 1101 km². The district capital lies at Pho Chau (Statoids, 2003).

2.2 Field data

The field data for image interpretation was collected during the field trips in May – September 2012. The field data collection was organized as iterative process. First the materials of previous NFI within the study areas were analyzed. Based on the analysis the number of possible land cover and forest cover classes was identified. Then during the field trips the classification was discussed with the local forest rangers and experts from FIPI. Based on this discussion the initial sample plots for classification were established. The coordinates of the sample plots were recorded by hand held GPS devices (positional accuracy +- 15 m). Based on the field observations each plot was assigned the land cover and forest cover class by FIPI expert using the FIPI classification system (Table 1).

Table 1. FIPI land use and forest cover classification system

NATURAL FOREST
NON ROCKY FOREST
Timber forest
Rich volume forest

PLANTATION
Non rocky plantation (with different species)
Rocky plantation (with different species)

NON FOREST AREA

Medium volume forest
Poor volume forest
Rehabilitation forest
Bamboo forest (with different species)
Mixed timber and bamboo forest
ROCKY FOREST
Timber forest
Rich volume forest
Medium volume forest
Poor volume forest
Rehabilitation forest
Bamboo forest (with different species)
Mixed timber and bamboo forest
Bare land with grass
Bare land with scattered trees
Young plantation (under 1 year old)
Agricultural land
Waterways
Infrastructure (housing, roads etc.)
Rocky area
Eroded area

After preliminary classification of the remote sensing data and assessing the accuracy of classification additional plots were established during the field visits. Additional plots were established for the classes showed low accuracy. For this purpose the results of image segmentation and preliminary classification were uploaded into iGIS programme on iPhone. iGIS represents a new era in mobile GIS solutions by enabling users to load, view, investigate, create and export their own spatial data over a background of Google Maps imagery (GeometryPtyLtd., 2012). Totally 242 plots were used for Huong Son district (Ha Thin province) image classification and 391 plots were used for Cho Moi district (Bac Kan province) image classification (Table 2).

Table 2. Number of filed plots established in the study area to classify remote sensing data

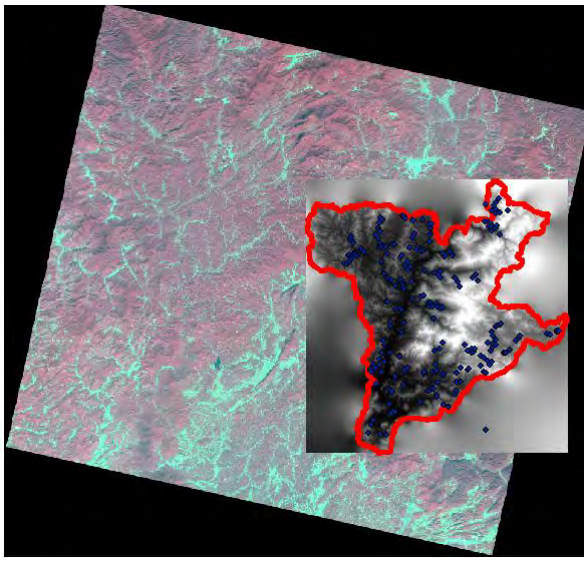
Land cover class	Houng Son district	Cho Moi district
Agriculture	38	5
Bare	18	25
Forest	125	285
Residential	47	24
Water	14	16
Industrial area		18
Total	242	391

2.3 Ancillary datasets

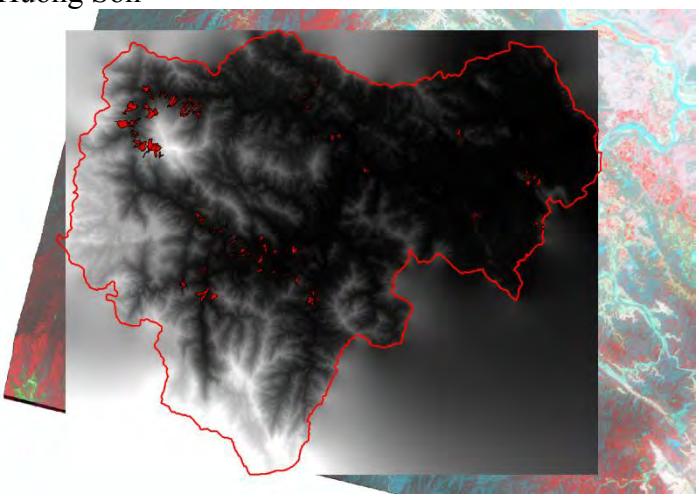
Digital Elevation Models (DEMs) were provided by FIPI for the districts of Cho Moi and Huong Son. The models were created using the digital contour lines from the topographical maps 1:10000. Spatial resolution of the DEMs was 10 m per pixel. Additionally the boundaries of districts were provided (Figure 2).

Figure 2. Ancillary data used in classification

Cho Moi



Huong Son



The remote sensing data and ancillary data were provided by FIPI in the local projection with the following projection parameters:
Projection: Transverse_Mercator
False_Easting: 500000.000000
False_Northing: 0.000000
Central_Meridian: 106.500000
Scale_Factor: 0.999900
Latitude_Of_Origin: 0.000000
Linear Unit: Meter (1.000000)
Geographic Coordinate System: GCS_VN_2000
Angular Unit: Degree (0.0174532925199433299)
Prime Meridian: Greenwich (0.000000000000000000)
Datum: D_Vietnam_2000
Spheroid: WGS_1984
Semimajor Axis: 6378137.000000000000000000
Semiminor Axis: 6356752.314245179300000000
Inverse Flattening: 298.257223563000030000

The DEMs and boundaries of the districts were included into the classification process. Additionally the elevation above sea level, slope and aspect were calculated using surface calculation algorithms implemented in eCognition Developer 8.7.2 (Trimble, 2012). The algorithms are using the Zevenbergen-Thorne method for slope calculation (Zevenbergen and Thorne, 1987) and Horn's method for the aspect calculation (Horn, 1981).

To select the proper segmentation parameters and test the accuracy of the classification in Cho Moi district the forest cover map created manually by FIPI experts was used. The map was created via manual delineation of the Spot-5 false color composite from 2010 and visual interpretation of the polygons. The map was updated using the field observations in 2012 by FIPI experts.

2.4 Potential remote sensing data for forest cover mapping

Analysis of the needs for forest resources mapping in Vietnam allowed identifying the following potential sources of remote sensing data: Spot 5, Landsat 7, Landsat 5, DMC, and RapidEye. The Spot 5 and DMC images were used in the analysis.

For 39 years, the Landsat program has collected spectral information from Earth's surface, creating a historical archive unmatched in quality, detail, coverage, and length. Landsat imagery provides a means of analyzing changes in forest cover structure over 28 year time span at a 30 m resolution and over 39 years at 80 m resolution. To resolve landscape scale changes and identify particular forest types is possible at 30 m resolution. The cost limitation for Landsat imagery was removed in 2008 with the opening of the USGS Landsat archive, providing a source of 30 m imagery from 1984 to present that can be used for land surface change studies (Fraser et. al., 2012). Landsat-5 and -7 continue to provide imagery in 2012, while the Landsat Data Continuity Mission scheduled for launch in 2012 will ensure a future source of no-cost data. The Landsat 5 and Landsat 7 images were downloaded from the USGS GloVis online catalogue for the study areas. The GloVis level one terrain corrected (L1T) product has sub-pixel multi-temporal registration accuracy, which is essential for any pixel level change analysis. The Landsat 7 images were available for the study area but due to the problems with to scan line corrector off since 31.03.2003 the images are not suitable for forest cover mapping (Figure 3). Theoretically it should be possible to combine two Landsat 7 images to be able to remove the effects from scan line corrector off to produce gap filled image. Due to the high dynamics in the land cover change in Vietnam and relatively limited number of Landsat 7 scenes obtained over the same month it is impossible to get accurate product suitable for forest cover mapping. Moreover the tests with segmentation of the filled image products showed that the gaps are still visible after the segmentation.

The Landsat series of satellites are unique in their temporal coverage. The long term continuity of both Landsat 5 and 7 is questionable as both have exceeded their anticipated lifespan. Cloud free Landsat 5 images were available for the Huong Son and Cho Moi districts only from 08.05.2007 (Figure 4). Using 5 years old data was not suitable for forest cover mapping.

Figure 3. Landsat 7 image on Huong Son district with the missing lines due to the scan line corrector off

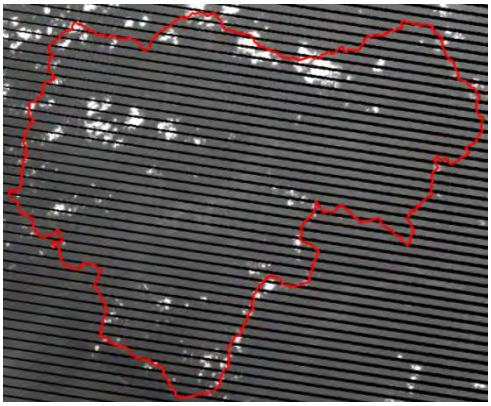
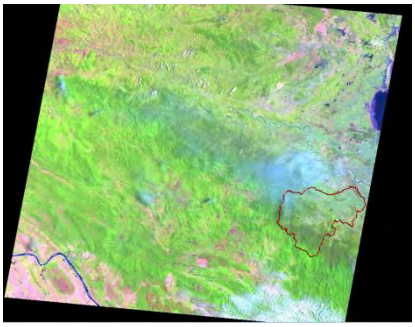
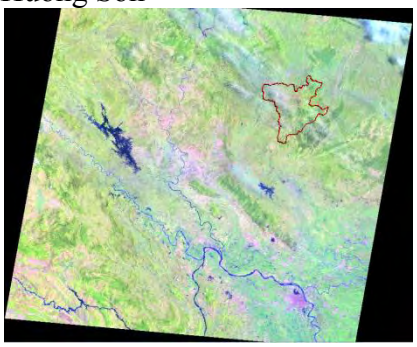


Figure 4. Landsat 4 images available for the study areas

Cho Moi

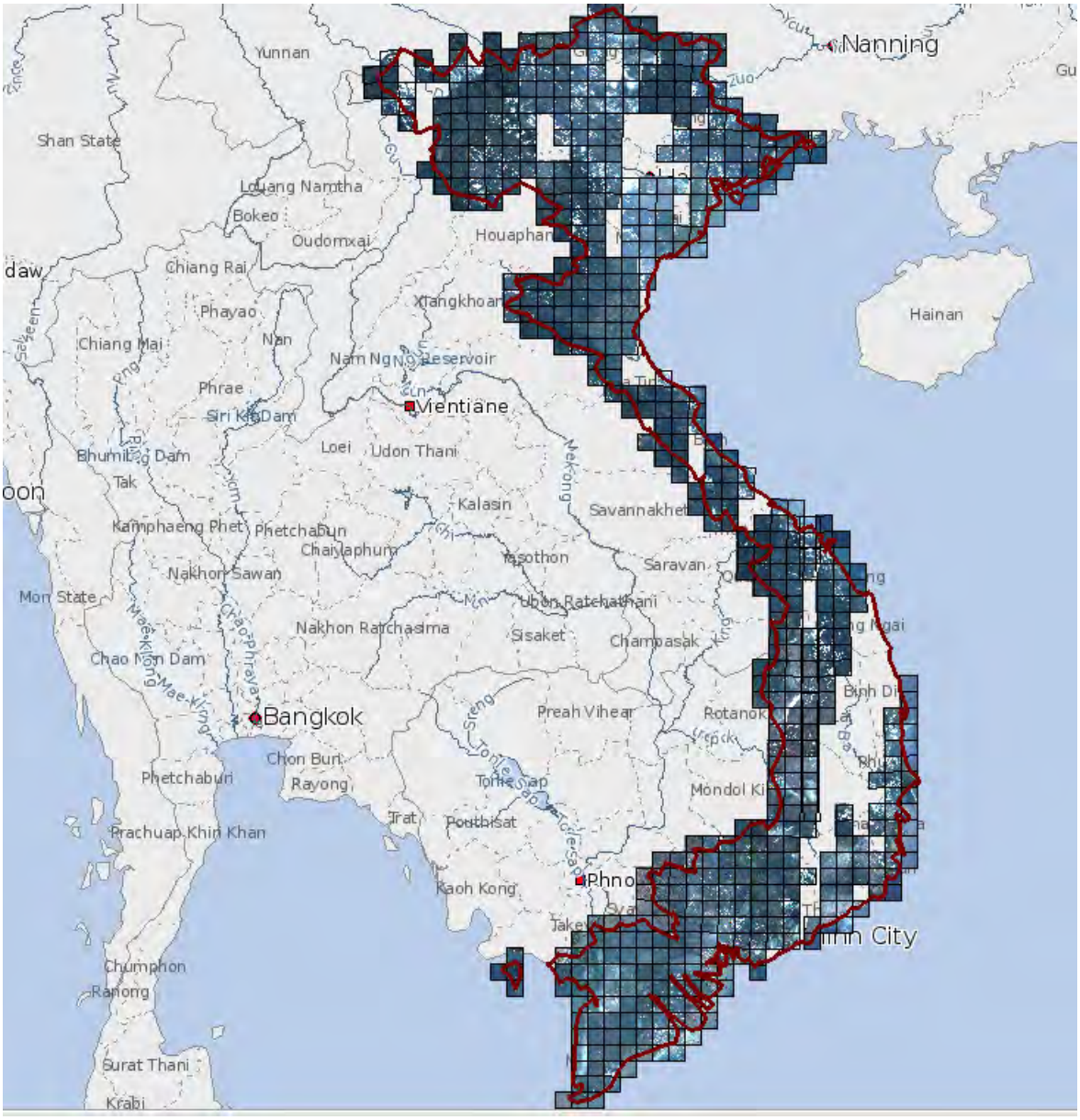


Huong Son



Another potential source of remote sensing data for forest resources mapping is RapidEye. Each of RapidEye's five satellites contain identical sensors, are equally calibrated and travel on the same orbital plane (at an altitude of 630 km). Together, the 5 satellites are capable of collecting over 4 million km² of 5 m resolution, 5-band color imagery every day. Each sensor is capable of collecting image data in five distinct bands of the electromagnetic spectrum: Blue (440-510 nm), Green (520-590 nm), Red (630-690 nm), Red-Edge (690-730 nm) and Near-Infrared (760-880 nm). RapidEye's satellites are the first commercial satellites to include the Red-Edge band, which is sensitive to changes in chlorophyll content. Studies show that this band can assist in monitoring vegetation health, improve species separation and help in measuring protein and nitrogen content in biomass. The RapidEye's satellites are one of the potential instruments for forest resources mapping in Vietnam (Figure 5). Due to the high data costs and cloud free data availability the RapidEye was not used in the study.

Figure 5. RapidEye coverage of Vietnam for 2011



2.5 SPOT Image data

Panchromatic (2.5 m) and multispectral (10 m) imagery from the Système Pour l'Observation de la Terre (SPOT-5) satellite was obtained from MONRE-NRSC via FIPI. The imagery consists of an extract from SPOT 5 imagery for the study areas: Cho Moi district (image was collected on 02.11.2010) and Huong Son district (image was collected on 15.02.2009). The images were calibrated, ortho rectified and processed to a false color composite at a spatial resolution of 2.5 m by MONRE-NRSC (Figure 6, 7). In addition, the original 2.5 m panchromatic channel and original 10 m multi-spectral image channels were obtained. A visual assessment confirmed that all image sources were aligned with ancillary data layers of higher spatially accuracy (e.g., road network etc.). The main limitation of using SPOT operationally at a national scale is the acquisition cost of the images.

Table 3. **Spectral and spatial resolution of SPOT-5 data**

Mode	Band	Spectral band	Resolution
Multispectral	B1	0,50 - 0,59 µm	10m x 10m
	B2	0,61 - 0,68 µm	10m x 10m
	B3	0,79 - 0,89 µm	10m x 10m
	SWIR	1,58 - 1,75 µm	20m x 20m
M - monospectral	PAN	0,51 - 0,73 µm	5m x 5m (or 2.5m x 2.5m in supermode)

Figure 6. SPOT-5 false colour image of Cho Moi district (R-NIR, G-Red, B-Green)

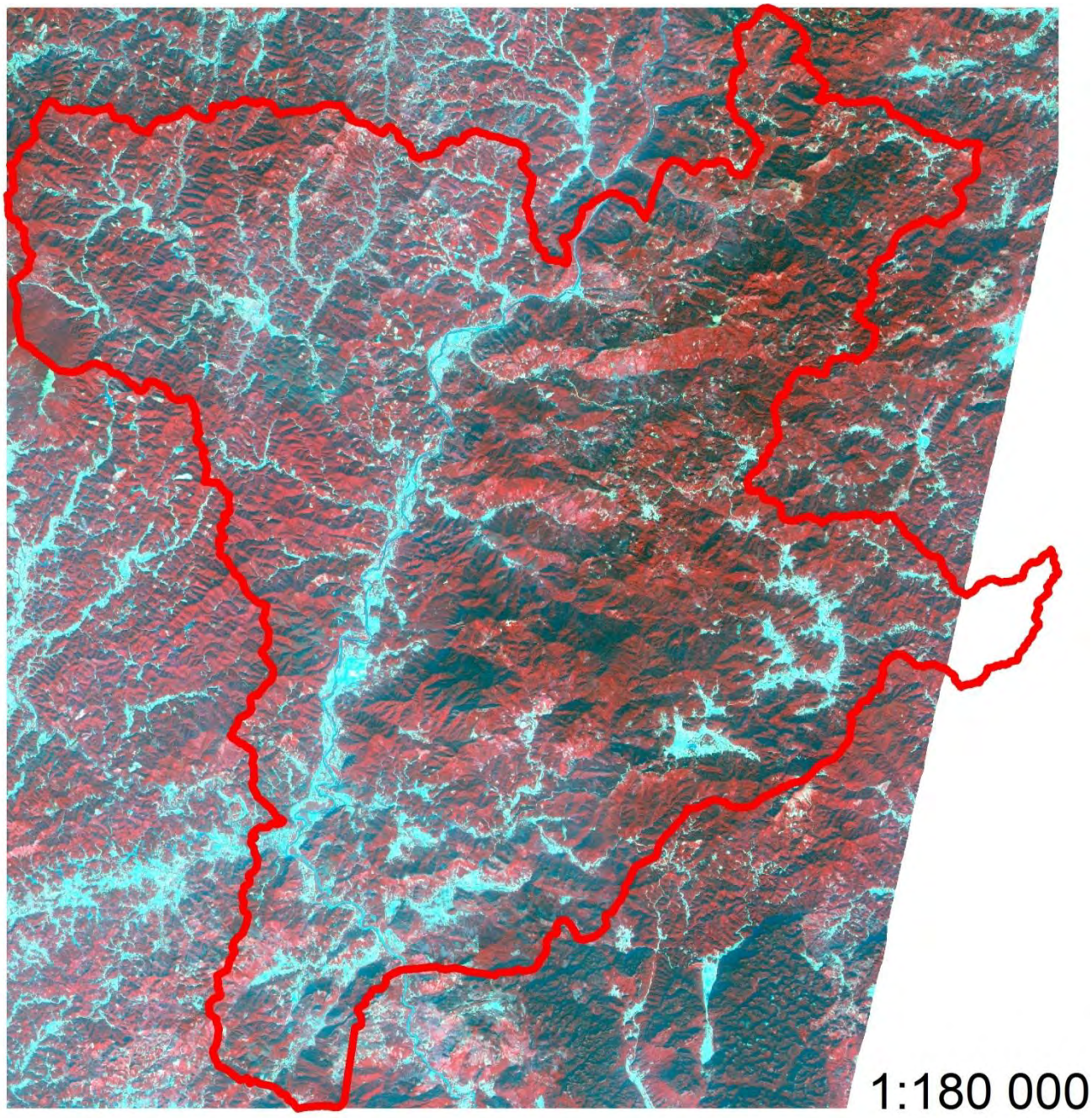
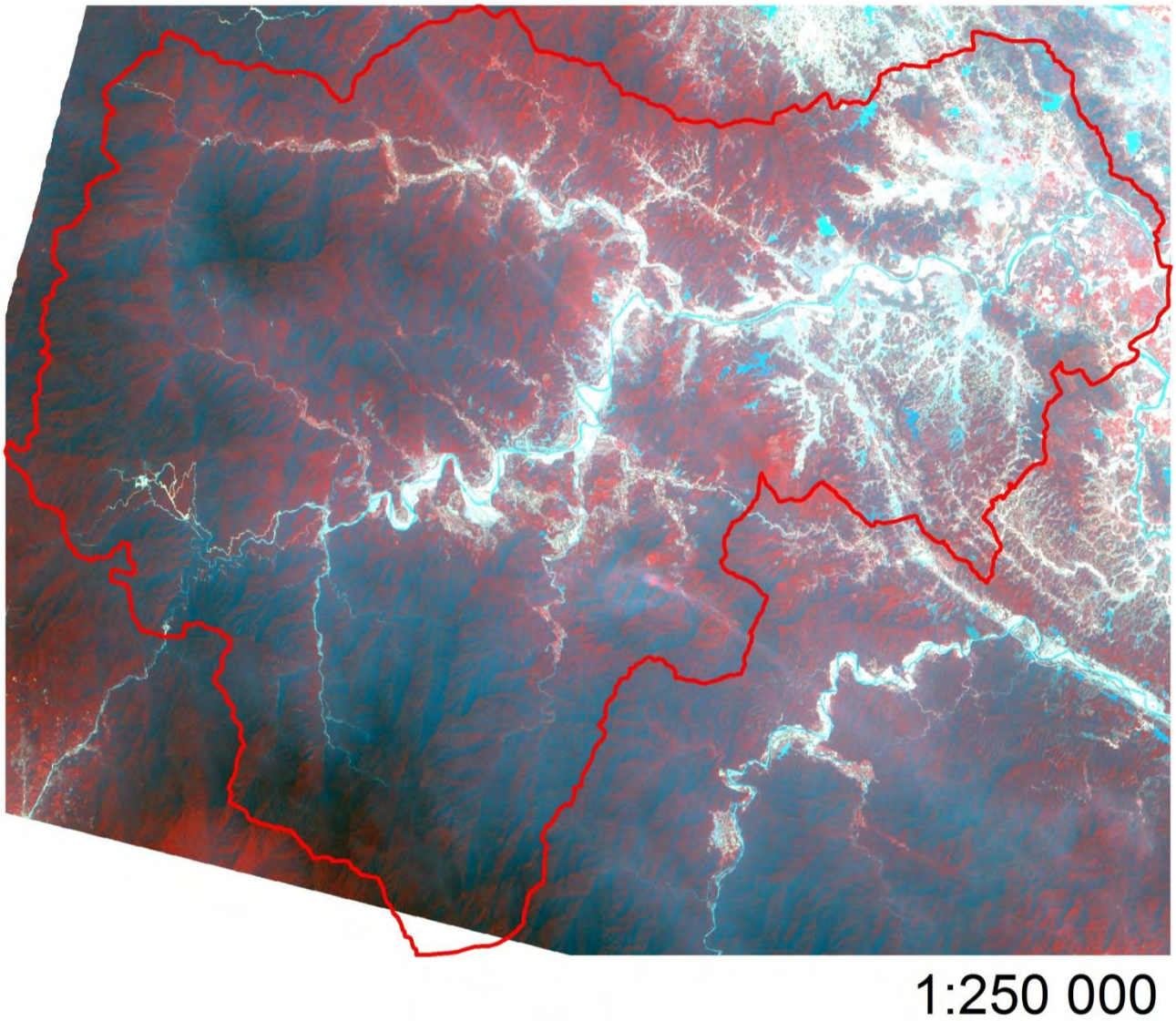


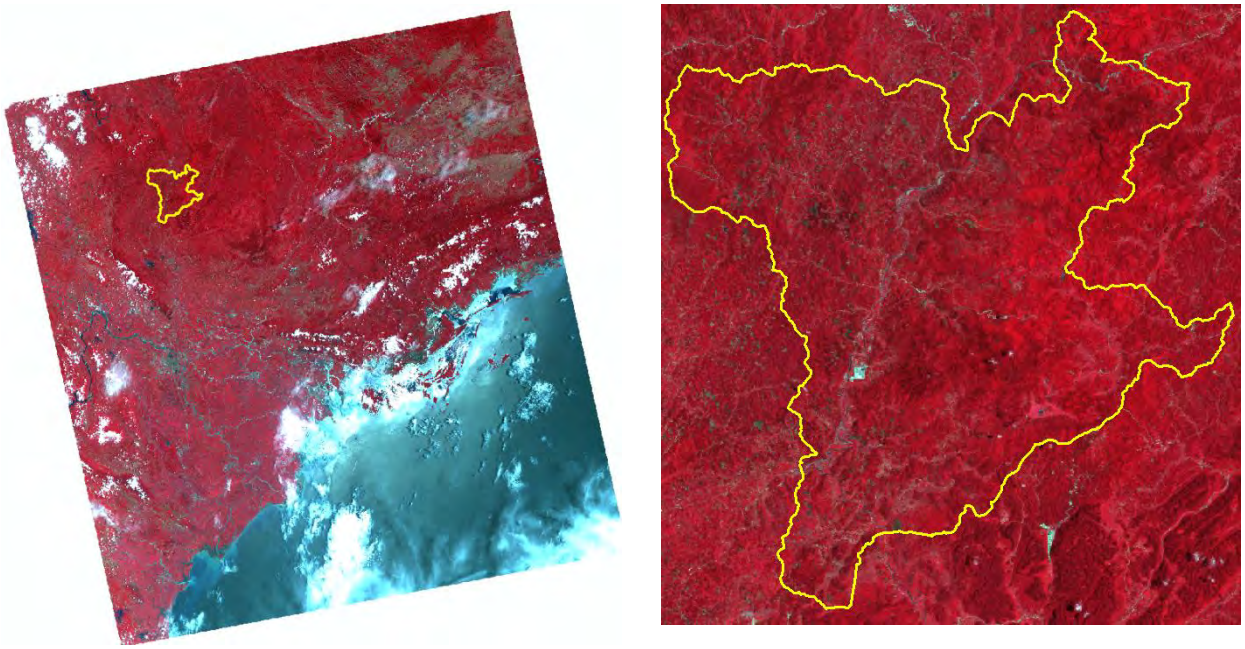
Figure 7. SPOT-5 false colour image of Huong Son district (R-NIR, G-Red, B-Green)



2.6 DMC Image data

The image acquired by DMC satellite was used to test the possibilities of remote sensing data covering large areas to map the forest resources (Figure 8). The DMC satellites cover a wide area (650x1600 km) at 22 m resolution with the ability to acquire images daily. The advantage of DMC is that it provides daily repeat capability. Currently three satellites are actively imaging the area of interest. The DMC image was provided by DMC International Imaging Ltd for free for the purposes of the testing the accuracy of forest mapping. The image was obtained on 15.05.2012 and was covering the Cho Moi district.

Figure 8. False colour composite of Cho Moi district DMC image (R-NIR, G-Red, B-Green)



2.7 Data processing

The remote sensing data was processed in eCognition Developer 8.7.2. eCognition 8.7 is a comprehensive image analysis platform for multi-dimensional image analysis. It contains all the client and server software needed to extract information from any digital image in a fully-automated or semi-automated way (Trimble, 2012). ArcGIS 10.0 was used for maps preparation and separation the sample plots into the training set and test set.

The SPOT-5 and DMC images were segmented using the multi-resolution segmentation algorithm found in 64-bit version of eCognition Developer 8 (Trimble, 2012). This algorithm uses a "bottom-up" image segmentation approach that begins with pixel sized objects which are iteratively grown through pair-wise merging of neighboring objects based on several user-defined parameters (scale, color/shape, smoothness/compactness) that are weighted together to define a homogeneity criterion; together, these parameters define a "stopping threshold" of within-object homogeneity based on underlying input layers, and thus define the size and shape of resulting image objects (Benz et al., 2004; Duro et al., 2012; Trimble, 2012). Of the parameters used by the multi-resolution segmentation algorithm, the selection of an appropriate value for the "scale" parameter is considered the most important, as this value controls the relative size of the image objects, which has a direct effect on the classification accuracy of the final map (Duro et al., 2012; Myint et al., 2011; Smith, 2010). The scale parameter is an abstract term that determines the maximum allowed heterogeneity for the resulting image objects. For heterogeneous data, the resulting objects for a given scale parameter will be smaller than in more homogeneous data. By modifying the value in the scale parameter value the size of segments can be changed. Parameters for shape and smoothness were kept fixed.

In this study, the selection of appropriate input layers and values for individual parameters used by the multi-resolution segmentation algorithm was guided by previous experience, by using an iterative "trial-and-error" approach and evaluation of the resulting segments size versus the scale parameter. The values for image segmentation parameters used in this study are found in chapter 3.1. The averages of object sizes were investigated for each scale parameter (Hirata and Takahashi, 2011).

The image segmentation process was considered complete once image objects were produced that visually corresponded to meaningful real-world objects of interest (Duro et al., 2012).

The segments were classified using two stages approach. First the segments were classified into the main land cover classes: agriculture, bare land, forest, residential, water, industrial area etc. Then the classification algorithm was applied to the forest class in order to classify the segments into the different forest types.

To train the classifier and verify the accuracy the plots were divided randomly in two data sets: training set and test set (Tables 4-7). In the Houng Son district the only plots collected in the field were used to form the training set and test set. In Cho Moi district the plots collected in the field were used as a training set and test set was prepared from the forest cover map prepared by FIPI. The algorithm «Create Random Points» in ESRI ArcMap 10 was used to split the plots in to two datasets. The plots were selected randomly by placing number of points within a study area. Regardless of how the area within which to place the points is specified, a random number stream was created from a random number generator and seed. When generating random points within a specified extent, a random value on the x-axis and another on the y-axis of the extent are identified, which become the x- and y- coordinates for a point. To randomly select the point on the x-axis, the next unused value on the random number stream is selected and transformed into a uniform distribution with a minimum and maximum being the minimum and maximum for the x extent. The same is done for the y-axis. The two values identify the first random point. This process is repeated until the specified number of points is reached (ArcMap, 2012). The specified number of points was chosen in order to split randomly the plots into two datasets.

Table 4. Ground control points for land cover mapping in Huong Son district

Land cover class	Number of plots	Training set	Test set
Agriculture	38	19	19
Bare	18	9	9
Forest	125	63	62
Residential	47	24	23
Water	14	7	7
Total	242	122	120

Table 5. Ground control points for forest types mapping in Huong Son district

Forest type class	Number of plots	Training set	Test set
Forest garden	10	5	5
Mixed timber and bamboo	10	5	5
Natural evergreen broad leaved forest poor (<100m3/ha)	12	6	6
Natural evergreen broad leaved forest rich (>200m3/ha)	10	5	5
Natural evergreen broad leaved forest medium (100-200m3/ha)	16	8	8
Natural regrowth	20	10	10
Plantation	47	24	23
Total	125	63	62

Table 6. Ground control points for land cover mapping in Cho Moi district

Land cover class	Number of plots	Training set	Test set
Bare	75	25	50
Forest	825	275	550
Fruit trees	9	3	6
Industrial area	54	18	36
Limestone without forest	51	17	34
Other land	39	13	26
Residential	72	24	48
Water	48	16	32
Total	1173	391	782

Table 7. Ground control points for forest types mapping in Cho Moi district

Forest type class	Number of points	Training set	Test set
Bamboo forest	39	13	26
Forest garden	39	13	26
Mixed timber and bamboo	33	11	22
Natural evergreen broadleaf forest medium (100-200m3/ha)	48	16	32
Natural evergreen broadleaf forest poor (<100m3/ha)	36	12	24
Natural evergreen broadleaf forest rich (>200m3/ha)	51	17	34
Natural regrowth forest	198	66	132
Natural regrowth forest on Limestone for	3	1	2
Palm trees	12	4	8
Plantation	351	117	234
Tea farm	15	5	10
Total	825	275	550

To classify the segments using the field plots the classification and regression trees CART method was used. The method is implemented in eCognition software as internal algorithm (Trimble, 2012). CART is a non-parametric decision tree learning technique that produces classification. Decision tree learning is a method commonly used in data mining. The goal is to create a model that predicts the value of a target variable based on several input variables. A tree can be "learned" by splitting the source set into subsets based on an attribute value test. This process is repeated on each derived subset in a recursive manner called recursive partitioning. The recursion is completed when the subset at a node all has the same value of the target variable, or when splitting no longer adds value to the predictions.

The principle concept of the decision trees is to split a complex arbitration into several simpler decisions, leading to solutions that are easier to interpret. For example, one forest type can be described by number of specific features, such as brightness in several spectral bands, texture, size and position etc. There are number of other objects having the similar features, but those features of certain forest type are within the certain range and combinations. The task of regression trees method is to find the solution based on machine learning theory to identify the certain forest type. The decision trees methods are based on a multistage/hierarchical decision scheme or a tree-like structure. The tree consists of a root node, with all data, a set of internal nodes (splits), and a set of

terminal nodes (leaves). One special feature of this classifier is that at each node of the tree only binary decisions, separate either one class or a bundle of classes from the remaining classes. Only the features carrying maximum information are automatically selected in class division at each node and the remaining features are rejected, thereby increasing computational efficiency. Feature selection and classification are thus performed simultaneously. Processing is done by a top-down approach, starting with the first node to the final one.

The variables describing the segments structure, relationships and properties were selected for use in the object-based classification. The object-based image analysis software used in this study refers to such variables as "object features" (Trimble, 2012), which is a term adopted throughout the rest of the text when referring to variables used by object-based classifications.

2.8 Accuracy assessment

The accuracy of the classification was evaluated by comparing the classification results with the test set of sample plots. The overall accuracy and the Kappa coefficient of inter-rater agreement (KIA) (Congalton, 1991) were used. Overall accuracy is directly interpreted as the proportion of pixels classified corresponds to probabilities related to a given thematic map's reported commission and omission accuracy (Stehman, 1997). The Kappa coefficient has been used to assess statistical difference between classifications (Congalton, 1991). Inside the eCognition software the accuracy assessment was tested at the raster grid (Trimble, 2012). This approach is taking into account the area of the training set samples. The accuracy of the classification was tested at 10x10 m raster grid. The pixels classification in the test was compared with pixels classification derived from decision trees based in the training set. All the pixels with the similar labels in the test set and results of classification were considered as correctly classified. In case of the pixel label from the classification was different then the pixels were considered as incorrectly classified. In cases with limited ground control points (e.g. different forest types plots) the share of correctly classified segment was used as an indicative measure to evaluate the accuracy at the object level.

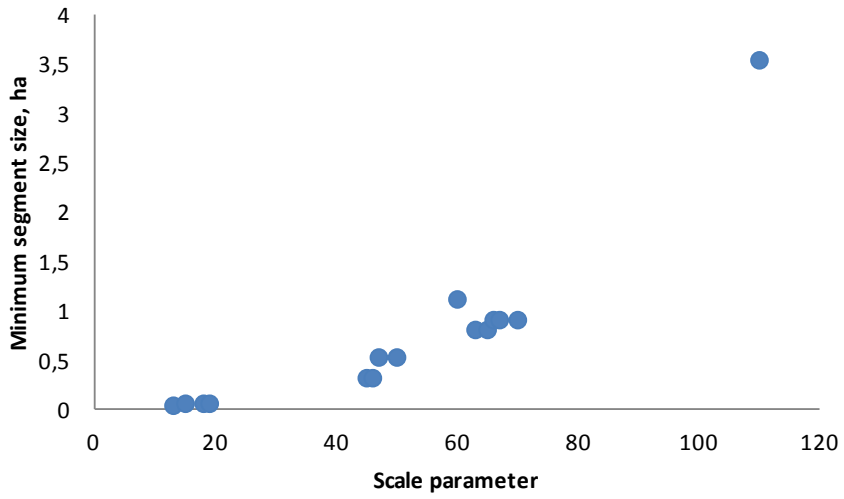
Confusion matrices (Congalton, 1991) that included kappa statistics were calculated. The Kappa coefficient of inter-rater agreement (KIA) (Cohen, 1960) serves as a more rigorous estimate of accuracy then the overall accuracy because it penalizes for agreement that may be expected to occur by chance. The KIA values < 0 as indicating no agreement and 0–.20 as slight, .21–.40 as fair, .41–.60 as moderate, .61–.80 as substantial, and .81–1 as almost perfect agreement (Landis and Koch, 1977).

3. Results

3.1. Segmentation parameters

The requirements of NFA forest mapping for SPOT5 were to produce the maps with the basic scale 1:10 000. The FIPI requirement for the minimum mapping unit was 0,5 ha. Tests showed that the best segmentation results can be achieved by using 2,5 m false color pan sharpened composites. The segmentation scale parameter at 2,5 m should be between 40 and 50 (Figure 9). Visual comparison showed that the best scale parameter for 22 m resolution DMC image segmentation was 15.

Figure 9. The impact of segmentation scale parameter on minimum mapping unit in Cho Moi district



3.2. Forest cover map of Huong Son district (Ha Tinh province) based on SPOT 5 data

Using 122 ground control points 35525 segments were classified in Huong Son district. The regression tree was derived from the training set (Figure 10). Based on this regression tree the segments were classified (Figure 11). For the land cover classification features were selected by the CART classifier at the training stage of the analysis (Figure 10). The overall classification accuracy (i.e. percentage of correctly classified samples) estimated at pixel level was 93% (Table 8). The Kappa coefficient of inter-rater agreement (KIA) showed almost perfect agreement with the test set.

Table 8. Accuracy of the land cover map in Huong Son district at pixel level

User \ Reference Class	Forest	Agriculture	Water	Bare	Sum
Forest	126833	3267	0	0	130100
Agriculture	2944	15240	0	0	18184
Water	0	265	3638	0	3903
Bare	2414	0	0	15919	18333
unclassified	2491	0	0	0	2491
Sum	134682	18772	3638	15919	
Producer	0,94	0,81	1,00	1,00	
User	0,97	0,84	0,93	0,87	
Hellden	0,96	0,82	0,96	0,93	
Short	0,92	0,70	0,93	0,87	
KIA Per Class	0,77	0,79	1,00	1,00	
Overall Accuracy	0,93				
KIA	0,83				

Figure 10. Regression tree for land cover mapping in Huong Son district

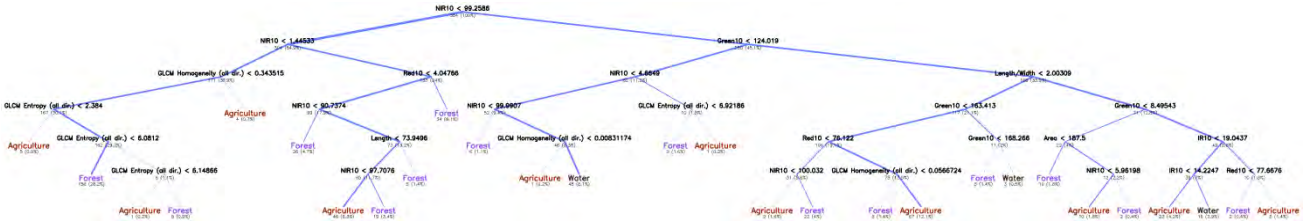
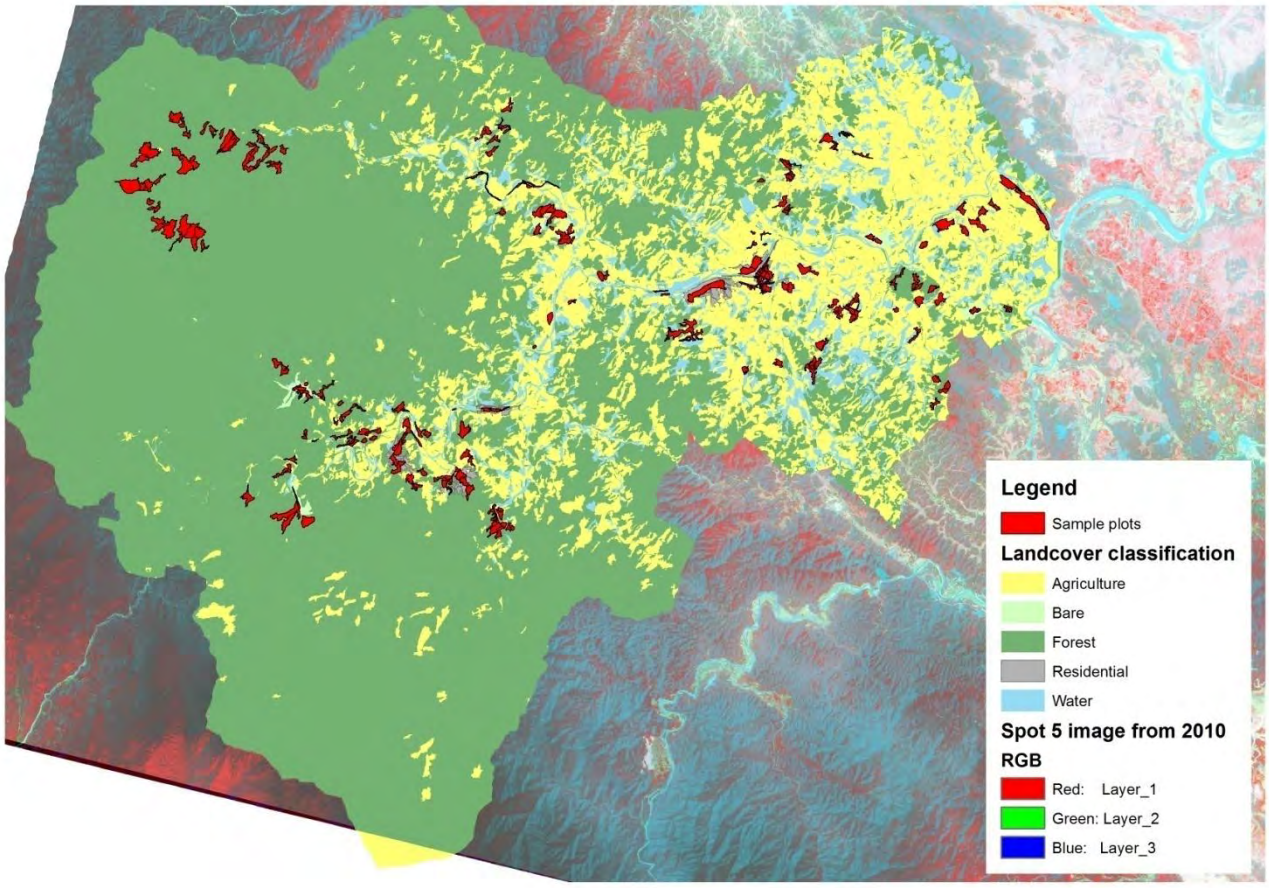


Figure 11. Land cover map of Huong Son district



The segments classified at the first stage as forest were used for further classification. Using 63 ground control points forest segments were classified in different forest types (Figure 13). The regression tree was derived from the training set (Figure 12). Based on this regression tree the forest segments were classified (Figure 13). The overall classification accuracy (i.e. percentage of correctly classified pixels) estimated at pixel level was 34% (Table 9). Due to the relatively low number of samples in the training set and test set the accuracy was evaluated also at the segment level, i.e. the proportion of correctly classified segments. The overall classification accuracy (i.e. percentage of correctly classified samples) estimated at segment level was 83% (Table 10).

Table 9. Accuracy of the forest types map in Huong Son district at pixel level

User \ Reference Class	Plantation	Mixed timber and bamboo	Natural regrowth	Natural evergreen broad leaved medium forest (100-200 m3/ha)	Forest garden	Natural evergreen broad leaved poor forest (<100m3/ha)	Natural evergreen broad leaved rich forest (>200m3/ha)	Sum
Plantation	13006	1530	4162	0	235	989	0	19922
Mixed timber and bamboo	12579	6570	7476	0	975	1356	1679	30635
Natural regrowth	21918	4319	14656	0	0	0	0	40893
Natural evergreen broad leaved forest (100-200 m3/ha)	666	934	621	10064	0	1275	2580	16140
Forest garden	16168	0	1277	0	67	0	0	17512
Natural evergreen broad leaved forest (<100m3/ha)	8169	3227	6218	12080	0	6349	0	36043
Natural evergreen broad leaved forest (>200m3/ha)	0	610	0	0	0	0	7140	7750
unclassified	0	0	0	0	0	0	0	0
Sum	72506	17190	34410	22144	1277	9969	11399	
Producer	0,18	0,38	0,43	0,45	0,05	0,64	0,63	
User	0,65	0,21	0,36	0,62	0,00	0,18	0,92	
Hellden	0,28	0,27	0,39	0,53	0,01	0,28	0,75	
Short	0,16	0,16	0,24	0,36	0,00	0,16	0,59	
KIA Per Class	0,07	0,25	0,24	0,40	-0,06	0,54	0,61	
Overall Accuracy	0,34							
KIA	0,23							

Table 10. Accuracy of the land cover map in Huong Son district at the object level

Class	Number of segments in test set	Number of correctly classified segments	Number of misclassified segments	% of correctly classified
Forest garden	5	4	1	80.00
Mixed timber and bamboo	5	4	1	80.00
Natural evergreen broad leaved forest (<100m3/ha)	6	5	1	83.33
Natural evergreen broad leaved forest (>200m3/ha)	5	5	0	100.00
Natural evergreen broad leaved forest (100-200m3/ha)	8	7	1	87.50
Natural regrowth	10	8	2	80.00
Plantation	23	19	4	82.61
Total	63	53	10	83.87

Figure 12. Regression tree for forest types mapping in Huong Son district

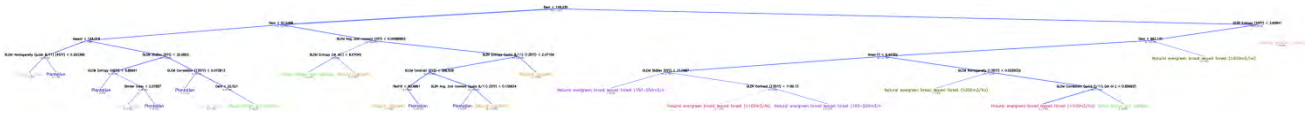
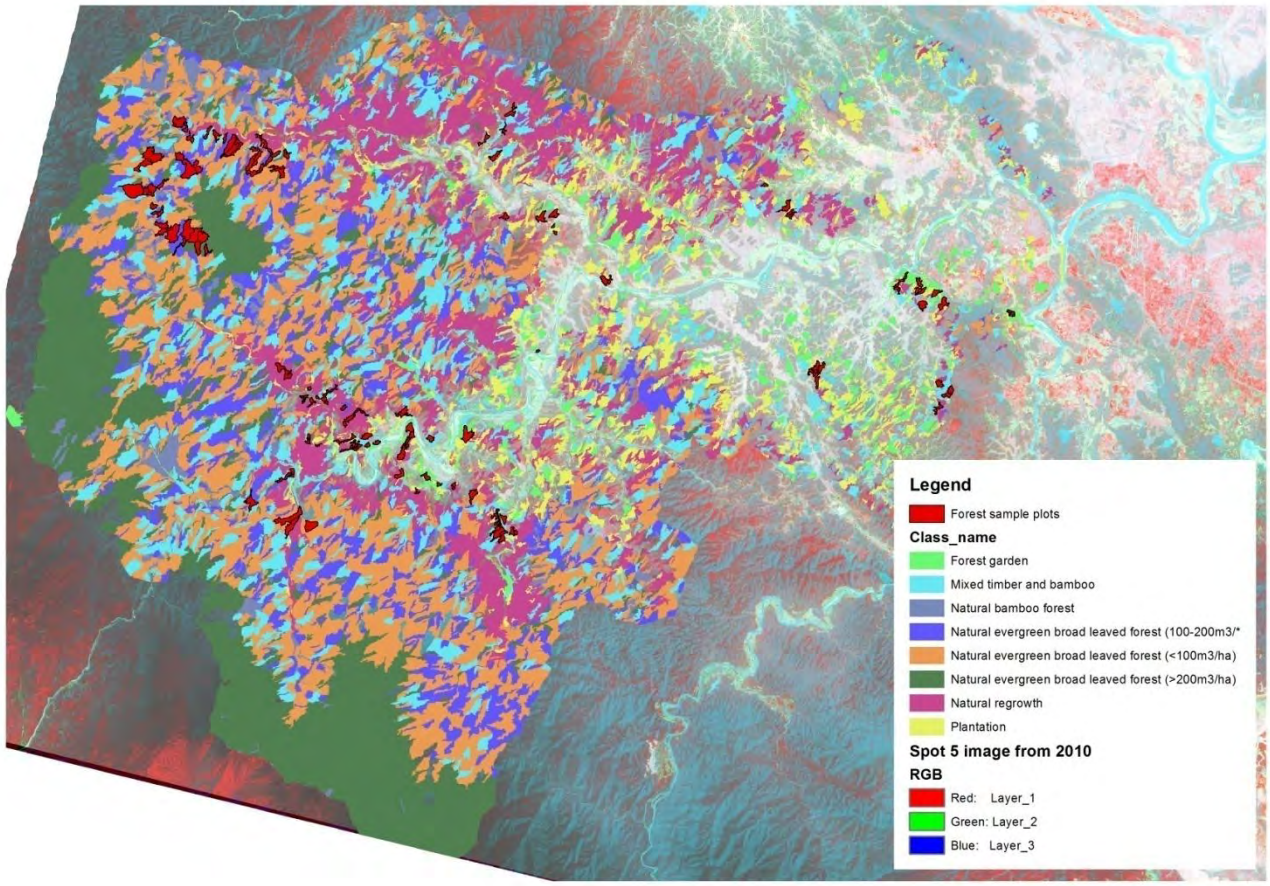


Figure 13. Forest types map of Huong Son district



3.3. Forest cover map of Cho Moi district (Bac Kan province) based on SPOT 5 data

Using 391 ground control points 99009 segments were classified in Cho Moi district. The regression tree (Figure 14) was derived from the training set. Based on this regression tree the segments were classified (Figure 15). For the forest types classification features were selected by the CART classifier at the training stage of the analysis. The overall classification accuracy (i.e. percentage of correctly classified samples) estimated at pixel level was 86% (Table 11). The Kappa coefficient of inter-rater agreement (KIA) showed substantial agreement with the test set.

Table 11. Accuracy of the land cover map in Cho Moi district at pixel level

User \ Reference Class	Limestone	Forest	Bare	Other	Industrial	Water	Residential	Sum
Limestone	54403	27027	2833	0	0	0	1920	86183
Forest	38259	960487	16437	1662	0	183	4663	1021691
Bare	0	30208	36044	2509	0	2784	2850	74395
Other	5390	34148	1622	27847	0	0	0	69007
Industrial	984	0	0	0	19882	0	0	20866
Water	933	8243	0	2005	925	32401	4824	49331
Residential	0	0	0	0	0	6989	50824	57813
unclassified	0	0	0	0	0	0	0	0
Sum	99969	1060113	56936	34023	20807	42357	65081	
Producer	0,54	0,91	0,63	0,82	0,96	0,76	0,78	
User	0,63	0,94	0,48	0,40	0,95	0,66	0,88	
Hellden	0,58	0,92	0,55	0,54	0,95	0,71	0,83	
Short	0,41	0,86	0,38	0,37	0,91	0,55	0,71	
KIA Per Class	0,51	0,64	0,61	0,81	0,95	0,76	0,77	
Overall Accuracy	0,86							
KIA	0,66							

Figure 14. Regression tree for land cover mapping in Cho Moi district

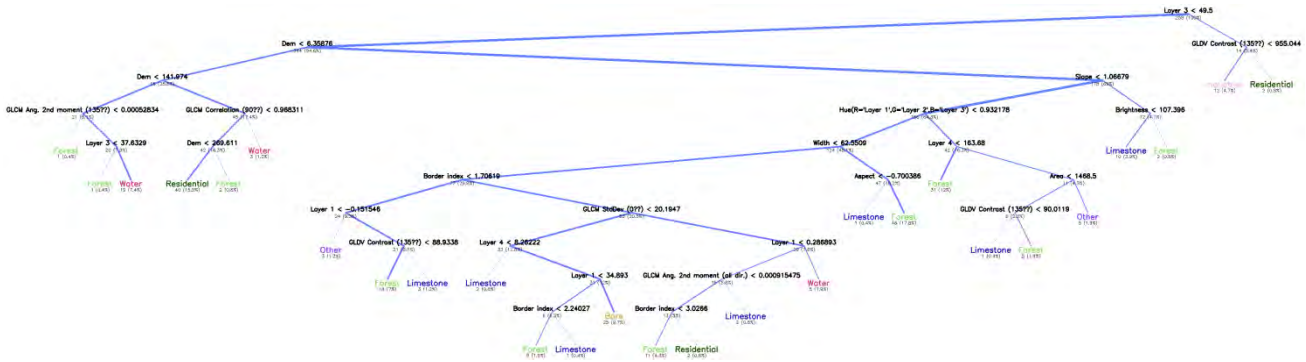
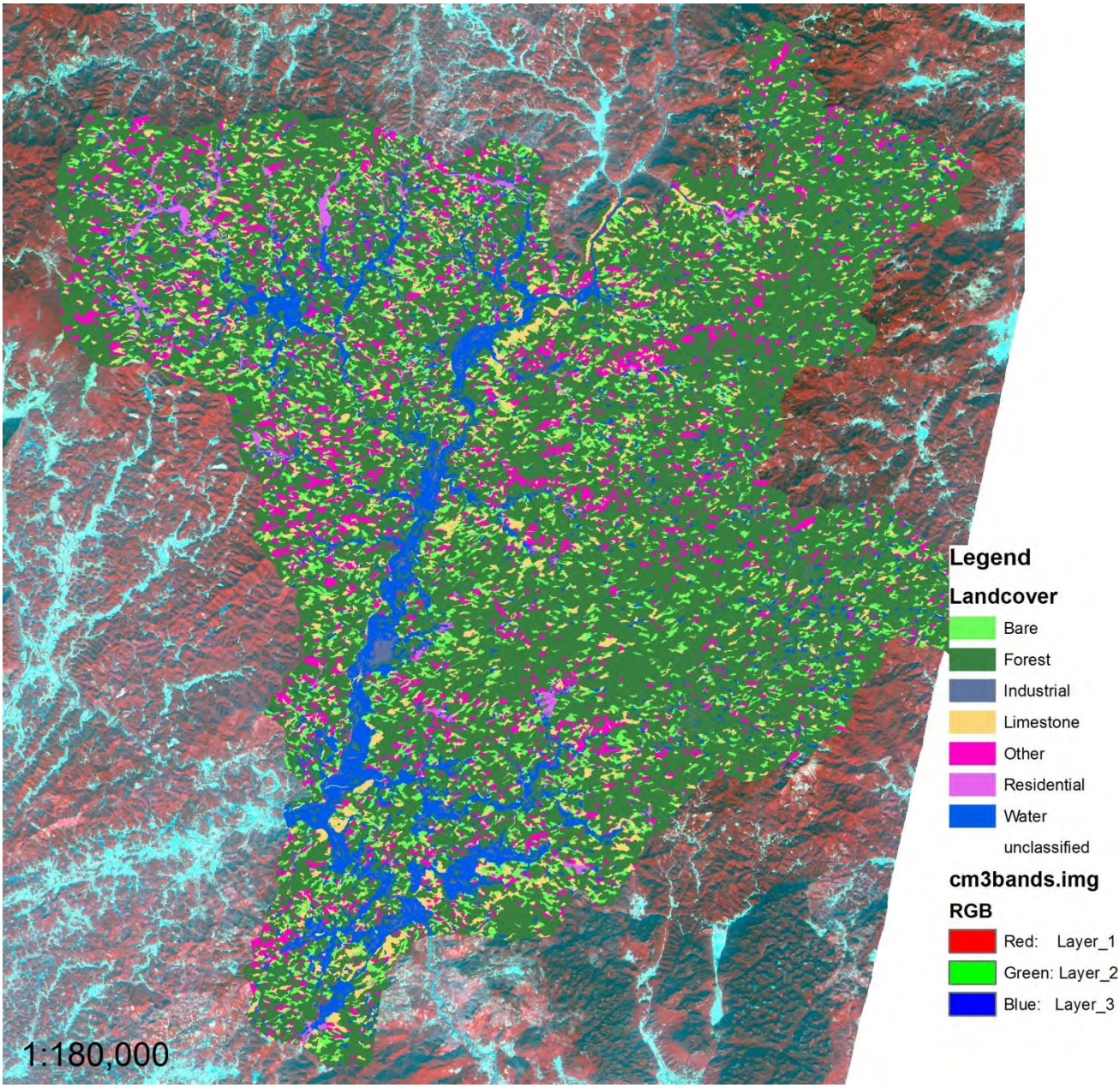


Figure 15. Land cover map of Cho Moi district



The segments classified at the first stage as forest were used for further classification. Using 275 ground control points forest segments were classified in different forest types (Figure 17). The regression tree (Figure 16) was derived from the training set. Based on this regression tree the forest segments were classified. At the pixel level the overall classification accuracy was 47% (Table 12). The reason for low accuracy was low separability on the image between mixed timber and bamboo, bamboo, regrowth forest on the limestone.

Table 12. Accuracy of the forest types map in Cho Moi district at pixel level

User \ Reference Class	Plantation	Forest garden	Mixed timber and bamboo	Natural eveegreen broadleaf forest (medium)	Bamboo forest	Natural eveegreen broadleaf forest (poor)	Natural regrowth forest on Limestone	Palm trees	Tea farm	Sum
Plantation	42358	0	0	0	10955	0	0	0	0	53313
Forest garden	0	71129	0	0	0	0	0	21375	909	93413
Mixed timeber and bamboo	0	0	9373	3420	0	6072	3454	0	0	22319
Natural eveegreen broadleaf forest (medi	17159	0	17424	42864	0	14282	0	0	0	91729
Bamboo forest	1767	0	0	0	6722	0	3476	0	0	11965
Natural eveegreen broadleaf forest (poor	0	0	17921	21850	22769	34437	23743	0	0	120720
Natural regrowth forest on Limestone for	1034	0	7084	26448	12513	5709	14413	0	0	67201
Palm trees	4525	4547	0	0	0	0	0	21458	0	30530
Tea farm	0	937	0	0	0	0	0	2028	3018	5983
unclassified	0	0	2272	7138	1476	6962	6504	0	0	24352
Sum	66843	76613	54074	101720	54435	67462	51590	44861	3927	
Producer	0,63	0,93	0,17	0,42	0,12	0,51	0,28	0,48	0,77	
User	0,79	0,76	0,42	0,47	0,56	0,29	0,21	0,70	0,50	
Hellden	0,71	0,84	0,25	0,44	0,20	0,37	0,24	0,57	0,61	
Short	0,54	0,72	0,14	0,28	0,11	0,22	0,14	0,40	0,44	
KIA Per Class	0,59	0,91	0,14	0,30	0,10	0,36	0,17	0,45	0,77	
Overall Accuracy	0,47									
KIA	0,39									

Figure 16. Regression tree for forest types mapping in Cho Moi district

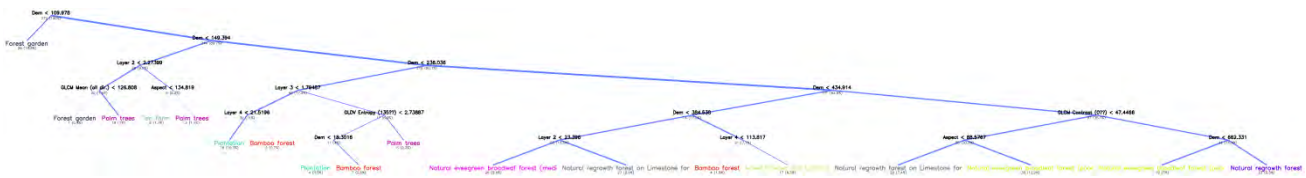
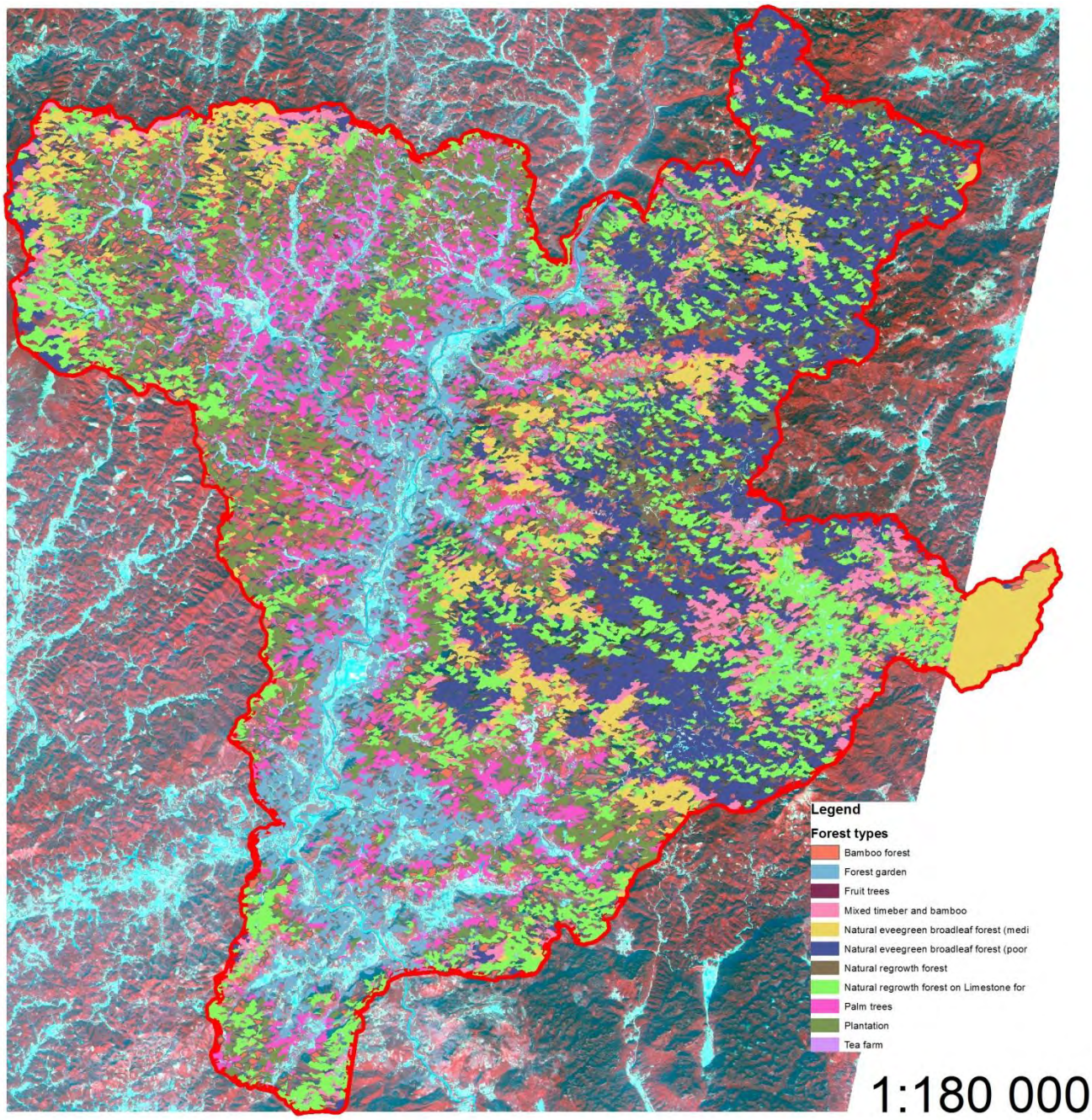


Figure 17. Forest types map Cho Moi district



3.4. Forest cover map of Cho Moi district (Bac Kan province) based on DMC data

Using 391 ground control points 22919 segments were classified in Cho Moi district. The regression tree (Figure 18) was derived from the training set. Based on this regression tree the segments were classified (Figure 19). For the forest types classification features were selected by the CART classifier at the training stage of the analysis. The overall classification accuracy (i.e. percentage of correctly classified samples) estimated at pixel level was 100% (Table 13). The Kappa coefficient of inter-rater agreement (KIA) showed high agreement with the test set.

Figure 18. Regression tree for land cover mapping in Cho Moi district using DMC data

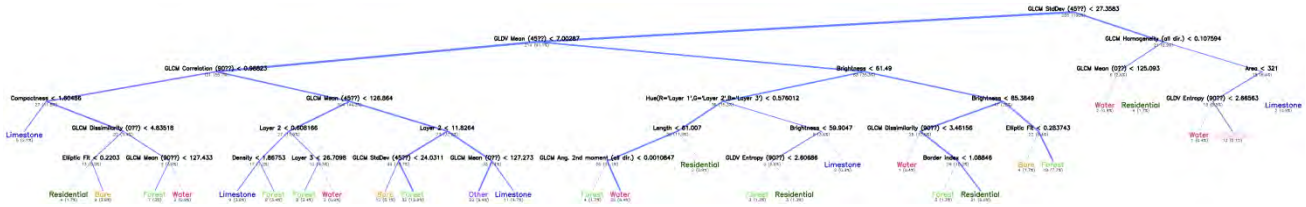


Figure 19. Land cover map of Cho Moi district using DMC data

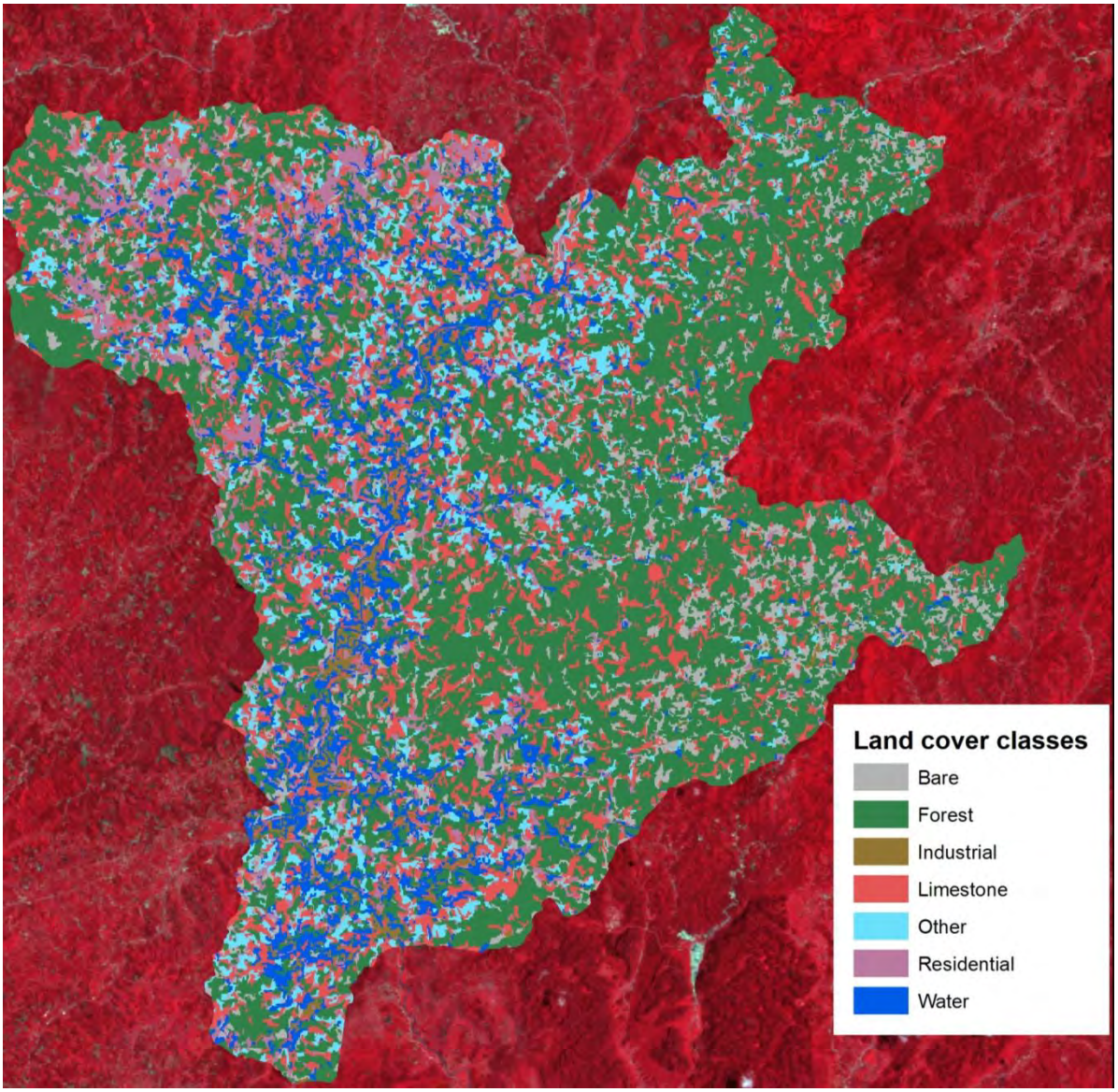


Table 13. Accuracy of the forest types map in Cho Moi district using DMC data

User \ Reference Class	Limestone	Forest	Bare	Other	Industrial	Water	Residential	Sum
Limestone	5503	0	0	0	0	0	0	5503
Forest	0	51764	0	0	0	0	0	51764
Bare	0	0	4151	0	0	0	0	4151
Other	0	0	0	2487	0	0	0	2487
Industrial	0	0	0	0	1373	0	0	1373
Water	0	0	0	0	0	5775	0	5775
Residential	0	0	0	0	0	0	7614	7614
unclassified	0	0	0	0	0	0	0	0
Sum	5503	51764	4151	2487	1373	5775	7614	
Producer	1	1	1	1	1	1	1	
User	1	1	1	1	1	1	1	
Hellden	1	1	1	1	1	1	1	
Short	1	1	1	1	1	1	1	
KIA Per Class	1	1	1	1	1	1	1	
Overall Accuracy	1							
KIA	1							

4.Discussion

4.1. Segmentation parameters

Previous studies (e.g. FORMIS project) aimed to forest status mapping using the SPOT 5 satellite imagery showed that the software-based image segmentation process failed to establish "meaningful" image objects in natural forest area of Vietnam where clear-cut boundaries between forest types are normally absent (Schweter, 2012). The FORMIS project was testing the forest status mapping in its three pilot districts using mainly visual interpretation and manual on-screen digitizing based on available SPOT 5 satellite imagery. The study also identified that image segmentation appears to produce very robust results for built-up and agricultural area, where abrupt boundaries are the norm and where generally rectangular shapes prevail. The test showed that an increase in segmentation detail appears not a suitable means to improve the classification result, as it requires substantial post-processing and editing and risks making the approach unfeasible in terms of effort and workload (Schweter, 2012). One of the key weaknesses of the study was wrongly selected segmentation parameters. It was suggested to use segmentation scale 70 – 100 (Schweter, 2012). The current study suggested using the segmentation scale between 40 and 50 (Figure 9). The lower segmentation scale allowed to bigger number of small segments with acceptable level of classification accuracy.

In our study it was found that the overall accuracy of the object-oriented classification is decreasing for larger average object sizes obtained from the similar images, which is in agreement with the results reported by other studies (Dorren et al., 2003; Hirata and Takahashi, 2011).

4.2. FIPI classification system

Two official land use classification systems are operating in Vietnam: that of the GDLA under MONRE, which focuses primarily on land use management and planning, and that of FIPI under MARD, which focuses on forest management. This situation creates inconsistencies between existing land use 'categories' and inconsistencies in the available forest data (Hoang, 2010). According to CIFOR (Pham, 2012) such inconsistencies complicate efforts to determine the most appropriate land use 'legend' or classification for the country for REDD+ accounting and monitoring (Table 14). Both systems include data on the total area under the three types of forest management as well as areas where natural forest is distinguished from plantation forest. However, the most significant difference between the two systems is the 'forest identity' of 'unused land' in the GDLA and 'bare land, mountain without forest', also referred to as 'forest land without forest' in the Forest Protection Department (Pham, 2012).

The difference in land cover classification caused the difference in the total forest area estimation by two agencies. The differences in the total area classified as forest in 2005 and 2007 were 4 million ha and 2.7 million ha, respectively. The cause of these differences is that areas classified as 'forest land without forest' under the MARD system are classified as 'unused land' plus land for forest regeneration under the GDLA system (Pham, 2012). Indeed, natural forest appears to be the only category for which the two systems provide consistent figures. The figures on changes in forest cover also differ between the two systems. It is unclear what data the estimations are based on and whether the same land areas have been given different land use characteristics or classifications in the two systems (Hoang, 2010; Pham, 2012).

Table 14. Comparison of two land use classification systems operating in Vietnam (Pham, 2012)

GDLA land use classification			FPD land use classification	
1	Agriculture	Forest land in both categories	I	Forest
1.1	Agriculture production land		A	Natural forest
1.2	Forestry land		A1	Forest (wood stock)
1.2.1	Production forest		A2	Bamboo forest
1.2.2	Protection forest		A3	Mixed forest
1.2.3	Special-uses forest		A4	Mangrove forest
1.3	Aquaculture land	FPD: Forest land without forest GLDA: Unused land	A5	Rock mountain forest
1.4	Salt production		B	Planted forest
1.5	Other agriculture land		B1	Planted forest (w/wood stock)
2	Non-agriculture land		B2	Planted forest (w/o wood stock)
3	Unused land		B3	Bamboo forest for production
4	Coastal wetland (observed)		B4	Specialty tree
			II	Bare land, mountain without forest
		Other land uses	C1	Ia (grass, cane)
			C2	Ib (scattered brush, tree, bamboo)
			C3	Ic (a lot of re-growth wood trees)
			C4	Rock mountain without forest
			C5	Sandbanks, swamps etc.
			III	Other land

Source: CIFOR (Pham, 2012)

In order to develop the common approaches for data analysis and reduce the costs for data collection it is necessary to harmonize the classification systems used in MONRE and MARD.

Additionally the currently used classification system in Vietnam needs to be revised and updated. Currently there are number of forest cover classed where the forest type is mixed with land use and geology. For example, group of classes “rocky forest” and “non rocky forest” (Table 1). The structure of the classed is the same, the only difference is a bed rock which is not always visible at aerial images. The same is with the class «forest on limestone» (Figure 20). The geological structure of such class is not visible at the remote sensing data therefore cannot be identified with high accuracy using the data mining algorithms.

The classes of timber forest «medium», «rich» and «poor» are based on the wood stock. During the field data collection the classes were identified by experts using the visual interpretation and without measuring the wood amount on the plots. This may cause possible errors in classification.

Figure 20. Forest on lime stone

4.3. Classification methodology

In general, classifications produced using SPOT 5 and DMC data created similar and visually acceptable depictions of the broad land cover classes present within the study area.

The methods proposed in this study are image and class structure independent therefore can be applied to any of the provinces in Vietnam. The results of classification accuracy are highly influenced by the spatial resolution of the remote sensing data (i.e. accuracy if higher for images with higher spatial resolution). The only one disadvantage of the proposed method is the required number of sample plots for image classification. It was calculated that at least 48 ground control points per class (24 training set and 24 for the test set) are needed to obtain reliable classification result. Unfortunately, the collection and use of large test set and training set might be prohibitive to assemble for logical or financial reasons. In case of test set it would represent «inefficient use of data» as these data are not used by classifier.

The method is based on utilization both remote sensing data and ancillary data (i.e. digital elevatiob model). The first trials of SPOT 5 image classification without DEM showed low classification accuracy. Most of the forests in Vietnam are located in mountainous regions within very diverse topographical conditions. The tests of image classification with DEM and without in Huong Son districts showed significant improve of classification accuracy when the DEM was included into the classification process. The altitude above sea level was one of the main decision tree feature in Cho Moi land cover mapping (Fig. 14), Cho Moi forest types mapping (Fig. 16), Huong Son forest types mapping (Fig. 12). In order to improve the classification accuracy the DEM was recalculated into the slope and aspect. The mean and standard deviation of those features were used for classification. The analysis of the regression trees used for classification showed that the following features were selected by the software for land cover classification: DEM, near infra red spectral band, slope, texture features (GLDV contrast, GLCM Correlation, GLCM Ang. 2nd moment, GLCM correlation, GLCM Homogeneity, GLCM Dissimilarity, GLDV Entropy), border index, area of the segment. Including the texture features into the classification is increasing the complexity of computation (up to 18 hours for 1 district), but improving the accuracy of classification.

The results showed that the accuracy of objects recognition is good at the land cover types level, but potentially some errors may occur when the method will be applied for the big areas, especially for recognition of the forest types which are very similar on the images. Therefore it is suggested to check visually the maps by local experts, in order to correct misclassified segments.

4.4. Accuracy assessment

Both the ground truth data and the spatial resolution of the remote sensing data are influencing the accuracy of the classification. When comparing overall classification accuracy there is an apparently consistent, but small (1–4%), improvement in Cho Moi district of Ha Tinh province, where the bigger number of sample plots were used. It was not possible to obtain the accurate results of forest types mapping using DMC data. Deciding on a sampling effort that is economically feasible and logistically possible, with one that allows for statistically rigorous comparisons is a major consideration in operational settings where resources are often limited (Congalton, 1991). A sample size that is too large can waste valuable resources that provide unnecessary precision, whereas a sampling effort that is too small may not be capable of resolving any statistically meaningful differences when comparing classification accuracies (Foody, 2009).

The FIPI map was used to collect the training set and test set data for Cho Moi district. The accuracy of this map was not tested; therefore some possible errors cannot be excluded from the classification. For the future land cover mapping in Vietnam it is recommended to use only ground control points to train the algorithm and evaluate the accuracy. The accuracy of the existing classification can be increased by the following measures:

- to increase the number of ground control points for each forest type;
- to equalize the number of ground control points used in the training set and the test set;
- to include more detailed digital elevation model also in segmentation process;
- to utilize high resolution images published in Google Earth to collect the ground truth data for the classes without changes.

Additionally the accuracy of object-based image analysis can be improved by using the logic of updating and backdating image object within versatile GIS environment.

One of the most important issue in object-based image analysis is accuracy assessment, which can be implemented both on pixel level and image object level. Object-based validation can provide accurate and precise estimate of the confusion matrix in order to assess the thematic quality of a land cover or forest types maps. The lower variance obtained with object-based sampling demonstrates its usefulness as it means that the sampling effort (number of samples) can be reduced (Radoux et. al, 2012). However, object-based validation has its drawbacks which could compensate the gain from sampling effort reduction. First, the extent of image-objects may not correspond to the extent of real world objects. This is not a problem in the case of over-segmentation as the land cover can then be unambiguously identified, but it is a real issue in the case of under-segmentation. When under-segmentation cannot be avoided, a fuzzy validation scheme is necessary, which increases the cost of the analysis and the cost per sample point. Second, object-based validation is more sensitive to labeling errors than point-based validation. A clear and well understood definition of each land cover class is therefore of paramount importance and the labeling of each sample point could suffer from this. Finally, there is no simple analytical solution to calculate the number of samples necessary to fulfill a given precision of accuracy assessment. This may increase the cost of the planning as map simulations are needed to estimate the variance (Radoux et. al, 2012). Contrary to pixel-based validation, boundary errors can be consequently reduced without affecting the sample representativity. However, object-based quality assessment is more sensitive to labelling errors than pixel-based accuracy. The increased cost for the validation of a single object may thus compensate the gain from the reduced number of objects needed because of the lower prediction variance. However, further studies are necessary to provide a generic analytical solution of the prediction variance as it already exists for pixel-based validation (Radoux et. al, 2012).

4.5. Spatial resolution and costs

Since the Landsat data was not suitable for the analysis two potential data sources were identified. The costs of DMC data for the 1 year for the whole country are around 72 000 euro (22 m spatial resolution, 3 spectral channels). The local costs of Spot 5 data for the whole country are around 2 mln. euro. Due to the reason that it was not possible to map the forest types in Cho Moi province of Vietnam with DMC data it is not possible to compare the two data sources. Based on the results from this study it is suggested to use the Spot 5 data to map the forest resources within the country and DMC data to monitor the deforestation.

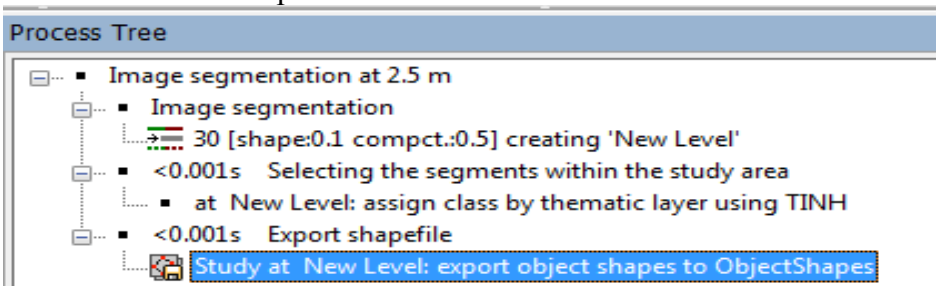
Annex 1. Instructions for SPOT5 Image processing in eCognition

- Input data for forest cover mapping
  - Spot 5 scene, 2.5 m
  - Spot 5 scene, 10 m
  - Digital elevation model
  - Sample plots
  - Boundaries of the study area

Steps for data processing

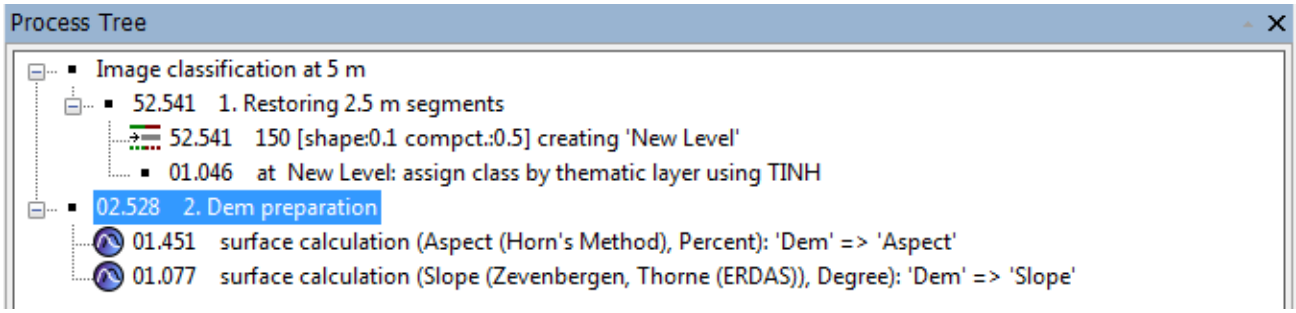
Step 1. Ruleset development and image segmentation:

1. Copy the data to your computer
2. Open the data in ArcGIS to understand the content
3. Start eCognition
4. Create the project for the high resolution image segmentation (File – Load Image File – Select 2.5 m Spot 5 pan sharpened scene)
5. Save the project (File – Save project as…)
6. Modify the project by adding the boundaries of the study area (File – Modify open project – Thematic Layer Alias – Insert – Boundaries (shape file)). Rename it to «Boundaries» by double click.
7. Define the subset for the analysis (File – Modify open project – Subset selection)
8. Start process tree development (Process – Process Tree)
9. Add name of the Ruleset (Righ click – Append New (Ctrl + A), ” Image segmentation at 2.5 m”)
10. Add the subrocess (Select process - Righ click – Insert child (Ctrl + I), ” Image segmentation”)
11. Add the suprocess (Select process - Righ click – Insert child (Ctrl + I) select **multiresolution image segmentation**, use the following parameters, next slide)
12. Execute the process (Select process - Execute (F5)). It may take some time to calculate.
13. Select the segments within the study area. Add the suprocess (Select process - Righ click – Insert child (Ctrl + I), ” Selecting the segments within the study area”)
14. Add the suprocess (Select process - Righ click – Insert child (Ctrl + I) select **assign class by thematic layer**, use the following parameters, next slide and create new class ”study”)
15. Execute the process (Select process - Execute (F5)). It may take some time to calculate.
16. Repeat the step 8 to create new process ”Export”
17. Add the suprocess (Select process - Righ click – Insert child (Ctrl + I) select **export vector layer**, use the following parameters and execute the process, result of ruleset development:



Step 2. Ruleset preparation for the classification:

1. Start eCognition
2. Create the project for the high resolution image segmentation (File – Load Image File – Select 10 m scene)
3. Save the project (File – Save project as…)
4. Modify the project by adding the boundaries of the study area (File – Modify open project – Thematic Layer Alias – Insert – Boundaries (shape file)). Rename it to «Boundaries» by double click.
5. Add the Dem and rename it as ”Dem”
6. Add the results of 2.5 m segmentation (Thematic Layer Alias – Insert – Boundaries (shape file)). Rename it to «Segments» by double click.
7. Save the project ” ChoMoi_5_m_classification.dpr”
8. Define the subset for the analysis (File – Modify open project – Subset selection)
9. Start process tree development (Process – Process Tree)
10. Add name of the Ruleset (Righ click – Append New (Ctrl + A), ” Image classification at 5 m”)
11. Add name of the Ruleset (Righ click – Append New (Ctrl + A), ”1. Restoring 2.5 m segments”)
12. Add the suprocess (Select process - Righ click – Insert child (Ctrl + I) select **multiresolution image segmentation**, use the following parameters, next slide)
13. Run the segmentation process
14. Add the suprocess (Select process - Righ click – Insert child (Ctrl + I) select **assign class by thematic layer**, use the following parameters, next slide and create new class ”study”)
15. Add the new process section «2. Dem preparation»
16. Add the suprocess **surface calculation - Slope** (use the parameters presented at the next slide)
17. Add the suprocess **surface calculation - Aspect** (use the parameters presented at the next slide)
18. Run the processing
19. Run the segmentation process
20. Add the suprocess (Select process - Righ click – Insert child (Ctrl + I) select **assign class by thematic layer**, use the following parameters, next slide and create new class ”study”)
21. Add the new process section «2. Dem preparation»
22. Add the suprocess **surface calculation - Slope** (use the parameters presented at the next slide)
23. Add the suprocess **surface calculation - Aspect** (use the parameters presented at the next slide)
24. Run the processing, result of ruleset development:



Step 3. Preparing the training set and test set in ArcGIS:

1. Load your field plots in ArcGIS as a shape file
2. Check the classification to correct the possible mistakes in class names
3. Create 2 variables for the shape file:
    1. Land cover class (agriculture, bare, forest, residential, water)
    2. Forest class (forest types)
4. Calculate the number of plots per land cover class and forest class, minimum should be 12 plots per class (i.e. 6 for training set, 6 for the test set)
5. If there is not enough number of plots, you will need to establish it by going to the field or using high resolution data from Google Earth (Note! Be careful, it can be old).
6. Divide the plots into 2 files for each classification step (i.e. land cover and forest types):
    1. Training set
    2. Test set

Step 6. Preparing the test set and training set for land cover classification:

1. Import test set and training sets into the project (File – Modify open – Thematic Layer) add test set «Test» and training set «Train»
2. Prepare the test set for accuracy assessment – Add process «3. Prepare the test set for LANDCOVER accuracy assessment»
    - Add the process **delete all samples**
    - Add the process **assign class by thematic layer** using the layer «Test», create new class using the table field ”Landcover”, use the parameters presented at the next slide
    - Add the process **classified image objects to samples (see next slides)**
3. Manually create TTA mask from samples: go to the eCognition menu: Classification – Samples – Create TTA mask from samples
4. Save TTA mask for further reference Classification – Samples – Save TTA mask
5. Revise your samples

Step 7. CART Land cover classification and accuracy assessment:

1. Copy the part of the ruleset «4. Prepare the training set for LANDCOVER classification»
2. Modify it accordingly, i.e. the process **assign class by thematic layer** using the layer «Train», create new class using the table field ”Landcover”, use the parameters presented at the next slide
3. Add the new ruleset part «5. LANDCOVER classification»
4. Right click on the ruleset window and choose Load ruleset
5. Select the file CART ruleset.dcp, provided
6. Modify the ruleset according the following settings
7. Save the project and execute classification
8. Evaluate the regression tree by observing the graphical file .bmp
9. Did you selected right variables for the interpretation?
10. Evaluate the accuracy of the classification by means of eCognition at the pixel level Tools – Accuracy Assessment – Based on TTA mask
11. Evaluate the accuracy on object level in ArcGIS

Annex 2. Table of sample plots in Cho Moi and Huong Son districts

Number	Class	Role	Longitude	Latitude
		Huong Son District		
Land cover classification				
1	Agriculture	Test set	105° 27.389' E	18° 34.280' N
2	Agriculture	Test set	105° 27.555' E	18° 34.285' N
3	Agriculture	Test set	105° 27.041' E	18° 34.158' N
4	Agriculture	Test set	105° 27.240' E	18° 33.975' N
5	Agriculture	Test set	105° 27.543' E	18° 34.248' N
6	Agriculture	Test set	105° 25.162' E	18° 31.565' N
7	Agriculture	Test set	105° 25.439' E	18° 31.541' N
8	Agriculture	Test set	105° 25.070' E	18° 31.486' N
9	Forest	Test set	105° 18.570' E	18° 34.480' N
10	Forest	Test set	105° 10.884' E	18° 34.400' N
11	Forest	Test set	105° 11.100' E	18° 34.340' N
12	Forest	Test set	105° 11.471' E	18° 34.118' N
13	Forest	Test set	105° 11.633' E	18° 34.261' N
14	Forest	Test set	105° 12.203' E	18° 34.328' N
15	Forest	Test set	105° 18.120' E	18° 34.285' N
16	Bare	Test set	105° 18.407' E	18° 34.126' N
17	Forest	Test set	105° 10.624' E	18° 33.544' N
18	Forest	Test set	105° 12.065' E	18° 33.411' N
19	Forest	Test set	105° 12.768' E	18° 33.434' N
20	Agriculture	Test set	105° 17.967' E	18° 33.242' N
21	Water	Test set	105° 18.162' E	18° 33.285' N
22	Forest	Test set	105° 9.442' E	18° 32.996' N
23	Forest	Test set	105° 9.705' E	18° 33.127' N
24	Forest	Test set	105° 25.344' E	18° 33.119' N
25	Forest	Test set	105° 8.965' E	18° 32.970' N
26	Agriculture	Test set	105° 19.263' E	18° 32.995' N
27	Forest	Test set	105° 9.307' E	18° 32.939' N
28	Forest	Test set	105° 9.481' E	18° 32.575' N
29	Forest	Test set	105° 25.902' E	18° 32.588' N
30	Forest	Test set	105° 9.618' E	18° 32.426' N
31	Forest	Test set	105° 19.884' E	18° 32.399' N
32	Forest	Test set	105° 18.614' E	18° 32.337' N
33	Forest	Test set	105° 19.548' E	18° 32.318' N
34	Forest	Test set	105° 26.011' E	18° 32.396' N
35	Forest	Test set	105° 9.705' E	18° 32.110' N
36	Forest	Test set	105° 10.361' E	18° 31.984' N
37	Forest	Test set	105° 19.856' E	18° 32.095' N
38	Forest	Test set	105° 9.748' E	18° 31.961' N
39	Forest	Test set	105° 9.993' E	18° 31.893' N

40	Forest	Test set	105° 10.755' E	18° 31.818' N
41	Bare	Test set	105° 19.534' E	18° 31.891' N
42	Forest	Test set	105° 19.908' E	18° 31.939' N
43	Bare	Test set	105° 20.385' E	18° 31.903' N
44	Forest	Test set	105° 10.550' E	18° 31.845' N
45	Bare	Test set	105° 20.239' E	18° 31.711' N
46	Forest	Test set	105° 10.208' E	18° 31.628' N
47	Bare	Test set	105° 20.284' E	18° 31.624' N
48	Residential	Test set	105° 24.976' E	18° 30.889' N
49	Residential	Test set	105° 25.464' E	18° 31.082' N
50	Residential	Test set	105° 25.334' E	18° 30.921' N
51	Residential	Test set	105° 25.391' E	18° 30.917' N
52	Residential	Test set	105° 25.405' E	18° 30.814' N
53	Residential	Test set	105° 25.532' E	18° 30.854' N
54	Residential	Test set	105° 25.255' E	18° 30.793' N
55	Residential	Test set	105° 25.371' E	18° 30.661' N
56	Residential	Test set	105° 25.505' E	18° 30.735' N
57	Residential	Test set	105° 25.041' E	18° 30.515' N
58	Residential	Test set	105° 25.373' E	18° 30.535' N
59	Residential	Test set	105° 25.958' E	18° 30.505' N
60	Residential	Test set	105° 26.099' E	18° 30.468' N
61	Residential	Test set	105° 25.466' E	18° 30.444' N
62	Water	Test set	105° 23.715' E	18° 29.313' N
63	Water	Test set	105° 23.462' E	18° 29.218' N
64	Water	Test set	105° 23.408' E	18° 29.184' N
65	Residential	Test set	105° 27.222' E	18° 30.081' N
66	Agriculture	Test set	105° 27.816' E	18° 30.219' N
67	Bare	Test set	105° 27.740' E	18° 29.971' N
68	Agriculture	Test set	105° 27.556' E	18° 29.982' N
69	Residential	Test set	105° 27.290' E	18° 29.927' N
70	Agriculture	Test set	105° 27.403' E	18° 29.920' N
71	Agriculture	Test set	105° 19.862' E	18° 29.724' N
72	Agriculture	Test set	105° 27.691' E	18° 29.895' N
73	Residential	Test set	105° 27.712' E	18° 29.716' N
74	Residential	Test set	105° 26.873' E	18° 29.059' N
75	Forest	Test set	105° 26.692' E	18° 28.634' N
76	Forest	Test set	105° 26.818' E	18° 28.608' N
77	Forest	Test set	105° 26.688' E	18° 28.320' N
78	Bare	Test set	105° 17.378' E	18° 27.457' N
79	Bare	Test set	105° 15.079' E	18° 26.857' N
80	Forest	Test set	105° 16.144' E	18° 27.112' N
81	Forest	Test set	105° 16.176' E	18° 26.919' N
82	Forest	Test set	105° 16.021' E	18° 26.691' N
83	Residential	Test set	105° 16.472' E	18° 26.910' N
84	Forest	Test set	105° 16.680' E	18° 26.843' N
85	Water	Test set	105° 13.254' E	18° 26.247' N

86	Residential	Test set	105° 13.173' E	18° 26.202' N
87	Forest	Test set	105° 14.633' E	18° 26.654' N
88	Water	Test set	105° 16.421' E	18° 26.696' N
89	Forest	Test set	105° 12.885' E	18° 25.868' N
90	Forest	Test set	105° 13.093' E	18° 25.992' N
91	Forest	Test set	105° 12.024' E	18° 25.269' N
92	Forest	Test set	105° 12.765' E	18° 28.596' N
93	Forest	Test set	105° 12.970' E	18° 28.416' N
94	Forest	Test set	105° 13.536' E	18° 28.079' N
95	Bare	Test set	105° 13.357' E	18° 27.967' N
96	Forest	Test set	105° 13.396' E	18° 27.845' N
97	Forest	Test set	105° 13.593' E	18° 27.752' N
98	Forest	Test set	105° 14.008' E	18° 27.939' N
99	Forest	Test set	105° 13.735' E	18° 27.865' N
100	Forest	Test set	105° 13.977' E	18° 27.731' N
101	Forest	Test set	105° 14.423' E	18° 27.601' N
102	Forest	Test set	105° 14.588' E	18° 27.347' N
103	Forest	Test set	105° 14.932' E	18° 27.491' N
104	Forest	Test set	105° 15.982' E	18° 27.500' N
105	Residential	Test set	105° 18.387' E	18° 27.452' N
106	Forest	Test set	105° 15.286' E	18° 26.738' N
107	Forest	Test set	105° 15.047' E	18° 26.680' N
108	Forest	Test set	105° 17.622' E	18° 26.940' N
109	Forest	Test set	105° 17.779' E	18° 26.932' N
110	Forest	Test set	105° 15.955' E	18° 26.494' N
111	Residential	Test set	105° 15.819' E	18° 26.197' N
112	Agriculture	Test set	105° 16.233' E	18° 25.741' N
113	Agriculture	Test set	105° 16.415' E	18° 25.563' N
114	Agriculture	Test set	105° 17.453' E	18° 25.959' N
115	Residential	Test set	105° 17.534' E	18° 25.827' N
116	Agriculture	Test set	105° 17.164' E	18° 25.774' N
117	Residential	Test set	105° 17.168' E	18° 25.582' N
118	Forest	Test set	105° 18.459' E	18° 24.858' N
119	Forest	Test set	105° 18.373' E	18° 24.911' N
120	Forest	Test set	105° 18.578' E	18° 24.859' N
121	Agriculture	Training set	105° 27.957' E	18° 33.751' N
122	Agriculture	Training set	105° 26.038' E	18° 33.498' N
123	Agriculture	Training set	105° 25.994' E	18° 33.590' N
124	Agriculture	Training set	105° 26.081' E	18° 33.288' N
125	Agriculture	Training set	105° 26.158' E	18° 33.243' N
126	Agriculture	Training set	105° 26.079' E	18° 33.200' N
127	Agriculture	Training set	105° 26.031' E	18° 33.153' N
128	Residential	Training set	105° 31.746' E	18° 33.050' N
129	Residential	Training set	105° 30.538' E	18° 32.423' N
130	Residential	Training set	105° 31.073' E	18° 32.353' N
131	Residential	Training set	105° 31.375' E	18° 32.504' N

132	Residential	Training set	105° 32.243' E	18° 32.659' N
133	Residential	Training set	105° 32.654' E	18° 32.161' N
134	Agriculture	Training set	105° 25.132' E	18° 31.829' N
135	Agriculture	Training set	105° 25.413' E	18° 31.793' N
136	Residential	Training set	105° 30.077' E	18° 32.038' N
137	Residential	Training set	105° 30.610' E	18° 31.883' N
138	Residential	Training set	105° 30.954' E	18° 32.046' N
139	Residential	Training set	105° 29.552' E	18° 31.530' N
140	Residential	Training set	105° 26.501' E	18° 30.912' N
141	Residential	Training set	105° 28.844' E	18° 29.922' N
142	Residential	Training set	105° 29.336' E	18° 29.308' N
143	Residential	Training set	105° 24.924' E	18° 28.440' N
144	Residential	Training set	105° 25.789' E	18° 28.604' N
145	Forest	Training set	105° 18.767' E	18° 34.928' N
146	Forest	Training set	105° 10.142' E	18° 34.670' N
147	Forest	Training set	105° 10.025' E	18° 34.588' N
148	Forest	Training set	105° 10.315' E	18° 34.512' N
149	Bare	Training set	105° 18.707' E	18° 34.404' N
150	Bare	Training set	105° 18.246' E	18° 34.346' N
151	Forest	Training set	105° 10.438' E	18° 34.258' N
152	Forest	Training set	105° 11.333' E	18° 34.263' N
153	Forest	Training set	105° 11.615' E	18° 34.033' N
154	Forest	Training set	105° 12.344' E	18° 34.139' N
155	Forest	Training set	105° 17.951' E	18° 34.140' N
156	Forest	Training set	105° 11.503' E	18° 33.972' N
157	Forest	Training set	105° 12.103' E	18° 33.998' N
158	Forest	Training set	105° 12.011' E	18° 33.652' N
159	Forest	Training set	105° 12.606' E	18° 33.899' N
160	Forest	Training set	105° 18.336' E	18° 33.829' N
161	Forest	Training set	105° 9.447' E	18° 33.835' N
162	Forest	Training set	105° 10.167' E	18° 33.800' N
163	Forest	Training set	105° 12.168' E	18° 33.779' N
164	Forest	Training set	105° 12.934' E	18° 33.864' N
165	Forest	Training set	105° 9.220' E	18° 33.607' N
166	Forest	Training set	105° 10.391' E	18° 33.475' N
167	Forest	Training set	105° 12.393' E	18° 33.647' N
168	Forest	Training set	105° 12.663' E	18° 33.545' N
169		Training set	105° 17.761' E	18° 33.185' N
170	Water	Training set	105° 19.376' E	18° 32.997' N
171	Water	Training set	105° 18.316' E	18° 32.864' N
172	Bare	Training set	105° 19.721' E	18° 32.398' N
173	Agriculture	Training set	105° 20.059' E	18° 32.261' N
174	Bare	Training set	105° 20.158' E	18° 31.809' N
175	Forest	Training set	105° 10.637' E	18° 31.558' N
176	Forest	Training set	105° 10.865' E	18° 31.491' N
177	Residential	Training set	105° 25.212' E	18° 31.094' N

178	Forest	Training set	105° 29.975' E	18° 30.185' N
179	Forest	Training set	105° 29.434' E	18° 30.150' N
180	Water	Training set	105° 23.323' E	18° 29.546' N
181	Water	Training set	105° 23.512' E	18° 29.594' N
182	Water	Training set	105° 22.950' E	18° 29.330' N
183	Water	Training set	105° 23.482' E	18° 29.401' N
184	Water	Training set	105° 23.104' E	18° 29.329' N
185	Forest	Training set	105° 29.875' E	18° 28.207' N
186	Forest	Training set	105° 30.120' E	18° 27.992' N
187	Forest	Training set	105° 29.837' E	18° 27.595' N
188	Forest	Training set	105° 21.320' E	18° 30.763' N
189	Forest	Training set	105° 21.181' E	18° 30.760' N
190	Residential	Training set	105° 20.425' E	18° 30.123' N
191	Agriculture	Training set	105° 22.722' E	18° 30.382' N
192	Agriculture	Training set	105° 22.849' E	18° 30.304' N
193	Residential	Training set	105° 27.702' E	18° 30.102' N
194	Agriculture	Training set	105° 27.352' E	18° 29.784' N
195	Agriculture	Training set	105° 27.801' E	18° 29.809' N
196	Forest	Training set	105° 19.456' E	18° 29.006' N
197	Agriculture	Training set	105° 26.994' E	18° 29.078' N
198	Forest	Training set	105° 26.659' E	18° 28.530' N
199	Forest	Training set	105° 26.533' E	18° 28.508' N
200	Forest	Training set	105° 15.935' E	18° 27.445' N
201	Forest	Training set	105° 13.528' E	18° 26.883' N
202	Forest	Training set	105° 13.493' E	18° 26.769' N
203	Forest	Training set	105° 13.760' E	18° 26.674' N
204	Forest	Training set	105° 14.486' E	18° 26.817' N
205	Forest	Training set	105° 15.022' E	18° 26.901' N
206	Forest	Training set	105° 14.780' E	18° 26.620' N
207	Residential	Training set	105° 15.315' E	18° 26.901' N
208	Residential	Training set	105° 23.925' E	18° 30.424' N
209	Bare	Training set	105° 13.540' E	18° 27.882' N
210	Agriculture	Training set	105° 14.313' E	18° 27.142' N
211	Residential	Training set	105° 15.856' E	18° 26.509' N
212	Residential	Training set	105° 16.009' E	18° 26.118' N
213	Agriculture	Training set	105° 17.668' E	18° 26.341' N
214	Agriculture	Training set	105° 17.805' E	18° 26.208' N
215	Bare	Training set	105° 13.321' E	18° 25.055' N
216	Forest	Training set	105° 15.888' E	18° 25.958' N
217	Forest	Training set	105° 16.570' E	18° 25.895' N
218	Forest	Training set	105° 16.329' E	18° 25.533' N
219	Forest	Training set	105° 16.667' E	18° 25.813' N
220	Forest	Training set	105° 16.897' E	18° 25.711' N
221	Forest	Training set	105° 17.285' E	18° 25.672' N
222	Residential	Training set	105° 17.636' E	18° 25.667' N
223	Forest	Training set	105° 17.771' E	18° 25.450' N

224	Agriculture	Training set	105° 18.575' E	18° 24.979' N
225	Forest	Training set	105° 13.063' E	18° 24.668' N
226	Forest	Training set	105° 13.016' E	18° 24.874' N
227	Forest	Training set	105° 13.572' E	18° 24.684' N
228	Forest	Training set	105° 18.406' E	18° 24.742' N
229	Forest	Training set	105° 18.383' E	18° 24.595' N
230	Bare	Training set	105° 18.664' E	18° 24.606' N
231	Forest	Training set	105° 18.828' E	18° 24.538' N
232	Forest	Training set	105° 18.434' E	18° 24.495' N
233	Forest	Training set	105° 18.549' E	18° 24.419' N
234	Bare	Training set	105° 28.263' E	18° 31.679' N
235	Forest	Training set	105° 28.999' E	18° 30.870' N
236	Forest	Training set	105° 28.807' E	18° 30.624' N
237	Forest	Training set	105° 29.353' E	18° 30.710' N
238	Forest	Training set	105° 29.310' E	18° 30.515' N
239	Forest	Training set	105° 29.421' E	18° 30.492' N
240	Forest	Training set	105° 29.784' E	18° 30.449' N
241	Bare	Training set	105° 30.869' E	18° 29.906' N
242	Forest	Training set	105° 31.742' E	18° 29.949' N
Forest cover classification				
243	Plantation	Training set	105° 18.767' E	18° 34.928' N
244	Natural evergreen broad leaved forest (<100m3/ha)	Training set	105° 10.142' E	18° 34.670' N
245	Natural evergreen broad leaved forest (<100m3/ha)	Training set	105° 10.025' E	18° 34.588' N
246	Natural regrowth	Training set	105° 10.315' E	18° 34.512' N
247	Plantation	Training set	105° 18.570' E	18° 34.480' N
248	Natural evergreen broad leaved forest (100-200m3/*	Training set	105° 10.884' E	18° 34.400' N
249	Plantation	Training set	105° 11.100' E	18° 34.340' N
250	Plantation	Training set	105° 11.471' E	18° 34.118' N
251	Plantation	Training set	105° 11.633' E	18° 34.261' N
252	Plantation	Training set	105° 12.203' E	18° 34.328' N
253	Plantation	Training set	105° 18.120' E	18° 34.285' N
254	Natural evergreen broad leaved forest (100-200m3/*	Training set	105° 10.438' E	18° 34.258' N
255	Natural regrowth	Training set	105° 12.344' E	18° 34.139' N
256	Plantation	Training set	105° 17.951' E	18° 34.140' N
257	Natural evergreen broad leaved forest (<100m3/ha)	Training set	105° 11.503' E	18° 33.972' N
258	Natural bamboo forest	Training set	105° 12.103' E	18° 33.998' N
259	Mixed timber and bamboo	Training set	105° 12.011' E	18° 33.652' N
260	Natural evergreen broad leaved forest (<100m3/ha)	Training set	105° 12.606' E	18° 33.899' N
261	Plantation	Training set	105° 18.336' E	18° 33.829' N
262	Plantation	Training set	105° 12.934' E	18° 33.864' N
263	Natural evergreen broad leaved forest (100-200m3/*	Training set	105° 10.391' E	18° 33.475' N
264	Natural evergreen broad leaved forest (<100m3/ha)	Training set	105° 12.663' E	18° 33.545' N
265	Natural evergreen broad leaved forest (<100m3/ha)	Training set	105° 12.065' E	18° 33.411' N
266	Plantation	Training set	105° 12.768' E	18° 33.434' N
267	Natural evergreen broad leaved forest (100-200m3/*	Training set	105° 9.442' E	18° 32.996' N
268	Natural evergreen broad leaved forest (>200m3/ha)	Training set	105° 9.705' E	18° 33.127' N

269	Plantation	Training set	105° 25.344' E	18° 33.119' N
270	Mixed timber and bamboo	Training set	105° 9.481' E	18° 32.575' N
271	Plantation	Training set	105° 25.902' E	18° 32.588' N
272	Plantation	Training set	105° 19.884' E	18° 32.399' N
273	Plantation	Training set	105° 18.614' E	18° 32.337' N
274	Plantation	Training set	105° 19.548' E	18° 32.318' N
275	Plantation	Training set	105° 26.011' E	18° 32.396' N
276	Natural evergreen broad leaved forest (100-200m3/*	Training set	105° 9.705' E	18° 32.110' N
277	Natural evergreen broad leaved forest (<100m3/ha)	Training set	105° 10.361' E	18° 31.984' N
278	Plantation	Training set	105° 19.856' E	18° 32.095' N
279	Plantation	Training set	105° 19.908' E	18° 31.939' N
280	Natural evergreen broad leaved forest (>200m3/ha)	Training set	105° 10.550' E	18° 31.845' N
281	Natural evergreen broad leaved forest (>200m3/ha)	Training set	105° 10.637' E	18° 31.558' N
282	Plantation	Training set	105° 21.320' E	18° 30.763' N
283	Natural regrowth	Training set	105° 21.181' E	18° 30.760' N
284	Plantation	Training set	105° 19.456' E	18° 29.006' N
285	Plantation	Training set	105° 26.659' E	18° 28.530' N
286	Plantation	Training set	105° 26.533' E	18° 28.508' N
287	Plantation	Training set	105° 26.692' E	18° 28.634' N
288	Plantation	Training set	105° 26.818' E	18° 28.608' N
289	Plantation	Training set	105° 26.688' E	18° 28.320' N
290	Natural regrowth	Training set	105° 15.935' E	18° 27.445' N
291	Natural regrowth	Training set	105° 13.528' E	18° 26.883' N
292	Natural regrowth	Training set	105° 13.493' E	18° 26.769' N
293	Plantation	Training set	105° 15.022' E	18° 26.901' N
294	Natural evergreen broad leaved forest (100-200m3/*	Training set	105° 12.885' E	18° 25.868' N
295	Natural regrowth	Training set	105° 13.093' E	18° 25.992' N
296	Natural regrowth	Training set	105° 12.765' E	18° 28.596' N
297	Natural regrowth	Training set	105° 12.970' E	18° 28.416' N
298	Natural regrowth	Training set	105° 13.536' E	18° 28.079' N
299	Natural regrowth	Training set	105° 13.396' E	18° 27.845' N
300	Natural regrowth	Training set	105° 13.593' E	18° 27.752' N
301	Natural regrowth	Training set	105° 13.977' E	18° 27.731' N
302	Natural regrowth	Training set	105° 14.588' E	18° 27.347' N
303	Forest garden	Training set	105° 16.570' E	18° 25.895' N
304	Mixed timber and bamboo	Training set	105° 18.459' E	18° 24.858' N
305	Mixed timber and bamboo	Training set	105° 18.383' E	18° 24.595' N
306	Plantation	Test set	105° 11.333' E	18° 34.263' N
307	Plantation	Test set	105° 11.615' E	18° 34.033' N
308	Natural evergreen broad leaved forest (100-200m3/*	Test set	105° 9.447' E	18° 33.835' N
309	Natural evergreen broad leaved forest (<100m3/ha)	Test set	105° 10.167' E	18° 33.800' N
310	Natural evergreen broad leaved forest (<100m3/ha)	Test set	105° 12.168' E	18° 33.779' N
311	Natural evergreen broad leaved forest (>200m3/ha)	Test set	105° 9.220' E	18° 33.607' N
312	Natural evergreen broad leaved forest (<100m3/ha)	Test set	105° 12.393' E	18° 33.647' N
313	Natural evergreen broad leaved forest (100-200m3/*	Test set	105° 10.624' E	18° 33.544' N
314	Natural evergreen broad leaved forest (100-200m3/*	Test set	105° 8.965' E	18° 32.970' N

315	Natural evergreen broad leaved forest (100-200m3/*	Test set	105° 9.307' E	18° 32.939' N
316	Mixed timber and bamboo	Test set	105° 9.618' E	18° 32.426' N
317	Natural evergreen broad leaved forest (<100m3/ha)	Test set	105° 9.748' E	18° 31.961' N
318	Natural evergreen broad leaved forest (100-200m3/*	Test set	105° 9.993' E	18° 31.893' N
319	Natural evergreen broad leaved forest (>200m3/ha)	Test set	105° 10.755' E	18° 31.818' N
320	Natural evergreen broad leaved forest (>200m3/ha)	Test set	105° 10.208' E	18° 31.628' N
321	Natural evergreen broad leaved forest (>200m3/ha)	Test set	105° 10.865' E	18° 31.491' N
322	Plantation	Test set	105° 29.975' E	18° 30.185' N
323	Plantation	Test set	105° 29.434' E	18° 30.150' N
324	Plantation	Test set	105° 29.875' E	18° 28.207' N
325	Plantation	Test set	105° 30.120' E	18° 27.992' N
326	Plantation	Test set	105° 29.837' E	18° 27.595' N
327	Natural regrowth	Test set	105° 13.760' E	18° 26.674' N
328	Natural regrowth	Test set	105° 14.486' E	18° 26.817' N
329	Natural regrowth	Test set	105° 14.780' E	18° 26.620' N
330	Natural evergreen broad leaved forest (<100m3/ha)	Test set	105° 16.144' E	18° 27.112' N
331	Plantation	Test set	105° 16.176' E	18° 26.919' N
332	Natural evergreen broad leaved forest (<100m3/ha)	Test set	105° 16.021' E	18° 26.691' N
333	Natural regrowth	Test set	105° 16.680' E	18° 26.843' N
334	Natural regrowth	Test set	105° 14.633' E	18° 26.654' N
335	Natural evergreen broad leaved forest (100-200m3/*	Test set	105° 12.024' E	18° 25.269' N
336	Natural regrowth	Test set	105° 14.008' E	18° 27.939' N
337	Natural regrowth	Test set	105° 13.735' E	18° 27.865' N
338	Plantation	Test set	105° 14.423' E	18° 27.601' N
339	Plantation	Test set	105° 14.932' E	18° 27.491' N
340	Natural regrowth	Test set	105° 15.982' E	18° 27.500' N
341	Natural regrowth	Test set	105° 15.286' E	18° 26.738' N
342	Forest garden	Test set	105° 15.047' E	18° 26.680' N
343	Plantation	Test set	105° 17.622' E	18° 26.940' N
344	Plantation	Test set	105° 17.779' E	18° 26.932' N
345	Plantation	Test set	105° 15.955' E	18° 26.494' N
346	Plantation	Test set	105° 15.888' E	18° 25.958' N
347	Plantation	Test set	105° 16.329' E	18° 25.533' N
348	Plantation	Test set	105° 16.667' E	18° 25.813' N
349	Plantation	Test set	105° 16.897' E	18° 25.711' N
350	Natural regrowth	Test set	105° 17.285' E	18° 25.672' N
351	Mixed timber and bamboo	Test set	105° 17.771' E	18° 25.450' N
352	Natural regrowth	Test set	105° 13.063' E	18° 24.668' N
353	Plantation	Test set	105° 13.016' E	18° 24.874' N
354	Natural regrowth	Test set	105° 13.572' E	18° 24.684' N
355	Mixed timber and bamboo	Test set	105° 18.373' E	18° 24.911' N
356	Natural regrowth	Test set	105° 18.578' E	18° 24.859' N
357	Mixed timber and bamboo	Test set	105° 18.406' E	18° 24.742' N
358	Plantation	Test set	105° 18.828' E	18° 24.538' N
359	Mixed timber and bamboo	Test set	105° 18.434' E	18° 24.495' N
360	Mixed timber and bamboo	Test set	105° 18.549' E	18° 24.419' N

361	Plantation	Test set	105° 28.999' E	18° 30.870' N
362	Plantation	Test set	105° 28.807' E	18° 30.624' N
363	Plantation	Test set	105° 29.353' E	18° 30.710' N
364	Plantation	Test set	105° 29.310' E	18° 30.515' N
365	Plantation	Test set	105° 29.421' E	18° 30.492' N
366	Plantation	Test set	105° 29.784' E	18° 30.449' N
367	Plantation	Test set	105° 31.742' E	18° 29.949' N
Cho Moi District				
Land cover classification				
1	Other	Training set	105° 53.212' E	22° 1.422' N
2	Other	Training set	105° 52.854' E	22° 1.421' N
3	Other	Training set	105° 52.052' E	22° 1.634' N
4	Other	Training set	105° 51.413' E	22° 1.644' N
5	Other	Training set	105° 52.126' E	21° 58.587' N
6	Other	Training set	105° 50.024' E	21° 59.183' N
7	Other	Training set	105° 48.916' E	22° 4.127' N
8	Bare	Training set	105° 56.710' E	22° 6.122' N
9	Bare	Training set	105° 58.748' E	22° 5.415' N
10	Bare	Training set	105° 57.366' E	22° 6.006' N
11	Bare	Training set	105° 49.468' E	22° 4.496' N
12	Bare	Training set	105° 49.599' E	22° 4.603' N
13	Bare	Training set	105° 45.678' E	22° 1.004' N
14	Bare	Training set	105° 49.480' E	21° 58.344' N
15	Bare	Training set	105° 54.796' E	21° 54.526' N
16	Bare	Training set	105° 46.590' E	21° 54.647' N
17	Bare	Training set	105° 47.932' E	21° 52.771' N
18	Bare	Training set	105° 47.932' E	21° 52.771' N
19	Bare	Training set	105° 47.941' E	21° 55.478' N
20	Forest	Training set	105° 48.970' E	22° 0.077' N
21	Forest	Training set	105° 49.018' E	21° 54.174' N
22	Forest	Training set	105° 49.045' E	22° 1.624' N
23	Forest	Training set	105° 49.055' E	22° 1.792' N
24	Forest	Training set	105° 49.056' E	22° 5.081' N
25	Forest	Training set	105° 49.194' E	22° 2.001' N
26	Forest	Training set	105° 49.259' E	21° 54.444' N
27	Forest	Training set	105° 49.285' E	22° 1.454' N
28	Forest	Training set	105° 49.312' E	22° 3.002' N
29	Forest	Training set	105° 49.429' E	22° 1.643' N
30	Forest	Training set	105° 49.512' E	22° 0.573' N
31	Forest	Training set	105° 49.607' E	21° 59.390' N
32	Forest	Training set	105° 49.581' E	22° 4.995' N
33	Forest	Training set	105° 49.595' E	22° 3.736' N
34	Forest	Training set	105° 49.606' E	22° 4.940' N
35	Forest	Training set	105° 49.742' E	22° 4.047' N
36	Forest	Training set	105° 49.893' E	22° 2.848' N
37	Forest	Training set	105° 50.152' E	22° 2.976' N

38	Forest	Training set	105° 50.202' E	21° 59.502' N
39	Forest	Training set	105° 50.191' E	22° 2.812' N
40	Forest	Training set	105° 50.332' E	22° 5.001' N
41	Forest	Training set	105° 50.362' E	22° 2.783' N
42	Forest	Training set	105° 50.473' E	21° 53.957' N
43	Forest	Training set	105° 50.463' E	21° 59.558' N
44	Forest	Training set	105° 50.527' E	22° 1.353' N
45	Forest	Training set	105° 50.565' E	21° 54.092' N
46	Forest	Training set	105° 50.787' E	21° 52.737' N
47	Forest	Training set	105° 50.772' E	22° 4.636' N
48	Forest	Training set	105° 50.857' E	21° 59.087' N
49	Forest	Training set	105° 50.876' E	22° 3.479' N
50	Forest	Training set	105° 50.881' E	22° 3.926' N
51	Forest	Training set	105° 50.939' E	21° 52.766' N
52	Forest	Training set	105° 50.918' E	21° 58.808' N
53	Forest	Training set	105° 50.940' E	21° 59.070' N
54	Forest	Training set	105° 50.922' E	22° 4.375' N
55	Forest	Training set	105° 51.087' E	21° 52.902' N
56	Forest	Training set	105° 51.051' E	22° 4.767' N
57	Bare	Training set	105° 51.139' E	21° 54.115' N
58	Forest	Training set	105° 51.119' E	21° 58.916' N
59	Forest	Training set	105° 51.141' E	21° 58.764' N
60	Forest	Training set	105° 51.236' E	21° 52.919' N
61	Forest	Training set	105° 51.249' E	21° 57.927' N
62	Forest	Training set	105° 51.305' E	21° 55.636' N
63	Forest	Training set	105° 51.300' E	22° 1.260' N
64	Forest	Training set	105° 51.376' E	21° 54.098' N
65	Forest	Training set	105° 51.416' E	21° 54.618' N
66	Forest	Training set	105° 51.462' E	21° 54.201' N
67	Forest	Training set	105° 51.443' E	21° 58.989' N
68	Forest	Training set	105° 51.517' E	21° 53.368' N
69	Forest	Training set	105° 51.523' E	21° 58.776' N
70	Forest	Training set	105° 51.563' E	22° 1.116' N
71	Forest	Training set	105° 51.651' E	21° 55.805' N
72	Forest	Training set	105° 51.736' E	21° 58.659' N
73	Forest	Training set	105° 51.729' E	22° 0.879' N
74	Forest	Training set	105° 51.728' E	22° 1.325' N
75	Forest	Training set	105° 51.801' E	21° 58.801' N
76	Forest	Training set	105° 51.869' E	22° 2.588' N
77	Forest	Training set	105° 51.911' E	21° 53.835' N
78	Forest	Training set	105° 51.891' E	21° 58.721' N
79	Forest	Training set	105° 51.908' E	21° 56.222' N
80	Forest	Training set	105° 51.980' E	21° 53.973' N
81	Forest	Training set	105° 52.016' E	21° 51.785' N
82	Forest	Training set	105° 52.056' E	22° 2.401' N
83	Forest	Training set	105° 52.124' E	22° 2.464' N

84	Forest	Training set	105° 52.394' E	21° 51.616' N
85	Forest	Training set	105° 52.428' E	22° 2.746' N
86	Forest	Training set	105° 52.656' E	22° 2.457' N
87	Forest	Training set	105° 52.806' E	22° 0.856' N
88	Forest	Training set	105° 52.928' E	21° 52.556' N
89	Forest	Training set	105° 52.898' E	22° 0.781' N
90	Forest	Training set	105° 52.951' E	21° 52.794' N
91	Forest	Training set	105° 52.989' E	21° 53.435' N
92	Forest	Training set	105° 53.015' E	21° 54.078' N
93	Forest	Training set	105° 53.016' E	22° 0.619' N
94	Forest	Training set	105° 53.164' E	22° 0.223' N
95	Forest	Training set	105° 53.263' E	21° 54.458' N
96	Forest	Training set	105° 53.296' E	21° 53.386' N
97	Forest	Training set	105° 53.587' E	21° 56.085' N
98	Forest	Training set	105° 53.810' E	21° 55.626' N
99	Forest	Training set	105° 53.877' E	21° 54.315' N
100	Forest	Training set	105° 53.894' E	21° 54.324' N
101	Forest	Training set	105° 54.119' E	21° 55.481' N
102	Forest	Training set	105° 54.134' E	21° 55.799' N
103	Forest	Training set	105° 54.221' E	22° 0.888' N
104	Forest	Training set	105° 54.306' E	21° 55.575' N
105	Forest	Training set	105° 54.394' E	21° 55.771' N
106	Forest	Training set	105° 54.402' E	22° 1.065' N
107	Forest	Training set	105° 54.571' E	22° 0.699' N
108	Forest	Training set	105° 54.808' E	21° 54.606' N
109	Forest	Training set	105° 54.850' E	21° 55.263' N
110	Forest	Training set	105° 55.034' E	21° 54.157' N
111	Forest	Training set	105° 55.053' E	21° 55.182' N
112	Forest	Training set	105° 55.127' E	22° 4.863' N
113	Forest	Training set	105° 55.163' E	22° 6.133' N
114	Forest	Training set	105° 55.214' E	21° 54.056' N
115	Forest	Training set	105° 55.270' E	21° 49.979' N
116	Forest	Training set	105° 55.296' E	22° 4.867' N
117	Forest	Training set	105° 55.342' E	21° 54.967' N
118	Forest	Training set	105° 55.371' E	21° 56.259' N
119	Forest	Training set	105° 55.441' E	22° 4.543' N
120	Forest	Training set	105° 55.498' E	21° 54.618' N
121	Forest	Training set	105° 55.554' E	22° 4.766' N
122	Forest	Training set	105° 55.628' E	21° 55.683' N
123	Forest	Training set	105° 55.670' E	21° 54.876' N
124	Forest	Training set	105° 55.634' E	22° 4.225' N
125	Forest	Training set	105° 55.643' E	22° 4.562' N
126	Forest	Training set	105° 55.658' E	22° 5.666' N
127	Forest	Training set	105° 55.702' E	21° 56.994' N
128	Forest	Training set	105° 55.723' E	21° 55.923' N
129	Forest	Training set	105° 55.739' E	21° 56.141' N

130	Forest	Training set	105° 55.771' E	21° 56.756' N
131	Forest	Training set	105° 55.772' E	22° 6.052' N
132	Forest	Training set	105° 55.856' E	22° 4.364' N
133	Forest	Training set	105° 55.943' E	21° 56.445' N
134	Forest	Training set	105° 55.905' E	22° 6.273' N
135	Forest	Training set	105° 55.908' E	22° 5.770' N
136	Forest	Training set	105° 55.927' E	22° 4.469' N
137	Forest	Training set	105° 55.942' E	22° 5.446' N
138	Forest	Training set	105° 55.985' E	21° 57.375' N
139	Forest	Training set	105° 55.993' E	21° 56.108' N
140	Forest	Training set	105° 56.039' E	21° 57.479' N
141	Forest	Training set	105° 56.042' E	22° 4.579' N
142	Forest	Training set	105° 56.188' E	22° 6.549' N
143	Forest	Training set	105° 56.247' E	21° 57.515' N
144	Forest	Training set	105° 56.234' E	22° 3.974' N
145	Forest	Training set	105° 56.241' E	22° 5.579' N
146	Forest	Training set	105° 56.371' E	21° 57.590' N
147	Forest	Training set	105° 56.585' E	21° 55.495' N
148	Forest	Training set	105° 56.678' E	21° 55.490' N
149	Forest	Training set	105° 56.755' E	21° 55.516' N
150	Forest	Training set	105° 56.865' E	22° 5.658' N
151	Forest	Training set	105° 57.034' E	21° 55.701' N
152	Forest	Training set	105° 57.541' E	21° 56.394' N
153	Forest	Training set	105° 57.757' E	21° 56.579' N
154	Forest	Training set	105° 57.836' E	21° 56.758' N
155	Forest	Training set	105° 59.912' E	21° 56.859' N
156	Forest	Training set	106° 0.138' E	21° 56.802' N
157	Forest	Training set	106° 0.694' E	21° 57.016' N
158	Forest	Training set	106° 0.701' E	21° 57.106' N
159	Forest	Training set	106° 0.737' E	21° 57.060' N
160	Forest	Training set	106° 0.803' E	21° 57.131' N
161	Residential	Training set	105° 46.970' E	22° 4.252' N
162	Residential	Training set	105° 46.961' E	22° 4.257' N
163	Residential	Training set	105° 43.639' E	22° 4.337' N
164	Residential	Training set	105° 43.503' E	22° 4.324' N
165	Residential	Training set	105° 43.543' E	22° 4.296' N
166	Residential	Training set	105° 43.569' E	22° 4.283' N
167	Residential	Training set	105° 43.675' E	22° 4.300' N
168	Residential	Training set	105° 43.591' E	22° 4.278' N
169	Residential	Training set	105° 43.615' E	22° 4.267' N
170	Residential	Training set	105° 43.584' E	22° 4.259' N
171	Residential	Training set	105° 43.574' E	22° 4.244' N
172	Residential	Training set	105° 43.658' E	22° 4.306' N
173	Residential	Training set	105° 43.679' E	22° 4.289' N
174	Residential	Training set	105° 43.715' E	22° 4.274' N
175	Residential	Training set	105° 45.859' E	22° 4.410' N

176	Residential	Training set	105° 45.832' E	22° 4.403' N
177	Residential	Training set	105° 45.851' E	22° 4.355' N
178	Residential	Training set	105° 45.821' E	22° 4.262' N
179	Residential	Training set	105° 45.849' E	22° 4.267' N
180	Residential	Training set	105° 44.699' E	22° 4.515' N
181	Residential	Training set	105° 44.667' E	22° 4.439' N
182	Residential	Training set	105° 44.652' E	22° 4.405' N
183	Residential	Training set	105° 43.495' E	22° 4.213' N
184	Residential	Training set	105° 43.379' E	22° 4.330' N
185	Residential	Training set	105° 43.331' E	22° 4.338' N
186	Residential	Training set	105° 43.382' E	22° 4.303' N
187	Residential	Training set	105° 48.511' E	22° 4.677' N
188	Residential	Training set	105° 48.464' E	22° 4.650' N
189	Residential	Training set	105° 44.815' E	22° 4.911' N
190	Residential	Training set	105° 44.800' E	22° 4.891' N
191	Residential	Training set	105° 44.825' E	22° 4.869' N
192	Residential	Training set	105° 44.831' E	22° 4.832' N
193	Residential	Training set	105° 43.847' E	22° 4.311' N
194	Residential	Training set	105° 43.840' E	22° 4.284' N
195	Residential	Training set	105° 48.495' E	22° 4.575' N
196	Residential	Training set	105° 48.537' E	22° 4.518' N
197	Residential	Training set	105° 48.482' E	22° 4.580' N
198	Residential	Training set	105° 48.532' E	22° 4.518' N
199	Residential	Training set	105° 43.573' E	22° 4.471' N
200	Residential	Training set	105° 43.602' E	22° 4.446' N
201	Residential	Training set	105° 44.102' E	22° 4.335' N
202	Residential	Training set	105° 44.076' E	22° 4.320' N
203	Residential	Training set	105° 44.046' E	22° 4.330' N
204	Residential	Training set	105° 46.954' E	22° 4.630' N
205	Residential	Training set	105° 46.979' E	22° 4.646' N
206	Residential	Training set	105° 46.939' E	22° 4.567' N
207	Residential	Training set	105° 50.021' E	22° 4.858' N
208	Water	Training set	105° 47.557' E	22° 4.127' N
209	Water	Training set	105° 47.510' E	22° 4.043' N
210	Water	Training set	105° 47.484' E	22° 4.007' N
211	Water	Training set	105° 54.767' E	22° 4.362' N
212	Water	Training set	105° 47.764' E	22° 3.700' N
213	Water	Training set	105° 47.806' E	22° 3.673' N
214	Water	Training set	105° 46.569' E	22° 3.024' N
215	Water	Training set	105° 45.700' E	22° 3.218' N
216	Water	Training set	105° 45.729' E	22° 3.181' N
217	Water	Training set	105° 48.140' E	22° 3.336' N
218	Water	Training set	105° 46.269' E	22° 2.935' N
219	Water	Training set	105° 46.275' E	22° 2.926' N
220	Water	Training set	105° 49.165' E	22° 3.394' N
221	Water	Training set	105° 50.668' E	22° 3.046' N

222	Water	Training set	105° 45.151' E	22° 2.618' N
223	Water	Training set	105° 45.532' E	22° 2.654' N
224	Water	Training set	105° 45.462' E	22° 2.642' N
225	Water	Training set	105° 45.851' E	22° 2.642' N
226	Water	Training set	105° 45.102' E	22° 2.567' N
227	Water	Training set	105° 45.496' E	22° 2.517' N
228	Water	Training set	105° 45.567' E	22° 2.458' N
229	Water	Training set	105° 45.937' E	22° 2.508' N
230	Water	Training set	105° 46.167' E	22° 2.469' N
231	Water	Training set	105° 46.155' E	22° 2.458' N
232	Water	Training set	105° 44.996' E	22° 2.417' N
233	Water	Training set	105° 46.166' E	22° 2.395' N
234	Water	Training set	105° 44.908' E	22° 2.252' N
235	Industrial	Training set	105° 48.027' E	21° 55.949' N
236	Industrial	Training set	105° 47.987' E	21° 55.934' N
237	Industrial	Training set	105° 48.240' E	21° 56.070' N
238	Industrial	Training set	105° 48.174' E	21° 56.032' N
239	Industrial	Training set	105° 48.072' E	21° 56.015' N
240	Industrial	Training set	105° 48.165' E	21° 55.989' N
241	Industrial	Training set	105° 48.071' E	21° 55.976' N
242	Industrial	Training set	105° 48.219' E	21° 56.040' N
243	Industrial	Training set	105° 48.029' E	21° 55.914' N
244	Industrial	Training set	105° 48.117' E	21° 55.937' N
245	Industrial	Training set	105° 48.130' E	21° 55.934' N
246	Industrial	Training set	105° 48.151' E	21° 55.920' N
247	Industrial	Training set	105° 48.057' E	21° 55.898' N
248	Industrial	Training set	105° 48.280' E	21° 55.931' N
249	Limestone	Training set	105° 49.262' E	21° 51.563' N
250	Limestone	Training set	105° 49.284' E	21° 51.513' N
251	Limestone	Training set	105° 51.285' E	21° 51.882' N
252	Limestone	Training set	105° 51.362' E	21° 51.885' N
253	Limestone	Training set	105° 51.361' E	21° 51.851' N
254	Limestone	Training set	105° 51.253' E	21° 51.860' N
255	Limestone	Training set	105° 51.348' E	21° 51.808' N
256	Limestone	Training set	105° 51.232' E	21° 51.808' N
257	Limestone	Training set	105° 51.264' E	21° 51.758' N
258	Limestone	Training set	105° 51.429' E	21° 51.874' N
259	Limestone	Training set	105° 51.288' E	21° 51.717' N
260	Limestone	Training set	105° 45.648' E	21° 49.548' N
261	Limestone	Training set	105° 45.558' E	21° 49.489' N
262	Limestone	Training set	105° 45.563' E	21° 49.521' N
263	Limestone	Training set	105° 45.613' E	21° 49.511' N
264	Limestone	Training set	105° 45.607' E	21° 49.490' N
265	Limestone	Training set	105° 45.522' E	21° 49.418' N
266	Limestone	Training set	105° 45.564' E	21° 49.414' N
267	Limestone	Training set	105° 49.003' E	21° 51.964' N

268	Limestone	Training set	105° 49.036' E	21° 52.018' N
269	Limestone	Training set	105° 49.082' E	21° 51.960' N
270	Limestone	Training set	105° 49.092' E	21° 51.925' N
271	Limestone	Training set	105° 49.081' E	21° 51.984' N
272	Limestone	Training set	105° 49.124' E	21° 51.945' N
273	Other	Test set	105° 48.504' E	22° 3.256' N
274	Other	Test set	105° 50.439' E	22° 3.064' N
275	Other	Test set	105° 48.742' E	22° 2.980' N
276	Other	Test set	105° 52.557' E	22° 3.223' N
277	Bare	Test set	105° 52.525' E	21° 58.935' N
278	Bare	Test set	105° 53.922' E	21° 58.545' N
279	Bare	Test set	105° 54.463' E	22° 1.036' N
280	Bare	Test set	105° 54.589' E	22° 4.336' N
281	Bare	Test set	105° 58.098' E	22° 5.988' N
282	Bare	Test set	105° 55.960' E	21° 56.529' N
283	Bare	Test set	105° 49.403' E	21° 57.851' N
284	Bare	Test set	105° 48.425' E	21° 59.311' N
285	Bare	Test set	105° 46.015' E	22° 4.334' N
286	Bare	Test set	105° 47.905' E	22° 3.633' N
287	Bare	Test set	105° 48.723' E	22° 5.509' N
288	Bare	Test set	105° 53.370' E	22° 2.827' N
289	Forest	Test set	105° 51.676' E	22° 3.110' N
290	Forest	Test set	105° 51.825' E	22° 3.029' N
291	Forest	Test set	105° 52.819' E	22° 3.824' N
292	Forest	Test set	105° 52.984' E	22° 4.029' N
293	Forest	Test set	105° 53.606' E	22° 3.892' N
294	Forest	Test set	105° 54.584' E	22° 4.622' N
295	Forest	Test set	105° 56.442' E	22° 3.967' N
296	Forest	Test set	105° 57.246' E	22° 4.239' N
297	Forest	Test set	105° 56.289' E	22° 2.947' N
298	Forest	Test set	105° 50.178' E	22° 1.538' N
299	Forest	Test set	105° 50.657' E	22° 1.878' N
300	Forest	Test set	105° 50.959' E	22° 1.989' N
301	Forest	Test set	105° 51.416' E	22° 2.460' N
302	Forest	Test set	105° 46.314' E	21° 59.069' N
303	Forest	Test set	105° 46.924' E	22° 0.198' N
304	Limestone	Test set	105° 57.442' E	22° 4.565' N
305	Limestone	Test set	105° 52.132' E	22° 3.668' N
306	Limestone	Test set	105° 50.498' E	21° 58.966' N
307	Limestone	Test set	105° 49.236' E	21° 58.404' N
308	Limestone	Test set	105° 49.554' E	21° 57.761' N
309	Limestone	Test set	105° 50.087' E	21° 57.068' N
310	Limestone	Test set	105° 49.893' E	21° 56.892' N
311	Limestone	Test set	105° 53.985' E	21° 54.667' N
312	Forest	Test set	105° 52.311' E	22° 1.921' N
313	Forest	Test set	105° 52.841' E	22° 1.845' N

314	Forest	Test set	105° 53.304' E	22° 3.067' N
315	Forest	Test set	105° 54.402' E	22° 3.165' N
316	Forest	Test set	105° 54.923' E	22° 3.102' N
317	Forest	Test set	105° 42.068' E	22° 4.626' N
318	Forest	Test set	105° 42.936' E	22° 4.328' N
319	Forest	Test set	105° 44.475' E	22° 4.690' N
320	Forest	Test set	105° 47.917' E	22° 1.724' N
321	Forest	Test set	105° 46.464' E	22° 0.967' N
322	Forest	Test set	105° 47.693' E	22° 1.001' N
323	Forest	Test set	105° 48.679' E	22° 0.630' N
324	Forest	Test set	105° 48.559' E	22° 1.877' N
325	Forest	Test set	105° 50.381' E	22° 2.562' N
326	Forest	Test set	105° 53.014' E	22° 0.839' N
327	Forest	Test set	105° 47.869' E	21° 58.872' N
328	Forest	Test set	105° 47.265' E	21° 57.217' N
329	Forest	Test set	105° 42.042' E	22° 2.676' N
330	Forest	Test set	105° 41.781' E	22° 2.430' N
331	Forest	Test set	105° 41.904' E	22° 2.153' N
332	Forest	Test set	105° 42.386' E	22° 2.147' N
333	Forest	Test set	105° 42.512' E	22° 1.520' N
334	Forest	Test set	105° 47.506' E	21° 58.450' N
335	Forest	Test set	105° 47.419' E	21° 59.258' N
336	Forest	Test set	105° 47.020' E	21° 59.337' N
337	Forest	Test set	105° 47.752' E	22° 0.095' N
338	Forest	Test set	105° 45.299' E	21° 59.909' N
339	Forest	Test set	105° 46.814' E	21° 59.508' N
340	Forest	Test set	105° 48.452' E	21° 59.152' N
341	Forest	Test set	105° 48.620' E	21° 58.855' N
342	Forest	Test set	105° 48.818' E	21° 59.467' N
343	Forest	Test set	105° 48.909' E	21° 59.745' N
344	Forest	Test set	105° 49.634' E	21° 58.944' N
345	Forest	Test set	105° 50.410' E	22° 0.535' N
346	Forest	Test set	105° 52.282' E	22° 2.696' N
347	Forest	Test set	105° 52.425' E	22° 2.815' N
348	Forest	Test set	105° 55.224' E	22° 4.335' N
349	Forest	Test set	105° 54.975' E	22° 4.265' N
350	Forest	Test set	105° 47.677' E	22° 3.795' N
351	Forest	Test set	105° 44.364' E	22° 1.852' N
352	Forest	Test set	105° 44.583' E	22° 1.832' N
353	Forest	Test set	105° 44.622' E	22° 2.429' N
354	Forest	Test set	105° 44.710' E	22° 2.009' N
355	Forest	Test set	105° 44.726' E	22° 2.476' N
356	Forest	Test set	105° 44.815' E	22° 3.555' N
357	Forest	Test set	105° 44.856' E	22° 2.192' N
358	Forest	Test set	105° 44.895' E	22° 3.784' N
359	Forest	Test set	105° 44.936' E	22° 2.412' N

360	Forest	Test set	105° 45.019' E	22° 2.366' N
361	Forest	Test set	105° 45.026' E	22° 2.584' N
362	Forest	Test set	105° 45.027' E	22° 3.366' N
363	Forest	Test set	105° 45.188' E	22° 2.645' N
364	Forest	Test set	105° 45.190' E	22° 2.576' N
365	Forest	Test set	105° 45.272' E	22° 2.414' N
366	Forest	Test set	105° 45.667' E	22° 2.791' N
367	Forest	Test set	105° 45.687' E	22° 2.952' N
368	Forest	Test set	105° 45.859' E	22° 2.699' N
369	Bare	Test set	105° 46.274' E	21° 49.701' N
370	Forest	Test set	105° 46.359' E	21° 54.216' N
371	Forest	Test set	105° 46.386' E	21° 54.293' N
372	Forest	Test set	105° 46.466' E	21° 54.140' N
373	Forest	Test set	105° 46.507' E	21° 50.305' N
374	Forest	Test set	105° 46.642' E	21° 50.640' N
375	Other	Test set	105° 46.765' E	21° 54.405' N
376	Forest	Test set	105° 46.751' E	22° 3.950' N
377	Forest	Test set	105° 46.867' E	21° 53.235' N
378	Forest	Test set	105° 46.981' E	22° 3.702' N
379	Forest	Test set	105° 46.984' E	22° 4.329' N
380	Forest	Test set	105° 47.046' E	21° 55.075' N
381	Forest	Test set	105° 47.039' E	22° 4.793' N
382	Other	Test set	105° 47.093' E	21° 54.582' N
383	Forest	Test set	105° 47.047' E	22° 4.234' N
384	Forest	Test set	105° 47.066' E	22° 3.010' N
385	Forest	Test set	105° 47.077' E	22° 3.294' N
386	Forest	Test set	105° 47.072' E	22° 4.178' N
387	Forest	Test set	105° 47.112' E	22° 5.138' N
388	Limestone	Test set	105° 47.205' E	21° 49.690' N
389	Forest	Test set	105° 47.160' E	22° 3.098' N
390	Forest	Test set	105° 47.171' E	22° 1.966' N
391	Forest	Test set	105° 47.256' E	21° 54.124' N
392	Forest	Test set	105° 47.253' E	21° 55.444' N
393	Forest	Test set	105° 47.250' E	22° 4.984' N
394	Forest	Test set	105° 47.413' E	21° 56.325' N
395	Forest	Test set	105° 47.426' E	21° 54.799' N
396	Forest	Test set	105° 47.462' E	21° 56.057' N
397	Forest	Test set	105° 47.453' E	22° 1.147' N
398	Forest	Test set	105° 47.475' E	22° 3.076' N
399	Forest	Test set	105° 47.608' E	21° 49.575' N
400	Forest	Test set	105° 47.569' E	21° 59.102' N
401	Forest	Test set	105° 47.661' E	21° 59.163' N
402	Forest	Test set	105° 47.647' E	22° 2.604' N
403	Forest	Test set	105° 47.711' E	22° 0.768' N
404	Forest	Test set	105° 47.821' E	21° 51.856' N
405	Forest	Test set	105° 47.873' E	21° 52.891' N

406	Forest	Test set	105° 47.875' E	21° 57.401' N
407	Forest	Test set	105° 47.926' E	21° 51.152' N
408	Forest	Test set	105° 47.912' E	22° 0.613' N
409	Forest	Test set	105° 47.940' E	21° 57.699' N
410	Forest	Test set	105° 47.989' E	21° 51.122' N
411	Forest	Test set	105° 47.944' E	22° 0.712' N
412	Forest	Test set	105° 47.997' E	22° 3.239' N
413	Forest	Test set	105° 48.058' E	21° 52.665' N
414	Forest	Test set	105° 48.058' E	21° 52.665' N
415	Forest	Test set	105° 48.220' E	22° 3.186' N
416	Forest	Test set	105° 48.270' E	21° 58.605' N
417	Forest	Test set	105° 48.335' E	21° 53.764' N
418	Forest	Test set	105° 48.352' E	21° 51.227' N
419	Forest	Test set	105° 48.316' E	22° 0.303' N
420	Forest	Test set	105° 48.575' E	21° 55.235' N
421	Forest	Test set	105° 48.602' E	21° 58.640' N
422	Forest	Test set	105° 48.613' E	22° 0.595' N
423	Forest	Test set	105° 48.643' E	21° 55.174' N
424	Forest	Test set	105° 48.639' E	22° 2.320' N
425	Forest	Test set	105° 48.714' E	22° 2.414' N
426	Forest	Test set	105° 48.744' E	22° 0.467' N
427	Forest	Test set	105° 48.745' E	22° 0.476' N
428	Forest	Test set	105° 48.756' E	21° 58.560' N
429	Forest	Test set	105° 48.757' E	22° 0.435' N
430	Forest	Test set	105° 48.757' E	22° 0.405' N
431	Forest	Test set	105° 48.757' E	22° 0.697' N
432	Forest	Test set	105° 48.782' E	21° 56.880' N
433	Forest	Test set	105° 48.828' E	22° 0.522' N
434	Forest	Test set	105° 48.814' E	22° 5.324' N
435	Forest	Test set	105° 48.906' E	21° 53.174' N
436	Forest	Test set	105° 48.924' E	22° 0.354' N
437	Forest	Test set	105° 48.928' E	22° 0.220' N
438	Forest	Test set	105° 48.946' E	21° 57.615' N
439	Forest	Test set	105° 48.975' E	21° 54.332' N
440	Forest	Test set	105° 48.924' E	22° 5.198' N
441	Limestone	Test set	105° 50.229' E	21° 52.008' N
442	Limestone	Test set	105° 51.502' E	21° 52.453' N
443	Limestone	Test set	105° 51.504' E	21° 52.358' N
444	Residential	Test set	105° 55.475' E	22° 6.022' N
445	Residential	Test set	105° 55.486' E	22° 5.971' N
446	Residential	Test set	105° 55.459' E	22° 5.987' N
447	Residential	Test set	105° 55.457' E	22° 5.978' N
448	Residential	Test set	105° 55.502' E	22° 5.923' N
449	Residential	Test set	105° 55.298' E	22° 6.320' N
450	Residential	Test set	105° 55.289' E	22° 6.274' N
451	Residential	Test set	105° 55.325' E	22° 6.261' N

452	Residential	Test set	105° 55.280' E	22° 6.253' N
453	Residential	Test set	105° 55.395' E	22° 6.247' N
454	Residential	Test set	105° 55.321' E	22° 6.245' N
455	Residential	Test set	105° 55.765' E	22° 5.884' N
456	Residential	Test set	105° 55.774' E	22° 5.892' N
457	Residential	Test set	105° 55.864' E	22° 5.874' N
458	Residential	Test set	105° 55.827' E	22° 5.878' N
459	Residential	Test set	105° 55.772' E	22° 5.817' N
460	Residential	Test set	105° 55.785' E	22° 5.843' N
461	Residential	Test set	105° 58.813' E	22° 5.349' N
462	Residential	Test set	105° 58.936' E	22° 5.230' N
463	Residential	Test set	105° 58.906' E	22° 5.281' N
464	Residential	Test set	105° 58.937' E	22° 5.225' N
465	Residential	Test set	105° 50.345' E	22° 5.055' N
466	Residential	Test set	105° 44.762' E	22° 5.009' N
467	Residential	Test set	105° 55.447' E	22° 6.156' N
468	Residential	Test set	105° 46.807' E	22° 4.351' N
469	Residential	Test set	105° 46.826' E	22° 4.304' N
470	Residential	Test set	105° 46.812' E	22° 4.264' N
471	Residential	Test set	105° 46.841' E	22° 4.248' N
472	Residential	Test set	105° 46.814' E	22° 4.190' N
473	Residential	Test set	105° 50.498' E	22° 4.860' N
474	Residential	Test set	105° 50.464' E	22° 4.799' N
475	Residential	Test set	105° 50.490' E	22° 4.853' N
476	Residential	Test set	105° 50.528' E	22° 4.804' N
477	Residential	Test set	105° 50.520' E	22° 4.855' N
478	Residential	Test set	105° 50.476' E	22° 4.817' N
479	Residential	Test set	105° 50.472' E	22° 4.813' N
480	Residential	Test set	105° 50.553' E	22° 4.799' N
481	Residential	Test set	105° 50.571' E	22° 4.773' N
482	Residential	Test set	105° 50.590' E	22° 4.754' N
483	Residential	Test set	105° 50.626' E	22° 4.756' N
484	Residential	Test set	105° 50.642' E	22° 4.758' N
485	Residential	Test set	105° 46.969' E	22° 4.477' N
486	Residential	Test set	105° 46.948' E	22° 4.410' N
487	Residential	Test set	105° 46.960' E	22° 4.388' N
488	Residential	Test set	105° 46.967' E	22° 4.329' N
489	Residential	Test set	105° 46.944' E	22° 4.330' N
490	Residential	Test set	105° 46.927' E	22° 4.319' N
491	Water	Test set	105° 47.408' E	22° 3.902' N
492	Water	Test set	105° 47.318' E	22° 3.872' N
493	Water	Test set	105° 47.398' E	22° 3.848' N
494	Water	Test set	105° 47.383' E	22° 3.854' N
495	Water	Test set	105° 47.310' E	22° 3.815' N
496	Water	Test set	105° 47.532' E	22° 3.877' N
497	Water	Test set	105° 47.335' E	22° 3.758' N

498	Water	Test set	105° 55.078' E	22° 4.252' N
499	Water	Test set	105° 55.407' E	22° 4.309' N
500	Water	Test set	105° 55.319' E	22° 4.257' N
501	Water	Test set	105° 55.508' E	22° 4.364' N
502	Water	Test set	105° 55.488' E	22° 4.347' N
503	Water	Test set	105° 55.615' E	22° 4.313' N
504	Water	Test set	105° 55.640' E	22° 4.257' N
505	Water	Test set	105° 55.047' E	22° 4.197' N
506	Water	Test set	105° 55.208' E	22° 4.224' N
507	Water	Test set	105° 55.229' E	22° 4.221' N
508	Water	Test set	105° 55.695' E	22° 4.206' N
509	Water	Test set	105° 55.792' E	22° 4.187' N
510	Water	Test set	105° 55.786' E	22° 4.187' N
511	Water	Test set	105° 55.851' E	22° 4.205' N
512	Water	Test set	105° 56.159' E	22° 4.101' N
513	Water	Test set	105° 56.222' E	22° 4.054' N
514	Water	Test set	105° 56.318' E	22° 3.953' N
515	Water	Test set	105° 56.493' E	22° 3.736' N
516	Water	Test set	105° 47.376' E	22° 4.084' N
517	Industrial	Test set	105° 47.982' E	21° 56.253' N
518	Industrial	Test set	105° 48.159' E	21° 56.261' N
519	Industrial	Test set	105° 48.270' E	21° 56.276' N
520	Industrial	Test set	105° 48.343' E	21° 56.260' N
521	Industrial	Test set	105° 48.002' E	21° 56.249' N
522	Industrial	Test set	105° 47.969' E	21° 56.216' N
523	Industrial	Test set	105° 48.057' E	21° 56.197' N
524	Industrial	Test set	105° 48.087' E	21° 56.186' N
525	Industrial	Test set	105° 48.077' E	21° 56.125' N
526	Industrial	Test set	105° 48.304' E	21° 56.209' N
527	Industrial	Test set	105° 48.300' E	21° 56.167' N
528	Industrial	Test set	105° 48.304' E	21° 56.143' N
529	Industrial	Test set	105° 48.307' E	21° 56.124' N
530	Industrial	Test set	105° 48.053' E	21° 55.983' N
531	Limestone	Test set	105° 47.344' E	21° 50.237' N
532	Limestone	Test set	105° 47.351' E	21° 50.190' N
533	Limestone	Test set	105° 47.381' E	21° 50.190' N
534	Limestone	Test set	105° 47.288' E	21° 50.112' N
535	Limestone	Test set	105° 47.266' E	21° 50.075' N
536	Limestone	Test set	105° 47.217' E	21° 50.042' N
537	Limestone	Test set	105° 47.273' E	21° 50.049' N
538	Limestone	Test set	105° 49.285' E	21° 51.804' N
539	Limestone	Test set	105° 49.252' E	21° 51.773' N
540	Limestone	Test set	105° 49.314' E	21° 51.734' N
541	Limestone	Test set	105° 49.235' E	21° 51.708' N
542	Limestone	Test set	105° 49.275' E	21° 51.659' N
543	Limestone	Test set	105° 49.191' E	21° 51.580' N

Forest cover classification				
544	Bamboo forest	Test set	105° 53.874' E	22° 4.657' N
545	Bamboo forest	Test set	105° 45.779' E	22° 5.130' N
546	Bamboo forest	Test set	105° 58.428' E	22° 5.625' N
547	Bamboo forest	Test set	105° 58.440' E	22° 5.638' N
548	Bamboo forest	Test set	105° 58.519' E	22° 5.622' N
549	Bamboo forest	Test set	105° 58.478' E	22° 5.625' N
550	Bamboo forest	Test set	105° 58.553' E	22° 5.615' N
551	Bamboo forest	Test set	105° 58.604' E	22° 5.605' N
552	Bamboo forest	Test set	105° 58.655' E	22° 5.553' N
553	Bamboo forest	Test set	105° 58.605' E	22° 5.557' N
554	Bamboo forest	Test set	105° 48.911' E	22° 4.744' N
555	Bamboo forest	Test set	105° 58.511' E	22° 5.564' N
556	Bamboo forest	Test set	105° 58.409' E	22° 5.457' N
557	Bamboo forest	Test set	105° 43.514' E	22° 4.505' N
558	Bamboo forest	Test set	105° 56.901' E	22° 5.707' N
559	Bamboo forest	Test set	105° 56.922' E	22° 5.666' N
560	Bamboo forest	Test set	105° 56.935' E	22° 5.670' N
561	Bamboo forest	Test set	105° 56.887' E	22° 5.646' N
562	Bamboo forest	Test set	105° 49.679' E	22° 5.241' N
563	Bamboo forest	Test set	105° 57.470' E	22° 6.040' N
564	Bamboo forest	Test set	105° 58.955' E	22° 5.008' N
565	Bamboo forest	Test set	105° 58.979' E	22° 4.966' N
566	Bamboo forest	Test set	105° 58.986' E	22° 5.355' N
567	Bamboo forest	Test set	105° 57.266' E	22° 6.057' N
568	Bamboo forest	Test set	105° 57.167' E	22° 6.037' N
569	Bamboo forest	Test set	105° 57.248' E	22° 6.009' N
570	Bamboo forest	Test set	105° 57.637' E	22° 5.271' N
571	Bamboo forest	Test set	105° 57.614' E	22° 5.162' N
572	Bamboo forest	Test set	105° 48.415' E	22° 5.321' N
573	Bamboo forest	Test set	105° 58.589' E	22° 5.694' N
574	Bare land	Test set	105° 47.418' E	22° 5.327' N
575	Bare land	Test set	105° 47.419' E	22° 5.358' N
576	Bare land	Test set	105° 47.601' E	22° 5.327' N
577	Bare land	Test set	105° 47.455' E	22° 5.257' N
578	Bare land	Test set	105° 57.142' E	22° 6.241' N
579	Bare land	Test set	105° 57.128' E	22° 6.200' N
580	Bare land	Test set	105° 57.131' E	22° 6.214' N
581	Bare land	Test set	105° 57.085' E	22° 6.186' N
582	Bare land	Test set	105° 57.048' E	22° 6.174' N
583	Bare land	Test set	105° 57.085' E	22° 6.135' N
584	Bare land	Test set	105° 57.156' E	22° 6.167' N
585	Bare land	Test set	105° 57.145' E	22° 6.158' N
586	Bare land	Test set	105° 57.717' E	22° 5.679' N
587	Bare land	Test set	105° 57.644' E	22° 5.631' N
588	Bare land	Test set	105° 57.718' E	22° 5.646' N

589	Bare land	Test set	105° 57.748' E	22° 5.591' N
590	Bare land	Test set	105° 57.675' E	22° 5.613' N
591	Bare land	Test set	105° 57.713' E	22° 5.505' N
592	Bare land	Test set	105° 57.763' E	22° 5.564' N
593	Bare land	Test set	105° 47.253' E	22° 4.885' N
594	Bare land	Test set	105° 47.345' E	22° 4.813' N
595	Bare land	Test set	105° 56.676' E	22° 6.171' N
596	Bare land	Test set	105° 56.748' E	22° 6.174' N
597	Bare land	Test set	105° 56.665' E	22° 6.090' N
598	Bare land	Test set	105° 56.688' E	22° 6.047' N
599	Bare land	Test set	105° 56.832' E	22° 6.142' N
600	Bare land	Test set	105° 56.151' E	22° 4.676' N
601	Bare land	Test set	105° 56.246' E	22° 4.671' N
602	Bare land	Test set	105° 56.243' E	22° 4.643' N
603	Bare land	Test set	105° 55.794' E	22° 7.542' N
604	Mixed timeber and bamboo	Test set	105° 46.170' E	22° 6.047' N
605	Mixed timeber and bamboo	Test set	105° 46.213' E	22° 5.993' N
606	Mixed timeber and bamboo	Test set	105° 46.220' E	22° 5.987' N
607	Mixed timeber and bamboo	Test set	105° 46.236' E	22° 5.962' N
608	Mixed timeber and bamboo	Test set	105° 46.273' E	22° 5.956' N
609	Mixed timeber and bamboo	Test set	105° 47.115' E	22° 5.976' N
610	Mixed timeber and bamboo	Test set	105° 47.348' E	22° 5.975' N
611	Mixed timeber and bamboo	Test set	105° 47.280' E	22° 6.010' N
612	Mixed timeber and bamboo	Test set	105° 47.495' E	22° 6.099' N
613	Mixed timeber and bamboo	Test set	105° 47.426' E	22° 6.077' N
614	Mixed timeber and bamboo	Test set	105° 47.524' E	22° 6.071' N
615	Mixed timeber and bamboo	Test set	105° 47.444' E	22° 6.037' N
616	Mixed timeber and bamboo	Test set	105° 47.478' E	22° 6.008' N
617	Mixed timeber and bamboo	Test set	105° 47.696' E	22° 6.068' N
618	Mixed timeber and bamboo	Test set	105° 47.605' E	22° 6.034' N
619	Mixed timeber and bamboo	Test set	105° 47.662' E	22° 6.024' N
620	Mixed timeber and bamboo	Test set	105° 47.663' E	22° 6.012' N
621	Mixed timeber and bamboo	Test set	105° 47.785' E	22° 6.087' N
622	Mixed timeber and bamboo	Test set	105° 47.794' E	22° 6.049' N
623	Mixed timeber and bamboo	Test set	105° 47.811' E	22° 6.002' N
624	Mixed timeber and bamboo	Test set	105° 45.889' E	22° 5.944' N
625	Mixed timeber and bamboo	Test set	105° 45.877' E	22° 5.912' N
626	Mixed timeber and bamboo	Test set	105° 46.094' E	22° 5.931' N
627	Mixed timeber and bamboo	Test set	105° 46.036' E	22° 5.886' N
628	Mixed timeber and bamboo	Test set	105° 46.090' E	22° 5.827' N
629	Mixed timeber and bamboo	Test set	105° 46.212' E	22° 5.944' N
630	Mixed timeber and bamboo	Test set	105° 46.149' E	22° 5.978' N
631	Mixed timeber and bamboo	Test set	105° 46.192' E	22° 5.919' N
632	Mixed timeber and bamboo	Test set	105° 46.166' E	22° 5.903' N
633	Mixed timeber and bamboo	Test set	105° 46.193' E	22° 5.838' N
634	Natural eveegreen broadleaf forest (medi	Test set	105° 45.281' E	22° 5.737' N

635	Natural eveegreen broadleaf forest (medi	Test set	105° 45.481' E	22° 5.814' N
636	Natural eveegreen broadleaf forest (medi	Test set	105° 45.398' E	22° 5.778' N
637	Natural eveegreen broadleaf forest (medi	Test set	105° 45.367' E	22° 5.747' N
638	Natural eveegreen broadleaf forest (medi	Test set	105° 45.579' E	22° 5.772' N
639	Natural eveegreen broadleaf forest (medi	Test set	105° 45.970' E	22° 5.811' N
640	Natural eveegreen broadleaf forest (medi	Test set	105° 46.030' E	22° 5.774' N
641	Natural eveegreen broadleaf forest (medi	Test set	105° 45.264' E	22° 5.681' N
642	Natural eveegreen broadleaf forest (medi	Test set	105° 45.216' E	22° 5.572' N
643	Natural eveegreen broadleaf forest (medi	Test set	105° 45.287' E	22° 5.633' N
644	Natural eveegreen broadleaf forest (medi	Test set	105° 45.406' E	22° 5.607' N
645	Natural eveegreen broadleaf forest (medi	Test set	105° 45.171' E	22° 5.451' N
646	Natural eveegreen broadleaf forest (medi	Test set	105° 45.219' E	22° 5.405' N
647	Natural eveegreen broadleaf forest (medi	Test set	105° 45.243' E	22° 5.300' N
648	Natural eveegreen broadleaf forest (medi	Test set	105° 57.901' E	22° 4.684' N
649	Natural eveegreen broadleaf forest (medi	Test set	105° 57.997' E	22° 4.738' N
650	Natural eveegreen broadleaf forest (medi	Test set	105° 58.006' E	22° 4.688' N
651	Natural eveegreen broadleaf forest (medi	Test set	105° 57.871' E	22° 4.665' N
652	Natural eveegreen broadleaf forest (medi	Test set	105° 58.005' E	22° 4.636' N
653	Natural eveegreen broadleaf forest (medi	Test set	105° 56.142' E	22° 6.160' N
654	Natural eveegreen broadleaf forest (medi	Test set	105° 56.318' E	22° 6.220' N
655	Natural eveegreen broadleaf forest (medi	Test set	105° 56.329' E	22° 6.164' N
656	Natural eveegreen broadleaf forest (medi	Test set	105° 56.152' E	22° 6.113' N
657	Natural eveegreen broadleaf forest (medi	Test set	105° 56.364' E	22° 6.088' N
658	Natural eveegreen broadleaf forest (medi	Test set	105° 56.270' E	22° 6.063' N
659	Natural eveegreen broadleaf forest (medi	Test set	105° 56.468' E	22° 6.066' N
660	Natural eveegreen broadleaf forest (medi	Test set	105° 56.563' E	22° 6.009' N
661	Natural eveegreen broadleaf forest (medi	Test set	105° 56.601' E	22° 6.050' N
662	Natural eveegreen broadleaf forest (medi	Test set	105° 56.173' E	22° 5.875' N
663	Natural eveegreen broadleaf forest (medi	Test set	105° 56.335' E	22° 5.946' N
664	Natural eveegreen broadleaf forest (poor	Test set	105° 58.918' E	22° 4.789' N
665	Natural eveegreen broadleaf forest (poor	Test set	105° 59.631' E	22° 5.122' N
666	Natural eveegreen broadleaf forest (poor	Test set	105° 59.689' E	22° 5.199' N
667	Natural eveegreen broadleaf forest (poor	Test set	105° 59.638' E	22° 5.186' N
668	Natural eveegreen broadleaf forest (poor	Test set	105° 59.553' E	22° 4.955' N
669	Natural eveegreen broadleaf forest (poor	Test set	105° 59.736' E	22° 5.008' N
670	Natural eveegreen broadleaf forest (poor	Test set	105° 59.797' E	22° 5.075' N
671	Natural eveegreen broadleaf forest (poor	Test set	105° 59.576' E	22° 4.907' N
672	Natural eveegreen broadleaf forest (poor	Test set	105° 59.117' E	22° 4.886' N
673	Natural eveegreen broadleaf forest (poor	Test set	105° 59.021' E	22° 4.719' N
674	Natural eveegreen broadleaf forest (poor	Test set	105° 58.990' E	22° 4.692' N
675	Natural eveegreen broadleaf forest (poor	Test set	105° 59.038' E	22° 4.715' N
676	Natural eveegreen broadleaf forest (poor	Test set	105° 59.073' E	22° 4.780' N
677	Natural eveegreen broadleaf forest (poor	Test set	105° 59.116' E	22° 4.729' N
678	Natural eveegreen broadleaf forest (poor	Test set	105° 59.174' E	22° 4.785' N
679	Natural eveegreen broadleaf forest (poor	Test set	105° 59.322' E	22° 4.730' N
680	Natural eveegreen broadleaf forest (poor	Test set	105° 59.239' E	22° 4.715' N

681	Natural eveegreen broadleaf forest (poor	Test set	105° 59.370' E	22° 4.693' N
682	Natural eveegreen broadleaf forest (poor	Test set	105° 56.663' E	22° 5.652' N
683	Natural eveegreen broadleaf forest (poor	Test set	105° 56.574' E	22° 5.613' N
684	Natural eveegreen broadleaf forest (poor	Test set	105° 56.567' E	22° 5.516' N
685	Natural eveegreen broadleaf forest (poor	Test set	105° 56.640' E	22° 5.525' N
686	Natural eveegreen broadleaf forest (poor	Test set	105° 56.688' E	22° 5.497' N
687	Natural eveegreen broadleaf forest (poor	Test set	105° 56.629' E	22° 5.458' N
688	Natural eveegreen broadleaf forest (poor	Test set	105° 56.714' E	22° 5.466' N
689	Natural eveegreen broadleaf forest (poor	Test set	105° 56.620' E	22° 5.438' N
690	Natural eveegreen broadleaf forest (poor	Test set	105° 56.685' E	22° 5.431' N
691	Natural eveegreen broadleaf forest (poor	Test set	105° 56.674' E	22° 5.321' N
692	Natural eveegreen broadleaf forest (poor	Test set	105° 56.722' E	22° 5.370' N
693	Natural eveegreen broadleaf forest (poor	Test set	105° 57.527' E	22° 4.933' N
694	Natural regrowth forest	Test set	105° 57.441' E	22° 5.951' N
695	Natural regrowth forest	Test set	105° 57.430' E	22° 5.878' N
696	Natural regrowth forest	Test set	105° 57.742' E	22° 5.906' N
697	Natural regrowth forest	Test set	105° 57.796' E	22° 5.995' N
698	Natural regrowth forest	Test set	105° 57.842' E	22° 5.926' N
699	Natural regrowth forest	Test set	105° 57.966' E	22° 5.933' N
700	Natural regrowth forest	Test set	105° 57.927' E	22° 5.888' N
701	Natural regrowth forest	Test set	105° 58.117' E	22° 5.920' N
702	Natural regrowth forest	Test set	105° 58.018' E	22° 5.904' N
703	Natural regrowth forest	Test set	105° 57.122' E	22° 5.859' N
704	Natural regrowth forest	Test set	105° 57.103' E	22° 5.869' N
705	Natural regrowth forest	Test set	105° 57.058' E	22° 5.820' N
706	Natural regrowth forest	Test set	105° 57.090' E	22° 5.827' N
707	Natural regrowth forest	Test set	105° 57.197' E	22° 5.866' N
708	Natural regrowth forest	Test set	105° 57.161' E	22° 5.842' N
709	Natural regrowth forest	Test set	105° 57.197' E	22° 5.773' N
710	Natural regrowth forest	Test set	105° 57.305' E	22° 5.731' N
711	Natural regrowth forest	Test set	105° 57.227' E	22° 5.763' N
712	Natural regrowth forest	Test set	105° 57.437' E	22° 5.835' N
713	Natural regrowth forest	Test set	105° 57.350' E	22° 5.808' N
714	Natural regrowth forest	Test set	105° 57.402' E	22° 5.795' N
715	Natural regrowth forest	Test set	105° 57.580' E	22° 5.879' N
716	Natural regrowth forest	Test set	105° 57.467' E	22° 5.836' N
717	Natural regrowth forest	Test set	105° 57.485' E	22° 5.795' N
718	Natural regrowth forest	Test set	105° 57.510' E	22° 5.760' N
719	Natural regrowth forest	Test set	105° 57.548' E	22° 5.733' N
720	Natural regrowth forest	Test set	105° 57.574' E	22° 5.778' N
721	Natural regrowth forest	Test set	105° 57.811' E	22° 5.827' N
722	Natural regrowth forest	Test set	105° 57.871' E	22° 5.855' N
723	Natural regrowth forest	Test set	105° 57.795' E	22° 5.784' N
724	Natural regrowth forest on Limestone for	Test set	105° 56.879' E	22° 5.155' N
725	Natural regrowth forest on Limestone for	Test set	105° 57.035' E	22° 5.246' N
726	Natural regrowth forest on Limestone for	Test set	105° 57.049' E	22° 5.224' N

727	Natural regrowth forest on Limestone for	Test set	105° 56.727' E	22° 5.133' N
728	Natural regrowth forest on Limestone for	Test set	105° 56.706' E	22° 5.122' N
729	Natural regrowth forest on Limestone for	Test set	105° 56.891' E	22° 5.195' N
730	Natural regrowth forest on Limestone for	Test set	105° 56.846' E	22° 5.082' N
731	Natural regrowth forest on Limestone for	Test set	105° 56.925' E	22° 5.159' N
732	Natural regrowth forest on Limestone for	Test set	105° 56.952' E	22° 5.124' N
733	Natural regrowth forest on Limestone for	Test set	105° 57.059' E	22° 5.172' N
734	Natural regrowth forest on Limestone for	Test set	105° 57.057' E	22° 5.135' N
735	Natural regrowth forest on Limestone for	Test set	105° 56.672' E	22° 5.080' N
736	Natural regrowth forest on Limestone for	Test set	105° 56.746' E	22° 5.022' N
737	Natural regrowth forest on Limestone for	Test set	105° 56.811' E	22° 4.981' N
738	Natural regrowth forest on Limestone for	Test set	105° 56.885' E	22° 4.980' N
739	Natural regrowth forest on Limestone for	Test set	105° 56.855' E	22° 4.991' N
740	Natural regrowth forest on Limestone for	Test set	105° 53.989' E	22° 4.929' N
741	Natural regrowth forest on Limestone for	Test set	105° 54.043' E	22° 4.909' N
742	Natural regrowth forest on Limestone for	Test set	105° 53.874' E	22° 4.905' N
743	Natural regrowth forest on Limestone for	Test set	105° 53.938' E	22° 4.881' N
744	Natural regrowth forest on Limestone for	Test set	105° 54.078' E	22° 4.910' N
745	Natural regrowth forest on Limestone for	Test set	105° 54.051' E	22° 4.839' N
746	Natural regrowth forest on Limestone for	Test set	105° 54.292' E	22° 4.833' N
747	Natural regrowth forest on Limestone for	Test set	105° 54.331' E	22° 4.932' N
748	Natural regrowth forest on Limestone for	Test set	105° 54.236' E	22° 4.877' N
749	Natural regrowth forest on Limestone for	Test set	105° 54.355' E	22° 4.669' N
750	Natural regrowth forest on Limestone for	Test set	105° 56.655' E	22° 5.172' N
751	Natural regrowth forest on Limestone for	Test set	105° 59.677' E	22° 5.064' N
752	Natural regrowth forest on Limestone for	Test set	105° 58.320' E	22° 4.750' N
753	Plantation	Test set	105° 45.370' E	22° 5.296' N
754	Plantation	Test set	105° 45.642' E	22° 5.322' N
755	Plantation	Test set	105° 45.735' E	22° 5.393' N
756	Plantation	Test set	105° 45.766' E	22° 5.358' N
757	Plantation	Test set	105° 45.743' E	22° 5.276' N
758	Plantation	Test set	105° 45.388' E	22° 5.269' N
759	Plantation	Test set	105° 45.505' E	22° 5.205' N
760	Plantation	Test set	105° 45.468' E	22° 5.162' N
761	Plantation	Test set	105° 45.561' E	22° 5.285' N
762	Plantation	Test set	105° 45.633' E	22° 5.259' N
763	Plantation	Test set	105° 45.654' E	22° 5.196' N
764	Plantation	Test set	105° 45.652' E	22° 5.135' N
765	Plantation	Test set	105° 45.756' E	22° 5.195' N
766	Plantation	Test set	105° 45.959' E	22° 5.194' N
767	Plantation	Test set	105° 45.910' E	22° 5.167' N
768	Plantation	Test set	105° 46.141' E	22° 5.244' N
769	Plantation	Test set	105° 45.531' E	22° 5.079' N
770	Plantation	Test set	105° 45.598' E	22° 5.119' N
771	Plantation	Test set	105° 45.734' E	22° 5.161' N
772	Plantation	Test set	105° 45.992' E	22° 5.122' N

773	Plantation	Test set	105° 46.089' E	22° 5.096' N
774	Plantation	Test set	105° 46.077' E	22° 5.018' N
775	Plantation	Test set	105° 46.204' E	22° 5.093' N
776	Plantation	Test set	105° 46.132' E	22° 5.063' N
777	Plantation	Test set	105° 46.343' E	22° 5.107' N
778	Plantation	Test set	105° 45.664' E	22° 4.925' N
779	Plantation	Test set	105° 45.629' E	22° 4.869' N
780	Plantation	Test set	105° 45.713' E	22° 4.907' N
781	Plantation	Test set	105° 45.735' E	22° 4.862' N
782	Plantation	Test set	105° 45.770' E	22° 4.820' N
783	Forest garden	Test set	105° 55.599' E	22° 4.250' N
784	Natural regrowth forest on Limestone for	Test set	105° 53.970' E	22° 4.380' N
785	Forest garden	Test set	105° 52.258' E	22° 2.686' N
786	Forest garden	Test set	105° 51.360' E	22° 2.692' N
787	Forest garden	Test set	105° 50.483' E	22° 1.934' N
788	Forest garden	Test set	105° 50.993' E	22° 2.947' N
789	Forest garden	Test set	105° 52.285' E	22° 2.509' N
790	Forest garden	Test set	105° 51.925' E	22° 2.571' N
791	Palm trees	Test set	105° 45.556' E	22° 2.583' N
792	Palm trees	Test set	105° 45.778' E	22° 2.090' N
793	Palm trees	Test set	105° 45.754' E	22° 2.062' N
794	Palm trees	Test set	105° 45.562' E	22° 2.792' N
795	Palm trees	Test set	105° 45.522' E	22° 2.721' N
796	Palm trees	Test set	105° 46.121' E	22° 1.788' N
797	Palm trees	Test set	105° 46.220' E	22° 2.713' N
798	Palm trees	Test set	105° 45.355' E	22° 2.542' N
799	Palm trees	Test set	105° 45.273' E	22° 2.636' N
800	Palm trees	Test set	105° 45.422' E	22° 2.902' N
801	Palm trees	Test set	105° 44.789' E	22° 1.962' N
802	Forest garden	Test set	105° 48.274' E	21° 58.887' N
803	Forest garden	Test set	105° 48.403' E	21° 58.902' N
804	Forest garden	Test set	105° 48.490' E	21° 58.914' N
805	Forest garden	Test set	105° 48.645' E	21° 58.798' N
806	Forest garden	Test set	105° 48.679' E	21° 58.875' N
807	Forest garden	Test set	105° 48.657' E	21° 58.830' N
808	Forest garden	Test set	105° 48.386' E	21° 59.162' N
809	Forest garden	Test set	105° 48.432' E	21° 59.188' N
810	Forest garden	Test set	105° 48.434' E	21° 59.109' N
811	Forest garden	Test set	105° 49.624' E	21° 59.033' N
812	Forest garden	Test set	105° 49.724' E	21° 59.021' N
813	Forest garden	Test set	105° 49.727' E	21° 58.970' N
814	Forest garden	Test set	105° 49.575' E	21° 58.923' N
815	Forest garden	Test set	105° 49.652' E	21° 58.937' N
816	Forest garden	Test set	105° 49.725' E	21° 58.909' N
817	Forest garden	Test set	105° 49.765' E	21° 58.913' N
818	Forest garden	Test set	105° 48.946' E	21° 59.780' N

819	Forest garden	Test set	105° 48.909' E	21° 59.720' N
820	Forest garden	Test set	105° 48.767' E	21° 59.523' N
821	Forest garden	Test set	105° 48.847' E	21° 59.478' N
822	Forest garden	Test set	105° 49.334' E	21° 59.162' N
823	Forest garden	Test set	105° 49.286' E	21° 59.054' N
824	Forest garden	Test set	105° 48.262' E	22° 0.242' N
825	Fruit trees	Test set	105° 53.006' E	22° 1.349' N
826	Fruit trees	Test set	105° 50.607' E	22° 1.226' N
827	Fruit trees	Test set	105° 50.948' E	22° 1.212' N
828	Fruit trees	Test set	105° 51.585' E	22° 1.302' N
829	Fruit trees	Test set	105° 51.574' E	22° 1.271' N
830	Fruit trees	Test set	105° 53.040' E	22° 1.221' N
831	Fruit trees	Test set	105° 53.039' E	22° 1.183' N
832	Fruit trees	Test set	105° 50.496' E	22° 1.370' N
833	Fruit trees	Test set	105° 50.375' E	21° 58.932' N
834	Fruit trees	Test set	105° 49.895' E	22° 1.005' N
835	Fruit trees	Test set	105° 49.223' E	22° 1.298' N
836	Fruit trees	Test set	105° 50.751' E	22° 1.311' N
837	Palm trees	Test set	105° 46.007' E	22° 1.503' N
838	Palm trees	Test set	105° 49.838' E	21° 59.138' N
839	Palm trees	Test set	105° 49.782' E	21° 59.221' N
840	Fruit trees	Test set	105° 49.618' E	21° 56.809' N
841	Fruit trees	Test set	105° 49.104' E	21° 56.818' N
842	Fruit trees	Test set	105° 46.477' E	21° 58.194' N
843	Palm trees	Test set	105° 48.712' E	21° 57.650' N
844	Palm trees	Test set	105° 48.758' E	21° 57.507' N
845	Tea farm	Test set	105° 48.825' E	21° 56.157' N
846	Tea farm	Test set	105° 48.513' E	21° 56.159' N
847	Fruit trees	Test set	105° 50.367' E	21° 54.551' N
848	Fruit trees	Test set	105° 50.440' E	21° 54.509' N
849	Fruit trees	Test set	105° 50.388' E	21° 54.367' N
850	Fruit trees	Test set	105° 47.805' E	21° 53.402' N
851	Fruit trees	Test set	105° 53.255' E	21° 55.154' N
852	Fruit trees	Test set	105° 53.291' E	21° 55.137' N
853	Fruit trees	Test set	105° 46.833' E	21° 54.631' N
854	Palm trees	Test set	105° 49.197' E	21° 53.876' N
855	Palm trees	Test set	105° 49.121' E	21° 53.561' N
856	Palm trees	Test set	105° 49.142' E	21° 53.546' N
857	Palm trees	Test set	105° 49.347' E	21° 53.843' N
858	Fruit trees	Test set	105° 49.688' E	21° 52.268' N
859	Bamboo forest	Training set	105° 58.633' E	22° 5.693' N
860	Bamboo forest	Training set	105° 45.907' E	22° 4.687' N
861	Bamboo forest	Training set	105° 45.658' E	22° 4.969' N
862	Bamboo forest	Training set	105° 45.932' E	22° 4.862' N
863	Bamboo forest	Training set	105° 44.705' E	22° 4.804' N
864	Bamboo forest	Training set	105° 50.057' E	22° 4.899' N

865	Bamboo forest	Training set	105° 58.308' E	22° 5.917' N
866	Bamboo forest	Training set	105° 56.792' E	22° 6.629' N
867	Bamboo forest	Training set	105° 44.810' E	22° 4.590' N
868	Bare land	Training set	105° 56.599' E	22° 6.502' N
869	Bare land	Training set	105° 45.014' E	22° 5.878' N
870	Bare land	Training set	105° 44.999' E	22° 5.840' N
871	Bare land	Training set	105° 44.770' E	22° 5.748' N
872	Bare land	Training set	105° 44.795' E	22° 5.714' N
873	Bare land	Training set	105° 44.788' E	22° 5.777' N
874	Bare land	Training set	105° 44.839' E	22° 5.782' N
875	Bare land	Training set	105° 44.924' E	22° 5.794' N
876	Bare land	Training set	105° 44.890' E	22° 5.728' N
877	Bare land	Training set	105° 44.840' E	22° 5.707' N
878	Bare land	Training set	105° 44.795' E	22° 5.649' N
879	Bare land	Training set	105° 44.749' E	22° 5.635' N
880	Bare land	Training set	105° 48.802' E	22° 5.625' N
881	Bare land	Training set	105° 48.851' E	22° 5.595' N
882	Bare land	Training set	105° 48.810' E	22° 5.575' N
883	Bare land	Training set	105° 48.809' E	22° 5.532' N
884	Bare land	Training set	105° 48.814' E	22° 5.489' N
885	Bare land	Training set	105° 48.678' E	22° 5.413' N
886	Bare land	Training set	105° 55.471' E	22° 7.339' N
887	Bare land	Training set	105° 55.371' E	22° 7.329' N
888	Bare land	Training set	105° 55.333' E	22° 7.244' N
889	Bare land	Training set	105° 55.387' E	22° 7.194' N
890	Bare land	Training set	105° 55.352' E	22° 7.177' N
891	Bare land	Training set	105° 55.476' E	22° 7.218' N
892	Bare land	Training set	105° 58.170' E	22° 6.101' N
893	Bare land	Training set	105° 58.033' E	22° 6.034' N
894	Bare land	Training set	105° 58.167' E	22° 6.025' N
895	Bare land	Training set	105° 58.137' E	22° 5.960' N
896	Bare land	Training set	105° 58.053' E	22° 5.947' N
897	Bare land	Training set	105° 58.192' E	22° 5.930' N
898	Fruit trees	Training set	105° 53.954' E	22° 4.822' N
899	Mixed timeber and bamboo	Training set	105° 46.416' E	22° 5.867' N
900	Mixed timeber and bamboo	Training set	105° 46.313' E	22° 5.850' N
901	Mixed timeber and bamboo	Training set	105° 46.464' E	22° 5.899' N
902	Mixed timeber and bamboo	Training set	105° 46.653' E	22° 5.918' N
903	Mixed timeber and bamboo	Training set	105° 46.755' E	22° 5.910' N
904	Mixed timeber and bamboo	Training set	105° 46.579' E	22° 5.836' N
905	Mixed timeber and bamboo	Training set	105° 46.774' E	22° 5.885' N
906	Mixed timeber and bamboo	Training set	105° 46.830' E	22° 5.946' N
907	Mixed timeber and bamboo	Training set	105° 46.913' E	22° 5.966' N
908	Mixed timeber and bamboo	Training set	105° 46.858' E	22° 5.923' N
909	Mixed timeber and bamboo	Training set	105° 46.882' E	22° 5.900' N
910	Mixed timeber and bamboo	Training set	105° 46.920' E	22° 5.877' N

911	Mixed timeber and bamboo	Training set	105° 47.059' E	22° 5.900' N
912	Mixed timeber and bamboo	Training set	105° 47.193' E	22° 5.948' N
913	Mixed timeber and bamboo	Training set	105° 47.244' E	22° 5.925' N
914	Mixed timeber and bamboo	Training set	105° 47.190' E	22° 5.894' N
915	Mixed timeber and bamboo	Training set	105° 47.364' E	22° 5.930' N
916	Mixed timeber and bamboo	Training set	105° 47.309' E	22° 5.880' N
917	Mixed timeber and bamboo	Training set	105° 47.480' E	22° 5.974' N
918	Mixed timeber and bamboo	Training set	105° 47.419' E	22° 5.950' N
919	Mixed timeber and bamboo	Training set	105° 47.459' E	22° 5.926' N
920	Mixed timeber and bamboo	Training set	105° 47.517' E	22° 5.929' N
921	Mixed timeber and bamboo	Training set	105° 47.474' E	22° 5.867' N
922	Mixed timeber and bamboo	Training set	105° 47.598' E	22° 5.975' N
923	Mixed timeber and bamboo	Training set	105° 47.599' E	22° 5.921' N
924	Mixed timeber and bamboo	Training set	105° 47.612' E	22° 5.867' N
925	Mixed timeber and bamboo	Training set	105° 47.673' E	22° 5.875' N
926	Mixed timeber and bamboo	Training set	105° 47.784' E	22° 5.948' N
927	Mixed timeber and bamboo	Training set	105° 47.722' E	22° 5.920' N
928	Mixed timeber and bamboo	Training set	105° 47.818' E	22° 5.925' N
929	Natural eveegreen broadleaf forest (medi	Training set	105° 45.949' E	22° 6.068' N
930	Natural eveegreen broadleaf forest (medi	Training set	105° 46.049' E	22° 6.111' N
931	Natural eveegreen broadleaf forest (medi	Training set	105° 45.977' E	22° 6.107' N
932	Natural eveegreen broadleaf forest (medi	Training set	105° 46.237' E	22° 6.124' N
933	Natural eveegreen broadleaf forest (medi	Training set	105° 46.310' E	22° 6.098' N
934	Natural eveegreen broadleaf forest (medi	Training set	105° 46.385' E	22° 6.097' N
935	Natural eveegreen broadleaf forest (medi	Training set	105° 45.370' E	22° 5.985' N
936	Natural eveegreen broadleaf forest (medi	Training set	105° 45.508' E	22° 6.046' N
937	Natural eveegreen broadleaf forest (medi	Training set	105° 45.490' E	22° 5.943' N
938	Natural eveegreen broadleaf forest (medi	Training set	105° 45.645' E	22° 6.077' N
939	Natural eveegreen broadleaf forest (medi	Training set	105° 45.595' E	22° 6.029' N
940	Natural eveegreen broadleaf forest (medi	Training set	105° 45.583' E	22° 5.969' N
941	Natural eveegreen broadleaf forest (medi	Training set	105° 45.806' E	22° 6.069' N
942	Natural eveegreen broadleaf forest (medi	Training set	105° 45.872' E	22° 6.047' N
943	Natural eveegreen broadleaf forest (medi	Training set	105° 45.952' E	22° 6.016' N
944	Natural eveegreen broadleaf forest (medi	Training set	105° 46.050' E	22° 6.059' N
945	Natural eveegreen broadleaf forest (medi	Training set	105° 46.144' E	22° 6.089' N
946	Natural eveegreen broadleaf forest (medi	Training set	105° 46.355' E	22° 6.007' N
947	Natural eveegreen broadleaf forest (medi	Training set	105° 46.271' E	22° 6.039' N
948	Natural eveegreen broadleaf forest (medi	Training set	105° 46.335' E	22° 6.012' N
949	Natural eveegreen broadleaf forest (medi	Training set	105° 46.494' E	22° 5.953' N
950	Natural eveegreen broadleaf forest (medi	Training set	105° 46.483' E	22° 6.051' N
951	Natural eveegreen broadleaf forest (medi	Training set	105° 46.462' E	22° 6.015' N
952	Natural eveegreen broadleaf forest (medi	Training set	105° 45.392' E	22° 5.899' N
953	Natural eveegreen broadleaf forest (medi	Training set	105° 45.540' E	22° 5.951' N
954	Natural eveegreen broadleaf forest (medi	Training set	105° 45.691' E	22° 5.943' N
955	Natural eveegreen broadleaf forest (medi	Training set	105° 45.710' E	22° 5.874' N
956	Natural eveegreen broadleaf forest (medi	Training set	105° 45.750' E	22° 5.845' N

957	Natural eveegreen broadleaf forest (medi	Training set	105° 45.860' E	22° 5.840' N
958	Natural eveegreen broadleaf forest (medi	Training set	105° 45.287' E	22° 5.828' N
959	Natural eveegreen broadleaf forest (poor	Training set	105° 57.627' E	22° 4.952' N
960	Natural eveegreen broadleaf forest (poor	Training set	105° 57.654' E	22° 4.907' N
961	Natural eveegreen broadleaf forest (poor	Training set	105° 57.605' E	22° 4.875' N
962	Natural eveegreen broadleaf forest (poor	Training set	105° 57.714' E	22° 4.792' N
963	Natural eveegreen broadleaf forest (poor	Training set	105° 57.828' E	22° 4.844' N
964	Natural eveegreen broadleaf forest (poor	Training set	105° 57.788' E	22° 4.791' N
965	Natural eveegreen broadleaf forest (poor	Training set	105° 57.791' E	22° 4.739' N
966	Natural eveegreen broadleaf forest (poor	Training set	105° 57.878' E	22° 4.775' N
967	Natural eveegreen broadleaf forest (poor	Training set	105° 55.646' E	22° 6.328' N
968	Natural eveegreen broadleaf forest (poor	Training set	105° 55.517' E	22° 6.190' N
969	Natural eveegreen broadleaf forest (poor	Training set	105° 55.643' E	22° 6.228' N
970	Natural eveegreen broadleaf forest (poor	Training set	105° 55.616' E	22° 6.142' N
971	Natural eveegreen broadleaf forest (poor	Training set	105° 55.636' E	22° 6.102' N
972	Natural eveegreen broadleaf forest (poor	Training set	105° 55.660' E	22° 6.051' N
973	Natural eveegreen broadleaf forest (poor	Training set	105° 55.740' E	22° 6.110' N
974	Natural eveegreen broadleaf forest (poor	Training set	105° 55.758' E	22° 6.057' N
975	Natural eveegreen broadleaf forest (poor	Training set	105° 55.732' E	22° 6.059' N
976	Natural eveegreen broadleaf forest (poor	Training set	105° 55.965' E	22° 6.077' N
977	Natural eveegreen broadleaf forest (poor	Training set	105° 55.892' E	22° 6.055' N
978	Natural eveegreen broadleaf forest (poor	Training set	105° 56.028' E	22° 6.019' N
979	Natural eveegreen broadleaf forest (poor	Training set	105° 55.991' E	22° 5.931' N
980	Natural eveegreen broadleaf forest (poor	Training set	105° 55.967' E	22° 6.941' N
981	Natural eveegreen broadleaf forest (poor	Training set	105° 56.144' E	22° 7.003' N
982	Natural eveegreen broadleaf forest (poor	Training set	105° 56.280' E	22° 7.056' N
983	Natural eveegreen broadleaf forest (poor	Training set	105° 55.975' E	22° 6.875' N
984	Natural eveegreen broadleaf forest (poor	Training set	105° 56.088' E	22° 6.915' N
985	Natural eveegreen broadleaf forest (poor	Training set	105° 56.073' E	22° 6.891' N
986	Natural eveegreen broadleaf forest (poor	Training set	105° 59.597' E	22° 5.353' N
987	Natural eveegreen broadleaf forest (poor	Training set	105° 59.710' E	22° 5.463' N
988	Natural eveegreen broadleaf forest (poor	Training set	105° 59.880' E	22° 5.447' N
989	Natural regrowth forest	Training set	105° 57.273' E	22° 6.172' N
990	Natural regrowth forest	Training set	105° 57.417' E	22° 6.164' N
991	Natural regrowth forest	Training set	105° 57.320' E	22° 6.165' N
992	Natural regrowth forest	Training set	105° 57.534' E	22° 6.144' N
993	Natural regrowth forest	Training set	105° 57.623' E	22° 6.175' N
994	Natural regrowth forest	Training set	105° 57.676' E	22° 6.169' N
995	Natural regrowth forest	Training set	105° 57.607' E	22° 6.144' N
996	Natural regrowth forest	Training set	105° 57.932' E	22° 6.215' N
997	Natural regrowth forest	Training set	105° 58.049' E	22° 6.182' N
998	Natural regrowth forest	Training set	105° 57.288' E	22° 6.134' N
999	Natural regrowth forest	Training set	105° 57.418' E	22° 6.127' N
1000	Natural regrowth forest	Training set	105° 57.556' E	22° 6.121' N
1001	Natural regrowth forest	Training set	105° 57.593' E	22° 6.078' N
1002	Natural regrowth forest	Training set	105° 57.624' E	22° 6.133' N

1003	Natural regrowth forest	Training set	105° 57.706' E	22° 6.134' N
1004	Natural regrowth forest	Training set	105° 57.666' E	22° 6.153' N
1005	Natural regrowth forest	Training set	105° 57.648' E	22° 6.106' N
1006	Natural regrowth forest	Training set	105° 57.823' E	22° 6.166' N
1007	Natural regrowth forest	Training set	105° 57.730' E	22° 6.020' N
1008	Natural regrowth forest	Training set	105° 57.845' E	22° 6.000' N
1009	Natural regrowth forest	Training set	105° 58.034' E	22° 6.114' N
1010	Natural regrowth forest	Training set	105° 57.923' E	22° 6.090' N
1011	Natural regrowth forest	Training set	105° 58.122' E	22° 6.139' N
1012	Natural regrowth forest	Training set	105° 57.431' E	22° 5.927' N
1013	Natural regrowth forest	Training set	105° 57.409' E	22° 5.914' N
1014	Natural regrowth forest	Training set	105° 57.336' E	22° 5.889' N
1015	Natural regrowth forest	Training set	105° 57.459' E	22° 5.971' N
1016	Natural regrowth forest	Training set	105° 57.413' E	22° 5.966' N
1017	Natural regrowth forest	Training set	105° 57.510' E	22° 5.968' N
1018	Natural regrowth forest	Training set	105° 57.552' E	22° 5.947' N
1019	Palm trees	Training set	105° 44.131' E	22° 4.496' N
1020	Palm trees	Training set	105° 44.028' E	22° 4.517' N
1021	Palm trees	Training set	105° 43.777' E	22° 4.515' N
1022	Palm trees	Training set	105° 44.866' E	22° 4.745' N
1023	Plantation	Training set	105° 45.750' E	22° 4.825' N
1024	Plantation	Training set	105° 45.808' E	22° 4.757' N
1025	Plantation	Training set	105° 45.904' E	22° 4.747' N
1026	Plantation	Training set	105° 45.960' E	22° 4.675' N
1027	Plantation	Training set	105° 45.834' E	22° 4.689' N
1028	Plantation	Training set	105° 46.012' E	22° 4.663' N
1029	Plantation	Training set	105° 46.103' E	22° 4.618' N
1030	Plantation	Training set	105° 45.836' E	22° 4.476' N
1031	Plantation	Training set	105° 46.019' E	22° 4.620' N
1032	Plantation	Training set	105° 45.950' E	22° 4.566' N
1033	Plantation	Training set	105° 46.011' E	22° 4.542' N
1034	Plantation	Training set	105° 46.047' E	22° 4.515' N
1035	Plantation	Training set	105° 46.043' E	22° 4.482' N
1036	Plantation	Training set	105° 46.173' E	22° 4.602' N
1037	Plantation	Training set	105° 50.306' E	22° 5.091' N
1038	Plantation	Training set	105° 50.656' E	22° 5.059' N
1039	Plantation	Training set	105° 50.515' E	22° 5.053' N
1040	Plantation	Training set	105° 50.296' E	22° 4.960' N
1041	Plantation	Training set	105° 50.297' E	22° 5.064' N
1042	Plantation	Training set	105° 50.401' E	22° 4.934' N
1043	Plantation	Training set	105° 50.467' E	22° 4.917' N
1044	Plantation	Training set	105° 50.543' E	22° 4.995' N
1045	Plantation	Training set	105° 50.488' E	22° 4.973' N
1046	Plantation	Training set	105° 50.514' E	22° 4.931' N
1047	Plantation	Training set	105° 50.612' E	22° 4.999' N
1048	Plantation	Training set	105° 50.656' E	22° 4.986' N

1049	Plantation	Training set	105° 50.684' E	22° 4.922' N
1050	Plantation	Training set	105° 50.651' E	22° 4.930' N
1051	Plantation	Training set	105° 50.615' E	22° 4.847' N
1052	Plantation	Training set	105° 50.911' E	22° 4.791' N
1053	Bamboo forest	Training set	105° 55.565' E	22° 3.787' N
1054	Bamboo forest	Training set	105° 54.949' E	22° 3.576' N
1055	Bamboo forest	Training set	105° 55.068' E	22° 3.675' N
1056	Bamboo forest	Training set	105° 55.129' E	22° 3.581' N
1057	Bamboo forest	Training set	105° 55.310' E	22° 3.626' N
1058	Bamboo forest	Training set	105° 55.447' E	22° 3.681' N
1059	Bamboo forest	Training set	105° 55.438' E	22° 3.629' N
1060	Bamboo forest	Training set	105° 55.415' E	22° 3.579' N
1061	Bamboo forest	Training set	105° 55.636' E	22° 3.694' N
1062	Bamboo forest	Training set	105° 55.049' E	22° 3.475' N
1063	Bamboo forest	Training set	105° 55.000' E	22° 3.465' N
1064	Bamboo forest	Training set	105° 55.243' E	22° 3.537' N
1065	Bamboo forest	Training set	105° 55.212' E	22° 3.437' N
1066	Bamboo forest	Training set	105° 55.409' E	22° 3.442' N
1067	Bamboo forest	Training set	105° 55.171' E	22° 3.337' N
1068	Bamboo forest	Training set	105° 55.177' E	22° 3.281' N
1069	Bamboo forest	Training set	105° 55.344' E	22° 3.404' N
1070	Bamboo forest	Training set	105° 55.398' E	22° 3.353' N
1071	Bamboo forest	Training set	105° 55.315' E	22° 3.362' N
1072	Bamboo forest	Training set	105° 54.823' E	22° 4.216' N
1073	Bamboo forest	Training set	105° 54.752' E	22° 4.131' N
1074	Fruit trees	Training set	105° 55.186' E	22° 4.373' N
1075	Fruit trees	Training set	105° 55.381' E	22° 4.395' N
1076	Fruit trees	Training set	105° 55.151' E	22° 4.341' N
1077	Fruit trees	Training set	105° 55.352' E	22° 4.375' N
1078	Fruit trees	Training set	105° 55.351' E	22° 4.319' N
1079	Fruit trees	Training set	105° 55.314' E	22° 4.340' N
1080	Fruit trees	Training set	105° 54.917' E	22° 4.266' N
1081	Fruit trees	Training set	105° 47.730' E	22° 3.853' N
1082	Fruit trees	Training set	105° 47.696' E	22° 3.797' N
1083	Fruit trees	Training set	105° 47.654' E	22° 3.758' N
1084	Fruit trees	Training set	105° 50.727' E	22° 3.822' N
1085	Fruit trees	Training set	105° 55.434' E	22° 3.748' N
1086	Fruit trees	Training set	105° 50.195' E	22° 4.055' N
1087	Fruit trees	Training set	105° 55.668' E	22° 4.286' N
1088	Natural regrowth forest on Limestone for	Training set	105° 53.922' E	22° 4.352' N
1089	Natural regrowth forest on Limestone for	Training set	105° 54.022' E	22° 4.309' N
1090	Natural regrowth forest on Limestone for	Training set	105° 53.898' E	22° 4.248' N
1091	Natural regrowth forest on Limestone for	Training set	105° 54.235' E	22° 4.337' N
1092	Natural regrowth forest on Limestone for	Training set	105° 54.249' E	22° 4.284' N
1093	Natural regrowth forest on Limestone for	Training set	105° 54.382' E	22° 4.257' N
1094	Natural regrowth forest on Limestone for	Training set	105° 54.440' E	22° 4.310' N

1095	Natural regrowth forest on Limestone for	Training set	105° 54.529' E	22° 4.294' N
1096	Natural regrowth forest on Limestone for	Training set	105° 53.675' E	22° 4.131' N
1097	Natural regrowth forest on Limestone for	Training set	105° 53.792' E	22° 4.152' N
1098	Natural regrowth forest on Limestone for	Training set	105° 53.719' E	22° 4.148' N
1099	Natural regrowth forest on Limestone for	Training set	105° 53.850' E	22° 4.131' N
1100	Natural regrowth forest on Limestone for	Training set	105° 53.898' E	22° 4.131' N
1101	Natural regrowth forest on Limestone for	Training set	105° 53.976' E	22° 4.195' N
1102	Natural regrowth forest on Limestone for	Training set	105° 54.104' E	22° 4.176' N
1103	Natural regrowth forest on Limestone for	Training set	105° 54.087' E	22° 4.109' N
1104	Natural regrowth forest on Limestone for	Training set	105° 54.144' E	22° 4.200' N
1105	Natural regrowth forest on Limestone for	Training set	105° 54.215' E	22° 4.151' N
1106	Natural regrowth forest on Limestone for	Training set	105° 54.241' E	22° 4.197' N
1107	Natural regrowth forest on Limestone for	Training set	105° 54.396' E	22° 4.159' N
1108	Natural regrowth forest on Limestone for	Training set	105° 54.539' E	22° 4.214' N
1109	Natural regrowth forest on Limestone for	Training set	105° 54.464' E	22° 4.120' N
1110	Natural regrowth forest on Limestone for	Training set	105° 54.527' E	22° 4.165' N
1111	Natural regrowth forest on Limestone for	Training set	105° 53.665' E	22° 4.061' N
1112	Natural regrowth forest on Limestone for	Training set	105° 53.705' E	22° 4.026' N
1113	Natural regrowth forest on Limestone for	Training set	105° 53.881' E	22° 4.059' N
1114	Natural regrowth forest on Limestone for	Training set	105° 53.838' E	22° 4.052' N
1115	Natural regrowth forest on Limestone for	Training set	105° 53.892' E	22° 3.987' N
1116	Natural regrowth forest on Limestone for	Training set	105° 53.977' E	22° 4.091' N
1117	Natural regrowth forest on Limestone for	Training set	105° 54.052' E	22° 4.050' N
1118	Palm trees	Training set	105° 44.064' E	22° 4.421' N
1119	Palm trees	Training set	105° 44.139' E	22° 4.372' N
1120	Palm trees	Training set	105° 43.492' E	22° 4.128' N
1121	Palm trees	Training set	105° 43.554' E	22° 4.063' N
1122	Tea farm	Training set	105° 47.981' E	22° 3.745' N
1123	Fruit trees	Training set	105° 52.444' E	22° 2.886' N
1124	Fruit trees	Training set	105° 52.764' E	22° 2.204' N
1125	Fruit trees	Training set	105° 50.576' E	22° 2.029' N
1126	Fruit trees	Training set	105° 50.518' E	22° 1.990' N
1127	Fruit trees	Training set	105° 51.818' E	22° 2.749' N
1128	Fruit trees	Training set	105° 51.854' E	22° 2.726' N
1129	Fruit trees	Training set	105° 50.677' E	22° 2.283' N
1130	Fruit trees	Training set	105° 50.316' E	22° 1.825' N
1131	Fruit trees	Training set	105° 52.029' E	22° 2.855' N
1132	Palm trees	Training set	105° 45.928' E	22° 2.089' N
1133	Palm trees	Training set	105° 46.052' E	22° 2.128' N
1134	Palm trees	Training set	105° 46.136' E	22° 2.035' N
1135	Palm trees	Training set	105° 45.944' E	22° 2.043' N
1136	Palm trees	Training set	105° 45.882' E	22° 1.964' N
1137	Palm trees	Training set	105° 46.088' E	22° 1.975' N
1138	Palm trees	Training set	105° 46.150' E	22° 3.041' N
1139	Palm trees	Training set	105° 46.278' E	22° 3.002' N
1140	Palm trees	Training set	105° 46.318' E	22° 2.928' N

1141	Palm trees	Training set	105° 46.349' E	22° 2.841' N
1142	Palm trees	Training set	105° 46.414' E	22° 2.762' N
1143	Palm trees	Training set	105° 46.195' E	22° 1.941' N
1144	Palm trees	Training set	105° 46.316' E	22° 1.935' N
1145	Palm trees	Training set	105° 46.429' E	22° 1.922' N
1146	Palm trees	Training set	105° 46.306' E	22° 2.083' N
1147	Palm trees	Training set	105° 45.453' E	22° 2.274' N
1148	Palm trees	Training set	105° 45.660' E	22° 1.904' N
1149	Palm trees	Training set	105° 45.955' E	22° 1.824' N
1150	Palm trees	Training set	105° 45.990' E	22° 1.790' N
1151	Palm trees	Training set	105° 46.502' E	22° 2.537' N
1152	Palm trees	Training set	105° 46.481' E	22° 2.487' N
1153	Palm trees	Training set	105° 45.618' E	22° 2.589' N
1154	Forest garden	Training set	105° 48.360' E	22° 0.148' N
1155	Forest garden	Training set	105° 49.377' E	21° 58.851' N
1156	Forest garden	Training set	105° 45.775' E	21° 59.850' N
1157	Forest garden	Training set	105° 49.751' E	22° 0.589' N
1158	Forest garden	Training set	105° 49.396' E	21° 59.412' N
1159	Forest garden	Training set	105° 48.792' E	21° 58.964' N
1160	Forest garden	Training set	105° 48.121' E	21° 58.924' N
1161	Forest garden	Training set	105° 49.740' E	22° 0.973' N
1162	Forest garden	Training set	105° 49.175' E	21° 58.888' N
1163	Fruit trees	Training set	105° 50.698' E	22° 1.237' N
1164	Fruit trees	Training set	105° 50.411' E	22° 0.546' N
1165	Fruit trees	Training set	105° 53.413' E	22° 1.313' N
1166	Fruit trees	Training set	105° 49.839' E	22° 0.489' N
1167	Fruit trees	Training set	105° 49.828' E	22° 0.347' N
1168	Fruit trees	Training set	105° 49.482' E	22° 0.545' N
1169	Forest garden	Training set	105° 48.865' E	21° 58.247' N
1170	Forest garden	Training set	105° 48.869' E	21° 58.146' N
1171	Forest garden	Training set	105° 48.961' E	21° 58.204' N
1172	Forest garden	Training set	105° 48.401' E	21° 56.079' N
1173	Forest garden	Training set	105° 48.912' E	21° 57.499' N
1174	Forest garden	Training set	105° 48.939' E	21° 57.490' N
1175	Forest garden	Training set	105° 48.972' E	21° 57.441' N
1176	Forest garden	Training set	105° 48.034' E	21° 57.224' N
1177	Forest garden	Training set	105° 48.497' E	21° 58.196' N
1178	Forest garden	Training set	105° 48.545' E	21° 56.359' N
1179	Forest garden	Training set	105° 48.996' E	21° 57.259' N
1180	Forest garden	Training set	105° 48.994' E	21° 57.196' N
1181	Forest garden	Training set	105° 49.007' E	21° 57.222' N
1182	Forest garden	Training set	105° 48.444' E	21° 56.499' N
1183	Forest garden	Training set	105° 48.355' E	21° 56.490' N
1184	Forest garden	Training set	105° 48.678' E	21° 56.267' N
1185	Forest garden	Training set	105° 48.265' E	21° 57.470' N
1186	Forest garden	Training set	105° 48.515' E	21° 56.201' N

1187	Forest garden	Training set	105° 47.711' E	21° 56.250' N
1188	Forest garden	Training set	105° 48.476' E	21° 57.079' N
1189	Forest garden	Training set	105° 48.787' E	21° 56.548' N
1190	Tea farm	Training set	105° 48.669' E	21° 56.134' N
1191	Tea farm	Training set	105° 48.631' E	21° 56.080' N

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