OPTIMUM MACHINE LEARNING ALGORITHM WITH OBJECT-BASED IMAGE ANALYSIS FOR DETECTING INCOMPLIANT LAND UTILIZATION IN AGRICULTURAL LAND REFORM AREAS

JUTAMAS NOINA

A Thesis Submitted in Partial Fulfillment of the Requirements for the
Degree of Doctor of Philosophy in Geoinformatics
Suranaree University of Technology
Academic Year 2024

อัลกอริทึมการเรียนรู้ด้วยเครื่องที่เหมาะสมที่สุดด้วยการวิเคราะห์ภาพตามวัตถุสำหรับตรวจจับการใช้ประโยชน์ที่ดินที่ไม่เหมาะสมในเขตปฏิรูปที่ดินเพื่อเกษตรกรรม

นางสาวจุฑามาศ น้อยนา

วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรดุษฎีบัณฑิต
สาขาวิชาภูมิสารสนเทศ
มหาวิทยาลัยเทคโนโลยีสุรนารี
ปีการศึกษา 2567

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Suranaree University of Technology has approved this thesis submitted in partial fulfillment of the requirements for the Degree of Doctor of Philosophy.

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จุฑามาศ น้อยนา : อัลกอริทึมการเรียนรู้ด้วยเครื่องที่เหมาะสมที่สุดด้วยการวิเคราะห์ภาพตามวัตถุสำหรับตรวจจับการใช้ประโยชน์ที่ดินที่ไม่เหมาะสมในเขตปฏิรูปที่ดินเพื่อเกษตรกรรม (OPTIMUM MACHINE LEARNING ALGORITHM WITH OBJECT-BASED IMAGE ANALYSIS FOR DETECTING INCOMPLIANT LAND UTILIZATION IN AGRICULTURAL LAND REFORM AREAS) อาจารย์ที่ปรึกษา : รองศาสตราจารย์ ดร.สุวิทย์ อ่องสมหวัง, 207 หน้า.

คำสำคัญ: อัลกอริทึมการเรียนรู้ด้วยเครื่องที่เหมาะสม; ป่าสุ่ม; การใช้ที่ดินที่ไม่เป็นไปตามข้อกำหนด, เขตปฏิรูปที่ดินเพื่อเกษตรกรรม

สำนักงานปฏิรูปที่ดินเพื่อการเกษตร (ส.ป.ก.) จัดตั้งขึ้นเพื่อแก้ไขปัญหาการพัฒนาประเทศผ่านโครงการปรับปรุงที่ดินโดยจัดสรรที่ดินเพื่อการเกษตรและที่อยู่อาศัยให้แก่เกษตรกร ปัจจุบันพบว่าการใช้ที่ดินบางแปลงที่อยู่ภายใต้ความรับผิดชอบของ ส.ป.ก. ไม่เป็นไปตามพระราชบัญญัติปฏิรูปที่ดินเพื่อการเกษตร เช่น โรงแรม รีสอร์ท และสถานที่พัก ส.ป.ก. จัดให้มีการตรวจสอบการใช้ที่ดินในแต่ละแปลงด้วยการตีความภาพจากภาพความละเอียดสูงและการสำรวจภาคสนาม วัตถุประสงค์หลักของการศึกษานี้คือ การระบุอัลกอริทึมการเรียนรู้ของเครื่องจักรที่เหมาะสมที่สุด ประกอบด้วย เครื่องจักรเวกเตอร์สนับสนุน (SVM), ป่าสุ่ม (RF), ต้นไม้ตัดสินใจ (DT), เบย์ส (Bayes) และเพื่อนบ้านที่ใกล้ที่สุด (KNN) เพื่อตรวจจับการใช้ที่ดินที่ไม่เป็นไปตามข้อกำหนดในอำเภอวังน้ำเขียวที่ใช้เป็นพื้นที่แบบจำลอง และอำเภอปากช่องที่ใช้เป็นพื้นที่ทดสอบ

ผลการศึกษาพบว่า อัลกอริทึมที่เหมาะสมที่สุดสำหรับการตรวจจับการใช้ที่ดินที่ไม่เป็นไปตามข้อกำหนดในแปลงที่ดิน ส.ป.ก. ในพื้นที่แบบจำลองคือ RF เนื่องจากอัลกอริทึมนี้สามารถให้ความถูกต้องโดยรวมและค่าสัมประสิทธิ์แคปปาแฮทสูงกว่า SVM, DT, Bayes และ KNN โดยมีความถูกต้องโดยรวมและค่าสัมประสิทธิ์แคปปาแฮทเท่ากับ 87.45% และ 79.57% ตามลำดับ นอกจากนี้ คุณสมบัติของวัตถุและอัลกอริทึมที่เหมาะสมที่สุดในพื้นที่แบบจำลองสามารถถ่ายโอนได้โดยตรงในการจำแนกประเภทการใช้ประโยชน์ที่ดินและการตรวจจับการใช้ที่ดินที่ไม่เป็นไปตามข้อกำหนด ในพื้นที่ทดสอบด้วยผลการตรวจสอบความถูกต้องที่ยอมรับได้

สาขาวิชาคณิตศาสตร์และภูมิสารสนเทศ ลายมือชื่อนักศึกษา จุฑามาศ น้อยนา
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ลายมือชื่ออาจารย์ที่ปรึกษาร่วม

JUTAMAS NOINA : OPTIMUM MACHINE LEARNING ALGORITHM WITH OBJECT-BASED IMAGE ANALYSIS FOR DETECTING INCOMPLIANT LAND UTILIZATION IN AGRICULTURAL LAND REFORM AREAS. THESIS ADVISOR : ASSOC. PROF. SUWIT ONGSOMWANG, Dr. rer. Nat. 207 PP.

Keywords: Machine learning algorithm; Random forests; Incompliant land utilization, agricultural land reform areas.

The Agricultural Land Reform Office (ALRO) was set up to solve the developmental problems of the country through land consolidation programs by allocating lands for agricultural and dwelling to farmers. At present, it is found that some land use under the responsibility of ALRO does not comply with the Agricultural Land Reform Act such as hotels, resorts, and accommodations. ALRO provides inspection land utilization in each plot by visual interpretation from a high-resolution image and field survey. The main objective of this study is to identify an optimum machine learning algorithm: support vector machines (SVM), random forests (RF), decision trees (DT), naïve Bayes (Bayes), and K nearest neighbor (KNN) for detecting incompliant land utilization at Wang Nam Khiao district as modeling area and validating result at Pak Chong district as testing area.

The results showed that the most suitable algorithm for detecting incompliant land utilization at ALRO plots in the modeling area was RF since it could provide overall accuracy and Kappa hat coefficient values higher than the SVM, DT, Bayes and KNN. The derived overall accuracy and Kappa hat coefficient of RF were 87.45% and 79.57%, respectively. Besides, the optimum object features and algorithm in the modeling area could be directly transferred for LULC classification and detecting incompliant land utilization at ALRO plots in the testing area with acceptable validation.

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ACKNOWLEDGEMENTS

Firstly, I would like to express my sincere gratitude to my advisor, Assoc. Prof. Dr. Suwit Ongsomwang, and my co-advisor, Dr. Tanakorn Sritarapipat, for the continuous support of my Ph.D. study and related research for his patience, motivation, and immense knowledge. His advice was helpful to me during the entire research and thesis-writing process. I could not have imagined having a better advisor and mentor for my Ph.D. study.

I would like to thank the chairman and committee members of this thesis defense: Assoc. Prof. Dr. Somkid Phumkokrux, Assoc. Prof. Dr. Songkot Dasananda, Asst. Prof. Dr. Pantip Piyatadsananon and Dr. Siripon Kamontam for all valuable suggestions and critical comments during the seminar and thesis defense.

My sincere thanks also go to my teamwork at the Agricultural Land Reform Office, which supported a survey. Last but not least, I would like to thank the Agricultural Research Development Agency (Public Organization) for financial support and great care. This thesis is dedicated to my father and my mother, all former teachers, and everyone who has taught and guided me.

จุฑามาศ นัยนา

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LIST OF ABBREVIATIONS

ALRO	Agricultural Land Reform Office
Bayes	Naïve Bayes classifiers
DT	Decision Tree
J	Jeffries–Matusita distance
KNN	K Nearest Neighbor
LULC	Land use land cover
ML	Machine learning
OBIA	Object-based image analysis
RF	Random Forest
SVM	Support Vector Machines

CHAPTER I

INTRODUCTION

1.1 Background problem and significance of the study

Land reforms (also agrarian reform, though that can have a broader meaning) is an often-controversial alteration in the societal arrangements whereby the government administers possession and land use. Land reform may consist of a government-initiated or government-backed real estate property redistribution, generally of agricultural land, or be part of an even more revolutionary program that may include forcible removal of an existing government that is seen to oppose such reforms (Sharma and Jha, 2016). According to the conventional definition, redistributive land reform is a public policy that transfers property rights over large private landholdings to small farmers and landless farm workers (Griffin, Khan, and Ickowitz, 2002). Therefore, land reform can be reasoned to be the change in the ownership of the land's property rights, typically involving a change from large, privately owned land to previously landless small-scale farmers. Land reform is concerned with changing the institutional structure governing human relations with land by intervening in the prevailing land ownership, control, and usage (World Bank, 1975; Macmillan, 2000).

The Thai Agricultural Land Reform Act was promulgated in March 1975. There had been several critical previous attempts to limit private land ownership, for example, the famous "National Economic Plant," which was submitted to the Parliament by Pridi Phanomyong in March 1993, and the 34th Article of the Land Code of 1954, promulgated during the tenure of Field Marshall Pibun Songkharm, set the limits of landownership at fifty rai (1 rai = 0.0016 sq. km) (Suehiro, 1978).

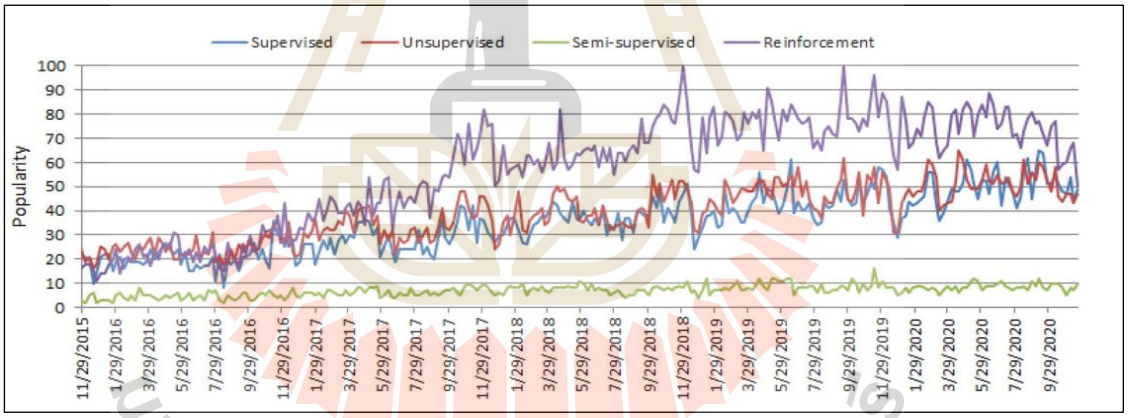
Thailand faces many obstacles, such as the loss of rights to agricultural land and transformation from arable land to rent land for agricultural production, with the high cost of rental land leading to a decline in production and many disadvantages for agriculturists. Thus, the Agricultural Land Reform Office (ALRO) was set up as a means to help solve the developmental problems of the country through land consolidation programs (Pongsapich, 2011) by allocating lands for living and dwelling to farms (ALRO, 2023). The ALRO has sought to preserve land for agricultural production, encouraged land redistribution, supported agriculture, and provided funding for agricultural production (ALRO, 2005). Besides, the ALRO aims to decrease the gap in social status between the poorest members of society and the middle and upper classes and to extend support to marginal occupations in areas where the number of farmers has been decreasing (ALRO, 2013).

Currently, land rights are a significant problem of ALRO 4-01 because several farmers who have received ALRO 4-01 land have tried to sell the land to other people illegally. ALRO 4-01 land cannot be sold to another person, and the land must be used for only agricultural reasons. Also, farmers do not understand ALRO's objective, and in some areas, they use land illegally, such as for the construction of a hotel and accommodations in a tourist area. In some areas, a hundred people illegally occupy the ALRO 4-01 land (Na Sakolnakorn, Kroeksakul, Kaewbutdee, Naipinit, and Laeheem, 2016). However, the ALRO has tried to solve these problems for many decades and has been looking for the right solutions for implementing its regulations and enhancing the operation of ALRO 4-01 land. In addition, ALRO provides inspection land utilization in each plot by visual interpretation from a high-resolution image for detecting incompliant land utilization in ALRO area. Consequently, this study examines a novel automated methodology to detect incompliant land utilization in agricultural land reform areas.

Meanwhile, machine learning offers the potential for effective and efficient classification of remotely sensed imagery (Maxwell, Warner, and Fang, 2018). Many studies have generally found that these methods produce higher accuracy than traditional parametric classifiers, especially for complex data with a high-dimensional feature space. Machine learning usually allows systems to learn and enhance from

experience without being specifically programmed automatically. It is generally considered the most popular latest technology in the fourth industrial revolution (4IR or Industry 4.0). The learning algorithms can be categorized into four major types: supervised, unsupervised, semi-supervised, and reinforcement learning (Sarker, 2021). The popularity of these learning approaches is increasing daily, as shown in Figure 1, based on data collected from Google Trends over the last five years.

According to Figure 1, the popularity indication values for these learning types were low in 2015 and are increasing daily. These statistics motivate me to study machine learning, which can play an essential role in the real world through Industry 4.0 automation. Based on the importance and potentiality of Machine Learning to analyze the data mentioned above, this study can provide various types of machine learning algorithms that can be applied to detect incompliant land utilization in agricultural land reform areas.



Source: Sarker (2021).

Figure 1 The worldwide popularity score of various types of ML algorithms.

Therefore, this study aims to examine the capability of the machine learning algorithm under object-based image analysis of the eCognition software for classifying land use and detecting incompliant land utilization in the ALRO area from free-downloaded remote sensing data with specific rules of ALRO.

1.2 Research objectives

This research aims to detect incompliant land utilization in the agricultural land reform area. Specific tentative research objectives are set as follows:

(1) To identify suitable features using separability measurement (Jeffries–Matsusita distance) for land use classification with five selected machine learning algorithms (SVM, RF, DT, BAYES, and KNN) under OBIA;

(2) To optimize parameter setting for five selected machine learning algorithms under OBIA with Python programming;

(3) To classify land use types for detecting Incompliant land utilization with two criteria (building and settlement and water body areas) in the modeling area (Wang Nam Khiao district) using five selected machine learning algorithms with optimized parameters;

(4) To identify an optimum machine learning algorithm for classifying land use and detecting incompliant land utilization based on the information of accuracy assessment and ALRO's rules from the modeling area;

(5) To validate an optimum machine learning algorithm for detecting incompliant land utilization in the testing area (Pak Chong District).

1.3 Scope and limitations of the study

1.3.1 Scope of the study

(1) Sentinel 2A data acquired in 2023 are used for optimum machine learning algorithm with object-based image analysis for detecting incompliant land utilization in agricultural land reform areas in modeling and testing areas.

(2) Suitable features for land use classification with machine learning under OBIA will be identified using separability measurement (Jeffries–Matusita distance), as suggested by Nussbaum and Menz (2008).

(3) An optimum parameter of five selected machine learning algorithms under OBIA will be operated using Python programming.

(4) Recent land use data in 2023 will be classified by five selected machine learning algorithms with optimized parameters for detecting Incompliant land utilization in the modeling area (Wang Nam Khiao district).

(5) An optimum machine learning algorithm for classifying land use and detecting Incompliant land utilization will be evaluated based on the accuracy assessment (overall accuracy, producer's accuracy, user's accuracy, and Kappa hat coefficient) and percentage of settlement and water body at ALRO plot in the modeling area.

(6) The optimum machine learning algorithm for detecting incompliant land utilization in modeling areas will be validated in the testing areas (Pak Chong district).

1.3.2 Limitations of the study

Due to cloud cover over modeling and testing areas in the rainy season, the available Sentinel 2A with cloud-free coverage in modeling and testing areas will be collected for land use classification in this study.

1.4 Study area

Two study areas, including modeling and testing areas, are chosen to serve the various objectives of the study. Wang Nam Khiao District, Nakhon Ratchasima Province, is selected as the modeling area to classify land use type by five selected machine learning algorithms with optimized parameters for detecting Incompliant land utilization (Figure 3). The modeling area covers the area of 217.97 sq. km.

Meanwhile, Pak Chong District, Nakhon Ratchasima Province, is selected as a testing area to validate an optimum machine learning algorithm for detecting Incompliant land utilization (Figure 4). The testing area covers the area of 109 q. km.

Both study areas are selected since incompliant land utilization in agricultural land reform plots is relatively high. In 2012, 986 of 9,647 plots; in 2015, 578 of 10,499 plots and in 2018, 123 of 10,379 plots in Wang Nam Khiao District were observed as incompliant land utilization by visual interpretation. Likewise, 585 of 4,065 plots in

2013 and 485 of 5,795 plots in 2015 in Pak Chong District were observed as incompliant land utilization, as shown in Figure 2.

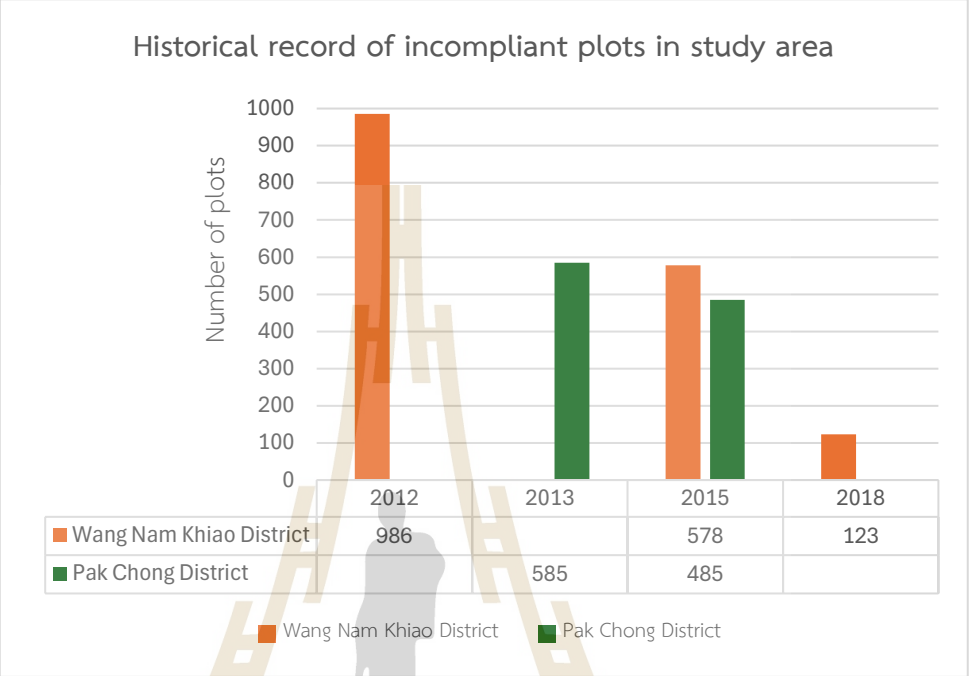


Figure 2 Historical record of incompliant plots in the study area.

In Wang Nam Khiao district and Pak Chong district, the biggest problem is encroachment by resorts in the scenic and hilly area, which has become hugely popular as a weekend getaway for Bangkok residents. About 35% of the land in Wang Nam Khiao designated for agricultural purposes is illegally occupied, according to the ALRO (Bangkok Post., 2016). Additionally, some agriculturists have sold ALRO 4-01 land to businessmen even though it is not legally possible for ALRO 4-01 land to be sold, and the land has been transformed from agricultural use to business use.

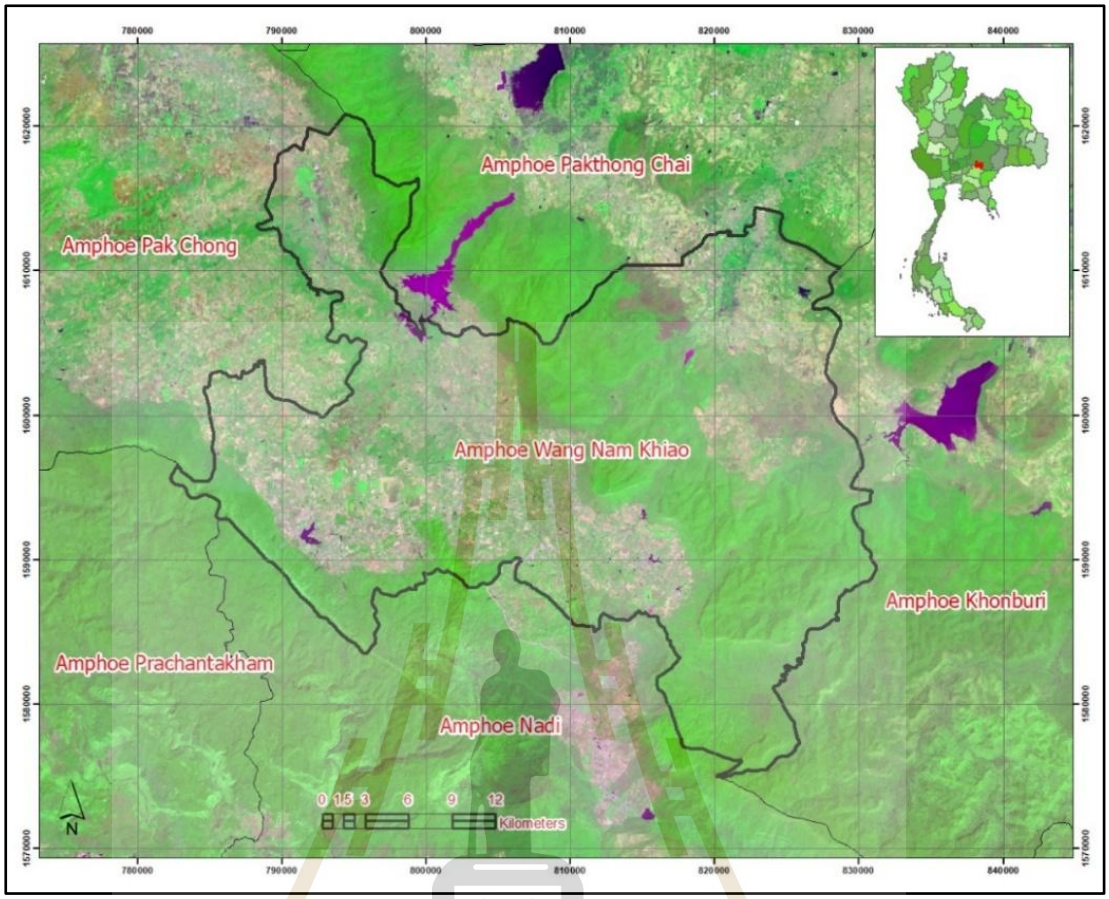


Figure 3 Location of the modeling area, Wang Nam Khiao District, Nakhon Ratchasima.

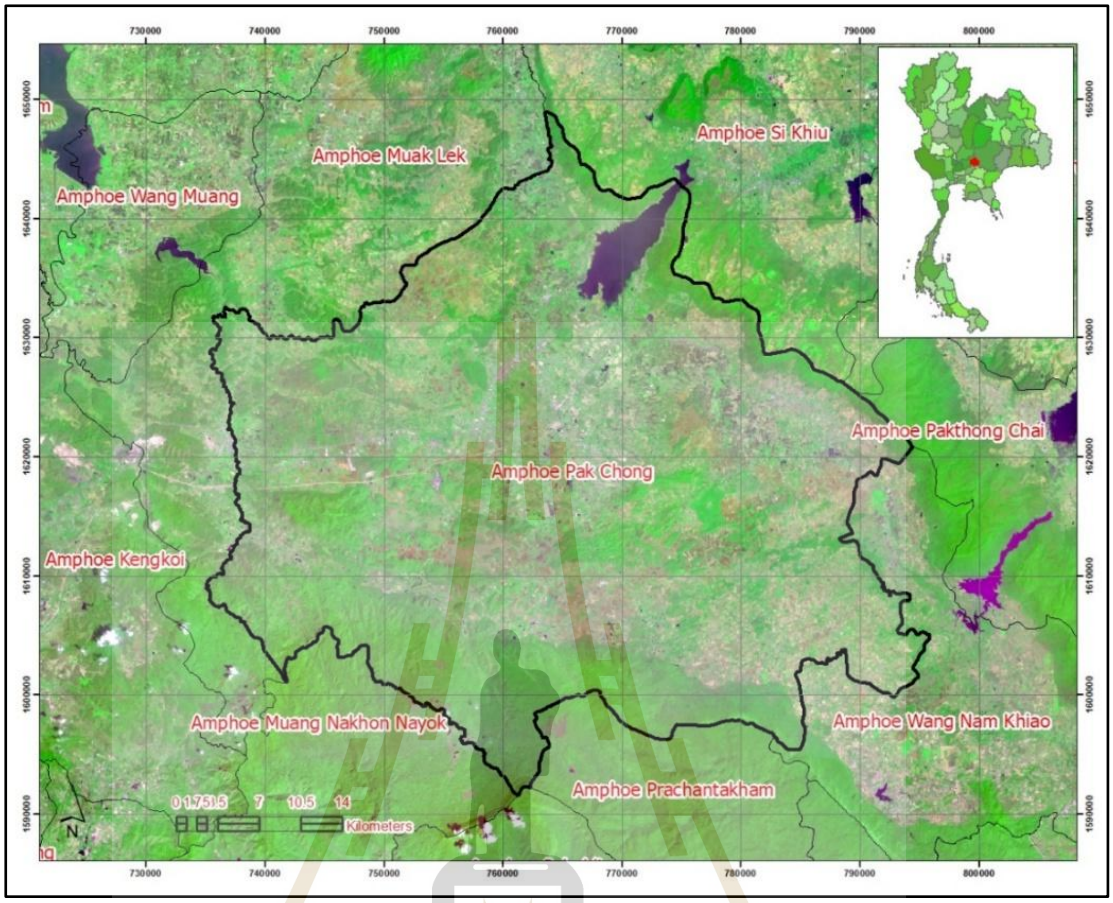


Figure 4 Location of the testing area, Pak Chong District, Nakhon Ratchasima.

1.5 Benefits of the study

The specific benefits of the study are presented below:

1. The derived suitable parameters for multiresolution segmentation with multispectral and indices of Sentinel 2A can be directly applied to generate image objects under object-based image analysis.

2. The procedure for feature extraction with Jeffries–Matusita distance measurement in this study can be used to identify suitable object features for land use and land cover classification under object-based image analysis.

3. The procedure for parametrization of machine learning algorithms can be used as a guideline for researchers when they apply each algorithm for land use and land cover classification under object-based image analysis.

4. The workflow of the research methodology in this study can be directly applied to detect incompliant land utilization in the ALRO area from free-downloaded remote sensing data with specific rules of ALRO. Subsequently, the ALRO can save on costs for detecting incompliant land utilization due to the Sentinel 2A data being downloaded for free and reducing the budget for purchasing high-resolution aerial or satellite images.

CHAPTER II

RELATED CONCEPTS AND LITERATURE REVIEWS

This section uses the machine learning algorithm and object-based image analysis to explain concepts and theories for detecting incompliant land utilization in agricultural land reform areas. Finally, the application of machine learning algorithm The support vector machine, random forest, decision tree, Bayes and K nearest neighbor were summarized.

2.1 Related concepts of machine learning

2.1.1 General concepts of machine learning

Machine learning is a subset of artificial intelligence that equips computer systems with the ability to acquire knowledge from examples, data, and experience (Sharma and Kumar, 2017). Gehler and Nowozin (2009) stated that machine learning is an area of artificial intelligence and generally refers to developing methods that optimize their performance iteratively by learning from the data. Such methods can be predictive (e.g., a regression model) and predict a specific phenomenon or descriptive (e.g., a classification model) and distinguish, for example, between different classes of patterns. The generic machine-learning model comprises six components: collection and preparation of data, feature selection, choice of algorithm, selection of model and parameters, training and performance evaluation (Alzubi, Nayyar, and Kumar, 2018). Brief information on each component based on Alzubi et al. (2018) is as follows

(1) Collection and preparation of data. The primary task of the machine learning process is to collect and prepare data in a format that can be given as input to the algorithm. The data must be cleaned and pre-processed in a structured format.

(2) Feature selection. The data obtained from the previous step that may contain numerous features should be selected as a subset of the most essential features

(3) Choice of algorithm. Selecting the optimal machine learning algorithm is critical for the best result.

(4) Selection of models and parameters. Almost all machine learning algorithms need some initial manual intervention for setting the most proper values of numerous parameters.

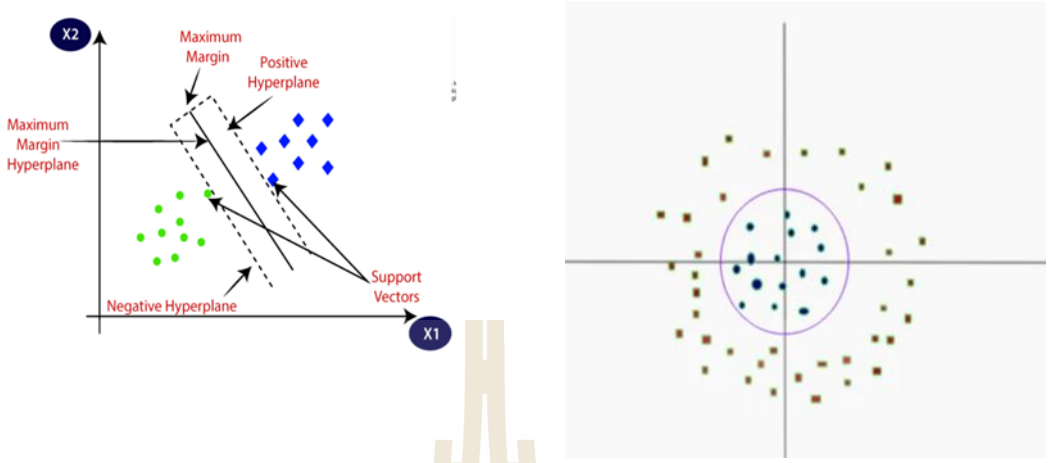
(5) Training. After selecting the suitable algorithm and parameter values, the machine learning algorithm will be trained based on a part of the dataset as a learning dataset.

(6) Performance evaluation. The model should be tested before the system's operation to evaluate how much has been learned using various performance indicators like overall accuracy, precision and recall.

2.1.2 Machine learning algorithms

This study focuses on regular machine-learning algorithms, including Support Vector Machines (SVM), Random Forests (RF), Naïve Bayes classifiers (Bayes), Decision Tree (DT), and K Nearest Neighbor (KNN).

(1) Support Vector Machines (SVM). The SVM was initially introduced as binary classifiers for creating a hyperplane to separate data patterns and classification within a multi-dimensional feature space. The optimization problem must be solved and relies on structural risk minimization, aiming to maximize the margins between the hyperplane and the closest training samples. A linear and non-linear hyperplane can be applied to create the optimal hyperplane with a support vector for classification (Figure 5). SVMs have been used successfully in several remote sensing studies (Huang, Davis, and Townshend, 2002; Foody and Mathur, 2004; Melgani and Bruzzone, 2004; Pal and Mather, 2005; Pal and Mather, 2006; Linden, 2008)



(a) (b)

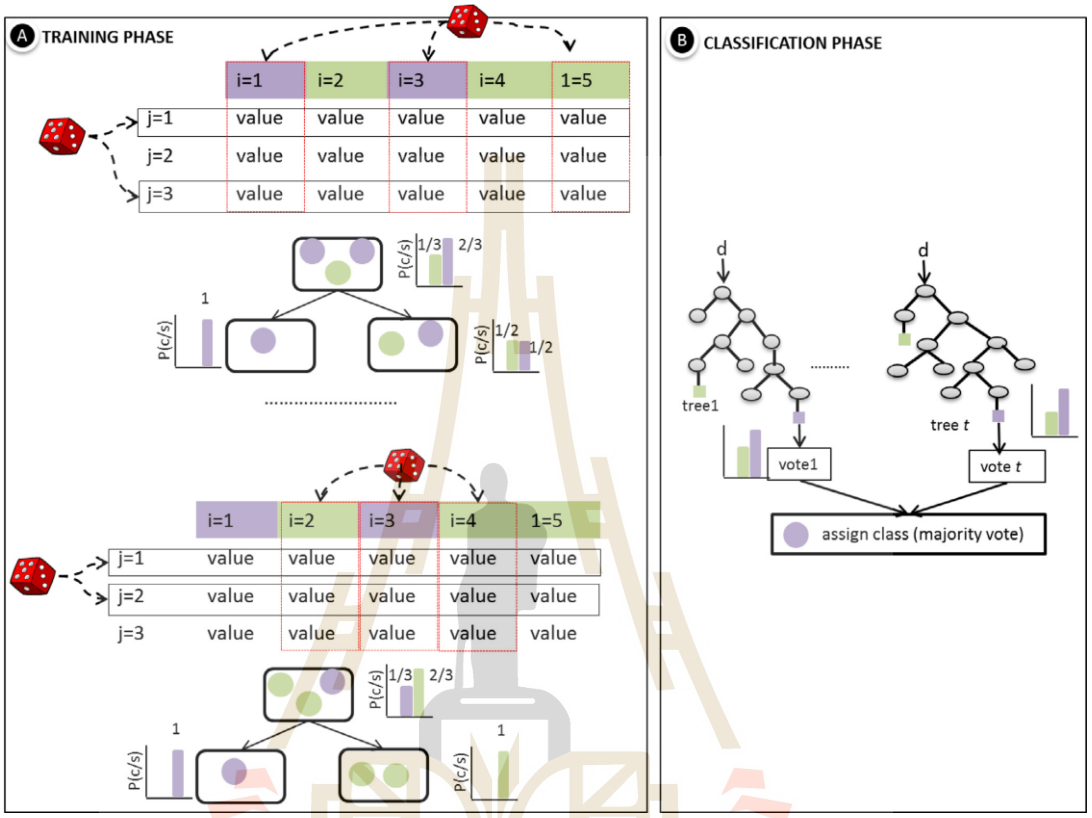
Modified from: javatpoint.com

Figure 5 Concept of SVM for classification based on hyperplane with its support vectors: (a) linear and (b) non-linear,

Many researchers, such as Dhiraj (2013), reported the advantages and disadvantages of the SVM algorithm. For the advantage, the SVM performs relatively well when there is a clear margin of separation between classes. It is more effective in high-dimensional feature spaces. In contrast, for disadvantages, the SVM does not perform well when the dataset has more noise. In cases where the number of features for each data point exceeds the number of training data samples, the SVM will underperform, which is unsuitable for large data sets.

(2) Random Forests (RF). The RF is one of the most successful learning techniques in pattern recognition with high-dimensional classification (Azar, Elshazly, Hassanien, and Elkorany, 2014). Breiman (2001) stated that the RF is an ensemble classifier that uses a set of classification and regression trees (CARTs) to make a prediction. To assign an unclassified pixel with its associated attributes into a class, the unclassified input pixel values are run through each of the x decision trees in the forests (e.g., 200 trees). Each decision tree classifies the pixel into one of the y classes, i.e., it votes for that class. The forest assigns the pixel to the class having the most votes from all the trees in the forest. Two steps for training and classification of the RF are displayed in Figure 6. The RF has been successfully used to map land use and land cover classes (Stefanski, Mack, and Waske, 2013; Deng and Wu, 2013; Räsänen and Kummu, 2013; Adelabu, Mutanga, and Adam, 2014; Belgiu, Dragut, and Strobl, 2014;

Haas and Ban, 2014; Frazier, Georgiades, Bishop, and Hardan, 2014: Colditz, 2015; Tsutsumida and Comber, 2015; Wang, Arora, Livescu, and Bilmes, 2015)



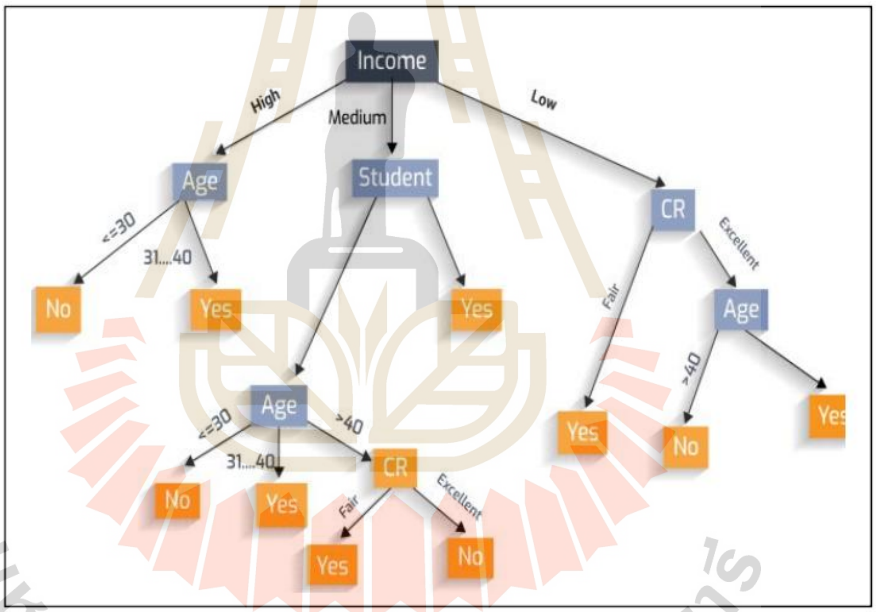
Source: Belgiu and Drăgut (2016).

Figure 6 Training and classification steps of random forests.

The advantages and disadvantages of the RF algorithm were summarized based on Bierman and Cutler (2001). For the advantages, the RF can handle classification and regression problems and work well with categorical and continuous variables, and it can process very fast with large datasets. Also, the RF can measure feature importance, which can help in feature selection and data understanding. On the contrary, for disadvantages of the RF, it is less prone to overfitting and less interpretable than a single decision tree since it involves multiple trees. Besides, the training time of The RF can be longer than other algorithms.

(3) Decision Tree (DT). The DT is one of the powerful methods commonly used in various fields, such as machine learning, image processing, and identification of patterns (Stein, Chen, Wu, and Hua, 2005). The conceptual rules of the

DT are more straightforward to construct than the numerical weights in the neural network of node connections (Barros, Ronsmans, Axelson, Loaiza, Bertoldi, França, and Victora, 2012). The nodes and branches are composed of each tree. Each node represents features in a category to be classified, and each subset defines a value that can be taken by the node (Swain and Hauska, 1997). Figure 7 shows an example of the DT structure for classification. Damanik, Windarto, Wanto, Poningsih, Andani, and Saputra (2019) claimed that the DT is a successive model that unites a series of primary tests efficiently and cohesively, where a numeric feature is compared to a threshold value in each test. Moreover, DT is a usually utilized classification model in Data Mining (Gavankar and Sawarkar, 2017).



Source: Mrva, Neupauer, Hudec, Ševcech, and Kapec (2019).

Figure 7 The decision tree structure for classification.

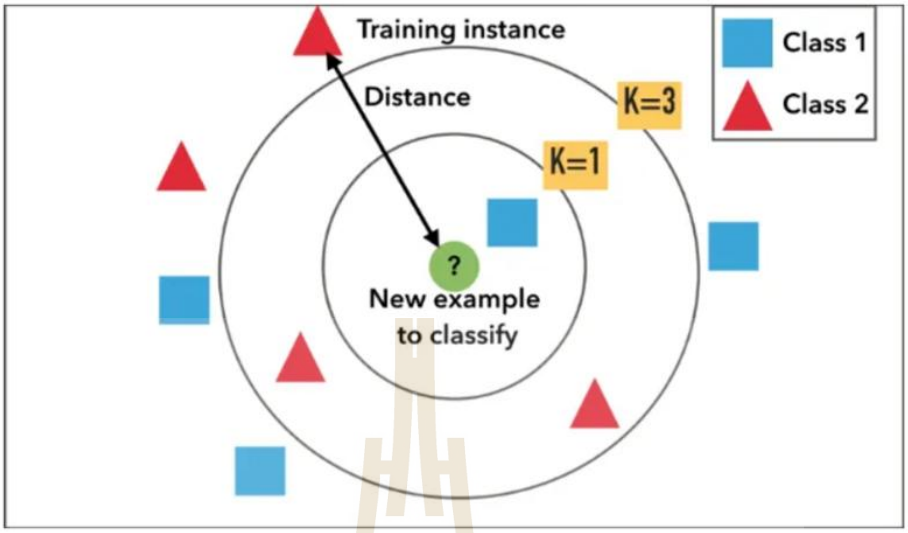
The advantages and disadvantages of the DT algorithm were summarized based on Stein, Chen, Wu, and Hua (2005). For the advantages, the DT can classify unknown records very fast and is strong in noise if other methods are overfitting. Also, in the presence of redundant attributes, the DT works very well. Conversely, for disadvantages, any minor changes in the data can change the overall

look of a decision tree. Also, a sub-tree in the DT can create duplicate trees many times.

(4) Naïve Bayes classifiers (Bayes). The Bayes is widely used for classification problems in data mining and machine learning because of its simplicity and impressive accuracy (Farid, Zhang, Rahman, Hossain and Strachan, 2014). It is a simple probabilistic classifier based on applying Bayes' theorem with strong independence assumptions. In simple terms, Bayes assumes that the presence (or absence) of a particular feature of a class is unrelated to the presence (or absence) of any other feature (Trimble Germany GmbH, 2014).

The advantages and disadvantages of the Bayes algorithm were summarized based on Stein, Chen, Wu, and Hua (2005). For the advantages, the Bayes is simple to implement and very fast since the probabilities can be directly computed. The conditional probabilities are easy to evaluate. On the contrary, the conditional independence assumption does not always maintain and in most situations, the features show some form of dependency. In addition, it can encounter a zero-probability problem.

(5) K Nearest Neighbor (KNN). The KNN has been widely used in classification problems in pixel-based and object-based image analysis (Jiang, Cai, Wang and Jiang, 2007). Trimble Germany GmbH (2014) stated that the KNN) is a method for classifying objects based on the closest training examples in the feature space. It is a type of instance-based learning where the function is only approximated locally, and all computation is deferred until classification. In other words, each sample should be classified similarly to its surrounding samples in this method (Domeniconi, Peng, and Gunopulos, 2002). Also, it is the fundamental and most straightforward classification technique when there is little or no prior knowledge about the data distribution. The rule of the KNN retains the entire training set during learning and assigns to each query a class represented by the majority label of its k-nearest neighbors in the training set (Imandoust and Bolandraftar, 2013). Figure 8 shows an example of KNN for feature classification.



Source: Anuuz (2020).

Figure 8 Example of KNN for feature classification.

The advantages and disadvantages of the KNN algorithm were summarized based on Jadhav and Channe (2016). For the advantages, the KNN is easy to understand and implement and robust to noisy training data. It performs well on applications in which a sample can have many class labels. In contrast, the KNN is sensitive to the local structure of the data.

2.2 Object-based image analysis (OBIA)

2.2.1 Background of object-based image analysis

Jensen (2015) stated that most digital image classification in the past was based on processing the entire scene pixel-by-pixel or per-pixel classification. Meanwhile, object-oriented classification techniques allow the analyst to decompose the scene into many relatively homogenous image objects using multi-resolution image segmentation. The various statistical characteristics of these homogeneous image objects in the scene are subjected to traditional statistical or fuzzy logic classification.

Image objects can be associated with hundreds of properties, such as shape, size, spectral response, and others used for image analysis. Most of these parameters are specific to object-based approaches and cannot be used in pixel-based image analysis. The objects domain offers more dimensions for image analysis and can

take advantage of the geographic information system (GIS) analysis (Navulur, 2006). Myint and Stow (2011) noted that object feature types contain several categories: customized, layer values, shape, texture, variables, and hierarchy.

2.2.2 Workflow of object-based image analysis

Nussbaum and Menz (2008) recommended an operational workflow for OBIA into three critical steps: image segmentation, feature extraction, and semantic modeling and classification.

(1) Image Segmentation. Image segmentation decomposes an input image into spatially discrete, contiguous, nonintersecting, and semantically meaningful segments or regions. These regions are patches comprising relatively homogeneous pixels. These pixels share a higher internal spectral homogeneity than external homogeneity with pixels in other regions (Ryherd and Woodcock, 1996).

The multi-resolution segmentation under e-Cognition software applied in this study will be summarized here. The multi-resolution segmentation developed by Baatz and Schäpe (2000) is a heuristic optimization procedure that minimizes the image objects' mean heterogeneity for a given resolution over the entire scene. Minimizing the heterogeneity leads to more homogeneity, so the expression maximization of homogeneity will be used in the following. The mean homogeneity of the image objects and their size (number of pixels) is weighted to optimize the homogeneity. The sum of this weighted homogeneity is maximized over all the image objects. The advantage of this approach is masking the objects with no interest at larger scales and focusing on extracting features of interest to the end user. Furthermore, by creating objects at different levels, parent-child relationships can be leveraged to improve/enhance the feature extraction process in various applications such as change detection (Navulur, 2006).

(2) Feature extraction. A typical object-based classification system starts with segmenting the image into smaller homogeneous regions (or image objects). These objects correspond to approximations of real-world objects. Every object is characterized by features defined based on layer values, texture, shape, and context. However, the essential issue is to manage the enormous information given by the object's color, shape, texture, and context (Nussbaum and Menz, 2008).

This study implemented feature selection as a significant step of OBIA for separability measurement using Jeffries–Matsushita (J) distance based on selected feature characteristics such as spectral value, geometry, and texture. In practice, the Bhattacharyya distance (B) is firstly calculated as a measure of separability from the Bayesian decision rule for misclassification probability using Equation 1.

$$B = \frac{1}{8}(m_1 - m_2)^2 \frac{2}{\sigma_1^2 + \sigma_2^2} + \frac{1}{2}\ln\left[\frac{\sigma_1^2 + \sigma_2^2}{2\sigma_1\sigma_2}\right] \quad (1)$$

Where m_i and σ_i, i =1,2, are the mean and the variance, respectively, for the two feature distributions. If the means coincide, the first term vanishes, whereas the second term vanishes if the two feature distributions have equal variances. Then, the Jeffries–Matusita distance (J), which has a finite dynamic range, is calculated using Equation (2).

$$J = 2(1 - e^{-B}) \quad (2)$$

The J distance measures the separability of two classes on a scale [0–2] in terms of the Bhattacharyya distance (B) (Nussbaum and Menz, 2008)

(3) Semantic modeling and classification. The semantic modeling consists of a feature analysis for the image objects obtained in the multi-resolution segmentation, forming a network of rule-based semantic features. The feature analysis has the task of identifying characteristic features for the individual object classes. Once these typical features have been determined, classification rules are assigned for each object class (Nussbaum and Menz, 2008).

2.3 Literature review

Applying machine learning algorithms (SVM, RF, DT, Bayes, and KNN) was separately reviewed and summarized below.

2.3.1 Application of SVM algorithm

Zylshal, Sulma, Yulianto, Nugroho, and Sofan (2016) studied the SYM under OBIA on urban green space extraction using Pleiades-1A imagery. The SVM was performed for the classification phase, followed by an expert-knowledge refinement based on visual interpretation of the Pleiades-1A image and field survey as reference data. The study results showed two classes of land cover: "urban green" and "non-urban green". The initial classification results still have some errors, especially in dark areas, as the SVM failed to distinguish some trees and buildings' shadows from water. This study scored 86% for overall accuracy using the area-based similarity measurement framework. The similarity measurement showed values above 87% for all 20 samples.

Petropoulos, Kalaitzidis, and Vadrevu (2012) used the SVM and OBIA to classify land use and cover from Hyperion hyperspectral imagery. The result showed that the OBIA marginally outperformed the SVM. For the SVM, overall accuracy (OA) and Kappa coefficient (Kappa) were 76.30% and 0.719, while the OBIA delivered overall accuracy and Kappa coefficient were 81.30% and 0.779, respectively. Based on the user's accuracy (UA) and producer's accuracy (PA) statistical measures, both classification techniques, the classes with the highest UA and PA were those of "sea water" and "bare land." In contrast, the lowest UA and PA classes for both classifiers were those of "sclerophyllous vegetation" and "heterogeneous agricultural areas." The lower accuracies for these two vegetation classes are attributed to the spectral similarity between vegetation classes, which hindered the discrimination of those classes in conjunction with the 30 m resolution of Hyperion.

2.3.2 Application of RF algorithm

Lou et al. (2020) used an object-based random forests algorithm for marsh vegetation mapping using high-spatial-resolution GF-1 (Gaofen-1) and ZY-3 (Ziyuan-3) data. This study optimized the parameters of an object-based random forest (RF) algorithm to improve the applicability of marsh vegetation classification. The result showed that the optimized object-based RF consistently produced more than 70.26% OA for all scenes of GF-1 and ZY-3 at the 95% confidence interval. The parameter optimization of the object-based RF algorithm effectively improved the stability and classification accuracy. The introduction of multi-dimensional datasets improved the OA of marsh vegetation mapping but with many redundant variables. The optical spectral bands, spectral indices, the mean value of green and NIR bands in textural information, DEM, Topographic wetness index (TWI), compactness, max difference, and shape index are valuable variables for marsh vegetation mapping. GF-1 and ZY-3 images had higher classification accuracy for forest, cropland, shrubs, and open water.

Stefanski, Mack, and Waske (2013) studied the optimization of object-based image analysis with the RF for land cover mapping. A semi-automatic optimization of object-based classification with the RF of multitemporal data is introduced. To evaluate the potential of the proposed concept, they focused on the land cover classification of two study areas, using multitemporal RapidEye and SPOT-5 images. The two segmentation algorithms, superpixel contour (SPc) and muti-resolution segmentation (MRS) perform similarly in accuracy and visual interpretation. The result showed that using SPc increases June's OA and Kappa statistics from 67.2% and 0.60 to 73.7% and 0.67, respectively. The PA of grassland, corn and winter wheat is improved by approximately 9% by SPc. Furthermore, the UA of potatoes and winter rape increased by more than 10% based on June SPc. The object-based classification of June and September shows overall improvements for all classes compared to the accuracy achieved on the pixel level. The OA and Kappa statistics increased from 78.2% and 0.73 to 81.6% and 0.77, respectively. Potatoes, which are difficult to classify on the pixel level, are more accurately classified due to image segmentation. Similar results were found for other single-month and two-month classifications.

2.3.3 Application of DT algorithm

Phiri, Simwanda, Nyirenda, Murayama, and Ranagalage (2020) used the DT for developing rule sets for object-based land cover classification. They focused on comparing the performance of five DT algorithms: Tree, C5.0, Rpart, Ipred, and Party. These DT algorithms were used to classify ten land cover classes using Landsat 8 images. The classification was done using OBIA by developing rule sets with thresholds defined by the DTs. The result showed that the five DTs' accuracy was not significantly different among these algorithms. The DT accuracies from this assessment showed that C5.0 had the highest OA (83%), while Party had the least OA (77%). The performance of DT algorithms with different sample sizes shows that individual accuracy increases with the increase in sample size. C5.0 had the highest DT accuracy of 88% when the largest sample size of 1000 was used, while Rpart had the lowest accuracy of 63% when the smallest sample size was used. The results from the Tree and Rpart DT algorithms produce a high OA of over 86%. The C5.0 and Party algorithms were equally suitable for overall accuracy; however, they incorporate many decision variables in the output, which can be challenging to implement and exhibit the effects of overfitting and saturation.

Hamedianfar and Shafri (2016) studied an integrated approach using data mining-based decision trees and object-based image analysis for high-resolution urban mapping of WorldView-2 satellite sensor data. This study reported a faster method for a transferable classification of detailed urban land-cover classes. Comparing classification accuracies with manual rule sets is crucial. The developed DT algorithm was applied to OBIA classification in the first study area. When this process, they validated the capability and transferability of the classification rules into second and third subsets. As a result, the first study site achieved a Kappa and OA of 0.86 and 88%, respectively. Meanwhile, the second study site provided an OA and Kappa of 85% and 0.83, respectively. The third study site achieved an OA rate of 85% in the third subset, confirming the high potential and effectiveness of transferability of the DT rule sets to the different study sites from the same satellite sensor images. The limitation of this learning process is the need for learning datasets and prior knowledge about the land cover classes.

2.3.4 Application of Bayes algorithm

Sitthi, Nagai, Daileyand Ninsawat (2016) studied exploring the LULC of geotagged social-sensing images using a naive Bayes classifier. This study used geotagged Flickr images to extract low-level LULC features automatically. The proposed method uses a naive Bayes classifier with color, shape, and color index descriptors. The classified images are mapped using a majority filtering approach. The classifier performance in OA, Kappa, precision, recall, and f-measure were 87.94%, 82.89%, 88.20%, 87.90%, and 88%, respectively. These tile datasets were used as training and validation samples to classify Landsat TM5 images. The results showed that the geotagged Flickr images could classify LULC types with reasonable accuracy, and the proposed approach improves LULC classification efficiency if a sufficient spatial distribution of crowdsourced data exists.

Santoso, Crysdian, and Holle (2018) studied the optimization of the naïve Bayes classifier to classify green open space objects based on Google Earth images. The case study of this research includes several cities in Indonesia, while the method employed to classify image-based green open space was a naïve Bayes classifier (NBC). This classification method relied on conditional probability, a simple, easy, and suitable method for textured objects of green open space taken from Google Earth images' satellite photos. The result showed that 270 images of green open space and non-green open space, with each class consisting of 30 images, generally showed that the new structure of the NBC model with several NBC models involved could classify each type of green open space and non-green open space with an accuracy of 75.19%. This result was better than a single NBC with only 69.63% accuracy. The test sample showed that the accuracy of the new structure of the NBC model in the green open space classification is better than the NBC single model.

2.3.5 Application of K-NN algorithm

Jiang et al. (2007) surveyed and studied improving the K-Nearest-Neighbor for classification. As a result, they found three main shortcomings confronting KNN and identified three main methods for overcoming them. The value of K in all K-related algorithms is 10. The experimental results show that they all significantly outperform KNN at a 95% confidence level.

CHAPTER III

RESEARCH METHODOLOGY

The research methodology is schematically illustrated in Figure 9. It consists of (1) data collection and preparation, (2) optimum parameter for multiresolution segmentation, (3) suitable feature selection for OBIA, (4) parameter optimization of machine learning algorithms, (5) land use classification and accuracy assessment, (6) optimum algorithm identification for classifying land use and detecting incompliant land utilization in ALRO plots, and (7) validation of an optimum algorithm for detecting incompliant land utilization in ALRO area. Brief information on each component is summarized below.

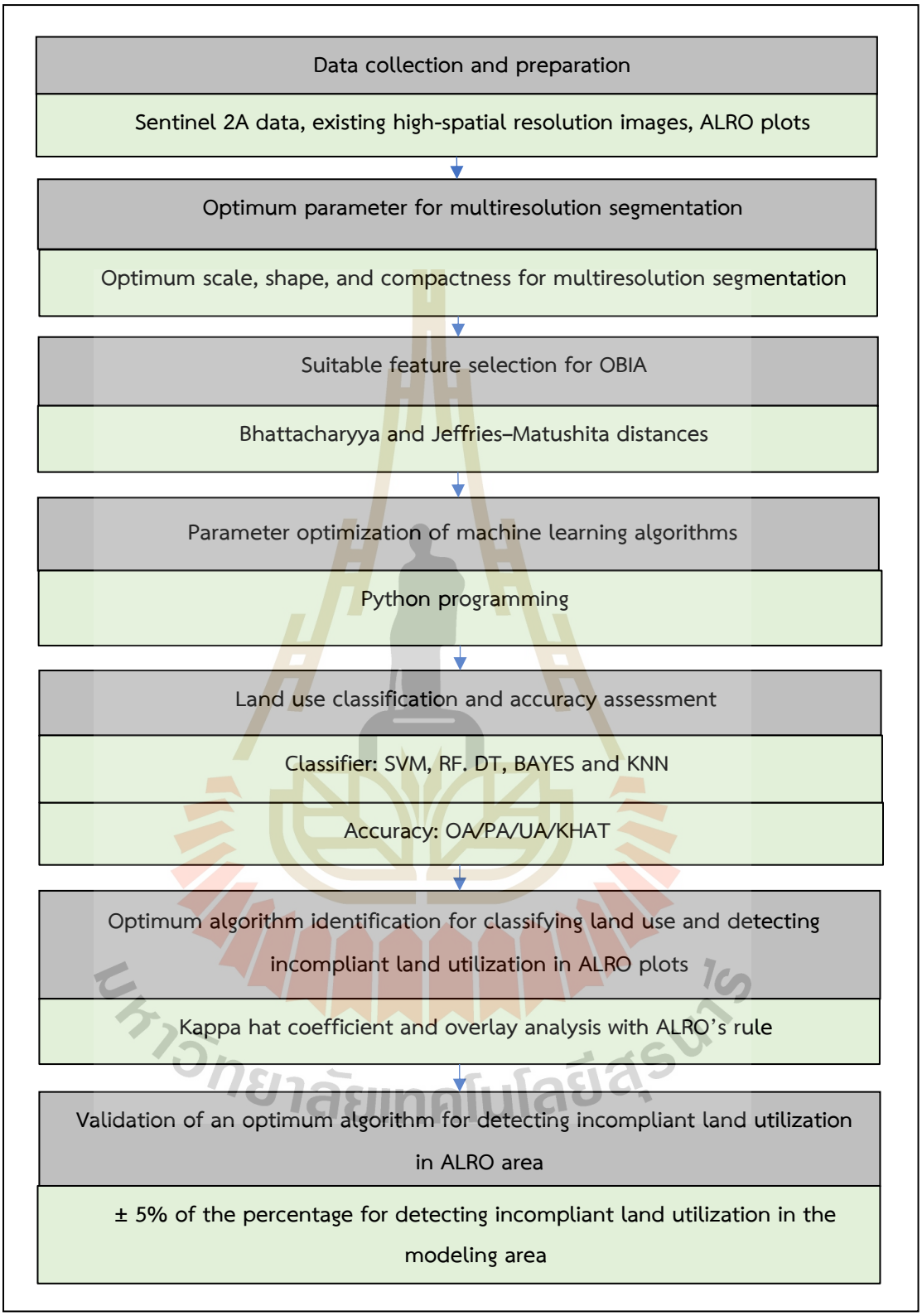


Figure 9 Overview workflow of research methodology.

3.1 Data collection and preparation

Data collection, including remotely sensed data, GIS data, and secondary data, are summarized in Table 1. Meanwhile, the collected multispectral data of Sentinel 2A are used to create spectral indices, including normalized difference vegetation index (NDVI), normalized difference built-up index (NDBI) and modified normalized wetness index (MNDWI), as a summary below.

Table 1 Lists data collection and preparation for analysis and modeling in the study.

Data	Data collection	Data Preparation	Source
Remote sensing data	Sentinel 2A in 2022 On 18 October 2022	Spectral indices extraction	Website: dataspace.copernicus.
	Google Earth Image On 16 April 2022	Project transformation and mosaic	Google Earth Image Pro
GIS data	Registered ALRO plots Wang Nam Khiao district	Project transformation	ALRO
	Registered ALRO plots Pack Chong district	Project transformation	ALRO

NDVI quantifies vegetation by measuring the difference between NIR and Red bands, which vegetation strongly reflects, and red light, which vegetation absorbs (Rouse, Haas, and Schell, 1974):

$$NDVI = \frac{NIR_{\text{Sentinel Band 8}} - RED_{\text{Sentinel Band 4}}}{NIR_{\text{Sentinel Band 8}} + RED_{\text{Sentinel Band 4}}} \quad (3)$$

The NDBI uses the NIR and SWIR 1 bands to emphasize manufactured built-up areas. It is a ratio based to mitigate the effects of terrain illumination differences as well as atmospheric effects (Zha, Gao and Ni, 2003) as:

$$NDBI = \frac{SWIR1_{\text{Sentinel Band 11}} - NIR_{\text{Sentinel Band 8}}}{SWIR1_{\text{Sentinel Band 11}} + NIR_{\text{Sentinel Band 8}}} \quad (4)$$

The MNDWI uses Green and SWIR 1 bands to enhance open water features. It also diminishes built-up area features that are often correlated with open water in other indices (Xu, 2006) as:

$$MNDWI = \frac{Green_{\text{Sentinel Band 3}} - SWIR_{\text{Sentinel Band 11}}}{Green_{\text{Sentinel Band 3}} - SWIR_{\text{Sentinel Band 11}}} \quad (5)$$

After that, multispectral bands and spectral indices are stacked as one dataset, including Blue, Green, Red, NIR, SWIR-1, NDVI, NDBI and MNDWI bands. This dataset was used to identify the optimum parameter for multiresolution segmentation in the next component.

3.2 Optimum parameter identification for multiresolution segmentation

The systematic optimum parameter identification for multiresolution segmentation under OBIA, including scale, shape, and compactness, is implemented in three steps, as summarized in Table 2.

Table 2 Systematic optimum parameter identification for multiresolution segmentation under OBIA.

Parameter	Step 1	Step 2	Step 3
Scale	5, 10, 15, 20, 25 and 30	Optimum scale parameter	Optimum scale parameter
Shape	0.5 (Fixed value)	0.1, 0.2, 0.3, 0.4, and 0.5	Optimum shape parameter
Compactness	0.5 (Fixed value)	0.5 (Fixed value)	0.1, 0.2, 0.3, 0.4, and 0.5
Expected output	Optimum scale parameter	Optimum shape parameter	Optimum compactness parameter

3.3 Suitable feature selection for OBIA

Feature selection as a significant step of OBIA was implemented for separability measurement using Jeffries–Matsushita (J) distance (Eq. 2) based on selected feature characteristics such as spectral value, geometry, and texture. In practice, the possibility of pairwise Bhattacharyya distance (B) and Jeffries–Matsushita (J) distance among training samples of land use types was first calculated and then selected as suitable features for land use classification. The threshold value for feature selection is a J value of >= 1.75, as Nussbaum and Menz (2008) suggested.

In this study, there are seven land use classes, including building and settlement areas, paddy fields, field crops, perennial trees and orchards, forest areas, water bodies and rangeland, which are identified as training areas for suitable feature selection based on Google Earth Image in 2023. (Table 3). Table 4 displays some examples of incompliant land utilization in Wang Nam Khiao district.

Table 3 Description of land use classification system.

No.	Land use classes	Description
1	Building and settlement areas	It comprises villages, city and commercial, institutional, industrial land, agricultural product trading center, recreation area, resort, hotel, and guesthouse.
2	Paddy field	It is an active and non-active paddy field.
3	Field crops	It comprises corn, sugarcane and cassava.
4	Perennial trees and orchards	It is an active and non-active sugarcane field.
5	Forest area	It is a natural forest and forest plantation.
6	Waterbody	It includes rivers, streams, ponds, reservoirs, farm ponds, and irrigation canals.
7	Rangeland	It consists of grass, shrubland and bamboo.

Source: Modified from LDD (2005).

Table 4 Examples of incompliant land utilization in Wang Nam Khiao district.

High-resolution image	Sentinel-2A	Photograph
		
		
		

Source: Google Earth (2022).

3.4 Parameter optimization of machine learning algorithms

The required parameters of each machine learning algorithm under OBIA of eCognition software were optimized before land use classification. In this study, Python programming was used as a tool for parameter optimization.

In practice, significant parameters of each algorithm were optimized based on the training sample with the accepted overall accuracy and Cohen Kappa of 0.7, as summarized in Table 5

Table 5 Selected parameters of each algorithm under parameter optimization.

Classifier	Parameters	Test value
SVM	**Normalize:** Change to Yes to normalize the selected features.	Yes
	Kernel type: Select either linear or RBF for kernel type.	Linear, RBF
	C: Insert the SVM parameter C.	01,0.03,0.05,0.07,0.09, 1,0.3,0.5,0.7,0.9,1,3,5,7 ,9,10,100,1000
	Gamma: For kernel type RBF, insert the SVM parameter gamma	0.1, 1, 10, 100, 1000
RF	**Depth:** Maximum tree depth	0
	Min sample count: Minimum number of samples per node.	0
	Use surrogates: Use surrogates for missing data. If yes, surrogate splits were built to work with missing data.	No
	Max categories: Cluster possible values of a categorical variable into K < max_categories clusters.	16
	Active variables: The size of the randomly selected subset of features at each tree node that is used to find the best split(s). If it is set to 0, the size is set to the square root of the total number of features).	0
	Max tree number: The maximum number of trees	50,100,150,200
	Forest accuracy: Sufficient accuracy of trained forest in %	0.01
	Termination criteria type: The learning termination criteria allows us to decide how training should be stopped: by max number of trees or forest accuracy or both.	Both
DT	**Depth**: Maximum tree depth.	0
	Min sample count: Minimum number of samples per node	0
	Max categories: Possible cluster values of a categorical variable into K < max_categories clusters	16
	Use surrogates: Use surrogates for missing data. If yes, surrogate splits were built to work with missing data.	No
	Cross-validation folds: Number of cross-validations to perform	5
	Truncate pruned tree: Pruned branches are physically removed from the tree if set to Yes.	Yes
Bayes	Not require	
KNN	**k:** Insert the value for k.	1-40

3.5 Land use classification and accuracy assessment

Land use data in 2023 of the modeling areas (Wang Nam Khiao district) were classified separately using five selected machine learning algorithms (SVM RF, DT, BAYES, KNN) with optimized parameters. Then, all classified land use maps are assessed for thematic accuracy (overall accuracy (OA), producer's accuracy (PA), user's accuracy (UA), and Kapa hat coefficient (KHAT)) by field survey with supporting of very spatial resolution image from Google Earth. In this study, the number of random stratified sampling points was calculated based on the multinomial distribution theory (Congalton and Green, 2008):

$$N = \frac{B}{4b^2} \tag{6}$$

Where:

N derived from a multinomial distribution is based on the equation

b_i is the desired precision (e.g., 5%) for the class

B is the upper (α/k) x 100 percentiles of the Chi-square distribution with 1 degree of freedom.

In addition, the pairwise Z test was examined to identify the significant difference in accuracy based on kappa hat coefficient values between standard nearest neighbor (SNN) and feature space optimization (FSO) function with SNN (Congalton and Green, 2008) as:

$$Z = \frac{\left|Khat_1 - Khat_2\right|}{\sqrt{var(Khat_1)} + \sqrt{var(Khat)_2}} \tag{7}$$

and variance of KHAT is calculated by:

$$\text{var (Khat)} = \frac{1}{n}\left\{\frac{\theta_1(1-\theta_1)}{(1-\theta_2)^2} + \frac{2(1-\theta_1)(2\theta_1\theta_2-\theta_3)}{(1-\theta_2)^3} + \frac{(1-\theta_1)^2(\theta_4-4\theta_2^2)}{(1-\theta_2)^4}\right\} \tag{8}$$

When:

$$\theta_1 = \frac{1}{n}\sum_{1=1}^{k} n_{ii} \tag{9}$$

$$\theta_2 = \frac{1}{n^2}\sum_{i=1}^{k} n_i + n_i \tag{10}$$

$$\theta_3 = \frac{1}{n^2}\sum_{i=1}^{k} n_{ii}\left(n_{i+}+n_{i}\right) \quad (11)$$

$$\theta_4 = \frac{1}{n^3}\sum_{i=1}^{k}\sum_{j=1}^{k} n_{ij}\left(n_{j+}+n_{i}\right)^2 \quad (12)$$

Z is standardized and normally distributed.

Herein, given the null hypothesis H0: (K1 - K2) = 0, and the alternative H1: (K1 - K2) ≠ 0, H0 is rejected if $Z \geq Z\alpha/2$.

3.6 Optimum algorithm identification for land use classification and detecting incompliant land utilization in ALRO plots

The optimum algorithm for detecting incompliant land utilization in agricultural land reform areas was justified based on accuracy assessment (OA, PA, UA, KHAT) and two criteria of ALRO about the percentage of building and settlement areas and water bodies in ALRO plots.

Based on thematic accuracy assessment, the Kappa hat coefficient of each algorithm was compared to identify an optimum algorithm for land use classification. The algorithm that delivers the highest Kappa hat coefficient was chosen as the optimum algorithm for land use classification under OBIA.

In the meantime, incompliant land utilization in each ALRO plot was detected using overlay analysis between the ALRO plot and the percentage of building and settlement area of more than 10% or water bodies of more than 5%. The algorithm that can deliver the highest correct number of plots (in percent) as incompliant land utilization by field survey was chosen as the optimum algorithm for detecting incompliant land utilization in the ALRO area.

Furthermore, the extracted compliant and incompliant land utilization in each ALRO plot were assessed for accuracy using binary change detection as suggested by Foody (2010). The binary error matrix, which was used to describe the sensitivity, specificity, and prevalence of the extracted compliant and incompliant land utilization in each ALRO plot, is shown in Table 6. Brief information about sensitivity, specificity, and prevalence and their equations are summarized based on Foody (2010) below:

Sensitivity is the proportion of cases correctly classified as having changed and is calculated using Equation (13) (Foody, 2010).

$$\text{Sensitivity} = \frac{a}{a+c} = \frac{a}{e} \quad (13)$$

Specificity is the proportion of cases correctly predicted to have not changed and is calculated using Equation (14) (Foody, 2010).

$$\text{Specificity} = \frac{d}{b+d} = \frac{d}{f} \quad (14)$$

Table 6 A binary error matrix.

		Binary Ground Reference by Google Earth image and field survey.		
		Incompliant	Compliant	Row total
Extracted incompliant and compliant land utilization	Incompliant	a	b	g
	Compliant	c	d	h
	Column total	e	f	N

Modified from Foody, (2010)

Sensitivity and specificity parameters represent the producer's accuracy for the change and no-change classes (Foody, 2010).

Meanwhile, the predicted positive value from the binary error matrix horizontally using Equation (15).

$$\text{Predicted}_{pos} = \frac{a}{a+b} = \frac{a}{g} \quad (15)$$

In the meantime, the predicted negative value from the binary error matrix horizontally using Equation (16) (Foody, 2010).

$$\text{Predicted}_{neg} = \frac{d}{c+d} = \frac{d}{h} \quad (16)$$

. The positive and negative predicted values for the change detection map represent the user's accuracy (Lu and Weng, 2007; Liu et al., 2007) for the change and no-change classes, respectively

Prevalence (θ) is computed using Equation (17) (Foody, 2010).

$$\text{Prevalence}(\theta) = \frac{a+c}{a+b+d+c} = \frac{e}{N} \quad (17)$$

3.7 Validation of an optimum algorithm for detecting incompliant land utilization in the ALRO area

The identified optimum algorithm for detecting incompliant land utilization in the ALRO area was validated in the testing area (Pak Chong district) to validate the result. The expected validation result should be ± 5% of the percentage for detecting incompliant land utilization in the modeling area (Wang Nam Khiao district).

CHAPTER IV
RESULTS AND DISCUSSION

Results of the study, which included (1) data collection and preparation, (2) optimum parameter identification for multiresolution segmentation, (3) suitable feature selection for LULC classification under OBIA, (4) parameter optimization of machine learning algorithms, (5) land use classification and accuracy assessment in modeling area, (6) incompliant land utilization detection in ALRO plots in the modeling area, and (7) validation of an optimum algorithm for LULC classification, accuracy assessment and incompliant land utilization detection in the testing area are separately described and discussed below.

4.1 Data collection and preparation

The spatial distribution of collected and prepared multispectral Sentinel imageries is displayed in Figure 10. Meanwhile, the mosaic multispectral Sentinel imageries are displayed in Figures 11-12. In the meantime, the spatial distribution of extracted spectral indices is displayed in Figures 13-14. Besides, the Google Earth image is displayed in Figure 15.

Furthermore, GIS data regarding registered ALRO plots at Wang Nam Khiao district and Pak Chong district, Nakhon Ratchasima Province, are displayed in Figures 16-17. The registered ALRO plots in Wang Nam Khiao district were promulged on 2 October 1978. There are currently 12,248 plots, and they cover approximately 405 square kilometers. In the meantime, the registered ALRO plots in Pak Chong district were promulged on 8 December 1991. There are currently 8,388 plots, and they cover approximately 592 square kilometers.

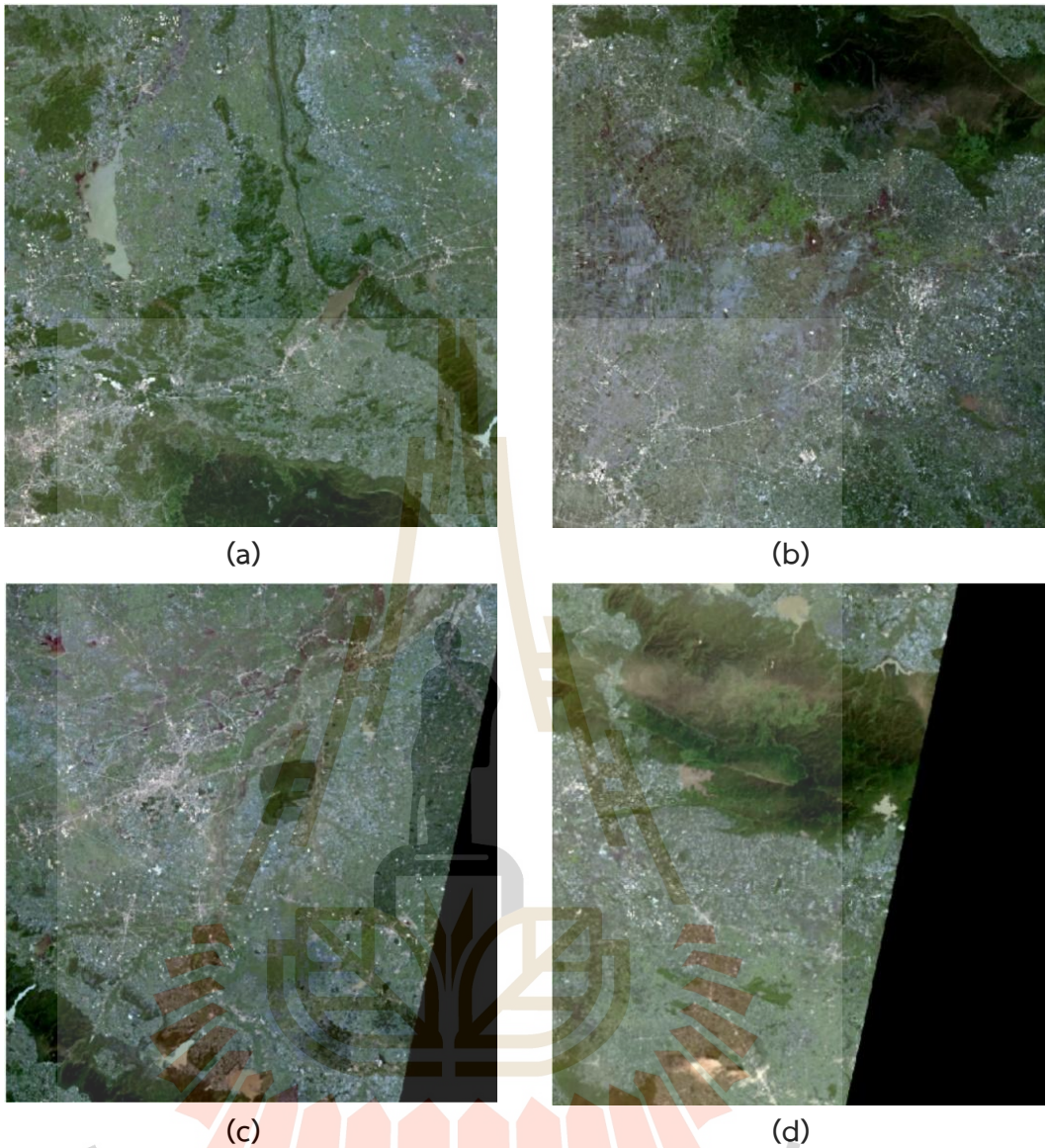


Figure 10 Collected multispectral Sentinel imageries: (a) Sentinel image, T47pqs, (b) Sentinel image, T47prs (c) Sentinel image, T47pqr and (d) Sentinel image, T47prr.

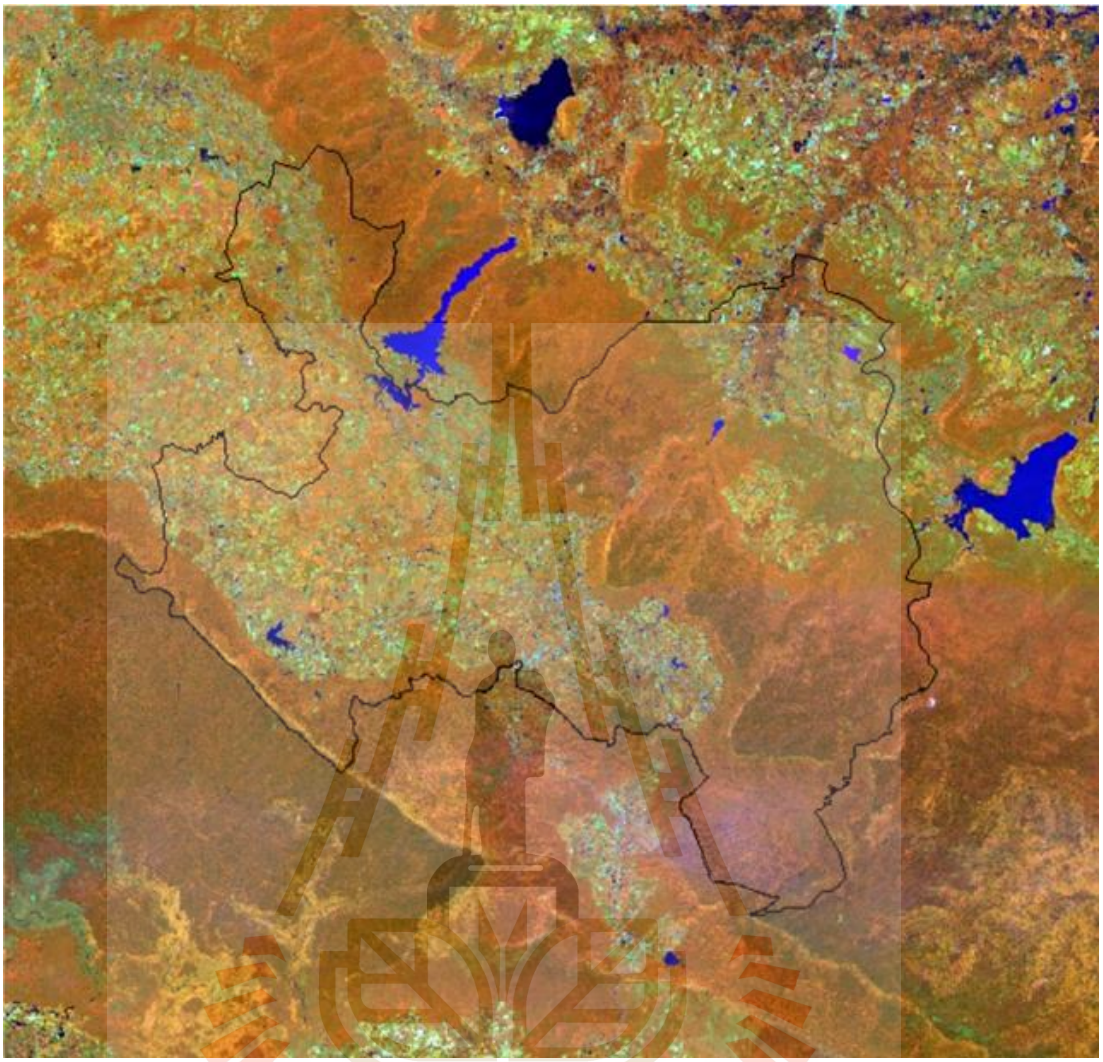


Figure 11 Mosaic multispectral Sentinel imageries in Wang Nam Khiao district: Band (Red, Vegetation red edge, Green).

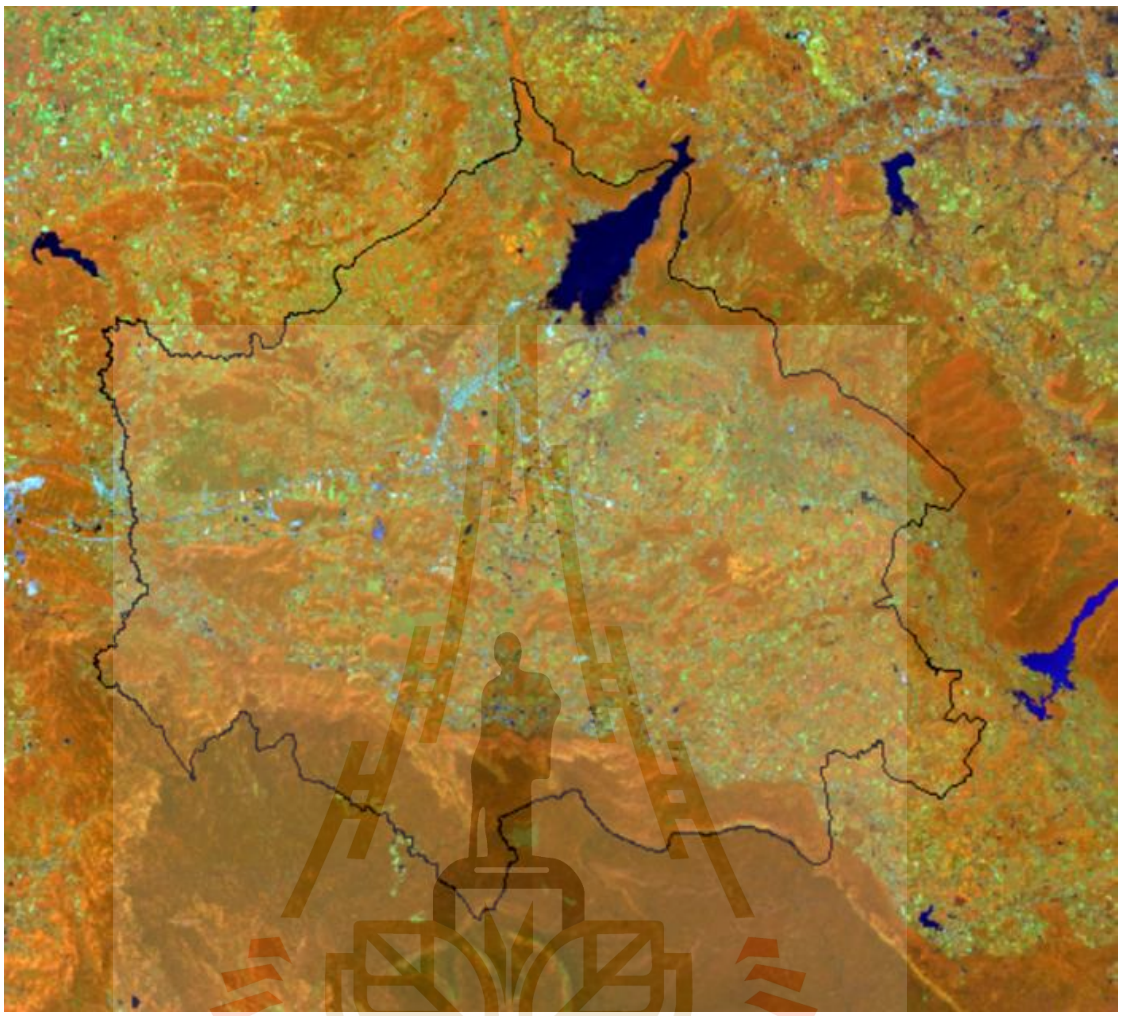
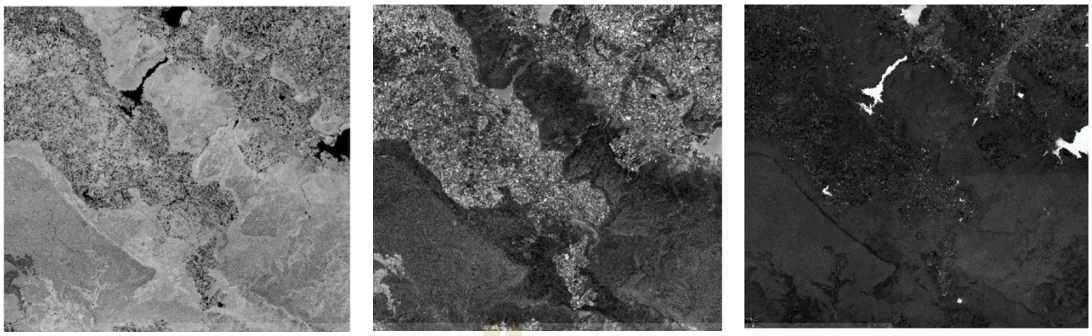
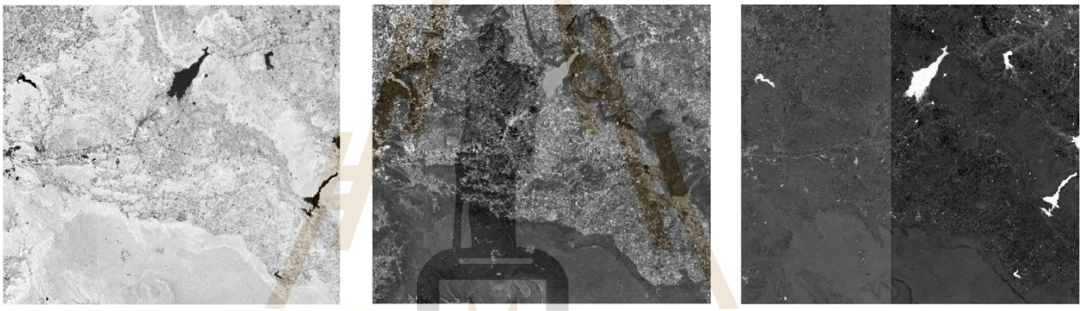


Figure 12 Mosaic multispectral Sentinel imageries in Pak Chong district: Band (Red, Vegetation red edge, Green).



(a) (b) (C)

Figure 13 Extracted spectral indices in the Wang Nam Khiao district: (a) NDVI, (b) NDBI, and (c) MNDWI.



(a) (b) (C)

Figure 14 Extracted spectral indices in the Pak Chong district: (a) NDVI, (b) NDBI, and (c) MNDWI.

(a) (b)

Figure 15 Google Earth image: (a) Wang Nam Khiao district, (b) Pak Chong district.

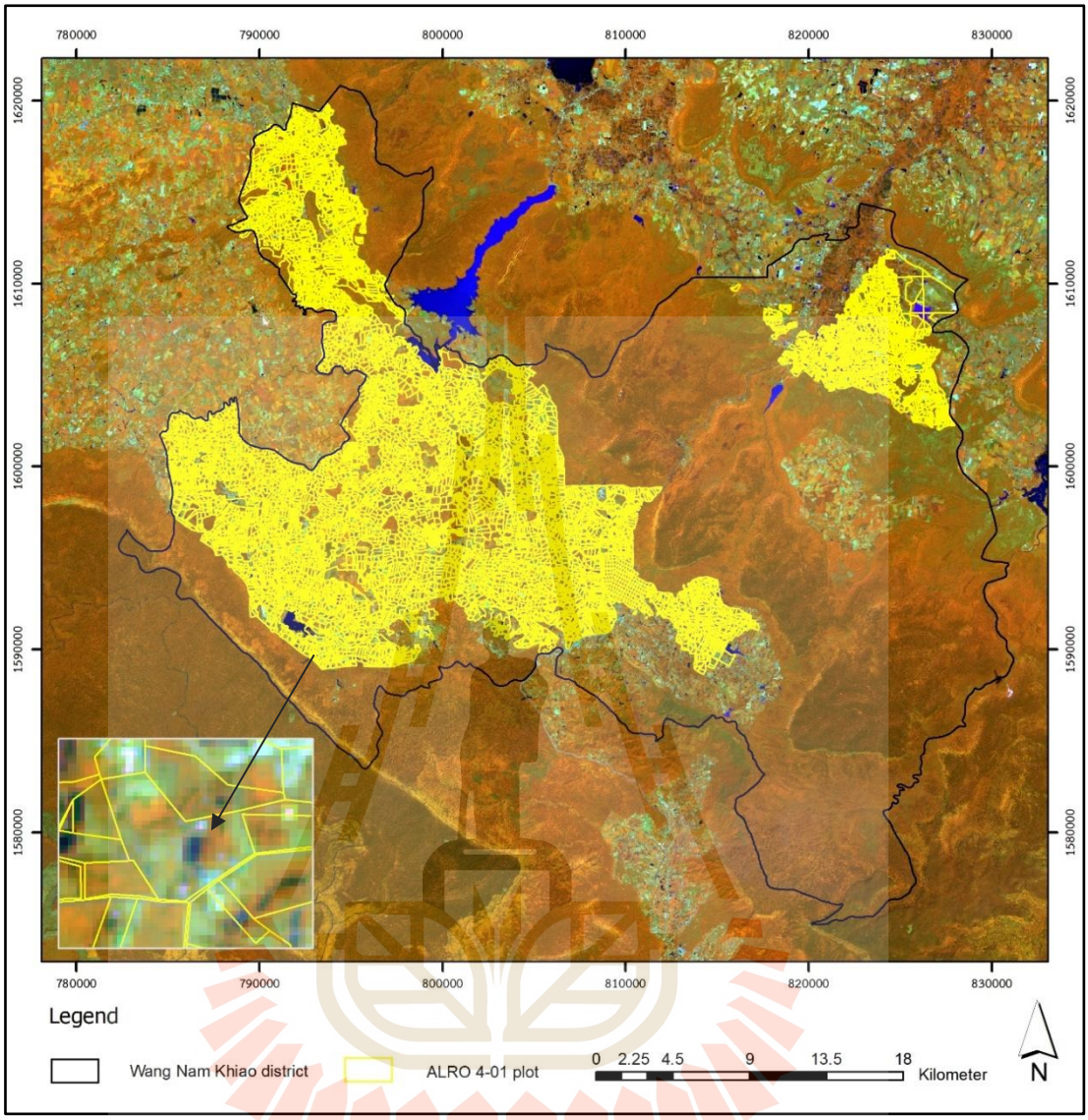


Figure 16 Spatial distribution of registered ALRO plots in Wang Nam Khiao district.

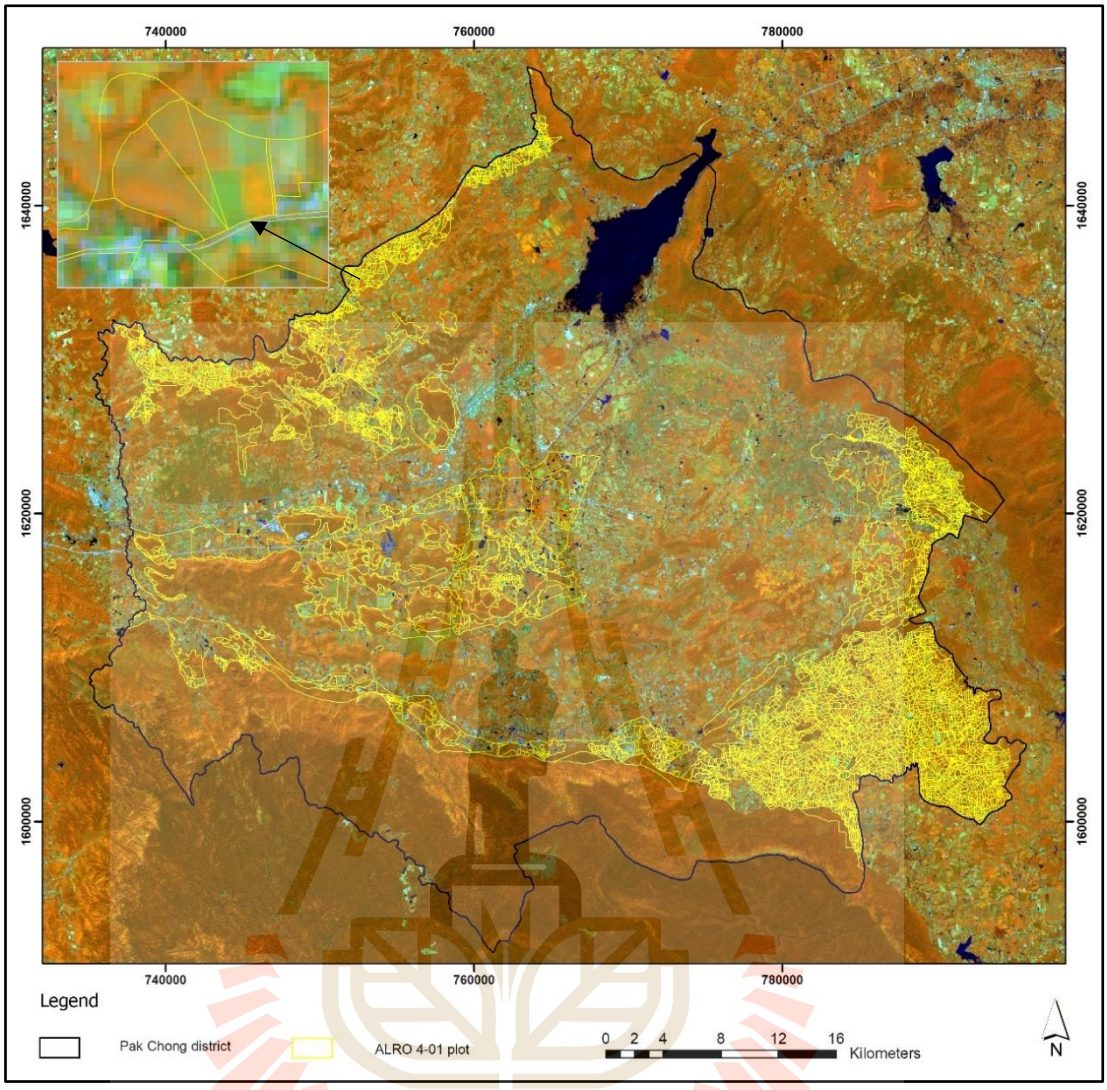
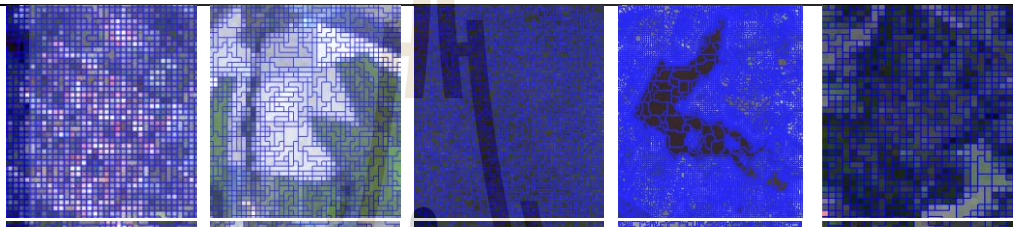
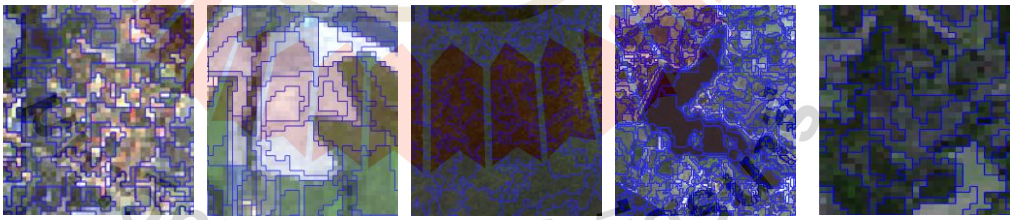
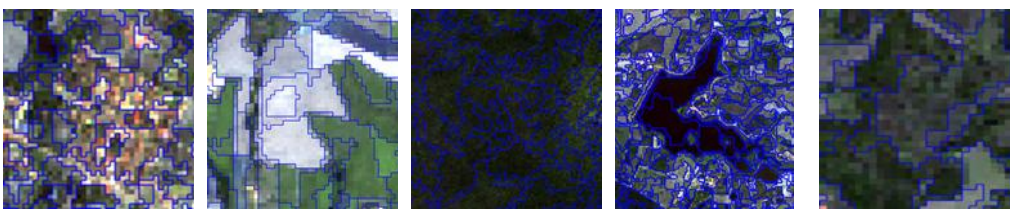


Figure 17 Spatial distribution of registered ALRO plots in Pak Chong district.

4.2 Optimum parameter identification for multiresolution segmentation.

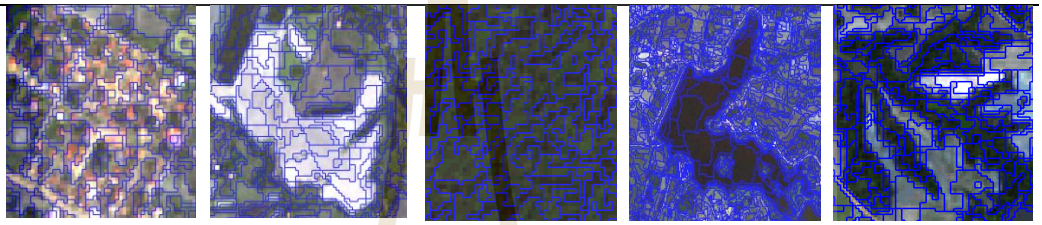
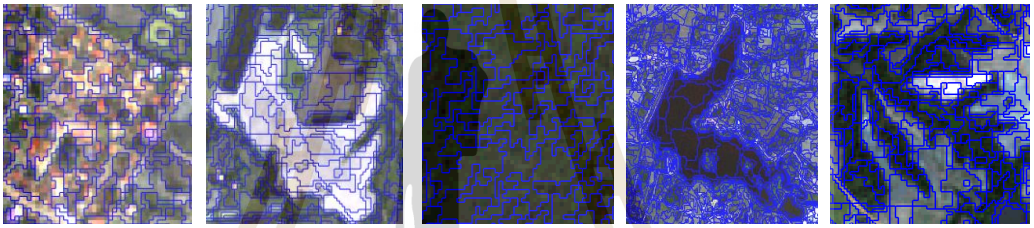
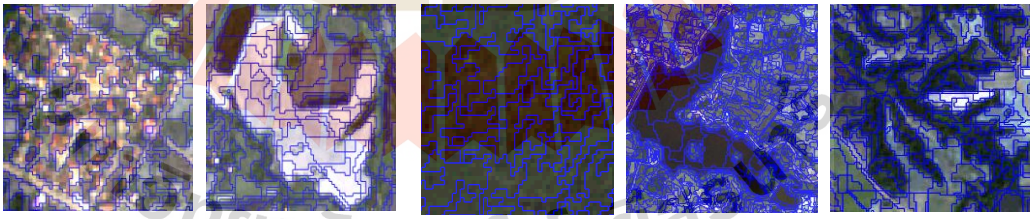
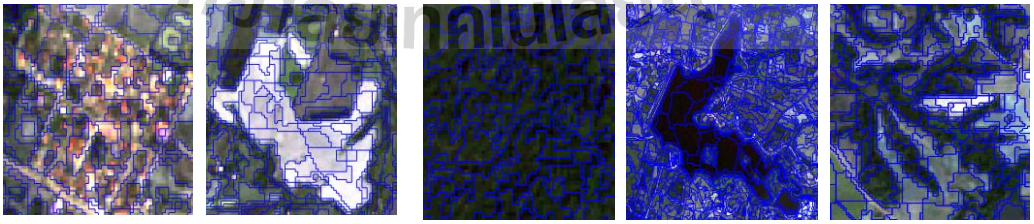
The scale parameters were set to 5,10, 15, 20, 25, and 30, and the remaining parameters were fixed to a constant value of 0.5. The optimal value of LULC by visual interpretation was examined for each scale parameter. As a result, the suitable scale parameter was 25. See the details in Table 7.

Table 7 Optimum scale parameter identification: 5, 10, 15, 20, 25, 30.

Scale	Building and settlement areas	Field crops	Forest area	Waterbody	Rangeland
5					
10					
15					
20					
25					
30					

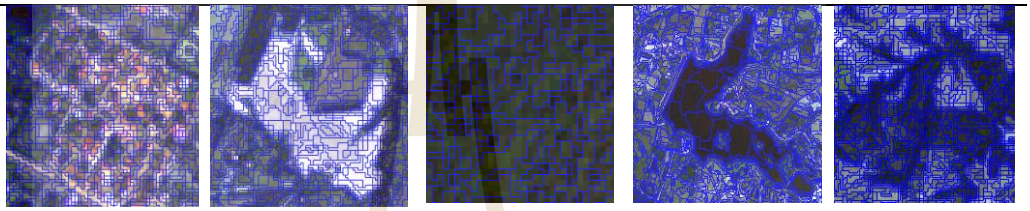
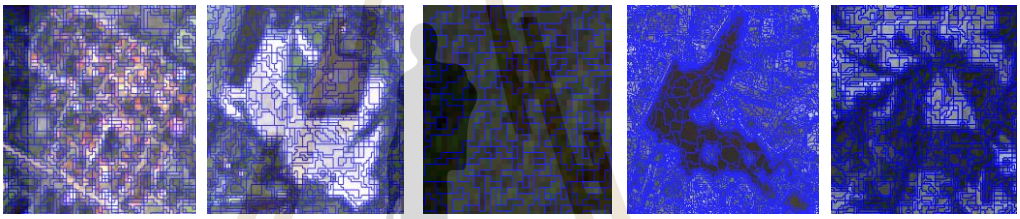
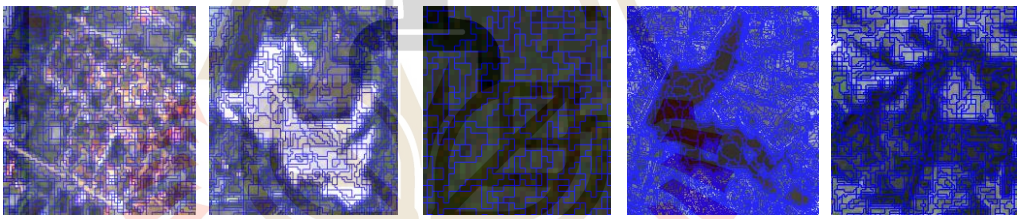
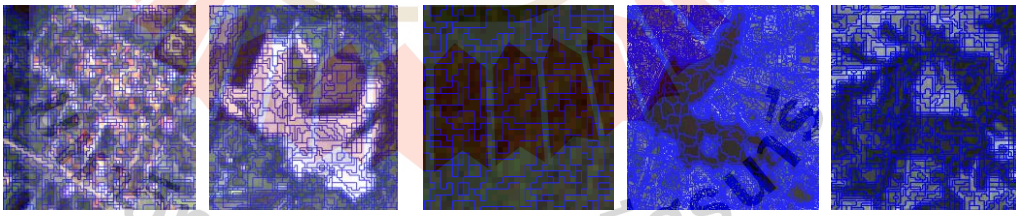
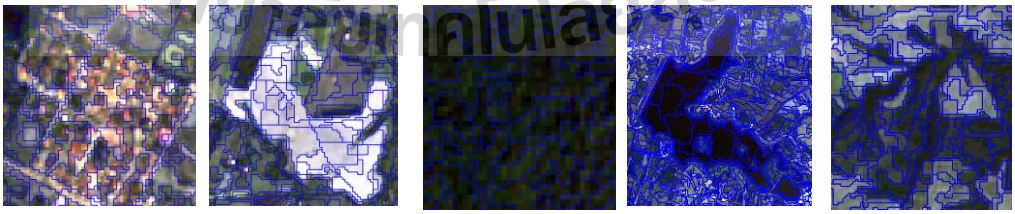
After that, the suitable scale parameter was used to set the optimum shape parameter. The shape parameter was set at 0.1, 0.2, 0.3, 0.4, and 0.5, while the compactness parameter was fixed to a constant value of 0.5. As a result, the suitable shape parameter was 0.5. See the details in Table 8.

Table 8 Optimum shape parameter identification: 0.1, 0.2, 0.3, 0.4, 0.5.

Shape	Building and settlement areas	Field crops	Forest area	Waterbody	Rangeland
0.1					
0.2					
0.3					
0.4					
0.5					

In the last step, the suitable shape parameter was used to set the optimum compactness parameter. The compactness parameter was set at 0.1, 0.2, 0.3, 0.4, and 0.5. As a result, the suitable compactness parameter was 0.5. See the details in Table 9.

Table 9 Optimum compactness parameter identification: 0.1, 0.2, 0.3, 0.4, 0.5.

CP	Building and settlement areas	Field crop	Forest area	Waterbody	Rangeland
0.1					
0.2					
0.3					
0.4					
0.5					

The results of optimum parameter identification for multiresolution segmentation based on Sentinel-2A under OBIA, including scale, shape, and compactness, are shown in Table 10.

Table 10 Optimum parameter identification for multiresolution segmentation based on Sentinel-2A.

Parameter	Step 1	Step 2	Step 3
Scale	5, 10, 15, 20, 25 and 30	25	25
Shape	0.5 (Fixed value)	0.1, 0.2, 0.3, 0.4, and 0.5	0.5
Compactness	0.5 (Fixed value)	0.5 (Fixed value)	0.1, 0.2, 0.3, 0.4, and 0.5
Result	**25**	**0.5**	**0.5**

As a result of the optimum parameter identification for multiresolution segmentation based on Sentinel-2A in Table 10, the optimum scale parameter, shape and compactness were 25, 0.5, and 0.5, respectively. Since the computer does not automatically do this process, it is an arbitrary judgment from the preference of the visual interpreter. In the case of the scale parameter, the object at scale 25 is discriminated against by the seven land use types, including building and settlement areas, paddy fields, field crops, perennial trees and orchards, forest area, water body and rangeland. At a scale level of 30, the rangeland, field crop, paddy field, and urban area were homogeneously classified, but the agriculture area was heterogeneous. So, a scale level of 25 was chosen in this study.

This study's result is similar to the previous study of Rakaksorn, Chuchip, and Narangajavana (2023). They visually identified the optimal parameter for multiresolution segmentation with Thaichote images and applied the DT algorithm for forest change in the Galyani Vadhana district, Chiangmai province. The optimum parameter of the scale parameter was 10, the shape and color parameters were 0.3 and 0.7, and the compactness and smoothness were 0.5 and 0.5, respectively.

4.3 Suitable feature selection for LULC classification under OBIA

The results of suitable feature selection, including spectral and texture property, for LULC classification under OBIA based on a pair-wise combination of Jeffries–Matsushita (J) distance among training samples of land use types were reported in Table 12. Herewith, three object properties, spectral, shape and texture, are extracted from 15 sample areas for 7 LULC classes and calculated J values for each pair. Table 18 shows an example of a training area for suitable feature selection from 7 LULC classes, including (1) building and settlement areas, (2) paddy fields, (3) field crops, (4) perennial trees and orchards, (5) forest areas 6) water bodies and 7) rangeland. Details of Jeffries–Matsushita (J) distance calculation between land use types as pair-wise combinations are presented in Appendix A.

As a result, In Table 11 , 34 features from two object properties, spectral and texture, were identified as suitable features for classifying LULC data. The highest J Values were Max diff, Mean layer 4, Mean layer 5, Mean layer 6, Ratio layer 2, Ratio layer 4, and Ratio layer 8 value of 2.0, and the lowest J value was GLCM Entropy layer 5 value of 1.78. It can be observed that the shape features, such as area, border length, width, asymmetry, border index and shape index, are not identified as suitable features for classifying LULC since the calculated J value between shape property with other properties is less than 1.75.

Table 11 The suitable spectral and texture features by Jeffries–Matusita distance.

No	Object property	Suitable feature	Jeffries–Matusita distance
1	**Spectral features**	Max. diff	2.0
2		Brightness	1.85
3		Mean Layer 1	1.99
4		Mean Layer 2	1.90
5		Mean Layer 3	1.97
6		Mean Layer 4	2.00
7		Mean Layer 5	2.00
8		Mean Layer 6	2.00
9		Mean Layer 7	198
10		Mean Layer 8	1.99
11		Ratio Layer 1	1.99
12		Ratio Layer 2	2.00
13		Ratio Layer 3	1.99
14		Ratio Layer 4	2.00
15		Ratio Layer 5	1.97
16		Ratio Layer 6	1.99
17		Ratio Layer 8	2.00
18		Standard deviation Layer 1	1.82
19		Standard deviation Layer 2	1.83
20		Standard deviation Layer 3	1.97
21		Standard deviation Layer 8	1.91
22	**Texture features**	GLCM Mean Layer 6	1.96
23		GLCM Homogeneity Layer 5	1.89
24		GLCM Homogeneity Layer 6	1.81
25		GLCM Homogeneity Layer 7	1.96
26		GLCM Homogeneity Layer 8	1.95
27		GLCM Entropy Layer 2	1.85
28		GLCM Entropy Layer 5	1.78
29		GLCM Entropy Layer 7	1.94
30		GLCM Dissimilarity Layer2	1.82
31		GLCM Dissimilarity Layer6	1.95
32		GLCM Dissimilarity Layer5	1.84
33		GLCM Contrast Layer2	1.79
34		GLCM Correlation Layer 4	1.83

Table 12 Example of training areas for suitable feature selection from 7 LULC classes.

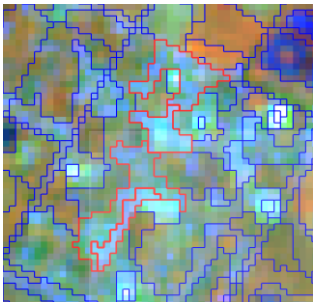
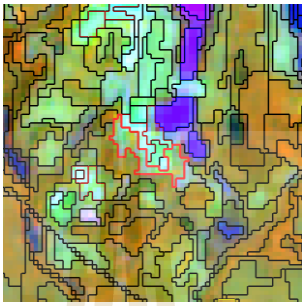
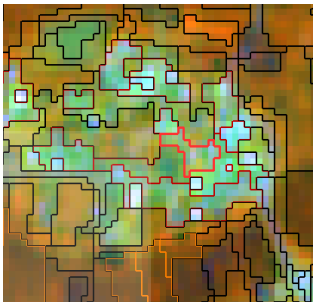
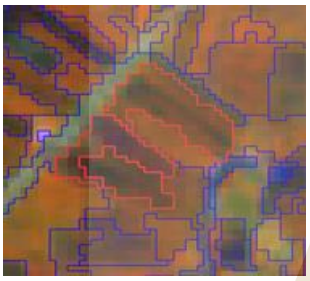
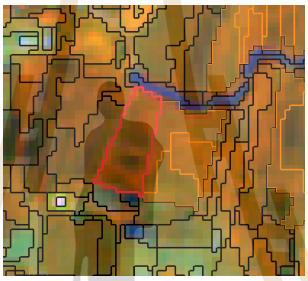
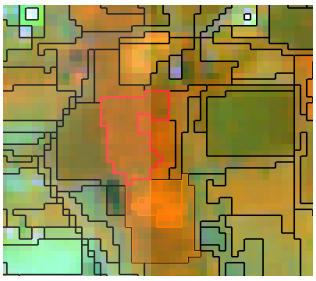
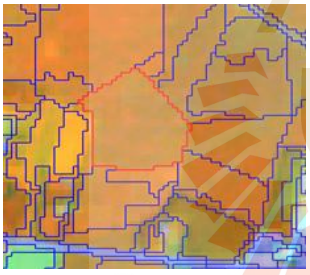
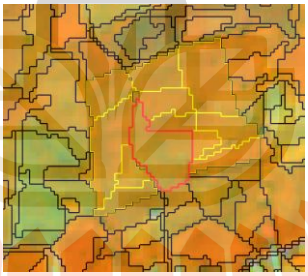
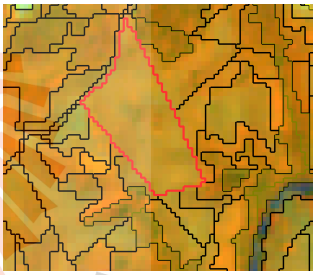
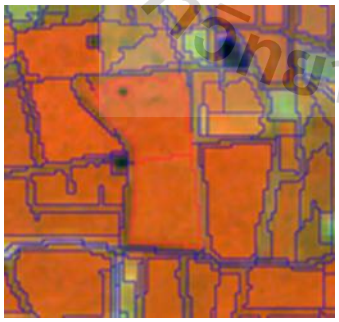
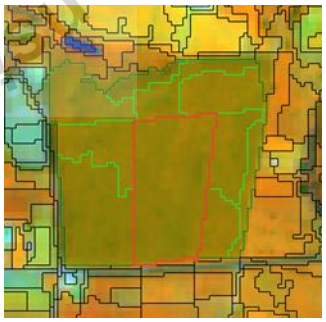
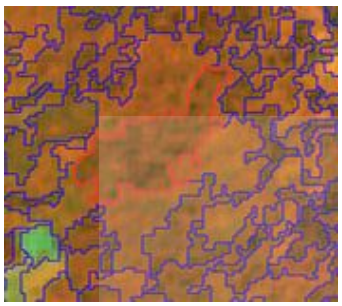
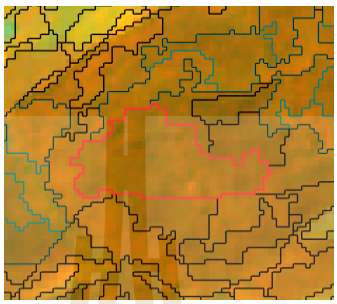
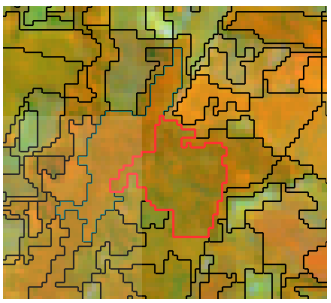
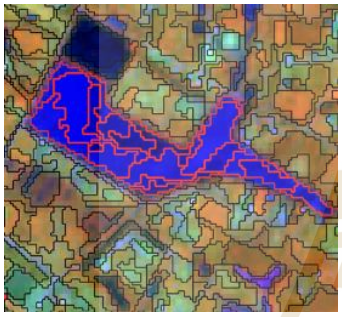
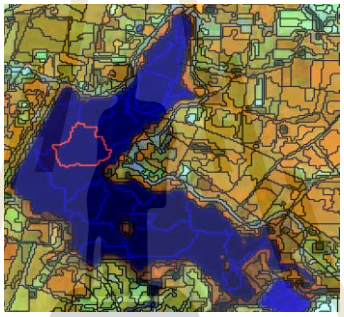
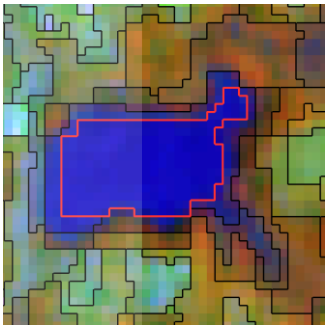
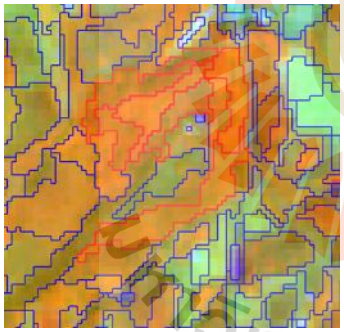
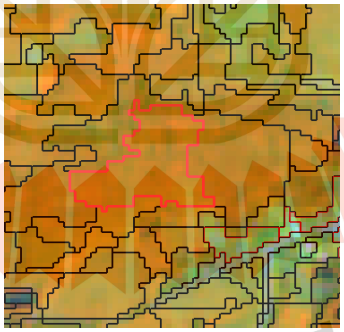
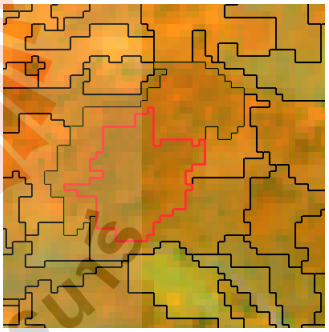
Training area 1	Training area 2	Training area 3
Building and settlement areas		
		
Paddy field		
		
Field crop		
		
Perennial trees and orchards		
		

Table 12 (Continued).

Training area 1	Training area 2	Training area 3
Forest area		
		
Waterbody		
		
Rangeland		
		

4.4 Parameter optimization of machine learning algorithms

The results of significant optimized parameters of each algorithm (SVM, RF, DT, and KNN) based on training samples with the accepted overall accuracy and Cohen Kappa, using Python programming, are summarized in the following sections.

4.4.1 Support vector machine

The result of optimized parameters of the SVM algorithm using linear and non-linear kernels (RBF) based on grid-search cross-validation was reported in Tables 13 and 14.

Table 13 The optimum parameter of the SVM algorithm with linear kernel.

LULC class	Precision	recall	F1-score	Support
Building and settlement areas	1.00	1.00	1.00	33
Field crops	0.94	0.91	0.92	32
Paddy field	0.97	0.85	0.91	34
Perennial trees and orchards	0.77	0.96	0.85	24
Forest area	0.72	0.68	0.70	34
Waterbody	1.00	1.00	1.00	26
Rangeland	0.61	0.63	0.62	27
Accuracy macro avg	0.86	0.86	0.86	210
Weight avg	0.86	0.86	0.86	210
Overall accuracy	0.85			
Cohen Kappa	0.83			
C	**0.09**			
Gamma	**100**			
Kernel	**linear**			

As a result, the accuracy macro average of all LULC classes based on the grid-search cross-validation as the F1-score was 0.86 or 86%. In the meantime, the overall accuracy and Cohen Kappa of the grid-search cross-validation were 0.85 or 85% and 0.83 or 83%, respectively. Notably, the optimum C and gamma parameters of the SVM algorithm with linear kernel were 0.09 and 100, respectively. It can be observed that the Cohen Kappa value is more than 80%, and the Kappa hat coefficient value

more than 80% represents high agreement between the training and testing data (Fitzpatrick-Lins, 1981).

Table 14 The optimum parameter of the SVM algorithm with non-linear kernel (RBF).

LULC class	Precision	recall	F1-score	Support
Building and settlement areas	1.00	0.06	0.11	33
Paddy field	1.0	0.06	0.11	34
Field crops	1.00	0.19	0.32	32
Perennial trees and orchards	0.12	1.00	0.22	24
Forest area	1.00	0.06	0.11	34
Water	0.00	0.00	0.00	26
Rangeland	1.00	0.04	0.07	27
Accuracy macro avg	0.73	0.20	0.13	210
Weight avg	0.78	0.18	0.14	
Overall accuracy	0.17			
Cohen Kappa	0.06			
C	**0.6**			
Gamma	**100**			
Kernel	**RBF**			

As a result, the accuracy macro average of all LULC classes based on the grid-search cross-validation as the F1-score was 0.13 or 13%. In the meantime, the overall accuracy and Cohen Kappa of the grid-search cross-validation were 0.17 or 17% and 0.06 or 6%, respectively. The optimum C and gamma parameters of the SVM algorithm with RBF kernel were 0.6 and 100, respectively. It can be observed that the Cohen Kappa value lower than 40% and the Kappa hat coefficient value less than 40% represent poor agreement between the training and testing data (Fitzpatrick-Lins, 1981).

According to the results above, the SVM algorithm with linear kernel and its optimized parameters will be used to detect incompliant land utilization in agricultural land reform areas.

4.4.2 Random Forest

The result of parameters used based on grid-search cross-validation of the RF algorithm is shown in Table 15.

Table 15 The optimum parameter of the RF algorithm.

LULC	Precision	recall	F1-score	Support
Building and settlement areas	0.97	1.00	0.99	34
Paddy field	0.82	0.90	0.86	31
Field crops	0.96	0.93	0.95	29
Perennial trees and orchards	0.92	0.85	0.88	26
Forest area	0.79	0.76	0.77	29
Water	1.00	0.97	0.99	34
Rangeland	0.64	0.67	0.65	27
Accuracy macro avg	0.87	0.87	0.87	210
Weight avg	0.88	0.88	0.88	210
Accuracy	0.88			
Cohen Kappa	0.85			
N Estimator (No. of tree)	**100**			

As a result, the accuracy macro average of all LULC classes based on the grid-search cross-validation as the F1-score was 0.87 or 87%. In the meantime, the overall accuracy and Cohen Kappa of the grid-search cross-validation were 0.88 or 88% and 0.85 or 85%, respectively. Importantly, the RF algorithm's optimum number of tree parameters was 100. It can be noted that the Cohen Kappa value is more than 80%, and the Kappa hat coefficient value more than 80% represents high agreement between the training and testing data (Fitzpatrick-Lins, 1981).

4.4.3 Decision tree

The result of optimum parameters used based on grid-search cross-validation of the DT algorithm is shown in Table 16.

Table 16 The optimum parameter of the DT algorithm.

LULC	Precision	recall	Fl-score	Support
Building and settlement areas	1.00	0.95	0.97	37
Paddy field	0.90	0.80	0.85	35
Field crops	0.72	0.78	0.75	23
Perennial trees and orchards	0.74	0.79	0.77	29
Forest area	0.69	0.76	0.72	29
Water	0.96	0.96	0.96	27
Rangeland	0.59	0.57	0.58	30
Accuracy macro avg	0.80	0.80	0.80	210
Weight avg	0.81	0.81	0.81	210
Accuracy	0.80			

As a result, the accuracy macro average of all LULC classes based on the grid-search cross-validation as the F1-score was 0.80 or 80%. In the meantime, the overall accuracy of the grid-search cross-validation was 0.80 or 80%.

4.4.4 K Nearest Neighbor

The result of parameters used based on grid-search cross-validation of the K Nearest Neighbor algorithm is shown in Figure 18 and Table 17.

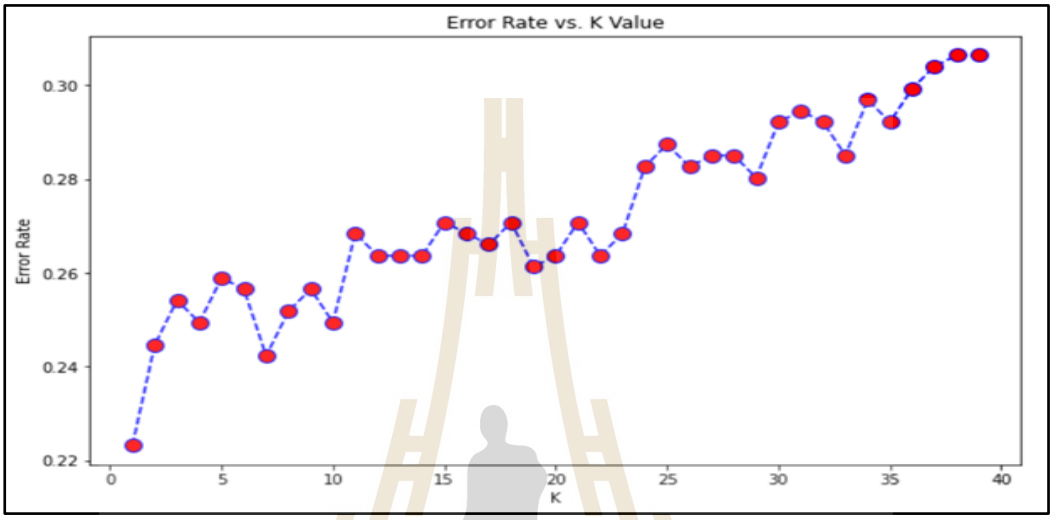


Figure 18 Variation of error rate during the optimization for K value.

Table 17 The optimum parameter of the KNN algorithm.

LULC	Precision	recall	F1-score	Support
Building and settlement areas	1.00	0.97	0.98	33
Paddy field	0.79	0.79	0.79	24
Field crops	0.89	0.78	0.83	32
Perennial trees and orchards	0.70	0.79	0.75	27
Forest area	0.71	0.65	0.68	34
Water	0.96	1.00	0.98	26
Rangeland	0.58	0.67	0.62	27
Accuracy macro avg	0.81	0.81	0.81	210
Weight avg	0.81	0.81	0.81	210
Accuracy	0.80			
K	**1**			

As a result, the error rate increases when the K value increases. See Figure 25. The accuracy macro average of all LULC classes based on the grid-search cross-validation as the F1-score was 0.81 or 81%. In the meantime, the overall accuracy

of the grid-search cross-validation was 0.80 or 80%. Importantly, the optimum K parameters of the KNN algorithm were 1.

In summary, the result of the optimum parameters of each algorithm (SVM, RF, DT, and KNN) using Python programming was reported in Table 18. A detail of Python coding for optimum parameters based on grid search cross-validation is shown in Appendix B.

Table 18 Optimum parameter of each algorithm under parameter optimization.

Classifier	Parameters	Optimum parameter	F1-score
SVM-Linear	C	0.09	0.86 or 86%
	Gamma	100	
SVM-N0n-linera	C	0.6	0.14 or 14%
	Gamma	100	
RF	Number tree	100	0.88 or 88%
DT	Depth	0	0.81 or 81%
	Min sample count	0	
	Max categories	16	
	Use surrogates	No	
	Cross-validation folds	5	
	Truncate pruned tree	Yes	
KNN	Insert the value for k.	1	0.81 or 81%

4.5 Land use classification and accuracy assessment in the modeling area

4.5.1 Land use classification

Results of classified LULC data using the SVM, RF, DT, Bayes, and KNN classifiers are displayed in Figures 19-23, respectively. Meanwhile, the area and percentage of LULC data are presented in Tables 24 to 28. The results of LULC data in the modeling area (WNK) are described in the next section.

4.5.1.1 Land use classification with SVM classifier

The classified settlement and built-up areas, as one criterion for identifying incompliant land utilization in the ALRO area from the SVM algorithm deliver the area with a value of 28.58 sq. km or 7.05 percent. On the contrary, the classified water body from SVM delivers the area with a value of 8.54 sq. km or 2.11 percent. See Table 19.

Table 19 Area and percentage of LULC data with SVM algorithm.

No	LULC class	Area (Km^2)	Percent
1	Building and settlement areas	**28.58**	**7.05**
2	Paddy field	11.15	2.75
3	Field crops	272.51	67.22
4	Perennial trees and orchards	13.44	3.32
5	Forest area	21.36	5.27
6	Waterbody	**8.54**	**2.11**
7	Rangeland	49.80	12.28
Total		**405.38**	**100**

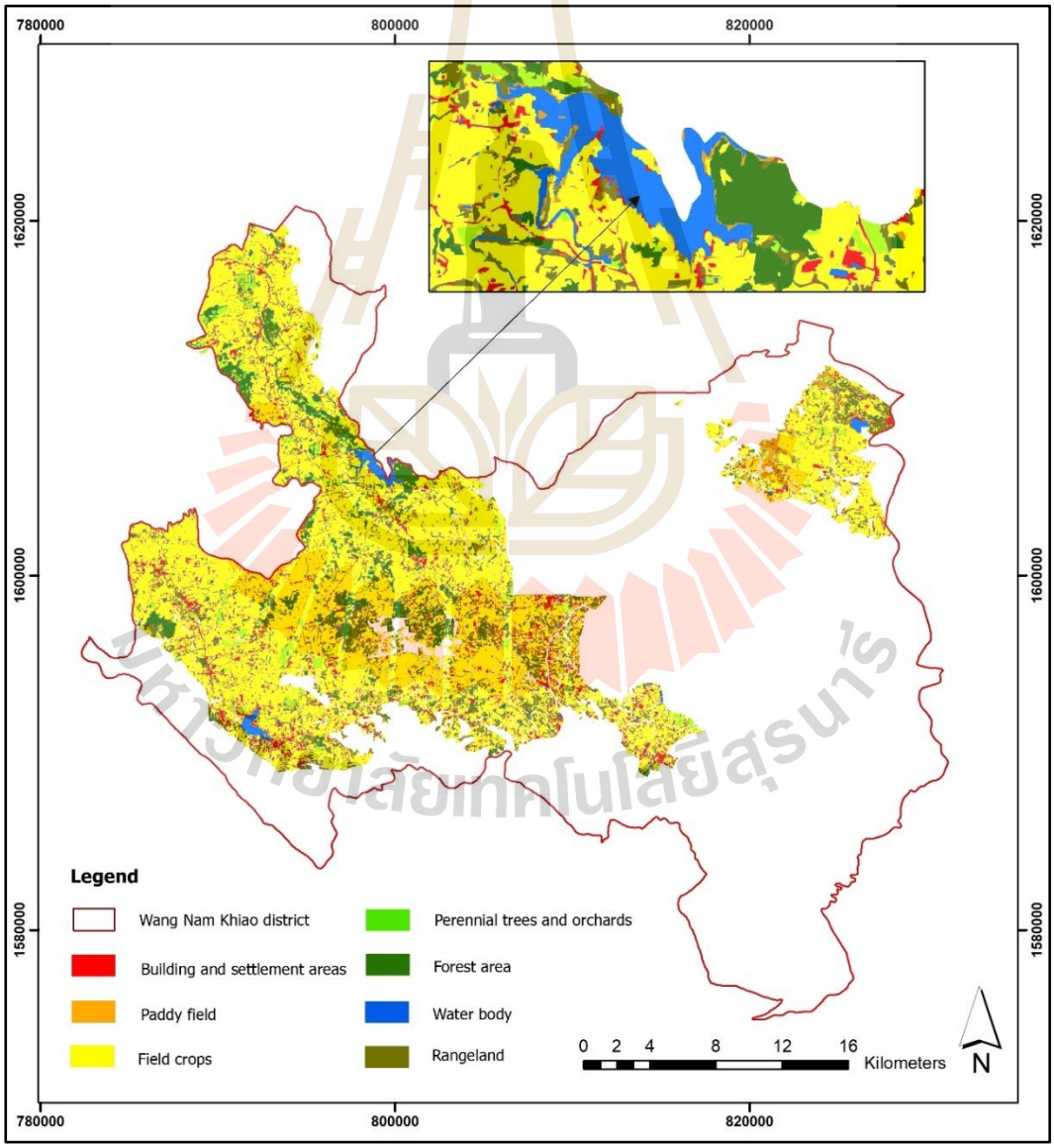


Figure 19 The spatial distribution of LULC types with the SVM algorithm.

4.5.1.2 Land use classification with RF classifier

The classified settlement and built-up areas, as one criterion for identifying incompliant land utilization in the ALRO area from the RF algorithm deliver the area with a value of 29.74 sq. km or 7.34 percent. On the contrary, the classified water body from RF delivers the area with a value of 8.86 sq. km or 2.18 percent. See Table 20.

Table 20 Area and percentage of LULC data with RF algorithm.

No	LULC class	Area (Km^2)	Percent
1	Building and settlement areas	**29.74**	**7.34**
2	Paddy field	11.26	2.78
3	Field crops	240.37	59.30
4	Perennial trees and orchards	15.98	3.94
5	Forest area	27.07	6.68
6	Waterbody	**8.86**	**2.18**
7	Rangeland	72.07	17.78
Total		**405.38**	**100**

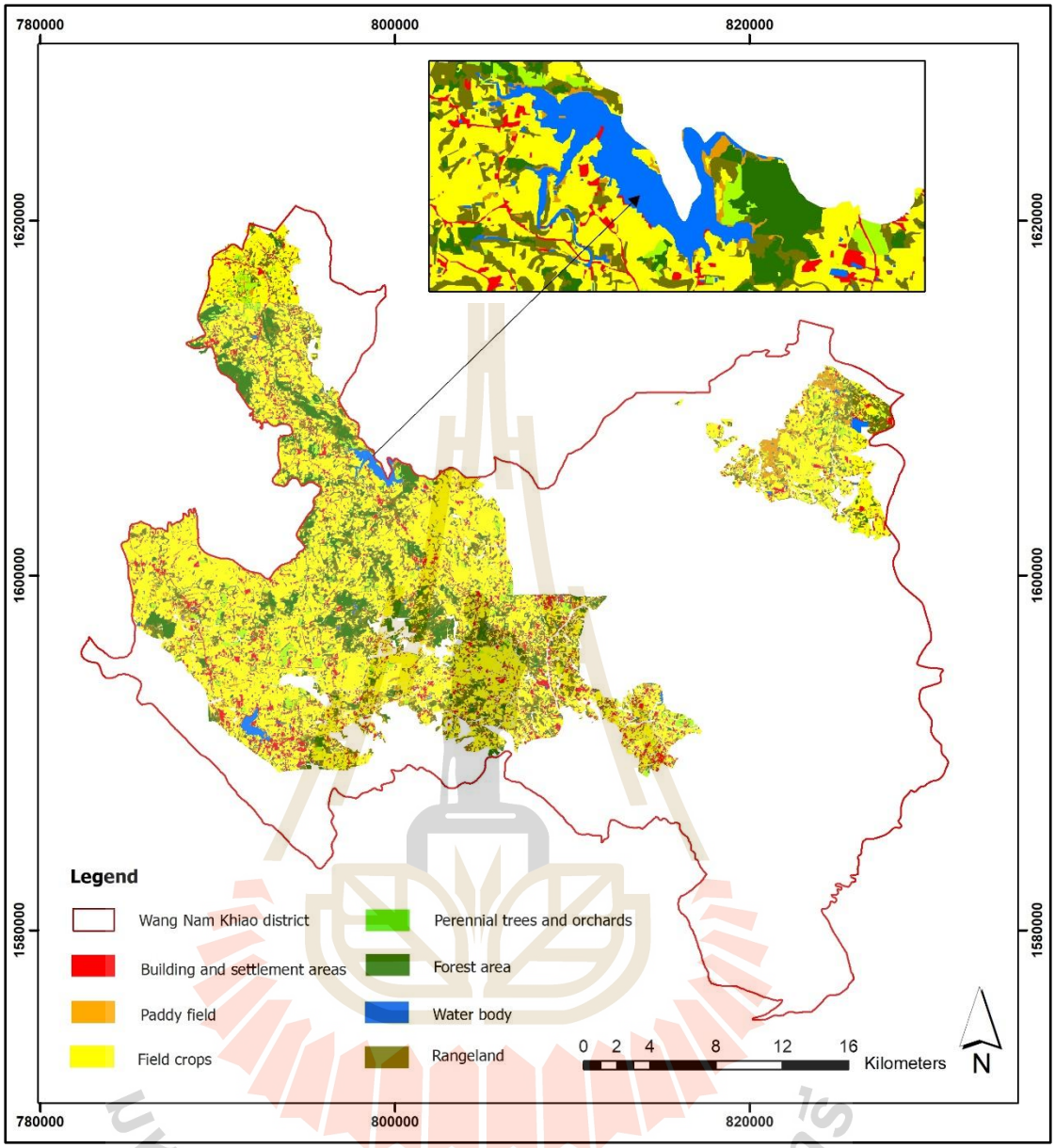


Figure 20 The spatial distribution of LULC types with the RF algorithm.

4.5.1.3 Land use classification with DT classifier

The classified settlement and built-up areas, as one criterion for identifying incompliant land utilization in the ALRO area from the DT algorithm deliver the area with a value of 39.22 sq. km or 9.68 percent. On the contrary, the classified water body from SVM delivers the area with a value of 8.54 sq. km or 2.11 percent. (See Table 21)

Table 21 Area and percentage of LULC data with DT algorithm.

No	LULC class	Area (Km^2)	Percent
1	Building and settlement areas	**39.22**	**9.68**
2	Paddy field	6.92	1.71
3	Field crops	226.65	55.92
4	Perennial trees and orchards	16.42	4.05
5	Forest area	33.91	8.36
6	Waterbody	**7.71**	**1.90**
7	Rangeland	74.51	18.38
Total			**100**

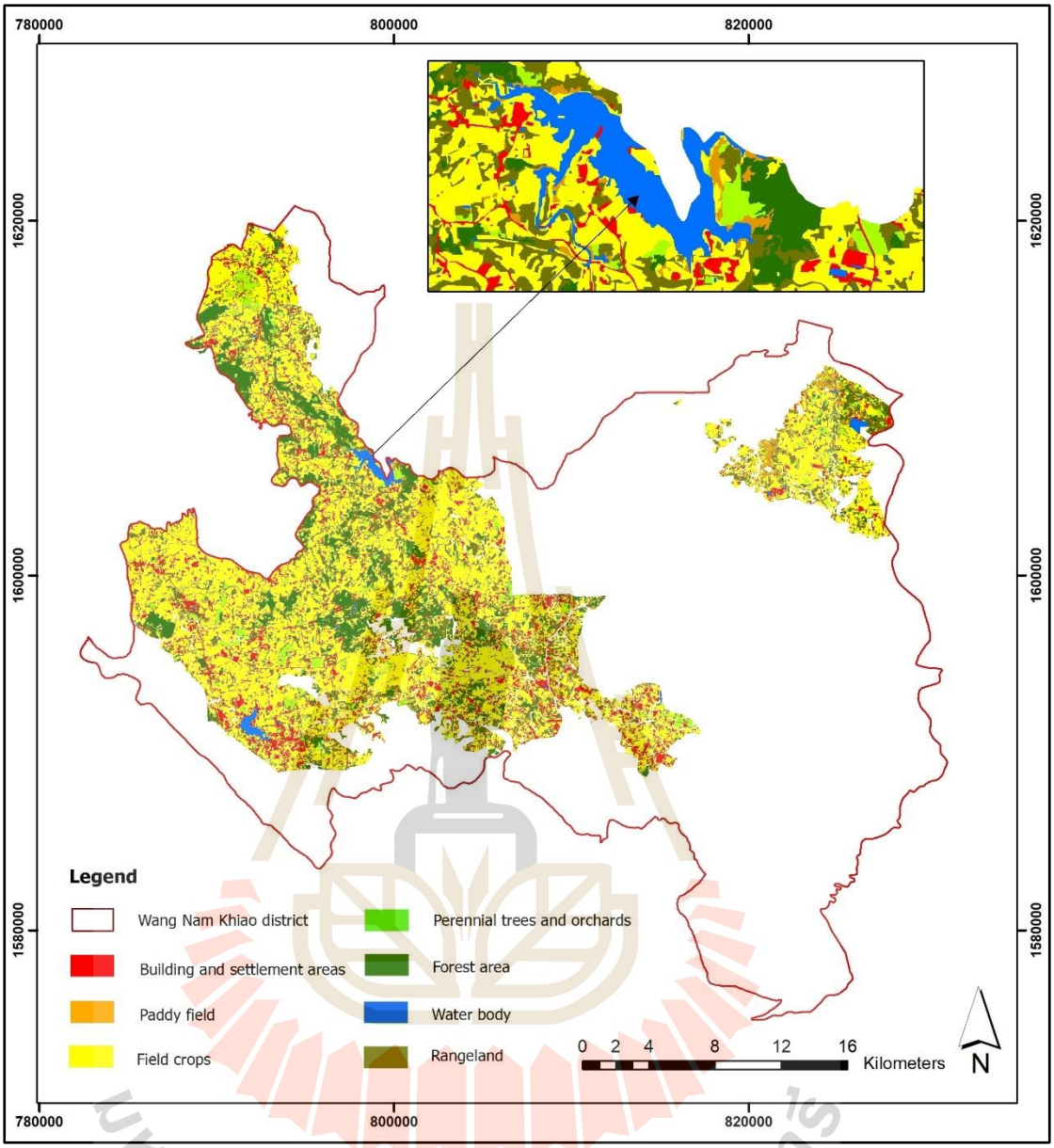


Figure 21 The spatial distribution of LULC types with the DT algorithm.

4.5.1.4 Land use classification with Bayes classifier

The classified settlement and built-up areas, as one criterion for identifying incompliant land utilization in the ALRO area from the Bayes algorithm, deliver the area with a value of 27.82 sq. km or 6.86 percent. On the contrary, the classified water body from Bayes delivers the area with a value of 9.22 sq. km or 2.28 percent. See Table 22.

Table 22 Area and percentage of LULC data with Bayes algorithm.

No	LULC class	Area (Km^2)	Percent
1	Building and settlement areas	**27.82**	**6.86**
2	Paddy field	16.96	4.17
3	Field crops	210.57	51.95
4	Perennial trees and orchards	25.38	6.26
5	Forest area	35.29	8.71
6	Waterbody	**9.22**	**2.28**
7	Rangeland	80.10	19.77
Total			**100**

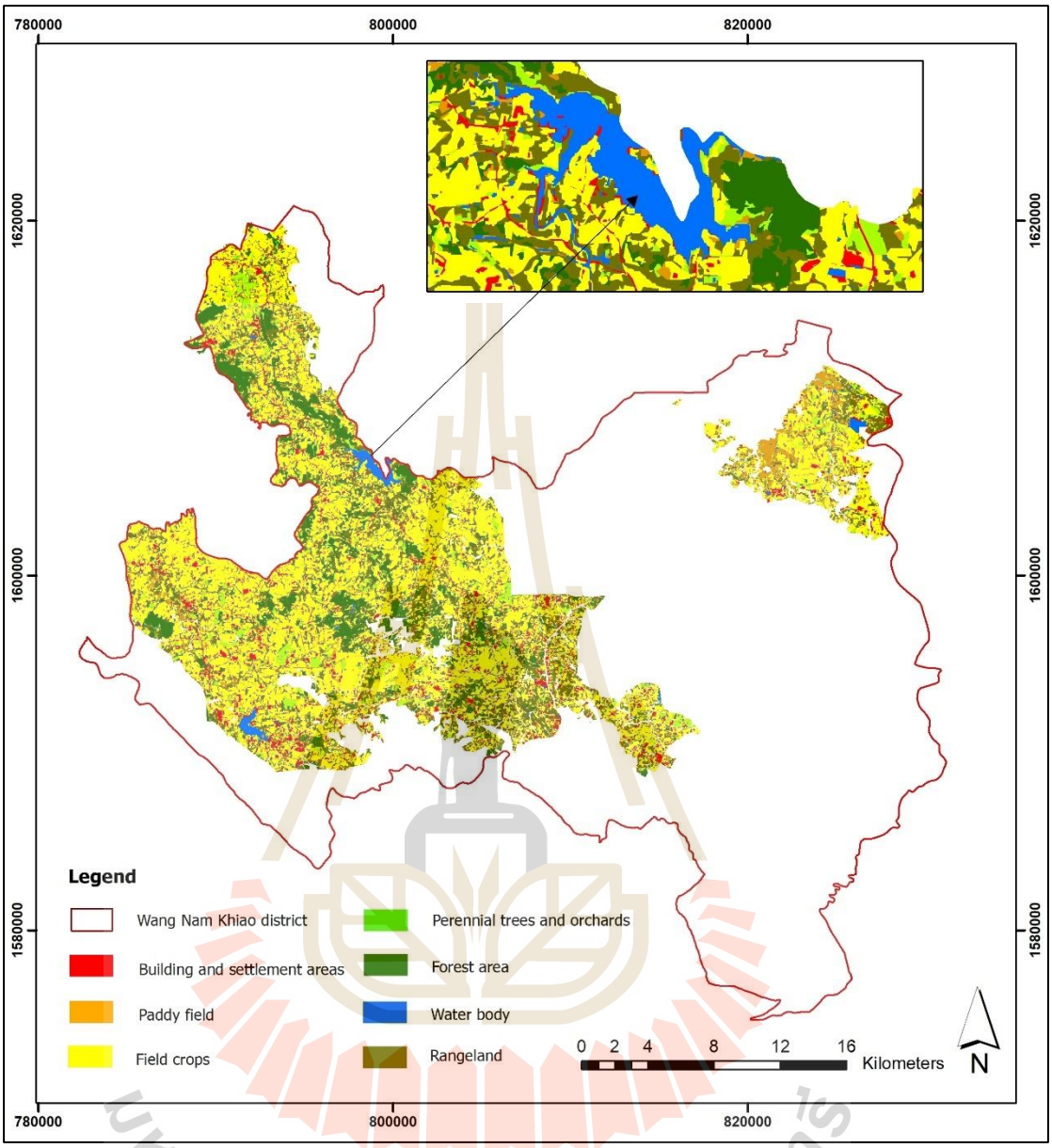


Figure 22 The spatial distribution of LULC types with the Bayes algorithm.

4.5.1.5 Land use classification with KNN classifier

The classified settlement and built-up areas, as one criterion for identifying incompliant land utilization in the ALRO area from the KNN algorithm deliver the area with a value of 36.30 sq. km or 8.96 percent. On the contrary, the classified water body from KNN delivers the area with a value of 8.56 sq. km or 2.11 percent. See Table 23.

Table 23 Area and percentage of LULC data with KNN algorithm.

No	LULC class	Area (Km^2)	Percent
1	Building and settlement areas	**36.30**	**8.96**
2	Paddy field	15.33	3.78
3	Field crops	240.03	59.22
4	Perennial trees and orchards	29.50	7.27
5	Forest area	28.97	7.15
6	Waterbody	**8.56**	**2.11**
7	Rangeland	46.67	11.51
Total			**100**

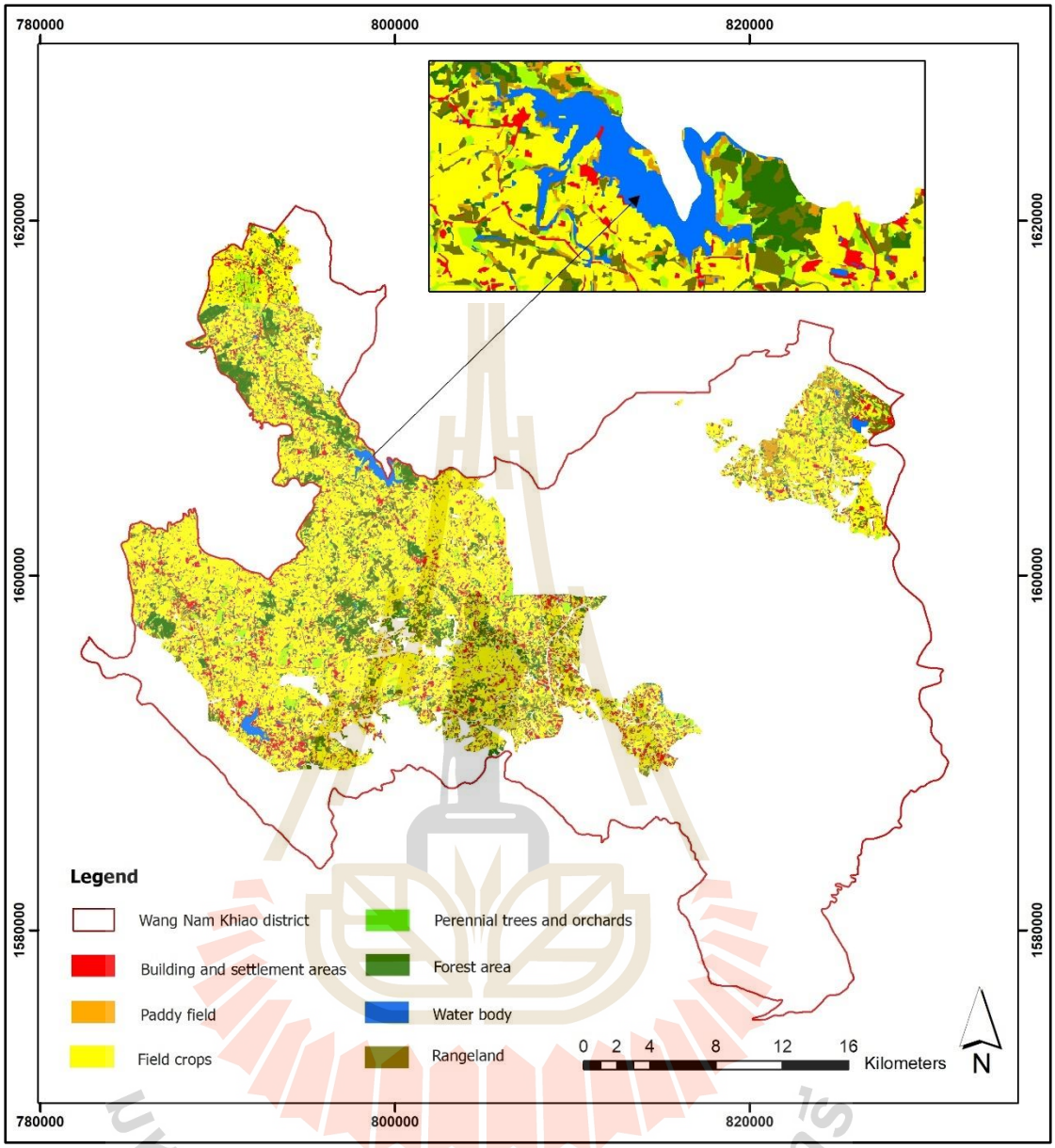


Figure 23 The spatial distribution of LULC types with the KNN algorithm.

As results mention in Section 4.5.1.1- 4.5.1.5, the classified settlement and built-up areas, as one criterion for identifying incompliant land utilization in the ALRO area from the DT algorithm, deliver the highest area with a value of 39.22 sq. km or 9.68 percent. On the contrary, the classified settlement and built-up areas from the Bayes algorithm deliver the lowest percentage with a value of 27.82 sq. km or 6.86 percent.

In addition, the classified water body, another criterion for identifying incompliant land utilization in the ALRO area from the Bayes algorithm, delivers the highest area with a value of 9.22 sq. km or 2.28 percent. On the contrary, the classified water body from the DT algorithm delivers the lowest area with a value of 7.71 sq. km or 1.90 percent.

Moreover, Figure 24 displays the proportional area of each land use type from the five selected algorithms. The result implies the characteristics of each algorithm, which requires different parameters and processes in different ways. Each algorithm has strengths and weaknesses. So, the optimum algorithm for LULC classification frequently requires thematic accuracy assessment.

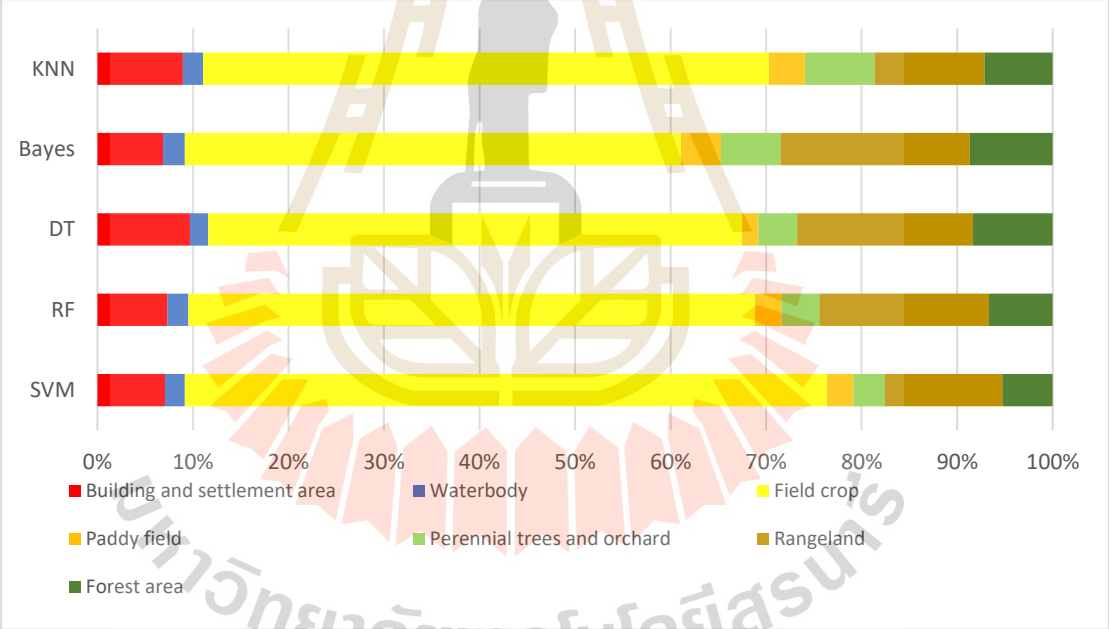


Figure 24 Proportional area of each land use type from the five algorithms.

4.5.2 Thematic accuracy assessment

The result of the thematic accuracy assessment of each algorithm (SVM, RF, DT, Bayes, and KNN) with error matrix and accuracy values are reported in Tables 29-33. Details of thematic accuracy assessment for LULC classification in the modeling area of each algorithm are described in the next section.

4.5.2.1 Accuracy assessment of SVM classifier

The overall accuracy and Kappa hat coefficient of all LULC classifications using SVM with linear kernel were 86.47% and 75.52%, respectively. The producer's accuracy (PA) of building and settlement areas is 71.15%, and the PA of water bodies is 80.00%. Meanwhile, the user's accuracy (UA) of building and settlement areas is 94.87%, and the UA of water bodies is 85.71%.

The error matrix reveals that there was confusion when classifying building and settlement areas from field crop, since the spectral value of some field crop areas are like building and settlement areas. Meanwhile, there was confusion when classifying water bodies from building and settlement areas and paddy fields because of the complexity of land use and land cover patterns. See details in Table 24

Table 24 Error Matrix and accuracy assessment of LULC map by SVM algorithm.

LULC type by SVM	Ground reference data using very high-resolution image							
	BS	PF	FC	PO	FA	WA	RL	SUM
Building and settlement areas (BS)	**37**		2					39
Paddy field (PF)	1	**10**	2	1	1	1	1	17
Field crop (FC)	7	2	**434**		1	2	1	447
Perennial tree and orchard (PO)	1	**3**	12	**18**	1		2	37
Forest area (FA)			**2**	1	**31**		6	40
Waterbody (WA)	1	1				**12**		14
Rangeland (RL)	5	4	27	4	**5**		**78**	123
Total	**52**	**20**	**479**	**24**	**39**	**15**	**88**	**717**
Producer's accuracy (PA) (%)	71.15	50.00	90.61	75.00	79.49	80.00	88.64	
User's accuracy (UA) (%)	94.87	58.82	97.09	48.65	77.50	85.71	63.41	
Overall accuracy (%)	**86.47**							
Kappa hat coefficient (%)	**75.52**							

Based on Anderson et al. (1976), the overall accuracy of the LULC map of more than 85% can provide an acceptable result. Thus, the classified LULC map by the SVM algorithm can be accepted in this study. In the meantime, the Kappa hat coefficient value between 40% to 80% represents moderate agreement or accuracy between the classified and the reference images (Fitzpatrick-Lins, 1981).

Furthermore, the derived thematic accuracy assessment of the SVM algorithm is consistent with the previous study of Tzotsos and Argialas (2008). They used the SVM algorithm to classify land cover, including woodland, grassland, impervious and water, using eCognition software under OBIA. The derived overall accuracy was 90.6%.

Likewise, the derived thematic accuracy assessment of the SVM algorithm in this study is consistent with the previous study of Ongsomwang (2023). He applied the SVM algorithm with linear function and default parameter and 29 spectral features (mean, standard deviation, and ratio) for classifying nine LULC types, including urban and built-up areas, paddy fields, field crops (e.g., cassava, sugarcane), perennial trees and orchards, forest land, shrubland and riverine forest, water bodies, marsh and swamp, and others, using Sentinel-2A at Chaloemprakiat district, Nakhon Ratchasima province. The derived overall accuracy and Kapa hat coefficient were 81.23% and 76.41%, respectively.

On the contrary, the accuracy of the classified LULC map by the SVM algorithm in this study is comparatively low compared to the previous study by Ongsomwang (2023). He applied an SVM algorithm with the Radial Basis function of EnMap Box software to classify 10 LULC classes, including (1) urban and built-up areas, (2) roads, (3) solar farms, (4) field crops, (5) eucalyptus plantation, (6) rubber plantation, (7) natural forest and plantation, (8) deteriorated forest, (9) waterbody, and (10) miscellaneous land, at Suranaree University of Technology (SUT) and its surrounding area, using Sentinel-2A images. The derived overall accuracy and Kapa hat coefficient were 94.03% and 92.83%, respectively.

4.5.2.2 Accuracy assessment of RF classifier

The overall accuracy and Kappa hat coefficient of all LULC classifications were 87.45% and 79.59%, respectively. The PA of building and settlement areas is 96.97%, and the PA of water bodies is 100.00%. The procedures of the RF algorithm with Sentinel data used are adequate for identifying building and settlement areas and water bodies in this study. Meanwhile, the UA of building and settlement areas is 57.14%, and the UA of water bodies is 93.75%.

The error matrix reveals confusion when classifying building and settlement areas from paddy fields, field crops, perennial trees and orchards and rangeland because of the complexity of land use and land cover pattern of these categories. In the meantime, there was confusion when classifying water bodies from paddy fields, since farm ponds frequently exist in paddy field areas. See details in Table 25.

Table 25 Error Matrix and accuracy assessment of LULC map by RF algorithm.

LULC type by RF	Ground reference data using very high-resolution image							
	BS	PF	FC	PO	FA	WA	RL	SUM
Building and settlement areas (BS)	**32**	2	14	1			7	56
Paddy field (PF)		**14**			1		5	20
Field Crop (FC)	1	1	**390**	12			18	422
Perennial tree and orchard (PO)			1	**21**	2		4	28
Forest Area (FA)			1	1	**37**		8	47
Waterbody (W)		1				**15**		16
Rangeland (RL)			1	6	3		**118**	128
Total	**33**	**18**	**407**	**41**	**43**	**15**	**160**	**717**
Producer's accuracy (%)	96.97	77.78	95.82	51.22	86.05	100	73.75	
User's accuracy (%)	57.14	70.00	92.42	75.00	78.72	93.75	92.19	
Overall accuracy (%)	**87.45**							
Kappa hat coefficient (%)	**79.59**							

Like the SVM algorithm, the overall accuracy of the classified LULC map by the RF algorithm of more than 85% can be accepted in this study (Anderson et al., 1976. In the meantime, the Kappa hat coefficient value between 40% to 80%

represents moderate agreement or accuracy between the classified and the reference images (Fitzpatrick-Lins, 1981).

Furthermore, the derived thematic accuracy assessment of the RF algorithm in this study is better than the previous study of Ongsomwang (2023). He applied RF algorithm with 50 decision trees and 29 spectral features (mean, standard deviation, and ratio) for classifying nine LULC types, including urban and built-up areas, paddy fields, field crops (e.g., cassava, sugarcane), perennial trees and orchards, forest land, shrubland and riverine forest, water bodies, marsh and swamp, and others, using Sentinel-2A at Chaloemprakiat district, Nakhon Ratchasima province. The derived overall accuracy and Kapa hat coefficient were 76.34% and 70.45%, respectively.

On the contrary, the accuracy of the classified LULC map with 150 decision trees under the Google Earth Engine (GEE), as pixel-based image analysis, to classify five land cover classes, including settlement, cropland, grassland, forest land, and wetland, using Sentinel-2A images. The derived overall accuracy and Kapa hat coefficient were 89.1% and 0.84, respectively.

Similarly, the accuracy of this classified LULC map by RF algorithm is comparatively low compared to the previous study by Ongsomwang (2023). He applied an RF algorithm with 500 decision trees of EnMap Box software to classify 10 LULC classes, including (1) urban and built-up areas, (2) roads, (3) solar farms, (4) field crops, (5) eucalyptus plantation, (6) rubber plantation, (7) natural forest and plantation, (8) deteriorated forest, (9) waterbody, and (10) miscellaneous land, at Suranaree University of Technology (SUT) and its surrounding area using Sentinel-2A images. The derived overall accuracy and Kapa hat coefficient were 93.20% and 91.84%, respectively.

4.5.2.3 Accuracy assessment of DT classifier

The overall accuracy and Kappa hat coefficient of all LULC classifications were 83.12% and 73.19%, respectively. The PA of building and settlement areas is 97.73%, and the PA of water bodies is 81.25%. The procedures of the DT algorithm with Sentinel data were used to adequately identify building and settlement areas and water bodies in this study. Meanwhile, the UA of building and settlement areas is 61.42%, and the UA of water bodies is 92.86%.

The error matrix reveals confusion when classifying building and settlement areas from field crops, perennial trees, orchards, and rangeland because of the complexity of land use and land cover patterns. In the meantime, there was confusion when classifying water bodies from paddy fields, since farm ponds frequently exist in paddy field areas. See details in Table 26.

Table 26 Error Matrix and accuracy assessment of LULC map by DT algorithm.

LULC type by DT	Ground reference data using very high-resolution image							
	BS	PF	FC	PO	FA	WA	RL	SUM
Building and settlement areas (BS)	**43**		18	3			6	70
Paddy field (PF)		**9**	1			2		12
Field Crop (FC)	1	1	**371**	12	3	1	11	400
Perennial tree and orchard (PO)			3	**19**	2		5	29
Forest Area (FA)			1	5	**39**		15	60
Waterbody (WA)		1				**13**		14
Rangeland (RL)		1	17	7	5		**102**	132
Total	**44**	**12**	**411**	**46**	**49**	**16**	**139**	**717**
Producer's accuracy (%)	97.73	75.00	90.27	41.30	79.59	81.25	73.38	
User's accuracy (%)	61.43	75.00	92.75	65.52	65.00	92.86	77.27	
Overall accuracy (%)	**83.12**							
Kappa hat coefficient (%)	**73.19**							

As a result, the Kappa hat coefficient value between 40% to 80% represents moderate agreement or accuracy between the classified and the reference images (Fitzpatrick-Lins, 1981).

Furthermore, the derived thematic accuracy assessment of the DT algorithm in this study is better than the previous study of Ongsomwang (2023). He applied DT algorithm with default parameter and 29 spectral features (mean, standard deviation, and ratio) for classifying nine LULC types, including urban and built-up areas, paddy fields, field crops (e.g., cassava, sugarcane), perennial trees and orchards, forest land, shrubland and riverine forest, water bodies, marsh and swamp, and others, using Sentinel-2A at Chaloemprakiat district, Nakhon Ratchasima province. The derived overall accuracy and Kapa hat coefficient were 72.08% and 65.19%, respectively.

4.5.2.4 Accuracy assessment of Bayes classifier

The overall accuracy and Kappa hat coefficient of all LULC classifications were 84.80% and 76.85%, respectively. The PA of building and settlement areas is 100.00%, and the PA of water bodies is 94.12%. The procedures of the Bayes algorithm with Sentinel data used are adequate for identifying building and settlement areas and water bodies in this study. Meanwhile, the UA of building and settlement areas is 62.00%, and the UA of water bodies is 94.12%.

The error matrix reveals confusion when classifying building and settlement areas from paddy fields, field crops, perennial trees, orchards and rangeland because of the complexity of land use and land cover pattern of these categories. In the meantime, there was confusion when classifying water bodies from perennial trees and orchards since farm ponds frequently exist in orchard areas. See details in Table 27.

Table 27 Error Matrix and accuracy assessment of LULC map by Bayes algorithm.

LULC type by Bayes	Ground reference data using very high-resolution image							
	BS	PF	FC	PO	FA	WA	RL	SUM
Building and settlement areas (BS)	**31**	1	12	1			5	50
Paddy field (PF)		**14**	10		1	1	4	30
Field Crop (FC)			**358**	5	2		6	371
Perennial tree and orchard (PO)			3	**31**	4		7	45
Forest Area (FA)			1	2	**51**		9	63
Waterbody (WA)				1		**16**		17
Rangeland (RL)		3	16	7	8		**107**	141
Total	**31**	**18**	**400**	**47**	**66**	**17**	**138**	**171**
Producer's accuracy (%)	100	77.78	89.50	65.96	77.27	94.12	77.54	
User's accuracy (%)	62.00	46.67	96.50	68.89	80.95	94.12	75.89	
Overall accuracy (%)	**84.80**							
Kappa hat coefficient (%)	**76.85**							

As a result, the Kappa hat coefficient value between 40% to 80% represents moderate agreement or accuracy between the classified and the reference images (Fitzpatrick-Lins, 1981).

Furthermore, the derived thematic accuracy assessment of the Bayes algorithm in this study is better than the previous study of Ongsomwang (2023). He applied Bayes algorithm with default parameter and 29 spectral features (mean, standard deviation, and ratio) for classifying nine LULC types, including urban and built-up areas, paddy fields, field crops (e.g., cassava, sugarcane), perennial trees and orchards, forest land, shrubland and riverine forest, water bodies, marsh and swamp, and others, using Sentinel-2A at Chaloemprakiat district, Nakhon Ratchasima province. The derived overall accuracy and Kapa hat coefficient were 68.14% and 60.87%, respectively.

4.5.2.5 Accuracy assessment of KNN classifier

The overall accuracy and Kappa hat coefficient of all LULC classifications were 77.27% and 64.00%, respectively. The PA of building and settlement areas is 94.59%, and the PA of water bodies is 83.33%. The procedures of the Bayes algorithm and Sentinel data used are adequate for identifying building and settlement areas and water bodies in this study. Meanwhile, the UA of building and settlement areas is 53.85%, and the UA of water bodies is 100.00%.

The error matrix reveals confusion when classifying building and settlement areas from paddy fields, field crops, perennial trees, orchards and rangeland because of the complexity of land use and land cover pattern of these categories. See details in Table 28.

Table 28 Error Matrix and accuracy assessment of LULC map by KNN algorithm.

LULC type by KNN	Ground reference data using very high-resolution image							
	BS	PF	FC	PO	FA	WA	RL	SUM
Building and settlement areas (BS)	**35**	1	18	1			10	65
Paddy field (PF)	1	**11**	5			3	7	27
Field Crop (FC)	1		**365**	19			38	423
Perennial tree and orchard (PO)		3	5	**27**	4		13	52
Forest Area (FA)		1	1	2	**33**		15	52
Waterbody (WA)						**15**		15
Rangeland (RL)			5	2	8		**68**	83
Total	**37**	**16**	**399**	**51**	**45**	**18**	**151**	**717**
Producer's accuracy (%)	94.59	68.75	91.48	52.94	73.33	83.33	45.03	
User's accuracy (%)	53.85	40.74	86.29	51.92	63.46	100	81.93	
Overall accuracy (%)	**77.27**							
Kappa hat coefficient (%)	**64.00**							

According to Fitzpatrick-Lins (1981), the Kappa hat coefficient value between 40% to 80% represents moderate agreement or accuracy between the classified and the reference images.

Furthermore, the derived thematic accuracy assessment of the KNN algorithm in this study is better than the previous study of Ongsomwang (2023). He applied KNN algorithm with default parameter and 29 spectral features (mean, standard deviation, and ratio) for classifying nine LULC types, including urban and built-up areas, paddy fields, field crops (e.g., cassava, sugarcane), perennial trees and orchards, forest land, shrubland and riverine forest, water bodies, marsh and swamp, and others, using Sentinel-2A at Chaloemprakiat district, Nakhon Ratchasima province. The derived overall accuracy and Kapa hat coefficient were 70.82% and 63.33%, respectively.

4.5.3 Comparison of accuracy assessment and pair-wise Z-Test

The derived accuracy values from five selected algorithms for LULC classification are compared, as shown in Table 29. The overall accuracy values of the LULC maps with the SVM, RF, DT, Bayes, and KNN classification algorithms are 86.47%, 87.45%, 83.12%, 84.80% and 77.27%, respectively. Meanwhile, the Kappa hat

coefficient values of those LULC maps are 75.52%, 79.57%, 73.19%, 76.85% and 64.00%, respectively.

Table 29 Comparison of machine learning classification algorithm.

Algorithm	Overall accuracy (%)	Kappa hat coefficient (%)
Random Forest	87.45	79.57
Bayes	84.80	76.85
Support Vector Machine	86.47	75.52
Decision Tree	83.12	73.19
K Nearest Neighbor	77.27	64.00

As a result, the RF algorithm delivers the highest overall accuracy and Kappa hat coefficient. On the contrary, the KNN algorithm distributes the lowest overall accuracy and Kappa hat coefficient.

Furthermore, the result of the pair-wise Z statistical test of the Kappa hat coefficient and its variance between five algorithms (SVM, RF, DT, Bayes, and KNN) is reported in Table 30.

Table 30 Pair-wise Z statistical test of the Kappa hat coefficient and its variance between RF and other algorithms.

Pair-wise Z test	Kappa hat	Variance	Z-Statistic	Confidential level of critical value			
				80%	90%	95%	100%
RF	0.795703	0.000378	0.980539	1.28	1.65	1.96	2.58
BAYES	0.768490	0.000392					
RF	0.795703	0.000378	1.372873	1.28*	1.65	1.96	2.58
SVM	0.755218	0.000492					
RF	0.795703	0.000378	2.205099	1.28*	1.65*	1.96*	2.58
DT	0.731916	0.000459					
RF	0.795703	0.000378	5.130398	1.28*	1.65*	1.96*	2.58*
KNN	0.640043	0.000543					

Note: * It is a significant difference between Kappa hat coefficients.

According to the pair-wise Z-test, the highest Kappa hat coefficient value of the RF algorithm is significantly different from SVM at an 80% confidential level. The RF algorithm significantly differs from DT at 80%, 90% and 95% confidential levels. The RF algorithm is significantly different from KNN at different confidential levels. Meanwhile, the Kappa hat coefficient value of the RF algorithm is insignificantly different from the Bayes algorithm at different confidential levels.

Still, the overall accuracy and Kappa hat coefficient value of the RF algorithm is higher than the Bayes algorithm. Thus, the most suitable algorithm for LULC classification in this study was the RF algorithm because the RF can provide the highest overall accuracy and Kappa hat coefficient than others. See details in Table 35. The classified LULC data from the RF algorithm was applied to detect incompliant ALRO plots in the modeling area.

4.6 Incompliant land utilization detection in ALRO plots in the modeling area

The results of incompliant land utilization detection in each ALRO plot using overlay analysis between the ALRO plots and the percentage of building and settlement area of more than 10% or water bodies of more than 5% based on the classified LULC data of the RF are separately displayed in Figure 25 and Figure 26, respectively. The number of incompliant and compliant plots using two criteria (percentage of building and settlement area and water bodies) are reported in Table 31.

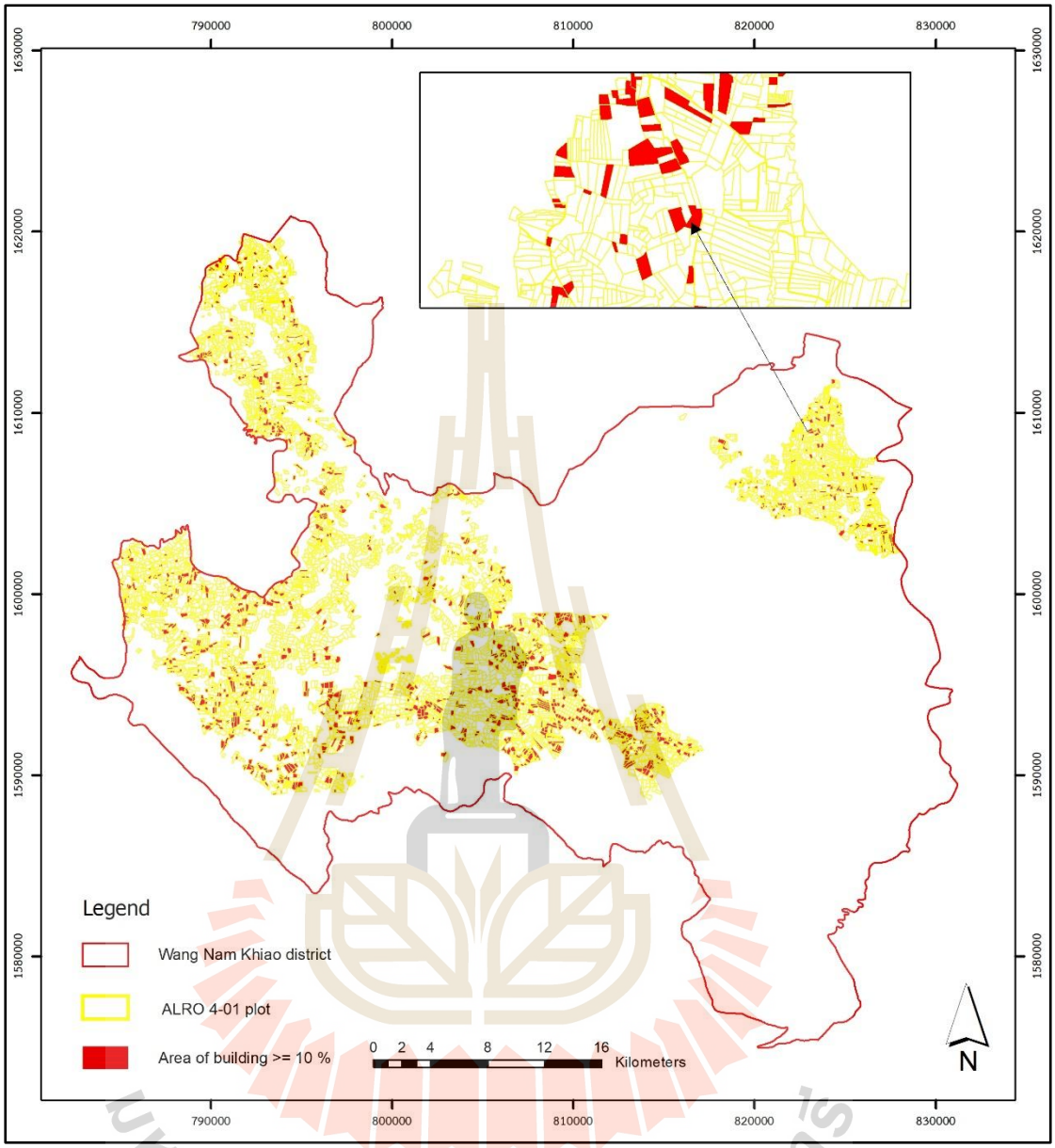


Figure 25 Incompliant land utilization plots based on the percent of building and settlement area more than 10% in each plot in the modeling area.

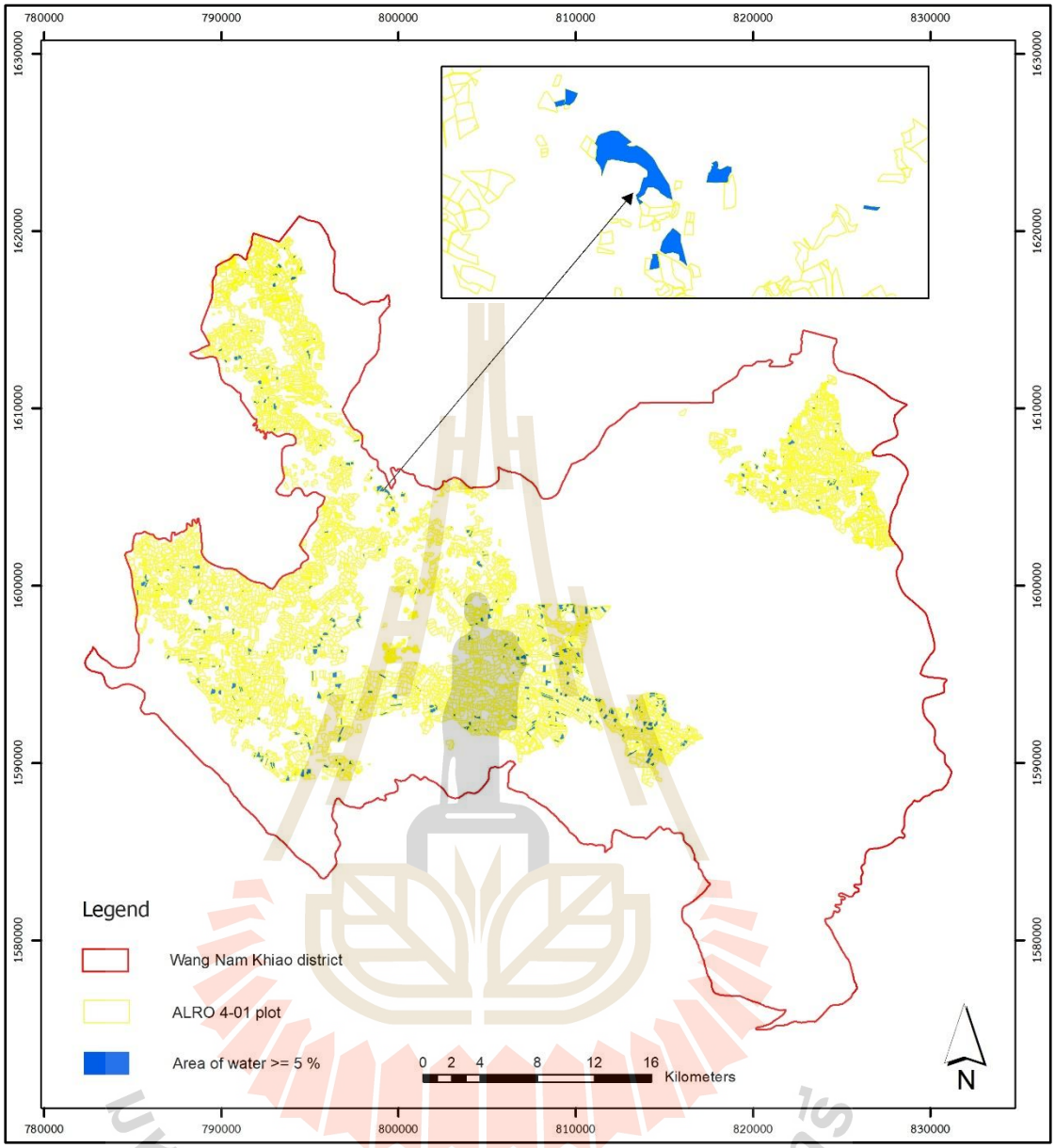


Figure 26 Incompliant land utilization plots based on the percent of waterbody area more than 5 % in each plot in the modeling area.

Table 31 Number and percentage of incompliant and compliant land utilization detection in ALRO plots based on two criteria in the modeling area.

Criteria	Incompliant utilization		Compliant land utilization		Total
	No. of Plots	Percent	No. of Plots	Percent	
Building and settlement area	1770	21.94	6297	78.06	8067
Waterbody	436	5.40	7631	94.60	8067

The incompliant and compliant land utilization in each ALRO plot based on the percentage of building and settlement area and water body area was further verified based on visual interpretation using very high-resolution images, as shown in Figure 27 and Figure 28, respectively. Examples of field surveys in the modeling area, Wang Nam Khiao district, are displayed in Appendix C.

In the meantime, the incompliant and compliant data from visual interpretation using very high-resolution images were used to create a binary error matrix for describing the sensitivity, specificity, predicted positive, predicted negative, and prevalence. Tables 32-33 show the binary error matrix of the incompliant and compliant data based on the percentage of building and settlement area and water body area, respectively.

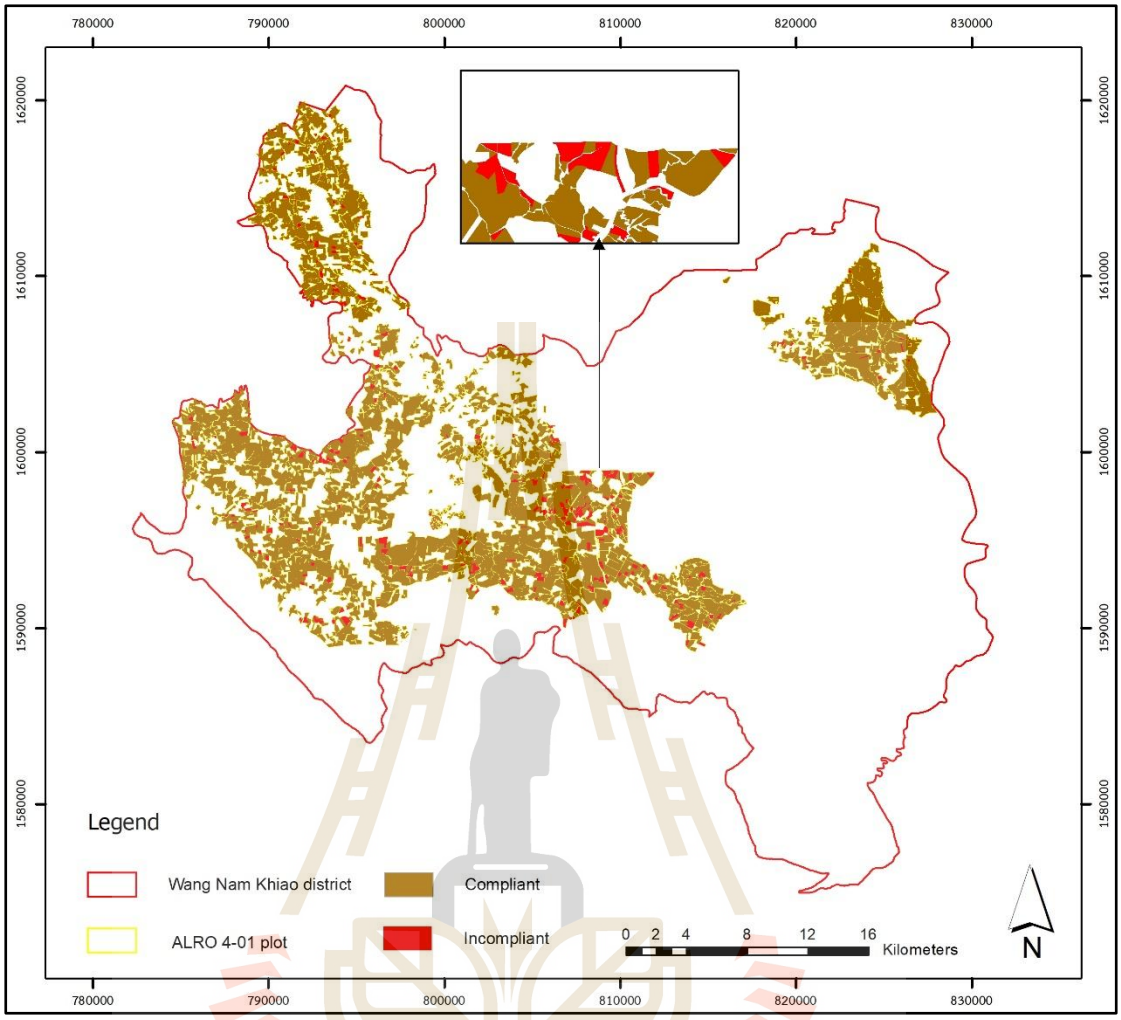


Figure 27 Verified incompliant and compliant land utilization detection based on the percentage of building and settlement area criteria in the modeling area.

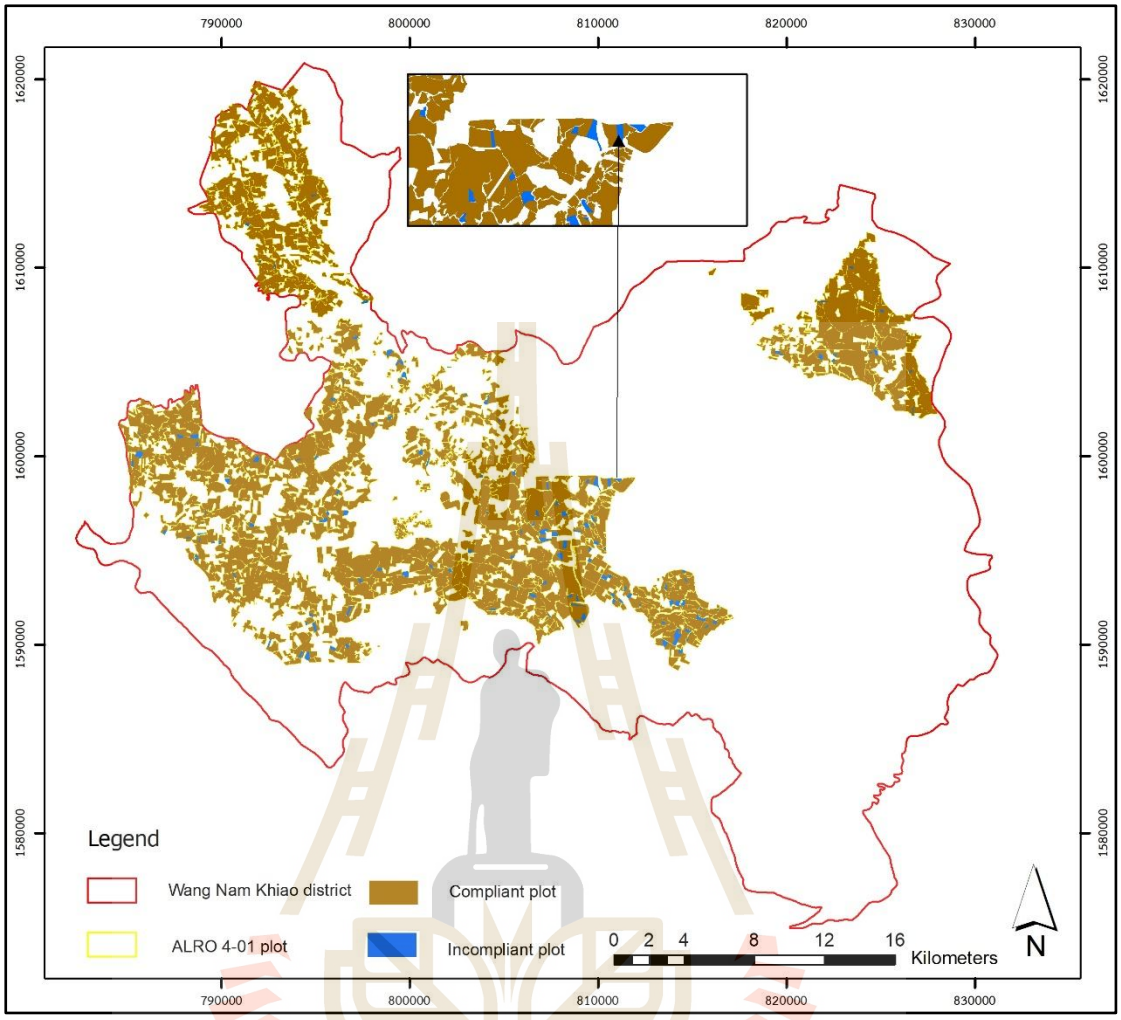


Figure 28 Verified incompliant and compliant land utilization detection based on the percentage of water body area criteria in the modeling area.

Table 32 Binary error matrix for describing the sensitivity, specificity, predicted positive, predicted negative, and prevalence of incompliant and compliant land utilization based on the building and settlement area criteria in the modeling area.

Binary error matrix	Reference of incompliant land utilization	Reference of compliant land utilization	Total
Extracted incompliant land utilization	394	1376	1770
Extracted compliant land utilization	18	6279	6297
Total	**412**	**7655**	**8067**
Sensitivity	95.63%		
Specificity	82.02%		
Predicted positive	22.26%		
Predicted negative	99.71%		
Prevalence	5.11%		

Table 33 Binary error matrix for describing the sensitivity, specificity, predicted positive, predicted negative, and prevalence of incompliant and compliant land utilization based on the criteria of the water body area in the modeling area.

Binary error matrix	Reference of incompliant land utilization	Reference of compliant land utilization	Total
Extracted incompliant land utilization	150	286	436
Extracted compliant land utilization	16	7615	7631
Total	**166**	**7901**	**8067**
Sensitivity	90.36%		
Specificity	96.38%		
Predicted positive	34.40%		
Predicted negative	99.79%		
Prevalence	2.06%		

As a result, the percentage of incompliant land utilization detection from the classified LULC map based on the criteria of building and settlement and water bodies areas was 21.94% and 5.40%, respectively. See Table 36.

Furthermore, the result of the binary error matrix for incompliant and compliant land utilization detection of both criteria (building and settlement and water bodies areas) based on visual interpretation using very high-resolution images and ground survey in 2024 is shown in Tables 31-32

The sensitivity values of incompliant land utilization detection using criteria of building and settlement area, and water body area were 98.06% and 93.89%, respectively. Meanwhile, the specificity values of compliant land utilization detection using criteria of building and settlement area, and water body area were 87.98% and 97.57%, respectively. These values represent the producer's accuracy for incompliant and compliant land utilization based on overlay analysis between classified LULC data and ALRO's plots. The producer's accuracy values for detecting incompliant land utilization from two criteria deliver a high accuracy level, with a value of about 98% and about 94%, respectively. Meanwhile, the producer's accuracy values for detecting compliant land utilization from two criteria deliver a high accuracy level, with a value of about 88% and 98%, respectively.

At the same time, the predicted positive values of incompliant land utilization detection using criteria of building and settlement area, and water body areas were 51.53% and 56.42%, respectively. While predicted negative value of compliant land utilization detection using criteria of building and settlement and water body areas were 99.71% and 99.79%, respectively. The positive and negative predicted values represent the user's accuracy for incompliant and compliant land utilization based on overlay analysis between classified LULC data and ALRO's plots. The user's accuracy values for detecting incompliant land utilization from two criteria deliver a moderate accuracy level, with about 52% and 56% values, respectively. Simultaneously, the user's accuracy values for detecting compliant land utilization from two criteria deliver a high accuracy level, with values of about 100% and 100%.

In addition, the prevalence, which represents the amount of incompliant land utilization detection using building and settlement area criteria, delivers a value of 11.53% or 930 plots. Meanwhile, the amount of incompliant land utilization detection using criteria of water body area provides a value of 3.25% or 262 plots.

As a result of the analysis of the binary error matrix based on building and settlement area and waterbody area criteria (Tables 37-38), the limited satellite image resolution of Sentinel-2A imagery (10 meters) may hinder the accurate classification of small-scale features and fine-grained land use details. Additionally, the complex land

use patterns with agricultural buildings in Wang Nam Khiao district may introduce errors in detecting incompliant land utilization.

4.7 Validation of an optimum algorithm for LULC classification, accuracy assessment and incompliant land utilization detection in the testing area

4.7.1 LULC classification and thematic accuracy assessment

The result of classified LULC data using the RF classifier as the optimum algorithm in Pak Chong District is displayed in Figure 29. Meanwhile, the area and percentage of LULC data are presented in Table 34. It should be noted that only six LULC classes, including building and settlement areas, field crops, perennial trees and orchards, forest areas, water bodies, and rangeland, were covered in the testing area.

As one criterion for identifying incompliant land utilization, the classified settlement and built-up areas covered an area of 75.87 sq. km or 12.80 percent. On the contrary, the classified water body as one criterion for identifying incompliant land utilization covered 11.33 sq. km or 1.91 percent.

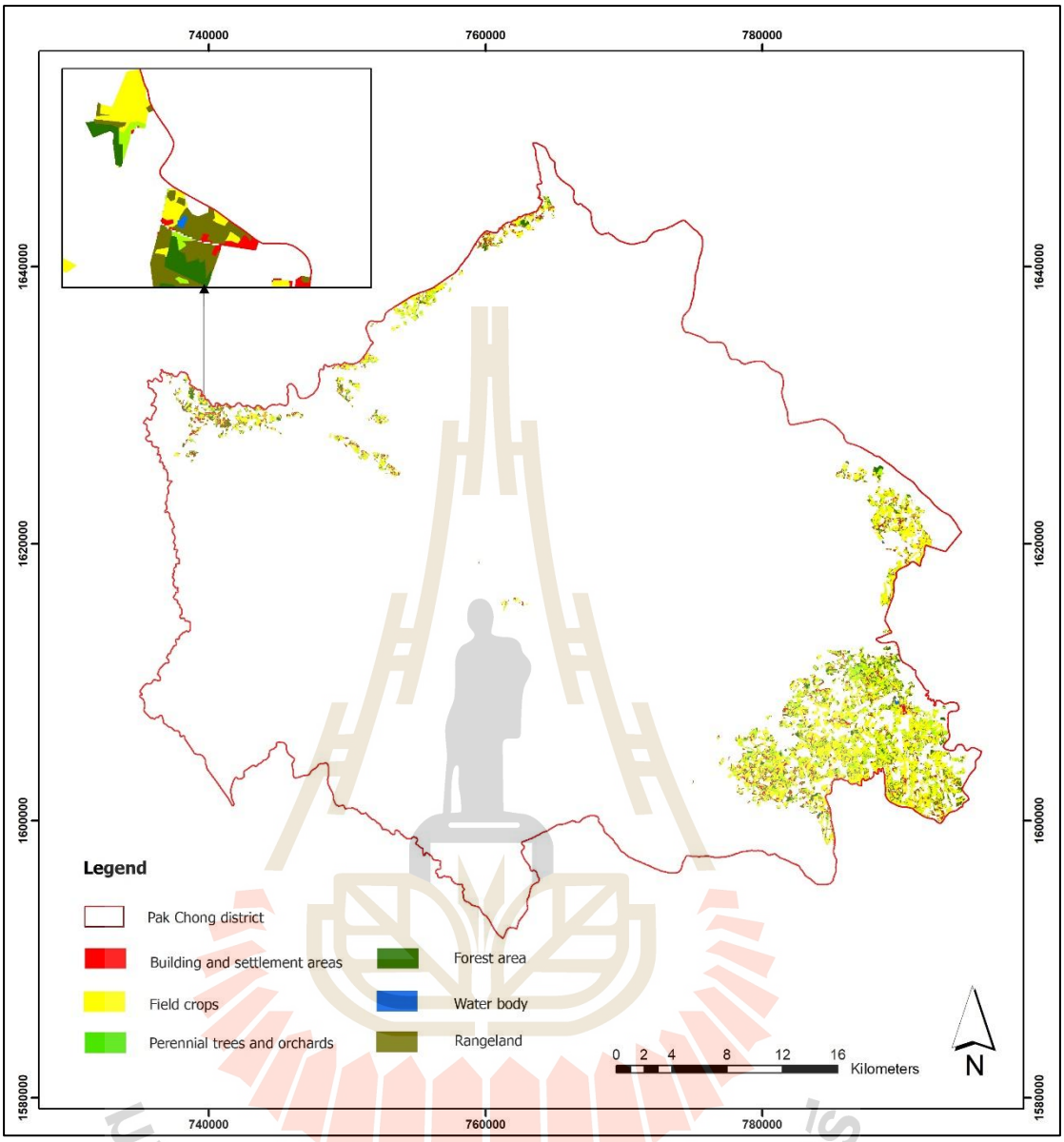


Figure 29 The spatial distribution of LULC types in the testing area.

Table 34 Area and percentage of LULC data in the testing area.

No	LULC class	Area (Km^2)	Percent
1	Building and settlement areas	75.87	12.80
2	Field crops	187.28	31.60
3	Perennial trees and orchards	101.17	17.07
4	Forest area	93.10	15.71
5	Waterbody	11.33	1.91
6	Rangeland	123.87	20.90
Total		**592.62**	**100**

The result of the thematic accuracy assessment of the classified LULC map in the testing area using the RF algorithm with error matrix and accuracy values are reported in Table 35. As a result, the overall accuracy and Kappa hat coefficient of the LULC map were 85.21% and 81%, respectively. Meanwhile, the PA for building and settlement areas is 66.67%, and the PA for water bodies is 85.71%. Meanwhile, the UA of building and settlement areas is 96.77%, and the UA of water bodies is 100%.

The error matrix reveals confusion when classifying building and settlement areas from field crops, orchards, and water bodies because of the complexity of land use and land cover pattern of these categories. In the meantime, there was no confusion when classifying water bodies from the others. See details in Table 40.

Furthermore, the result of the pair-wise Z test between the Kappa hat coefficient of the classified LULC with the RF algorithm in the modeling and testing areas is reported in Table 36. As a result, the Kappa hat coefficient value of the classified LULC in the testing area is insignificantly different from the Kappa hat coefficient value of the classified LULC map in the modeling area at different confidential levels. So, the result of the classified LULC map in the testing area using optimum object features and RF algorithm can be validated. This finding infers that the optimum object features and algorithm in the modeling area (Wang Nam Khiao district) can be directly transferred (transferability) for LULC classification in the testing area (Pak Chong district).

Table 35 Error Matrix and accuracy assessment of LULC map in the testing area.

LULC type by RF	Ground reference data using very high-resolution image						
	BS	FC	PO	FA	WA	RL	SUM
Building and settlement areas (BS)	**60**	1			1		62
Field Crop (FC)	18	**209**	13	1		7	248
Perennial tree and orchard (PO)	3	2	**101**	6		6	118
Forest Area (FA)		5		**95**		12	112
Waterbody (WA)					**12**		12
Rangeland (RL)	9	5	6	8	1	**122**	151
Total	**90**	**222**	**120**	**110**	**14**	**147**	**703**
Producer's accuracy (%)	66.67	94.14	86.17	86.36	85.71	82.99	
User's accuracy (%)	96.77	84.27	85.59	84.82	100.00	80.79	
Overall accuracy (%)	**85.21**						
Kappa hat coefficient (%)	**81.00**						

Table 36 Pair-wise Z test of Kappa hat coefficient value for LULC extraction by RF algorithm in modeling and testing area.

Pair-wise Z test	Kappa- hat	Variance	Z-Statistic	Confidential level of critical value			
				80%	90%	95%	100%
Model area	0.795703	0.000378	0.605330	1.28	1.65	1.96	2.58
Testing area	0.809964	0.000177					

4.7.2 Incompliant land utilization detection in ALRO plots in the testing area

The result of incompliant land utilization in each ALRO plot using overlay analysis between the ALRO plot and the percentage of building and settlement area of more than 10% or water bodies of more than 5% are shown in Figures 30-31 and Table 37.

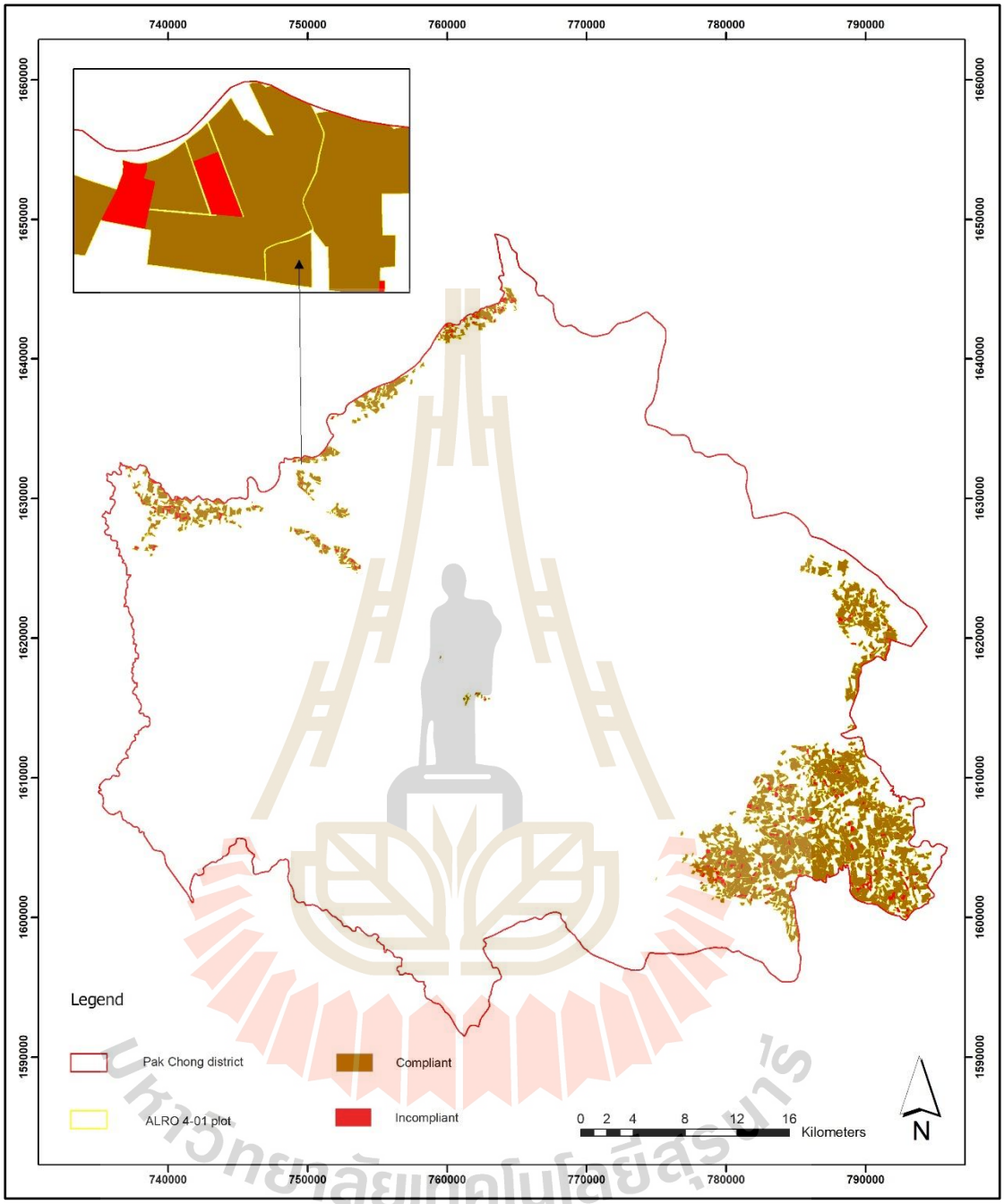


Figure 30 Incompliant land utilization plots based on the percent of building and settlement area more than 10% in each plot in the testing area.

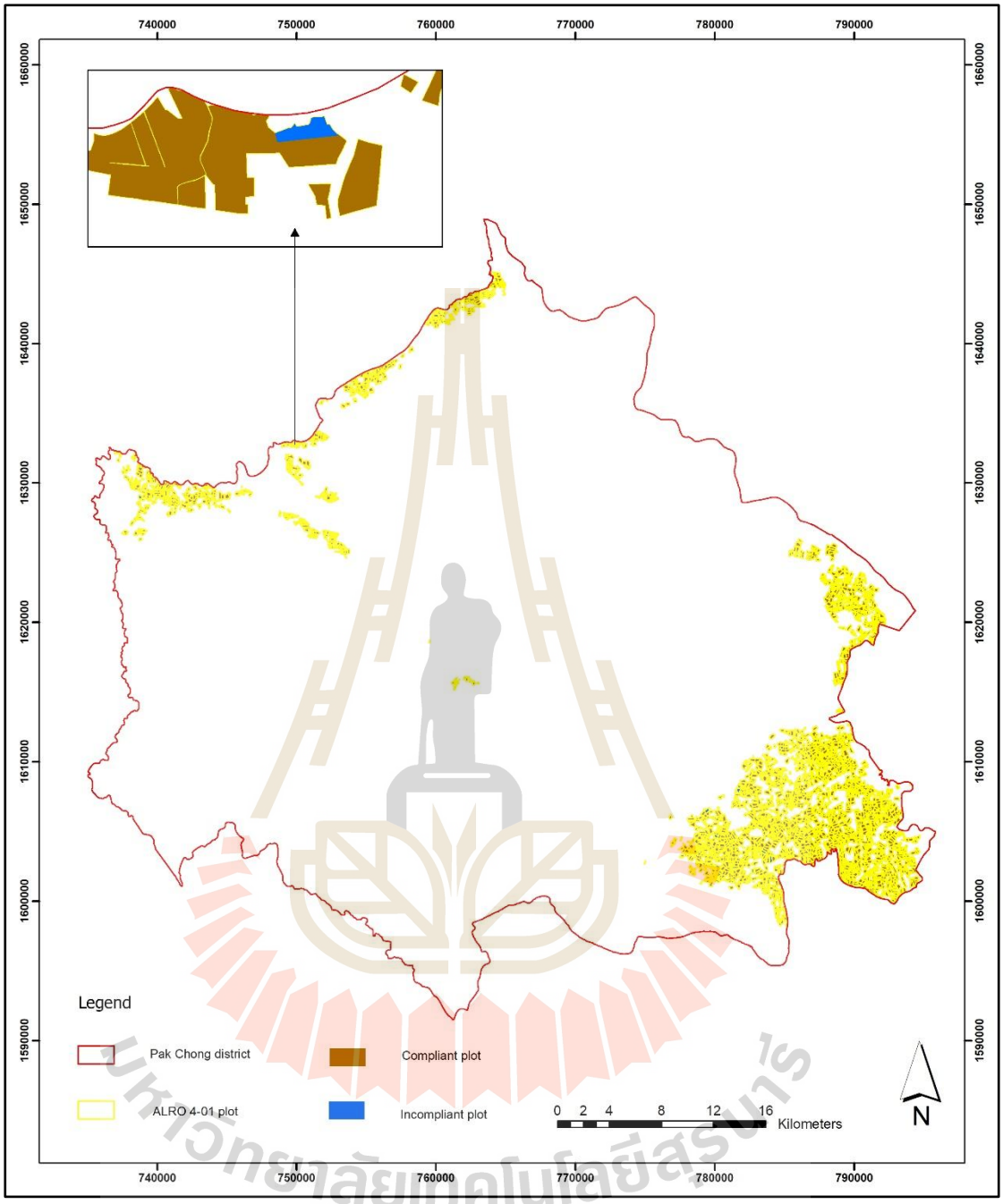


Figure 31 Incompliant land utilization plots based on the percent of waterbody area more than 5% in each plot in the testing area.

Table 37 Number and percentage of incompliant and compliant land utilization detection in ALRO plots based on two criteria in the testing area.

Criteria	Incompliant land utilization		Compliant utilization		Total
	No. of Plots	Percent	No. of Plots	Percent	
Building and settlement area	1213	30.1	2814	69.87	4027
Waterbody	107	2.65	3920	97.34	4027

As a result, the percentage of incompliant and compliant land utilization detection for building and settlement areas is 30.05% and 69.95%, respectively. In the meantime, the percentage of incompliant and compliant land utilization detection for water bodies with values of 2.66% and 97.34%, respectively.

The incompliant and compliant land utilization in each ALRO plot based on the percentage of building and settlement area and water body area was further verified based on visual interpretation using very high-resolution images in 2022, as results shown in Figure 32 and Figure 33, respectively. Examples of field surveys in the testing area, Pak Chong district, are displayed in Appendix D.

After that, the incompliant and compliant data from visual interpretation using very high-resolution images in 2022 were used to create a binary error matrix for describing the sensitivity, specificity, predicted positive, predicted negative, and prevalence as summarized in Tables 38-39.

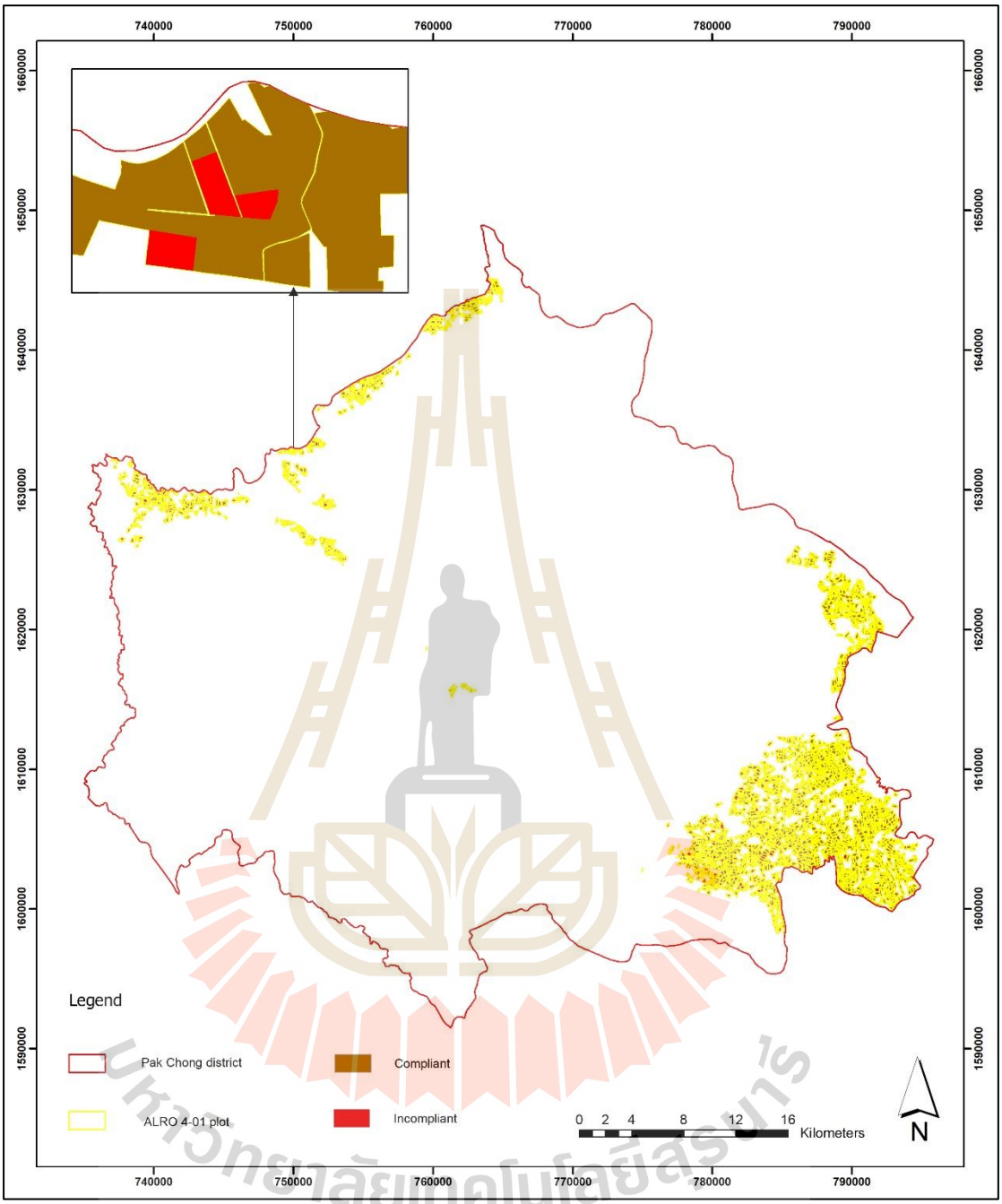


Figure 32 Verified compliant and incompliant land utilization detection based on the percentage of building and settlement area criteria in the testing area.

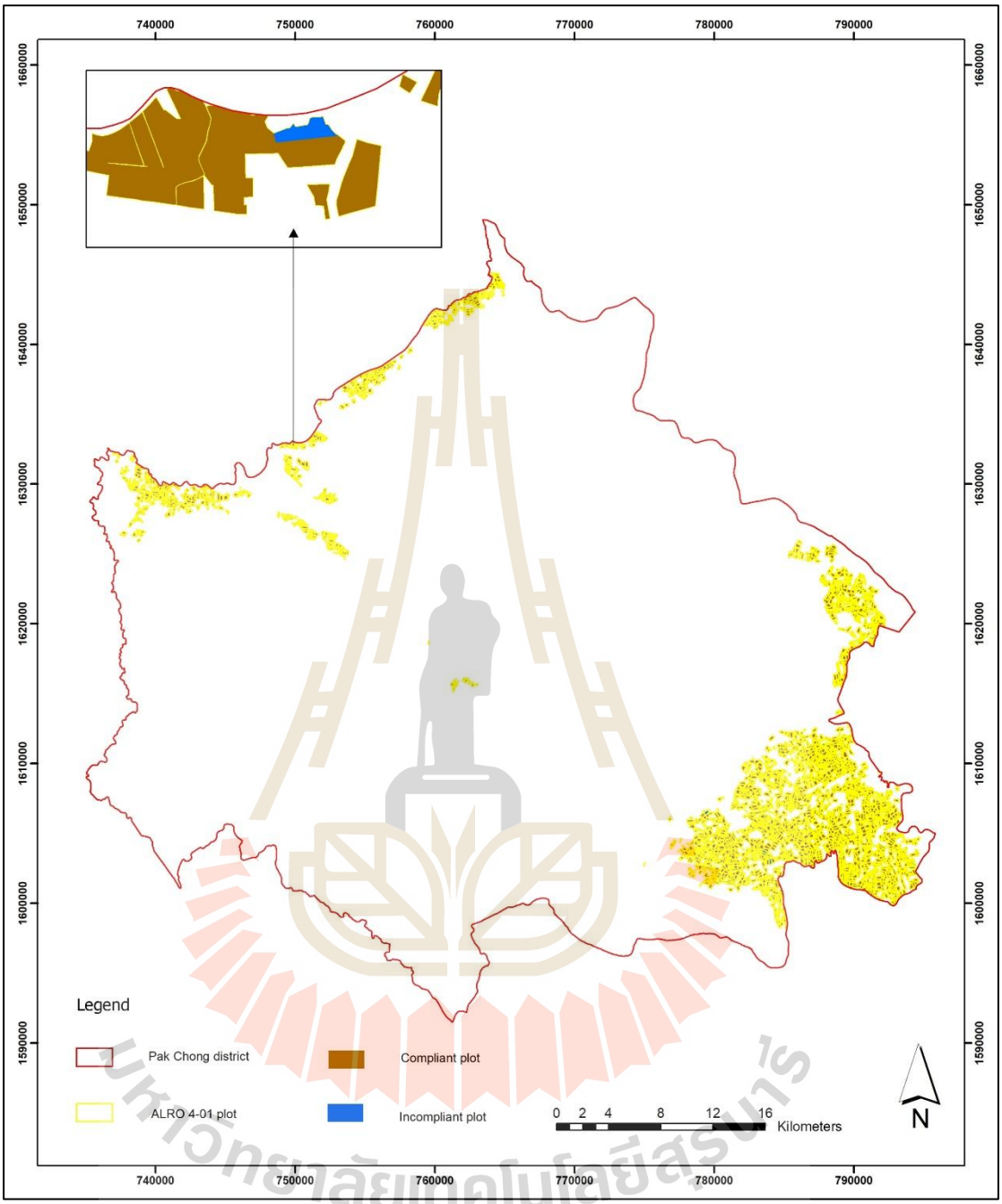


Figure 33 Verified compliant and incompliant land utilization detection based on the percentage of water body area criteria in the testing area.

Table 38 Binary error matrix for describing the sensitivity, specificity, predicted positive, predicted negative, and prevalence of incompliant and compliant land utilization based on the building and settlement area criteria in the testing area.

Binary error matrix	Reference of incompliant land utilization	Reference of compliant land utilization	Total
Extracted incompliant land utilization	364	849	1213
Extracted compliant land utilization	7	2807	2814
Total	**371**	**3656**	**4027**
Sensitivity	97.82%		
Specificity	77.70%		
Predicted positive	33.42%		
Predicted negative	99.68%		
Prevalence	10.27%		

Table 39 Binary error matrix for describing the sensitivity, specificity, predicted positive, predicted negative, and prevalence of incompliant and compliant land utilization based on the criteria of the water body area in the testing area.

Binary error matrix	Reference of incompliant land utilization	Reference of compliant land utilization	Total
Extracted incompliant land utilization	47	60	107
Extracted compliant land utilization	3	3917	3920
Total	**50**	**3977**	**4027**
Sensitivity	94.00%		
Specificity	98.49%		
Predicted positive	43.93%		
Predicted negative	99.92%		
Prevalence	1.24%		

The sensitivity values of incompliant land utilization detection using criteria of building and settlement area, and water body area were 98.85% and 96.10%, respectively. Meanwhile, the specificity values of compliant land utilization detection using criteria of building and settlement area, and water body area were 86.55% and 99.16%, respectively. These values represent the producer's accuracy for incompliant and compliant land utilization based on overlay analysis between classified LULC data

and ALRO's plots. The producer's accuracy values for detecting incompliant land utilization from two criteria deliver a high accuracy level, with a value of about 99% and about 96%, respectively. Meanwhile, the producer's accuracy values for detecting compliant land utilization from two criteria deliver a high accuracy level, with a value of about 87% and about 99%, respectively.

At the same time, the predicted positive values of incompliant land utilization detection using criteria of building and settlement area, and water body areas were 63.94% and 69.16%, respectively. While predicted negative value of compliant land utilization detection using criteria of building and settlement and water body areas were 99.68% and 99.92%, respectively. The positive and negative predicted values represent the user's accuracy for incompliant and compliant land utilization based on overlay analysis between classified LULC data and ALRO's plots. The user's accuracy values for detecting incompliant land utilization from two criteria deliver a moderate accuracy level, with 64% and 69% values. Simultaneously, the user's accuracy values for detecting compliant land utilization from two criteria deliver a high accuracy level, with values of about 100% and 100%.

In addition, the prevalence, which represents the amount of incompliant land utilization detection using criteria of building and settlement area, delivers a value of 19.44% or 782 plots. Meanwhile the amount of incompliant land utilization detection using criteria of water body area provides a value of 1.91% or 77 plots.

Like Wang Nam Khiao district, the limited satellite image resolution of Sentinel-2A imagery (10 meters) may hinder the accurate classification of small-scale features and fine-grained land use details. The complex land use patterns with agricultural buildings in Pak Chong district may introduce errors in detecting incompliant land utilization.

CHAPTER V
CONCLUSION AND RECOMMENDATION

This study examines the capability of the machine learning algorithm under object-based image analysis of the eCognition software for classifying land use and detecting incompliant land utilization in the ALRO area from free-downloaded remote sensing data with specific rules of ALRO. Thus, this chapter summarizes the findings and results according to the study's research objectives.

5.1 Conclusion

(1) The optimum scale, shape and compactness parameters for multiresolution segmentation of eCognition software based on Sentinel-2A images are 25, 0.5, and 0.5, respectively. These parameters can be applied directly to segment images using a multiresolution segmentation algorithm.

(2) The suitable features for object-based image analysis from three image object properties, spectral, shape, and texture, by comparing a pair-wise combination of Jeffries–Matsushita distance among land use types comes from spectral and texture image object properties.

(3) The suitable parameters for land use and land cover classification using a support vector machine (SVM) with a linear kernel are C of 0.09 and gamma of 100. Meanwhile, the optimum parameter for land use and land cover classification using random forests (RF) is 100 decision trees. In the meantime, a default setting is an optimum parameter for land use and land cover classification using a decision tree (DT), Naïve Bayes (Bayes) and K-Nearest Neighbor (KNN).

(4) For land use and land cover classification with five machine learning algorithms (SVM, RF, DT, Bayes, and KNN) in the modeling area, Wang Nam Khiao district, the derived overall accuracy of the classified LULC maps with the SVM, RF, DT, Bayes, and KNN are 86.47%, 87.45%, 83.12%, 84.80% and 77.27%, respectively.

Meanwhile, the Kappa hat coefficient values of those LULC maps are 75.52%, 79.57%, 73.19%, 76.85% and 64.00%, respective.

(5) The most suitable algorithm for land use and land cover classification in the modeling is the RF algorithm since it provides the highest overall accuracy and Kappa hat coefficient than others.

(6) Using overlay analysis between classified LULC map and ALRO plots in Wang Nam Khiao District, the number of incompliant and compliant land utilization plots based on building and settlement area criteria were 1,770 plots or 21.94% and 6,297 plots or 78.06%. Meanwhile, based on water body area criteria, the number of incompliant and compliant land utilization was 436 plots or 5.40% and 7,631 plots or 94.60%. After ground verification, the number of incompliant and compliant land utilization plots based on building and settlement area criteria were 394 plots or 4.88% and 6,279 plots or 77.83%. Meanwhile, the number of incompliant and compliant land utilization plots based on water body area criteria were 150 plots or 1.85% and 7,615 plots or 97.94%.

(7) For model validation, using overlay analysis between classified LULC map and ALRO plots in Pak Chong district, the number of incompliant and compliant land utilization plots based on building and settlement area criteria were 1,213 plots or 30.01% and 2,814 plots or 69.87%. Meanwhile, the number of incompliant and compliant land utilization plots based on water body area criteria were 107 plots or 2.66% and 3,920 plots or 97.34%. After ground verification, the number of incompliant and compliant land utilization plots based on building and settlement area criteria were 364 plots or 9.03% and 2,807 plots or 69.70%. Meanwhile, the number of incompliant and compliant land utilization plots based on water body area criteria were 47 plots or 1.17% and 3,917 plots or 97.27%

5.2 Recommendations

Many objectives were explored in this study; therefore, the possible technical, policy and practice recommendations could be made for further studies as the following:

(1) Since new algorithms for land use and land cover classification with remote sensing data have developed quickly, such as Convolutional Neural Networks, the researchers should investigate more detail to improve classification accuracy.

(2) Incompliant land utilization detection should be updated every 2-3 years to protect illegal uses in ALRO-401.

REFERENCES

REFERENCES

Adelabu, S., Mutanga, O., and Adam, E. (2014). Evaluating the impact of red-edge band from Rapideye image for classifying insect defoliation levels. *ISPRS journal of photogrammetry and remote sensing, 95*, 34-41.

ALRO. (2023). Introduction of ALRO. Retrieved from http://alro.go.th/.

ALRO. (2005). Introduction of ALRO. Retrieved from http://alro.go.th/.

ALRO. (2013). Land use for agriculture management. Retrieved from http://alro.go.th/.

Alzubi, J., Nayyar, A., and Kumar, A. (2018). Machine learning from theory to algorithms: an overview. *Paper Presented at the Journal of Physics: conference series*.

Anderson, JR., Hardy, EE., Roach, JT., and Witmer, RE. (1976). A land use and land cover classification system for use with remote sensor data. *Washington: Geological Survey of United States.*

Anuuz. (2020). The advantages and disadvantages of KNN algorithm. Retrieved from https://medium.com/.

Azar, A. T., Elshazly, H. I., Hassanien, A. E., and Elkorany, A. M. (2014). A random forest classifier for lymph diseases. *Computer Methods and Programs in Biomedicine, 113*(2), 465-473.

Baatz, M., and Schäpe, A. (2000). *Multiresolution Segmentation: an Optimization Approach for High-quality Multi-scale Image Segmentation*.

Barros, A. J., Ronsmans, C., Axelson, H., Loaiza, E., Bertoldi, A. D., França, G. V., and Victora, C. G. (2012). Equity in maternal, newborn, and child health interventions in Countdown to 2015: a retrospective review of survey data from 54 countries. *Lancet, 379*(9822), 1225-123

Belgiu, M., Dragut, L., and Strobl, J. (2014). Quantitative evaluation of variations in rule-based classifications of land cover in urban neighbourhoods using WorldView-2 imagery. *ISPRS Journal of Photogrammetry and Remote Sensing, 87*, 205-215.

Belgiu, M., and Drăgut, L. (2016). Random forest in remote sensing: A review of applications and future directions. *ISPRS Journal of Photogrammetry and Remote Sensing, 114*, 24-31.

Breiman, L. (2001). *Random forests. Machine learning, 45*, 5-32.

Colditz, R. R. (2015). An evaluation of different training sample allocation schemes for discrete and continuous land cover classification using decision tree-based algorithms. *Remote Sensing, 7*(8), 9655-9681.

Congalton, R. G., and Green, K. (2008). Assessing the Accuracy of Remotely Sensed Data: Principles and Practices, Second Edition (2nd ed.). *CRC Press*.

Damanik, I. S., Windarto, A. P., Wanto, A., Poningsih, Andani, S. R., and Saputra, W. (2019). *Decision tree optimization in C4. 5 algorithm using genetic algorithm.* Paper presented at the Journal of Physics: Conference Series.

Dhiraj. (2013). The advantages and disadvantages of SVM algorithm. Retrieved from https://dhirajkumarblog.medium.com/.

Deng, C., and Wu, C. (2013). A spatially adaptive spectral mixture analysis for mapping subpixel urban impervious surface distribution. *Remote Sensing of Environment, 133*, 62-70.

Domeniconi, C., Peng, J., and Gunopulos, D. (2002). Locally adaptive metric nearest-neighbor classification. *Ieee Transactions on Pattern Analysis and Machine Intelligence, 24*(9), 1281-1285.

Farid, D. M., Zhang, L., Rahman, C. M., Hossain, M. A., and Strachan, R. (2014). Hybrid decision tree and naïve Bayes classifiers for multi-class classification tasks. *Expert Systems with Applications, 41*(4), 1937-1946.

Fitzpatrick-Lins, K. (1981). Comparison of sampling procedures and data analysis for a land-use and land cover map. *Photogrammetric Engineering and Remote Sensing, 47*(3*),* 343–51.

Foody, G. (2010). Assessing the accuracy of remotely sensed data: principles and practices. *Photogramm*, 204-205.

Foody, G. M., and Mathur, A. (2004). Toward intelligent training of supervised image classifications: directing training data acquisition for SVM classification. *Remote Sensing of Environment, 93*(1-2), 107-117.

Frazier, T. W., Georgiades, S., Bishop, S. L., and Hardan, A. Y. (2014). Behavioral and cognitive characteristics of females and males with autism in the Simons Simplex Collection. *Journal of the American Academy of Child and Adolescent Psychiatry, 53*(3), 329-340. e323.

Gavankar, S. S., and Sawarkar, S. D. (2017). Eager decision tree. *Paper presented at the 2017 2nd International Conference for Convergence in Technology (I2CT)*.

Gehler, P., and Nowozin, S. (2009, 29 Sept.-2 Oct. 2009). On feature combination for multi-class object classification. *Paper presented at the 2009 IEEE 12th International Conference on Computer Vision*.

Griffin, K., Khan. R. A., and Ickowitz, A. (2002). Poverty and the Distribution of Land. *Journal of Agrarian Change, 2*(3), 279-330.

Haas, J., and Ban, Y. (2014). Urban growth and environmental impacts in Jing-jin-ji, the Yangtze River Delta and the Pearl River Delta. *International Journal of Applied Earth Observation and Geoinformation, 30*, 42-55.

Hamedianfar, A., and Shafri, H. Z. M. (2016). Integrated approach using data mining-based decision tree and object-based image analysis for high-resolution urban mapping of WorldView-2 satellite sensor data. *Journal of Applied Remote Sensing*, *10*(2), 025001.

Huang, C., Davis, L. S., and Townshend, J. R. G. (2002). An assessment of support vector machines for land cover classification. *International Journal of Remote Sensing, 23*(4), 725-749.

Imandoust, S. B., and Bolandraftar, M. (2013). Application of k-nearest neighbor (KNN) approach for predicting economic events: Theoretical background. *International Journal of Engineering Research and Applications, 3*(5), 605-610.

Jadhav, S. D., and Channe, H. (2016). Comparative Study of K-NN, Naive Bayes and Decision Tree Classification Techniques.

javatpoint.com. (2022). Support Vector Machine Algorithm. Retrieved from https://www.javatpoint.com/machine-learning-support-vector-machin-algorithm. Retrieved 20/12/2022.

Jensen, J. R. (2015). *Introductory Digital Image Processing*: A Remote Sensing Perspective. NJ, United States: Prentice Hall Press.

Jiang, L., Cai, Z., Wang, D., and Jiang, S. (2007). Survey of improving k-nearest-neighbor for classification. *Paper presented at the Fourth International Conference on Fuzzy Systems and Knowledge Discovery (FSKD 2007).*

Linden, S. v. d. (2008). Investigating the potential of hyperspectral remote sensing data for the analysis of urban imperviousness.

Lu, D. and Weng, Q. (2007). A Survey of Image Classification Methods and Techniques for Improving Classification Performance. *International journal of Remote Sensing*, *28*, 823-870.

Lou, P., Fu, B., He, H., Li, Y., Tang, T., Lin, X., and Gao, E. (2020). An Optimized Object-Based Random Forest Algorithm for Marsh Vegetation Mapping Using High-Spatial-Resolution GF-1 and ZY-3 Data. *Remote Sensing, 12*(8).

Macmillan, D. C. (2000). An economic case for land reform. *Land Use Policy, 17*(1), 49-57.

Maxwell, A. E., Warner, T. A., and Fang, F. (2018). Implementation of machine-learning classification in remote sensing: an applied review. *International Journal of Remote Sensing*, *39*(9), 2784-2817.

Melgani, F., and Bruzzone, L. (2004). Classification of hyperspectral remote sensing images with support vector machines. *IEEE Transactions on Geoscience and Remote Sensing, 42*(8), 1778-1790.

Myint, S., and Stow, D. (2011). An Object-Oriented Pattern Recognition Approach for Urban Classification (pp. 129-140).

Mrva, J., Neupauer, Š., Hudec, L., Ševcech, J., and Kapec, P. (2019). Decision Support in Medical Data Using 3D Decision Tree Visualisation. *In 2019 E-Health and Bioengineering Conference (EHB),* (pp. 1-4), IEEE.

Na Sakolnakorn, P. T, Kroeksakul, P., Kaewbutee, P., Naipainit, A., and Laeheem, K. (2016). Land-Use Change under the Management of the Agricultural Land Reform Office: A Case Study in Phuket. *NIDA Development Journal, 56*(4), 121-169.

Navulur, K. (2006). Multispectral image analysis using the object-oriented paradigm. CRC Press.

Nussbaum, S., and Menz, G. (2008). Object-based image analysis and treaty verification: new approaches in remote sensing-applied to nuclear facilities in Iran. *Springer Science and Business Media*.

Ongsomwang, S. (2023). Systematic experiment on the suitable machine learning algorithm for land use classification under object-based image analysis of eCognition software. *Journal of Remote Sensing and GIS Association of Thailand, 24*(3), 1-40.

Ongsomwang, S. (2023). Thematic accuracy assessment of support vector machine and random forests algorithms with a systematic sample design for land use and land cover classification. *Journal of Remote Sensing and GIS Association of Thailand, 24*(2), 1-31.

Pal, M., and Mather, P. M. (2005). Support Vector Machines for Classification in Remote Sensing. *International Journal of Remote Sensing*, *26*, 1007-1011.

Pal, M., and Mather, P. M. (2006). Support vector machines for classification in remote sensing. *International Journal of Remote Sensing, 26*(5), 1007-1011.

Petropoulos, G. P., Kalaitzidis, C., and Prasad Vadrevu, K. (2012). Support vector machines and object-based classification for obtaining land-use/cover cartography from Hyperion hyperspectral imagery. *Computers and Geosciences*, *41*, 99-107.

Phiri, D., Simwanda, M., Nyirenda, V., Murayama, Y., and Ranagalage, M. (2020). Decision tree algorithms for developing rule-sets for object-based land cover classification. *ISPRS International Journal of Geo-Information*, *9*(5), 329.

Pongsapich, A. (2011). Land and Agricultural Development Policies Impacting on Human Rights in Thailand. *In Proceedings of Human Rights and Business: Plural Legal Approaches to Conflict Resolution, Institutional Strengthening and Legal Reform. Bali, Indonesia. November 28-December, 1,* 2011.

Rakaksorn, Chuchip, and Narangajavana. (2023). Development of a Semi-automatic GIS Approach for Forest Land Use Change Detection. *Journal of Remote Sensing and GIS Association of Thailand, 24*(2), 32-50.

Räsänen, T. A., and Kummu, M. (2013). Spatiotemporal influences of ENSO on precipitation and flood pulse in the Mekong River Basin. *Journal of Hydrology, 476*, 154-168.

Rouse, J. W., Haas, R. H., Schell, J. A., and Deering, D. W. (1974). Monitoring vegetation systems in the Great Plains with ERTS. *NASA. Goddard Space Flight Center 3d ERTS-1 Symp*, *351*(1), 309.

Ryherd, S., and Woodcock, C. (1996). Combining spectral and texture data in the segmentation of remotely sensed images. *Photogrammetric Engineering and Remote Sensing, 62*(2), 181-194.

Santoso, I. B., Crysdian, C., and Holle, K. F. H. (2018). Optimization of naïve Bayes classifier to classify green open space object based on Google Earth image. Paper presented at the 2018 International Seminar on Research of Information Technology and Intelligent Systems (ISRITI).

Sarker, I. H. (2021). Machine Learning: Algorithms, Real-World Applications and Research Directions. *SN Computer Science, 2*(3), 160.

Sharma, D., and Kumar, N. (2017). *A Review on Machine Learning Algorithms, Tasks and Applications, 6*, 2278-1323.

Sharma, R., and Jha, K. P. (2016). Land reform experiences some lessons from across South Asia. A Research Document Prepared for the World Forum for Access to and 2016. *The Food and Agriculture Organization of the United Nations*.

Sitthi, A., Nagai, M., Dailey, M., and Ninsawat, S. (2016). Exploring land use and land cover of geotagged social-sensing images using naive Bayes classifier. *Sustainability*, *8*(9), 921.

Stefanski, J., Mack, B., and Waske, B. (2013). Optimization of object-based image analysis with random forests for land cover mapping. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 6*(6), 2492-2504.

Stein, G., Chen, B., Wu, A. S., and Hua, K. A. (2005). *Decision tree classifier for network intrusion detection with GA-based feature selection.* Paper presented at the Proceedings of the 43rd Annual Southeast Regional Conference-Volume 2.

Suehiro, A. (1987). The Concept and Bangkok of the Agricultural Land Reform Act of 1975. (The development of agribusiness in Thailand: the six groups in feed and broiler industry), in T. Takigawa (ed.) Tonan ajia no nogyo gijutsu henkaku to noson shakai, Institute of Developing Economies, Tokyo. 275-321.

Swain, P. H., and Hauska, H. (1997). The decision tree classifier: Design and potential. *IEEE Transactions on Geoscience Electronics, 15*(3), 142-147.

Trimble Germany GmbH. (2014). Arnulfstrasse 126, D-80636 Munich, Germany.

Tsutsumida, N., and Comber, A. J. (2015). Measures of spatio-temporal accuracy for time series land cover data. *International Journal of Applied Earth Observation and Geoinformation, 41*, 46-55.

Tzotsos, A., and Argialas, D. (2008). Support Vector Machine Classification for Object-Based Image Analysis. In T. Blaschke, S. Lang, & G. J. Hay (Eds.), Object-based image analysis: Spatial concepts for knowledge-driven remote sensing applications, 663-677. Berlin, Heidelberg: Springer Berlin Heidelberg.

Wang, W., Arora, R., Livescu, K., and Bilmes, J. (2015). On deep multi-view representation learning. *Paper presented at the international conference on machine learning.*

World Bank. (1975). Land reform (Sector Policy Paper), 77.

Xu, H. (2006). Modification of normalized difference water index (NDWI) to enhance open water features in remotely sensed imagery. *International Journal of Remote Sensing*, *27*(14), 3025-3033.

Zha, Y., Gao, J., and Ni, S. (2003). Use of normalized difference built-up index in automatically mapping urban areas from TM imagery. *International Journal of Remote Sensing*, *24*(3), 583-594.

Zylshal, Sulma, S., Yulianto, F., Nugroho, J. T., and Sofan, P. (2016). A support vector machine object based image analysis approach on urban green space extraction using Pleiades-1A imagery. *Modeling Earth Systems and Environment, 2*(2), 54.

APPENDICES

APPENDIX A

J VALUES

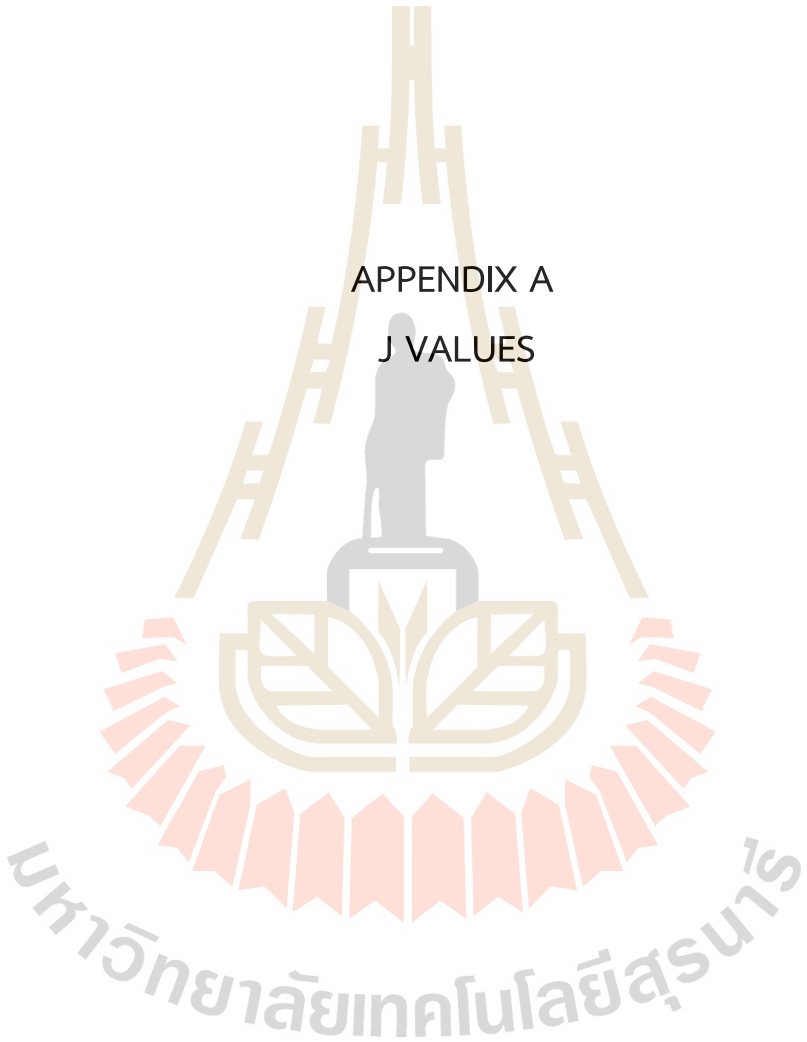


Table A1 J value from building and settlement area and field crops.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1733.37600	1519.20600	17841.76287	7791.45380	0.44736	0.04173	0.48909	0.77363
Mean Layer 1	2012.19600	1407.32200	102497.45560	1706.01482	0.87778	0.68560	1.56338	1.58115
Mean Layer 2	2128.28300	1669.33600	40154.76871	3772.87214	1.19875	0.28955	1.48830	1.54849
Mean Layer 3	2104.12100	1516.93200	44005.89594	21117.63853	1.32360	0.03296	1.35656	1.48491
Mean Layer 4	3325.61000	4176.82400	179227.66370	660161.72103	0.21580	0.09948	0.31528	0.54083
Mean Layer 5	3932.11700	3019.85800	397830.64730	56229.48708	0.45821	0.20867	0.66688	0.97339
Mean Layer 6	144.52200	196.21400	211.81677	602.17883	0.82066	0.06533	0.88600	1.17539
Mean Layer 7	130.92700	83.49200	586.06291	455.70677	0.53997	0.00395	0.54391	0.83905
Mean Layer 8	89.23200	83.66300	151.57566	61.38982	0.03641	0.04941	0.08582	0.16447
Max. diff.	2.25040	2.69950	0.05496	0.14298	0.25474	0.05509	0.30983	0.53286
Standard deviation Layer 1	230.48100	26.41000	10326.57254	121.75531	0.99645	0.76940	1.76585	1.65792
Standard deviation Layer 2	211.84300	40.28400	5707.42907	285.62138	1.22778	0.42656	1.65433	1.61756
Standard deviation Layer 3	250.84100	54.79900	9955.20214	825.13468	0.89126	0.31582	1.20708	1.40186
Standard deviation Layer 4	248.94700	185.98400	10936.52616	3112.73600	0.07054	0.09281	0.16335	0.30142
Standard deviation Layer 5	259.32300	83.75800	10080.82249	1212.12617	0.68235	0.23976	0.92212	1.20465
Standard deviation Layer 6	13.03910	6.06310	23.13802	8.87132	0.38008	0.05537	0.43545	0.70605
Standard deviation Layer 7	9.75780	5.19310	6.57930	3.41751	0.52108	0.02635	0.54743	0.84313
Standard deviation Layer 8	9.55800	2.87180	5.36850	3.00483	1.33475	0.02076	1.35551	1.48437
Ration Layer 1	0.14461	0.11622	0.00024	0.00007	0.65687	0.08758	0.74444	1.05000
Ration Layer 2	0.15334	0.13776	0.00002	0.00009	0.53395	0.10419	0.63813	0.94344
Ration Layer 3	0.15177	0.12551	0.00011	0.00028	0.44182	0.05248	0.49430	0.78001
Ration Layer 4	0.24105	0.34173	0.00124	0.00244	0.68878	0.02816	0.71695	1.02352
Ration Layer 5	0.28281	0.24878	0.00095	0.00038	0.21743	0.05091	0.26833	0.47070
Ration Layer 6	0.01055	0.01612	0.00000	0.00000	2.90896	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 7	0.00941	0.00694	0.00000	0.00000	0.62986	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 8	0.00652	0.00693	0.00000	0.00000	0.03633	#DIV/0!	#DIV/0!	#DIV/0!
Area	28.50000	222.30000	210.05556	9300.23333	0.98731	0.61220	1.59951	1.59601
Border length	29.60000	89.00000	182.04444	253.55556	2.02500	0.00683	2.03183	1.73781
Width	5.14480	13.50670	4.96342	36.01383	0.42659	0.21344	0.64002	0.94544
Asymmetry	0.54890	0.61741	0.02142	0.06772	0.01316	0.07861	0.09177	0.17537
Border index	1.22590	1.34440	0.06811	0.01607	0.04170	0.12040	0.16210	0.29928
Shape index	1.38250	1.56960	0.08429	0.09491	0.04884	0.00088	0.04972	0.09700
GLCM Homogeneity Layer 1	0.01942	0.03142	0.00009	0.00009	0.20370	0.00007	0.20378	0.36871
GLCM Homogeneity Layer 2	0.01703	0.03542	0.00002	0.00004	1.38110	0.02464	1.40574	1.50963
GLCM Homogeneity Layer 3	0.01732	0.03558	0.00007	0.00005	0.70729	0.00582	0.71310	1.01976
GLCM Homogeneity Layer 4	0.01958	0.03205	0.00004	0.00002	0.61380	0.03650	0.65030	0.95622
GLCM Homogeneity Layer 5	0.23747	0.25653	0.00001	0.00002	2.95875	0.02409	2.98284	1.89870
GLCM Homogeneity Layer 6	0.02386	0.07105	0.00012	0.00186	0.28126	0.37124	0.65250	0.95851
GLCM Homogeneity Layer 7	0.01924	0.06888	4.67459	0.00087	0.67189	0.41053	1.08243	1.32245
GLCM Homogeneity Layer 8	0.02048	0.12133	5.77424	0.00366	0.68397	0.69855	1.38253	1.49811

Table A1 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	4153.94800	1997.14400	2987749.23300	333414.92043	0.35016	0.25455	0.60471	0.907533
GLCM Contrast Layer 2	3812.36200	1844.71100	248119.21720	181066.55065	2.25523	0.00618	2.26141	1.791592
GLCM Contrast Layer 3	3643.05600	1660.13000	554849.58640	267203.10244	1.19579	0.03265	1.22844	1.414500
GLCM Contrast Layer 4	4235.65200	1799.18100	8617612.11100	40511.59017	0.17141	0.99577	1.16718	1.377510
GLCM Contrast Layer 5	3866.67100	1448.58300	1037410.32600	163903.01402	1.21682	0.18807	1.40490	1.509215
GLCM Contrast Layer 6	3303.85700	1854.38300	1729968.27900	87701.09291	0.28897	0.42363	0.71260	1.019263
GLCM Contrast Layer 7	3672.56500	1886.69700	2363595.42100	152586.25722	0.31688	0.36976	0.68664	0.993471
GLCM Contrast Layer 8	3635.16300	2227.62900	457870.71920	213011.79312	0.73826	0.03574	0.77400	1.077673
GLCM Dissimilarity Layer 1	50.47100	33.72900	126.05825	31.58301	0.44451	0.11125	0.55576	0.852727
GLCM Dissimilarity Layer2	49.50300	31.46700	18.27436	14.90920	2.45074	0.00258	2.45333	1.827986
GLCM Dissimilarity Layer 3	48.23700	30.05500	26.47507	23.48709	1.65418	0.00090	1.65507	1.617843
GLCM Dissimilarity Layer 4	50.80200	31.64100	333.12315	2.99374	0.27308	0.83590	1.10897	1.340205
GLCM Dissimilarity Layer 5	45.42800	24.63400	32.63595	15.74749	2.23419	0.03248	2.26667	1.792686
GLCM Dissimilarity Layer 6	45.40200	32.96200	91.65382	5.78997	0.39703	0.37453	0.77156	1.075418
GLCM Dissimilarity Layer 7	48.41700	32.91900	122.84625	12.43899	0.44385	0.27418	0.71803	1.024577
GLCM Dissimilarity Layer 8	47.96700	36.31200	15.74456	19.13144	0.97373	0.00237	0.97610	1.246442
GLCM Entropy Layer 1	5.38880	6.96510	0.44333	0.13964	1.06555	0.07915	1.14470	1.363358
GLCM Entropy Layer 2	5.44580	7.03680	0.36527	0.19496	1.12957	0.02424	1.15381	1.369135
GLCM Entropy Layer 3	5.44010	7.11650	0.34440	0.15457	1.40805	0.03909	1.44714	1.529515
GLCM Entropy Layer 4	5.41310	7.26090	0.46131	0.14770	1.40160	0.07703	1.47863	1.544102
GLCM Entropy Layer 5	4.11910	5.91170	0.28992	0.13357	1.89699	0.03663	1.93362	1.710752
GLCM Entropy Layer 6	5.17550	5.42650	0.30699	0.71961	0.01534	0.04405	0.05939	0.115323
GLCM Entropy Layer 7	5.18450	5.39460	0.37256	0.32784	0.01576	0.00102	0.01678	0.033274
GLCM Entropy Layer 8	5.19760	4.29780	0.34982	0.59166	0.21499	0.01707	0.23206	0.414199
GLCM Mean Layer 1	121.06300	127.10500	31.63656	2.01281	0.27122	0.37296	0.64418	0.949818
GLCM Mean Layer2	121.70900	127.11500	17.79561	2.73161	0.35593	0.19334	0.54927	0.845257
GLCM Mean Layer 3	122.17000	127.24700	17.71024	1.71762	0.33169	0.28301	0.61470	0.918391
GLCM Mean Layer 4	128.81500	126.55900	86.08881	2.21945	0.01441	0.58068	0.59509	0.896976
GLCM Mean Layer 5	120.66500	127.26600	18.70474	2.87492	0.50479	0.19310	0.69790	1.004737
GLCM Mean Layer 6	133.27200	125.86600	8.64882	2.84209	1.19331	0.07371	1.26702	1.436662
GLCM Mean Layer 7	121.60400	127.85500	56.98727	3.46456	0.16160	0.38300	0.54459	0.839843
GLCM Mean Layer 8	123.89700	126.89400	50.60427	4.69514	0.04061	0.29217	0.33277	0.566134
GLCM Correlation Layer 1	0.46016	0.64018	0.00854	0.01003	0.43633	0.00162	0.43794	0.709277
GLCM Correlation Layer 2	0.44285	0.67954	0.01206	0.00569	0.78890	0.03449	0.82339	1.122118
GLCM Correlation Layer 3	0.48636	0.72606	0.02087	0.00489	0.55757	0.12148	0.67904	0.985796
GLCM Correlation Layer 4	0.52938	0.70700	0.02899	0.00066	0.26603	0.61028	0.87631	1.167367
GLCM Correlation Layer 5	0.48757	0.78780	0.02347	0.00486	0.79552	0.14117	0.93670	1.216159
GLCM Correlation Layer 6	0.58107	0.71401	0.02613	0.00136	0.16071	0.41771	0.57842	0.878435
GLCM Correlation Layer 7	0.52826	0.70481	0.02857	0.00606	0.22501	0.13728	0.36229	0.607838
GLCM Correlation Layer 8	0.42551	0.62787	0.01214	0.00764	0.51747	0.01330	0.53077	0.823698

Table A2 J value from building and settlement area and forest area.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1733.37600	1361.15700	17841.76287	4860.82820	1.52567	0.09898	1.62465	1.60604
Mean Layer 1	2012.19600	1283.41800	102497.45560	932.59988	1.28376	0.83286	2.11662	1.75912
Mean Layer 2	2128.28300	1451.23000	40154.76871	2841.38796	2.66536	0.34972	3.01508	1.90192
Mean Layer 3	2104.12100	1275.86900	44005.89594	1190.61388	3.79455	0.56924	4.36379	1.97454
Mean Layer 4	3325.61000	3922.79500	179227.66370	92203.98903	0.32847	0.02712	0.35559	0.59848
Mean Layer 5	3932.11700	2592.84400	397830.64730	28402.83169	1.05204	0.34779	1.39983	1.50672
Mean Layer 6	144.52200	207.83400	211.81677	22.27116	4.28088	0.26652	4.54740	1.97881
Mean Layer 7	130.92700	73.12300	586.06291	7.00273	1.40849	0.76615	2.17463	1.77270
Mean Layer 8	89.23200	82.14200	151.57566	11.69544	0.07697	0.33106	0.40803	0.67008
Max. diff.	2.25040	2.82510	0.05496	0.00680	1.33704	0.23417	1.57121	1.58441
Standard deviation Layer 1	230.48100	17.33500	10326.57254	13.73434	1.09840	1.30974	2.40814	1.82003
Standard deviation Layer 2	211.84300	29.48300	5707.42907	25.58353	1.45016	1.00756	2.45772	1.82874
Standard deviation Layer 3	250.84100	19.48600	9955.20214	57.75680	1.33640	0.94372	2.28012	1.79546
Standard deviation Layer 4	248.94700	191.51100	10936.52616	1215.10192	0.06787	0.25542	0.32329	0.55248
Standard deviation Layer 5	259.32300	54.31100	10080.82249	225.78528	1.01949	0.61420	1.63369	1.60958
Standard deviation Layer 6	13.03910	3.95300	23.13802	0.47401	0.87410	0.63557	1.50967	1.55803
Standard deviation Layer 7	9.75780	4.55540	6.57930	0.61919	0.93995	0.28921	1.22917	1.41493
Standard deviation Layer 8	9.55800	1.76970	5.36850	0.31491	2.66818	0.39093	3.05912	1.90614
Ration Layer 1	0.14461	0.11805	0.00024	0.00002	0.68496	0.30449	0.98946	1.25644
Ration Layer 2	0.15334	0.13337	0.00002	0.00001	3.12599	0.06646	3.19245	1.91786
Ration Layer 3	0.15177	0.11732	0.00011	0.00001	2.40608	0.24182	2.64789	1.85840
Ration Layer 4	0.24105	0.35987	0.00124	0.00010	2.64117	0.32744	2.96861	1.89725
Ration Layer 5	0.28281	0.23800	0.00095	0.00002	0.51759	0.65057	1.16816	1.37812
Ration Layer 6	0.01055	0.01911	0.00000	0.00000	6.04896	0.21448	6.26344	1.99619
Ration Layer 7	0.00941	0.00673	0.00000	0.00000	0.67922	0.29835	0.97757	1.24755
Ration Layer 8	0.00652	0.00757	0.00000	0.00000	0.17669	0.07461	0.25130	0.44443
Area	28.50000	396.60000	210.05556	58820.71111	0.57384	1.06393	1.63777	1.61117
Border length	29.60000	140.00000	182.04444	2475.55556	1.14654	0.34140	1.48794	1.54832
Width	5.14480	20.40440	4.96342	43.33958	1.20518	0.24938	1.45456	1.53300
Asymmetry	0.54890	0.53568	0.02142	0.05233	0.00059	0.04830	0.04889	0.09543
Border index	1.22590	1.69850	0.06811	0.05526	0.45259	0.00273	0.45532	0.73151
Shape index	1.38250	1.83230	0.08429	0.08368	0.30112	0.00000	0.30112	0.52003
GLCM Homogeneity Layer 1	0.01942	0.02320	0.00009	0.00001	0.03650	0.23149	0.26799	0.47016
GLCM Homogeneity Layer 2	0.01703	0.02264	0.00002	0.00001	0.22670	0.01288	0.23958	0.42608
GLCM Homogeneity Layer 3	0.01732	0.02516	0.00007	0.00006	0.11607	0.00017	0.11624	0.21948
GLCM Homogeneity Layer 4	0.01958	0.02139	0.00004	0.00001	0.01502	0.10712	0.12214	0.22995
GLCM Homogeneity Layer 5	0.23747	0.25190	0.00001	0.00002	1.52072	0.03791	1.55863	1.57915
GLCM Homogeneity Layer 6	0.02386	0.04940	0.00012	0.00010	0.75239	0.00254	0.75493	1.05991
GLCM Homogeneity Layer 7	0.01925	0.04146	0.00005	0.00008	0.96921	0.01822	0.98743	1.25493
GLCM Homogeneity Layer 8	0.02049	0.15928	0.00006	0.00180	2.59686	0.52870	3.12556	1.91218

Table A2 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	4153.94800	2574.37300	2987749.23300	73489.04847	0.20376	0.59186	0.79562	1.09740
GLCM Contrast Layer 2	3812.36200	2460.72800	248119.21720	177072.49820	1.07417	0.00708	1.08125	1.32166
GLCM Contrast Layer 3	3643.05600	2108.30700	554849.58640	108952.22130	0.88711	0.15002	1.03712	1.29105
GLCM Contrast Layer 4	4235.65200	2672.58900	8617612.11100	44149.58097	0.07052	0.97448	1.04499	1.29661
GLCM Contrast Layer 5	3866.67100	1645.13500	1037410.32600	119103.88290	1.06683	0.24889	1.31572	1.46344
GLCM Contrast Layer 6	3303.85700	2729.50400	1729968.27900	79518.72916	0.04558	0.44586	0.49144	0.77651
GLCM Contrast Layer 7	3672.56500	2973.43200	2363595.42100	198792.39400	0.04769	0.31272	0.36041	0.60522
GLCM Contrast Layer 8	3635.16300	2283.70700	457870.71920	141961.03300	0.76123	0.08122	0.84244	1.13869
GLCM Dissimilarity Layer 1	50.47100	40.09900	126.05825	5.22219	0.20486	0.46968	0.67454	0.98122
GLCM Dissimilarity Layer2	49.50300	38.74400	18.27436	12.03387	0.95482	0.01083	0.96565	1.23853
GLCM Dissimilarity Layer 3	48.23700	35.85200	26.47507	14.10297	0.94502	0.02439	0.96941	1.24139
GLCM Dissimilarity Layer 4	50.80200	40.65100	333.12315	4.05334	0.07640	0.76172	0.83812	1.13495
GLCM Dissimilarity Layer 5	45.42800	27.65300	32.63595	9.18167	1.88886	0.09443	1.98329	1.72477
GLCM Dissimilarity Layer 6	45.40200	41.55000	91.65382	3.92704	0.03881	0.46194	0.50075	0.78784
GLCM Dissimilarity Layer 7	48.41700	43.11900	122.84625	10.36894	0.05268	0.31197	0.36465	0.61112
GLCM Dissimilarity Layer 8	47.96700	37.44500	15.74456	12.34829	0.98524	0.00368	0.98892	1.25604
GLCM Entropy Layer 1	5.38880	7.20030	0.44333	0.14702	1.38967	0.07257	1.46223	1.53656
GLCM Entropy Layer 2	5.44580	7.55770	0.36527	0.27969	1.72883	0.00444	1.73327	1.64659
GLCM Entropy Layer 3	5.44010	7.18090	0.34440	0.11267	1.65749	0.07428	1.73176	1.64606
GLCM Entropy Layer 4	5.41310	7.75800	0.46131	0.38845	1.61768	0.00184	1.61952	1.60401
GLCM Entropy Layer 5	4.11910	6.32080	0.28992	0.37300	1.82809	0.00396	1.83205	1.67983
GLCM Entropy Layer 6	5.17550	5.36390	0.30699	0.04587	0.02515	0.19832	0.22347	0.40051
GLCM Entropy Layer 7	5.18450	5.62310	0.37256	0.04847	0.11423	0.22443	0.33866	0.57455
GLCM Entropy Layer 8	5.19760	3.72870	0.34982	0.24130	0.91254	0.00857	0.92111	1.20385
GLCM Mean Layer 1	121.06300	127.63100	31.63656	1.54123	0.32506	0.43264	0.75770	1.06251
GLCM Mean Layer2	121.70900	127.78900	17.79561	5.31070	0.39996	0.08631	0.48627	0.77017
GLCM Mean Layer 3	122.17000	127.41700	17.71024	1.18873	0.36419	0.36122	0.72541	1.03175
GLCM Mean Layer 4	128.81500	126.85600	86.08881	7.88714	0.01021	0.29479	0.30500	0.52576
GLCM Mean Layer 5	120.66500	127.61100	18.70474	3.82963	0.53526	0.14306	0.67832	0.98506
GLCM Mean Layer 6	133.27200	126.17200	8.64882	6.41662	0.83652	0.00555	0.84207	1.13836
GLCM Mean Layer 7	121.60400	127.77300	56.98727	5.24849	0.15287	0.29370	0.44657	0.72036
GLCM Mean Layer 8	123.89700	127.75100	50.60427	1.14534	0.07176	0.61170	0.68346	0.99026
GLCM Correlation Layer 1	0.46016	0.54193	0.00854	0.00399	0.13346	0.03541	0.16887	0.31076
GLCM Correlation Layer 2	0.44285	0.58872	0.01206	0.00794	0.26589	0.01084	0.27673	0.48348
GLCM Correlation Layer 3	0.48636	0.62994	0.02087	0.00178	0.22756	0.31028	0.53785	0.83199
GLCM Correlation Layer 4	0.52938	0.57380	0.02899	0.00141	0.01623	0.43380	0.45003	0.72478
GLCM Correlation Layer 5	0.48757	0.76240	0.02347	0.00256	0.72565	0.25945	0.98510	1.25320
GLCM Correlation Layer 6	0.58107	0.57949	0.02613	0.00310	0.00002	0.24251	0.24254	0.43073
GLCM Correlation Layer 7	0.52826	0.49665	0.02857	0.00995	0.00648	0.06652	0.07300	0.14080
GLCM Correlation Layer 8	0.42551	0.64038	0.01214	0.00492	0.67646	0.04939	0.72585	1.03217

Table A3 J value from building and settlement area and paddy field.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1733.37600	1321.03100	17841.76287	8597.03472	1.60775	0.03260	1.64036	1.61218
Mean Layer 1	2012.19600	1304.21400	102497.45560	442.12358	1.21731	1.01708	2.23439	1.78589
Mean Layer 2	2128.28300	1524.75100	40154.76871	913.79552	2.21733	0.61040	2.82773	1.88171
Mean Layer 3	2104.12100	1331.44600	44005.89594	1571.55178	3.27479	0.50404	3.77883	1.95430
Mean Layer 4	3325.61000	3676.98600	179227.66370	324461.02860	0.06128	0.02170	0.08298	0.15926
Mean Layer 5	3932.11700	2368.87000	397830.64730	40450.86540	1.39393	0.27333	1.66726	1.62247
Mean Layer 6	144.52200	197.51400	211.81677	195.67825	1.72281	0.00039	1.72321	1.64301
Mean Layer 7	130.92700	71.31400	586.06291	47.39534	1.40250	0.32104	1.72354	1.64313
Mean Layer 8	89.23200	93.14700	151.57566	65.04105	0.01769	0.04347	0.06115	0.11864
Max. diff.	2.25040	2.71520	0.05496	0.05576	0.48784	0.00001	0.48785	0.77211
Standard deviation Layer 1	230.48100	23.25300	10326.57254	103.70462	1.02930	0.80865	1.83795	1.68171
Standard deviation Layer 2	211.84300	37.11800	5707.42907	415.02597	1.24659	0.34382	1.59041	1.59232
Standard deviation Layer 3	250.84100	37.16500	9955.20214	524.67636	1.08917	0.41487	1.50404	1.55554
Standard deviation Layer 4	248.94700	232.63600	10936.52616	4277.92832	0.00437	0.05316	0.05753	0.11181
Standard deviation Layer 5	259.32300	78.78000	10080.82249	1518.79980	0.70252	0.19677	0.89929	1.18628
Standard deviation Layer 6	13.03910	6.75160	23.13802	1.82859	0.39586	0.32594	0.72180	1.02824
Standard deviation Layer 7	9.75780	5.34680	6.57930	0.84514	0.65516	0.22690	0.88206	1.17214
Standard deviation Layer 8	9.55800	3.41510	5.36850	2.98850	1.12885	0.02115	1.15000	1.36672
Ration Layer 1	0.14461	0.12399	0.00024	0.00008	0.33205	0.06523	0.39728	0.65570
Ration Layer 2	0.15334	0.14482	0.00002	0.00008	0.17328	0.08941	0.26269	0.46204
Ration Layer 3	0.15177	0.12661	0.00011	0.00011	0.71439	0.00001	0.71439	1.02102
Ration Layer 4	0.24105	0.34623	0.00124	0.00081	1.34815	0.01106	1.35921	1.48627
Ration Layer 5	0.28281	0.22396	0.00095	0.00002	0.89125	0.63007	1.52133	1.56316
Ration Layer 6	0.01055	0.01869	0.00000	0.00000	5.81904	0.35460	6.17364	1.99583
Ration Layer 7	0.00941	0.00681	0.00000	0.00000	0.48617	0.04146	0.52764	0.82000
Ration Layer 8	0.00652	0.00890	0.00000	0.00000	0.47805	0.01044	0.48848	0.77289
Area	28.50000	127.30000	210.05556	4486.67778	0.51959	0.44168	0.96126	1.23518
Border length	29.60000	64.00000	182.04444	326.22222	0.58206	0.02097	0.60303	0.90570
Width	5.14480	9.46880	4.96342	18.32484	0.20071	0.09981	0.30053	0.51914
Asymmetry	0.54890	0.58648	0.02142	0.10895	0.00271	0.14981	0.15252	0.28292
Border index	1.22590	1.24700	0.06811	0.02492	0.00120	0.06071	0.06191	0.12006
Shape index	1.38250	1.48400	0.08429	0.08576	0.01515	0.00002	0.01516	0.03010
GLCM Homogeneity Layer 1	0.01942	0.02684	0.00009	0.00007	0.08923	0.00407	0.09330	0.17816
GLCM Homogeneity Layer 2	0.01703	0.03102	0.00002	0.00016	0.26343	0.22600	0.48942	0.77404
GLCM Homogeneity Layer 3	0.01732	0.03272	0.00007	0.00029	0.16461	0.12280	0.28742	0.49960
GLCM Homogeneity Layer 4	0.01958	0.03085	0.00004	0.00004	0.37680	0.00021	0.37701	0.62818
GLCM Homogeneity Layer 5	0.23747	0.25038	0.00001	0.00008	0.47880	0.21030	0.68910	0.99594
GLCM Homogeneity Layer 6	0.02386	0.04793	0.00012	0.00010	0.65308	0.00143	0.65451	0.96061
GLCM Homogeneity Layer 7	0.01925	0.05129	0.00005	0.00024	0.89985	0.15033	1.05017	1.30025
GLCM Homogeneity Layer 8	0.02049	0.10096	0.00006	0.00041	3.49575	0.20722	3.70297	1.95070

Table A3 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	4153.94800	2522.80900	2987749.23300	861951.58320	0.17278	0.09093	0.26371	0.46361
GLCM Contrast Layer 2	3812.36200	1919.87000	248119.21720	351187.18160	1.49403	0.00751	1.50154	1.55442
GLCM Contrast Layer 3	3643.05600	2116.22400	554849.58640	969739.43570	0.38227	0.01924	0.40150	0.66138
GLCM Contrast Layer 4	4235.65200	1746.53200	8617612.11100	155852.09090	0.17655	0.66555	0.84210	1.13839
GLCM Contrast Layer 5	3866.67100	1751.64500	1037410.32600	546012.97020	0.70628	0.02532	0.73159	1.03772
GLCM Contrast Layer 6	3303.85700	1792.04000	1729968.27900	239048.23140	0.29019	0.21294	0.50313	0.79073
GLCM Contrast Layer 7	3672.56500	2098.56000	2363595.42100	208103.14920	0.24084	0.30309	0.54394	0.83908
GLCM Contrast Layer 8	3635.16300	1852.10900	457870.71920	332699.22740	1.00538	0.00635	1.01172	1.27282
GLCM Dissimilarity Layer 1	50.47100	38.81600	126.05825	64.21736	0.17848	0.02791	0.20639	0.37296
GLCM Dissimilarity Layer2	49.50300	33.42600	18.27436	40.50734	1.09928	0.03860	1.13788	1.35900
GLCM Dissimilarity Layer 3	48.23700	33.95100	26.47507	87.62090	0.44719	0.08464	0.53183	0.82494
GLCM Dissimilarity Layer 4	50.80200	31.45100	333.12315	16.26548	0.26794	0.43213	0.70007	1.00690
GLCM Dissimilarity Layer 5	45.42800	27.74900	32.63595	40.27068	1.07174	0.00276	1.07449	1.31706
GLCM Dissimilarity Layer 6	45.40200	32.23800	91.65382	25.41635	0.37006	0.09646	0.46652	0.74564
GLCM Dissimilarity Layer 7	48.41700	35.13300	122.84625	11.94529	0.32729	0.28247	0.60977	0.91304
GLCM Dissimilarity Layer 8	47.96700	32.45900	15.74456	39.83365	1.08180	0.05202	1.13382	1.35640
GLCM Entropy Layer 1	5.38880	6.51230	0.44333	0.18287	0.50393	0.04749	0.55142	0.84774
GLCM Entropy Layer 2	5.44580	6.61840	0.36527	0.20432	0.60350	0.02080	0.62430	0.92873
GLCM Entropy Layer 3	5.44010	6.63920	0.34440	0.28551	0.57065	0.00219	0.57284	0.87216
GLCM Entropy Layer 4	5.41310	6.76010	0.46131	0.22184	0.66399	0.03278	0.69677	1.00361
GLCM Entropy Layer 5	4.11910	5.37560	0.28992	0.23476	0.75227	0.00278	0.75505	1.06002
GLCM Entropy Layer 6	5.17550	5.67340	0.30699	0.05179	0.17274	0.17627	0.34901	0.58923
GLCM Entropy Layer 7	5.18450	5.42510	0.37256	0.06784	0.03286	0.16289	0.19575	0.35557
GLCM Entropy Layer 8	5.19760	4.55770	0.34982	0.18242	0.19234	0.02604	0.21838	0.39236
GLCM Mean Layer 1	121.06300	127.90600	31.63656	1.62600	0.35195	0.42053	0.77248	1.07627
GLCM Mean Layer2	121.70900	128.16300	17.79561	1.50958	0.53942	0.31092	0.85033	1.14545
GLCM Mean Layer 3	122.17000	127.75800	17.71024	4.56848	0.35040	0.10691	0.45731	0.73403
GLCM Mean Layer 4	128.81500	127.35800	86.08881	12.21853	0.00540	0.20789	0.21329	0.38416
GLCM Mean Layer 5	120.66500	127.28500	18.70474	3.03856	0.50388	0.18304	0.68692	0.99376
GLCM Mean Layer 6	133.27200	126.84000	8.64882	13.14596	0.47455	0.01088	0.48542	0.76913
GLCM Mean Layer 7	121.60400	126.96800	56.98727	11.23173	0.10544	0.14940	0.25484	0.44991
GLCM Mean Layer 8	123.89700	127.53900	50.60427	10.98614	0.05384	0.13351	0.18735	0.34170
GLCM Correlation Layer 1	0.46016	0.57745	0.00854	0.03393	0.08098	0.11060	0.19158	0.34870
GLCM Correlation Layer 2	0.44285	0.67906	0.01206	0.01710	0.47831	0.00757	0.48588	0.76968
GLCM Correlation Layer 3	0.48636	0.66943	0.02087	0.01841	0.21329	0.00098	0.21428	0.38575
GLCM Correlation Layer 4	0.52938	0.75530	0.02899	0.00192	0.41282	0.36404	0.77686	1.08030
GLCM Correlation Layer 5	0.48757	0.76544	0.02347	0.00555	0.66515	0.11992	0.78507	1.08783
GLCM Correlation Layer 6	0.58107	0.74324	0.02613	0.00273	0.22781	0.26793	0.49574	0.78176
GLCM Correlation Layer 7	0.52826	0.67823	0.02857	0.00543	0.16535	0.15543	0.32078	0.54884
GLCM Correlation Layer 8	0.42551	0.73478	0.01214	0.00454	1.43286	0.05809	1.49095	1.54968

Table A4 J value from building and settlement area and perennial tree and orchard.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1733.37600	1366.98100	17841.76287	5005.38201	1.46895	0.09483	1.56378	1.58131
Mean Layer 1	2012.19600	1279.21100	102497.45560	738.32725	1.30107	0.89032	2.19138	1.77648
Mean Layer 2	2128.28300	1444.40500	40154.76871	2485.55389	2.74206	0.37902	3.12108	1.91178
Mean Layer 3	2104.12100	1293.66600	44005.89594	4592.44727	3.37891	0.26804	3.64694	1.94786
Mean Layer 4	3325.61000	3934.46400	179227.66370	247864.91930	0.21699	0.00654	0.22353	0.40062
Mean Layer 5	3932.11700	2620.88000	397830.64730	118523.44450	0.83244	0.08654	0.91898	1.20215
Mean Layer 6	144.52200	206.29700	211.81677	177.75476	2.44894	0.00192	2.45086	1.82756
Mean Layer 7	130.92700	73.90800	586.06291	316.99093	0.90005	0.02324	0.92329	1.20558
Mean Layer 8	89.23200	83.01000	151.57566	114.45838	0.03638	0.00491	0.04129	0.08091
Max. diff.	2.25040	2.82380	0.05496	0.07843	0.61624	0.00786	0.62410	0.92852
Standard deviation Layer 1	230.48100	15.89100	10326.57254	24.80074	1.11214	1.16253	2.27467	1.79434
Standard deviation Layer 2	211.84300	22.72800	5707.42907	38.41324	1.55610	0.90706	2.46316	1.82967
Standard deviation Layer 3	250.84100	22.28990	9955.20214	194.49417	1.28663	0.64696	1.93359	1.71074
Standard deviation Layer 4	248.94700	126.34700	10936.52616	537.95547	0.32748	0.43046	0.75794	1.06274
Standard deviation Layer 5	259.32300	57.89300	10080.82249	537.36591	0.95530	0.41232	1.36762	1.49057
Standard deviation Layer 6	13.03910	3.22540	23.13802	0.88459	1.00227	0.48821	1.49048	1.54947
Standard deviation Layer 7	9.75780	3.25440	6.57930	0.44018	1.50632	0.36193	1.86825	1.69121
Standard deviation Layer 8	9.55800	1.83417	5.36850	0.47305	2.55316	0.30293	2.85608	1.88501
Ration Layer 1	0.14461	0.11731	0.00024	0.00005	0.63914	0.12350	0.76264	1.06713
Ration Layer 2	0.15334	0.13237	0.00002	0.00006	1.27187	0.05734	1.32921	1.47063
Ration Layer 3	0.15177	0.11862	0.00011	0.00009	1.38937	0.00331	1.39268	1.50318
Ration Layer 4	0.24105	0.35913	0.00124	0.00115	1.45710	0.00032	1.45742	1.53433
Ration Layer 5	0.28281	0.23927	0.00095	0.00066	0.29481	0.00859	0.30341	0.52340
Ration Layer 6	0.01055	0.01888	0.00000	0.00000	4.72355	0.05711	4.78066	1.98322
Ration Layer 7	0.00941	0.00677	0.00000	0.00000	0.34516	0.00039	0.34554	0.58433
Ration Layer 8	0.00652	0.00765	0.00000	0.00000	0.10290	0.01418	0.11708	0.22098
Area	28.50000	308.30000	210.05556	32593.34444	0.59665	0.91776	1.51441	1.56012
Border length	29.60000	84.00000	182.04444	584.00000	0.96579	0.08051	1.04630	1.29753
Width	5.14480	16.27000	4.96342	18.30678	1.32971	0.09967	1.42938	1.52108
Asymmetry	0.54890	0.43772	0.02142	0.06217	0.03697	0.06784	0.10481	0.19901
Border index	1.22590	1.16470	0.06811	0.00978	0.01202	0.20570	0.21772	0.39130
Shape index	1.38250	1.23320	0.08429	0.01757	0.05470	0.14008	0.19478	0.35397
GLCM Homogeneity Layer 1	0.01942	0.02526	0.00009	0.00001	0.08496	0.19040	0.27536	0.48140
GLCM Homogeneity Layer 2	0.01703	0.03161	0.00002	0.00008	0.55035	0.09429	0.64464	0.95029
GLCM Homogeneity Layer 3	0.01732	0.03381	0.00007	0.00006	0.52134	0.00041	0.52175	0.81304
GLCM Homogeneity Layer 4	0.01958	0.03170	0.00004	0.00002	0.54825	0.02241	0.57066	0.86969
GLCM Homogeneity Layer 5	0.23747	0.25456	0.00001	0.00006	0.98000	0.17743	1.15743	1.37141
GLCM Homogeneity Layer 6	0.02386	0.09501	0.00012	0.00044	2.27735	0.09852	2.37587	1.81413
GLCM Homogeneity Layer 7	0.01925	0.08631	0.00005	0.00025	3.80310	0.15753	3.96063	1.96190
GLCM Homogeneity Layer 8	0.02049	0.19886	0.00006	0.00491	1.60057	0.77013	2.37070	1.81317

Table A4 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	4153.94800	2667.94800	2987749.23300	471380.52280	0.15959	0.18833	0.34792	0.58769
GLCM Contrast Layer 2	3812.36200	1912.37700	248119.21720	353896.56100	1.49911	0.00784	1.50695	1.55683
GLCM Contrast Layer 3	3643.05600	1971.07100	554849.58640	382827.40660	0.74533	0.00856	0.75389	1.05894
GLCM Contrast Layer 4	4235.65200	1746.48500	8617612.11100	357465.99680	0.17259	0.46938	0.64197	0.94749
GLCM Contrast Layer 5	3866.67100	1392.14300	1037410.32600	164675.59650	1.27347	0.18722	1.46069	1.53585
GLCM Contrast Layer 6	3303.85700	1867.86700	1729968.27900	427959.51120	0.23889	0.11316	0.35205	0.59351
GLCM Contrast Layer 7	3672.56500	2126.10200	2363595.42100	321144.56370	0.22270	0.21614	0.43884	0.71043
GLCM Contrast Layer 8	3635.16300	2313.96400	457870.71920	841101.36930	0.33595	0.02277	0.35872	0.60286
GLCM Dissimilarity Layer 1	50.47100	40.32600	126.05825	28.58496	0.16638	0.12658	0.29297	0.50790
GLCM Dissimilarity Layer2	49.50300	33.00100	18.27436	34.49814	1.29005	0.02482	1.31487	1.46298
GLCM Dissimilarity Layer 3	48.23700	33.12000	26.47507	35.64009	0.91976	0.00550	0.92526	1.20714
GLCM Dissimilarity Layer 4	50.80200	31.16400	333.12315	32.60547	0.26362	0.28112	0.54474	0.84002
GLCM Dissimilarity Layer 5	45.42800	23.72400	32.63595	14.54818	2.49588	0.03974	2.53561	1.84157
GLCM Dissimilarity Layer 6	45.40200	32.70800	91.65382	31.99977	0.32578	0.06623	0.39202	0.64861
GLCM Dissimilarity Layer 7	48.41700	34.70800	122.84625	21.19251	0.32619	0.17232	0.49851	0.78513
GLCM Dissimilarity Layer 8	47.96700	35.57100	15.74456	57.83041	0.52212	0.09908	0.62120	0.92540
GLCM Entropy Layer 1	5.38880	6.97150	0.44333	0.06010	1.24395	0.21658	1.46053	1.53577
GLCM Entropy Layer 2	5.44580	7.13730	0.36527	0.06973	1.64433	0.15477	1.79910	1.66910
GLCM Entropy Layer 3	5.44010	6.94450	0.34440	0.06750	1.37365	0.15035	1.52400	1.56432
GLCM Entropy Layer 4	5.41310	7.50380	0.46131	0.18137	1.70031	0.05260	1.75291	1.65346
GLCM Entropy Layer 5	4.11910	6.09360	0.28992	0.15546	2.18839	0.02389	2.21228	1.78110
GLCM Entropy Layer 6	5.17550	4.67950	0.30699	0.20913	0.11917	0.00915	0.12832	0.24086
GLCM Entropy Layer 7	5.18450	4.79510	0.37256	0.07212	0.08525	0.15242	0.23766	0.42307
GLCM Entropy Layer 8	5.19760	3.62000	0.34982	0.34819	0.89140	0.00000	0.89140	1.17984
GLCM Mean Layer 1	121.06300	128.18700	31.63656	1.15833	0.38688	0.49824	0.88512	1.17467
GLCM Mean Layer2	121.70900	127.80300	17.79561	1.25413	0.48737	0.35060	0.83797	1.13482
GLCM Mean Layer 3	122.17000	127.76300	17.71024	1.51925	0.40669	0.30856	0.71525	1.02186
GLCM Mean Layer 4	128.81500	126.43800	86.08881	3.91073	0.01569	0.44855	0.46425	0.74278
GLCM Mean Layer 5	120.66500	127.80600	18.70474	0.78392	0.65415	0.46701	1.12116	1.34820
GLCM Mean Layer 6	133.27200	125.63200	8.64882	4.53173	1.10712	0.02567	1.13278	1.35573
GLCM Mean Layer 7	121.60400	128.65100	56.98727	4.61679	0.20153	0.32066	0.52219	0.81356
GLCM Mean Layer 8	123.89700	127.69000	50.60427	4.53136	0.06523	0.29956	0.36479	0.61132
GLCM Correlation Layer 1	0.46016	0.53505	0.00854	0.02085	0.04772	0.04823	0.09595	0.18297
GLCM Correlation Layer 2	0.44285	0.68206	0.01206	0.00834	0.70098	0.00844	0.70943	1.01615
GLCM Correlation Layer 3	0.48636	0.65596	0.02087	0.01320	0.21105	0.01301	0.22406	0.40146
GLCM Correlation Layer 4	0.52938	0.74075	0.02899	0.00649	0.31485	0.12869	0.44354	0.71648
GLCM Correlation Layer 5	0.48757	0.79586	0.02347	0.00420	0.85889	0.16597	1.02486	1.28231
GLCM Correlation Layer 6	0.58107	0.72115	0.02613	0.00771	0.14496	0.08788	0.23285	0.41545
GLCM Correlation Layer 7	0.52826	0.67163	0.02857	0.00814	0.13998	0.09267	0.23265	0.41513
GLCM Correlation Layer 8	0.42551	0.65206	0.01214	0.01785	0.42781	0.00921	0.43703	0.70809

Table A5 J value from building and settlement area and rangeland.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1733.37600	1401.62700	17841.76287	1182.33660	1.44629	0.36402	1.81031	1.67279
Mean Layer 1	2012.19600	1316.44200	102497.45560	1022.57206	1.16903	0.81027	1.97930	1.72367
Mean Layer 2	2128.28300	1524.27900	40154.76871	2029.22079	2.16208	0.42435	2.58643	1.84942
Mean Layer 3	2104.12100	1335.04600	44005.89594	1991.59127	3.21472	0.44941	3.66413	1.94875
Mean Layer 4	3325.61000	3954.73300	179227.66370	21128.39829	0.49387	0.24366	0.73752	1.04340
Mean Layer 5	3932.11700	2718.93400	397830.64730	6964.61549	0.90899	0.67340	1.58239	1.58903
Mean Layer 6	144.52200	204.66400	211.81677	12.86756	4.02460	0.38317	4.40777	1.97564
Mean Layer 7	130.92700	77.11500	586.06291	7.75892	1.21911	0.74115	1.96026	1.71836
Mean Layer 8	89.23200	81.81000	151.57566	4.96431	0.08797	0.52424	0.61222	0.91570
Max. diff.	2.25040	2.76610	0.05496	0.00396	1.12853	0.34589	1.47443	1.54218
Standard deviation Layer 1	230.48100	30.99300	10326.57254	159.92665	0.94873	0.70305	1.65178	1.61658
Standard deviation Layer 2	211.84300	52.49200	5707.42907	224.32657	1.07020	0.48181	1.55201	1.57636
Standard deviation Layer 3	250.84100	56.89400	9955.20214	1083.43332	0.85190	0.25957	1.11147	1.34185
Standard deviation Layer 4	248.94700	309.81100	10936.52616	6500.71848	0.05311	0.01673	0.06984	0.13491
Standard deviation Layer 5	259.32300	98.15300	10080.82249	813.30705	0.59610	0.32154	0.91764	1.20108
Standard deviation Layer 6	13.03910	8.45560	23.13802	10.67308	0.15534	0.03652	0.19186	0.34915
Standard deviation Layer 7	9.75780	7.65650	6.57930	3.58733	0.10858	0.02265	0.13122	0.24596
Standard deviation Layer 8	9.55800	3.88860	5.36850	4.69709	0.79832	0.00111	0.79943	1.10083
Ration Layer 1	0.14461	0.11744	0.00024	0.00001	0.74589	0.45058	1.19647	1.39548
Ration Layer 2	0.15334	0.13594	0.00002	0.00001	2.54289	0.10661	2.64949	1.85863
Ration Layer 3	0.15177	0.11905	0.00011	0.00001	2.28785	0.38012	2.66798	1.86121
Ration Layer 4	0.24105	0.35266	0.00124	0.00006	2.40148	0.44304	2.84452	1.88368
Ration Layer 5	0.28281	0.24247	0.00095	0.00001	0.42165	0.72778	1.14943	1.36637
Ration Layer 6	0.01055	0.01826	0.00000	0.00000	5.04776	0.26576	5.31352	1.99015
Ration Layer 7	0.00941	0.00688	0.00000	0.00000	0.63564	0.47766	1.11330	1.34305
Ration Layer 8	0.00652	0.00730	0.00000	0.00000	0.12141	0.37356	0.49498	0.78083
Area	28.50000	123.60000	210.05556	3840.48889	0.55820	0.40655	0.96475	1.23784
Border length	29.60000	86.60000	182.04444	873.82222	0.76927	0.14020	0.90948	1.19453
Width	5.14480	12.18080	4.96342	23.87806	0.42912	0.14057	0.56969	0.86859
Asymmetry	0.54890	0.62722	0.02142	0.06069	0.01868	0.06493	0.08360	0.16041
Border index	1.22590	1.76590	0.06811	0.23248	0.24252	0.08881	0.33133	0.56406
Shape index	1.38250	2.01710	0.08429	0.40081	0.20754	0.13866	0.34620	0.58526
GLCM Homogeneity Layer 1	0.01942	0.02676	0.00009	0.00006	0.08920	0.00573	0.09492	0.18112
GLCM Homogeneity Layer 2	0.01703	0.02383	0.00002	0.00001	0.38624	0.04736	0.43360	0.70366
GLCM Homogeneity Layer 3	0.01732	0.03683	0.00007	0.00010	0.55225	0.01151	0.56376	0.86187
GLCM Homogeneity Layer 4	0.01958	0.02431	0.00004	0.00003	0.07705	0.00939	0.08644	0.16562
GLCM Homogeneity Layer 5	0.23747	0.24848	0.00001	0.00010	0.28282	0.25582	0.53864	0.83292
GLCM Homogeneity Layer 6	0.02386	0.03455	0.00012	0.00011	0.12620	0.00072	0.12691	0.23838
GLCM Homogeneity Layer 7	0.01925	0.02949	0.00005	0.00004	0.31374	0.00349	0.31722	0.54366
GLCM Homogeneity Layer 8	0.02049	0.08441	0.00006	0.00133	0.73425	0.45954	1.19378	1.39386

Table A5 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	4153.94800	2456.83500	2987749.23300	656967.37660	0.19756	0.13147	0.32903	0.56075
GLCM Contrast Layer 2	3812.36200	2376.29200	248119.21720	452281.99900	0.73611	0.02220	0.75831	1.06309
GLCM Contrast Layer 3	3643.05600	1930.86400	554849.58640	461552.86980	0.72107	0.00212	0.72319	1.02959
GLCM Contrast Layer 4	4235.65200	2424.00700	8617612.11100	386301.68100	0.09113	0.45159	0.54272	0.83767
GLCM Contrast Layer 5	3866.67100	2418.07500	1037410.32600	582673.99190	0.32381	0.02052	0.34433	0.58261
GLCM Contrast Layer 6	3303.85700	2152.12800	1729968.27900	300436.01180	0.16333	0.17115	0.33448	0.56857
GLCM Contrast Layer 7	3672.56500	2488.80500	2363595.42100	329598.74770	0.13008	0.21121	0.34129	0.57830
GLCM Contrast Layer 8	3635.16300	2402.77400	457870.71920	864290.88640	0.28718	0.02481	0.31199	0.53602
GLCM Dissimilarity Layer 1	50.47100	37.89000	126.05825	47.56176	0.22791	0.05717	0.28508	0.49609
GLCM Dissimilarity Layer2	49.50300	37.71500	18.27436	25.26965	0.79780	0.00654	0.80433	1.10523
GLCM Dissimilarity Layer 3	48.23700	32.47500	26.47507	37.50783	0.97073	0.00755	0.97828	1.24808
GLCM Dissimilarity Layer 4	50.80200	38.63400	333.12315	33.19985	0.10104	0.27742	0.37846	0.63018
GLCM Dissimilarity Layer 5	45.42800	33.89300	32.63595	35.67547	0.48695	0.00050	0.48744	0.77161
GLCM Dissimilarity Layer 6	45.40200	35.95900	91.65382	31.83543	0.18052	0.06685	0.24738	0.43831
GLCM Dissimilarity Layer 7	48.41700	39.29400	122.84625	27.24956	0.13863	0.13007	0.26870	0.47125
GLCM Dissimilarity Layer 8	47.96700	37.70700	15.74456	73.44047	0.29508	0.13554	0.43062	0.69979
GLCM Entropy Layer 1	5.38880	6.68920	0.44333	0.11894	0.75188	0.10118	0.85306	1.14778
GLCM Entropy Layer 2	5.44580	6.81690	0.36527	0.14442	0.92209	0.05199	0.97408	1.24492
GLCM Entropy Layer 3	5.44010	6.69390	0.34440	0.10714	0.87035	0.08077	0.95113	1.22739
GLCM Entropy Layer 4	5.41310	6.84400	0.46131	0.15071	0.83637	0.07446	0.91082	1.19561
GLCM Entropy Layer 5	4.11910	5.45730	0.28992	0.14034	1.04052	0.03220	1.07272	1.31584
GLCM Entropy Layer 6	5.17550	5.92890	0.30699	0.09354	0.35428	0.08351	0.43780	0.70909
GLCM Entropy Layer 7	5.18450	5.93980	0.37256	0.02244	0.36107	0.38507	0.74614	1.05161
GLCM Entropy Layer 8	5.19760	4.67110	0.34982	0.66348	0.06839	0.02518	0.09357	0.17866
GLCM Mean Layer 1	121.06300	129.52300	31.63656	3.70265	0.50632	0.24508	0.75140	1.05659
GLCM Mean Layer2	121.70900	130.02500	17.79561	3.24967	0.82151	0.16239	0.98390	1.25230
GLCM Mean Layer 3	122.17000	129.11800	17.71024	2.38615	0.60054	0.21774	0.81828	1.11762
GLCM Mean Layer 4	128.81500	128.09500	86.08881	14.24887	0.00129	0.17968	0.18097	0.33109
GLCM Mean Layer 5	120.66500	129.77200	18.70474	10.64784	0.70639	0.01958	0.72597	1.03229
GLCM Mean Layer 6	133.27200	127.06600	8.64882	10.47416	0.50351	0.00229	0.50580	0.79395
GLCM Mean Layer 7	121.60400	126.93500	56.98727	9.83465	0.10633	0.17226	0.27858	0.48629
GLCM Mean Layer 8	123.89700	127.37300	50.60427	4.75213	0.05457	0.28967	0.34423	0.58247
GLCM Correlation Layer 1	0.46016	0.59482	0.00854	0.02703	0.12746	0.07877	0.20623	0.37271
GLCM Correlation Layer 2	0.44285	0.63679	0.01206	0.01449	0.35416	0.00209	0.35625	0.59941
GLCM Correlation Layer 3	0.48636	0.68829	0.02087	0.01350	0.29656	0.01176	0.30832	0.53065
GLCM Correlation Layer 4	0.52938	0.62369	0.02899	0.00559	0.06431	0.15311	0.21742	0.39082
GLCM Correlation Layer 5	0.48757	0.65799	0.02347	0.00602	0.24623	0.10770	0.35392	0.59614
GLCM Correlation Layer 6	0.58107	0.66366	0.02613	0.00473	0.05526	0.16406	0.21932	0.39387
GLCM Correlation Layer 7	52826	57355	02857	01137	01284	05133	06417	12431
GLCM Correlation Layer 8	42551	59625	01214	02414	20088	02893	22981	41063

Table A6 J value from building and settlement area and water body.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1733.37600	1155.76800	17841.76287	14834.20397	2.55257	0.00213	2.55470	1.84457
Mean Layer 1	2012.19600	1665.12000	102497.45560	26324.60884	0.23378	0.10756	0.34133	0.57835
Mean Layer 2	2128.28300	1982.50800	40154.76871	80686.62151	0.04396	0.02984	0.07380	0.14229
Mean Layer 3	2104.12100	1990.85000	44005.89594	136906.86820	0.01773	0.07653	0.09426	0.17990
Mean Layer 4	3325.61000	1743.95000	179227.66370	44851.55109	2.79103	0.11142	2.90245	1.89022
Mean Layer 5	3932.11700	1516.09200	397830.64730	31830.54168	3.39638	0.32331	3.71970	1.95152
Mean Layer 6	144.52200	80.77700	211.81677	298.80845	1.98944	0.00736	1.99680	1.72846
Mean Layer 7	130.92700	100.33600	586.06291	34.45612	0.37703	0.39043	0.76745	1.07161
Mean Layer 8	89.23200	166.52500	151.57566	322.91541	3.14769	0.03493	3.18262	1.91705
Max. diff.	2.25040	1.69900	0.05496	0.01505	1.08575	0.09823	1.18398	1.38788
Standard deviation Layer 1	230.48100	44.98700	10326.57254	365.55569	0.80452	0.50608	1.31060	1.46068
Standard deviation Layer 2	211.84300	56.26400	5707.42907	483.00212	0.97751	0.31142	1.28893	1.44887
Standard deviation Layer 3	250.84100	71.51700	9955.20214	1136.50100	0.72480	0.25001	0.97481	1.24547
Standard deviation Layer 4	248.94700	124.18600	10936.52616	8201.09163	0.20333	0.00516	0.20849	0.37639
Standard deviation Layer 5	259.32300	101.17200	10080.82249	4690.16502	0.42333	0.03573	0.45906	0.73624
Standard deviation Layer 6	13.03910	9.15520	23.13802	41.82114	0.05805	0.02159	0.07964	0.15310
Standard deviation Layer 7	9.75780	6.25910	6.57930	12.05007	0.16427	0.02255	0.18682	0.34081
Standard deviation Layer 8	9.55800	7.36440	5.36850	16.17177	0.05585	0.07243	0.12828	0.24079
Ration Layer 1	0.14461	0.18055	0.00024	0.00013	0.89103	0.02468	0.91571	1.19954
Ration Layer 2	0.15334	0.21391	0.00002	0.00020	4.16485	0.23963	4.40448	1.97555
Ration Layer 3	0.15177	0.21386	0.00011	0.00038	1.95889	0.09087	2.04976	1.74247
Ration Layer 4	0.24105	0.18886	0.00124	0.00023	0.46316	0.15876	0.62192	0.92618
Ration Layer 5	0.28281	0.16483	0.00095	0.00039	2.59052	0.04769	2.63820	1.85702
Ration Layer 6	0.01055	0.00892	0.00000	0.00001	0.07173	0.04838	0.12012	0.22637
Ration Layer 7	0.00941	0.01101	0.00000	0.00000	0.12021	0.00166	0.12187	0.22947
Ration Layer 8	0.00652	0.01808	0.00000	0.00000	7.84049	0.05564	7.89613	1.99926
Area	28.50000	174.70000	210.05556	39580.67778	0.13429	0.96575	1.10005	1.33429
Border length	29.60000	70.80000	182.04444	1643.73333	0.23243	0.25606	0.48849	0.77290
Width	5.14480	11.60410	4.96342	52.22826	0.18238	0.28720	0.46958	0.74947
Asymmetry	0.54890	0.51831	0.02142	0.07180	0.00251	0.08637	0.08888	0.17009
Border index	1.22590	1.35670	0.06811	0.05597	0.03447	0.00241	0.03688	0.07241
Shape index	1.38250	1.53370	0.08429	0.13578	0.02597	0.01407	0.04004	0.07851
GLCM Homogeneity Layer 1	0.01942	0.03437	0.00009	0.00020	0.19806	0.03987	0.23793	0.42349
GLCM Homogeneity Layer 2	0.01703	0.03283	0.00002	0.00008	0.60478	0.10625	0.71103	1.01772
GLCM Homogeneity Layer 3	0.01732	0.03311	0.00007	0.00010	0.36799	0.01003	0.37802	0.62956
GLCM Homogeneity Layer 4	0.01958	0.04096	0.00004	0.00032	0.31613	0.21563	0.53176	0.82486
GLCM Homogeneity Layer 5	0.23747	0.25455	0.00001	0.00038	0.18452	0.56270	0.74722	1.05264
GLCM Homogeneity Layer 6	0.02386	0.08887	0.00012	0.00392	0.26138	0.54166	0.80304	1.10407
GLCM Homogeneity Layer 7	0.01925	0.07695	0.00005	0.00694	0.11904	0.90704	1.02608	1.28318
GLCM Homogeneity Layer 8	0.02049	0.08867	0.00006	0.00769	0.15011	0.87995	1.03006	1.28603

Table A6 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	4153.94800	2949.91900	2987749.23300	1658584.28400	0.07800	0.02134	0.09935	0.18914
GLCM Contrast Layer 2	3812.36200	2943.11400	248119.21720	1596316.75400	0.10242	0.19105	0.29346	0.50865
GLCM Contrast Layer 3	3643.05600	2812.11500	554849.58640	1770516.09900	0.07423	0.07981	0.15404	0.28553
GLCM Contrast Layer 4	4235.65200	3376.09900	8617612.11100	4700693.74700	0.01387	0.02262	0.03649	0.07166
GLCM Contrast Layer 5	3866.67100	4214.86200	1037410.32600	8639713.87600	0.00313	0.24003	0.24317	0.43172
GLCM Contrast Layer 6	3303.85700	3357.36800	1729968.27900	3781270.90300	0.00013	0.03728	0.03741	0.07344
GLCM Contrast Layer 7	3672.56500	4218.78200	2363595.42100	2756373.39800	0.01457	0.00148	0.01604	0.03183
GLCM Contrast Layer 8	3635.16300	3324.26000	457870.71920	3873154.13400	0.00558	0.24310	0.24868	0.44035
GLCM Dissimilarity Layer 1	50.47100	39.79000	126.05825	64.95211	0.14932	0.02699	0.17631	0.32328
GLCM Dissimilarity Layer2	49.50300	39.71400	18.27436	78.66029	0.24714	0.12279	0.36992	0.61842
GLCM Dissimilarity Layer 3	48.23700	38.59100	26.47507	90.95588	0.19809	0.08971	0.28779	0.50017
GLCM Dissimilarity Layer 4	50.80200	40.06200	333.12315	319.45457	0.04419	0.00011	0.04430	0.08666
GLCM Dissimilarity Layer 5	45.42800	43.11500	32.63595	423.90292	0.00293	0.33153	0.33446	0.56856
GLCM Dissimilarity Layer 6	45.40200	40.48200	91.65382	226.24120	0.01904	0.04938	0.06842	0.13226
GLCM Dissimilarity Layer 7	48.41700	47.54900	122.84625	179.76865	0.00062	0.00901	0.00963	0.01916
GLCM Dissimilarity Layer 8	47.96700	40.89700	15.74456	252.31516	0.04662	0.37724	0.42386	0.69096
GLCM Entropy Layer 1	5.38880	6.39240	0.44333	0.90793	0.18635	0.03145	0.21780	0.39143
GLCM Entropy Layer 2	5.44580	6.30270	0.36527	0.78871	0.15907	0.03615	0.19523	0.35471
GLCM Entropy Layer 3	5.44010	6.36910	0.34440	0.76102	0.19518	0.03830	0.23348	0.41646
GLCM Entropy Layer 4	5.41310	6.35250	0.46131	0.98694	0.15233	0.03531	0.18765	0.34218
GLCM Entropy Layer 5	4.11910	5.02710	0.28992	1.25673	0.13327	0.12388	0.25715	0.45349
GLCM Entropy Layer 6	5.17550	4.80980	0.30699	0.78066	0.03074	0.05257	0.08331	0.15988
GLCM Entropy Layer 7	5.18450	5.03550	0.37256	1.04399	0.00392	0.06362	0.06754	0.13061
GLCM Entropy Layer 8	5.19760	4.95240	0.34982	0.90127	0.01201	0.05401	0.06602	0.12778
GLCM Mean Layer 1	121.06300	120.18200	31.63656	26.93388	0.00331	0.00162	0.00493	0.00984
GLCM Mean Layer2	121.70900	120.28300	17.79561	28.73082	0.01093	0.01421	0.02513	0.04964
GLCM Mean Layer 3	122.17000	120.14500	17.71024	29.07154	0.02191	0.01520	0.03711	0.07286
GLCM Mean Layer 4	128.81500	134.62600	86.08881	44.47787	0.06466	0.02678	0.09143	0.17475
GLCM Mean Layer 5	120.66500	137.11400	18.70474	67.37378	0.78582	0.09630	0.88212	1.17219
GLCM Mean Layer 6	133.27200	135.77400	8.64882	41.08383	0.03147	0.13850	0.16997	0.31261
GLCM Mean Layer 7	121.60400	125.65400	56.98727	28.39267	0.04803	0.02974	0.07777	0.14965
GLCM Mean Layer 8	123.89700	117.31200	50.60427	45.14084	0.11322	0.00082	0.11404	0.21555
GLCM Correlation Layer 1	0.46016	0.62461	0.00854	0.01744	0.26023	0.03124	0.29147	0.50567
GLCM Correlation Layer 2	0.44285	0.63036	0.01206	0.01748	0.29756	0.00854	0.30610	0.52738
GLCM Correlation Layer 3	0.48636	0.66236	0.02087	0.01971	0.19083	0.00021	0.19104	0.34780
GLCM Correlation Layer 4	0.52938	0.61083	0.02899	0.04281	0.02310	0.00944	0.03254	0.06404
GLCM Correlation Layer 5	0.48757	0.57458	0.02347	0.04566	0.02738	0.02720	0.05458	0.10623
GLCM Correlation Layer 6	0.58107	0.57500	0.02613	0.04770	0.00012	0.02229	0.02242	0.04434
GLCM Correlation Layer 7	0.52826	0.34612	0.02857	0.04153	0.11830	0.00870	0.12700	0.23853
GLCM Correlation Layer 8	0.42551	0.64583	0.01214	0.02895	0.29529	0.04577	0.34106	0.57796

Table A7 J value from field crops and building and settlement area.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1519.20600	1733.37600	7791.45380	17841.76287	0.44736	0.04173	0.48909	0.77363
Mean Layer 1	1407.32200	2012.19600	1706.01482	102497.45560	0.87778	0.68560	1.56338	1.58115
Mean Layer 2	1669.33600	2128.28300	3772.87214	40154.76871	1.19875	0.28955	1.48830	1.54849
Mean Layer 3	1516.93200	2104.12100	21117.63853	44005.89594	1.32360	0.03296	1.35656	1.48491
Mean Layer 4	4176.82400	3325.61000	660161.72103	179227.66370	0.21580	0.09948	0.31528	0.54083
Mean Layer 5	3019.85800	3932.11700	56229.48708	397830.64730	0.45821	0.20867	0.66688	0.97339
Mean Layer 6	196.21400	144.52200	602.17883	211.81677	0.82066	0.06533	0.88600	1.17539
Mean Layer 7	83.49200	130.92700	455.70677	586.06291	0.53997	0.00395	0.54391	0.83905
Mean Layer 8	83.66300	89.23200	61.38982	151.57566	0.03641	0.04941	0.08582	0.16447
Max. diff.	2.69950	2.25040	0.14298	0.05496	0.25474	0.05509	0.30983	0.53286
Standard deviation Layer 1	26.41000	230.48100	121.75531	10326.57254	0.99645	0.76940	1.76585	1.65792
Standard deviation Layer 2	40.28400	211.84300	285.62138	5707.42907	1.22778	0.42656	1.65433	1.61756
Standard deviation Layer 3	54.79900	250.84100	825.13468	9955.20214	0.89126	0.31582	1.20708	1.40186
Standard deviation Layer 4	185.98400	248.94700	3112.73600	10936.52616	0.07054	0.09281	0.16335	0.30142
Standard deviation Layer 5	83.75800	259.32300	1212.12617	10080.82249	0.68235	0.23976	0.92212	1.20465
Standard deviation Layer 6	6.06310	13.03910	8.87132	23.13802	0.38008	0.05537	0.43545	0.70605
Standard deviation Layer 7	5.19310	9.75780	3.41751	6.57930	0.52108	0.02635	0.54743	0.84313
Standard deviation Layer 8	2.87180	9.55800	3.00483	5.36850	1.33475	0.02076	1.35551	1.48437
Ration Layer 1	0.11622	0.14461	0.00007	0.00024	0.65687	0.08758	0.74444	1.05000
Ration Layer 2	0.13776	0.15334	0.00009	0.00002	0.53395	0.10419	0.63813	0.94344
Ration Layer 3	0.12551	0.15177	0.00028	0.00011	0.44182	0.05248	0.49430	0.78001
Ration Layer 4	0.34173	0.24105	0.00244	0.00124	0.68878	0.02816	0.71695	1.02352
Ration Layer 5	0.24878	0.28281	0.00038	0.00095	0.21743	0.05091	0.26833	0.47070
Ration Layer 6	0.01612	0.01055	0.00000	0.00000	2.90896	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 7	0.00694	0.00941	0.00000	0.00000	0.62986	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 8	0.00693	0.00652	0.00000	0.00000	0.03633	#DIV/0!	#DIV/0!	#DIV/0!
Area	222.30000	28.50000	9300.23333	210.05556	0.98731	0.61220	1.59951	1.59601
Border length	89.00000	29.60000	253.55556	182.04444	2.02500	0.00683	2.03183	1.73781
Width	13.50670	5.14480	36.01383	4.96342	0.42659	0.21344	0.64002	0.94544
Asymmetry	0.61741	0.54890	0.06772	0.02142	0.01316	0.07861	0.09177	0.17537
Border index	1.34440	1.22590	0.01607	0.06811	0.04170	0.12040	0.16210	0.29928
Shape index	1.56960	1.38250	0.09491	0.08429	0.04884	0.00088	0.04972	0.09700
GLCM Homogeneity Layer 1	0.03142	0.01942	0.00009	0.00009	0.20370	0.00007	0.20378	0.36871
GLCM Homogeneity Layer 2	0.03542	0.01703	0.00004	0.00002	1.38110	0.02464	1.40574	1.50963
GLCM Homogeneity Layer 3	0.03558	0.01732	0.00005	0.00007	0.70729	0.00582	0.71310	1.01976
GLCM Homogeneity Layer 4	0.03205	0.01958	0.00002	0.00004	0.61380	0.03650	0.65030	0.95622
GLCM Homogeneity Layer 5	0.25653	0.23747	0.00002	0.00001	2.95875	0.02409	2.98284	1.89870
GLCM Homogeneity Layer 6	0.07105	0.02386	0.00186	0.00012	0.28126	0.37124	0.65250	0.95851
GLCM Homogeneity Layer 7	1519.20600	1733.37600	7791.45380	17841.76287	0.44736	0.04173	0.48909	0.77363
GLCM Homogeneity Layer 8	1407.32200	2012.19600	1706.01482	102497.45560	0.87778	0.68560	1.56338	1.58115

Table A7 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.06888	0.01925	0.00087	0.00005	0.67189	0.41054	1.08243	1.32246
GLCM Contrast Layer 2	0.12134	0.02049	0.00366	0.00006	0.68398	0.69856	1.38254	1.49812
GLCM Contrast Layer 3	1997.14400	4153.94800	333414.92043	2987749.23300	0.35016	0.25455	0.60471	0.90753
GLCM Contrast Layer 4	1844.71100	3812.36200	181066.55065	248119.21720	2.25523	0.00618	2.26141	1.79159
GLCM Contrast Layer 5	1660.13000	3643.05600	267203.10244	554849.58640	1.19579	0.03265	1.22844	1.41450
GLCM Contrast Layer 6	1799.18100	4235.65200	40511.59017	8617612.11100	0.17141	0.99577	1.16718	1.37751
GLCM Contrast Layer 7	1448.58300	3866.67100	163903.01402	1037410.32600	1.21682	0.18807	1.40490	1.50921
GLCM Contrast Layer 8	1854.38300	3303.85700	87701.09291	1729968.27900	0.28897	0.42363	0.71260	1.01926
GLCM Dissimilarity Layer 1	1886.69700	3672.56500	152586.25722	2363595.42100	0.31688	0.36976	0.68664	0.99347
GLCM Dissimilarity Layer2	2227.62900	3635.16300	213011.79312	457870.71920	0.73826	0.03574	0.77400	1.07767
GLCM Dissimilarity Layer 3	33.72900	50.47100	31.58301	126.05825	0.44451	0.11125	0.55576	0.85273
GLCM Dissimilarity Layer 4	31.46700	49.50300	14.90920	18.27436	2.45074	0.00258	2.45333	1.82799
GLCM Dissimilarity Layer 5	30.05500	48.23700	23.48709	26.47507	1.65418	0.00090	1.65507	1.61784
GLCM Dissimilarity Layer 6	31.64100	50.80200	2.99374	333.12315	0.27308	0.83590	1.10897	1.34021
GLCM Dissimilarity Layer 7	24.63400	45.42800	15.74749	32.63595	2.23419	0.03248	2.26667	1.79269
GLCM Dissimilarity Layer 8	32.96200	45.40200	5.78997	91.65382	0.39703	0.37453	0.77156	1.07542
GLCM Entropy Layer 1	32.91900	48.41700	12.43899	122.84625	0.44385	0.27418	0.71803	1.02458
GLCM Entropy Layer 2	36.31200	47.96700	19.13144	15.74456	0.97373	0.00237	0.97610	1.24644
GLCM Entropy Layer 3	6.96510	5.38880	0.13964	0.44333	1.06555	0.07915	1.14470	1.36336
GLCM Entropy Layer 4	7.03680	5.44580	0.19496	0.36527	1.12957	0.02424	1.15381	1.36913
GLCM Entropy Layer 5	7.11650	5.44010	0.15457	0.34440	1.40805	0.03909	1.44714	1.52952
GLCM Entropy Layer 6	7.26090	5.41310	0.14770	0.46131	1.40160	0.07703	1.47863	1.54410
GLCM Entropy Layer 7	5.91170	4.11910	0.13357	0.28992	1.89699	0.03663	1.93362	1.71075
GLCM Entropy Layer 8	5.42650	5.17550	0.71961	0.30699	0.01534	0.04405	0.05939	0.11532
GLCM Mean Layer 1	5.39460	5.18450	0.32784	0.37256	0.01576	0.00102	0.01678	0.03327
GLCM Mean Layer2	4.29780	5.19760	0.59166	0.34982	0.21499	0.01707	0.23206	0.41420
GLCM Mean Layer 3	127.10500	121.06300	2.01281	31.63656	0.27122	0.37296	0.64418	0.94982
GLCM Mean Layer 4	127.11500	121.70900	2.73161	17.79561	0.35593	0.19334	0.54927	0.84526
GLCM Mean Layer 5	127.24700	122.17000	1.71762	17.71024	0.33169	0.28301	0.61470	0.91839
GLCM Mean Layer 6	126.55900	128.81500	2.21945	86.08881	0.01441	0.58068	0.59509	0.89698
GLCM Mean Layer 7	127.26600	120.66500	2.87492	18.70474	0.50479	0.19310	0.69790	1.00474
GLCM Mean Layer 8	125.86600	133.27200	2.84209	8.64882	1.19331	0.07371	1.26702	1.43666
GLCM Correlation Layer 1	127.85500	121.60400	3.46456	56.98727	0.16160	0.38300	0.54459	0.83984
GLCM Correlation Layer 2	126.89400	123.89700	4.69514	50.60427	0.04061	0.29217	0.33277	0.56613
GLCM Correlation Layer 3	0.64018	0.46016	0.01003	0.00854	0.43633	0.00162	0.43794	0.70928
GLCM Correlation Layer 4	0.67954	0.44285	0.00569	0.01206	0.78890	0.03449	0.82339	1.12212
GLCM Correlation Layer 5	0.72606	0.48636	0.00489	0.02087	0.55757	0.12148	0.67904	0.98580
GLCM Correlation Layer 6	0.70700	0.52938	0.00066	0.02899	0.26603	0.61028	0.87631	1.16737
GLCM Correlation Layer 7	0.78780	0.48757	0.00486	0.02347	0.79552	0.14117	0.93670	1.21616
GLCM Correlation Layer 8	0.71401	0.58107	0.00136	0.02613	0.16071	0.41771	0.57842	0.87843

Table A8 J value from field crops and forest areas.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1519.20600	1361.15700	7791.45380	4860.82820	0.17011	4860.99831	2.00000	1.85418
Mean Layer 1	1407.32200	1283.41800	1706.01482	932.59988	0.00505	932.60493	2.00000	1.99755
Mean Layer 2	1669.33600	1451.23000	3772.87214	2841.38796	0.05501	2841.44296	2.00000	0.37943
Mean Layer 3	1516.93200	1275.86900	21117.63853	1190.61388	0.38438	1190.99825	2.00000	1.93469
Mean Layer 4	4176.82400	3922.79500	660161.72103	92203.98903	0.93781	92204.92684	2.00000	1.99543
Mean Layer 5	3019.85800	2592.84400	56229.48708	28402.83169	0.44514	28403.27683	2.00000	1.55896
Mean Layer 6	196.21400	207.83400	602.17883	22.27116	0.06763	22.33879	2.00000	1.99962
Mean Layer 7	83.49200	73.12300	455.70677	7.00273	0.18526	7.18800	1.99849	0.70463
Mean Layer 8	83.66300	82.14200	61.38982	11.69544	0.00528	11.70072	1.99998	1.35001
Max. diff.	2.69950	2.82510	0.14298	0.00680	0.42401	0.43081	0.70004	1.99534
Standard deviation Layer 1	26.41000	17.33500	121.75531	13.73434	0.20730	13.94164	2.00000	0.63158
Standard deviation Layer 2	40.28400	29.48300	285.62138	25.58353	0.27026	25.85379	2.00000	0.56708
Standard deviation Layer 3	54.79900	19.48600	825.13468	57.75680	0.60156	58.35836	2.00000	1.47431
Standard deviation Layer 4	185.98400	191.51100	3112.73600	1215.10192	0.38036	1215.48228	2.00000	0.62409
Standard deviation Layer 5	83.75800	54.31100	1212.12617	225.78528	0.45169	226.23697	2.00000	0.94186
Standard deviation Layer 6	6.06310	3.95300	8.87132	0.47401	0.03977	0.51379	0.80355	1.20133
Standard deviation Layer 7	5.19310	4.55540	3.41751	0.61919	0.00514	0.62434	0.92877	1.68703
Standard deviation Layer 8	2.87180	1.76970	3.00483	0.31491	0.01732	0.33223	0.56535	0.81647
Ration Layer 1	0.11622	0.11805	0.00007	0.00002	1.51131	1.51134	1.55877	0.53832
Ration Layer 2	0.13776	0.13337	0.00009	0.00001	1.47903	1.47904	1.54429	1.71796
Ration Layer 3	0.12551	0.11732	0.00028	0.00001	1.16409	1.16410	1.37559	1.65925
Ration Layer 4	0.34173	0.35987	0.00244	0.00010	0.90524	0.90534	1.19119	0.83912
Ration Layer 5	0.24878	0.23800	0.00038	0.00002	1.26419	1.26421	1.43507	0.41163
Ration Layer 6	0.01612	0.01911	0.00000	0.00000	#DIV/0!	#DIV/0!	#DIV/0!	0.39370
Ration Layer 7	0.00694	0.00673	0.00000	0.00000	#DIV/0!	#DIV/0!	#DIV/0!	0.61292
Ration Layer 8	0.00693	0.00757	0.00000	0.00000	#DIV/0!	#DIV/0!	#DIV/0!	0.87724
Area	222.30000	396.60000	9300.23333	58820.71111	0.46302	58821.17413	2.00000	1.67482
Border length	89.00000	140.00000	253.55556	2475.55556	0.02173	2475.57729	2.00000	0.86048
Width	13.50670	20.40440	36.01383	43.33958	0.01991	43.35948	2.00000	0.19078
Asymmetry	0.61741	0.53568	0.06772	0.05233	0.22999	0.28232	0.49193	0.27018
Border index	1.34440	1.69850	0.01607	0.05526	0.82327	0.87853	1.16921	0.21241
Shape index	1.56960	1.83230	0.09491	0.08368	0.41878	0.50246	0.78991	0.56268
GLCM Homogeneity Layer 1	0.03142	0.02320	0.00009	0.00001	1.04335	1.04336	1.29546	0.92520
GLCM Homogeneity Layer 2	0.03542	0.02264	0.00004	0.00001	1.23891	1.23892	1.42061	1.40231
GLCM Homogeneity Layer 3	0.03558	0.02516	0.00005	0.00006	1.20964	1.20970	1.40343	1.58910
GLCM Homogeneity Layer 4	0.03205	0.02139	0.00002	0.00001	1.39760	1.39761	1.50562	0.04317
GLCM Homogeneity Layer 5	0.25653	0.25190	0.00002	0.00002	2.01373	2.01375	1.73303	1.13945
GLCM Homogeneity Layer 6	0.07105	0.04940	0.00186	0.00010	0.49176	0.49186	0.77702	0.00953
GLCM Homogeneity Layer 7	1519.20600	1361.15700	7791.45380	4860.82820	0.17011	4860.99831	2.00000	1.85418
GLCM Homogeneity Layer 8	1407.32200	1283.41800	1706.01482	932.59988	0.00505	932.60493	2.00000	1.99755

Table A8 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.06888	0.04146	0.00087	0.00008	0.62978	0.62986	0.93467	1.14877
GLCM Contrast Layer 2	0.12134	0.15928	0.00366	0.00180	0.60809	0.60989	0.91318	0.91965
GLCM Contrast Layer 3	1997.14400	2574.37300	333414.92043	73489.04847	0.87322	73489.92169	2.00000	1.43056
GLCM Contrast Layer 4	1844.71100	2460.72800	181066.55065	177072.49820	0.73478	177073.2329	2.00000	0.84649
GLCM Contrast Layer 5	1660.13000	2108.30700	267203.10244	108952.22130	0.86789	108953.0891	2.00000	0.47050
GLCM Contrast Layer 6	1799.18100	2672.58900	40511.59017	44149.58097	0.36500	44149.94597	2.00000	0.07467
GLCM Contrast Layer 7	1448.58300	1645.13500	163903.01402	119103.88290	0.80878	119104.6916	2.00000	0.03647
GLCM Contrast Layer 8	1854.38300	2729.50400	87701.09291	79518.72916	0.53620	79519.26536	2.00000	1.18315
GLCM Dissimilarity Layer 1	1886.69700	2973.43200	152586.25722	198792.39400	0.64758	198793.0415	2.00000	0.43738
GLCM Dissimilarity Layer2	2227.62900	2283.70700	213011.79312	141961.03300	0.79265	141961.8256	2.00000	1.45307
GLCM Dissimilarity Layer 3	33.72900	40.09900	31.58301	5.22219	0.00355	5.22574	1.98925	0.71067
GLCM Dissimilarity Layer 4	31.46700	38.74400	14.90920	12.03387	0.05496	12.08883	1.99999	1.09201
GLCM Dissimilarity Layer 5	30.05500	35.85200	23.48709	14.10297	0.01110	14.11407	2.00000	0.84232
GLCM Dissimilarity Layer 6	31.64100	40.65100	2.99374	4.05334	0.34108	4.39442	1.97531	0.97165
GLCM Dissimilarity Layer 7	24.63400	27.65300	15.74749	9.18167	0.01956	9.20123	1.99980	0.89465
GLCM Dissimilarity Layer 8	32.96200	41.55000	5.78997	3.92704	0.21135	4.13839	1.96810	1.95809
GLCM Entropy Layer 1	32.91900	43.11900	12.43899	10.36894	0.09094	10.45988	1.99994	0.78310
GLCM Entropy Layer 2	36.31200	37.44500	19.13144	12.34829	0.02767	12.37597	1.99999	0.57215
GLCM Entropy Layer 3	6.96510	7.20030	0.13964	0.14702	0.64873	0.79575	1.09751	0.65903
GLCM Entropy Layer 4	7.03680	7.55770	0.19496	0.27969	0.58054	0.86023	1.15387	1.84733
GLCM Entropy Layer 5	7.11650	7.18090	0.15457	0.11267	0.62371	0.73638	1.04231	0.00822
GLCM Entropy Layer 6	7.26090	7.75800	0.14770	0.38845	0.65318	1.04163	1.29424	0.21375
GLCM Entropy Layer 7	5.91170	6.32080	0.13357	0.37300	0.62813	1.00112	1.26507	0.42071
GLCM Entropy Layer 8	5.42650	5.36390	0.71961	0.04587	0.21856	0.26442	0.46470	0.82795
GLCM Mean Layer 1	5.39460	5.62310	0.32784	0.04847	0.39229	0.44076	0.71290	0.38051
GLCM Mean Layer2	4.29780	3.72870	0.59166	0.24130	0.18729	0.42858	0.69714	0.05990
GLCM Mean Layer 3	127.10500	127.63100	2.01281	1.54123	0.69865	2.23989	1.78706	1.00389
GLCM Mean Layer 4	127.11500	127.78900	2.73161	5.31070	0.62537	5.93607	1.99472	0.02828
GLCM Mean Layer 5	127.24700	127.41700	1.71762	1.18873	0.73675	1.92549	1.70839	0.47489
GLCM Mean Layer 6	126.55900	126.85600	2.21945	7.88714	0.67355	8.56068	1.99962	0.91319
GLCM Mean Layer 7	127.26600	127.61100	2.87492	3.82963	0.61281	4.44244	1.97647	1.71788
GLCM Mean Layer 8	125.86600	126.17200	2.84209	6.41662	0.61284	7.02946	1.99823	1.96647
GLCM Correlation Layer 1	127.85500	127.77300	3.46456	5.24849	0.56872	5.81721	1.99405	0.91510
GLCM Correlation Layer 2	126.89400	127.75100	4.69514	1.14534	0.49736	1.64271	1.61309	0.53441
GLCM Correlation Layer 3	0.64018	0.54193	0.01003	0.00399	0.65998	0.66397	0.97039	0.17230
GLCM Correlation Layer 4	0.67954	0.58872	0.00569	0.00794	0.81805	0.82599	1.12440	0.62707
GLCM Correlation Layer 5	0.72606	0.62994	0.00489	0.00178	0.87190	0.87368	1.16517	0.13432
GLCM Correlation Layer 6	0.70700	0.57380	0.00066	0.00141	1.34595	1.34736	1.48015	1.15229
GLCM Correlation Layer 7	0.78780	0.76240	0.00486	0.00256	0.92046	0.92302	1.20536	0.55772
GLCM Correlation Layer 8	0.71401	0.57949	0.00136	0.00310	1.16826	1.17136	1.38011	0.85668

Table A9 J value from field crops and paddy field.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1519.20600	1321.03100	7791.45380	8597.03472	0.59910	0.00060	0.59970	0.90205
Mean Layer 1	1407.32200	1304.21400	1706.01482	442.12358	1.23726	0.10623	1.34349	1.47813
Mean Layer 2	1669.33600	1524.75100	3772.87214	913.79552	1.11512	0.11637	1.23149	1.41628
Mean Layer 3	1516.93200	1331.44600	21117.63853	1571.55178	0.37909	0.33883	0.71792	1.02447
Mean Layer 4	4176.82400	3676.98600	660161.72103	324461.02860	0.06343	0.03089	0.09433	0.18003
Mean Layer 5	3019.85800	2368.87000	56229.48708	40450.86540	1.09584	0.00675	1.10259	1.33598
Mean Layer 6	196.21400	197.51400	602.17883	195.67825	0.00053	0.07513	0.07566	0.14574
Mean Layer 7	83.49200	71.31400	455.70677	47.39534	0.07369	0.26873	0.34242	0.57991
Mean Layer 8	83.66300	93.14700	61.38982	65.04105	0.17786	0.00021	0.17807	0.32622
Max. diff.	2.69950	2.71520	0.14298	0.05576	0.00031	0.05349	0.05380	0.10476
Standard deviation Layer 1	26.41000	23.25300	121.75531	103.70462	0.01105	0.00161	0.01266	0.02516
Standard deviation Layer 2	40.28400	37.11800	285.62138	415.02597	0.00358	0.00868	0.01225	0.02436
Standard deviation Layer 3	54.79900	37.16500	825.13468	524.67636	0.05759	0.01270	0.07030	0.13577
Standard deviation Layer 4	185.98400	232.63600	3112.73600	4277.92832	0.07362	0.00629	0.07991	0.15361
Standard deviation Layer 5	83.75800	78.78000	1212.12617	1518.79980	0.00227	0.00317	0.00544	0.01085
Standard deviation Layer 6	6.06310	6.75160	8.87132	1.82859	0.01108	0.14195	0.15303	0.28379
Standard deviation Layer 7	5.19310	5.34680	3.41751	0.84514	0.00139	0.11321	0.11459	0.21654
Standard deviation Layer 8	2.87180	3.41510	3.00483	2.98850	0.01231	0.00000	0.01231	0.02448
Ration Layer 1	0.11622	0.12399	0.00007	0.00008	0.09843	0.00190	0.10033	0.19093
Ration Layer 2	0.13776	0.14482	0.00009	0.00008	0.07284	0.00068	0.07352	0.14176
Ration Layer 3	0.12551	0.12661	0.00028	0.00011	0.00077	0.05138	0.05215	0.10164
Ration Layer 4	0.34173	0.34623	0.00244	0.00081	0.00156	0.07207	0.07363	0.14196
Ration Layer 5	0.24878	0.22396	0.00038	0.00002	0.38507	0.41580	0.80088	1.10213
Ration Layer 6	0.01612	0.01869	0.00000	0.00000	8.99181	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 7	0.00694	0.00681	0.00000	0.00000	0.00412	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 8	0.00693	0.00890	0.00000	0.00000	0.54245	#DIV/0!	#DIV/0!	#DIV/0!
Area	222.30000	127.30000	9300.23333	4486.67778	0.16365	0.03250	0.19615	0.35622
Border length	89.00000	64.00000	253.55556	326.22222	0.26950	0.00396	0.27346	0.47851
Width	13.50670	9.46880	36.01383	18.32484	0.07501	0.02800	0.10302	0.19578
Asymmetry	0.61741	0.58648	0.06772	0.10895	0.00135	0.01400	0.01535	0.03047
Border index	1.34440	1.24700	0.01607	0.02492	0.05786	0.01193	0.06979	0.13482
Shape index	1.56960	1.48400	0.09491	0.08576	0.01014	0.00064	0.01078	0.02144
GLCM Homogeneity Layer 1	0.03142	0.02684	0.00009	0.00007	0.03342	0.00524	0.03866	0.07584
GLCM Homogeneity Layer 2	0.03542	0.03102	0.00004	0.00016	0.02366	0.11583	0.13950	0.26041
GLCM Homogeneity Layer 3	0.03558	0.03272	0.00005	0.00029	0.00599	0.17376	0.17975	0.32905
GLCM Homogeneity Layer 4	0.03205	0.03085	0.00002	0.00004	0.00592	0.03138	0.03730	0.07323
GLCM Homogeneity Layer 5	0.25653	0.25038	0.00002	0.00008	0.09816	0.10461	0.20277	0.36707
GLCM Homogeneity Layer 6	0.07105	0.04793	0.00186	0.00010	0.06808	0.40481	0.47289	0.75360
GLCM Homogeneity Layer 7	1519.20600	1321.03100	7791.45380	8597.03472	0.59910	0.00060	0.59970	0.90205
GLCM Homogeneity Layer 8	1407.32200	1304.21400	1706.01482	442.12358	1.23726	0.10623	1.34349	1.47813

Table A9 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.06888	0.05129	0.00087	0.00024	0.06982	0.09809	0.16791	0.30914
GLCM Contrast Layer 2	0.12134	0.10096	0.00366	0.00041	0.02554	0.25604	0.28158	0.49082
GLCM Contrast Layer 3	1997.14400	2522.80900	333414.92043	861951.58320	0.05779	0.05438	0.11217	0.21222
GLCM Contrast Layer 4	1844.71100	1919.87000	181066.55065	351187.18160	0.00265	0.02694	0.02959	0.05832
GLCM Contrast Layer 5	1660.13000	2116.22400	267203.10244	969739.43570	0.04204	0.09737	0.13941	0.26026
GLCM Contrast Layer 6	1799.18100	1746.53200	40511.59017	155852.09090	0.00353	0.10579	0.10932	0.20711
GLCM Contrast Layer 7	1448.58300	1751.64500	163903.01402	546012.97020	0.03234	0.08552	0.11786	0.22237
GLCM Contrast Layer 8	1854.38300	1792.04000	87701.09291	239048.23140	0.00297	0.06037	0.06335	0.12276
GLCM Dissimilarity Layer 1	1886.69700	2098.56000	152586.25722	208103.14920	0.03111	0.00599	0.03711	0.07285
GLCM Dissimilarity Layer2	2227.62900	1852.10900	213011.79312	332699.22740	0.06460	0.01232	0.07693	0.14808
GLCM Dissimilarity Layer 3	33.72900	38.81600	31.58301	64.21736	0.06753	0.03084	0.09837	0.18737
GLCM Dissimilarity Layer 4	31.46700	33.42600	14.90920	40.50734	0.01731	0.06000	0.07731	0.14880
GLCM Dissimilarity Layer 5	30.05500	33.95100	23.48709	87.62090	0.03415	0.10131	0.13546	0.25338
GLCM Dissimilarity Layer 6	31.64100	31.45100	2.99374	16.26548	0.00047	0.16103	0.16150	0.29826
GLCM Dissimilarity Layer 7	24.63400	27.74900	15.74749	40.27068	0.04330	0.05319	0.09649	0.18397
GLCM Dissimilarity Layer 8	32.96200	32.23800	5.78997	25.41635	0.00420	0.12586	0.13006	0.24391
GLCM Entropy Layer 1	32.91900	35.13300	12.43899	11.94529	0.05026	0.00010	0.05036	0.09822
GLCM Entropy Layer 2	36.31200	32.45900	19.13144	39.83365	0.06294	0.03289	0.09583	0.18276
GLCM Entropy Layer 3	6.96510	6.51230	0.13964	0.18287	0.15893	0.00453	0.16346	0.30160
GLCM Entropy Layer 4	7.03680	6.61840	0.19496	0.20432	0.10961	0.00014	0.10975	0.20788
GLCM Entropy Layer 5	7.11650	6.63920	0.15457	0.28551	0.12942	0.02317	0.15259	0.28304
GLCM Entropy Layer 6	7.26090	6.76010	0.14770	0.22184	0.16967	0.01027	0.17994	0.32936
GLCM Entropy Layer 7	5.91170	5.37560	0.13357	0.23476	0.19507	0.01962	0.21469	0.38642
GLCM Entropy Layer 8	5.42650	5.67340	0.71961	0.05179	0.01976	0.34605	0.36580	0.61272
GLCM Mean Layer 1	5.39460	5.42510	0.32784	0.06784	0.00059	0.14132	0.14191	0.26460
GLCM Mean Layer2	4.29780	4.55770	0.59166	0.18242	0.02182	0.08196	0.10377	0.19714
GLCM Mean Layer 3	127.10500	127.90600	2.01281	1.62600	0.04408	0.00284	0.04692	0.09168
GLCM Mean Layer 4	127.11500	128.16300	2.73161	1.50958	0.06474	0.02167	0.08641	0.16556
GLCM Mean Layer 5	127.24700	127.75800	1.71762	4.56848	0.01038	0.05757	0.06795	0.13139
GLCM Mean Layer 6	126.55900	127.35800	2.21945	12.21853	0.01105	0.16330	0.17436	0.32001
GLCM Mean Layer 7	127.26600	127.28500	2.87492	3.03856	0.00002	0.00019	0.00021	0.00041
GLCM Mean Layer 8	125.86600	126.84000	2.84209	13.14596	0.01483	0.13418	0.14902	0.27689
GLCM Correlation Layer 1	127.85500	126.96800	3.46456	11.23173	0.01338	0.08189	0.09528	0.18176
GLCM Correlation Layer 2	126.89400	127.53900	4.69514	10.98614	0.00663	0.04387	0.05050	0.09850
GLCM Correlation Layer 3	0.64018	0.57745	0.01003	0.03393	0.02238	0.08761	0.10998	0.20830
GLCM Correlation Layer 4	0.67954	0.67906	0.00569	0.01710	0.00000	0.07214	0.07214	0.13920
GLCM Correlation Layer 5	0.72606	0.66943	0.00489	0.01841	0.03441	0.10264	0.13704	0.25614
GLCM Correlation Layer 6	0.70700	0.75530	0.00066	0.00192	0.22598	0.06817	0.29415	0.50968
GLCM Correlation Layer 7	0.78780	0.76544	0.00486	0.00555	0.01200	0.00111	0.01311	0.02606
GLCM Correlation Layer 8	0.71401	0.74324	0.00136	0.00273	0.05224	0.02971	0.08195	0.15737

Table A10 J value from field crops and perennial tree and orchard.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1519.20600	1366.98100	7791.45380	5005.38201	0.45270	0.01214	0.46484	0.74353
Mean Layer 1	1407.32200	1279.21100	1706.01482	738.32725	1.67861	0.04262	1.72123	1.64231
Mean Layer 2	1669.33600	1444.40500	3772.87214	2485.55389	2.02103	0.01081	2.03184	1.73781
Mean Layer 3	1516.93200	1293.66600	21117.63853	4592.44727	0.48471	0.13324	0.61795	0.92190
Mean Layer 4	4176.82400	3934.46400	660161.72103	247864.91930	0.01617	0.05772	0.07389	0.14246
Mean Layer 5	3019.85800	2620.88000	56229.48708	118523.44450	0.22773	0.03397	0.26170	0.46052
Mean Layer 6	196.21400	206.29700	602.17883	177.75476	0.03259	0.08779	0.12038	0.22683
Mean Layer 7	83.49200	73.90800	455.70677	316.99093	0.02972	0.00819	0.03791	0.07440
Mean Layer 8	83.66300	83.01000	61.38982	114.45838	0.00061	0.02387	0.02448	0.04836
Max. diff.	2.69950	2.82380	0.14298	0.07843	0.01745	0.02221	0.03965	0.07775
Standard deviation Layer 1	26.41000	15.89100	121.75531	24.80074	0.18875	0.14391	0.33266	0.56597
Standard deviation Layer 2	40.28400	22.72800	285.62138	38.41324	0.23779	0.21808	0.45588	0.73222
Standard deviation Layer 3	54.79900	22.28990	825.13468	194.49417	0.25912	0.12054	0.37966	0.63181
Standard deviation Layer 4	185.98400	126.34700	3112.73600	537.95547	0.24355	0.17200	0.41556	0.68006
Standard deviation Layer 5	83.75800	57.89300	1212.12617	537.36591	0.09560	0.04026	0.13586	0.25408
Standard deviation Layer 6	6.06310	3.22540	8.87132	0.88459	0.20635	0.27732	0.48367	0.76696
Standard deviation Layer 7	5.19310	3.25440	3.41751	0.44018	0.24358	0.22638	0.46995	0.74993
Standard deviation Layer 8	2.87180	1.83417	3.00483	0.47305	0.07739	0.18872	0.26612	0.46730
Ration Layer 1	0.11622	0.11731	0.00007	0.00005	0.00238	0.00376	0.00614	0.01225
Ration Layer 2	0.13776	0.13237	0.00009	0.00006	0.04754	0.00806	0.05560	0.10816
Ration Layer 3	0.12551	0.11862	0.00028	0.00009	0.03229	0.08013	0.11242	0.21265
Ration Layer 4	0.34173	0.35913	0.00244	0.00115	0.02107	0.03432	0.05538	0.10776
Ration Layer 5	0.24878	0.23927	0.00038	0.00066	0.02182	0.01841	0.04023	0.07887
Ration Layer 6	0.01612	0.01888	0.00000	0.00000	1.89260	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 7	0.00694	0.00677	0.00000	0.00000	0.00270	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 8	0.00693	0.00765	0.00000	0.00000	0.06667	#DIV/0!	#DIV/0!	#DIV/0!
Area	222.30000	308.30000	9300.23333	32593.34444	0.04414	0.09246	0.13659	0.25535
Border length	89.00000	84.00000	253.55556	584.00000	0.00746	0.04230	0.04976	0.09709
Width	13.50670	16.27000	36.01383	18.30678	0.03514	0.02808	0.06323	0.12254
Asymmetry	0.61741	0.43772	0.06772	0.06217	0.06215	0.00046	0.06260	0.12137
Border index	1.34440	1.16470	0.01607	0.00978	0.31229	0.01525	0.32754	0.55861
Shape index	1.56960	1.23320	0.09491	0.01757	0.25151	0.15999	0.41150	0.67469
GLCM Homogeneity Layer 1	0.03142	0.02526	0.00009	0.00001	0.09169	0.19673	0.28842	0.50111
GLCM Homogeneity Layer 2	0.03542	0.03161	0.00004	0.00008	0.03138	0.02472	0.05610	0.10912
GLCM Homogeneity Layer 3	0.03558	0.03381	0.00005	0.00006	0.00693	0.00315	0.01008	0.02006
GLCM Homogeneity Layer 4	0.03205	0.03170	0.00002	0.00002	0.00068	0.00181	0.00249	0.00497
GLCM Homogeneity Layer 5	0.25653	0.25456	0.00002	0.00006	0.01158	0.07980	0.09137	0.17464
GLCM Homogeneity Layer 6	0.07105	0.09501	0.00186	0.00044	0.06248	0.12126	0.18374	0.33570
GLCM Homogeneity Layer 7	1519.20600	1366.98100	7791.45380	5005.38201	0.45270	0.01214	0.46484	0.74353
GLCM Homogeneity Layer 8	1407.32200	1279.21100	1706.01482	738.32725	1.67861	0.04262	1.72123	1.64231

Table A10 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.06888	0.08631	0.00087	0.00025	0.06782	0.09211	0.15993	0.29560
GLCM Contrast Layer 2	0.12134	0.19886	0.00366	0.00491	0.17527	0.00539	0.18066	0.33056
GLCM Contrast Layer 3	1997.14400	2667.94800	333414.92043	471380.52280	0.13978	0.00746	0.14724	0.27382
GLCM Contrast Layer 4	1844.71100	1912.37700	181066.55065	353896.56100	0.00214	0.02756	0.02970	0.05852
GLCM Contrast Layer 5	1660.13000	1971.07100	267203.10244	382827.40660	0.03718	0.00804	0.04522	0.08843
GLCM Contrast Layer 6	1799.18100	1746.48500	40511.59017	357465.99680	0.00174	0.25147	0.25321	0.44739
GLCM Contrast Layer 7	1448.58300	1392.14300	163903.01402	164675.59650	0.00242	0.00000	0.00243	0.00484
GLCM Contrast Layer 8	1854.38300	1867.86700	87701.09291	427959.51120	0.00009	0.14291	0.14300	0.26649
GLCM Dissimilarity Layer 1	1886.69700	2126.10200	152586.25722	321144.56370	0.03025	0.03384	0.06409	0.12415
GLCM Dissimilarity Layer2	2227.62900	2313.96400	213011.79312	841101.36930	0.00177	0.10964	0.11141	0.21085
GLCM Dissimilarity Layer 3	33.72900	40.32600	31.58301	28.58496	0.18083	0.00062	0.18145	0.33188
GLCM Dissimilarity Layer 4	31.46700	33.00100	14.90920	34.49814	0.01191	0.04275	0.05466	0.10639
GLCM Dissimilarity Layer 5	30.05500	33.12000	23.48709	35.64009	0.03972	0.01079	0.05051	0.09851
GLCM Dissimilarity Layer 6	31.64100	31.16400	2.99374	32.60547	0.00160	0.29434	0.29594	0.51233
GLCM Dissimilarity Layer 7	24.63400	23.72400	15.74749	14.54818	0.00683	0.00039	0.00723	0.01440
GLCM Dissimilarity Layer 8	32.96200	32.70800	5.78997	31.99977	0.00043	0.16398	0.16441	0.30321
GLCM Entropy Layer 1	32.91900	34.70800	12.43899	21.19251	0.02379	0.01754	0.04133	0.08097
GLCM Entropy Layer 2	36.31200	35.57100	19.13144	57.83041	0.00178	0.07287	0.07465	0.14387
GLCM Entropy Layer 3	6.96510	6.97150	0.13964	0.06010	0.00005	0.04317	0.04322	0.08461
GLCM Entropy Layer 4	7.03680	7.13730	0.19496	0.06973	0.00954	0.06334	0.07288	0.14058
GLCM Entropy Layer 5	7.11650	6.94450	0.15457	0.06750	0.03331	0.04174	0.07504	0.14459
GLCM Entropy Layer 6	7.26090	7.50380	0.14770	0.18137	0.04482	0.00263	0.04745	0.09269
GLCM Entropy Layer 7	5.91170	6.09360	0.13357	0.15546	0.02862	0.00144	0.03006	0.05922
GLCM Entropy Layer 8	5.42650	4.67950	0.71961	0.20913	0.15021	0.08993	0.24013	0.42695
GLCM Mean Layer 1	5.39460	4.79510	0.32784	0.07212	0.22465	0.13139	0.35604	0.59911
GLCM Mean Layer2	4.29780	3.62000	0.59166	0.34819	0.12220	0.01737	0.13957	0.26053
GLCM Mean Layer 3	127.10500	128.18700	2.01281	1.15833	0.09230	0.01884	0.11114	0.21037
GLCM Mean Layer 4	127.11500	127.80300	2.73161	1.25413	0.02969	0.03695	0.06664	0.12894
GLCM Mean Layer 5	127.24700	127.76300	1.71762	1.51925	0.02056	0.00094	0.02151	0.04255
GLCM Mean Layer 6	126.55900	126.43800	2.21945	3.91073	0.00060	0.01979	0.02039	0.04037
GLCM Mean Layer 7	127.26600	127.80600	2.87492	0.78392	0.01992	0.09886	0.11878	0.22399
GLCM Mean Layer 8	125.86600	125.63200	2.84209	4.53173	0.00186	0.01348	0.01534	0.03045
GLCM Correlation Layer 1	127.85500	128.65100	3.46456	4.61679	0.01960	0.00513	0.02474	0.04886
GLCM Correlation Layer 2	126.89400	127.69000	4.69514	4.53136	0.01717	0.00008	0.01725	0.03420
GLCM Correlation Layer 3	0.64018	0.53505	0.01003	0.02085	0.08949	0.03273	0.12222	0.23009
GLCM Correlation Layer 4	0.67954	0.68206	0.00569	0.00834	0.00011	0.00911	0.00922	0.01835
GLCM Correlation Layer 5	0.72606	0.65596	0.00489	0.01320	0.06791	0.05926	0.12717	0.23883
GLCM Correlation Layer 6	0.70700	0.74075	0.00066	0.00649	0.03985	0.27318	0.31303	0.53754
GLCM Correlation Layer 7	0.78780	0.79586	0.00486	0.00420	0.00179	0.00134	0.00313	0.00626
GLCM Correlation Layer 8	0.71401	0.72115	0.00136	0.00771	0.00141	0.16838	0.16978	0.31230

Table A11 J value from field crops and perennial tree and rangeland.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1519.20600	1401.62700	7791.45380	1182.33660	0.38514	0.19545	0.58059	0.88087
Mean Layer 1	1407.32200	1316.44200	1706.01482	1022.57206	0.75673	0.01620	0.77292	1.07668
Mean Layer 2	1669.33600	1524.27900	3772.87214	2029.22079	0.90664	0.02366	0.93030	1.21113
Mean Layer 3	1516.93200	1335.04600	21117.63853	1991.59127	0.35789	0.28878	0.64667	0.95243
Mean Layer 4	4176.82400	3954.73300	660161.72103	21128.39829	0.01810	0.52964	0.54774	0.84349
Mean Layer 5	3019.85800	2718.93400	56229.48708	6964.61549	0.35824	0.23396	0.59220	0.89379
Mean Layer 6	196.21400	204.66400	602.17883	12.86756	0.02902	0.62546	0.65448	0.96058
Mean Layer 7	83.49200	77.11500	455.70677	7.75892	0.02194	0.68012	0.70206	1.00887
Mean Layer 8	83.66300	81.81000	61.38982	4.96431	0.01294	0.32105	0.33399	0.56787
Max. diff.	2.69950	2.76610	0.14298	0.00396	0.00755	0.56381	0.57136	0.87049
Standard deviation Layer 1	26.41000	30.99300	121.75531	159.92665	0.01864	0.00463	0.02328	0.04601
Standard deviation Layer 2	40.28400	52.49200	285.62138	224.32657	0.07306	0.00364	0.07670	0.14767
Standard deviation Layer 3	54.79900	56.89400	825.13468	1083.43332	0.00057	0.00462	0.00520	0.01037
Standard deviation Layer 4	185.98400	309.81100	3112.73600	6500.71848	0.39874	0.03315	0.43190	0.70145
Standard deviation Layer 5	83.75800	98.15300	1212.12617	813.30705	0.02558	0.00989	0.03546	0.06968
Standard deviation Layer 6	6.06310	8.45560	8.87132	10.67308	0.07322	0.00213	0.07535	0.14517
Standard deviation Layer 7	5.19310	7.65650	3.41751	3.58733	0.21658	0.00015	0.21672	0.38969
Standard deviation Layer 8	2.87180	3.88860	3.00483	4.69709	0.03356	0.01237	0.04593	0.08978
Ration Layer 1	0.11622	0.11744	0.00007	0.00001	0.00462	0.19479	0.19941	0.36157
Ration Layer 2	0.13776	0.13594	0.00009	0.00001	0.00862	0.35860	0.36722	0.61468
Ration Layer 3	0.12551	0.11905	0.00028	0.00001	0.03638	0.59534	0.63172	0.93664
Ration Layer 4	0.34173	0.35266	0.00244	0.00006	0.01196	0.60137	0.61333	0.91691
Ration Layer 5	0.24878	0.24247	0.00038	0.00001	0.02531	0.50857	0.53388	0.82735
Ration Layer 6	0.01612	0.01826	0.00000	0.00000	4.08668	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 7	0.00694	0.00688	0.00000	0.00000	0.00943	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 8	0.00693	0.00730	0.00000	0.00000	0.44864	#DIV/0!	#DIV/0!	#DIV/0!
Area	222.30000	123.60000	9300.23333	3840.48889	0.18533	0.04737	0.23271	0.41523
Border length	89.00000	86.60000	253.55556	873.82222	0.00128	0.09014	0.09141	0.17472
Width	13.50670	12.18080	36.01383	23.87806	0.00734	0.01048	0.01782	0.03532
Asymmetry	0.61741	0.62722	0.06772	0.06069	0.00019	0.00075	0.00094	0.00188
Border index	1.34440	1.76590	0.01607	0.23248	0.17870	0.35481	0.53351	0.82691
Shape index	1.56960	2.01710	0.09491	0.40081	0.10099	0.11983	0.22082	0.39628
GLCM Homogeneity Layer 1	0.03142	0.02676	0.00009	0.00006	0.03527	0.00710	0.04237	0.08296
GLCM Homogeneity Layer 2	0.03542	0.02383	0.00004	0.00001	0.68784	0.13190	0.81974	1.11891
GLCM Homogeneity Layer 3	0.03558	0.03683	0.00005	0.00010	0.00252	0.03316	0.03568	0.07009
GLCM Homogeneity Layer 4	0.03205	0.02431	0.00002	0.00003	0.30302	0.00919	0.31221	0.53635
GLCM Homogeneity Layer 5	0.25653	0.24848	0.00002	0.00010	0.13911	0.14098	0.28009	0.48857
GLCM Homogeneity Layer 6	0.07105	0.03455	0.00186	0.00011	0.16929	0.39492	0.56421	0.86238
GLCM Homogeneity Layer 7	1519.20600	1401.62700	7791.45380	1182.33660	0.38514	0.19545	0.58059	0.88087
GLCM Homogeneity Layer 8	1407.32200	1316.44200	1706.01482	1022.57206	0.75673	0.01620	0.77292	1.07668

Table A11 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.06888	0.02949	0.00087	0.00004	0.42774	0.46426	0.89200	1.18033
GLCM Contrast Layer 2	0.12134	0.08441	0.00366	0.00133	0.06827	0.06117	0.12944	0.24282
GLCM Contrast Layer 3	1997.14400	2456.83500	333414.92043	656967.37660	0.05334	0.02822	0.08156	0.15664
GLCM Contrast Layer 4	1844.71100	2376.29200	181066.55065	452281.99900	0.11154	0.05064	0.16219	0.29943
GLCM Contrast Layer 5	1660.13000	1930.86400	267203.10244	461552.86980	0.02514	0.01844	0.04359	0.08531
GLCM Contrast Layer 6	1799.18100	2424.00700	40511.59017	386301.68100	0.22868	0.26705	0.49572	0.78174
GLCM Contrast Layer 7	1448.58300	2418.07500	163903.01402	582673.99190	0.31474	0.09445	0.40919	0.67163
GLCM Contrast Layer 8	1854.38300	2152.12800	87701.09291	300436.01180	0.05710	0.08931	0.14641	0.27240
GLCM Dissimilarity Layer 1	1886.69700	2488.80500	152586.25722	329598.74770	0.18796	0.03619	0.22415	0.40161
GLCM Dissimilarity Layer2	2227.62900	2402.77400	213011.79312	864290.88640	0.00712	0.11372	0.12084	0.22765
GLCM Dissimilarity Layer 3	33.72900	37.89000	31.58301	47.56176	0.05469	0.01040	0.06509	0.12604
GLCM Dissimilarity Layer 4	31.46700	37.71500	14.90920	25.26965	0.24290	0.01720	0.26010	0.45805
GLCM Dissimilarity Layer 5	30.05500	32.47500	23.48709	37.50783	0.02400	0.01357	0.03758	0.07376
GLCM Dissimilarity Layer 6	31.64100	38.63400	2.99374	33.19985	0.33778	0.29810	0.63588	0.94106
GLCM Dissimilarity Layer 7	24.63400	33.89300	15.74749	35.67547	0.41678	0.04068	0.45747	0.73423
GLCM Dissimilarity Layer 8	32.96200	35.95900	5.78997	31.83543	0.05968	0.16309	0.22277	0.39940
GLCM Entropy Layer 1	32.91900	39.29400	12.43899	27.24956	0.25600	0.03749	0.29349	0.50868
GLCM Entropy Layer 2	36.31200	37.70700	19.13144	73.44047	0.00526	0.10547	0.11072	0.20963
GLCM Entropy Layer 3	6.96510	6.68920	0.13964	0.11894	0.07359	0.00161	0.07520	0.14489
GLCM Entropy Layer 4	7.03680	6.81690	0.19496	0.14442	0.03562	0.00561	0.04123	0.08078
GLCM Entropy Layer 5	7.11650	6.69390	0.15457	0.10714	0.17060	0.00835	0.17895	0.32770
GLCM Entropy Layer 6	7.26090	6.84400	0.14770	0.15071	0.14561	0.00003	0.14564	0.27106
GLCM Entropy Layer 7	5.91170	5.45730	0.13357	0.14034	0.18845	0.00015	0.18861	0.34377
GLCM Entropy Layer 8	5.42650	5.92890	0.71961	0.09354	0.07760	0.22460	0.30220	0.52162
GLCM Mean Layer 1	5.39460	5.93980	0.32784	0.02244	0.21215	0.35697	0.56912	0.86795
GLCM Mean Layer2	4.29780	4.67110	0.59166	0.66348	0.02776	0.00082	0.02858	0.05634
GLCM Mean Layer 3	127.10500	129.52300	2.01281	3.70265	0.25574	0.02287	0.27861	0.48633
GLCM Mean Layer 4	127.11500	130.02500	2.73161	3.24967	0.35394	0.00188	0.35582	0.59881
GLCM Mean Layer 5	127.24700	129.11800	1.71762	2.38615	0.21326	0.00672	0.21998	0.39493
GLCM Mean Layer 6	126.55900	128.09500	2.21945	14.24887	0.03582	0.19066	0.22648	0.40532
GLCM Mean Layer 7	127.26600	129.77200	2.87492	10.64784	0.11610	0.10027	0.21637	0.38912
GLCM Mean Layer 8	125.86600	127.06600	2.84209	10.47416	0.02703	0.09956	0.12659	0.23781
GLCM Correlation Layer 1	127.85500	126.93500	3.46456	9.83465	0.01591	0.06515	0.08107	0.15573
GLCM Correlation Layer 2	126.89400	127.37300	4.69514	4.75213	0.00607	0.00001	0.00608	0.01212
GLCM Correlation Layer 3	0.64018	0.59482	0.01003	0.02703	0.01388	0.05906	0.07294	0.14068
GLCM Correlation Layer 4	0.67954	0.63679	0.00569	0.01449	0.02264	0.05271	0.07535	0.14517
GLCM Correlation Layer 5	0.72606	0.68829	0.00489	0.01350	0.01939	0.06188	0.08127	0.15611
GLCM Correlation Layer 6	0.70700	0.62369	0.00066	0.00559	0.27768	0.24330	0.52099	0.81213
GLCM Correlation Layer 7	0.78780	0.65799	0.00486	0.00602	0.38715	0.00286	0.39001	0.64590
GLCM Correlation Layer 8	0.71401	0.66366	0.00136	0.00473	0.10414	0.09128	0.19542	0.35502

Table A12 J value from field crops and water body.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1519.20600	1155.76800	7791.45380	14834.20397	1.45948	0.02548	1.48496	1.54698
Mean Layer 1	1407.32200	1665.12000	1706.01482	26324.60884	0.59274	0.36891	0.96165	1.23548
Mean Layer 2	1669.33600	1982.50800	3772.87214	80686.62151	0.29031	0.44196	0.73227	1.03836
Mean Layer 3	1516.93200	1990.85000	21117.63853	136906.86820	0.35532	0.19245	0.54777	0.84353
Mean Layer 4	4176.82400	1743.95000	660161.72103	44851.55109	2.09885	0.35857	2.45743	1.82869
Mean Layer 5	3019.85800	1516.09200	56229.48708	31830.54168	6.41980	0.01997	6.43977	1.99681
Mean Layer 6	196.21400	80.77700	602.17883	298.80845	3.69753	0.03008	3.72761	1.95190
Mean Layer 7	83.49200	100.33600	455.70677	34.45612	0.14471	0.33541	0.48012	0.76258
Mean Layer 8	83.66300	166.52500	61.38982	322.91541	4.46657	0.15549	4.62206	1.98033
Max. diff.	2.69950	1.69900	0.14298	0.01505	1.58355	0.26628	1.84983	1.68547
Standard deviation Layer 1	26.41000	44.98700	121.75531	365.55569	0.17705	0.07202	0.24907	0.44094
Standard deviation Layer 2	40.28400	56.26400	285.62138	483.00212	0.08306	0.01706	0.10011	0.19053
Standard deviation Layer 3	54.79900	71.51700	825.13468	1136.50100	0.03562	0.00638	0.04200	0.08226
Standard deviation Layer 4	185.98400	124.18600	3112.73600	8201.09163	0.08439	0.05650	0.14088	0.26282
Standard deviation Layer 5	83.75800	101.17200	1212.12617	4690.16502	0.01284	0.10664	0.11948	0.22524
Standard deviation Layer 6	6.06310	9.15520	8.87132	41.82114	0.04715	0.13726	0.18441	0.33681
Standard deviation Layer 7	5.19310	6.25910	3.41751	12.05007	0.01837	0.09330	0.11167	0.21132
Standard deviation Layer 8	2.87180	7.36440	3.00483	16.17177	0.26313	0.15940	0.42253	0.68922
Ration Layer 1	0.11622	0.18055	0.00007	0.00013	5.28810	0.02109	5.30919	1.99011
Ration Layer 2	0.13776	0.21391	0.00009	0.00020	5.05885	0.03721	5.09606	1.98776
Ration Layer 3	0.12551	0.21386	0.00028	0.00038	2.94863	0.00599	2.95462	1.89580
Ration Layer 4	0.34173	0.18886	0.00244	0.00023	2.18723	0.28790	2.47513	1.83170
Ration Layer 5	0.24878	0.16483	0.00038	0.00039	2.28296	0.00006	2.28302	1.79605
Ration Layer 6	0.01612	0.00892	0.00000	0.00001	1.98428	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 7	0.00694	0.01101	0.00000	0.00000	1.44748	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 8	0.00693	0.01808	0.00000	0.00000	10.07699	#DIV/0!	#DIV/0!	#DIV/0!
Area	222.30000	174.70000	9300.23333	39580.67778	0.01159	0.12102	0.13261	0.24839
Border length	89.00000	70.80000	253.55556	1643.73333	0.04365	0.19244	0.23609	0.42057
Width	13.50670	11.60410	36.01383	52.22826	0.01026	0.00859	0.01884	0.03733
Asymmetry	0.61741	0.51831	0.06772	0.07180	0.01760	0.00021	0.01781	0.03531
Border index	1.34440	1.35670	0.01607	0.05597	0.00053	0.09159	0.09212	0.17600
Shape index	1.56960	1.53370	0.09491	0.13578	0.00140	0.00797	0.00937	0.01865
GLCM Homogeneity Layer 1	0.03142	0.03437	0.00009	0.00020	0.00761	0.03662	0.04423	0.08654
GLCM Homogeneity Layer 2	0.03542	0.03283	0.00004	0.00008	0.01377	0.03150	0.04528	0.08854
GLCM Homogeneity Layer 3	0.03558	0.03311	0.00005	0.00010	0.01011	0.03066	0.04076	0.07989
GLCM Homogeneity Layer 4	0.03205	0.04096	0.00002	0.00032	0.05869	0.37563	0.43432	0.70460
GLCM Homogeneity Layer 5	0.25653	0.25455	0.00002	0.00038	0.00242	0.41786	0.42028	0.68628
GLCM Homogeneity Layer 6	0.07105	0.08887	0.00186	0.00392	0.01372	0.03401	0.04773	0.09322
GLCM Homogeneity Layer 7	1519.20600	1155.76800	7791.45380	14834.20397	1.45948	0.02548	1.48496	1.54698
GLCM Homogeneity Layer 8	1407.32200	1665.12000	1706.01482	26324.60884	0.59274	0.36891	0.96165	1.23548

Table A12 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.06888	0.07695	0.00087	0.00694	0.00208	0.23175	0.23383	0.41701
GLCM Contrast Layer 2	0.12134	0.08867	0.00366	0.00769	0.02351	0.03364	0.05715	0.11110
GLCM Contrast Layer 3	1997.14400	2949.91900	333414.92043	1658584.28400	0.11393	0.14610	0.26002	0.45793
GLCM Contrast Layer 4	1844.71100	2943.11400	181066.55065	1596316.75400	0.16970	0.25130	0.42100	0.68721
GLCM Contrast Layer 5	1660.13000	2812.11500	267203.10244	1770516.09900	0.16281	0.19646	0.35927	0.60363
GLCM Contrast Layer 6	1799.18100	3376.09900	40511.59017	4700693.74700	0.13112	0.84619	0.97731	1.24735
GLCM Contrast Layer 7	1448.58300	4214.86200	163903.01402	8639713.87600	0.21731	0.65404	0.87134	1.16322
GLCM Contrast Layer 8	1854.38300	3357.36800	87701.09291	3781270.90300	0.14597	0.60586	0.75183	1.05699
GLCM Dissimilarity Layer 1	1886.69700	4218.78200	152586.25722	2756373.39800	0.46740	0.40385	0.87125	1.16315
GLCM Dissimilarity Layer2	2227.62900	3324.26000	213011.79312	3873154.13400	0.07358	0.40531	0.47889	0.76106
GLCM Dissimilarity Layer 3	33.72900	39.79000	31.58301	64.95211	0.09514	0.03181	0.12695	0.23844
GLCM Dissimilarity Layer 4	31.46700	39.71400	14.90920	78.66029	0.18172	0.15600	0.33772	0.57321
GLCM Dissimilarity Layer 5	30.05500	38.59100	23.48709	90.95588	0.15917	0.10676	0.26593	0.46701
GLCM Dissimilarity Layer 6	31.64100	40.06200	2.99374	319.45457	0.05498	0.82561	0.88059	1.17093
GLCM Dissimilarity Layer 7	24.63400	43.11500	15.74749	423.90292	0.19422	0.49487	0.68909	0.99593
GLCM Dissimilarity Layer 8	32.96200	40.48200	5.78997	226.24120	0.06093	0.58243	0.64336	0.94895
GLCM Entropy Layer 1	32.91900	47.54900	12.43899	179.76865	0.27839	0.35459	0.63298	0.93799
GLCM Entropy Layer 2	36.31200	40.89700	19.13144	252.31516	0.01936	0.33481	0.35417	0.59648
GLCM Entropy Layer 3	6.96510	6.39240	0.13964	0.90793	0.07827	0.19298	0.27125	0.47516
GLCM Entropy Layer 4	7.03680	6.30270	0.19496	0.78871	0.13696	0.11327	0.25024	0.44277
GLCM Entropy Layer 5	7.11650	6.36910	0.15457	0.76102	0.15253	0.14438	0.29691	0.51378
GLCM Entropy Layer 6	7.26090	6.35250	0.14770	0.98694	0.18182	0.19801	0.37983	0.63205
GLCM Entropy Layer 7	5.91170	5.02710	0.13357	1.25673	0.14071	0.26434	0.40505	0.66611
GLCM Entropy Layer 8	5.42650	4.80980	0.71961	0.78066	0.06338	0.00041	0.06379	0.12359
GLCM Mean Layer 1	5.39460	5.03550	0.32784	1.04399	0.02350	0.07954	0.10304	0.19583
GLCM Mean Layer2	4.29780	4.95240	0.59166	0.90127	0.07176	0.01099	0.08275	0.15883
GLCM Mean Layer 3	127.10500	120.18200	2.01281	26.93388	0.41393	0.33793	0.75186	1.05702
GLCM Mean Layer 4	127.11500	120.28300	2.73161	28.73082	0.37089	0.28711	0.65800	0.96422
GLCM Mean Layer 5	127.24700	120.14500	1.71762	29.07154	0.40955	0.38933	0.79888	1.10033
GLCM Mean Layer 6	126.55900	134.62600	2.21945	44.47787	0.34840	0.42721	0.77560	1.07915
GLCM Mean Layer 7	127.26600	137.11400	2.87492	67.37378	0.34514	0.46288	0.80802	1.10852
GLCM Mean Layer 8	125.86600	135.77400	2.84209	41.08383	0.55872	0.35464	0.91336	1.19765
GLCM Correlation Layer 1	127.85500	125.65400	3.46456	28.39267	0.03802	0.23688	0.27490	0.48070
GLCM Correlation Layer 2	126.89400	117.31200	4.69514	45.14084	0.46058	0.26872	0.72930	1.03551
GLCM Correlation Layer 3	0.64018	0.62461	0.01003	0.01744	0.00221	0.01890	0.02110	0.04176
GLCM Correlation Layer 4	0.67954	0.63036	0.00569	0.01748	0.02610	0.07489	0.10099	0.19212
GLCM Correlation Layer 5	0.72606	0.66236	0.00489	0.01971	0.04124	0.11270	0.15394	0.28536
GLCM Correlation Layer 6	0.70700	0.61083	0.00066	0.04281	0.05319	0.70416	0.75735	1.06218
GLCM Correlation Layer 7	0.78780	0.57458	0.00486	0.04566	0.22497	0.26405	0.48902	0.77355
GLCM Correlation Layer 8	0.71401	0.57500	0.00136	0.04770	0.09848	0.55682	0.65530	0.96143

Table A13 J value from forest area and building and settlement area.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1361.15700	1733.37600	4860.82820	17841.76287	1.52567	0.09898	1.62465	1.60604
Mean Layer 1	1283.41800	2012.19600	932.59988	102497.45560	1.28376	0.83286	2.11662	1.75912
Mean Layer 2	1451.23000	2128.28300	2841.38796	40154.76871	2.66536	0.34972	3.01508	1.90192
Mean Layer 3	1275.86900	2104.12100	1190.61388	44005.89594	3.79455	0.56924	4.36379	1.97454
Mean Layer 4	3922.79500	3325.61000	92203.98903	179227.66370	0.32847	0.02712	0.35559	0.59848
Mean Layer 5	2592.84400	3932.11700	28402.83169	397830.64730	1.05204	0.34779	1.39983	1.50672
Mean Layer 6	207.83400	144.52200	22.27116	211.81677	4.28088	0.26652	4.54740	1.97881
Mean Layer 7	73.12300	130.92700	7.00273	586.06291	1.40849	0.76615	2.17463	1.77270
Mean Layer 8	82.14200	89.23200	11.69544	151.57566	0.07697	0.33106	0.40803	0.67008
Max. diff.	2.82510	2.25040	0.00680	0.05496	1.33704	0.23417	1.57121	1.58441
Standard deviation Layer 1	17.33500	230.48100	13.73434	10326.57254	1.09840	1.30974	2.40814	1.82003
Standard deviation Layer 2	29.48300	211.84300	25.58353	5707.42907	1.45016	1.00756	2.45772	1.82874
Standard deviation Layer 3	19.48600	250.84100	57.75680	9955.20214	1.33640	0.94372	2.28012	1.79546
Standard deviation Layer 4	191.51100	248.94700	1215.10192	10936.52616	0.06787	0.25542	0.32329	0.55248
Standard deviation Layer 5	54.31100	259.32300	225.78528	10080.82249	1.01949	0.61420	1.63369	1.60958
Standard deviation Layer 6	3.95300	13.03910	0.47401	23.13802	0.87410	0.63557	1.50967	1.55803
Standard deviation Layer 7	4.55540	9.75780	0.61919	6.57930	0.93995	0.28921	1.22917	1.41493
Standard deviation Layer 8	1.76970	9.55800	0.31491	5.36850	2.66818	0.39093	3.05912	1.90614
Ration Layer 1	0.11805	0.14461	0.00002	0.00024	0.68496	0.30449	0.98946	1.25644
Ration Layer 2	0.13337	0.15334	0.00001	0.00002	3.12599	0.06646	3.19245	1.91786
Ration Layer 3	0.11732	0.15177	0.00001	0.00011	2.40608	0.24182	2.64789	1.85840
Ration Layer 4	0.35987	0.24105	0.00010	0.00124	2.64117	0.32744	2.96861	1.89725
Ration Layer 5	0.23800	0.28281	0.00002	0.00095	0.51759	0.65057	1.16816	1.37812
Ration Layer 6	0.01911	0.01055	0.00000	0.00000	6.04896	0.21448	6.26344	1.99619
Ration Layer 7	0.00673	0.00941	0.00000	0.00000	0.67922	0.29835	0.97757	1.24755
Ration Layer 8	0.00757	0.00652	0.00000	0.00000	0.17669	0.07461	0.25130	0.44443
Area	396.60000	28.50000	58820.71111	210.05556	0.57384	1.06393	1.63777	1.61117
Border length	140.00000	29.60000	2475.55556	182.04444	1.14654	0.34140	1.48794	1.54832
Width	20.40440	5.14480	43.33958	4.96342	1.20518	0.24938	1.45456	1.53300
Asymmetry	0.53568	0.54890	0.05233	0.02142	0.00059	0.04830	0.04889	0.09543
Border index	1.69850	1.22590	0.05526	0.06811	0.45259	0.00273	0.45532	0.73151
Shape index	1.83230	1.38250	0.08368	0.08429	0.30112	0.00000	0.30112	0.52003
GLCM Homogeneity Layer 1	0.02320	0.01942	0.00001	0.00009	0.03650	0.23149	0.26799	0.47016
GLCM Homogeneity Layer 2	0.02264	0.01703	0.00001	0.00002	0.22670	0.01288	0.23958	0.42608
GLCM Homogeneity Layer 3	0.02516	0.01732	0.00006	0.00007	0.11607	0.00017	0.11624	0.21948
GLCM Homogeneity Layer 4	0.02139	0.01958	0.00001	0.00004	0.01502	0.10712	0.12214	0.22995
GLCM Homogeneity Layer 5	0.25190	0.23747	0.00002	0.00001	1.52072	0.03791	1.55863	1.57915
GLCM Homogeneity Layer 6	0.04940	0.02386	0.00010	0.00012	0.75239	0.00254	0.75493	1.05991
GLCM Homogeneity Layer 7	1361.15700	1733.37600	4860.82820	17841.76287	1.52567	0.09898	1.62465	1.60604
GLCM Homogeneity Layer 8	1283.41800	2012.19600	932.59988	102497.45560	1.28376	0.83286	2.11662	1.75912

Table A13 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.04146	0.01925	0.00008	0.00005	0.96921	0.01822	0.98743	1.25493
GLCM Contrast Layer 2	0.15928	0.02049	0.00180	0.00006	2.59686	0.52870	3.12556	1.91218
GLCM Contrast Layer 3	2574.37300	4153.94800	73489.04847	2987749.23300	0.20376	0.59186	0.79562	1.09740
GLCM Contrast Layer 4	2460.72800	3812.36200	177072.49820	248119.21720	1.07417	0.00708	1.08125	1.32166
GLCM Contrast Layer 5	2108.30700	3643.05600	108952.22130	554849.58640	0.88711	0.15002	1.03712	1.29105
GLCM Contrast Layer 6	2672.58900	4235.65200	44149.58097	8617612.11100	0.07052	0.97448	1.04499	1.29661
GLCM Contrast Layer 7	1645.13500	3866.67100	119103.88290	1037410.32600	1.06683	0.24889	1.31572	1.46344
GLCM Contrast Layer 8	2729.50400	3303.85700	79518.72916	1729968.27900	0.04558	0.44586	0.49144	0.77651
GLCM Dissimilarity Layer 1	2973.43200	3672.56500	198792.39400	2363595.42100	0.04769	0.31272	0.36041	0.60522
GLCM Dissimilarity Layer2	2283.70700	3635.16300	141961.03300	457870.71920	0.76123	0.08122	0.84244	1.13869
GLCM Dissimilarity Layer 3	40.09900	50.47100	5.22219	126.05825	0.20486	0.46968	0.67454	0.98122
GLCM Dissimilarity Layer 4	38.74400	49.50300	12.03387	18.27436	0.95482	0.01083	0.96565	1.23853
GLCM Dissimilarity Layer 5	35.85200	48.23700	14.10297	26.47507	0.94502	0.02439	0.96941	1.24139
GLCM Dissimilarity Layer 6	40.65100	50.80200	4.05334	333.12315	0.07640	0.76172	0.83812	1.13495
GLCM Dissimilarity Layer 7	27.65300	45.42800	9.18167	32.63595	1.88886	0.09443	1.98329	1.72477
GLCM Dissimilarity Layer 8	41.55000	45.40200	3.92704	91.65382	0.03881	0.46194	0.50075	0.78784
GLCM Entropy Layer 1	43.11900	48.41700	10.36894	122.84625	0.05268	0.31197	0.36465	0.61112
GLCM Entropy Layer 2	37.44500	47.96700	12.34829	15.74456	0.98524	0.00368	0.98892	1.25604
GLCM Entropy Layer 3	7.20030	5.38880	0.14702	0.44333	1.38967	0.07257	1.46223	1.53656
GLCM Entropy Layer 4	7.55770	5.44580	0.27969	0.36527	1.72883	0.00444	1.73327	1.64659
GLCM Entropy Layer 5	7.18090	5.44010	0.11267	0.34440	1.65749	0.07428	1.73176	1.64606
GLCM Entropy Layer 6	7.75800	5.41310	0.38845	0.46131	1.61768	0.00184	1.61952	1.60401
GLCM Entropy Layer 7	6.32080	4.11910	0.37300	0.28992	1.82809	0.00396	1.83205	1.67983
GLCM Entropy Layer 8	5.36390	5.17550	0.04587	0.30699	0.02515	0.19832	0.22347	0.40051
GLCM Mean Layer 1	5.62310	5.18450	0.04847	0.37256	0.11423	0.22443	0.33866	0.57455
GLCM Mean Layer2	3.72870	5.19760	0.24130	0.34982	0.91254	0.00857	0.92111	1.20385
GLCM Mean Layer 3	127.63100	121.06300	1.54123	31.63656	0.32506	0.43264	0.75770	1.06251
GLCM Mean Layer 4	127.78900	121.70900	5.31070	17.79561	0.39996	0.08631	0.48627	0.77017
GLCM Mean Layer 5	127.41700	122.17000	1.18873	17.71024	0.36419	0.36122	0.72541	1.03175
GLCM Mean Layer 6	126.85600	128.81500	7.88714	86.08881	0.01021	0.29479	0.30500	0.52576
GLCM Mean Layer 7	127.61100	120.66500	3.82963	18.70474	0.53526	0.14306	0.67832	0.98506
GLCM Mean Layer 8	126.17200	133.27200	6.41662	8.64882	0.83652	0.00555	0.84207	1.13836
GLCM Correlation Layer 1	127.77300	121.60400	5.24849	56.98727	0.15287	0.29370	0.44657	0.72036
GLCM Correlation Layer 2	127.75100	123.89700	1.14534	50.60427	0.07176	0.61170	0.68346	0.99026
GLCM Correlation Layer 3	0.54193	0.46016	0.00399	0.00854	0.13346	0.03541	0.16887	0.31076
GLCM Correlation Layer 4	0.58872	0.44285	0.00794	0.01206	0.26589	0.01084	0.27673	0.48348
GLCM Correlation Layer 5	0.62994	0.48636	0.00178	0.02087	0.22756	0.31028	0.53785	0.83199
GLCM Correlation Layer 6	0.57380	0.52938	0.00141	0.02899	0.01623	0.43380	0.45003	0.72478
GLCM Correlation Layer 7	0.76240	0.48757	0.00256	0.02347	0.72565	0.25945	0.98510	1.25320
GLCM Correlation Layer 8	0.57949	0.58107	0.00310	0.02613	0.00002	0.24251	0.24254	0.43073

Table A14 J value from forest area and field crop.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1361.15700	1519.20600	4860.82820	7791.45380	0.08016	7791.53396	2.00000	1.85418
Mean Layer 1	1283.41800	1407.32200	932.59988	1706.01482	0.01051	1706.02533	2.00000	1.99755
Mean Layer 2	1451.23000	1669.33600	2841.38796	3772.87214	0.01748	3772.88962	2.00000	0.37943
Mean Layer 3	1275.86900	1516.93200	1190.61388	21117.63853	0.00366	21117.64219	2.00000	1.93469
Mean Layer 4	3922.79500	4176.82400	92203.98903	660161.72103	0.44919	660162.17022	2.00000	1.99543
Mean Layer 5	2592.84400	3019.85800	28402.83169	56229.48708	0.26427	56229.75135	2.00000	1.55896
Mean Layer 6	207.83400	196.21400	22.27116	602.17883	0.25116	602.42999	2.00000	1.99962
Mean Layer 7	73.12300	83.49200	7.00273	455.70677	0.31331	456.02008	2.00000	0.70463
Mean Layer 8	82.14200	83.66300	11.69544	61.38982	0.21075	61.60057	2.00000	1.35001
Max. diff.	2.82510	2.69950	0.00680	0.14298	1.15067	1.29365	1.45146	1.99534
Standard deviation Layer 1	17.33500	26.41000	13.73434	121.75531	0.02626	121.78157	2.00000	0.63158
Standard deviation Layer 2	29.48300	40.28400	25.58353	285.62138	0.01277	285.63415	2.00000	0.56708
Standard deviation Layer 3	19.48600	54.79900	57.75680	825.13468	0.00017	825.13485	2.00000	1.47431
Standard deviation Layer 4	191.51100	185.98400	1215.10192	3112.73600	0.19387	3112.92987	2.00000	0.62409
Standard deviation Layer 5	54.31100	83.75800	225.78528	1212.12617	0.05910	1212.18527	2.00000	0.94186
Standard deviation Layer 6	3.95300	6.06310	0.47401	8.87132	0.32825	9.19957	1.99980	1.20133
Standard deviation Layer 7	4.55540	5.19310	0.61919	3.41751	0.24142	3.65893	1.94848	1.68703
Standard deviation Layer 8	1.76970	2.87180	0.31491	3.00483	0.25805	3.26288	1.92344	0.81647
Ration Layer 1	0.11805	0.11622	0.00002	0.00007	1.81170	1.81177	1.67327	0.53832
Ration Layer 2	0.13337	0.13776	0.00001	0.00009	2.08445	2.08454	1.75127	1.71796
Ration Layer 3	0.11732	0.12551	0.00001	0.00028	1.94511	1.94539	1.71414	1.65925
Ration Layer 4	0.35987	0.34173	0.00010	0.00244	1.69471	1.69715	1.63359	0.83912
Ration Layer 5	0.23800	0.24878	0.00002	0.00038	2.03264	2.03302	1.73812	0.41163
Ration Layer 6	0.01911	0.01612	0.00000	0.00000	2.32691	2.32691	1.80481	0.39370
Ration Layer 7	0.00673	0.00694	0.00000	0.00000	2.24506	2.24506	1.78816	0.61292
Ration Layer 8	0.00757	0.00693	0.00000	0.00000	2.10337	2.10337	1.75591	0.87724
Area	396.60000	222.30000	58820.71111	9300.23333	1.04987	9301.28320	2.00000	1.67482
Border length	140.00000	89.00000	2475.55556	253.55556	0.50248	254.05804	2.00000	0.86048
Width	20.40440	13.50670	43.33958	36.01383	0.08054	36.09437	2.00000	0.19078
Asymmetry	0.53568	0.61741	0.05233	0.06772	0.31109	0.37881	0.63065	0.27018
Border index	1.69850	1.34440	0.05526	0.01607	0.47149	0.48756	0.77175	0.21241
Shape index	1.83230	1.56960	0.08368	0.09491	0.41229	0.50720	0.79565	0.56268
GLCM Homogeneity Layer 1	0.02320	0.03142	0.00001	0.00009	1.64507	1.64516	1.61404	0.92520
GLCM Homogeneity Layer 2	0.02264	0.03542	0.00001	0.00004	1.62238	1.62242	1.60516	1.40231
GLCM Homogeneity Layer 3	0.02516	0.03558	0.00006	0.00005	1.23267	1.23272	1.41700	1.58910
GLCM Homogeneity Layer 4	0.02139	0.03205	0.00001	0.00002	1.64414	1.64416	1.61365	0.04317
GLCM Homogeneity Layer 5	0.25190	0.25653	0.00002	0.00002	1.97759	1.97761	1.72320	1.13945
GLCM Homogeneity Layer 6	0.04940	0.07105	0.00010	0.00186	1.30198	1.30384	1.45702	0.00953
GLCM Homogeneity Layer 7	1361.15700	1519.20600	4860.82820	7791.45380	0.08016	7791.53396	2.00000	1.85418
GLCM Homogeneity Layer 8	1283.41800	1407.32200	932.59988	1706.01482	0.01051	1706.02533	2.00000	1.99755

Table A14 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.04146	0.06888	0.00008	0.00087	1.34207	1.34294	1.47785	1.14877
GLCM Contrast Layer 2	0.15928	0.12134	0.00180	0.00366	0.71391	0.71757	1.02412	0.91965
GLCM Contrast Layer 3	2574.37300	1997.14400	73489.04847	333414.92043	0.56819	333415.4886	2.00000	1.43056
GLCM Contrast Layer 4	2460.72800	1844.71100	177072.49820	181066.55065	0.79967	181067.3503	2.00000	0.84649
GLCM Contrast Layer 5	2108.30700	1660.13000	108952.22130	267203.10244	0.70699	267203.8094	2.00000	0.47050
GLCM Contrast Layer 6	2672.58900	1799.18100	44149.58097	40511.59017	0.47346	40512.06363	2.00000	0.07467
GLCM Contrast Layer 7	1645.13500	1448.58300	119103.88290	163903.01402	0.76182	163903.7758	2.00000	0.03647
GLCM Contrast Layer 8	2729.50400	1854.38300	79518.72916	87701.09291	0.60456	87701.69747	2.00000	1.18315
GLCM Dissimilarity Layer 1	2973.43200	1886.69700	198792.39400	152586.25722	0.82251	152587.0797	2.00000	0.43738
GLCM Dissimilarity Layer2	2283.70700	2227.62900	141961.03300	213011.79312	0.69987	213012.49299	2.00000	1.45307
GLCM Dissimilarity Layer 3	40.09900	33.72900	5.22219	31.58301	0.19176	31.77477	2.00000	0.71067
GLCM Dissimilarity Layer 4	38.74400	31.46700	12.03387	14.90920	0.05565	14.96485	2.00000	1.09201
GLCM Dissimilarity Layer 5	35.85200	30.05500	14.10297	23.48709	0.03496	23.52205	2.00000	0.84232
GLCM Dissimilarity Layer 6	40.65100	31.64100	4.05334	2.99374	0.22742	3.22116	1.92018	0.97165
GLCM Dissimilarity Layer 7	27.65300	24.63400	9.18167	15.74749	0.05855	15.80604	2.00000	0.89465
GLCM Dissimilarity Layer 8	41.55000	32.96200	3.92704	5.78997	0.24157	6.03154	1.99520	1.95809
GLCM Entropy Layer 1	43.11900	32.91900	10.36894	12.43899	0.07915	12.51814	1.99999	0.78310
GLCM Entropy Layer 2	37.44500	36.31200	12.34829	19.13144	0.06944	19.20088	2.00000	0.57215
GLCM Entropy Layer 3	7.20030	6.96510	0.14702	0.13964	0.62840	0.76804	1.07216	0.65903
GLCM Entropy Layer 4	7.55770	7.03680	0.27969	0.19496	0.47922	0.67418	0.98085	1.84733
GLCM Entropy Layer 5	7.18090	7.11650	0.11267	0.15457	0.69770	0.85227	1.14711	0.00822
GLCM Entropy Layer 6	7.75800	7.26090	0.38845	0.14770	0.41151	0.55921	0.85668	0.21375
GLCM Entropy Layer 7	6.32080	5.91170	0.37300	0.13357	0.37480	0.50837	0.79705	0.42071
GLCM Entropy Layer 8	5.36390	5.42650	0.04587	0.71961	0.85096	1.57057	1.58415	0.82795
GLCM Mean Layer 1	5.62310	5.39460	0.04847	0.32784	0.83594	1.16378	1.37539	0.38051
GLCM Mean Layer2	3.72870	4.29780	0.24130	0.59166	0.40070	0.99236	1.25860	0.05990
GLCM Mean Layer 3	127.63100	127.10500	1.54123	2.01281	0.76256	2.77537	1.87535	1.00389
GLCM Mean Layer 4	127.78900	127.11500	5.31070	2.73161	0.46773	3.19934	1.91842	0.02828
GLCM Mean Layer 5	127.41700	127.24700	1.18873	1.71762	0.82639	2.54401	1.84290	0.47489
GLCM Mean Layer 6	126.85600	126.55900	7.88714	2.21945	0.37752	2.59697	1.85100	0.91319
GLCM Mean Layer 7	127.61100	127.26600	3.82963	2.87492	0.54413	3.41905	1.93451	1.71788
GLCM Mean Layer 8	126.17200	125.86600	6.41662	2.84209	0.42237	3.26446	1.92356	1.96647
GLCM Correlation Layer 1	127.77300	127.85500	5.24849	3.46456	0.47178	3.93634	1.96096	0.91510
GLCM Correlation Layer 2	127.75100	126.89400	1.14534	4.69514	0.83483	5.52997	1.99207	0.53441
GLCM Correlation Layer 3	0.54193	0.64018	0.00399	0.01003	0.92623	0.93626	1.21582	0.17230
GLCM Correlation Layer 4	0.58872	0.67954	0.00794	0.00569	0.77153	0.77722	1.08063	0.62707
GLCM Correlation Layer 5	0.62994	0.72606	0.00178	0.00489	1.15798	1.16287	1.37483	0.13432
GLCM Correlation Layer 6	0.57380	0.70700	0.00141	0.00066	1.20966	1.21032	1.40379	1.15229
GLCM Correlation Layer 7	0.76240	0.78780	0.00256	0.00486	1.08780	1.09266	1.32936	0.55772
GLCM Correlation Layer 8	0.57949	0.71401	0.00310	0.00136	1.01559	1.01695	1.27661	0.85668

Table A15 J value from forest area and paddy field.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1361.15700	1321.03100	4860.82820	8597.03472	0.02991	0.02005	0.04996	0.09747
Mean Layer 1	1283.41800	1304.21400	932.59988	442.12358	0.07865	0.03404	0.11269	0.21314
Mean Layer 2	1451.23000	1524.75100	2841.38796	913.79552	0.35986	0.07646	0.43632	0.70717
Mean Layer 3	1275.86900	1331.44600	1190.61388	1571.55178	0.27956	0.00480	0.28436	0.49501
Mean Layer 4	3922.79500	3676.98600	92203.98903	324461.02860	0.03625	0.09303	0.12928	0.24254
Mean Layer 5	2592.84400	2368.87000	28402.83169	40450.86540	0.18214	0.00777	0.18992	0.34594
Mean Layer 6	207.83400	197.51400	22.27116	195.67825	0.12216	0.25062	0.37278	0.62237
Mean Layer 7	73.12300	71.31400	7.00273	47.39534	0.01504	0.20038	0.21542	0.38760
Mean Layer 8	82.14200	93.14700	11.69544	65.04105	0.39456	0.16506	0.55963	0.85715
Max. diff.	2.82510	2.71520	0.00680	0.05576	0.04827	0.23699	0.28526	0.49636
Standard deviation Layer 1	17.33500	23.25300	13.73434	103.70462	0.07456	0.22102	0.29558	0.51180
Standard deviation Layer 2	29.48300	37.11800	25.58353	415.02597	0.03308	0.37993	0.41301	0.67669
Standard deviation Layer 3	19.48600	37.16500	57.75680	524.67636	0.13416	0.25728	0.39143	0.64783
Standard deviation Layer 4	191.51100	232.63600	1215.10192	4277.92832	0.07697	0.09309	0.17007	0.31278
Standard deviation Layer 5	54.31100	78.78000	225.78528	1518.79980	0.08580	0.19925	0.28505	0.49604
Standard deviation Layer 6	3.95300	6.75160	0.47401	1.82859	0.85036	0.10619	0.95655	1.23157
Standard deviation Layer 7	4.55540	5.34680	0.61919	0.84514	0.10693	0.00602	0.11295	0.21361
Standard deviation Layer 8	1.76970	3.41510	0.31491	2.98850	0.20489	0.26608	0.47097	0.75120
Ration Layer 1	0.11805	0.12399	0.00002	0.00008	0.08476	0.11253	0.19729	0.35810
Ration Layer 2	0.13337	0.14482	0.00001	0.00008	0.36694	0.27337	0.64031	0.94574
Ration Layer 3	0.11732	0.12661	0.00001	0.00011	0.17338	0.24382	0.41721	0.68223
Ration Layer 4	0.35987	0.34623	0.00010	0.00081	0.05113	0.24064	0.29178	0.50613
Ration Layer 5	0.23800	0.22396	0.00002	0.00002	1.28810	0.00046	1.28856	1.44866
Ration Layer 6	0.01911	0.01869	0.00000	0.00000	0.07978	0.02866	0.10844	0.20554
Ration Layer 7	0.00673	0.00681	0.00000	0.00000	0.00112	0.14231	0.14343	0.26724
Ration Layer 8	0.00757	0.00890	0.00000	0.00000	0.20340	0.13394	0.33734	0.57267
Area	396.60000	127.30000	58820.71111	4486.67778	0.28639	0.33353	0.61992	0.92402
Border length	140.00000	64.00000	2475.55556	326.22222	0.51539	0.22198	0.73737	1.04326
Width	20.40440	9.46880	43.33958	18.32484	0.48483	0.04495	0.52978	0.82253
Asymmetry	0.53568	0.58648	0.05233	0.10895	0.00400	0.03288	0.03688	0.07242
Border index	1.69850	1.24700	0.05526	0.02492	0.63565	0.03864	0.67429	0.98096
Shape index	1.83230	1.48400	0.08368	0.08576	0.17899	0.00004	0.17903	0.32783
GLCM Homogeneity Layer 1	0.02320	0.02684	0.00001	0.00007	0.04236	0.18359	0.22594	0.40448
GLCM Homogeneity Layer 2	0.02264	0.03102	0.00001	0.00016	0.09868	0.31860	0.41728	0.68233
GLCM Homogeneity Layer 3	0.02516	0.03272	0.00006	0.00029	0.04005	0.13093	0.17098	0.31432
GLCM Homogeneity Layer 4	0.02139	0.03085	0.00001	0.00004	0.42955	0.09877	0.52832	0.82081
GLCM Homogeneity Layer 5	0.25190	0.25038	0.00002	0.00008	0.00578	0.08194	0.08773	0.16797
GLCM Homogeneity Layer 6	0.04940	0.04793	0.00010	0.00010	0.00270	0.00016	0.00286	0.00571
GLCM Homogeneity Layer 7	1361.15700	1321.03100	4860.82820	8597.03472	0.02991	0.02005	0.04996	0.09747
GLCM Homogeneity Layer 8	1283.41800	1304.21400	932.59988	442.12358	0.07865	0.03404	0.11269	0.21314

Table A15 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.04146	0.05129	0.00008	0.00024	0.07580	0.07041	0.14620	0.27204
GLCM Contrast Layer 2	0.15928	0.10096	0.00180	0.00041	0.38616	0.12738	0.51355	0.80326
GLCM Contrast Layer 3	2574.37300	2522.80900	73489.04847	861951.58320	0.00071	0.30985	0.31056	0.53393
GLCM Contrast Layer 4	2460.72800	1919.87000	177072.49820	351187.18160	0.13844	0.02875	0.16719	0.30792
GLCM Contrast Layer 5	2108.30700	2116.22400	108952.22130	969739.43570	0.00001	0.25319	0.25321	0.44739
GLCM Contrast Layer 6	2672.58900	1746.53200	44149.58097	155852.09090	1.07197	0.09347	1.16543	1.37643
GLCM Contrast Layer 7	1645.13500	1751.64500	119103.88290	546012.97020	0.00426	0.13275	0.13701	0.25608
GLCM Contrast Layer 8	2729.50400	1792.04000	79518.72916	239048.23140	0.68968	0.07218	0.76186	1.06640
GLCM Dissimilarity Layer 1	2973.43200	2098.56000	198792.39400	208103.14920	0.47027	0.00013	0.47040	0.75049
GLCM Dissimilarity Layer2	2283.70700	1852.10900	141961.03300	332699.22740	0.09811	0.04403	0.14214	0.26500
GLCM Dissimilarity Layer 3	40.09900	38.81600	5.22219	64.21736	0.00593	0.31986	0.32578	0.55608
GLCM Dissimilarity Layer 4	38.74400	33.42600	12.03387	40.50734	0.13457	0.08692	0.22149	0.39735
GLCM Dissimilarity Layer 5	35.85200	33.95100	14.10297	87.62090	0.00888	0.18471	0.19359	0.35200
GLCM Dissimilarity Layer 6	40.65100	31.45100	4.05334	16.26548	1.04140	0.11205	1.15345	1.36891
GLCM Dissimilarity Layer 7	27.65300	27.74900	9.18167	40.27068	0.00005	0.12572	0.12577	0.23636
GLCM Dissimilarity Layer 8	41.55000	32.23800	3.92704	25.41635	0.73878	0.19214	0.93092	1.21162
GLCM Entropy Layer 1	43.11900	35.13300	10.36894	11.94529	0.71452	0.00125	0.71577	1.02237
GLCM Entropy Layer 2	37.44500	32.45900	12.34829	39.83365	0.11910	0.08124	0.20034	0.36310
GLCM Entropy Layer 3	7.20030	6.51230	0.14702	0.18287	0.35871	0.00297	0.36168	0.60699
GLCM Entropy Layer 4	7.55770	6.61840	0.27969	0.20432	0.45572	0.00614	0.46185	0.73977
GLCM Entropy Layer 5	7.18090	6.63920	0.11267	0.28551	0.18424	0.05219	0.23643	0.42111
GLCM Entropy Layer 6	7.75800	6.76010	0.38845	0.22184	0.40793	0.01936	0.42729	0.69545
GLCM Entropy Layer 7	6.32080	5.37560	0.37300	0.23476	0.36750	0.01328	0.38078	0.63335
GLCM Entropy Layer 8	5.36390	5.67340	0.04587	0.05179	0.24522	0.00092	0.24614	0.43637
GLCM Mean Layer 1	5.62310	5.42510	0.04847	0.06784	0.08427	0.00703	0.09130	0.17450
GLCM Mean Layer2	3.72870	4.55770	0.24130	0.18242	0.40549	0.00488	0.41036	0.67318
GLCM Mean Layer 3	127.63100	127.90600	1.54123	1.62600	0.00597	0.00018	0.00615	0.01226
GLCM Mean Layer 4	127.78900	128.16300	5.31070	1.50958	0.00513	0.09299	0.09812	0.18691
GLCM Mean Layer 5	127.41700	127.75800	1.18873	4.56848	0.00505	0.10564	0.11069	0.20956
GLCM Mean Layer 6	126.85600	127.35800	7.88714	12.21853	0.00313	0.01188	0.01501	0.02980
GLCM Mean Layer 7	127.61100	127.28500	3.82963	3.03856	0.00387	0.00334	0.00721	0.01436
GLCM Mean Layer 8	126.17200	126.84000	6.41662	13.14596	0.00570	0.03148	0.03719	0.07301
GLCM Correlation Layer 1	127.77300	126.96800	5.24849	11.23173	0.00983	0.03534	0.04517	0.08832
GLCM Correlation Layer 2	127.75100	127.53900	1.14534	10.98614	0.00093	0.26824	0.26917	0.47197
GLCM Correlation Layer 3	0.54193	0.57745	0.00399	0.03393	0.00832	0.24433	0.25264	0.44651
GLCM Correlation Layer 4	0.58872	0.67906	0.00794	0.01710	0.08148	0.03588	0.11736	0.22146
GLCM Correlation Layer 5	0.62994	0.66943	0.00178	0.01841	0.01931	0.28413	0.30344	0.52345
GLCM Correlation Layer 6	0.57380	0.75530	0.00141	0.00192	2.47618	0.00609	2.48227	1.83289
GLCM Correlation Layer 7	0.76240	0.76544	0.00256	0.00555	0.00028	0.03675	0.03703	0.07271
GLCM Correlation Layer 8	0.57949	0.74324	0.00310	0.00273	1.15042	0.00101	1.15143	1.36763

Table A16 J value from forest area and perennial tree and orchard.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1361.15700	1366.98100	4860.82820	5005.38201	0.00086	0.00005	0.00091	0.00183
Mean Layer 1	1283.41800	1279.21100	932.59988	738.32725	0.00265	0.00340	0.00605	0.01206
Mean Layer 2	1451.23000	1444.40500	2841.38796	2485.55389	0.00219	0.00112	0.00330	0.00660
Mean Layer 3	1275.86900	1293.66600	1190.61388	4592.44727	0.01369	0.10617	0.11986	0.22592
Mean Layer 4	3922.79500	3934.46400	92203.98903	247864.91930	0.00010	0.05878	0.05888	0.11436
Mean Layer 5	2592.84400	2620.88000	28402.83169	118523.44450	0.00134	0.11799	0.11933	0.22497
Mean Layer 6	207.83400	206.29700	22.27116	177.75476	0.00295	0.23173	0.23468	0.41835
Mean Layer 7	73.12300	73.90800	7.00273	316.99093	0.00048	0.61749	0.61797	0.92192
Mean Layer 8	82.14200	83.01000	11.69544	114.45838	0.00149	0.27232	0.27382	0.47906
Max. diff.	2.82510	2.82380	0.00680	0.07843	0.00000	0.30633	0.30633	0.52772
Standard deviation Layer 1	17.33500	15.89100	13.73434	24.80074	0.01353	0.02152	0.03505	0.06888
Standard deviation Layer 2	29.48300	22.72800	25.58353	38.41324	0.17825	0.01025	0.18851	0.34361
Standard deviation Layer 3	19.48600	22.28990	57.75680	194.49417	0.00779	0.08698	0.09477	0.18083
Standard deviation Layer 4	191.51100	126.34700	1215.10192	537.95547	0.60556	0.04039	0.64596	0.95168
Standard deviation Layer 5	54.31100	57.89300	225.78528	537.36591	0.00420	0.04559	0.04979	0.09714
Standard deviation Layer 6	3.95300	3.22540	0.47401	0.88459	0.09742	0.02394	0.12136	0.22857
Standard deviation Layer 7	4.55540	3.25440	0.61919	0.44018	0.39943	0.00724	0.40668	0.66828
Standard deviation Layer 8	1.76970	1.83417	0.31491	0.47305	0.00132	0.01028	0.01160	0.02306
Ration Layer 1	0.11805	0.11731	0.00002	0.00005	0.00181	0.05690	0.05872	0.11405
Ration Layer 2	0.13337	0.13237	0.00001	0.00006	0.00352	0.22271	0.22623	0.40493
Ration Layer 3	0.11732	0.11862	0.00001	0.00009	0.00420	0.19784	0.20203	0.36587
Ration Layer 4	0.35987	0.35913	0.00010	0.00115	0.00011	0.31216	0.31227	0.53643
Ration Layer 5	0.23800	0.23927	0.00002	0.00066	0.00060	0.56184	0.56244	0.86036
Ration Layer 6	0.01911	0.01888	0.00000	0.00000	0.01002	0.06158	0.07160	0.13818
Ration Layer 7	0.00673	0.00677	0.00000	0.00000	0.00014	0.31493	0.31506	0.54051
Ration Layer 8	0.00757	0.00765	0.00000	0.00000	0.00061	0.14514	0.14576	0.27127
Area	396.60000	308.30000	58820.71111	32593.34444	0.02132	0.02148	0.04280	0.08379
Border length	140.00000	84.00000	2475.55556	584.00000	0.25625	0.12041	0.37665	0.62769
Width	20.40440	16.27000	43.33958	18.30678	0.06932	0.04505	0.11437	0.21614
Asymmetry	0.53568	0.43772	0.05233	0.06217	0.02095	0.00185	0.02281	0.04509
Border index	1.69850	1.16470	0.05526	0.00978	1.09526	0.16781	1.26307	1.43443
Shape index	1.83230	1.23320	0.08368	0.01757	0.88620	0.13888	1.02508	1.28246
GLCM Homogeneity Layer 1	0.02320	0.02526	0.00001	0.00001	0.04355	0.00296	0.04651	0.09089
GLCM Homogeneity Layer 2	0.02264	0.03161	0.00001	0.00008	0.22669	0.16633	0.39302	0.64997
GLCM Homogeneity Layer 3	0.02516	0.03381	0.00006	0.00006	0.14743	0.00005	0.14748	0.27424
GLCM Homogeneity Layer 4	0.02139	0.03170	0.00001	0.00002	0.76298	0.03464	0.79763	1.09921
GLCM Homogeneity Layer 5	0.25190	0.25456	0.00002	0.00006	0.02025	0.05976	0.08001	0.15379
GLCM Homogeneity Layer 6	0.04940	0.09501	0.00010	0.00044	0.97392	0.12895	1.10287	1.33617
GLCM Homogeneity Layer 7	1361.15700	1366.98100	4860.82820	5005.38201	0.00086	0.00005	0.00091	0.00183
GLCM Homogeneity Layer 8	1283.41800	1279.21100	932.59988	738.32725	0.00265	0.00340	0.00605	0.01206

Table A16 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.04146	0.08631	0.00008	0.00025	1.52698	0.07575	1.60274	1.59731
GLCM Contrast Layer 2	0.15928	0.19886	0.00180	0.00491	0.05837	0.06071	0.11908	0.22452
GLCM Contrast Layer 3	2574.37300	2667.94800	73489.04847	471380.52280	0.00402	0.19050	0.19452	0.35353
GLCM Contrast Layer 4	2460.72800	1912.37700	177072.49820	353896.56100	0.14158	0.02939	0.17096	0.31429
GLCM Contrast Layer 5	2108.30700	1971.07100	108952.22130	382827.40660	0.00957	0.09282	0.10239	0.19465
GLCM Contrast Layer 6	2672.58900	1746.48500	44149.58097	357465.99680	0.53389	0.23452	0.76840	1.07249
GLCM Contrast Layer 7	1645.13500	1392.14300	119103.88290	164675.59650	0.05639	0.00653	0.06292	0.12196
GLCM Contrast Layer 8	2729.50400	1867.86700	79518.72916	427959.51120	0.36574	0.15940	0.52514	0.81705
GLCM Dissimilarity Layer 1	2973.43200	2126.10200	198792.39400	321144.56370	0.34522	0.01424	0.35946	0.60389
GLCM Dissimilarity Layer2	2283.70700	2313.96400	141961.03300	841101.36930	0.00023	0.17620	0.17643	0.32348
GLCM Dissimilarity Layer 3	40.09900	40.32600	5.22219	28.58496	0.00038	0.16231	0.16269	0.30030
GLCM Dissimilarity Layer 4	38.74400	33.00100	12.03387	34.49814	0.17720	0.06634	0.24354	0.43230
GLCM Dissimilarity Layer 5	35.85200	33.12000	14.10297	35.64009	0.03751	0.05190	0.08941	0.17106
GLCM Dissimilarity Layer 6	40.65100	31.16400	4.05334	32.60547	0.61379	0.23325	0.84704	1.14263
GLCM Dissimilarity Layer 7	27.65300	23.72400	9.18167	14.54818	0.16263	0.01312	0.17576	0.32236
GLCM Dissimilarity Layer 8	41.55000	32.70800	3.92704	31.99977	0.54403	0.23576	0.77979	1.08300
GLCM Entropy Layer 1	43.11900	34.70800	10.36894	21.19251	0.56037	0.03128	0.59165	0.89318
GLCM Entropy Layer 2	37.44500	35.57100	12.34829	57.83041	0.01251	0.13619	0.14870	0.27635
GLCM Entropy Layer 3	7.20030	6.97150	0.14702	0.06010	0.06319	0.04844	0.11163	0.21124
GLCM Entropy Layer 4	7.55770	7.13730	0.27969	0.06973	0.12645	0.11198	0.23842	0.42426
GLCM Entropy Layer 5	7.18090	6.94450	0.11267	0.06750	0.07755	0.01623	0.09378	0.17903
GLCM Entropy Layer 6	7.75800	7.50380	0.38845	0.18137	0.02835	0.03541	0.06376	0.12354
GLCM Entropy Layer 7	6.32080	6.09360	0.37300	0.15546	0.02442	0.04642	0.07084	0.13677
GLCM Entropy Layer 8	5.36390	4.67950	0.04587	0.20913	0.45923	0.13187	0.59110	0.89257
GLCM Mean Layer 1	5.62310	4.79510	0.04847	0.07212	1.42127	0.00980	1.43108	1.52190
GLCM Mean Layer2	3.72870	3.62000	0.24130	0.34819	0.00501	0.00836	0.01337	0.02656
GLCM Mean Layer 3	127.63100	128.18700	1.54123	1.15833	0.02863	0.00508	0.03371	0.06629
GLCM Mean Layer 4	127.78900	127.80300	5.31070	1.25413	0.00001	0.12025	0.12026	0.22661
GLCM Mean Layer 5	127.41700	127.76300	1.18873	1.51925	0.01105	0.00375	0.01480	0.02939
GLCM Mean Layer 6	126.85600	126.43800	7.88714	3.91073	0.00370	0.03015	0.03385	0.06656
GLCM Mean Layer 7	127.61100	127.80600	3.82963	0.78392	0.00206	0.14310	0.14516	0.27023
GLCM Mean Layer 8	126.17200	125.63200	6.41662	4.53173	0.00666	0.00752	0.01418	0.02816
GLCM Correlation Layer 1	127.77300	128.65100	5.24849	4.61679	0.01954	0.00103	0.02056	0.04070
GLCM Correlation Layer 2	127.75100	127.69000	1.14534	4.53136	0.00016	0.10993	0.11009	0.20850
GLCM Correlation Layer 3	0.54193	0.53505	0.00399	0.02085	0.00048	0.15449	0.15496	0.28710
GLCM Correlation Layer 4	0.58872	0.68206	0.00794	0.00834	0.13373	0.00015	0.13388	0.25062
GLCM Correlation Layer 5	0.62994	0.65596	0.00178	0.01320	0.01130	0.21803	0.22933	0.40986
GLCM Correlation Layer 6	0.57380	0.74075	0.00141	0.00649	0.88301	0.13387	1.01687	1.27655
GLCM Correlation Layer 7	0.76240	0.79586	0.00256	0.00420	0.04145	0.01524	0.05669	0.11022
GLCM Correlation Layer 8	0.57949	0.72115	0.00310	0.00771	0.46423	0.05021	0.51445	0.80434

Table A17 J value from forest area and rangeland.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1361.15700	1401.62700	4860.82820	1182.33660	0.06776	0.11571	0.18347	0.33525
Mean Layer 1	1283.41800	1316.44200	932.59988	1022.57206	0.13945	0.00053	0.13998	0.26125
Mean Layer 2	1451.23000	1524.27900	2841.38796	2029.22079	0.27390	0.00705	0.28095	0.48986
Mean Layer 3	1275.86900	1335.04600	1190.61388	1991.59127	0.27512	0.01636	0.29148	0.50569
Mean Layer 4	3922.79500	3954.73300	92203.98903	21128.39829	0.00225	0.12493	0.12718	0.23886
Mean Layer 5	2592.84400	2718.93400	28402.83169	6964.61549	0.11238	0.11449	0.22687	0.40595
Mean Layer 6	207.83400	204.66400	22.27116	12.86756	0.07149	0.01858	0.09007	0.17227
Mean Layer 7	73.12300	77.11500	7.00273	7.75892	0.26989	0.00066	0.27055	0.47407
Mean Layer 8	82.14200	81.81000	11.69544	4.96431	0.00165	0.04456	0.04621	0.09032
Max. diff.	2.82510	2.76610	0.00680	0.00396	0.08090	0.01808	0.09898	0.18847
Standard deviation Layer 1	17.33500	30.99300	13.73434	159.92665	0.26854	0.30833	0.57687	0.87669
Standard deviation Layer 2	29.48300	52.49200	25.58353	224.32657	0.52960	0.25021	0.77982	1.08302
Standard deviation Layer 3	19.48600	56.89400	57.75680	1083.43332	0.30656	0.41231	0.71886	1.02539
Standard deviation Layer 4	191.51100	309.81100	1215.10192	6500.71848	0.45345	0.15838	0.61183	0.91528
Standard deviation Layer 5	54.31100	98.15300	225.78528	813.30705	0.46245	0.09630	0.55876	0.85616
Standard deviation Layer 6	3.95300	8.45560	0.47401	10.67308	0.45468	0.45372	0.90839	1.19366
Standard deviation Layer 7	4.55540	7.65650	0.61919	3.58733	0.57154	0.17223	0.74377	1.04936
Standard deviation Layer 8	1.76970	3.88860	0.31491	4.69709	0.22395	0.36147	0.58542	0.88626
Ration Layer 1	0.11805	0.11744	0.00002	0.00001	0.00297	0.02706	0.03003	0.05916
Ration Layer 2	0.13337	0.13594	0.00001	0.00001	0.11502	0.00556	0.12058	0.22718
Ration Layer 3	0.11732	0.11905	0.00001	0.00001	0.03760	0.02663	0.06423	0.12442
Ration Layer 4	0.35987	0.35266	0.00010	0.00006	0.08389	0.01687	0.10077	0.19171
Ration Layer 5	0.23800	0.24247	0.00002	0.00001	0.15797	0.00634	0.16431	0.30304
Ration Layer 6	0.01911	0.01826	0.00000	0.00000	0.27928	0.00426	0.28353	0.49377
Ration Layer 7	0.00673	0.00688	0.00000	0.00000	0.01727	0.04005	0.05732	0.11142
Ration Layer 8	0.00757	0.00730	0.00000	0.00000	0.03994	0.15166	0.19159	0.34871
Area	396.60000	123.60000	58820.71111	3840.48889	0.29735	0.36727	0.66462	0.97106
Border length	140.00000	86.60000	2475.55556	873.82222	0.21284	0.06492	0.27776	0.48504
Width	20.40440	12.18080	43.33958	23.87806	0.25152	0.02189	0.27341	0.47844
Asymmetry	0.53568	0.62722	0.05233	0.06069	0.01854	0.00137	0.01991	0.03942
Border index	1.69850	1.76590	0.05526	0.23248	0.00395	0.11925	0.12319	0.23182
Shape index	1.83230	2.01710	0.08368	0.40081	0.01762	0.13985	0.15748	0.29141
GLCM Homogeneity Layer 1	0.02320	0.02676	0.00001	0.00006	0.04227	0.17502	0.21730	0.39062
GLCM Homogeneity Layer 2	0.02264	0.02383	0.00001	0.00001	0.01618	0.01138	0.02756	0.05438
GLCM Homogeneity Layer 3	0.02516	0.03683	0.00006	0.00010	0.20161	0.01440	0.21600	0.38853
GLCM Homogeneity Layer 4	0.02139	0.02431	0.00001	0.00003	0.05274	0.05636	0.10910	0.20673
GLCM Homogeneity Layer 5	0.25190	0.24848	0.00002	0.00010	0.02437	0.11524	0.13961	0.26060
GLCM Homogeneity Layer 6	0.04940	0.03455	0.00010	0.00011	0.26937	0.00056	0.26993	0.47314
GLCM Homogeneity Layer 7	1361.15700	1401.62700	4860.82820	1182.33660	0.06776	0.11571	0.18347	0.33525
GLCM Homogeneity Layer 8	1283.41800	1316.44200	932.59988	1022.57206	0.13945	0.00053	0.13998	0.26125

Table A17 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.04146	0.02949	0.00008	0.00004	0.30480	0.03707	0.34187	0.57913
GLCM Contrast Layer 2	0.15928	0.08441	0.00180	0.00133	0.44769	0.00554	0.45322	0.72885
GLCM Contrast Layer 3	2574.37300	2456.83500	73489.04847	656967.37660	0.00473	0.25407	0.25880	0.45604
GLCM Contrast Layer 4	2460.72800	2376.29200	177072.49820	452281.99900	0.00283	0.05306	0.05589	0.10871
GLCM Contrast Layer 5	2108.30700	1930.86400	108952.22130	461552.86980	0.01380	0.12031	0.13411	0.25101
GLCM Contrast Layer 6	2672.58900	2424.00700	44149.58097	386301.68100	0.03589	0.24979	0.28568	0.49700
GLCM Contrast Layer 7	1645.13500	2418.07500	119103.88290	582673.99190	0.21283	0.14333	0.35616	0.59928
GLCM Contrast Layer 8	2729.50400	2152.12800	79518.72916	300436.01180	0.21934	0.10315	0.32249	0.55131
GLCM Dissimilarity Layer 1	2973.43200	2488.80500	198792.39400	329598.74770	0.11112	0.01581	0.12693	0.23841
GLCM Dissimilarity Layer2	2283.70700	2402.77400	141961.03300	864290.88640	0.00352	0.18105	0.18458	0.33709
GLCM Dissimilarity Layer 3	40.09900	37.89000	5.22219	47.56176	0.02311	0.25779	0.28091	0.48980
GLCM Dissimilarity Layer 4	38.74400	37.71500	12.03387	25.26965	0.00710	0.03364	0.04073	0.07983
GLCM Dissimilarity Layer 5	35.85200	32.47500	14.10297	37.50783	0.05524	0.05756	0.11280	0.21334
GLCM Dissimilarity Layer 6	40.65100	38.63400	4.05334	33.19985	0.02730	0.23677	0.26407	0.46417
GLCM Dissimilarity Layer 7	27.65300	33.89300	9.18167	35.67547	0.21701	0.10725	0.32426	0.55387
GLCM Dissimilarity Layer 8	41.55000	35.95900	3.92704	31.83543	0.21852	0.23476	0.45328	0.72892
GLCM Entropy Layer 1	43.11900	39.29400	10.36894	27.24956	0.09723	0.05621	0.15344	0.28450
GLCM Entropy Layer 2	37.44500	37.70700	12.34829	73.44047	0.00020	0.17687	0.17707	0.32456
GLCM Entropy Layer 3	7.20030	6.68920	0.14702	0.11894	0.24555	0.00280	0.24835	0.43983
GLCM Entropy Layer 4	7.55770	6.81690	0.27969	0.14442	0.32349	0.02682	0.35032	0.59107
GLCM Entropy Layer 5	7.18090	6.69390	0.11267	0.10714	0.26974	0.00016	0.26990	0.47308
GLCM Entropy Layer 6	7.75800	6.84400	0.38845	0.15071	0.38736	0.05406	0.44142	0.71375
GLCM Entropy Layer 7	6.32080	5.45730	0.37300	0.14034	0.36313	0.05748	0.42061	0.68671
GLCM Entropy Layer 8	5.36390	5.92890	0.04587	0.09354	0.57245	0.03110	0.60355	0.90626
GLCM Mean Layer 1	5.62310	5.93980	0.04847	0.02244	0.35361	0.03620	0.38981	0.64563
GLCM Mean Layer2	3.72870	4.67110	0.24130	0.66348	0.24540	0.06139	0.30679	0.52838
GLCM Mean Layer 3	127.63100	129.52300	1.54123	3.70265	0.17066	0.04655	0.21721	0.39048
GLCM Mean Layer 4	127.78900	130.02500	5.31070	3.24967	0.14601	0.01493	0.16094	0.29732
GLCM Mean Layer 5	127.41700	129.11800	1.18873	2.38615	0.20234	0.02975	0.23209	0.41425
GLCM Mean Layer 6	126.85600	128.09500	7.88714	14.24887	0.01734	0.02155	0.03889	0.07628
GLCM Mean Layer 7	127.61100	129.77200	3.82963	10.64784	0.08064	0.06269	0.14333	0.26707
GLCM Mean Layer 8	126.17200	127.06600	6.41662	10.47416	0.01183	0.01486	0.02669	0.05267
GLCM Correlation Layer 1	127.77300	126.93500	5.24849	9.83465	0.01164	0.02425	0.03589	0.07051
GLCM Correlation Layer 2	127.75100	127.37300	1.14534	4.75213	0.00606	0.11711	0.12317	0.23178
GLCM Correlation Layer 3	0.54193	0.59482	0.00399	0.02703	0.02255	0.20070	0.22325	0.40017
GLCM Correlation Layer 4	0.58872	0.63679	0.00794	0.01449	0.02575	0.02224	0.04800	0.09373
GLCM Correlation Layer 5	0.62994	0.68829	0.00178	0.01350	0.05571	0.22235	0.27806	0.48550
GLCM Correlation Layer 6	0.57380	0.62369	0.00141	0.00559	0.08897	0.11073	0.19970	0.36205
GLCM Correlation Layer 7	0.76240	0.65799	0.00256	0.00602	0.31776	0.04457	0.36234	0.60790
GLCM Correlation Layer 8	0.57949	0.66366	0.00310	0.00473	0.22636	0.01106	0.23742	0.42267

Table A18 J value from forest area and water body.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1361.15	1155.7680	4860.82820	1182.33660	1.74514	0.11571	1.86085	1.68892
Mean Layer 1	1283.41	1665.1200	932.59988	1022.57206	18.62962	0.00053	18.63015	2.00000
Mean Layer 2	1451.23	1982.5080	2841.38796	2029.22079	14.48773	0.00705	14.49478	2.00000
Mean Layer 3	1275.86	1990.8500	1190.61388	1991.59127	40.16066	0.01636	40.17702	2.00000
Mean Layer 4	3922.79	1743.9500	92203.9890	21128.3982	10.47222	0.12493	10.59715	1.99995
Mean Layer 5	2592.84	1516.0920	28402.8316	6964.61549	8.19535	0.11449	8.30984	1.99951
Mean Layer 6	207.834	80.77700	22.27116	12.86756	114.85536	0.01858	114.87394	2.00000
Mean Layer 7	73.1230	100.33600	7.00273	7.75892	12.54174	0.00066	12.54240	1.99999
Mean Layer 8	82.1420	166.52500	11.69544	4.96431	106.85170	0.04456	106.89625	2.00000
Max. diff.	2.82510	1.69900	0.00680	0.00396	29.46946	0.01808	29.48754	2.00000
Standard deviation Layer 1	17.3350	44.98700	13.73434	159.92665	1.10076	0.30833	1.40908	1.51126
Standard deviation Layer 2	29.4830	56.26400	25.58353	224.32657	0.71748	0.25021	0.96769	1.24008
Standard deviation Layer 3	19.4860	71.51700	57.75680	1083.43332	0.59307	0.41231	1.00538	1.26819
Standard deviation Layer 4	191.511	124.18600	1215.10192	6500.71848	0.14686	0.15838	0.30524	0.52611
Standard deviation Layer 5	54.3110	101.17200	225.78528	813.30705	0.52833	0.09630	0.62464	0.92909
Standard deviation Layer 6	3.95300	9.15520	0.47401	10.67308	0.60695	0.45372	1.06066	1.30755
Standard deviation Layer 7	4.55540	6.25910	0.61919	3.58733	0.17251	0.17223	0.34473	0.58318
Standard deviation Layer 8	1.76970	7.36440	0.31491	4.69709	1.56129	0.36147	1.92276	1.70759
Ration Layer 1	0.11805	0.18055	0.00002	0.00001	31.13284	0.02706	31.15990	2.00000
Ration Layer 2	0.13337	0.21391	0.00001	0.00001	112.96047	0.00556	112.96602	2.00000
Ration Layer 3	0.11732	0.21386	0.00001	0.00001	117.08436	0.02663	117.11099	2.00000
Ration Layer 4	0.35987	0.18886	0.00010	0.00006	47.19601	0.01687	47.21288	2.00000
Ration Layer 5	0.23800	0.16483	0.00002	0.00001	42.32653	0.00634	42.33287	2.00000
Ration Layer 6	0.01911	0.00892	0.00000	0.00000	40.11760	0.00426	40.12186	2.00000
Ration Layer 7	0.00673	0.01101	0.00000	0.00000	14.47132	0.04005	14.51138	2.00000
Ration Layer 8	0.00757	0.01808	0.00000	0.00000	60.09268	0.15166	60.24433	2.00000
Area	396.600	174.70000	58820.7111	3840.48889	0.19645	0.36727	0.56373	0.86183
Border length	140.000	70.80000	2475.55556	873.82222	0.35743	0.06492	0.42234	0.68898
Width	20.4044	11.60410	43.33958	23.87806	0.28804	0.02189	0.30993	0.53300
Asymmetry	0.53568	0.51831	0.05233	0.06069	0.00067	0.00137	0.00204	0.00407
Border index	1.69850	1.35670	0.05526	0.23248	0.10150	0.11925	0.22075	0.39617
Shape index	1.83230	1.53370	0.08368	0.40081	0.04601	0.13985	0.18586	0.33922
GLCM Homogeneity Layer 1	0.02320	0.03437	0.00001	0.00006	0.41563	0.17502	0.59066	0.89207
GLCM Homogeneity Layer 2	0.02264	0.03283	0.00001	0.00001	1.16781	0.01138	1.17920	1.38495
GLCM Homogeneity Layer 3	0.02516	0.03311	0.00006	0.00010	0.09352	0.01440	0.10792	0.20460
GLCM Homogeneity Layer 4	0.02139	0.04096	0.00001	0.00003	2.36170	0.05636	2.41806	1.82181
GLCM Homogeneity Layer 5	0.2519	0.25455	2.35356	9.64573	0.0146310	0.11523904	0.12987012	0.243580
GLCM Homogeneity Layer 6	0.04940	0.0888652	9.74835	0.00010716	1.9024146	0.00056035	1.90297505	1.7017510
GLCM Homogeneity Layer 7	0.04145	0.0769463	0.000080474	3.69012E	2.6828882	0.03706967	2.71995792	1.8682447
GLCM Homogeneity Layer 8	0.15928	0.0886721	0.00179689	0.00133362	0.3981716	0.00553564	0.40370725	0.6643204

Table A18 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	2460.72800	2943.11400	177072.49820	452281.99900	0.09243	0.05306	0.14549	0.27081
GLCM Contrast Layer 2	2108.30700	2812.11500	108952.22130	461552.86980	0.21706	0.12031	0.33738	0.57272
GLCM Contrast Layer 3	2672.58900	3376.09900	44149.58097	386301.68100	0.28745	0.24979	0.53724	0.83128
GLCM Contrast Layer 4	1645.13500	4214.86200	119103.88290	582673.99190	2.35242	0.14333	2.49575	1.83513
GLCM Contrast Layer 5	2729.50400	3357.36800	79518.72916	300436.01180	0.25938	0.10315	0.36253	0.60817
GLCM Contrast Layer 6	2973.43200	4218.78200	198792.39400	329598.74770	0.73378	0.01581	0.74959	1.05488
GLCM Contrast Layer 7	2283.70700	3324.26000	141961.03300	864290.88640	0.26901	0.18105	0.45006	0.72482
GLCM Contrast Layer 8	40.09900	39.79000	5.22219	47.56176	0.00045	0.25779	0.25825	0.45519
GLCM Dissimilarity Layer 1	38.74400	39.71400	12.03387	25.26965	0.00631	0.03364	0.03994	0.07831
GLCM Dissimilarity Layer2	35.85200	38.59100	14.10297	37.50783	0.03634	0.05756	0.09390	0.17925
GLCM Dissimilarity Layer 3	40.65100	40.06200	4.05334	33.19985	0.00233	0.23677	0.23910	0.42533
GLCM Dissimilarity Layer 4	27.65300	43.11500	9.18167	35.67547	1.33242	0.10725	1.43967	1.52599
GLCM Dissimilarity Layer 5	41.55000	40.48200	3.92704	31.83543	0.00797	0.23476	0.24273	0.43104
GLCM Dissimilarity Layer 6	43.11900	47.54900	10.36894	27.24956	0.13042	0.05621	0.18663	0.34050
GLCM Dissimilarity Layer 7	37.44500	40.89700	12.34829	73.44047	0.03473	0.17687	0.21160	0.38142
GLCM Dissimilarity Layer 8	7.20030	6.39240	0.14702	0.11894	0.61354	0.00280	0.61634	0.92016
GLCM Entropy Layer 1	7.55770	6.30270	0.27969	0.14442	0.92844	0.02682	0.95526	1.23057
GLCM Entropy Layer 2	7.18090	6.36910	0.11267	0.10714	0.74952	0.00016	0.74967	1.05496
GLCM Entropy Layer 3	7.75800	6.35250	0.38845	0.15071	0.91599	0.05406	0.97004	1.24186
GLCM Entropy Layer 4	6.32080	5.02710	0.37300	0.14034	0.81508	0.05748	0.87256	1.16424
GLCM Entropy Layer 5	5.36390	4.80980	0.04587	0.09354	0.55058	0.03110	0.58167	0.88207
GLCM Entropy Layer 6	5.62310	5.03550	0.04847	0.02244	1.21729	0.03620	1.25349	1.42899
GLCM Entropy Layer 7	3.72870	4.95240	0.24130	0.66348	0.41376	0.06139	0.47515	0.75641
GLCM Entropy Layer 8	127.63100	120.18200	1.54123	3.70265	2.64535	0.04655	2.69190	1.86450
GLCM Mean Layer 1	127.78900	120.28300	5.31070	3.24967	1.64537	0.01493	1.66030	1.61984
GLCM Mean Layer2	127.41700	120.14500	1.18873	2.38615	3.69816	0.02975	3.72791	1.95191
GLCM Mean Layer 3	126.85600	134.62600	7.88714	14.24887	0.68184	0.02155	0.70339	1.01019
GLCM Mean Layer 4	127.61100	137.11400	3.82963	10.64784	1.55944	0.06269	1.62213	1.60505
GLCM Mean Layer 5	126.17200	135.77400	6.41662	10.47416	1.36463	0.01486	1.37949	1.49658
GLCM Mean Layer 6	127.77300	125.65400	5.24849	9.83465	0.07442	0.02425	0.09868	0.18793
GLCM Mean Layer 7	127.75100	117.31200	1.14534	4.75213	4.61946	0.11711	4.73658	1.98246
GLCM Mean Layer 8	0.54193	0.62461	0.00399	0.02703	0.05510	0.20070	0.25581	0.45141
GLCM Correlation Layer 1	0.58872	0.63036	0.00794	0.01449	0.01933	0.02224	0.04157	0.08143
GLCM Correlation Layer 2	0.62994	0.66236	0.00178	0.01350	0.01720	0.22235	0.23955	0.42603
GLCM Correlation Layer 3	0.57380	0.61083	0.00141	0.00559	0.04902	0.11073	0.15974	0.29527
GLCM Correlation Layer 4	0.76240	0.57458	0.00256	0.00602	1.02826	0.04457	1.07283	1.31592
GLCM Correlation Layer 5	0.57949	0.57500	0.00310	0.00473	0.00064	0.01106	0.01170	0.02327
GLCM Correlation Layer 6	0.49665	0.34612	0.00995	0.01137	0.26574	0.00110	0.26684	0.46841
GLCM Correlation Layer 7	0.64038	0.64583	0.00492	0.02414	0.00026	0.14382	0.14407	0.26835
GLCM Correlation Layer 8	2460.72800	2943.11400	177072.49820	452281.99900	0.09243	0.05306	0.14549	0.27081

Table A19 J value paddy field and building and settlement area.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1321.03100	1733.37600	8597.03472	17841.76287	1.60775	0.03260	1.64036	1.61218
Mean Layer 1	1304.21400	2012.19600	442.12358	102497.45560	1.21731	1.01708	2.23439	1.78589
Mean Layer 2	1524.75100	2128.28300	913.79552	40154.76871	2.21733	0.61040	2.82773	1.88171
Mean Layer 3	1331.44600	2104.12100	1571.55178	44005.89594	3.27479	0.50404	3.77883	1.95430
Mean Layer 4	3676.98600	3325.61000	324461.02860	179227.66370	0.06128	0.02170	0.08298	0.15926
Mean Layer 5	2368.87000	3932.11700	40450.86540	397830.64730	1.39393	0.27333	1.66726	1.62247
Mean Layer 6	197.51400	144.52200	195.67825	211.81677	1.72281	0.00039	1.72321	1.64301
Mean Layer 7	71.31400	130.92700	47.39534	586.06291	1.40250	0.32104	1.72354	1.64313
Mean Layer 8	93.14700	89.23200	65.04105	151.57566	0.01769	0.04347	0.06115	0.11864
Max. diff.	2.71520	2.25040	0.05576	0.05496	0.48784	0.00001	0.48785	0.77211
Standard deviation Layer 1	23.25300	230.48100	103.70462	10326.57254	1.02930	0.80865	1.83795	1.68171
Standard deviation Layer 2	37.11800	211.84300	415.02597	5707.42907	1.24659	0.34382	1.59041	1.59232
Standard deviation Layer 3	37.16500	250.84100	524.67636	9955.20214	1.08917	0.41487	1.50404	1.55554
Standard deviation Layer 4	232.63600	248.94700	4277.92832	10936.52616	0.00437	0.05316	0.05753	0.11181
Standard deviation Layer 5	78.78000	259.32300	1518.79980	10080.82249	0.70252	0.19677	0.89929	1.18628
Standard deviation Layer 6	6.75160	13.03910	1.82859	23.13802	0.39586	0.32594	0.72180	1.02824
Standard deviation Layer 7	5.34680	9.75780	0.84514	6.57930	0.65516	0.22690	0.88206	1.17214
Standard deviation Layer 8	3.41510	9.55800	2.98850	5.36850	1.12885	0.02115	1.15000	1.36672
Ration Layer 1	0.12399	0.14461	0.00008	0.00024	0.33205	0.06523	0.39728	0.65570
Ration Layer 2	0.14482	0.15334	0.00008	0.00002	0.17328	0.08941	0.26269	0.46204
Ration Layer 3	0.12661	0.15177	0.00011	0.00011	0.71439	0.00001	0.71439	1.02102
Ration Layer 4	0.34623	0.24105	0.00081	0.00124	1.34815	0.01106	1.35921	1.48627
Ration Layer 5	0.22396	0.28281	0.00002	0.00095	0.89125	0.63007	1.52133	1.56316
Ration Layer 6	0.01869	0.01055	0.00000	0.00000	5.81904	0.35460	6.17364	1.99583
Ration Layer 7	0.00681	0.00941	0.00000	0.00000	0.48617	0.04146	0.52764	0.82000
Ration Layer 8	0.00890	0.00652	0.00000	0.00000	0.47805	0.01044	0.48848	0.77289
Area	127.30000	28.50000	4486.67778	210.05556	0.51959	0.44168	0.96126	1.23518
Border length	64.00000	29.60000	326.22222	182.04444	0.58206	0.02097	0.60303	0.90570
Width	9.46880	5.14480	18.32484	4.96342	0.20071	0.09981	0.30053	0.51914
Asymmetry	0.58648	0.54890	0.10895	0.02142	0.00271	0.14981	0.15252	0.28292
Border index	1.24700	1.22590	0.02492	0.06811	0.00120	0.06071	0.06191	0.12006
Shape index	1.48400	1.38250	0.08576	0.08429	0.01515	0.00002	0.01516	0.03010
GLCM Homogeneity Layer 1	0.02684	0.01942	0.00007	0.00009	0.08923	0.00407	0.09330	0.17816
GLCM Homogeneity Layer 2	0.03102	0.01703	0.00016	0.00002	0.26343	0.22600	0.48942	0.77404
GLCM Homogeneity Layer 3	0.03272	0.01732	0.00029	0.00007	0.16461	0.12280	0.28742	0.49960
GLCM Homogeneity Layer 4	0.03085	0.01958	0.00004	0.00004	0.37680	0.00021	0.37701	0.62818
GLCM Homogeneity Layer 5	0.25038	0.23747	0.00008	0.00001	0.47880	0.21030	0.68910	0.99594
GLCM Homogeneity Layer 6	1321.03100	1733.37600	8597.03472	17841.76287	1.60775	0.03260	1.64036	1.61218
GLCM Homogeneity Layer 7	1304.21400	2012.19600	442.12358	102497.45560	1.21731	1.01708	2.23439	1.78589
GLCM Homogeneity Layer 8	1524.75100	2128.28300	913.79552	40154.76871	2.21733	0.61040	2.82773	1.88171

Table A19 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.04793	0.02386	0.00010	0.00012	0.65308	0.00143	0.65451	0.96061
GLCM Contrast Layer 2	0.05129	0.01925	0.00024	0.00005	0.89985	0.15033	1.05017	1.30025
GLCM Contrast Layer 3	0.10096	0.02049	0.00041	0.00006	3.49575	0.20722	3.70297	1.95070
GLCM Contrast Layer 4	2522.80900	4153.94800	861951.58320	2987749.23300	0.17278	0.09093	0.26371	0.46361
GLCM Contrast Layer 5	1919.87000	3812.36200	351187.18160	248119.21720	1.49403	0.00751	1.50154	1.55442
GLCM Contrast Layer 6	2116.22400	3643.05600	969739.43570	554849.58640	0.38227	0.01924	0.40150	0.66138
GLCM Contrast Layer 7	1746.53200	4235.65200	155852.09090	8617612.11100	0.17655	0.66555	0.84210	1.13839
GLCM Contrast Layer 8	1751.64500	3866.67100	546012.97020	1037410.32600	0.70628	0.02532	0.73159	1.03772
GLCM Dissimilarity Layer 1	1792.04000	3303.85700	239048.23140	1729968.27900	0.29019	0.21294	0.50313	0.79073
GLCM Dissimilarity Layer2	2098.56000	3672.56500	208103.14920	2363595.42100	0.24084	0.30309	0.54394	0.83908
GLCM Dissimilarity Layer 3	1852.10900	3635.16300	332699.22740	457870.71920	1.00538	0.00635	1.01172	1.27282
GLCM Dissimilarity Layer 4	38.81600	50.47100	64.21736	126.05825	0.17848	0.02791	0.20639	0.37296
GLCM Dissimilarity Layer 5	33.42600	49.50300	40.50734	18.27436	1.09928	0.03860	1.13788	1.35900
GLCM Dissimilarity Layer 6	33.95100	48.23700	87.62090	26.47507	0.44719	0.08464	0.53183	0.82494
GLCM Dissimilarity Layer 7	31.45100	50.80200	16.26548	333.12315	0.26794	0.43213	0.70007	1.00690
GLCM Dissimilarity Layer 8	27.74900	45.42800	40.27068	32.63595	1.07174	0.00276	1.07449	1.31706
GLCM Entropy Layer 1	32.23800	45.40200	25.41635	91.65382	0.37006	0.09646	0.46652	0.74564
GLCM Entropy Layer 2	35.13300	48.41700	11.94529	122.84625	0.32729	0.28247	0.60977	0.91304
GLCM Entropy Layer 3	32.45900	47.96700	39.83365	15.74456	1.08180	0.05202	1.13382	1.35640
GLCM Entropy Layer 4	6.51230	5.38880	0.18287	0.44333	0.50393	0.04749	0.55142	0.84774
GLCM Entropy Layer 5	6.61840	5.44580	0.20432	0.36527	0.60350	0.02080	0.62430	0.92873
GLCM Entropy Layer 6	6.63920	5.44010	0.28551	0.34440	0.57065	0.00219	0.57284	0.87216
GLCM Entropy Layer 7	6.76010	5.41310	0.22184	0.46131	0.66399	0.03278	0.69677	1.00361
GLCM Entropy Layer 8	5.37560	4.11910	0.23476	0.28992	0.75227	0.00278	0.75505	1.06002
GLCM Mean Layer 1	5.67340	5.17550	0.05179	0.30699	0.17274	0.17627	0.34901	0.58923
GLCM Mean Layer2	5.42510	5.18450	0.06784	0.37256	0.03286	0.16289	0.19575	0.35557
GLCM Mean Layer 3	4.55770	5.19760	0.18242	0.34982	0.19234	0.02604	0.21838	0.39236
GLCM Mean Layer 4	127.90600	121.06300	1.62600	31.63656	0.35195	0.42053	0.77248	1.07627
GLCM Mean Layer 5	128.16300	121.70900	1.50958	17.79561	0.53942	0.31092	0.85033	1.14545
GLCM Mean Layer 6	127.75800	122.17000	4.56848	17.71024	0.35040	0.10691	0.45731	0.73403
GLCM Mean Layer 7	127.35800	128.81500	12.21853	86.08881	0.00540	0.20789	0.21329	0.38416
GLCM Mean Layer 8	127.28500	120.66500	3.03856	18.70474	0.50388	0.18304	0.68692	0.99376
GLCM Correlation Layer 1	126.84000	133.27200	13.14596	8.64882	0.47455	0.01088	0.48542	0.76913
GLCM Correlation Layer 2	126.96800	121.60400	11.23173	56.98727	0.10544	0.14940	0.25484	0.44991
GLCM Correlation Layer 3	127.53900	123.89700	10.98614	50.60427	0.05384	0.13351	0.18735	0.34170
GLCM Correlation Layer 4	0.57745	0.46016	0.03393	0.00854	0.08098	0.11060	0.19158	0.34870
GLCM Correlation Layer 5	0.67906	0.44285	0.01710	0.01206	0.47831	0.00757	0.48588	0.76968
GLCM Correlation Layer 6	0.66943	0.48636	0.01841	0.02087	0.21329	0.00098	0.21428	0.38575
GLCM Correlation Layer 7	0.75530	0.52938	0.00192	0.02899	0.41282	0.36404	0.77686	1.08030
GLCM Correlation Layer 8	0.76544	0.48757	0.00555	0.02347	0.66515	0.11992	0.78507	1.08783

Table A20 J value paddy field and field crop.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1321.03100	1519.20600	8597.03472	7791.45380	0.59910	0.00060	0.59970	0.90205
Mean Layer 1	1304.21400	1407.32200	442.12358	1706.01482	1.23726	0.10623	1.34349	1.47813
Mean Layer 2	1524.75100	1669.33600	913.79552	3772.87214	1.11512	0.11637	1.23149	1.41628
Mean Layer 3	1331.44600	1516.93200	1571.55178	21117.63853	0.37909	0.33883	0.71792	1.02447
Mean Layer 4	3676.98600	4176.82400	324461.02860	660161.72103	0.06343	0.03089	0.09433	0.18003
Mean Layer 5	2368.87000	3019.85800	40450.86540	56229.48708	1.09584	0.00675	1.10259	1.33598
Mean Layer 6	197.51400	196.21400	195.67825	602.17883	0.00053	0.07513	0.07566	0.14574
Mean Layer 7	71.31400	83.49200	47.39534	455.70677	0.07369	0.26873	0.34242	0.57991
Mean Layer 8	93.14700	83.66300	65.04105	61.38982	0.17786	0.00021	0.17807	0.32622
Max. diff.	2.71520	2.69950	0.05576	0.14298	0.00031	0.05349	0.05380	0.10476
Standard deviation Layer 1	23.25300	26.41000	103.70462	121.75531	0.01105	0.00161	0.01266	0.02516
Standard deviation Layer 2	37.11800	40.28400	415.02597	285.62138	0.00358	0.00868	0.01225	0.02436
Standard deviation Layer 3	37.16500	54.79900	524.67636	825.13468	0.05759	0.01270	0.07030	0.13577
Standard deviation Layer 4	232.63600	185.98400	4277.92832	3112.73600	0.07362	0.00629	0.07991	0.15361
Standard deviation Layer 5	78.78000	83.75800	1518.79980	1212.12617	0.00227	0.00317	0.00544	0.01085
Standard deviation Layer 6	6.75160	6.06310	1.82859	8.87132	0.01108	0.14195	0.15303	0.28379
Standard deviation Layer 7	5.34680	5.19310	0.84514	3.41751	0.00139	0.11321	0.11459	0.21654
Standard deviation Layer 8	3.41510	2.87180	2.98850	3.00483	0.01231	0.00000	0.01231	0.02448
Ration Layer 1	0.12399	0.11622	0.00008	0.00007	0.09843	0.00190	0.10033	0.19093
Ration Layer 2	0.14482	0.13776	0.00008	0.00009	0.07284	0.00068	0.07352	0.14176
Ration Layer 3	0.12661	0.12551	0.00011	0.00028	0.00077	0.05138	0.05215	0.10164
Ration Layer 4	0.34623	0.34173	0.00081	0.00244	0.00156	0.07207	0.07363	0.14196
Ration Layer 5	0.22396	0.24878	0.00002	0.00038	0.38507	0.41580	0.80088	1.10213
Ration Layer 6	0.01869	0.01612	0.00000	0.00000	8.99181	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 7	0.00681	0.00694	0.00000	0.00000	0.00412	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 8	0.00890	0.00693	0.00000	0.00000	0.54245	#DIV/0!	#DIV/0!	#DIV/0!
Area	127.30000	222.30000	4486.67778	9300.23333	0.16365	0.03250	0.19615	0.35622
Border length	64.00000	89.00000	326.22222	253.55556	0.26950	0.00396	0.27346	0.47851
Width	9.46880	13.50670	18.32484	36.01383	0.07501	0.02800	0.10302	0.19578
Asymmetry	0.58648	0.61741	0.10895	0.06772	0.00135	0.01400	0.01535	0.03047
Border index	1.24700	1.34440	0.02492	0.01607	0.05786	0.01193	0.06979	0.13482
Shape index	1.48400	1.56960	0.08576	0.09491	0.01014	0.00064	0.01078	0.02144
GLCM Homogeneity Layer 1	0.02684	0.03142	0.00007	0.00009	0.03342	0.00524	0.03866	0.07584
GLCM Homogeneity Layer 2	0.03102	0.03542	0.00016	0.00004	0.02366	0.11583	0.13950	0.26041
GLCM Homogeneity Layer 3	0.03272	0.03558	0.00029	0.00005	0.00599	0.17376	0.17975	0.32905
GLCM Homogeneity Layer 4	0.03085	0.03205	0.00004	0.00002	0.00592	0.03138	0.03730	0.07323
GLCM Homogeneity Layer 5	0.25038	0.25653	0.00008	0.00002	0.09816	0.10461	0.20277	0.36707
GLCM Homogeneity Layer 6	1321.03100	1519.20600	8597.03472	7791.45380	0.59910	0.00060	0.59970	0.90205
GLCM Homogeneity Layer 7	1304.21400	1407.32200	442.12358	1706.01482	1.23726	0.10623	1.34349	1.47813
GLCM Homogeneity Layer 8	1524.75100	1669.33600	913.79552	3772.87214	1.11512	0.11637	1.23149	1.41628

Table A20 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.04793	0.07105	0.00010	0.00186	0.06808	0.40481	0.47289	0.75360
GLCM Contrast Layer 2	0.05129	0.06888	0.00024	0.00087	0.06982	0.09809	0.16791	0.30914
GLCM Contrast Layer 3	0.10096	0.12134	0.00041	0.00366	0.02554	0.25604	0.28158	0.49082
GLCM Contrast Layer 4	2522.80900	1997.14400	861951.58320	333414.92043	0.05779	0.05438	0.11217	0.21222
GLCM Contrast Layer 5	1919.87000	1844.71100	351187.18160	181066.55065	0.00265	0.02694	0.02959	0.05832
GLCM Contrast Layer 6	2116.22400	1660.13000	969739.43570	267203.10244	0.04204	0.09737	0.13941	0.26026
GLCM Contrast Layer 7	1746.53200	1799.18100	155852.09090	40511.59017	0.00353	0.10579	0.10932	0.20711
GLCM Contrast Layer 8	1751.64500	1448.58300	546012.97020	163903.01402	0.03234	0.08552	0.11786	0.22237
GLCM Dissimilarity Layer 1	1792.04000	1854.38300	239048.23140	87701.09291	0.00297	0.06037	0.06335	0.12276
GLCM Dissimilarity Layer2	2098.56000	1886.69700	208103.14920	152586.25722	0.03111	0.00599	0.03711	0.07285
GLCM Dissimilarity Layer 3	1852.10900	2227.62900	332699.22740	213011.79312	0.06460	0.01232	0.07693	0.14808
GLCM Dissimilarity Layer 4	38.81600	33.72900	64.21736	31.58301	0.06753	0.03084	0.09837	0.18737
GLCM Dissimilarity Layer 5	33.42600	31.46700	40.50734	14.90920	0.01731	0.06000	0.07731	0.14880
GLCM Dissimilarity Layer 6	33.95100	30.05500	87.62090	23.48709	0.03415	0.10131	0.13546	0.25338
GLCM Dissimilarity Layer 7	31.45100	31.64100	16.26548	2.99374	0.00047	0.16103	0.16150	0.29826
GLCM Dissimilarity Layer 8	27.74900	24.63400	40.27068	15.74749	0.04330	0.05319	0.09649	0.18397
GLCM Entropy Layer 1	32.23800	32.96200	25.41635	5.78997	0.00420	0.12586	0.13006	0.24391
GLCM Entropy Layer 2	35.13300	32.91900	11.94529	12.43899	0.05026	0.00010	0.05036	0.09822
GLCM Entropy Layer 3	32.45900	36.31200	39.83365	19.13144	0.06294	0.03289	0.09583	0.18276
GLCM Entropy Layer 4	6.51230	6.96510	0.18287	0.13964	0.15893	0.00453	0.16346	0.30160
GLCM Entropy Layer 5	6.61840	7.03680	0.20432	0.19496	0.10961	0.00014	0.10975	0.20788
GLCM Entropy Layer 6	6.63920	7.11650	0.28551	0.15457	0.12942	0.02317	0.15259	0.28304
GLCM Entropy Layer 7	6.76010	7.26090	0.22184	0.14770	0.16967	0.01027	0.17994	0.32936
GLCM Entropy Layer 8	5.37560	5.91170	0.23476	0.13357	0.19507	0.01962	0.21469	0.38642
GLCM Mean Layer 1	5.67340	5.42650	0.05179	0.71961	0.01976	0.34605	0.36580	0.61272
GLCM Mean Layer2	5.42510	5.39460	0.06784	0.32784	0.00059	0.14132	0.14191	0.26460
GLCM Mean Layer 3	4.55770	4.29780	0.18242	0.59166	0.02182	0.08196	0.10377	0.19714
GLCM Mean Layer 4	127.90600	127.10500	1.62600	2.01281	0.04408	0.00284	0.04692	0.09168
GLCM Mean Layer 5	128.16300	127.11500	1.50958	2.73161	0.06474	0.02167	0.08641	0.16556
GLCM Mean Layer 6	127.75800	127.24700	4.56848	1.71762	0.01038	0.05757	0.06795	0.13139
GLCM Mean Layer 7	127.35800	126.55900	12.21853	2.21945	0.01105	0.16330	0.17436	0.32001
GLCM Mean Layer 8	127.28500	127.26600	3.03856	2.87492	0.00002	0.00019	0.00021	0.00041
GLCM Correlation Layer 1	126.84000	125.86600	13.14596	2.84209	0.01483	0.13418	0.14902	0.27689
GLCM Correlation Layer 2	126.96800	127.85500	11.23173	3.46456	0.01338	0.08189	0.09528	0.18176
GLCM Correlation Layer 3	127.53900	126.89400	10.98614	4.69514	0.00663	0.04387	0.05050	0.09850
GLCM Correlation Layer 4	0.57745	0.64018	0.03393	0.01003	0.02238	0.08761	0.10998	0.20830
GLCM Correlation Layer 5	0.67906	0.67954	0.01710	0.00569	0.00000	0.07214	0.07214	0.13920
GLCM Correlation Layer 6	0.66943	0.72606	0.01841	0.00489	0.03441	0.10264	0.13704	0.25614
GLCM Correlation Layer 7	0.75530	0.70700	0.00192	0.00066	0.22598	0.06817	0.29415	0.50968
GLCM Correlation Layer 8	0.76544	0.78780	0.00555	0.00486	0.01200	0.00111	0.01311	0.02606

Table A21 J value paddy field and forest area.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1321.03100	1361.15700	8597.03472	4860.82820	0.02991	0.02005	0.04996	0.09747
Mean Layer 1	1304.21400	1283.41800	442.12358	932.59988	0.07865	0.03404	0.11269	0.21314
Mean Layer 2	1524.75100	1451.23000	913.79552	2841.38796	0.35986	0.07646	0.43632	0.70717
Mean Layer 3	1331.44600	1275.86900	1571.55178	1190.61388	0.27956	0.00480	0.28436	0.49501
Mean Layer 4	3676.98600	3922.79500	324461.02860	92203.98903	0.03625	0.09303	0.12928	0.24254
Mean Layer 5	2368.87000	2592.84400	40450.86540	28402.83169	0.18214	0.00777	0.18992	0.34594
Mean Layer 6	197.51400	207.83400	195.67825	22.27116	0.12216	0.25062	0.37278	0.62237
Mean Layer 7	71.31400	73.12300	47.39534	7.00273	0.01504	0.20038	0.21542	0.38760
Mean Layer 8	93.14700	82.14200	65.04105	11.69544	0.39456	0.16506	0.55963	0.85715
Max. diff.	2.71520	2.82510	0.05576	0.00680	0.04827	0.23699	0.28526	0.49636
Standard deviation Layer 1	23.25300	17.33500	103.70462	13.73434	0.07456	0.22102	0.29558	0.51180
Standard deviation Layer 2	37.11800	29.48300	415.02597	25.58353	0.03308	0.37993	0.41301	0.67669
Standard deviation Layer 3	37.16500	19.48600	524.67636	57.75680	0.13416	0.25728	0.39143	0.64783
Standard deviation Layer 4	232.63600	191.51100	4277.92832	1215.10192	0.07697	0.09309	0.17007	0.31278
Standard deviation Layer 5	78.78000	54.31100	1518.79980	225.78528	0.08580	0.19925	0.28505	0.49604
Standard deviation Layer 6	6.75160	3.95300	1.82859	0.47401	0.85036	0.10619	0.95655	1.23157
Standard deviation Layer 7	5.34680	4.55540	0.84514	0.61919	0.10693	0.00602	0.11295	0.21361
Standard deviation Layer 8	3.41510	1.76970	2.98850	0.31491	0.20489	0.26608	0.47097	0.75120
Ration Layer 1	0.12399	0.11805	0.00008	0.00002	0.08476	0.11253	0.19729	0.35810
Ration Layer 2	0.14482	0.13337	0.00008	0.00001	0.36694	0.27337	0.64031	0.94574
Ration Layer 3	0.12661	0.11732	0.00011	0.00001	0.17338	0.24382	0.41721	0.68223
Ration Layer 4	0.34623	0.35987	0.00081	0.00010	0.05113	0.24064	0.29178	0.50613
Ration Layer 5	0.22396	0.23800	0.00002	0.00002	1.28810	0.00046	1.28856	1.44866
Ration Layer 6	0.01869	0.01911	0.00000	0.00000	0.07978	0.02866	0.10844	0.20554
Ration Layer 7	0.00681	0.00673	0.00000	0.00000	0.00112	0.14231	0.14343	0.26724
Ration Layer 8	0.00890	0.00757	0.00000	0.00000	0.20340	0.13394	0.33734	0.57267
Area	127.30000	396.60000	4486.67778	58820.71111	0.28639	0.33353	0.61992	0.92402
Border length	64.00000	140.00000	326.22222	2475.55556	0.51539	0.22198	0.73737	1.04326
Width	9.46880	20.40440	18.32484	43.33958	0.48483	0.04495	0.52978	0.82253
Asymmetry	0.58648	0.53568	0.10895	0.05233	0.00400	0.03288	0.03688	0.07242
Border index	1.24700	1.69850	0.02492	0.05526	0.63565	0.03864	0.67429	0.98096
Shape index	1.48400	1.83230	0.08576	0.08368	0.17899	0.00004	0.17903	0.32783
GLCM Homogeneity Layer 1	0.02684	0.02320	0.00007	0.00001	0.04236	0.18359	0.22594	0.40448
GLCM Homogeneity Layer 2	0.03102	0.02264	0.00016	0.00001	0.09868	0.31860	0.41728	0.68233
GLCM Homogeneity Layer 3	0.03272	0.02516	0.00029	0.00006	0.04005	0.13093	0.17098	0.31432
GLCM Homogeneity Layer 4	0.03085	0.02139	0.00004	0.00001	0.42955	0.09877	0.52832	0.82081
GLCM Homogeneity Layer 5	0.25038	0.25190	0.00008	0.00002	0.00578	0.08194	0.08773	0.16797
GLCM Homogeneity Layer 6	1321.03100	1361.15700	8597.03472	4860.82820	0.02991	0.02005	0.04996	0.09747
GLCM Homogeneity Layer 7	1304.21400	1283.41800	442.12358	932.59988	0.07865	0.03404	0.11269	0.21314
GLCM Homogeneity Layer 8	1524.75100	1451.23000	913.79552	2841.38796	0.35986	0.07646	0.43632	0.70717

Table A21 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.04793	0.04940	0.00010	0.00010	0.00270	0.00016	0.00286	0.00571
GLCM Contrast Layer 2	0.05129	0.04146	0.00024	0.00008	0.07580	0.07041	0.14620	0.27204
GLCM Contrast Layer 3	0.10096	0.15928	0.00041	0.00180	0.38616	0.12738	0.51355	0.80326
GLCM Contrast Layer 4	2522.80900	2574.37300	861951.58320	73489.04847	0.00071	0.30985	0.31056	0.53393
GLCM Contrast Layer 5	1919.87000	2460.72800	351187.18160	177072.49820	0.13844	0.02875	0.16719	0.30792
GLCM Contrast Layer 6	2116.22400	2108.30700	969739.43570	108952.22130	0.00001	0.25319	0.25321	0.44739
GLCM Contrast Layer 7	1746.53200	2672.58900	155852.09090	44149.58097	1.07197	0.09347	1.16543	1.37643
GLCM Contrast Layer 8	1751.64500	1645.13500	546012.97020	119103.88290	0.00426	0.13275	0.13701	0.25608
GLCM Dissimilarity Layer 1	1792.04000	2729.50400	239048.23140	79518.72916	0.68968	0.07218	0.76186	1.06640
GLCM Dissimilarity Layer2	2098.56000	2973.43200	208103.14920	198792.39400	0.47027	0.00013	0.47040	0.75049
GLCM Dissimilarity Layer 3	1852.10900	2283.70700	332699.22740	141961.03300	0.09811	0.04403	0.14214	0.26500
GLCM Dissimilarity Layer 4	38.81600	40.09900	64.21736	5.22219	0.00593	0.31986	0.32578	0.55608
GLCM Dissimilarity Layer 5	33.42600	38.74400	40.50734	12.03387	0.13457	0.08692	0.22149	0.39735
GLCM Dissimilarity Layer 6	33.95100	35.85200	87.62090	14.10297	0.00888	0.18471	0.19359	0.35200
GLCM Dissimilarity Layer 7	31.45100	40.65100	16.26548	4.05334	1.04140	0.11205	1.15345	1.36891
GLCM Dissimilarity Layer 8	27.74900	27.65300	40.27068	9.18167	0.00005	0.12572	0.12577	0.23636
GLCM Entropy Layer 1	32.23800	41.55000	25.41635	3.92704	0.73878	0.19214	0.93092	1.21162
GLCM Entropy Layer 2	35.13300	43.11900	11.94529	10.36894	0.71452	0.00125	0.71577	1.02237
GLCM Entropy Layer 3	32.45900	37.44500	39.83365	12.34829	0.11910	0.08124	0.20034	0.36310
GLCM Entropy Layer 4	6.51230	7.20030	0.18287	0.14702	0.35871	0.00297	0.36168	0.60699
GLCM Entropy Layer 5	6.61840	7.55770	0.20432	0.27969	0.45572	0.00614	0.46185	0.73977
GLCM Entropy Layer 6	6.63920	7.18090	0.28551	0.11267	0.18424	0.05219	0.23643	0.42111
GLCM Entropy Layer 7	6.76010	7.75800	0.22184	0.38845	0.40793	0.01936	0.42729	0.69545
GLCM Entropy Layer 8	5.37560	6.32080	0.23476	0.37300	0.36750	0.01328	0.38078	0.63335
GLCM Mean Layer 1	5.67340	5.36390	0.05179	0.04587	0.24522	0.00092	0.24614	0.43637
GLCM Mean Layer2	5.42510	5.62310	0.06784	0.04847	0.08427	0.00703	0.09130	0.17450
GLCM Mean Layer 3	4.55770	3.72870	0.18242	0.24130	0.40549	0.00488	0.41036	0.67318
GLCM Mean Layer 4	127.90600	127.63100	1.62600	1.54123	0.00597	0.00018	0.00615	0.01226
GLCM Mean Layer 5	128.16300	127.78900	1.50958	5.31070	0.00513	0.09299	0.09812	0.18691
GLCM Mean Layer 6	127.75800	127.41700	4.56848	1.18873	0.00505	0.10564	0.11069	0.20956
GLCM Mean Layer 7	127.35800	126.85600	12.21853	7.88714	0.00313	0.01188	0.01501	0.02980
GLCM Mean Layer 8	127.28500	127.61100	3.03856	3.82963	0.00387	0.00334	0.00721	0.01436
GLCM Correlation Layer 1	126.84000	126.17200	13.14596	6.41662	0.00570	0.03148	0.03719	0.07301
GLCM Correlation Layer 2	126.96800	127.77300	11.23173	5.24849	0.00983	0.03534	0.04517	0.08832
GLCM Correlation Layer 3	127.53900	127.75100	10.98614	1.14534	0.00093	0.26824	0.26917	0.47197
GLCM Correlation Layer 4	0.57745	0.54193	0.03393	0.00399	0.00832	0.24433	0.25264	0.44651
GLCM Correlation Layer 5	0.67906	0.58872	0.01710	0.00794	0.08148	0.03588	0.11736	0.22146
GLCM Correlation Layer 6	0.66943	0.62994	0.01841	0.00178	0.01931	0.28413	0.30344	0.52345
GLCM Correlation Layer 7	0.75530	0.57380	0.00192	0.00141	2.47618	0.00609	2.48227	1.83289
GLCM Correlation Layer 8	0.76544	0.76240	0.00555	0.00256	0.00028	0.03675	0.03703	0.07271

Table A22 J value paddy field and perennial tree and orchard.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1321.03100	1366.98100	8597.03472	5005.38201	0.03881	0.01807	0.05687	0.11057
Mean Layer 1	1304.21400	1279.21100	442.12358	738.32725	0.13240	0.01626	0.14865	0.27627
Mean Layer 2	1524.75100	1444.40500	913.79552	2485.55389	0.47476	0.06013	0.53489	0.82853
Mean Layer 3	1331.44600	1293.66600	1571.55178	4592.44727	0.05789	0.06867	0.12656	0.23776
Mean Layer 4	3676.98600	3934.46400	324461.02860	247864.91930	0.02896	0.00452	0.03348	0.06585
Mean Layer 5	2368.87000	2620.88000	40450.86540	118523.44450	0.09987	0.06900	0.16887	0.31076
Mean Layer 6	197.51400	206.29700	195.67825	177.75476	0.05164	0.00058	0.05222	0.10176
Mean Layer 7	71.31400	73.90800	47.39534	316.99093	0.00462	0.19818	0.20280	0.36712
Mean Layer 8	93.14700	83.01000	65.04105	114.45838	0.14312	0.01970	0.16282	0.30052
Max. diff.	2.71520	2.82380	0.05576	0.07843	0.02197	0.00724	0.02921	0.05758
Standard deviation Layer 1	23.25300	15.89100	103.70462	24.80074	0.10544	0.11831	0.22375	0.40097
Standard deviation Layer 2	37.11800	22.72800	415.02597	38.41324	0.11417	0.29267	0.40684	0.66850
Standard deviation Layer 3	37.16500	22.28990	524.67636	194.49417	0.07692	0.05918	0.13610	0.25449
Standard deviation Layer 4	232.63600	126.34700	4277.92832	537.95547	0.58646	0.23101	0.81748	1.11691
Standard deviation Layer 5	78.78000	57.89300	1518.79980	537.36591	0.05304	0.06464	0.11768	0.22204
Standard deviation Layer 6	6.75160	3.22540	1.82859	0.88459	1.14571	0.03226	1.17797	1.38419
Standard deviation Layer 7	5.34680	3.25440	0.84514	0.44018	0.85156	0.02614	0.87770	1.16852
Standard deviation Layer 8	3.41510	1.83417	2.98850	0.47305	0.18051	0.18773	0.36824	0.61610
Ration Layer 1	0.12399	0.11731	0.00008	0.00005	0.08077	0.01096	0.09173	0.17530
Ration Layer 2	0.14482	0.13237	0.00008	0.00006	0.26936	0.00408	0.27343	0.47847
Ration Layer 3	0.12661	0.11862	0.00011	0.00009	0.08026	0.00360	0.08386	0.16088
Ration Layer 4	0.34623	0.35913	0.00081	0.00115	0.02117	0.00763	0.02880	0.05677
Ration Layer 5	0.22396	0.23927	0.00002	0.00066	0.08669	0.54171	0.62840	0.93311
Ration Layer 6	0.01869	0.01888	0.00000	0.00000	0.00714	0.16175	0.16889	0.31080
Ration Layer 7	0.00681	0.00677	0.00000	0.00000	0.00009	0.04949	0.04958	0.09675
Ration Layer 8	0.00890	0.00765	0.00000	0.00000	0.10635	0.00029	0.10665	0.20231
Area	127.30000	308.30000	4486.67778	32593.34444	0.22088	0.21366	0.43454	0.70488
Border length	64.00000	84.00000	326.22222	584.00000	0.10986	0.02090	0.13076	0.24515
Width	9.46880	16.27000	18.32484	18.30678	0.31569	0.00000	0.31569	0.54142
Asymmetry	0.58648	0.43772	0.10895	0.06217	0.03233	0.01942	0.05175	0.10087
Border index	1.24700	1.16470	0.02492	0.00978	0.04880	0.05277	0.10157	0.19316
Shape index	1.48400	1.23320	0.08576	0.01757	0.15217	0.14292	0.29509	0.51107
GLCM Homogeneity Layer 1	0.02684	0.02526	0.00007	0.00001	0.00768	0.14580	0.15348	0.28456
GLCM Homogeneity Layer 2	0.03102	0.03161	0.00016	0.00008	0.00037	0.03713	0.03750	0.07361
GLCM Homogeneity Layer 3	0.03272	0.03381	0.00029	0.00006	0.00085	0.13566	0.13651	0.25520
GLCM Homogeneity Layer 4	0.03085	0.03170	0.00004	0.00002	0.00284	0.01839	0.02123	0.04201
GLCM Homogeneity Layer 5	0.25038	0.25456	0.00008	0.00006	0.03117	0.00200	0.03317	0.06526
GLCM Homogeneity Layer 6	1321.03100	1366.98100	8597.03472	5005.38201	0.03881	0.01807	0.05687	0.11057
GLCM Homogeneity Layer 7	1304.21400	1279.21100	442.12358	738.32725	0.13240	0.01626	0.14865	0.27627
GLCM Homogeneity Layer 8	1524.75100	1444.40500	913.79552	2485.55389	0.47476	0.06013	0.53489	0.82853

Table A22 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.04793	0.09501	0.00010	0.00044	1.02801	0.12104	1.14905	1.36612
GLCM Contrast Layer 2	0.05129	0.08631	0.00024	0.00025	0.62896	0.00011	0.62907	0.93383
GLCM Contrast Layer 3	0.10096	0.19886	0.00041	0.00491	0.45063	0.31672	0.76735	1.07152
GLCM Contrast Layer 4	2522.80900	2667.94800	861951.58320	471380.52280	0.00395	0.02243	0.02638	0.05207
GLCM Contrast Layer 5	1919.87000	1912.37700	351187.18160	353896.56100	0.00002	0.00000	0.00002	0.00005
GLCM Contrast Layer 6	2116.22400	1971.07100	969739.43570	382827.40660	0.00389	0.05215	0.05605	0.10901
GLCM Contrast Layer 7	1746.53200	1746.48500	155852.09090	357465.99680	0.00000	0.04189	0.04189	0.08204
GLCM Contrast Layer 8	1751.64500	1392.14300	546012.97020	164675.59650	0.04546	0.08489	0.13035	0.24443
GLCM Dissimilarity Layer 1	1792.04000	1867.86700	239048.23140	427959.51120	0.00216	0.02090	0.02306	0.04559
GLCM Dissimilarity Layer2	2098.56000	2126.10200	208103.14920	321144.56370	0.00036	0.01167	0.01203	0.02392
GLCM Dissimilarity Layer 3	1852.10900	2313.96400	332699.22740	841101.36930	0.04543	0.05194	0.09737	0.18556
GLCM Dissimilarity Layer 4	38.81600	40.32600	64.21736	28.58496	0.00614	0.03987	0.04602	0.08995
GLCM Dissimilarity Layer 5	33.42600	33.00100	40.50734	34.49814	0.00060	0.00161	0.00221	0.00442
GLCM Dissimilarity Layer 6	33.95100	33.12000	87.62090	35.64009	0.00140	0.04896	0.05036	0.09822
GLCM Dissimilarity Layer 7	31.45100	31.16400	16.26548	32.60547	0.00042	0.02964	0.03006	0.05922
GLCM Dissimilarity Layer 8	27.74900	23.72400	40.27068	14.54818	0.07388	0.06217	0.13605	0.25441
GLCM Entropy Layer 1	32.23800	32.70800	25.41635	31.99977	0.00096	0.00331	0.00427	0.00852
GLCM Entropy Layer 2	35.13300	34.70800	11.94529	21.19251	0.00136	0.02027	0.02163	0.04280
GLCM Entropy Layer 3	32.45900	35.57100	39.83365	57.83041	0.02479	0.00864	0.03343	0.06575
GLCM Entropy Layer 4	6.51230	6.97150	0.18287	0.06010	0.21697	0.07371	0.29068	0.50449
GLCM Entropy Layer 5	6.61840	7.13730	0.20432	0.06973	0.24563	0.06899	0.31462	0.53987
GLCM Entropy Layer 6	6.63920	6.94450	0.28551	0.06750	0.06601	0.12008	0.18609	0.33961
GLCM Entropy Layer 7	6.76010	7.50380	0.22184	0.18137	0.34293	0.00253	0.34546	0.58421
GLCM Entropy Layer 8	5.37560	6.09360	0.23476	0.15546	0.33028	0.01054	0.34082	0.57763
GLCM Mean Layer 1	5.67340	4.67950	0.05179	0.20913	0.94650	0.11299	1.05949	1.30673
GLCM Mean Layer2	5.42510	4.79510	0.06784	0.07212	0.70897	0.00023	0.70920	1.01592
GLCM Mean Layer 3	4.55770	3.62000	0.18242	0.34819	0.41428	0.02568	0.43996	0.71187
GLCM Mean Layer 4	127.90600	128.18700	1.62600	1.15833	0.00709	0.00715	0.01424	0.02829
GLCM Mean Layer 5	128.16300	127.80300	1.50958	1.25413	0.01172	0.00214	0.01387	0.02755
GLCM Mean Layer 6	127.75800	127.76300	4.56848	1.51925	0.00000	0.07222	0.07222	0.13934
GLCM Mean Layer 7	127.35800	126.43800	12.21853	3.91073	0.01312	0.07707	0.09019	0.17249
GLCM Mean Layer 8	127.28500	127.80600	3.03856	0.78392	0.01775	0.10689	0.12465	0.23438
GLCM Correlation Layer 1	126.84000	125.63200	13.14596	4.53173	0.02064	0.06777	0.08841	0.16923
GLCM Correlation Layer 2	126.96800	128.65100	11.23173	4.61679	0.04468	0.04785	0.09253	0.17676
GLCM Correlation Layer 3	127.53900	127.69000	10.98614	4.53136	0.00037	0.04750	0.04786	0.09347
GLCM Correlation Layer 4	0.57745	0.53505	0.03393	0.02085	0.00820	0.01469	0.02289	0.04527
GLCM Correlation Layer 5	0.67906	0.68206	0.01710	0.00834	0.00009	0.03151	0.03159	0.06220
GLCM Correlation Layer 6	0.66943	0.65596	0.01841	0.01320	0.00143	0.00689	0.00832	0.01657
GLCM Correlation Layer 7	0.75530	0.74075	0.00192	0.00649	0.00630	0.08735	0.09365	0.17879
GLCM Correlation Layer 8	0.76544	0.79586	0.00555	0.00420	0.02372	0.00488	0.02861	0.05640

Table A23 J value paddy field and rangeland.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1321.03100	1401.62700	8597.03472	1182.33660	0.16606	0.21384	0.37989	0.63213
Mean Layer 1	1304.21400	1316.44200	442.12358	1022.57206	0.02552	0.04271	0.06823	0.13191
Mean Layer 2	1524.75100	1524.27900	913.79552	2029.22079	0.00002	0.03877	0.03879	0.07609
Mean Layer 3	1331.44600	1335.04600	1571.55178	1991.59127	0.00091	0.00350	0.00441	0.00880
Mean Layer 4	3676.98600	3954.73300	324461.02860	21128.39829	0.05581	0.36786	0.42366	0.69071
Mean Layer 5	2368.87000	2718.93400	40450.86540	6964.61549	0.64612	0.17267	0.81879	1.11807
Mean Layer 6	197.51400	204.66400	195.67825	12.86756	0.06128	0.36571	0.42699	0.69507
Mean Layer 7	71.31400	77.11500	47.39534	7.75892	0.15253	0.18165	0.33419	0.56816
Mean Layer 8	93.14700	81.81000	65.04105	4.96431	0.45899	0.33339	0.79238	1.09447
Max. diff.	2.71520	2.76610	0.05576	0.00396	0.01085	0.34902	0.35987	0.60446
Standard deviation Layer 1	23.25300	30.99300	103.70462	159.92665	0.05681	0.01164	0.06845	0.13231
Standard deviation Layer 2	37.11800	52.49200	415.02597	224.32657	0.09242	0.02329	0.11571	0.21854
Standard deviation Layer 3	37.16500	56.89400	524.67636	1083.43332	0.06051	0.03217	0.09268	0.17702
Standard deviation Layer 4	232.63600	309.81100	4277.92832	6500.71848	0.13814	0.01086	0.14901	0.27687
Standard deviation Layer 5	78.78000	98.15300	1518.79980	813.30705	0.04023	0.02399	0.06423	0.12442
Standard deviation Layer 6	6.75160	8.45560	1.82859	10.67308	0.05806	0.17354	0.23161	0.41348
Standard deviation Layer 7	5.34680	7.65650	0.84514	3.58733	0.30089	0.12062	0.42150	0.68788
Standard deviation Layer 8	3.41510	3.88860	2.98850	4.69709	0.00729	0.01267	0.01996	0.03953
Ration Layer 1	0.12399	0.11744	0.00008	0.00001	0.11408	0.22775	0.34183	0.57906
Ration Layer 2	0.14482	0.13594	0.00008	0.00001	0.22609	0.33600	0.56209	0.85996
Ration Layer 3	0.12661	0.11905	0.00011	0.00001	0.12097	0.38238	0.50335	0.79099
Ration Layer 4	0.34623	0.35266	0.00081	0.00006	0.01188	0.34903	0.36091	0.60592
Ration Layer 5	0.22396	0.24247	0.00002	0.00001	2.57579	0.01016	2.58595	1.84935
Ration Layer 6	0.01869	0.01826	0.00000	0.00000	0.09974	0.01106	0.11080	0.20977
Ration Layer 7	0.00681	0.00688	0.00000	0.00000	0.00111	0.29532	0.29643	0.51307
Ration Layer 8	0.00890	0.00730	0.00000	0.00000	0.34439	0.46594	0.81033	1.11058
Area	127.30000	123.60000	4486.67778	3840.48889	0.00041	0.00151	0.00192	0.00384
Border length	64.00000	86.60000	326.22222	873.82222	0.10640	0.05837	0.16477	0.30383
Width	9.46880	12.18080	18.32484	23.87806	0.04357	0.00437	0.04794	0.09361
Asymmetry	0.58648	0.62722	0.10895	0.06069	0.00245	0.02110	0.02355	0.04654
Border index	1.24700	1.76590	0.02492	0.23248	0.26152	0.26265	0.52417	0.81591
Shape index	1.48400	2.01710	0.08576	0.40081	0.14602	0.13585	0.28187	0.49125
GLCM Homogeneity Layer 1	0.02684	0.02676	0.00007	0.00006	0.00001	0.00014	0.00015	0.00031
GLCM Homogeneity Layer 2	0.03102	0.02383	0.00016	0.00001	0.07442	0.41235	0.48677	0.77079
GLCM Homogeneity Layer 3	0.03272	0.03683	0.00029	0.00010	0.01065	0.06345	0.07410	0.14285
GLCM Homogeneity Layer 4	0.03085	0.02431	0.00004	0.00003	0.15189	0.00683	0.15872	0.29352
GLCM Homogeneity Layer 5	0.25038	0.24848	0.00008	0.00010	0.00522	0.00342	0.00864	0.01720
GLCM Homogeneity Layer 6	1321.03100	1401.62700	8597.03472	1182.33660	0.16606	0.21384	0.37989	0.63213
GLCM Homogeneity Layer 7	1304.21400	1316.44200	442.12358	1022.57206	0.02552	0.04271	0.06823	0.13191
GLCM Homogeneity Layer 8	1524.75100	1524.27900	913.79552	2029.22079	0.00002	0.03877	0.03879	0.07609

Table 23 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.04793	0.03455	0.00010	0.00011	0.21343	0.00012	0.21355	0.38457
GLCM Contrast Layer 2	0.05129	0.02949	0.00024	0.00004	0.43128	0.19189	0.62317	0.92751
GLCM Contrast Layer 3	0.10096	0.08441	0.00041	0.00133	0.03937	0.08384	0.12320	0.23183
GLCM Contrast Layer 4	2522.80900	2456.83500	861951.58320	656967.37660	0.00072	0.00460	0.00531	0.01059
GLCM Contrast Layer 5	1919.87000	2376.29200	351187.18160	452281.99900	0.06482	0.00399	0.06881	0.13299
GLCM Contrast Layer 6	2116.22400	1930.86400	969739.43570	461552.86980	0.00600	0.03369	0.03969	0.07782
GLCM Contrast Layer 7	1746.53200	2424.00700	155852.09090	386301.68100	0.21164	0.04982	0.26146	0.46015
GLCM Contrast Layer 8	1751.64500	2418.07500	546012.97020	582673.99190	0.09837	0.00026	0.09864	0.18786
GLCM Dissimilarity Layer 1	1792.04000	2152.12800	239048.23140	300436.01180	0.06009	0.00326	0.06334	0.12276
GLCM Dissimilarity Layer2	2098.56000	2488.80500	208103.14920	329598.74770	0.07081	0.01310	0.08391	0.16097
GLCM Dissimilarity Layer 3	1852.10900	2402.77400	332699.22740	864290.88640	0.06333	0.05492	0.11825	0.22306
GLCM Dissimilarity Layer 4	38.81600	37.89000	64.21736	47.56176	0.00192	0.00561	0.00753	0.01501
GLCM Dissimilarity Layer 5	33.42600	37.71500	40.50734	25.26965	0.06992	0.01379	0.08371	0.16060
GLCM Dissimilarity Layer 6	33.95100	32.47500	87.62090	37.50783	0.00435	0.04371	0.04806	0.09384
GLCM Dissimilarity Layer 7	31.45100	38.63400	16.26548	33.19985	0.26077	0.03116	0.29193	0.50636
GLCM Dissimilarity Layer 8	27.74900	33.89300	40.27068	35.67547	0.12426	0.00092	0.12518	0.23532
GLCM Entropy Layer 1	32.23800	35.95900	25.41635	31.83543	0.06046	0.00316	0.06362	0.12328
GLCM Entropy Layer 2	35.13300	39.29400	11.94529	27.24956	0.11043	0.04136	0.15179	0.28166
GLCM Entropy Layer 3	32.45900	37.70700	39.83365	73.44047	0.06079	0.02303	0.08382	0.16081
GLCM Entropy Layer 4	6.51230	6.68920	0.18287	0.11894	0.02592	0.01148	0.03740	0.07341
GLCM Entropy Layer 5	6.61840	6.81690	0.20432	0.14442	0.02825	0.00749	0.03573	0.07021
GLCM Entropy Layer 6	6.63920	6.69390	0.28551	0.10714	0.00191	0.05778	0.05969	0.11588
GLCM Entropy Layer 7	6.76010	6.84400	0.22184	0.15071	0.00472	0.00928	0.01401	0.02782
GLCM Entropy Layer 8	5.37560	5.45730	0.23476	0.14034	0.00445	0.01636	0.02081	0.04119
GLCM Mean Layer 1	5.67340	5.92890	0.05179	0.09354	0.11229	0.02153	0.13383	0.25052
GLCM Mean Layer2	5.42510	5.93980	0.06784	0.02244	0.73364	0.07289	0.80653	1.10719
GLCM Mean Layer 3	4.55770	4.67110	0.18242	0.66348	0.00380	0.09768	0.10148	0.19300
GLCM Mean Layer 4	127.90600	129.52300	1.62600	3.70265	0.12267	0.04118	0.16385	0.30227
GLCM Mean Layer 5	128.16300	130.02500	1.50958	3.24967	0.18212	0.03588	0.21800	0.39174
GLCM Mean Layer 6	127.75800	129.11800	4.56848	2.38615	0.06649	0.02591	0.09240	0.17652
GLCM Mean Layer 7	127.35800	128.09500	12.21853	14.24887	0.00513	0.00148	0.00661	0.01317
GLCM Mean Layer 8	127.28500	129.77200	3.03856	10.64784	0.11298	0.09244	0.20542	0.37139
GLCM Correlation Layer 1	126.84000	127.06600	13.14596	10.47416	0.00054	0.00322	0.00376	0.00751
GLCM Correlation Layer 2	126.96800	126.93500	11.23173	9.83465	0.00001	0.00110	0.00111	0.00223
GLCM Correlation Layer 3	127.53900	127.37300	10.98614	4.75213	0.00044	0.04267	0.04310	0.08438
GLCM Correlation Layer 4	0.57745	0.59482	0.03393	0.02703	0.00124	0.00323	0.00447	0.00891
GLCM Correlation Layer 5	0.67906	0.63679	0.01710	0.01449	0.01414	0.00172	0.01586	0.03146
GLCM Correlation Layer 6	0.66943	0.68829	0.01841	0.01350	0.00279	0.00599	0.00877	0.01747
GLCM Correlation Layer 7	0.75530	0.62369	0.00192	0.00559	0.57664	0.06813	0.64478	0.95044
GLCM Correlation Layer 8	0.76544	0.65799	0.00555	0.00602	0.24936	0.00041	0.24977	0.44204

Table 24 J value paddy field and water body.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1321.03100	1155.76800	8597.03472	14834.20397	0.29140	0.01837	0.30978	0.53278
Mean Layer 1	1304.21400	1665.12000	442.12358	26324.60884	1.21656	0.68342	1.89998	1.70086
Mean Layer 2	1524.75100	1982.50800	913.79552	80686.62151	0.64197	0.77924	1.42121	1.51716
Mean Layer 3	1331.44600	1990.85000	1571.55178	136906.86820	0.78498	0.77594	1.56093	1.58012
Mean Layer 4	3676.98600	1743.95000	324461.02860	44851.55109	2.52945	0.21287	2.74232	1.87116
Mean Layer 5	2368.87000	1516.09200	40450.86540	31830.54168	2.51527	0.00358	2.51886	1.83890
Mean Layer 6	197.51400	80.77700	195.67825	298.80845	6.88973	0.01112	6.90085	1.99799
Mean Layer 7	71.31400	100.33600	47.39534	34.45612	2.57258	0.00633	2.57890	1.84829
Mean Layer 8	93.14700	166.52500	65.04105	322.91541	3.46967	0.14577	3.61545	1.94619
Max. diff.	2.71520	1.69900	0.05576	0.01505	3.64604	0.10029	3.74634	1.95279
Standard deviation Layer 1	23.25300	44.98700	103.70462	365.55569	0.25165	0.09326	0.34492	0.58344
Standard deviation Layer 2	37.11800	56.26400	415.02597	483.00212	0.10205	0.00144	0.10348	0.19662
Standard deviation Layer 3	37.16500	71.51700	524.67636	1136.50100	0.17759	0.03644	0.21404	0.38537
Standard deviation Layer 4	232.63600	124.18600	4277.92832	8201.09163	0.23562	0.02602	0.26164	0.46042
Standard deviation Layer 5	78.78000	101.17200	1518.79980	4690.16502	0.02019	0.07558	0.09577	0.18264
Standard deviation Layer 6	6.75160	9.15520	1.82859	41.82114	0.03309	0.45729	0.49038	0.77521
Standard deviation Layer 7	5.34680	6.25910	0.84514	12.05007	0.01614	0.35165	0.36778	0.61547
Standard deviation Layer 8	3.41510	7.36440	2.98850	16.17177	0.20351	0.16034	0.36384	0.61000
Ration Layer 1	0.12399	0.18055	0.00008	0.00013	3.82653	0.01045	3.83698	1.95688
Ration Layer 2	0.14482	0.21391	0.00008	0.00020	4.29810	0.04749	4.34559	1.97407
Ration Layer 3	0.12661	0.21386	0.00011	0.00038	3.85925	0.08947	3.94872	1.96144
Ration Layer 4	0.34623	0.18886	0.00081	0.00023	5.93341	0.09288	6.02629	1.99517
Ration Layer 5	0.22396	0.16483	0.00002	0.00039	2.12310	0.42267	2.54577	1.84317
Ration Layer 6	0.01869	0.00892	0.00000	0.00001	3.55910	0.55863	4.11773	1.96744
Ration Layer 7	0.00681	0.01101	0.00000	0.00000	1.12472	0.05875	1.18348	1.38758
Ration Layer 8	0.00890	0.01808	0.00000	0.00000	4.33889	0.01874	4.35764	1.97438
Area	127.30000	174.70000	4486.67778	39580.67778	0.01275	0.25142	0.26417	0.46431
Border length	64.00000	70.80000	326.22222	1643.73333	0.00587	0.14823	0.15410	0.28563
Width	9.46880	11.60410	18.32484	52.22826	0.01616	0.06564	0.08180	0.15708
Asymmetry	0.58648	0.51831	0.10895	0.07180	0.00643	0.01079	0.01721	0.03413
Border index	1.24700	1.35670	0.02492	0.05597	0.03719	0.03986	0.07706	0.14832
Shape index	1.48400	1.53370	0.08576	0.13578	0.00279	0.01308	0.01587	0.03148
GLCM Homogeneity Layer 1	0.02684	0.03437	0.00007	0.00020	0.05401	0.06775	0.12176	0.22927
GLCM Homogeneity Layer 2	0.03102	0.03283	0.00016	0.00008	0.00332	0.02977	0.03309	0.06509
GLCM Homogeneity Layer 3	0.03272	0.03311	0.00029	0.00010	0.00010	0.06691	0.06701	0.12962
GLCM Homogeneity Layer 4	0.03085	0.04096	0.00004	0.00032	0.07117	0.22665	0.29782	0.51513
GLCM Homogeneity Layer 5	0.25038	0.25455	0.00008	0.00038	0.00943	0.14821	0.15764	0.29169
GLCM Homogeneity Layer 6	1321.03100	1155.76800	8597.03472	14834.20397	0.29140	0.01837	0.30978	0.53278
GLCM Homogeneity Layer 7	1304.21400	1665.12000	442.12358	26324.60884	1.21656	0.68342	1.89998	1.70086
GLCM Homogeneity Layer 8	1524.75100	1982.50800	913.79552	80686.62151	0.64197	0.77924	1.42121	1.51716

Table A24 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.04793	0.08887	0.00010	0.00392	0.10408	0.57740	0.68148	0.98826
GLCM Contrast Layer 2	0.05129	0.07695	0.00024	0.00694	0.02291	0.51315	0.53606	0.82990
GLCM Contrast Layer 3	0.10096	0.08867	0.00041	0.00769	0.00466	0.41469	0.41936	0.68506
GLCM Contrast Layer 4	2522.80900	2949.91900	861951.58320	1658584.28400	0.01809	0.02631	0.04440	0.08686
GLCM Contrast Layer 5	1919.87000	2943.11400	351187.18160	1596316.75400	0.13441	0.13138	0.26579	0.46680
GLCM Contrast Layer 6	2116.22400	2812.11500	969739.43570	1770516.09900	0.04418	0.02232	0.06650	0.12867
GLCM Contrast Layer 7	1746.53200	3376.09900	155852.09090	4700693.74700	0.13670	0.52137	0.65807	0.96430
GLCM Contrast Layer 8	1751.64500	4214.86200	546012.97020	8639713.87600	0.16513	0.37444	0.53957	0.83400
GLCM Dissimilarity Layer 1	1792.04000	3357.36800	239048.23140	3781270.90300	0.15237	0.37436	0.52673	0.81894
GLCM Dissimilarity Layer2	2098.56000	4218.78200	208103.14920	2756373.39800	0.37910	0.33573	0.71483	1.02145
GLCM Dissimilarity Layer 3	1852.10900	3324.26000	332699.22740	3873154.13400	0.12882	0.30828	0.43710	0.70818
GLCM Dissimilarity Layer 4	38.81600	39.79000	64.21736	64.95211	0.00184	0.00001	0.00184	0.00368
GLCM Dissimilarity Layer 5	33.42600	39.71400	40.50734	78.66029	0.08295	0.02704	0.10998	0.20830
GLCM Dissimilarity Layer 6	33.95100	38.59100	87.62090	90.95588	0.03014	0.00009	0.03023	0.05955
GLCM Dissimilarity Layer 7	31.45100	40.06200	16.26548	319.45457	0.05522	0.42265	0.47787	0.75979
GLCM Dissimilarity Layer 8	27.74900	43.11500	40.27068	423.90292	0.12717	0.28727	0.41444	0.67858
GLCM Entropy Layer 1	32.23800	40.48200	25.41635	226.24120	0.06752	0.25321	0.32073	0.54876
GLCM Entropy Layer 2	35.13300	47.54900	11.94529	179.76865	0.20102	0.36343	0.56445	0.86266
GLCM Entropy Layer 3	32.45900	40.89700	39.83365	252.31516	0.06093	0.18821	0.24914	0.44105
GLCM Entropy Layer 4	6.51230	6.39240	0.18287	0.90793	0.00329	0.14577	0.14907	0.27697
GLCM Entropy Layer 5	6.61840	6.30270	0.20432	0.78871	0.02509	0.10629	0.13138	0.24623
GLCM Entropy Layer 6	6.63920	6.36910	0.28551	0.76102	0.01743	0.05781	0.07524	0.14495
GLCM Entropy Layer 7	6.76010	6.35250	0.22184	0.98694	0.03436	0.12797	0.16233	0.29968
GLCM Entropy Layer 8	5.37560	5.02710	0.23476	1.25673	0.02036	0.15849	0.17884	0.32753
GLCM Mean Layer 1	5.67340	4.80980	0.05179	0.78066	0.22398	0.36377	0.58775	0.88885
GLCM Mean Layer2	5.42510	5.03550	0.06784	1.04399	0.03413	0.36833	0.40246	0.66266
GLCM Mean Layer 3	4.55770	4.95240	0.18242	0.90127	0.03594	0.14496	0.18090	0.33097
GLCM Mean Layer 4	127.90600	120.18200	1.62600	26.93388	0.52224	0.38455	0.90679	1.19236
GLCM Mean Layer 5	128.16300	120.28300	1.50958	28.73082	0.51334	0.41557	0.92891	1.21003
GLCM Mean Layer 6	127.75800	120.14500	4.56848	29.07154	0.43072	0.18905	0.61977	0.92386
GLCM Mean Layer 7	127.35800	134.62600	12.21853	44.47787	0.23292	0.09780	0.33072	0.56319
GLCM Mean Layer 8	127.28500	137.11400	3.03856	67.37378	0.34301	0.45020	0.79321	1.09522
GLCM Correlation Layer 1	126.84000	135.77400	13.14596	41.08383	0.36795	0.07711	0.44506	0.71843
GLCM Correlation Layer 2	126.96800	125.65400	11.23173	28.39267	0.01089	0.05193	0.06282	0.12178
GLCM Correlation Layer 3	127.53900	117.31200	10.98614	45.14084	0.46587	0.11563	0.58150	0.88188
GLCM Correlation Layer 4	0.57745	0.62461	0.03393	0.01744	0.01082	0.02718	0.03800	0.07458
GLCM Correlation Layer 5	0.67906	0.63036	0.01710	0.01748	0.01715	0.00003	0.01718	0.03406
GLCM Correlation Layer 6	0.66943	0.66236	0.01841	0.01971	0.00033	0.00029	0.00062	0.00123
GLCM Correlation Layer 7	0.75530	0.61083	0.00192	0.04281	0.11665	0.45139	0.56803	0.86672
GLCM Correlation Layer 8	0.76544	0.57458	0.00555	0.04566	0.17782	0.23752	0.41533	0.67976

Table A25 J value perennial tree and orchard and building and settlement area.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1366.98100	1733.37600	5005.38201	17841.76287	1.46895	0.09483	1.56378	1.58131
Mean Layer 1	1279.21100	2012.19600	738.32725	102497.45560	1.30107	0.89032	2.19138	1.77648
Mean Layer 2	1444.40500	2128.28300	2485.55389	40154.76871	2.74206	0.37902	3.12108	1.91178
Mean Layer 3	1293.66600	2104.12100	4592.44727	44005.89594	3.37891	0.26804	3.64694	1.94786
Mean Layer 4	3934.46400	3325.61000	247864.91930	179227.66370	0.21699	0.00654	0.22353	0.40062
Mean Layer 5	2620.88000	3932.11700	118523.44450	397830.64730	0.83244	0.08654	0.91898	1.20215
Mean Layer 6	206.29700	144.52200	177.75476	211.81677	2.44894	0.00192	2.45086	1.82756
Mean Layer 7	73.90800	130.92700	316.99093	586.06291	0.90005	0.02324	0.92329	1.20558
Mean Layer 8	83.01000	89.23200	114.45838	151.57566	0.03638	0.00491	0.04129	0.08091
Max. diff.	2.82380	2.25040	0.07843	0.05496	0.61624	0.00786	0.62410	0.92852
Standard deviation Layer 1	15.89100	230.48100	24.80074	10326.57254	1.11214	1.16253	2.27467	1.79434
Standard deviation Layer 2	22.72800	211.84300	38.41324	5707.42907	1.55610	0.90706	2.46316	1.82967
Standard deviation Layer 3	22.28990	250.84100	194.49417	9955.20214	1.28663	0.64696	1.93359	1.71074
Standard deviation Layer 4	126.34700	248.94700	537.95547	10936.52616	0.32748	0.43046	0.75794	1.06274
Standard deviation Layer 5	57.89300	259.32300	537.36591	10080.82249	0.95530	0.41232	1.36762	1.49057
Standard deviation Layer 6	3.22540	13.03910	0.88459	23.13802	1.00227	0.48821	1.49048	1.54947
Standard deviation Layer 7	3.25440	9.75780	0.44018	6.57930	1.50632	0.36193	1.86825	1.69121
Standard deviation Layer 8	1.83417	9.55800	0.47305	5.36850	2.55316	0.30293	2.85608	1.88501
Ration Layer 1	0.11731	0.14461	0.00005	0.00024	0.63914	0.12350	0.76264	1.06713
Ration Layer 2	0.13237	0.15334	0.00006	0.00002	1.27187	0.05734	1.32921	1.47063
Ration Layer 3	0.11862	0.15177	0.00009	0.00011	1.38937	0.00331	1.39268	1.50318
Ration Layer 4	0.35913	0.24105	0.00115	0.00124	1.45710	0.00032	1.45742	1.53433
Ration Layer 5	0.23927	0.28281	0.00066	0.00095	0.29481	0.00859	0.30341	0.52340
Ration Layer 6	0.01888	0.01055	0.00000	0.00000	4.72355	0.05711	4.78066	1.98322
Ration Layer 7	0.00677	0.00941	0.00000	0.00000	0.34516	0.00039	0.34554	0.58433
Ration Layer 8	0.00765	0.00652	0.00000	0.00000	0.10290	0.01418	0.11708	0.22098
Area	308.30000	28.50000	32593.34444	210.05556	0.59665	0.91776	1.51441	1.56012
Border length	84.00000	29.60000	584.00000	182.04444	0.96579	0.08051	1.04630	1.29753
Width	16.27000	5.14480	18.30678	4.96342	1.32971	0.09967	1.42938	1.52108
Asymmetry	0.43772	0.54890	0.06217	0.02142	0.03697	0.06784	0.10481	0.19901
Border index	1.16470	1.22590	0.00978	0.06811	0.01202	0.20570	0.21772	0.39130
Shape index	1.23320	1.38250	0.01757	0.08429	0.05470	0.14008	0.19478	0.35397
GLCM Homogeneity Layer 1	0.02526	0.01942	0.00001	0.00009	0.08496	0.19040	0.27536	0.48140
GLCM Homogeneity Layer 2	0.03161	0.01703	0.00008	0.00002	0.55035	0.09429	0.64464	0.95029
GLCM Homogeneity Layer 3	0.03381	0.01732	0.00006	0.00007	0.52134	0.00041	0.52175	0.81304
GLCM Homogeneity Layer 4	0.03170	0.01958	0.00002	0.00004	0.54825	0.02241	0.57066	0.86969
GLCM Homogeneity Layer 5	0.25456	0.23747	0.00006	0.00001	0.98000	0.17743	1.15743	1.37141
GLCM Homogeneity Layer 6	0.09501	0.02386	0.00044	0.00012	2.27735	0.09852	2.37587	1.81413
GLCM Homogeneity Layer 7	1366.98100	1733.37600	5005.38201	17841.76287	1.46895	0.09483	1.56378	1.58131
GLCM Homogeneity Layer 8	1279.21100	2012.19600	738.32725	102497.45560	1.30107	0.89032	2.19138	1.77648

Table A25 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.08631	0.01925	0.00025	0.00005	3.80310	0.15753	3.96063	1.96190
GLCM Contrast Layer 2	0.19886	0.02049	0.00491	0.00006	1.60057	0.77013	2.37070	1.81317
GLCM Contrast Layer 3	2667.94800	4153.94800	471380.52280	2987749.23300	0.15959	0.18833	0.34792	0.58769
GLCM Contrast Layer 4	1912.37700	3812.36200	353896.56100	248119.21720	1.49911	0.00784	1.50695	1.55683
GLCM Contrast Layer 5	1971.07100	3643.05600	382827.40660	554849.58640	0.74533	0.00856	0.75389	1.05894
GLCM Contrast Layer 6	1746.48500	4235.65200	357465.99680	8617612.11100	0.17259	0.46938	0.64197	0.94749
GLCM Contrast Layer 7	1392.14300	3866.67100	164675.59650	1037410.32600	1.27347	0.18722	1.46069	1.53585
GLCM Contrast Layer 8	1867.86700	3303.85700	427959.51120	1729968.27900	0.23889	0.11316	0.35205	0.59351
GLCM Dissimilarity Layer 1	2126.10200	3672.56500	321144.56370	2363595.42100	0.22270	0.21614	0.43884	0.71043
GLCM Dissimilarity Layer2	2313.96400	3635.16300	841101.36930	457870.71920	0.33595	0.02277	0.35872	0.60286
GLCM Dissimilarity Layer 3	40.32600	50.47100	28.58496	126.05825	0.16638	0.12658	0.29297	0.50790
GLCM Dissimilarity Layer 4	33.00100	49.50300	34.49814	18.27436	1.29005	0.02482	1.31487	1.46298
GLCM Dissimilarity Layer 5	33.12000	48.23700	35.64009	26.47507	0.91976	0.00550	0.92526	1.20714
GLCM Dissimilarity Layer 6	31.16400	50.80200	32.60547	333.12315	0.26362	0.28112	0.54474	0.84002
GLCM Dissimilarity Layer 7	23.72400	45.42800	14.54818	32.63595	2.49588	0.03974	2.53561	1.84157
GLCM Dissimilarity Layer 8	32.70800	45.40200	31.99977	91.65382	0.32578	0.06623	0.39202	0.64861
GLCM Entropy Layer 1	34.70800	48.41700	21.19251	122.84625	0.32619	0.17232	0.49851	0.78513
GLCM Entropy Layer 2	35.57100	47.96700	57.83041	15.74456	0.52212	0.09908	0.62120	0.92540
GLCM Entropy Layer 3	6.97150	5.38880	0.06010	0.44333	1.24395	0.21658	1.46053	1.53577
GLCM Entropy Layer 4	7.13730	5.44580	0.06973	0.36527	1.64433	0.15477	1.79910	1.66910
GLCM Entropy Layer 5	6.94450	5.44010	0.06750	0.34440	1.37365	0.15035	1.52400	1.56432
GLCM Entropy Layer 6	7.50380	5.41310	0.18137	0.46131	1.70031	0.05260	1.75291	1.65346
GLCM Entropy Layer 7	6.09360	4.11910	0.15546	0.28992	2.18839	0.02389	2.21228	1.78110
GLCM Entropy Layer 8	4.67950	5.17550	0.20913	0.30699	0.11917	0.00915	0.12832	0.24086
GLCM Mean Layer 1	4.79510	5.18450	0.07212	0.37256	0.08525	0.15242	0.23766	0.42307
GLCM Mean Layer2	3.62000	5.19760	0.34819	0.34982	0.89140	0.00000	0.89140	1.17984
GLCM Mean Layer 3	128.18700	121.06300	1.15833	31.63656	0.38688	0.49824	0.88512	1.17467
GLCM Mean Layer 4	127.80300	121.70900	1.25413	17.79561	0.48737	0.35060	0.83797	1.13482
GLCM Mean Layer 5	127.76300	122.17000	1.51925	17.71024	0.40669	0.30856	0.71525	1.02186
GLCM Mean Layer 6	126.43800	128.81500	3.91073	86.08881	0.01569	0.44855	0.46425	0.74278
GLCM Mean Layer 7	127.80600	120.66500	0.78392	18.70474	0.65415	0.46701	1.12116	1.34820
GLCM Mean Layer 8	125.63200	133.27200	4.53173	8.64882	1.10712	0.02567	1.13278	1.35573
GLCM Correlation Layer 1	128.65100	121.60400	4.61679	56.98727	0.20153	0.32066	0.52219	0.81356
GLCM Correlation Layer 2	127.69000	123.89700	4.53136	50.60427	0.06523	0.29956	0.36479	0.61132
GLCM Correlation Layer 3	0.53505	0.46016	0.02085	0.00854	0.04772	0.04823	0.09595	0.18297
GLCM Correlation Layer 4	0.68206	0.44285	0.00834	0.01206	0.70098	0.00844	0.70943	1.01615
GLCM Correlation Layer 5	0.65596	0.48636	0.01320	0.02087	0.21105	0.01301	0.22406	0.40146
GLCM Correlation Layer 6	0.74075	0.52938	0.00649	0.02899	0.31485	0.12869	0.44354	0.71648
GLCM Correlation Layer 7	0.79586	0.48757	0.00420	0.02347	0.85889	0.16597	1.02486	1.28231
GLCM Correlation Layer 8	0.72115	0.58107	0.00771	0.02613	0.14496	0.08788	0.23285	0.41545

Table 26 J value perennial tree and orchard and field crop.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1366.98100	1519.20600	5005.38201	7791.45380	0.45270	0.01214	0.46484	0.74353
Mean Layer 1	1279.21100	1407.32200	738.32725	1706.01482	1.67861	0.04262	1.72123	1.64231
Mean Layer 2	1444.40500	1669.33600	2485.55389	3772.87214	2.02103	0.01081	2.03184	1.73781
Mean Layer 3	1293.66600	1516.93200	4592.44727	21117.63853	0.48471	0.13324	0.61795	0.92190
Mean Layer 4	3934.46400	4176.82400	247864.91930	660161.72103	0.01617	0.05772	0.07389	0.14246
Mean Layer 5	2620.88000	3019.85800	118523.44450	56229.48708	0.22773	0.03397	0.26170	0.46052
Mean Layer 6	206.29700	196.21400	177.75476	602.17883	0.03259	0.08779	0.12038	0.22683
Mean Layer 7	73.90800	83.49200	316.99093	455.70677	0.02972	0.00819	0.03791	0.07440
Mean Layer 8	83.01000	83.66300	114.45838	61.38982	0.00061	0.02387	0.02448	0.04836
Max. diff.	2.82380	2.69950	0.07843	0.14298	0.01745	0.02221	0.03965	0.07775
Standard deviation Layer 1	15.89100	26.41000	24.80074	121.75531	0.18875	0.14391	0.33266	0.56597
Standard deviation Layer 2	22.72800	40.28400	38.41324	285.62138	0.23779	0.21808	0.45588	0.73222
Standard deviation Layer 3	22.28990	54.79900	194.49417	825.13468	0.25912	0.12054	0.37966	0.63181
Standard deviation Layer 4	126.34700	185.98400	537.95547	3112.73600	0.24355	0.17200	0.41556	0.68006
Standard deviation Layer 5	57.89300	83.75800	537.36591	1212.12617	0.09560	0.04026	0.13586	0.25408
Standard deviation Layer 6	3.22540	6.06310	0.88459	8.87132	0.20635	0.27732	0.48367	0.76696
Standard deviation Layer 7	3.25440	5.19310	0.44018	3.41751	0.24358	0.22638	0.46995	0.74993
Standard deviation Layer 8	1.83417	2.87180	0.47305	3.00483	0.07739	0.18872	0.26612	0.46730
Ration Layer 1	0.11731	0.11622	0.00005	0.00007	0.00238	0.00376	0.00614	0.01225
Ration Layer 2	0.13237	0.13776	0.00006	0.00009	0.04754	0.00806	0.05560	0.10816
Ration Layer 3	0.11862	0.12551	0.00009	0.00028	0.03229	0.08013	0.11242	0.21265
Ration Layer 4	0.35913	0.34173	0.00115	0.00244	0.02107	0.03432	0.05538	0.10776
Ration Layer 5	0.23927	0.24878	0.00066	0.00038	0.02182	0.01841	0.04023	0.07887
Ration Layer 6	0.01888	0.01612	0.00000	0.00000	1.89260	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 7	0.00677	0.00694	0.00000	0.00000	0.00270	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 8	0.00765	0.00693	0.00000	0.00000	0.06667	#DIV/0!	#DIV/0!	#DIV/0!
Area	308.30000	222.30000	32593.34444	9300.23333	0.04414	0.09246	0.13659	0.25535
Border length	84.00000	89.00000	584.00000	253.55556	0.00746	0.04230	0.04976	0.09709
Width	16.27000	13.50670	18.30678	36.01383	0.03514	0.02808	0.06323	0.12254
Asymmetry	0.43772	0.61741	0.06217	0.06772	0.06215	0.00046	0.06260	0.12137
Border index	1.16470	1.34440	0.00978	0.01607	0.31229	0.01525	0.32754	0.55861
Shape index	1.23320	1.56960	0.01757	0.09491	0.25151	0.15999	0.41150	0.67469
GLCM Homogeneity Layer 1	0.02526	0.03142	0.00001	0.00009	0.09169	0.19673	0.28842	0.50111
GLCM Homogeneity Layer 2	0.03161	0.03542	0.00008	0.00004	0.03138	0.02472	0.05610	0.10912
GLCM Homogeneity Layer 3	0.03381	0.03558	0.00006	0.00005	0.00693	0.00315	0.01008	0.02006
GLCM Homogeneity Layer 4	0.03170	0.03205	0.00002	0.00002	0.00068	0.00181	0.00249	0.00497
GLCM Homogeneity Layer 5	0.25456	0.25653	0.00006	0.00002	0.01158	0.07980	0.09137	0.17464
GLCM Homogeneity Layer 6	0.09501	0.07105	0.00044	0.00186	0.06248	0.12126	0.18374	0.33570
GLCM Homogeneity Layer 7	1366.98100	1519.20600	5005.38201	7791.45380	0.45270	0.01214	0.46484	0.74353
GLCM Homogeneity Layer 8	1279.21100	1407.32200	738.32725	1706.01482	1.67861	0.04262	1.72123	1.64231

Table A26 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.08631	0.06888	0.00025	0.00087	0.06782	0.09211	0.15993	0.29560
GLCM Contrast Layer 2	0.19886	0.12134	0.00491	0.00366	0.17527	0.00539	0.18066	0.33056
GLCM Contrast Layer 3	2667.94800	1997.14400	471380.52280	333414.92043	0.13978	0.00746	0.14724	0.27382
GLCM Contrast Layer 4	1912.37700	1844.71100	353896.56100	181066.55065	0.00214	0.02756	0.02970	0.05852
GLCM Contrast Layer 5	1971.07100	1660.13000	382827.40660	267203.10244	0.03718	0.00804	0.04522	0.08843
GLCM Contrast Layer 6	1746.48500	1799.18100	357465.99680	40511.59017	0.00174	0.25147	0.25321	0.44739
GLCM Contrast Layer 7	1392.14300	1448.58300	164675.59650	163903.01402	0.00242	0.00000	0.00243	0.00484
GLCM Contrast Layer 8	1867.86700	1854.38300	427959.51120	87701.09291	0.00009	0.14291	0.14300	0.26649
GLCM Dissimilarity Layer 1	2126.10200	1886.69700	321144.56370	152586.25722	0.03025	0.03384	0.06409	0.12415
GLCM Dissimilarity Layer2	2313.96400	2227.62900	841101.36930	213011.79312	0.00177	0.10964	0.11141	0.21085
GLCM Dissimilarity Layer 3	40.32600	33.72900	28.58496	31.58301	0.18083	0.00062	0.18145	0.33188
GLCM Dissimilarity Layer 4	33.00100	31.46700	34.49814	14.90920	0.01191	0.04275	0.05466	0.10639
GLCM Dissimilarity Layer 5	33.12000	30.05500	35.64009	23.48709	0.03972	0.01079	0.05051	0.09851
GLCM Dissimilarity Layer 6	31.16400	31.64100	32.60547	2.99374	0.00160	0.29434	0.29594	0.51233
GLCM Dissimilarity Layer 7	23.72400	24.63400	14.54818	15.74749	0.00683	0.00039	0.00723	0.01440
GLCM Dissimilarity Layer 8	32.70800	32.96200	31.99977	5.78997	0.00043	0.16398	0.16441	0.30321
GLCM Entropy Layer 1	34.70800	32.91900	21.19251	12.43899	0.02379	0.01754	0.04133	0.08097
GLCM Entropy Layer 2	35.57100	36.31200	57.83041	19.13144	0.00178	0.07287	0.07465	0.14387
GLCM Entropy Layer 3	6.97150	6.96510	0.06010	0.13964	0.00005	0.04317	0.04322	0.08461
GLCM Entropy Layer 4	7.13730	7.03680	0.06973	0.19496	0.00954	0.06334	0.07288	0.14058
GLCM Entropy Layer 5	6.94450	7.11650	0.06750	0.15457	0.03331	0.04174	0.07504	0.14459
GLCM Entropy Layer 6	7.50380	7.26090	0.18137	0.14770	0.04482	0.00263	0.04745	0.09269
GLCM Entropy Layer 7	6.09360	5.91170	0.15546	0.13357	0.02862	0.00144	0.03006	0.05922
GLCM Entropy Layer 8	4.67950	5.42650	0.20913	0.71961	0.15021	0.08993	0.24013	0.42695
GLCM Mean Layer 1	4.79510	5.39460	0.07212	0.32784	0.22465	0.13139	0.35604	0.59911
GLCM Mean Layer2	3.62000	4.29780	0.34819	0.59166	0.12220	0.01737	0.13957	0.26053
GLCM Mean Layer 3	128.18700	127.10500	1.15833	2.01281	0.09230	0.01884	0.11114	0.21037
GLCM Mean Layer 4	127.80300	127.11500	1.25413	2.73161	0.02969	0.03695	0.06664	0.12894
GLCM Mean Layer 5	127.76300	127.24700	1.51925	1.71762	0.02056	0.00094	0.02151	0.04255
GLCM Mean Layer 6	126.43800	126.55900	3.91073	2.21945	0.00060	0.01979	0.02039	0.04037
GLCM Mean Layer 7	127.80600	127.26600	0.78392	2.87492	0.01992	0.09886	0.11878	0.22399
GLCM Mean Layer 8	125.63200	125.86600	4.53173	2.84209	0.00186	0.01348	0.01534	0.03045
GLCM Correlation Layer 1	128.65100	127.85500	4.61679	3.46456	0.01960	0.00513	0.02474	0.04886
GLCM Correlation Layer 2	127.69000	126.89400	4.53136	4.69514	0.01717	0.00008	0.01725	0.03420
GLCM Correlation Layer 3	0.53505	0.64018	0.02085	0.01003	0.08949	0.03273	0.12222	0.23009
GLCM Correlation Layer 4	0.68206	0.67954	0.00834	0.00569	0.00011	0.00911	0.00922	0.01835
GLCM Correlation Layer 5	0.65596	0.72606	0.01320	0.00489	0.06791	0.05926	0.12717	0.23883
GLCM Correlation Layer 6	0.74075	0.70700	0.00649	0.00066	0.03985	0.27318	0.31303	0.53754
GLCM Correlation Layer 7	0.79586	0.78780	0.00420	0.00486	0.00179	0.00134	0.00313	0.00626
GLCM Correlation Layer 8	0.72115	0.71401	0.00771	0.00136	0.00141	0.16838	0.16978	0.31230

Table A27 J value perennial tree and orchard and forest area.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1366.98100	1361.15700	5005.38201	4860.82820	0.00086	0.00005	0.00091	0.00183
Mean Layer 1	1279.21100	1283.41800	738.32725	932.59988	0.00265	0.00340	0.00605	0.01206
Mean Layer 2	1444.40500	1451.23000	2485.55389	2841.38796	0.00219	0.00112	0.00330	0.00660
Mean Layer 3	1293.66600	1275.86900	4592.44727	1190.61388	0.01369	0.10617	0.11986	0.22592
Mean Layer 4	3934.46400	3922.79500	247864.91930	92203.98903	0.00010	0.05878	0.05888	0.11436
Mean Layer 5	2620.88000	2592.84400	118523.44450	28402.83169	0.00134	0.11799	0.11933	0.22497
Mean Layer 6	206.29700	207.83400	177.75476	22.27116	0.00295	0.23173	0.23468	0.41835
Mean Layer 7	73.90800	73.12300	316.99093	7.00273	0.00048	0.61749	0.61797	0.92192
Mean Layer 8	83.01000	82.14200	114.45838	11.69544	0.00149	0.27232	0.27382	0.47906
Max. diff.	2.82380	2.82510	0.07843	0.00680	0.00000	0.30633	0.30633	0.52772
Standard deviation Layer 1	15.89100	17.33500	24.80074	13.73434	0.01353	0.02152	0.03505	0.06888
Standard deviation Layer 2	22.72800	29.48300	38.41324	25.58353	0.17825	0.01025	0.18851	0.34361
Standard deviation Layer 3	22.28990	19.48600	194.49417	57.75680	0.00779	0.08698	0.09477	0.18083
Standard deviation Layer 4	126.34700	191.51100	537.95547	1215.10192	0.60556	0.04039	0.64596	0.95168
Standard deviation Layer 5	57.89300	54.31100	537.36591	225.78528	0.00420	0.04559	0.04979	0.09714
Standard deviation Layer 6	3.22540	3.95300	0.88459	0.47401	0.09742	0.02394	0.12136	0.22857
Standard deviation Layer 7	3.25440	4.55540	0.44018	0.61919	0.39943	0.00724	0.40668	0.66828
Standard deviation Layer 8	1.83417	1.76970	0.47305	0.31491	0.00132	0.01028	0.01160	0.02306
Ration Layer 1	0.11731	0.11805	0.00005	0.00002	0.00181	0.05690	0.05872	0.11405
Ration Layer 2	0.13237	0.13337	0.00006	0.00001	0.00352	0.22271	0.22623	0.40493
Ration Layer 3	0.11862	0.11732	0.00009	0.00001	0.00420	0.19784	0.20203	0.36587
Ration Layer 4	0.35913	0.35987	0.00115	0.00010	0.00011	0.31216	0.31227	0.53643
Ration Layer 5	0.23927	0.23800	0.00066	0.00002	0.00060	0.56184	0.56244	0.86036
Ration Layer 6	0.01888	0.01911	0.00000	0.00000	0.01002	0.06158	0.07160	0.13818
Ration Layer 7	0.00677	0.00673	0.00000	0.00000	0.00014	0.31493	0.31506	0.54051
Ration Layer 8	0.00765	0.00757	0.00000	0.00000	0.00061	0.14514	0.14576	0.27127
Area	308.30000	396.60000	32593.34444	58820.71111	0.02132	0.02148	0.04280	0.08379
Border length	84.00000	140.00000	584.00000	2475.55556	0.25625	0.12041	0.37665	0.62769
Width	16.27000	20.40440	18.30678	43.33958	0.06932	0.04505	0.11437	0.21614
Asymmetry	0.43772	0.53568	0.06217	0.05233	0.02095	0.00185	0.02281	0.04509
Border index	1.16470	1.69850	0.00978	0.05526	1.09526	0.16781	1.26307	1.43443
Shape index	1.23320	1.83230	0.01757	0.08368	0.88620	0.13888	1.02508	1.28246
GLCM Homogeneity Layer 1	0.02526	0.02320	0.00001	0.00001	0.04355	0.00296	0.04651	0.09089
GLCM Homogeneity Layer 2	0.03161	0.02264	0.00008	0.00001	0.22669	0.16633	0.39302	0.64997
GLCM Homogeneity Layer 3	0.03381	0.02516	0.00006	0.00006	0.14743	0.00005	0.14748	0.27424
GLCM Homogeneity Layer 4	0.03170	0.02139	0.00002	0.00001	0.76298	0.03464	0.79763	1.09921
GLCM Homogeneity Layer 5	0.25456	0.25190	0.00006	0.00002	0.02025	0.05976	0.08001	0.15379
GLCM Homogeneity Layer 6	0.09501	0.04940	0.00044	0.00010	0.97392	0.12895	1.10287	1.33617
GLCM Homogeneity Layer 7	1366.98100	1361.15700	5005.38201	4860.82820	0.00086	0.00005	0.00091	0.00183
GLCM Homogeneity Layer 8	1279.21100	1283.41800	738.32725	932.59988	0.00265	0.00340	0.00605	0.01206

Table A27 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.08631	0.04146	0.00025	0.00008	1.52698	0.07575	1.60274	1.59731
GLCM Contrast Layer 2	0.19886	0.15928	0.00491	0.00180	0.05837	0.06071	0.11908	0.22452
GLCM Contrast Layer 3	2667.94800	2574.37300	471380.52280	73489.04847	0.00402	0.19050	0.19452	0.35353
GLCM Contrast Layer 4	1912.37700	2460.72800	353896.56100	177072.49820	0.14158	0.02939	0.17096	0.31429
GLCM Contrast Layer 5	1971.07100	2108.30700	382827.40660	108952.22130	0.00957	0.09282	0.10239	0.19465
GLCM Contrast Layer 6	1746.48500	2672.58900	357465.99680	44149.58097	0.53389	0.23452	0.76840	1.07249
GLCM Contrast Layer 7	1392.14300	1645.13500	164675.59650	119103.88290	0.05639	0.00653	0.06292	0.12196
GLCM Contrast Layer 8	1867.86700	2729.50400	427959.51120	79518.72916	0.36574	0.15940	0.52514	0.81705
GLCM Dissimilarity Layer 1	2126.10200	2973.43200	321144.56370	198792.39400	0.34522	0.01424	0.35946	0.60389
GLCM Dissimilarity Layer2	2313.96400	2283.70700	841101.36930	141961.03300	0.00023	0.17620	0.17643	0.32348
GLCM Dissimilarity Layer 3	40.32600	40.09900	28.58496	5.22219	0.00038	0.16231	0.16269	0.30030
GLCM Dissimilarity Layer 4	33.00100	38.74400	34.49814	12.03387	0.17720	0.06634	0.24354	0.43230
GLCM Dissimilarity Layer 5	33.12000	35.85200	35.64009	14.10297	0.03751	0.05190	0.08941	0.17106
GLCM Dissimilarity Layer 6	31.16400	40.65100	32.60547	4.05334	0.61379	0.23325	0.84704	1.14263
GLCM Dissimilarity Layer 7	23.72400	27.65300	14.54818	9.18167	0.16263	0.01312	0.17576	0.32236
GLCM Dissimilarity Layer 8	32.70800	41.55000	31.99977	3.92704	0.54403	0.23576	0.77979	1.08300
GLCM Entropy Layer 1	34.70800	43.11900	21.19251	10.36894	0.56037	0.03128	0.59165	0.89318
GLCM Entropy Layer 2	35.57100	37.44500	57.83041	12.34829	0.01251	0.13619	0.14870	0.27635
GLCM Entropy Layer 3	6.97150	7.20030	0.06010	0.14702	0.06319	0.04844	0.11163	0.21124
GLCM Entropy Layer 4	7.13730	7.55770	0.06973	0.27969	0.12645	0.11198	0.23842	0.42426
GLCM Entropy Layer 5	6.94450	7.18090	0.06750	0.11267	0.07755	0.01623	0.09378	0.17903
GLCM Entropy Layer 6	7.50380	7.75800	0.18137	0.38845	0.02835	0.03541	0.06376	0.12354
GLCM Entropy Layer 7	6.09360	6.32080	0.15546	0.37300	0.02442	0.04642	0.07084	0.13677
GLCM Entropy Layer 8	4.67950	5.36390	0.20913	0.04587	0.45923	0.13187	0.59110	0.89257
GLCM Mean Layer 1	4.79510	5.62310	0.07212	0.04847	1.42127	0.00980	1.43108	1.52190
GLCM Mean Layer2	3.62000	3.72870	0.34819	0.24130	0.00501	0.00836	0.01337	0.02656
GLCM Mean Layer 3	128.18700	127.63100	1.15833	1.54123	0.02863	0.00508	0.03371	0.06629
GLCM Mean Layer 4	127.80300	127.78900	1.25413	5.31070	0.00001	0.12025	0.12026	0.22661
GLCM Mean Layer 5	127.76300	127.41700	1.51925	1.18873	0.01105	0.00375	0.01480	0.02939
GLCM Mean Layer 6	126.43800	126.85600	3.91073	7.88714	0.00370	0.03015	0.03385	0.06656
GLCM Mean Layer 7	127.80600	127.61100	0.78392	3.82963	0.00206	0.14310	0.14516	0.27023
GLCM Mean Layer 8	125.63200	126.17200	4.53173	6.41662	0.00666	0.00752	0.01418	0.02816
GLCM Correlation Layer 1	128.65100	127.77300	4.61679	5.24849	0.01954	0.00103	0.02056	0.04070
GLCM Correlation Layer 2	127.69000	127.75100	4.53136	1.14534	0.00016	0.10993	0.11009	0.20850
GLCM Correlation Layer 3	0.53505	0.54193	0.02085	0.00399	0.00048	0.15449	0.15496	0.28710
GLCM Correlation Layer 4	0.68206	0.58872	0.00834	0.00794	0.13373	0.00015	0.13388	0.25062
GLCM Correlation Layer 5	0.65596	0.62994	0.01320	0.00178	0.01130	0.21803	0.22933	0.40986
GLCM Correlation Layer 6	0.74075	0.57380	0.00649	0.00141	0.88301	0.13387	1.01687	1.27655
GLCM Correlation Layer 7	0.79586	0.76240	0.00420	0.00256	0.04145	0.01524	0.05669	0.11022
GLCM Correlation Layer 8	0.72115	0.57949	0.00771	0.00310	0.46423	0.05021	0.51445	0.80434

Table A28 J value perennial tree and orchard and paddy field.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1366.98100	1321.03100	5005.38201	8597.03472	0.03881	0.01807	0.05687	0.11057
Mean Layer 1	1279.21100	1304.21400	738.32725	442.12358	0.13240	0.01626	0.14865	0.27627
Mean Layer 2	1444.40500	1524.75100	2485.55389	913.79552	0.47476	0.06013	0.53489	0.82853
Mean Layer 3	1293.66600	1331.44600	4592.44727	1571.55178	0.05789	0.06867	0.12656	0.23776
Mean Layer 4	3934.46400	3676.98600	247864.91930	324461.02860	0.02896	0.00452	0.03348	0.06585
Mean Layer 5	2620.88000	2368.87000	118523.44450	40450.86540	0.09987	0.06900	0.16887	0.31076
Mean Layer 6	206.29700	197.51400	177.75476	195.67825	0.05164	0.00058	0.05222	0.10176
Mean Layer 7	73.90800	71.31400	316.99093	47.39534	0.00462	0.19818	0.20280	0.36712
Mean Layer 8	83.01000	93.14700	114.45838	65.04105	0.14312	0.01970	0.16282	0.30052
Max. diff.	2.82380	2.71520	0.07843	0.05576	0.02197	0.00724	0.02921	0.05758
Standard deviation Layer 1	15.89100	23.25300	24.80074	103.70462	0.10544	0.11831	0.22375	0.40097
Standard deviation Layer 2	22.72800	37.11800	38.41324	415.02597	0.11417	0.29267	0.40684	0.66850
Standard deviation Layer 3	22.28990	37.16500	194.49417	524.67636	0.07692	0.05918	0.13610	0.25449
Standard deviation Layer 4	126.34700	232.63600	537.95547	4277.92832	0.58646	0.23101	0.81748	1.11691
Standard deviation Layer 5	57.89300	78.78000	537.36591	1518.79980	0.05304	0.06464	0.11768	0.22204
Standard deviation Layer 6	3.22540	6.75160	0.88459	1.82859	1.14571	0.03226	1.17797	1.38419
Standard deviation Layer 7	3.25440	5.34680	0.44018	0.84514	0.85156	0.02614	0.87770	1.16852
Standard deviation Layer 8	1.83417	3.41510	0.47305	2.98850	0.18051	0.18773	0.36824	0.61610
Ration Layer 1	0.11731	0.12399	0.00005	0.00008	0.08077	0.01096	0.09173	0.17530
Ration Layer 2	0.13237	0.14482	0.00006	0.00008	0.26936	0.00408	0.27343	0.47847
Ration Layer 3	0.11862	0.12661	0.00009	0.00011	0.08026	0.00360	0.08386	0.16088
Ration Layer 4	0.35913	0.34623	0.00115	0.00081	0.02117	0.00763	0.02880	0.05677
Ration Layer 5	0.23927	0.22396	0.00066	0.00002	0.08669	0.54171	0.62840	0.93311
Ration Layer 6	0.01888	0.01869	0.00000	0.00000	0.00714	0.16175	0.16889	0.31080
Ration Layer 7	0.00677	0.00681	0.00000	0.00000	0.00009	0.04949	0.04958	0.09675
Ration Layer 8	0.00765	0.00890	0.00000	0.00000	0.10635	0.00029	0.10665	0.20231
Area	308.30000	127.30000	32593.34444	4486.67778	0.22088	0.21366	0.43454	0.70488
Border length	84.00000	64.00000	584.00000	326.22222	0.10986	0.02090	0.13076	0.24515
Width	16.27000	9.46880	18.30678	18.32484	0.31569	0.00000	0.31569	0.54142
Asymmetry	0.43772	0.58648	0.06217	0.10895	0.03233	0.01942	0.05175	0.10087
Border index	1.16470	1.24700	0.00978	0.02492	0.04880	0.05277	0.10157	0.19316
Shape index	1.23320	1.48400	0.01757	0.08576	0.15217	0.14292	0.29509	0.51107
GLCM Homogeneity Layer 1	0.02526	0.02684	0.00001	0.00007	0.00768	0.14580	0.15348	0.28456
GLCM Homogeneity Layer 2	0.03161	0.03102	0.00008	0.00016	0.00037	0.03713	0.03750	0.07361
GLCM Homogeneity Layer 3	0.03381	0.03272	0.00006	0.00029	0.00085	0.13566	0.13651	0.25520
GLCM Homogeneity Layer 4	0.03170	0.03085	0.00002	0.00004	0.00284	0.01839	0.02123	0.04201
GLCM Homogeneity Layer 5	0.25456	0.25038	0.00006	0.00008	0.03117	0.00200	0.03317	0.06526
GLCM Homogeneity Layer 6	0.09501	0.04793	0.00044	0.00010	1.02801	0.12104	1.14905	1.36612
GLCM Homogeneity Layer 7	1366.98100	1321.03100	5005.38201	8597.03472	0.03881	0.01807	0.05687	0.11057
GLCM Homogeneity Layer 8	1279.21100	1304.21400	738.32725	442.12358	0.13240	0.01626	0.14865	0.27627

Table A28 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.08631	0.05129	0.00025	0.00024	0.62896	0.00011	0.62907	0.93383
GLCM Contrast Layer 2	0.19886	0.10096	0.00491	0.00041	0.45063	0.31672	0.76735	1.07152
GLCM Contrast Layer 3	2667.94800	2522.80900	471380.52280	861951.58320	0.00395	0.02243	0.02638	0.05207
GLCM Contrast Layer 4	1912.37700	1919.87000	353896.56100	351187.18160	0.00002	0.00000	0.00002	0.00005
GLCM Contrast Layer 5	1971.07100	2116.22400	382827.40660	969739.43570	0.00389	0.05215	0.05605	0.10901
GLCM Contrast Layer 6	1746.48500	1746.53200	357465.99680	155852.09090	0.00000	0.04189	0.04189	0.08204
GLCM Contrast Layer 7	1392.14300	1751.64500	164675.59650	546012.97020	0.04546	0.08489	0.13035	0.24443
GLCM Contrast Layer 8	1867.86700	1792.04000	427959.51120	239048.23140	0.00216	0.02090	0.02306	0.04559
GLCM Dissimilarity Layer 1	2126.10200	2098.56000	321144.56370	208103.14920	0.00036	0.01167	0.01203	0.02392
GLCM Dissimilarity Layer2	2313.96400	1852.10900	841101.36930	332699.22740	0.04543	0.05194	0.09737	0.18556
GLCM Dissimilarity Layer 3	40.32600	38.81600	28.58496	64.21736	0.00614	0.03987	0.04602	0.08995
GLCM Dissimilarity Layer 4	33.00100	33.42600	34.49814	40.50734	0.00060	0.00161	0.00221	0.00442
GLCM Dissimilarity Layer 5	33.12000	33.95100	35.64009	87.62090	0.00140	0.04896	0.05036	0.09822
GLCM Dissimilarity Layer 6	31.16400	31.45100	32.60547	16.26548	0.00042	0.02964	0.03006	0.05922
GLCM Dissimilarity Layer 7	23.72400	27.74900	14.54818	40.27068	0.07388	0.06217	0.13605	0.25441
GLCM Dissimilarity Layer 8	32.70800	32.23800	31.99977	25.41635	0.00096	0.00331	0.00427	0.00852
GLCM Entropy Layer 1	34.70800	35.13300	21.19251	11.94529	0.00136	0.02027	0.02163	0.04280
GLCM Entropy Layer 2	35.57100	32.45900	57.83041	39.83365	0.02479	0.00864	0.03343	0.06575
GLCM Entropy Layer 3	6.97150	6.51230	0.06010	0.18287	0.21697	0.07371	0.29068	0.50449
GLCM Entropy Layer 4	7.13730	6.61840	0.06973	0.20432	0.24563	0.06899	0.31462	0.53987
GLCM Entropy Layer 5	6.94450	6.63920	0.06750	0.28551	0.06601	0.12008	0.18609	0.33961
GLCM Entropy Layer 6	7.50380	6.76010	0.18137	0.22184	0.34293	0.00253	0.34546	0.58421
GLCM Entropy Layer 7	6.09360	5.37560	0.15546	0.23476	0.33028	0.01054	0.34082	0.57763
GLCM Entropy Layer 8	4.67950	5.67340	0.20913	0.05179	0.94650	0.11299	1.05949	1.30673
GLCM Mean Layer 1	4.79510	5.42510	0.07212	0.06784	0.70897	0.00023	0.70920	1.01592
GLCM Mean Layer2	3.62000	4.55770	0.34819	0.18242	0.41428	0.02568	0.43996	0.71187
GLCM Mean Layer 3	128.18700	127.90600	1.15833	1.62600	0.00709	0.00715	0.01424	0.02829
GLCM Mean Layer 4	127.80300	128.16300	1.25413	1.50958	0.01172	0.00214	0.01387	0.02755
GLCM Mean Layer 5	127.76300	127.75800	1.51925	4.56848	0.00000	0.07222	0.07222	0.13934
GLCM Mean Layer 6	126.43800	127.35800	3.91073	12.21853	0.01312	0.07707	0.09019	0.17249
GLCM Mean Layer 7	127.80600	127.28500	0.78392	3.03856	0.01775	0.10689	0.12465	0.23438
GLCM Mean Layer 8	125.63200	126.84000	4.53173	13.14596	0.02064	0.06777	0.08841	0.16923
GLCM Correlation Layer 1	128.65100	126.96800	4.61679	11.23173	0.04468	0.04785	0.09253	0.17676
GLCM Correlation Layer 2	127.69000	127.53900	4.53136	10.98614	0.00037	0.04750	0.04786	0.09347
GLCM Correlation Layer 3	0.53505	0.57745	0.02085	0.03393	0.00820	0.01469	0.02289	0.04527
GLCM Correlation Layer 4	0.68206	0.67906	0.00834	0.01710	0.00009	0.03151	0.03159	0.06220
GLCM Correlation Layer 5	0.65596	0.66943	0.01320	0.01841	0.00143	0.00689	0.00832	0.01657
GLCM Correlation Layer 6	0.74075	0.75530	0.00649	0.00192	0.00630	0.08735	0.09365	0.17879
GLCM Correlation Layer 7	0.79586	0.76544	0.00420	0.00555	0.02372	0.00488	0.02861	0.05640
GLCM Correlation Layer 8	0.72115	0.74324	0.00771	0.00273	0.01169	0.06458	0.07627	0.14687

Table A29 J value perennial tree and orchard rangeland.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1366.98100	1401.62700	5005.38201	1182.33660	0.04850	0.12021	0.16871	0.31048
Mean Layer 1	1279.21100	1316.44200	738.32725	1022.57206	0.19680	0.00660	0.20340	0.36809
Mean Layer 2	1444.40500	1524.27900	2485.55389	2029.22079	0.35328	0.00257	0.35584	0.59884
Mean Layer 3	1293.66600	1335.04600	4592.44727	1991.59127	0.06502	0.04241	0.10743	0.20372
Mean Layer 4	3934.46400	3954.73300	247864.91930	21128.39829	0.00038	0.30989	0.31028	0.53351
Mean Layer 5	2620.88000	2718.93400	118523.44450	6964.61549	0.01915	0.39054	0.40970	0.67230
Mean Layer 6	206.29700	204.66400	177.75476	12.86756	0.00350	0.34479	0.34829	0.58821
Mean Layer 7	73.90800	77.11500	316.99093	7.75892	0.00792	0.59303	0.60094	0.90341
Mean Layer 8	83.01000	81.81000	114.45838	4.96431	0.00301	0.45914	0.46215	0.74015
Max. diff.	2.82380	2.76610	0.07843	0.00396	0.01010	0.42465	0.43475	0.70515
Standard deviation Layer 1	15.89100	30.99300	24.80074	159.92665	0.30866	0.19147	0.50013	0.78709
Standard deviation Layer 2	22.72800	52.49200	38.41324	224.32657	0.84294	0.17363	1.01657	1.27633
Standard deviation Layer 3	22.28990	56.89400	194.49417	1083.43332	0.23426	0.16535	0.39961	0.65883
Standard deviation Layer 4	126.34700	309.81100	537.95547	6500.71848	1.19550	0.31615	1.51166	1.55891
Standard deviation Layer 5	57.89300	98.15300	537.36591	813.30705	0.30001	0.01066	0.31067	0.53409
Standard deviation Layer 6	3.22540	8.45560	0.88459	10.67308	0.59171	0.31583	0.90753	1.19296
Standard deviation Layer 7	3.25440	7.65650	0.44018	3.58733	1.20288	0.23579	1.43867	1.52552
Standard deviation Layer 8	1.83417	3.88860	0.47305	4.69709	0.20409	0.27528	0.47937	0.76165
Ration Layer 1	0.11731	0.11744	0.00005	0.00001	0.00006	0.15145	0.15152	0.28119
Ration Layer 2	0.13237	0.13594	0.00006	0.00001	0.04625	0.28218	0.32842	0.55988
Ration Layer 3	0.11862	0.11905	0.00009	0.00001	0.00049	0.33002	0.33051	0.56289
Ration Layer 4	0.35913	0.35266	0.00115	0.00006	0.00864	0.42671	0.43535	0.70593
Ration Layer 5	0.23927	0.24247	0.00066	0.00001	0.00382	0.63791	0.64174	0.94724
Ration Layer 6	0.01888	0.01826	0.00000	0.00000	0.07356	0.09531	0.16887	0.31076
Ration Layer 7	0.00677	0.00688	0.00000	0.00000	0.00107	0.49592	0.49699	0.78328
Ration Layer 8	0.00765	0.00730	0.00000	0.00000	0.01513	0.48174	0.49687	0.78313
Area	308.30000	123.60000	32593.34444	3840.48889	0.23408	0.24375	0.47783	0.75975
Border length	84.00000	86.60000	584.00000	873.82222	0.00116	0.01008	0.01124	0.02236
Width	16.27000	12.18080	18.30678	23.87806	0.09910	0.00440	0.10350	0.19664
Asymmetry	0.43772	0.62722	0.06217	0.06069	0.07308	0.00004	0.07311	0.14101
Border index	1.16470	1.76590	0.00978	0.23248	0.37298	0.46612	0.83911	1.13581
Shape index	1.23320	2.01710	0.01757	0.40081	0.36719	0.45664	0.82383	1.12250
GLCM Homogeneity Layer 1	0.02526	0.02676	0.00001	0.00006	0.00722	0.13792	0.14515	0.27021
GLCM Homogeneity Layer 2	0.03161	0.02383	0.00008	0.00001	0.17964	0.24632	0.42596	0.69371
GLCM Homogeneity Layer 3	0.03381	0.03683	0.00006	0.00010	0.01360	0.01619	0.02979	0.05869
GLCM Homogeneity Layer 4	0.03170	0.02431	0.00002	0.00003	0.25731	0.00287	0.26018	0.45817
GLCM Homogeneity Layer 5	0.25456	0.24848	0.00006	0.00010	0.05766	0.01059	0.06826	0.13196
GLCM Homogeneity Layer 6	0.09501	0.03455	0.00044	0.00011	1.68095	0.11426	1.79521	1.66781
GLCM Homogeneity Layer 7	1366.98100	1401.62700	5005.38201	1182.33660	0.04850	0.12021	0.16871	0.31048
GLCM Homogeneity Layer 8	1279.21100	1316.44200	738.32725	1022.57206	0.19680	0.00660	0.20340	0.36809

Table A29 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.08631	0.02949	0.00025	0.00004	2.82380	0.19972	3.02352	1.90274
GLCM Contrast Layer 2	0.19886	0.08441	0.00491	0.00133	0.52432	0.09947	0.62379	0.92818
GLCM Contrast Layer 3	2667.94800	2456.83500	471380.52280	656967.37660	0.00987	0.00686	0.01673	0.03318
GLCM Contrast Layer 4	1912.37700	2376.29200	353896.56100	452281.99900	0.06674	0.00375	0.07049	0.13613
GLCM Contrast Layer 5	1971.07100	1930.86400	382827.40660	461552.86980	0.00048	0.00218	0.00266	0.00532
GLCM Contrast Layer 6	1746.48500	2424.00700	357465.99680	386301.68100	0.15429	0.00038	0.15467	0.28660
GLCM Contrast Layer 7	1392.14300	2418.07500	164675.59650	582673.99190	0.35209	0.09379	0.44588	0.71948
GLCM Contrast Layer 8	1867.86700	2152.12800	427959.51120	300436.01180	0.02773	0.00778	0.03552	0.06979
GLCM Dissimilarity Layer 1	2126.10200	2488.80500	321144.56370	329598.74770	0.05054	0.00004	0.05058	0.09865
GLCM Dissimilarity Layer2	2313.96400	2402.77400	841101.36930	864290.88640	0.00116	0.00005	0.00120	0.00240
GLCM Dissimilarity Layer 3	40.32600	37.89000	28.58496	47.56176	0.01948	0.01603	0.03551	0.06978
GLCM Dissimilarity Layer 4	33.00100	37.71500	34.49814	25.26965	0.09295	0.00603	0.09898	0.18848
GLCM Dissimilarity Layer 5	33.12000	32.47500	35.64009	37.50783	0.00142	0.00016	0.00158	0.00317
GLCM Dissimilarity Layer 6	31.16400	38.63400	32.60547	33.19985	0.21199	0.00002	0.21201	0.38209
GLCM Dissimilarity Layer 7	23.72400	33.89300	14.54818	35.67547	0.51474	0.04869	0.56343	0.86149
GLCM Dissimilarity Layer 8	32.70800	35.95900	31.99977	31.83543	0.04139	0.00000	0.04139	0.08110
GLCM Entropy Layer 1	34.70800	39.29400	21.19251	27.24956	0.10854	0.00394	0.11248	0.21277
GLCM Entropy Layer 2	35.57100	37.70700	57.83041	73.44047	0.00869	0.00356	0.01225	0.02435
GLCM Entropy Layer 3	6.97150	6.68920	0.06010	0.11894	0.11128	0.02858	0.13986	0.26104
GLCM Entropy Layer 4	7.13730	6.81690	0.06973	0.14442	0.11984	0.03242	0.15226	0.28247
GLCM Entropy Layer 5	6.94450	6.69390	0.06750	0.10714	0.08990	0.01323	0.10313	0.19598
GLCM Entropy Layer 6	7.50380	6.84400	0.18137	0.15071	0.32774	0.00214	0.32988	0.56198
GLCM Entropy Layer 7	6.09360	5.45730	0.15546	0.14034	0.34219	0.00065	0.34284	0.58050
GLCM Entropy Layer 8	4.67950	5.92890	0.20913	0.09354	1.28935	0.03941	1.32876	1.47039
GLCM Mean Layer 1	4.79510	5.93980	0.07212	0.02244	3.46432	0.08076	3.54508	1.94227
GLCM Mean Layer2	3.62000	4.67110	0.34819	0.66348	0.27302	0.02554	0.29856	0.51623
GLCM Mean Layer 3	128.18700	129.52300	1.15833	3.70265	0.09180	0.08004	0.17184	0.31577
GLCM Mean Layer 4	127.80300	130.02500	1.25413	3.24967	0.27406	0.05464	0.32870	0.56028
GLCM Mean Layer 5	127.76300	129.11800	1.51925	2.38615	0.11753	0.01263	0.13016	0.24410
GLCM Mean Layer 6	126.43800	128.09500	3.91073	14.24887	0.03780	0.09793	0.13572	0.25383
GLCM Mean Layer 7	127.80600	129.77200	0.78392	10.64784	0.08453	0.34115	0.42567	0.69334
GLCM Mean Layer 8	125.63200	127.06600	4.53173	10.47416	0.03426	0.04264	0.07690	0.14804
GLCM Correlation Layer 1	128.65100	126.93500	4.61679	9.83465	0.05094	0.03492	0.08586	0.16456
GLCM Correlation Layer 2	127.69000	127.37300	4.53136	4.75213	0.00271	0.00014	0.00285	0.00569
GLCM Correlation Layer 3	0.53505	0.59482	0.02085	0.02703	0.01866	0.00420	0.02286	0.04520
GLCM Correlation Layer 4	0.68206	0.63679	0.00834	0.01449	0.02244	0.01879	0.04123	0.08078
GLCM Correlation Layer 5	0.65596	0.68829	0.01320	0.01350	0.00979	0.00003	0.00982	0.01954
GLCM Correlation Layer 6	0.74075	0.62369	0.00649	0.00559	0.28371	0.00139	0.28509	0.49611
GLCM Correlation Layer 7	0.79586	0.65799	0.00420	0.00602	0.46502	0.00809	0.47311	0.75388
GLCM Correlation Layer 8	0.72115	0.66366	0.00771	0.00473	0.06645	0.01481	0.08126	0.15609

Table 30 J value perennial tree and orchard and water body.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1366.98100	1155.76800	5005.38201	14834.20397	0.56215	0.07040	0.63255	0.93753
Mean Layer 1	1279.21100	1665.12000	738.32725	26324.60884	1.37574	0.56072	1.93646	1.71157
Mean Layer 2	1444.40500	1982.50800	2485.55389	80686.62151	0.87035	0.53862	1.40896	1.51121
Mean Layer 3	1293.66600	1990.85000	4592.44727	136906.86820	0.85878	0.51865	1.37742	1.49554
Mean Layer 4	3934.46400	1743.95000	247864.91930	44851.55109	4.09812	0.16397	4.26209	1.97181
Mean Layer 5	2620.88000	1516.09200	118523.44450	31830.54168	2.02947	0.10104	2.13051	1.76245
Mean Layer 6	206.29700	80.77700	177.75476	298.80845	8.26505	0.01667	8.28172	1.99949
Mean Layer 7	73.90800	100.33600	316.99093	34.45612	0.49683	0.25982	0.75665	1.06153
Mean Layer 8	83.01000	166.52500	114.45838	322.91541	3.98672	0.06442	4.05114	1.96520
Max. diff.	2.82380	1.69900	0.07843	0.01505	3.38354	0.15389	3.53742	1.94182
Standard deviation Layer 1	15.89100	44.98700	24.80074	365.55569	0.54218	0.35888	0.90107	1.18773
Standard deviation Layer 2	22.72800	56.26400	38.41324	483.00212	0.53924	0.32459	0.86383	1.15691
Standard deviation Layer 3	22.28990	71.51700	194.49417	1136.50100	0.45517	0.17374	0.62891	0.93365
Standard deviation Layer 4	126.34700	124.18600	537.95547	8201.09163	0.00013	0.36626	0.36639	0.61353
Standard deviation Layer 5	57.89300	101.17200	537.36591	4690.16502	0.08958	0.24930	0.33888	0.57486
Standard deviation Layer 6	3.22540	9.15520	0.88459	41.82114	0.20584	0.62790	0.83374	1.13116
Standard deviation Layer 7	3.25440	6.25910	0.44018	12.05007	0.18071	0.49878	0.67948	0.98624
Standard deviation Layer 8	1.83417	7.36440	0.47305	16.17177	0.45935	0.55080	1.01015	1.27167
Ration Layer 1	0.11731	0.18055	0.00005	0.00013	5.54222	0.04194	5.58416	1.99249
Ration Layer 2	0.13237	0.21391	0.00006	0.00020	6.40901	0.07734	6.48635	1.99695
Ration Layer 3	0.11862	0.21386	0.00009	0.00038	4.83154	0.12485	4.95639	1.98592
Ration Layer 4	0.35913	0.18886	0.00115	0.00023	5.23615	0.14660	5.38275	1.99081
Ration Layer 5	0.23927	0.16483	0.00066	0.00039	1.32214	0.01643	1.33857	1.47556
Ration Layer 6	0.01888	0.00892	0.00000	0.00001	3.29122	0.19229	3.48351	1.93860
Ration Layer 7	0.00677	0.01101	0.00000	0.00000	0.81792	0.00044	0.81836	1.11769
Ration Layer 8	0.00765	0.01808	0.00000	0.00000	5.46002	0.01441	5.47443	1.99161
Area	308.30000	174.70000	32593.34444	39580.67778	0.06183	0.00235	0.06418	0.12433
Border length	84.00000	70.80000	584.00000	1643.73333	0.01955	0.06414	0.08369	0.16057
Width	16.27000	11.60410	18.30678	52.22826	0.07716	0.06576	0.14292	0.26635
Asymmetry	0.43772	0.51831	0.06217	0.07180	0.01212	0.00130	0.01341	0.02665
Border index	1.16470	1.35670	0.00978	0.05597	0.14017	0.17004	0.31021	0.53342
Shape index	1.23320	1.53370	0.01757	0.13578	0.14720	0.22544	0.37264	0.62218
GLCM Homogeneity Layer 1	0.02526	0.03437	0.00001	0.00020	0.09932	0.35383	0.45315	0.72875
GLCM Homogeneity Layer 2	0.03161	0.03283	0.00008	0.00008	0.00234	0.00043	0.00277	0.00554
GLCM Homogeneity Layer 3	0.03381	0.03311	0.00006	0.00010	0.00076	0.01443	0.01519	0.03016
GLCM Homogeneity Layer 4	0.03170	0.04096	0.00002	0.00032	0.06263	0.33853	0.40115	0.66090
GLCM Homogeneity Layer 5	0.25456	0.25455	0.00006	0.00038	0.00000	0.17922	0.17922	0.32816
GLCM Homogeneity Layer 6	0.09501	0.08887	0.00044	0.00392	0.00216	0.25515	0.25731	0.45374
GLCM Homogeneity Layer 7	1366.98100	1155.76800	5005.38201	14834.20397	0.56215	0.07040	0.63255	0.93753
GLCM Homogeneity Layer 8	1279.21100	1665.12000	738.32725	26324.60884	1.37574	0.56072	1.93646	1.71157

Table 30 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.08631	0.07695	0.00025	0.00694	0.00304	0.50325	0.50629	0.79454
GLCM Contrast Layer 2	0.19886	0.08867	0.00491	0.00769	0.24094	0.01242	0.25337	0.44764
GLCM Contrast Layer 3	2667.94800	2949.91900	471380.52280	1658584.28400	0.00933	0.09301	0.10234	0.19456
GLCM Contrast Layer 4	1912.37700	2943.11400	353896.56100	1596316.75400	0.13619	0.13016	0.26635	0.46766
GLCM Contrast Layer 5	1971.07100	2812.11500	382827.40660	1770516.09900	0.08212	0.13416	0.21629	0.38899
GLCM Contrast Layer 6	1746.48500	3376.09900	357465.99680	4700693.74700	0.13126	0.33418	0.46543	0.74427
GLCM Contrast Layer 7	1392.14300	4214.86200	164675.59650	8639713.87600	0.22624	0.65290	0.87915	1.16973
GLCM Contrast Layer 8	1867.86700	3357.36800	427959.51120	3781270.90300	0.13177	0.25173	0.38350	0.63706
GLCM Dissimilarity Layer 1	2126.10200	4218.78200	321144.56370	2756373.39800	0.35575	0.24598	0.60173	0.90427
GLCM Dissimilarity Layer2	2313.96400	3324.26000	841101.36930	3873154.13400	0.05413	0.13347	0.18759	0.34210
GLCM Dissimilarity Layer 3	40.32600	39.79000	28.58496	64.95211	0.00077	0.04097	0.04174	0.08176
GLCM Dissimilarity Layer 4	33.00100	39.71400	34.49814	78.66029	0.09956	0.04131	0.14087	0.26280
GLCM Dissimilarity Layer 5	33.12000	38.59100	35.64009	90.95588	0.05911	0.05297	0.11207	0.21204
GLCM Dissimilarity Layer 6	31.16400	40.06200	32.60547	319.45457	0.05622	0.27255	0.32878	0.56039
GLCM Dissimilarity Layer 7	23.72400	43.11500	14.54818	423.90292	0.21440	0.51331	0.72771	1.03397
GLCM Dissimilarity Layer 8	32.70800	40.48200	31.99977	226.24120	0.05851	0.20854	0.26705	0.46873
GLCM Entropy Layer 1	34.70800	47.54900	21.19251	179.76865	0.20513	0.24365	0.44878	0.72319
GLCM Entropy Layer 2	35.57100	40.89700	57.83041	252.31516	0.02287	0.12490	0.14776	0.27473
GLCM Entropy Layer 3	6.97150	6.39240	0.06010	0.90793	0.08661	0.36428	0.45089	0.72588
GLCM Entropy Layer 4	7.13730	6.30270	0.06973	0.78871	0.20285	0.30222	0.50507	0.79307
GLCM Entropy Layer 5	6.94450	6.36910	0.06750	0.76102	0.09990	0.30156	0.40147	0.66132
GLCM Entropy Layer 6	7.50380	6.35250	0.18137	0.98694	0.28363	0.16130	0.44493	0.71826
GLCM Entropy Layer 7	6.09360	5.02710	0.15546	1.25673	0.20136	0.23421	0.43557	0.70621
GLCM Entropy Layer 8	4.67950	4.80980	0.20913	0.78066	0.00429	0.10140	0.10569	0.20059
GLCM Mean Layer 1	4.79510	5.03550	0.07212	1.04399	0.01294	0.35494	0.36789	0.61561
GLCM Mean Layer2	3.62000	4.95240	0.34819	0.90127	0.35521	0.05452	0.40973	0.67234
GLCM Mean Layer 3	128.18700	120.18200	1.15833	26.93388	0.57026	0.46108	1.03135	1.28695
GLCM Mean Layer 4	127.80300	120.28300	1.25413	28.73082	0.47149	0.45767	0.92916	1.21023
GLCM Mean Layer 5	127.76300	120.14500	1.51925	29.07154	0.47428	0.41678	0.89106	1.17956
GLCM Mean Layer 6	126.43800	134.62600	3.91073	44.47787	0.34638	0.30338	0.64976	0.95566
GLCM Mean Layer 7	127.80600	137.11400	0.78392	67.37378	0.31779	0.77264	1.09043	1.32785
GLCM Mean Layer 8	125.63200	135.77400	4.53173	41.08383	0.56373	0.25687	0.82061	1.11967
GLCM Correlation Layer 1	128.65100	125.65400	4.61679	28.39267	0.06803	0.18287	0.25089	0.44379
GLCM Correlation Layer 2	127.69000	117.31200	4.53136	45.14084	0.54207	0.27595	0.81802	1.11739
GLCM Correlation Layer 3	0.53505	0.62461	0.02085	0.01744	0.05237	0.00198	0.05435	0.10581
GLCM Correlation Layer 4	0.68206	0.63036	0.00834	0.01748	0.02588	0.03341	0.05929	0.11513
GLCM Correlation Layer 5	0.65596	0.66236	0.01320	0.01971	0.00031	0.00997	0.01028	0.02046
GLCM Correlation Layer 6	0.74075	0.61083	0.00649	0.04281	0.08560	0.19575	0.28134	0.49046
GLCM Correlation Layer 7	0.79586	0.57458	0.00420	0.04566	0.24551	0.29408	0.53960	0.83403
GLCM Correlation Layer 8	0.72115	0.57500	0.00771	0.04770	0.09638	0.18396	0.28035	0.48895

Table 31 J value rangeland and building and settlement area.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1401.62700	1733.37600	1182.33660	17841.76287	1.44629	0.36402	1.81031	1.67279
Mean Layer 1	1316.44200	2012.19600	1022.57206	102497.45560	1.16903	0.81027	1.97930	1.72367
Mean Layer 2	1524.27900	2128.28300	2029.22079	40154.76871	2.16208	0.42435	2.58643	1.84942
Mean Layer 3	1335.04600	2104.12100	1991.59127	44005.89594	3.21472	0.44941	3.66413	1.94875
Mean Layer 4	3954.73300	3325.61000	21128.39829	179227.66370	0.49387	0.24366	0.73752	1.04340
Mean Layer 5	2718.93400	3932.11700	6964.61549	397830.64730	0.90899	0.67340	1.58239	1.58903
Mean Layer 6	204.66400	144.52200	12.86756	211.81677	4.02460	0.38317	4.40777	1.97564
Mean Layer 7	77.11500	130.92700	7.75892	586.06291	1.21911	0.74115	1.96026	1.71836
Mean Layer 8	81.81000	89.23200	4.96431	151.57566	0.08797	0.52424	0.61222	0.91570
Max. diff.	2.76610	2.25040	0.00396	0.05496	1.12853	0.34589	1.47443	1.54218
Standard deviation Layer 1	30.99300	230.48100	159.92665	10326.57254	0.94873	0.70305	1.65178	1.61658
Standard deviation Layer 2	52.49200	211.84300	224.32657	5707.42907	1.07020	0.48181	1.55201	1.57636
Standard deviation Layer 3	56.89400	250.84100	1083.43332	9955.20214	0.85190	0.25957	1.11147	1.34185
Standard deviation Layer 4	309.81100	248.94700	6500.71848	10936.52616	0.05311	0.01673	0.06984	0.13491
Standard deviation Layer 5	98.15300	259.32300	813.30705	10080.82249	0.59610	0.32154	0.91764	1.20108
Standard deviation Layer 6	8.45560	13.03910	10.67308	23.13802	0.15534	0.03652	0.19186	0.34915
Standard deviation Layer 7	7.65650	9.75780	3.58733	6.57930	0.10858	0.02265	0.13122	0.24596
Standard deviation Layer 8	3.88860	9.55800	4.69709	5.36850	0.79832	0.00111	0.79943	1.10083
Ration Layer 1	0.11744	0.14461	0.00001	0.00024	0.74589	0.45058	1.19647	1.39548
Ration Layer 2	0.13594	0.15334	0.00001	0.00002	2.54289	0.10661	2.64949	1.85863
Ration Layer 3	0.11905	0.15177	0.00001	0.00011	2.28785	0.38012	2.66798	1.86121
Ration Layer 4	0.35266	0.24105	0.00006	0.00124	2.40148	0.44304	2.84452	1.88368
Ration Layer 5	0.24247	0.28281	0.00001	0.00095	0.42165	0.72778	1.14943	1.36637
Ration Layer 6	0.01826	0.01055	0.00000	0.00000	5.04776	0.26576	5.31352	1.99015
Ration Layer 7	0.00688	0.00941	0.00000	0.00000	0.63564	0.47766	1.11330	1.34305
Ration Layer 8	0.00730	0.00652	0.00000	0.00000	0.12141	0.37356	0.49498	0.78083
Area	123.60000	28.50000	3840.48889	210.05556	0.55820	0.40655	0.96475	1.23784
Border length	86.60000	29.60000	873.82222	182.04444	0.76927	0.14020	0.90948	1.19453
Width	12.18080	5.14480	23.87806	4.96342	0.42912	0.14057	0.56969	0.86859
Asymmetry	0.62722	0.54890	0.06069	0.02142	0.01868	0.06493	0.08360	0.16041
Border index	1.76590	1.22590	0.23248	0.06811	0.24252	0.08881	0.33133	0.56406
Shape index	2.01710	1.38250	0.40081	0.08429	0.20754	0.13866	0.34620	0.58526
GLCM Homogeneity Layer 1	0.02676	0.01942	0.00006	0.00009	0.08920	0.00573	0.09492	0.18112
GLCM Homogeneity Layer 2	0.02383	0.01703	0.00001	0.00002	0.38624	0.04736	0.43360	0.70366
GLCM Homogeneity Layer 3	0.03683	0.01732	0.00010	0.00007	0.55225	0.01151	0.56376	0.86187
GLCM Homogeneity Layer 4	0.02431	0.01958	0.00003	0.00004	0.07705	0.00939	0.08644	0.16562
GLCM Homogeneity Layer 5	0.24848	0.23747	0.00010	0.00001	0.28282	0.25582	0.53864	0.83292
GLCM Homogeneity Layer 6	0.03455	0.02386	0.00011	0.00012	0.12620	0.00072	0.12691	0.23838
GLCM Homogeneity Layer 7	1401.62700	1733.37600	1182.33660	17841.76287	1.44629	0.36402	1.81031	1.67279
GLCM Homogeneity Layer 8	1316.44200	2012.19600	1022.57206	102497.45560	1.16903	0.81027	1.97930	1.72367

Table A31 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.02949	0.01925	0.00004	0.00005	0.31374	0.00349	0.31722	0.54366
GLCM Contrast Layer 2	0.08441	0.02049	0.00133	0.00006	0.73425	0.45954	1.19378	1.39386
GLCM Contrast Layer 3	2456.83500	4153.94800	656967.37660	2987749.23300	0.19756	0.13147	0.32903	0.56075
GLCM Contrast Layer 4	2376.29200	3812.36200	452281.99900	248119.21720	0.73611	0.02220	0.75831	1.06309
GLCM Contrast Layer 5	1930.86400	3643.05600	461552.86980	554849.58640	0.72107	0.00212	0.72319	1.02959
GLCM Contrast Layer 6	2424.00700	4235.65200	386301.68100	8617612.11100	0.09113	0.45159	0.54272	0.83767
GLCM Contrast Layer 7	2418.07500	3866.67100	582673.99190	1037410.32600	0.32381	0.02052	0.34433	0.58261
GLCM Contrast Layer 8	2152.12800	3303.85700	300436.01180	1729968.27900	0.16333	0.17115	0.33448	0.56857
GLCM Dissimilarity Layer 1	2488.80500	3672.56500	329598.74770	2363595.42100	0.13008	0.21121	0.34129	0.57830
GLCM Dissimilarity Layer2	2402.77400	3635.16300	864290.88640	457870.71920	0.28718	0.02481	0.31199	0.53602
GLCM Dissimilarity Layer 3	37.89000	50.47100	47.56176	126.05825	0.22791	0.05717	0.28508	0.49609
GLCM Dissimilarity Layer 4	37.71500	49.50300	25.26965	18.27436	0.79780	0.00654	0.80433	1.10523
GLCM Dissimilarity Layer 5	32.47500	48.23700	37.50783	26.47507	0.97073	0.00755	0.97828	1.24808
GLCM Dissimilarity Layer 6	38.63400	50.80200	33.19985	333.12315	0.10104	0.27742	0.37846	0.63018
GLCM Dissimilarity Layer 7	33.89300	45.42800	35.67547	32.63595	0.48695	0.00050	0.48744	0.77161
GLCM Dissimilarity Layer 8	35.95900	45.40200	31.83543	91.65382	0.18052	0.06685	0.24738	0.43831
GLCM Entropy Layer 1	39.29400	48.41700	27.24956	122.84625	0.13863	0.13007	0.26870	0.47125
GLCM Entropy Layer 2	37.70700	47.96700	73.44047	15.74456	0.29508	0.13554	0.43062	0.69979
GLCM Entropy Layer 3	6.68920	5.38880	0.11894	0.44333	0.75188	0.10118	0.85306	1.14778
GLCM Entropy Layer 4	6.81690	5.44580	0.14442	0.36527	0.92209	0.05199	0.97408	1.24492
GLCM Entropy Layer 5	6.69390	5.44010	0.10714	0.34440	0.87035	0.08077	0.95113	1.22739
GLCM Entropy Layer 6	6.84400	5.41310	0.15071	0.46131	0.83637	0.07446	0.91082	1.19561
GLCM Entropy Layer 7	5.45730	4.11910	0.14034	0.28992	1.04052	0.03220	1.07272	1.31584
GLCM Entropy Layer 8	5.92890	5.17550	0.09354	0.30699	0.35428	0.08351	0.43780	0.70909
GLCM Mean Layer 1	5.93980	5.18450	0.02244	0.37256	0.36107	0.38507	0.74614	1.05161
GLCM Mean Layer2	4.67110	5.19760	0.66348	0.34982	0.06839	0.02518	0.09357	0.17866
GLCM Mean Layer 3	129.52300	121.06300	3.70265	31.63656	0.50632	0.24508	0.75140	1.05659
GLCM Mean Layer 4	130.02500	121.70900	3.24967	17.79561	0.82151	0.16239	0.98390	1.25230
GLCM Mean Layer 5	129.11800	122.17000	2.38615	17.71024	0.60054	0.21774	0.81828	1.11762
GLCM Mean Layer 6	128.09500	128.81500	14.24887	86.08881	0.00129	0.17968	0.18097	0.33109
GLCM Mean Layer 7	129.77200	120.66500	10.64784	18.70474	0.70639	0.01958	0.72597	1.03229
GLCM Mean Layer 8	127.06600	133.27200	10.47416	8.64882	0.50351	0.00229	0.50580	0.79395
GLCM Correlation Layer 1	126.93500	121.60400	9.83465	56.98727	0.10633	0.17226	0.27858	0.48629
GLCM Correlation Layer 2	127.37300	123.89700	4.75213	50.60427	0.05457	0.28967	0.34423	0.58247
GLCM Correlation Layer 3	0.59482	0.46016	0.02703	0.00854	0.12746	0.07877	0.20623	0.37271
GLCM Correlation Layer 4	0.63679	0.44285	0.01449	0.01206	0.35416	0.00209	0.35625	0.59941
GLCM Correlation Layer 5	0.68829	0.48636	0.01350	0.02087	0.29656	0.01176	0.30832	0.53065
GLCM Correlation Layer 6	0.62369	0.52938	0.00559	0.02899	0.06431	0.15311	0.21742	0.39082
GLCM Correlation Layer 7	0.65799	0.48757	0.00602	0.02347	0.24623	0.10770	0.35392	0.59614
GLCM Correlation Layer 8	0.66366	0.58107	0.00473	0.02613	0.05526	0.16406	0.21932	0.39387

Table A32 J value rangeland and field crop.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1401.62700	1519.20600	1182.33660	7791.45380	0.38514	0.19545	0.58059	0.88087
Mean Layer 1	1316.44200	1407.32200	1022.57206	1706.01482	0.75673	0.01620	0.77292	1.07668
Mean Layer 2	1524.27900	1669.33600	2029.22079	3772.87214	0.90664	0.02366	0.93030	1.21113
Mean Layer 3	1335.04600	1516.93200	1991.59127	21117.63853	0.35789	0.28878	0.64667	0.95243
Mean Layer 4	3954.73300	4176.82400	21128.39829	660161.72103	0.01810	0.52964	0.54774	0.84349
Mean Layer 5	2718.93400	3019.85800	6964.61549	56229.48708	0.35824	0.23396	0.59220	0.89379
Mean Layer 6	204.66400	196.21400	12.86756	602.17883	0.02902	0.62546	0.65448	0.96058
Mean Layer 7	77.11500	83.49200	7.75892	455.70677	0.02194	0.68012	0.70206	1.00887
Mean Layer 8	81.81000	83.66300	4.96431	61.38982	0.01294	0.32105	0.33399	0.56787
Max. diff.	2.76610	2.69950	0.00396	0.14298	0.00755	0.56381	0.57136	0.87049
Standard deviation Layer 1	30.99300	26.41000	159.92665	121.75531	0.01864	0.00463	0.02328	0.04601
Standard deviation Layer 2	52.49200	40.28400	224.32657	285.62138	0.07306	0.00364	0.07670	0.14767
Standard deviation Layer 3	56.89400	54.79900	1083.43332	825.13468	0.00057	0.00462	0.00520	0.01037
Standard deviation Layer 4	309.81100	185.98400	6500.71848	3112.73600	0.39874	0.03315	0.43190	0.70145
Standard deviation Layer 5	98.15300	83.75800	813.30705	1212.12617	0.02558	0.00989	0.03546	0.06968
Standard deviation Layer 6	8.45560	6.06310	10.67308	8.87132	0.07322	0.00213	0.07535	0.14517
Standard deviation Layer 7	7.65650	5.19310	3.58733	3.41751	0.21658	0.00015	0.21672	0.38969
Standard deviation Layer 8	3.88860	2.87180	4.69709	3.00483	0.03356	0.01237	0.04593	0.08978
Ration Layer 1	0.11744	0.11622	0.00001	0.00007	0.00462	0.19479	0.19941	0.36157
Ration Layer 2	0.13594	0.13776	0.00001	0.00009	0.00862	0.35860	0.36722	0.61468
Ration Layer 3	0.11905	0.12551	0.00001	0.00028	0.03638	0.59534	0.63172	0.93664
Ration Layer 4	0.35266	0.34173	0.00006	0.00244	0.01196	0.60137	0.61333	0.91691
Ration Layer 5	0.24247	0.24878	0.00001	0.00038	0.02531	0.50857	0.53388	0.82735
Ration Layer 6	0.01826	0.01612	0.00000	0.00000	4.08668	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 7	0.00688	0.00694	0.00000	0.00000	0.00943	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 8	0.00730	0.00693	0.00000	0.00000	0.44864	#DIV/0!	#DIV/0!	#DIV/0!
Area	123.60000	222.30000	3840.48889	9300.23333	0.18533	0.04737	0.23271	0.41523
Border length	86.60000	89.00000	873.82222	253.55556	0.00128	0.09014	0.09141	0.17472
Width	12.18080	13.50670	23.87806	36.01383	0.00734	0.01048	0.01782	0.03532
Asymmetry	0.62722	0.61741	0.06069	0.06772	0.00019	0.00075	0.00094	0.00188
Border index	1.76590	1.34440	0.23248	0.01607	0.17870	0.35481	0.53351	0.82691
Shape index	2.01710	1.56960	0.40081	0.09491	0.10099	0.11983	0.22082	0.39628
GLCM Homogeneity Layer 1	0.02676	0.03142	0.00006	0.00009	0.03527	0.00710	0.04237	0.08296
GLCM Homogeneity Layer 2	0.02383	0.03542	0.00001	0.00004	0.68784	0.13190	0.81974	1.11891
GLCM Homogeneity Layer 3	0.03683	0.03558	0.00010	0.00005	0.00252	0.03316	0.03568	0.07009
GLCM Homogeneity Layer 4	0.02431	0.03205	0.00003	0.00002	0.30302	0.00919	0.31221	0.53635
GLCM Homogeneity Layer 5	0.24848	0.25653	0.00010	0.00002	0.13911	0.14098	0.28009	0.48857
GLCM Homogeneity Layer 6	0.03455	0.07105	0.00011	0.00186	0.16929	0.39492	0.56421	0.86238
GLCM Homogeneity Layer 7	1401.62700	1519.20600	1182.33660	7791.45380	0.38514	0.19545	0.58059	0.88087
GLCM Homogeneity Layer 8	1316.44200	1407.32200	1022.57206	1706.01482	0.75673	0.01620	0.77292	1.07668

Table 32 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.02949	0.06888	0.00004	0.00087	0.42774	0.46426	0.89200	1.18033
GLCM Contrast Layer 2	0.08441	0.12134	0.00133	0.00366	0.06827	0.06117	0.12944	0.24282
GLCM Contrast Layer 3	2456.83500	1997.14400	656967.37660	333414.92043	0.05334	0.02822	0.08156	0.15664
GLCM Contrast Layer 4	2376.29200	1844.71100	452281.99900	181066.55065	0.11154	0.05064	0.16219	0.29943
GLCM Contrast Layer 5	1930.86400	1660.13000	461552.86980	267203.10244	0.02514	0.01844	0.04359	0.08531
GLCM Contrast Layer 6	2424.00700	1799.18100	386301.68100	40511.59017	0.22868	0.26705	0.49572	0.78174
GLCM Contrast Layer 7	2418.07500	1448.58300	582673.99190	163903.01402	0.31474	0.09445	0.40919	0.67163
GLCM Contrast Layer 8	2152.12800	1854.38300	300436.01180	87701.09291	0.05710	0.08931	0.14641	0.27240
GLCM Dissimilarity Layer 1	2488.80500	1886.69700	329598.74770	152586.25722	0.18796	0.03619	0.22415	0.40161
GLCM Dissimilarity Layer2	2402.77400	2227.62900	864290.88640	213011.79312	0.00712	0.11372	0.12084	0.22765
GLCM Dissimilarity Layer 3	37.89000	33.72900	47.56176	31.58301	0.05469	0.01040	0.06509	0.12604
GLCM Dissimilarity Layer 4	37.71500	31.46700	25.26965	14.90920	0.24290	0.01720	0.26010	0.45805
GLCM Dissimilarity Layer 5	32.47500	30.05500	37.50783	23.48709	0.02400	0.01357	0.03758	0.07376
GLCM Dissimilarity Layer 6	38.63400	31.64100	33.19985	2.99374	0.33778	0.29810	0.63588	0.94106
GLCM Dissimilarity Layer 7	33.89300	24.63400	35.67547	15.74749	0.41678	0.04068	0.45747	0.73423
GLCM Dissimilarity Layer 8	35.95900	32.96200	31.83543	5.78997	0.05968	0.16309	0.22277	0.39940
GLCM Entropy Layer 1	39.29400	32.91900	27.24956	12.43899	0.25600	0.03749	0.29349	0.50868
GLCM Entropy Layer 2	37.70700	36.31200	73.44047	19.13144	0.00526	0.10547	0.11072	0.20963
GLCM Entropy Layer 3	6.68920	6.96510	0.11894	0.13964	0.07359	0.00161	0.07520	0.14489
GLCM Entropy Layer 4	6.81690	7.03680	0.14442	0.19496	0.03562	0.00561	0.04123	0.08078
GLCM Entropy Layer 5	6.69390	7.11650	0.10714	0.15457	0.17060	0.00835	0.17895	0.32770
GLCM Entropy Layer 6	6.84400	7.26090	0.15071	0.14770	0.14561	0.00003	0.14564	0.27106
GLCM Entropy Layer 7	5.45730	5.91170	0.14034	0.13357	0.18845	0.00015	0.18861	0.34377
GLCM Entropy Layer 8	5.92890	5.42650	0.09354	0.71961	0.07760	0.22460	0.30220	0.52162
GLCM Mean Layer 1	5.93980	5.39460	0.02244	0.32784	0.21215	0.35697	0.56912	0.86795
GLCM Mean Layer2	4.67110	4.29780	0.66348	0.59166	0.02776	0.00082	0.02858	0.05634
GLCM Mean Layer 3	129.52300	127.10500	3.70265	2.01281	0.25574	0.02287	0.27861	0.48633
GLCM Mean Layer 4	130.02500	127.11500	3.24967	2.73161	0.35394	0.00188	0.35582	0.59881
GLCM Mean Layer 5	129.11800	127.24700	2.38615	1.71762	0.21326	0.00672	0.21998	0.39493
GLCM Mean Layer 6	128.09500	126.55900	14.24887	2.21945	0.03582	0.19066	0.22648	0.40532
GLCM Mean Layer 7	129.77200	127.26600	10.64784	2.87492	0.11610	0.10027	0.21637	0.38912
GLCM Mean Layer 8	127.06600	125.86600	10.47416	2.84209	0.02703	0.09956	0.12659	0.23781
GLCM Correlation Layer 1	126.93500	127.85500	9.83465	3.46456	0.01591	0.06515	0.08107	0.15573
GLCM Correlation Layer 2	127.37300	126.89400	4.75213	4.69514	0.00607	0.00001	0.00608	0.01212
GLCM Correlation Layer 3	0.59482	0.64018	0.02703	0.01003	0.01388	0.05906	0.07294	0.14068
GLCM Correlation Layer 4	0.63679	0.67954	0.01449	0.00569	0.02264	0.05271	0.07535	0.14517
GLCM Correlation Layer 5	0.68829	0.72606	0.01350	0.00489	0.01939	0.06188	0.08127	0.15611
GLCM Correlation Layer 6	0.62369	0.70700	0.00559	0.00066	0.27768	0.24330	0.52099	0.81213
GLCM Correlation Layer 7	0.65799	0.78780	0.00602	0.00486	0.38715	0.00286	0.39001	0.64590
GLCM Correlation Layer 8	0.66366	0.71401	0.00473	0.00136	0.10414	0.09128	0.19542	0.35502

Table A33 J value rangeland and forest area.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1401.62700	1361.15700	1182.33660	4860.82820	0.06776	0.11571	0.18347	0.33525
Mean Layer 1	1316.44200	1283.41800	1022.57206	932.59988	0.13945	0.00053	0.13998	0.26125
Mean Layer 2	1524.27900	1451.23000	2029.22079	2841.38796	0.27390	0.00705	0.28095	0.48986
Mean Layer 3	1335.04600	1275.86900	1991.59127	1190.61388	0.27512	0.01636	0.29148	0.50569
Mean Layer 4	3954.73300	3922.79500	21128.39829	92203.98903	0.00225	0.12493	0.12718	0.23886
Mean Layer 5	2718.93400	2592.84400	6964.61549	28402.83169	0.11238	0.11449	0.22687	0.40595
Mean Layer 6	204.66400	207.83400	12.86756	22.27116	0.07149	0.01858	0.09007	0.17227
Mean Layer 7	77.11500	73.12300	7.75892	7.00273	0.26989	0.00066	0.27055	0.47407
Mean Layer 8	81.81000	82.14200	4.96431	11.69544	0.00165	0.04456	0.04621	0.09032
Max. diff.	2.76610	2.82510	0.00396	0.00680	0.08090	0.01808	0.09898	0.18847
Standard deviation Layer 1	30.99300	17.33500	159.92665	13.73434	0.26854	0.30833	0.57687	0.87669
Standard deviation Layer 2	52.49200	29.48300	224.32657	25.58353	0.52960	0.25021	0.77982	1.08302
Standard deviation Layer 3	56.89400	19.48600	1083.43332	57.75680	0.30656	0.41231	0.71886	1.02539
Standard deviation Layer 4	309.81100	191.51100	6500.71848	1215.10192	0.45345	0.15838	0.61183	0.91528
Standard deviation Layer 5	98.15300	54.31100	813.30705	225.78528	0.46245	0.09630	0.55876	0.85616
Standard deviation Layer 6	8.45560	3.95300	10.67308	0.47401	0.45468	0.45372	0.90839	1.19366
Standard deviation Layer 7	7.65650	4.55540	3.58733	0.61919	0.57154	0.17223	0.74377	1.04936
Standard deviation Layer 8	3.88860	1.76970	4.69709	0.31491	0.22395	0.36147	0.58542	0.88626
Ration Layer 1	0.11744	0.11805	0.00001	0.00002	0.00297	0.02706	0.03003	0.05916
Ration Layer 2	0.13594	0.13337	0.00001	0.00001	0.11502	0.00556	0.12058	0.22718
Ration Layer 3	0.11905	0.11732	0.00001	0.00001	0.03760	0.02663	0.06423	0.12442
Ration Layer 4	0.35266	0.35987	0.00006	0.00010	0.08389	0.01687	0.10077	0.19171
Ration Layer 5	0.24247	0.23800	0.00001	0.00002	0.15797	0.00634	0.16431	0.30304
Ration Layer 6	0.01826	0.01911	0.00000	0.00000	0.27928	0.00426	0.28353	0.49377
Ration Layer 7	0.00688	0.00673	0.00000	0.00000	0.01727	0.04005	0.05732	0.11142
Ration Layer 8	0.00730	0.00757	0.00000	0.00000	0.03994	0.15166	0.19159	0.34871
Area	123.60000	396.60000	3840.48889	58820.71111	0.29735	0.36727	0.66462	0.97106
Border length	86.60000	140.00000	873.82222	2475.55556	0.21284	0.06492	0.27776	0.48504
Width	12.18080	20.40440	23.87806	43.33958	0.25152	0.02189	0.27341	0.47844
Asymmetry	0.62722	0.53568	0.06069	0.05233	0.01854	0.00137	0.01991	0.03942
Border index	1.76590	1.69850	0.23248	0.05526	0.00395	0.11925	0.12319	0.23182
Shape index	2.01710	1.83230	0.40081	0.08368	0.01762	0.13985	0.15748	0.29141
GLCM Homogeneity Layer 1	0.02676	0.02320	0.00006	0.00001	0.04227	0.17502	0.21730	0.39062
GLCM Homogeneity Layer 2	0.02383	0.02264	0.00001	0.00001	0.01618	0.01138	0.02756	0.05438
GLCM Homogeneity Layer 3	0.03683	0.02516	0.00010	0.00006	0.20161	0.01440	0.21600	0.38853
GLCM Homogeneity Layer 4	0.02431	0.02139	0.00003	0.00001	0.05274	0.05636	0.10910	0.20673
GLCM Homogeneity Layer 5	0.24848	0.25190	0.00010	0.00002	0.02437	0.11524	0.13961	0.26060
GLCM Homogeneity Layer 6	0.03455	0.04940	0.00011	0.00010	0.26937	0.00056	0.26993	0.47314
GLCM Homogeneity Layer 7	1401.62700	1361.15700	1182.33660	4860.82820	0.06776	0.11571	0.18347	0.33525
GLCM Homogeneity Layer 8	1316.44200	1283.41800	1022.57206	932.59988	0.13945	0.00053	0.13998	0.26125

Table A33 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.02949	0.04146	0.00004	0.00008	0.30480	0.03707	0.34187	0.57913
GLCM Contrast Layer 2	0.08441	0.15928	0.00133	0.00180	0.44769	0.00554	0.45322	0.72885
GLCM Contrast Layer 3	2456.83500	2574.37300	656967.37660	73489.04847	0.00473	0.25407	0.25880	0.45604
GLCM Contrast Layer 4	2376.29200	2460.72800	452281.99900	177072.49820	0.00283	0.05306	0.05589	0.10871
GLCM Contrast Layer 5	1930.86400	2108.30700	461552.86980	108952.22130	0.01380	0.12031	0.13411	0.25101
GLCM Contrast Layer 6	2424.00700	2672.58900	386301.68100	44149.58097	0.03589	0.24979	0.28568	0.49700
GLCM Contrast Layer 7	2418.07500	1645.13500	582673.99190	119103.88290	0.21283	0.14333	0.35616	0.59928
GLCM Contrast Layer 8	2152.12800	2729.50400	300436.01180	79518.72916	0.21934	0.10315	0.32249	0.55131
GLCM Dissimilarity Layer 1	2488.80500	2973.43200	329598.74770	198792.39400	0.11112	0.01581	0.12693	0.23841
GLCM Dissimilarity Layer2	2402.77400	2283.70700	864290.88640	141961.03300	0.00352	0.18105	0.18458	0.33709
GLCM Dissimilarity Layer 3	37.89000	40.09900	47.56176	5.22219	0.02311	0.25779	0.28091	0.48980
GLCM Dissimilarity Layer 4	37.71500	38.74400	25.26965	12.03387	0.00710	0.03364	0.04073	0.07983
GLCM Dissimilarity Layer 5	32.47500	35.85200	37.50783	14.10297	0.05524	0.05756	0.11280	0.21334
GLCM Dissimilarity Layer 6	38.63400	40.65100	33.19985	4.05334	0.02730	0.23677	0.26407	0.46417
GLCM Dissimilarity Layer 7	33.89300	27.65300	35.67547	9.18167	0.21701	0.10725	0.32426	0.55387
GLCM Dissimilarity Layer 8	35.95900	41.55000	31.83543	3.92704	0.21852	0.23476	0.45328	0.72892
GLCM Entropy Layer 1	39.29400	43.11900	27.24956	10.36894	0.09723	0.05621	0.15344	0.28450
GLCM Entropy Layer 2	37.70700	37.44500	73.44047	12.34829	0.00020	0.17687	0.17707	0.32456
GLCM Entropy Layer 3	6.68920	7.20030	0.11894	0.14702	0.24555	0.00280	0.24835	0.43983
GLCM Entropy Layer 4	6.81690	7.55770	0.14442	0.27969	0.32349	0.02682	0.35032	0.59107
GLCM Entropy Layer 5	6.69390	7.18090	0.10714	0.11267	0.26974	0.00016	0.26990	0.47308
GLCM Entropy Layer 6	6.84400	7.75800	0.15071	0.38845	0.38736	0.05406	0.44142	0.71375
GLCM Entropy Layer 7	5.45730	6.32080	0.14034	0.37300	0.36313	0.05748	0.42061	0.68671
GLCM Entropy Layer 8	5.92890	5.36390	0.09354	0.04587	0.57245	0.03110	0.60355	0.90626
GLCM Mean Layer 1	5.93980	5.62310	0.02244	0.04847	0.35361	0.03620	0.38981	0.64563
GLCM Mean Layer2	4.67110	3.72870	0.66348	0.24130	0.24540	0.06139	0.30679	0.52838
GLCM Mean Layer 3	129.52300	127.63100	3.70265	1.54123	0.17066	0.04655	0.21721	0.39048
GLCM Mean Layer 4	130.02500	127.78900	3.24967	5.31070	0.14601	0.01493	0.16094	0.29732
GLCM Mean Layer 5	129.11800	127.41700	2.38615	1.18873	0.20234	0.02975	0.23209	0.41425
GLCM Mean Layer 6	128.09500	126.85600	14.24887	7.88714	0.01734	0.02155	0.03889	0.07628
GLCM Mean Layer 7	129.77200	127.61100	10.64784	3.82963	0.08064	0.06269	0.14333	0.26707
GLCM Mean Layer 8	127.06600	126.17200	10.47416	6.41662	0.01183	0.01486	0.02669	0.05267
GLCM Correlation Layer 1	126.93500	127.77300	9.83465	5.24849	0.01164	0.02425	0.03589	0.07051
GLCM Correlation Layer 2	127.37300	127.75100	4.75213	1.14534	0.00606	0.11711	0.12317	0.23178
GLCM Correlation Layer 3	0.59482	0.54193	0.02703	0.00399	0.02255	0.20070	0.22325	0.40017
GLCM Correlation Layer 4	0.63679	0.58872	0.01449	0.00794	0.02575	0.02224	0.04800	0.09373
GLCM Correlation Layer 5	0.68829	0.62994	0.01350	0.00178	0.05571	0.22235	0.27806	0.48550
GLCM Correlation Layer 6	0.62369	0.57380	0.00559	0.00141	0.08897	0.11073	0.19970	0.36205
GLCM Correlation Layer 7	0.65799	0.76240	0.00602	0.00256	0.31776	0.04457	0.36234	0.60790
GLCM Correlation Layer 8	0.66366	0.57949	0.00473	0.00310	0.22636	0.01106	0.23742	0.42267

Table A34 J value rangeland and paddy field.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1401.62700	1321.03100	1182.33660	8597.03472	0.16606	0.21384	0.37989	0.63213
Mean Layer 1	1316.44200	1304.21400	1022.57206	442.12358	0.02552	0.04271	0.06823	0.13191
Mean Layer 2	1524.27900	1524.75100	2029.22079	913.79552	0.00002	0.03877	0.03879	0.07609
Mean Layer 3	1335.04600	1331.44600	1991.59127	1571.55178	0.00091	0.00350	0.00441	0.00880
Mean Layer 4	3954.73300	3676.98600	21128.39829	324461.02860	0.05581	0.36786	0.42366	0.69071
Mean Layer 5	2718.93400	2368.87000	6964.61549	40450.86540	0.64612	0.17267	0.81879	1.11807
Mean Layer 6	204.66400	197.51400	12.86756	195.67825	0.06128	0.36571	0.42699	0.69507
Mean Layer 7	77.11500	71.31400	7.75892	47.39534	0.15253	0.18165	0.33419	0.56816
Mean Layer 8	81.81000	93.14700	4.96431	65.04105	0.45899	0.33339	0.79238	1.09447
Max. diff.	2.76610	2.71520	0.00396	0.05576	0.01085	0.34902	0.35987	0.60446
Standard deviation Layer 1	30.99300	23.25300	159.92665	103.70462	0.05681	0.01164	0.06845	0.13231
Standard deviation Layer 2	52.49200	37.11800	224.32657	415.02597	0.09242	0.02329	0.11571	0.21854
Standard deviation Layer 3	56.89400	37.16500	1083.43332	524.67636	0.06051	0.03217	0.09268	0.17702
Standard deviation Layer 4	309.81100	232.63600	6500.71848	4277.92832	0.13814	0.01086	0.14901	0.27687
Standard deviation Layer 5	98.15300	78.78000	813.30705	1518.79980	0.04023	0.02399	0.06423	0.12442
Standard deviation Layer 6	8.45560	6.75160	10.67308	1.82859	0.05806	0.17354	0.23161	0.41348
Standard deviation Layer 7	7.65650	5.34680	3.58733	0.84514	0.30089	0.12062	0.42150	0.68788
Standard deviation Layer 8	3.88860	3.41510	4.69709	2.98850	0.00729	0.01267	0.01996	0.03953
Ration Layer 1	0.11744	0.12399	0.00001	0.00008	0.11408	0.22775	0.34183	0.57906
Ration Layer 2	0.13594	0.14482	0.00001	0.00008	0.22609	0.33600	0.56209	0.85996
Ration Layer 3	0.11905	0.12661	0.00001	0.00011	0.12097	0.38238	0.50335	0.79099
Ration Layer 4	0.35266	0.34623	0.00006	0.00081	0.01188	0.34903	0.36091	0.60592
Ration Layer 5	0.24247	0.22396	0.00001	0.00002	2.57579	0.01016	2.58595	1.84935
Ration Layer 6	0.01826	0.01869	0.00000	0.00000	0.09974	0.01106	0.11080	0.20977
Ration Layer 7	0.00688	0.00681	0.00000	0.00000	0.00111	0.29532	0.29643	0.51307
Ration Layer 8	0.00730	0.00890	0.00000	0.00000	0.34439	0.46594	0.81033	1.11058
Area	123.60000	127.30000	3840.48889	4486.67778	0.00041	0.00151	0.00192	0.00384
Border length	86.60000	64.00000	873.82222	326.22222	0.10640	0.05837	0.16477	0.30383
Width	12.18080	9.46880	23.87806	18.32484	0.04357	0.00437	0.04794	0.09361
Asymmetry	0.62722	0.58648	0.06069	0.10895	0.00245	0.02110	0.02355	0.04654
Border index	1.76590	1.24700	0.23248	0.02492	0.26152	0.26265	0.52417	0.81591
Shape index	2.01710	1.48400	0.40081	0.08576	0.14602	0.13585	0.28187	0.49125
GLCM Homogeneity Layer 1	0.02676	0.02684	0.00006	0.00007	0.00001	0.00014	0.00015	0.00031
GLCM Homogeneity Layer 2	0.02383	0.03102	0.00001	0.00016	0.07442	0.41235	0.48677	0.77079
GLCM Homogeneity Layer 3	0.03683	0.03272	0.00010	0.00029	0.01065	0.06345	0.07410	0.14285
GLCM Homogeneity Layer 4	0.02431	0.03085	0.00003	0.00004	0.15189	0.00683	0.15872	0.29352
GLCM Homogeneity Layer 5	0.24848	0.25038	0.00010	0.00008	0.00522	0.00342	0.00864	0.01720
GLCM Homogeneity Layer 6	0.03455	0.04793	0.00011	0.00010	0.21343	0.00012	0.21355	0.38457
GLCM Homogeneity Layer 7	1401.62700	1321.03100	1182.33660	8597.03472	0.16606	0.21384	0.37989	0.63213
GLCM Homogeneity Layer 8	1316.44200	1304.21400	1022.57206	442.12358	0.02552	0.04271	0.06823	0.13191

Table A34 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.02949	0.05129	0.00004	0.00024	0.43128	0.19189	0.62317	0.92751
GLCM Contrast Layer 2	0.08441	0.10096	0.00133	0.00041	0.03937	0.08384	0.12320	0.23183
GLCM Contrast Layer 3	2456.83500	2522.80900	656967.37660	861951.58320	0.00072	0.00460	0.00531	0.01059
GLCM Contrast Layer 4	2376.29200	1919.87000	452281.99900	351187.18160	0.06482	0.00399	0.06881	0.13299
GLCM Contrast Layer 5	1930.86400	2116.22400	461552.86980	969739.43570	0.00600	0.03369	0.03969	0.07782
GLCM Contrast Layer 6	2424.00700	1746.53200	386301.68100	155852.09090	0.21164	0.04982	0.26146	0.46015
GLCM Contrast Layer 7	2418.07500	1751.64500	582673.99190	546012.97020	0.09837	0.00026	0.09864	0.18786
GLCM Contrast Layer 8	2152.12800	1792.04000	300436.01180	239048.23140	0.06009	0.00326	0.06334	0.12276
GLCM Dissimilarity Layer 1	2488.80500	2098.56000	329598.74770	208103.14920	0.07081	0.01310	0.08391	0.16097
GLCM Dissimilarity Layer2	2402.77400	1852.10900	864290.88640	332699.22740	0.06333	0.05492	0.11825	0.22306
GLCM Dissimilarity Layer 3	37.89000	38.81600	47.56176	64.21736	0.00192	0.00561	0.00753	0.01501
GLCM Dissimilarity Layer 4	37.71500	33.42600	25.26965	40.50734	0.06992	0.01379	0.08371	0.16060
GLCM Dissimilarity Layer 5	32.47500	33.95100	37.50783	87.62090	0.00435	0.04371	0.04806	0.09384
GLCM Dissimilarity Layer 6	38.63400	31.45100	33.19985	16.26548	0.26077	0.03116	0.29193	0.50636
GLCM Dissimilarity Layer 7	33.89300	27.74900	35.67547	40.27068	0.12426	0.00092	0.12518	0.23532
GLCM Dissimilarity Layer 8	35.95900	32.23800	31.83543	25.41635	0.06046	0.00316	0.06362	0.12328
GLCM Entropy Layer 1	39.29400	35.13300	27.24956	11.94529	0.11043	0.04136	0.15179	0.28166
GLCM Entropy Layer 2	37.70700	32.45900	73.44047	39.83365	0.06079	0.02303	0.08382	0.16081
GLCM Entropy Layer 3	6.68920	6.51230	0.11894	0.18287	0.02592	0.01148	0.03740	0.07341
GLCM Entropy Layer 4	6.81690	6.61840	0.14442	0.20432	0.02825	0.00749	0.03573	0.07021
GLCM Entropy Layer 5	6.69390	6.63920	0.10714	0.28551	0.00191	0.05778	0.05969	0.11588
GLCM Entropy Layer 6	6.84400	6.76010	0.15071	0.22184	0.00472	0.00928	0.01401	0.02782
GLCM Entropy Layer 7	5.45730	5.37560	0.14034	0.23476	0.00445	0.01636	0.02081	0.04119
GLCM Entropy Layer 8	5.92890	5.67340	0.09354	0.05179	0.11229	0.02153	0.13383	0.25052
GLCM Mean Layer 1	5.93980	5.42510	0.02244	0.06784	0.73364	0.07289	0.80653	1.10719
GLCM Mean Layer2	4.67110	4.55770	0.66348	0.18242	0.00380	0.09768	0.10148	0.19300
GLCM Mean Layer 3	129.52300	127.90600	3.70265	1.62600	0.12267	0.04118	0.16385	0.30227
GLCM Mean Layer 4	130.02500	128.16300	3.24967	1.50958	0.18212	0.03588	0.21800	0.39174
GLCM Mean Layer 5	129.11800	127.75800	2.38615	4.56848	0.06649	0.02591	0.09240	0.17652
GLCM Mean Layer 6	128.09500	127.35800	14.24887	12.21853	0.00513	0.00148	0.00661	0.01317
GLCM Mean Layer 7	129.77200	127.28500	10.64784	3.03856	0.11298	0.09244	0.20542	0.37139
GLCM Mean Layer 8	127.06600	126.84000	10.47416	13.14596	0.00054	0.00322	0.00376	0.00751
GLCM Correlation Layer 1	126.93500	126.96800	9.83465	11.23173	0.00001	0.00110	0.00111	0.00223
GLCM Correlation Layer 2	127.37300	127.53900	4.75213	10.98614	0.00044	0.04267	0.04310	0.08438
GLCM Correlation Layer 3	0.59482	0.57745	0.02703	0.03393	0.00124	0.00323	0.00447	0.00891
GLCM Correlation Layer 4	0.63679	0.67906	0.01449	0.01710	0.01414	0.00172	0.01586	0.03146
GLCM Correlation Layer 5	0.68829	0.66943	0.01350	0.01841	0.00279	0.00599	0.00877	0.01747
GLCM Correlation Layer 6	0.62369	0.75530	0.00559	0.00192	0.57664	0.06813	0.64478	0.95044
GLCM Correlation Layer 7	0.65799	0.76544	0.00602	0.00555	0.24936	0.00041	0.24977	0.44204
GLCM Correlation Layer 8	0.66366	0.74324	0.00473	0.00273	0.21238	0.01863	0.23101	0.41254

Table A35 J value rangeland and perennial tree and orchard.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1401.62700	1366.98100	1182.33660	5005.38201	0.04850	0.12021	0.16871	0.31048
Mean Layer 1	1316.44200	1279.21100	1022.57206	738.32725	0.19680	0.00660	0.20340	0.36809
Mean Layer 2	1524.27900	1444.40500	2029.22079	2485.55389	0.35328	0.00257	0.35584	0.59884
Mean Layer 3	1335.04600	1293.66600	1991.59127	4592.44727	0.06502	0.04241	0.10743	0.20372
Mean Layer 4	3954.73300	3934.46400	21128.39829	247864.91930	0.00038	0.30989	0.31028	0.53351
Mean Layer 5	2718.93400	2620.88000	6964.61549	118523.44450	0.01915	0.39054	0.40970	0.67230
Mean Layer 6	204.66400	206.29700	12.86756	177.75476	0.00350	0.34479	0.34829	0.58821
Mean Layer 7	77.11500	73.90800	7.75892	316.99093	0.00792	0.59303	0.60094	0.90341
Mean Layer 8	81.81000	83.01000	4.96431	114.45838	0.00301	0.45914	0.46215	0.74015
Max. diff.	2.76610	2.82380	0.00396	0.07843	0.01010	0.42465	0.43475	0.70515
Standard deviation Layer 1	30.99300	15.89100	159.92665	24.80074	0.30866	0.19147	0.50013	0.78709
Standard deviation Layer 2	52.49200	22.72800	224.32657	38.41324	0.84294	0.17363	1.01657	1.27633
Standard deviation Layer 3	56.89400	22.28990	1083.43332	194.49417	0.23426	0.16535	0.39961	0.65883
Standard deviation Layer 4	309.81100	126.34700	6500.71848	537.95547	1.19550	0.31615	1.51166	1.55891
Standard deviation Layer 5	98.15300	57.89300	813.30705	537.36591	0.30001	0.01066	0.31067	0.53409
Standard deviation Layer 6	8.45560	3.22540	10.67308	0.88459	0.59171	0.31583	0.90753	1.19296
Standard deviation Layer 7	7.65650	3.25440	3.58733	0.44018	1.20288	0.23579	1.43867	1.52552
Standard deviation Layer 8	3.88860	1.83417	4.69709	0.47305	0.20409	0.27528	0.47937	0.76165
Ration Layer 1	0.11744	0.11731	0.00001	0.00005	0.00006	0.15145	0.15152	0.28119
Ration Layer 2	0.13594	0.13237	0.00001	0.00006	0.04625	0.28218	0.32842	0.55988
Ration Layer 3	0.11905	0.11862	0.00001	0.00009	0.00049	0.33002	0.33051	0.56289
Ration Layer 4	0.35266	0.35913	0.00006	0.00115	0.00864	0.42671	0.43535	0.70593
Ration Layer 5	0.24247	0.23927	0.00001	0.00066	0.00382	0.63791	0.64174	0.94724
Ration Layer 6	0.01826	0.01888	0.00000	0.00000	0.07356	0.09531	0.16887	0.31076
Ration Layer 7	0.00688	0.00677	0.00000	0.00000	0.00107	0.49592	0.49699	0.78328
Ration Layer 8	0.00730	0.00765	0.00000	0.00000	0.01513	0.48174	0.49687	0.78313
Area	123.60000	308.30000	3840.48889	32593.34444	0.23408	0.24375	0.47783	0.75975
Border length	86.60000	84.00000	873.82222	584.00000	0.00116	0.01008	0.01124	0.02236
Width	12.18080	16.27000	23.87806	18.30678	0.09910	0.00440	0.10350	0.19664
Asymmetry	0.62722	0.43772	0.06069	0.06217	0.07308	0.00004	0.07311	0.14101
Border index	1.76590	1.16470	0.23248	0.00978	0.37298	0.46612	0.83911	1.13581
Shape index	2.01710	1.23320	0.40081	0.01757	0.36719	0.45664	0.82383	1.12250
GLCM Homogeneity Layer 1	0.02676	0.02526	0.00006	0.00001	0.00722	0.13792	0.14515	0.27021
GLCM Homogeneity Layer 2	0.02383	0.03161	0.00001	0.00008	0.17964	0.24632	0.42596	0.69371
GLCM Homogeneity Layer 3	0.03683	0.03381	0.00010	0.00006	0.01360	0.01619	0.02979	0.05869
GLCM Homogeneity Layer 4	0.02431	0.03170	0.00003	0.00002	0.25731	0.00287	0.26018	0.45817
GLCM Homogeneity Layer 5	0.24848	0.25456	0.00010	0.00006	0.05766	0.01059	0.06826	0.13196
GLCM Homogeneity Layer 6	0.03455	0.09501	0.00011	0.00044	1.68095	0.11426	1.79521	1.66781
GLCM Homogeneity Layer 7	1401.62700	1366.98100	1182.33660	5005.38201	0.04850	0.12021	0.16871	0.31048
GLCM Homogeneity Layer 8	1316.44200	1279.21100	1022.57206	738.32725	0.19680	0.00660	0.20340	0.36809

Table 35 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.02949	0.08631	0.00004	0.00025	2.82380	0.19972	3.02352	1.90274
GLCM Contrast Layer 2	0.08441	0.19886	0.00133	0.00491	0.52432	0.09947	0.62379	0.92818
GLCM Contrast Layer 3	2456.83500	2667.94800	656967.37660	471380.52280	0.00987	0.00686	0.01673	0.03318
GLCM Contrast Layer 4	2376.29200	1912.37700	452281.99900	353896.56100	0.06674	0.00375	0.07049	0.13613
GLCM Contrast Layer 5	1930.86400	1971.07100	461552.86980	382827.40660	0.00048	0.00218	0.00266	0.00532
GLCM Contrast Layer 6	2424.00700	1746.48500	386301.68100	357465.99680	0.15429	0.00038	0.15467	0.28660
GLCM Contrast Layer 7	2418.07500	1392.14300	582673.99190	164675.59650	0.35209	0.09379	0.44588	0.71948
GLCM Contrast Layer 8	2152.12800	1867.86700	300436.01180	427959.51120	0.02773	0.00778	0.03552	0.06979
GLCM Dissimilarity Layer 1	2488.80500	2126.10200	329598.74770	321144.56370	0.05054	0.00004	0.05058	0.09865
GLCM Dissimilarity Layer2	2402.77400	2313.96400	864290.88640	841101.36930	0.00116	0.00005	0.00120	0.00240
GLCM Dissimilarity Layer 3	37.89000	40.32600	47.56176	28.58496	0.01948	0.01603	0.03551	0.06978
GLCM Dissimilarity Layer 4	37.71500	33.00100	25.26965	34.49814	0.09295	0.00603	0.09898	0.18848
GLCM Dissimilarity Layer 5	32.47500	33.12000	37.50783	35.64009	0.00142	0.00016	0.00158	0.00317
GLCM Dissimilarity Layer 6	38.63400	31.16400	33.19985	32.60547	0.21199	0.00002	0.21201	0.38209
GLCM Dissimilarity Layer 7	33.89300	23.72400	35.67547	14.54818	0.51474	0.04869	0.56343	0.86149
GLCM Dissimilarity Layer 8	35.95900	32.70800	31.83543	31.99977	0.04139	0.00000	0.04139	0.08110
GLCM Entropy Layer 1	39.29400	34.70800	27.24956	21.19251	0.10854	0.00394	0.11248	0.21277
GLCM Entropy Layer 2	37.70700	35.57100	73.44047	57.83041	0.00869	0.00356	0.01225	0.02435
GLCM Entropy Layer 3	6.68920	6.97150	0.11894	0.06010	0.11128	0.02858	0.13986	0.26104
GLCM Entropy Layer 4	6.81690	7.13730	0.14442	0.06973	0.11984	0.03242	0.15226	0.28247
GLCM Entropy Layer 5	6.69390	6.94450	0.10714	0.06750	0.08990	0.01323	0.10313	0.19598
GLCM Entropy Layer 6	6.84400	7.50380	0.15071	0.18137	0.32774	0.00214	0.32988	0.56198
GLCM Entropy Layer 7	5.45730	6.09360	0.14034	0.15546	0.34219	0.00065	0.34284	0.58050
GLCM Entropy Layer 8	5.92890	4.67950	0.09354	0.20913	1.28935	0.03941	1.32876	1.47039
GLCM Mean Layer 1	5.93980	4.79510	0.02244	0.07212	3.46432	0.08076	3.54508	1.94227
GLCM Mean Layer2	4.67110	3.62000	0.66348	0.34819	0.27302	0.02554	0.29856	0.51623
GLCM Mean Layer 3	129.52300	128.18700	3.70265	1.15833	0.09180	0.08004	0.17184	0.31577
GLCM Mean Layer 4	130.02500	127.80300	3.24967	1.25413	0.27406	0.05464	0.32870	0.56028
GLCM Mean Layer 5	129.11800	127.76300	2.38615	1.51925	0.11753	0.01263	0.13016	0.24410
GLCM Mean Layer 6	128.09500	126.43800	14.24887	3.91073	0.03780	0.09793	0.13572	0.25383
GLCM Mean Layer 7	129.77200	127.80600	10.64784	0.78392	0.08453	0.34115	0.42567	0.69334
GLCM Mean Layer 8	127.06600	125.63200	10.47416	4.53173	0.03426	0.04264	0.07690	0.14804
GLCM Correlation Layer 1	126.93500	128.65100	9.83465	4.61679	0.05094	0.03492	0.08586	0.16456
GLCM Correlation Layer 2	127.37300	127.69000	4.75213	4.53136	0.00271	0.00014	0.00285	0.00569
GLCM Correlation Layer 3	0.59482	0.53505	0.02703	0.02085	0.01866	0.00420	0.02286	0.04520
GLCM Correlation Layer 4	0.63679	0.68206	0.01449	0.00834	0.02244	0.01879	0.04123	0.08078
GLCM Correlation Layer 5	0.68829	0.65596	0.01350	0.01320	0.00979	0.00003	0.00982	0.01954
GLCM Correlation Layer 6	0.62369	0.74075	0.00559	0.00649	0.28371	0.00139	0.28509	0.49611
GLCM Correlation Layer 7	0.65799	0.79586	0.00602	0.00420	0.46502	0.00809	0.47311	0.75388
GLCM Correlation Layer 8	0.66366	0.72115	0.00473	0.00771	0.06645	0.01481	0.08126	0.15609

Table A36 J value rangeland and water body.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1401.62700	1155.76800	1182.33660	14834.20397	0.94350	0.32413	1.26763	1.43701
Mean Layer 1	1316.44200	1665.12000	1022.57206	26324.60884	1.11142	0.48453	1.59594	1.59456
Mean Layer 2	1524.27900	1982.50800	2029.22079	80686.62151	0.63462	0.58658	1.22120	1.41025
Mean Layer 3	1335.04600	1990.85000	1991.59127	136906.86820	0.77409	0.71824	1.49233	1.55030
Mean Layer 4	3954.73300	1743.95000	21128.39829	44851.55109	18.51912	0.03461	18.55372	2.00000
Mean Layer 5	2718.93400	1516.09200	6964.61549	31830.54168	9.32351	0.13226	9.45577	1.99984
Mean Layer 6	204.66400	80.77700	12.86756	298.80845	12.31085	0.46078	12.77163	1.99999
Mean Layer 7	77.11500	100.33600	7.75892	34.45612	3.19326	0.12768	3.32095	1.92776
Mean Layer 8	81.81000	166.52500	4.96431	322.91541	5.47200	0.70483	6.17683	1.99585
Max. diff.	2.76610	1.69900	0.00396	0.01505	14.97549	0.10409	15.07958	2.00000
Standard deviation Layer 1	30.99300	44.98700	159.92665	365.55569	0.09317	0.04155	0.13472	0.25208
Standard deviation Layer 2	52.49200	56.26400	224.32657	483.00212	0.00503	0.03589	0.04092	0.08019
Standard deviation Layer 3	56.89400	71.51700	1083.43332	1136.50100	0.02408	0.00014	0.02422	0.04787
Standard deviation Layer 4	309.81100	124.18600	6500.71848	8201.09163	0.58593	0.00337	0.58929	0.89056
Standard deviation Layer 5	98.15300	101.17200	813.30705	4690.16502	0.00041	0.17141	0.17182	0.31575
Standard deviation Layer 6	8.45560	9.15520	10.67308	41.82114	0.00233	0.10850	0.11083	0.20981
Standard deviation Layer 7	7.65650	6.25910	3.58733	12.05007	0.03122	0.08664	0.11786	0.22236
Standard deviation Layer 8	3.88860	7.36440	4.69709	16.17177	0.14473	0.09000	0.23473	0.41843
Ration Layer 1	0.11744	0.18055	0.00001	0.00013	7.30494	0.31088	7.61582	1.99901
Ration Layer 2	0.13594	0.21391	0.00001	0.00020	7.49860	0.53636	8.03496	1.99935
Ration Layer 3	0.11905	0.21386	0.00001	0.00038	5.78295	0.66971	6.45266	1.99685
Ration Layer 4	0.35266	0.18886	0.00006	0.00023	23.22844	0.11185	23.34029	2.00000
Ration Layer 5	0.24247	0.16483	0.00001	0.00039	3.72034	0.51568	4.23602	1.97107
Ration Layer 6	0.01826	0.00892	0.00000	0.00001	3.20556	0.46025	3.66580	1.94883
Ration Layer 7	0.00688	0.01101	0.00000	0.00000	1.44187	0.51548	1.95735	1.71754
Ration Layer 8	0.00730	0.01808	0.00000	0.00000	9.20210	0.59507	9.79717	1.99989
Area	123.60000	174.70000	3840.48889	39580.67778	0.01503	0.28291	0.29795	0.51532
Border length	86.60000	70.80000	873.82222	1643.73333	0.02479	0.02455	0.04934	0.09628
Width	12.18080	11.60410	23.87806	52.22826	0.00109	0.03735	0.03844	0.07542
Asymmetry	0.62722	0.51831	0.06069	0.07180	0.02238	0.00177	0.02415	0.04772
Border index	1.76590	1.35670	0.23248	0.05597	0.14512	0.11729	0.26241	0.46161
Shape index	2.01710	1.53370	0.40081	0.13578	0.10887	0.06991	0.17878	0.32742
GLCM Homogeneity Layer 1	0.02676	0.03437	0.00006	0.00020	0.05580	0.07369	0.12948	0.24290
GLCM Homogeneity Layer 2	0.02383	0.03283	0.00001	0.00008	0.22276	0.26296	0.48572	0.76949
GLCM Homogeneity Layer 3	0.03683	0.03311	0.00010	0.00010	0.01682	0.00005	0.01687	0.03346
GLCM Homogeneity Layer 4	0.02431	0.04096	0.00003	0.00032	0.19933	0.29315	0.49247	0.77777
GLCM Homogeneity Layer 5	0.24848	0.25455	0.00010	0.00038	0.01915	0.11107	0.13022	0.24420
GLCM Homogeneity Layer 6	0.03455	0.08887	0.00011	0.00392	0.18302	0.56691	0.74993	1.05520
GLCM Homogeneity Layer 7	1401.62700	1155.76800	1182.33660	14834.20397	0.94350	0.32413	1.26763	1.43701
GLCM Homogeneity Layer 8	1316.44200	1665.12000	1022.57206	26324.60884	1.11142	0.48453	1.59594	1.59456

Table A36 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.02949	0.07695	0.00004	0.00694	0.08063	0.96545	1.04609	1.29738
GLCM Contrast Layer 2	0.08441	0.08867	0.00133	0.00769	0.00050	0.17130	0.17180	0.31570
GLCM Contrast Layer 3	2456.83500	2949.91900	656967.37660	1658584.28400	0.02625	0.05179	0.07804	0.15014
GLCM Contrast Layer 4	2376.29200	2943.11400	452281.99900	1596316.75400	0.03921	0.09344	0.13265	0.24846
GLCM Contrast Layer 5	1930.86400	2812.11500	461552.86980	1770516.09900	0.08698	0.10536	0.19235	0.34996
GLCM Contrast Layer 6	2424.00700	3376.09900	386301.68100	4700693.74700	0.04455	0.31763	0.36218	0.60768
GLCM Contrast Layer 7	2418.07500	4214.86200	582673.99190	8639713.87600	0.08752	0.36018	0.44770	0.72181
GLCM Contrast Layer 8	2152.12800	3357.36800	300436.01180	3781270.90300	0.08897	0.32480	0.41377	0.67769
GLCM Dissimilarity Layer 1	2488.80500	4218.78200	329598.74770	2756373.39800	0.24245	0.24085	0.48330	0.76652
GLCM Dissimilarity Layer2	2402.77400	3324.26000	864290.88640	3873154.13400	0.04481	0.12912	0.17393	0.31929
GLCM Dissimilarity Layer 3	37.89000	39.79000	47.56176	64.95211	0.00802	0.00604	0.01407	0.02794
GLCM Dissimilarity Layer 4	37.71500	39.71400	25.26965	78.66029	0.00961	0.07660	0.08621	0.16520
GLCM Dissimilarity Layer 5	32.47500	38.59100	37.50783	90.95588	0.07279	0.04752	0.12031	0.22671
GLCM Dissimilarity Layer 6	38.63400	40.06200	33.19985	319.45457	0.00145	0.26888	0.27033	0.47374
GLCM Dissimilarity Layer 7	33.89300	43.11500	35.67547	423.90292	0.04626	0.31259	0.35885	0.60304
GLCM Dissimilarity Layer 8	35.95900	40.48200	31.83543	226.24120	0.01982	0.20951	0.22933	0.40986
GLCM Entropy Layer 1	39.29400	47.54900	27.24956	179.76865	0.08229	0.19565	0.27795	0.48532
GLCM Entropy Layer 2	37.70700	40.89700	73.44047	252.31516	0.00781	0.08971	0.09752	0.18583
GLCM Entropy Layer 3	6.68920	6.39240	0.11894	0.90793	0.02145	0.22311	0.24456	0.43390
GLCM Entropy Layer 4	6.81690	6.30270	0.14442	0.78871	0.07084	0.16192	0.23276	0.41531
GLCM Entropy Layer 5	6.69390	6.36910	0.10714	0.76102	0.03038	0.20941	0.23979	0.42642
GLCM Entropy Layer 6	6.84400	6.35250	0.15071	0.98694	0.05309	0.19430	0.24739	0.43832
GLCM Entropy Layer 7	5.45730	5.02710	0.14034	1.25673	0.03312	0.25440	0.28752	0.49976
GLCM Entropy Layer 8	5.92890	4.80980	0.09354	0.78066	0.35815	0.24044	0.59859	0.90083
GLCM Mean Layer 1	5.93980	5.03550	0.02244	1.04399	0.19170	0.62407	0.81577	1.11541
GLCM Mean Layer2	4.67110	4.95240	0.66348	0.90127	0.01264	0.00584	0.01848	0.03663
GLCM Mean Layer 3	129.52300	120.18200	3.70265	26.93388	0.71201	0.21391	0.92593	1.20767
GLCM Mean Layer 4	130.02500	120.28300	3.24967	28.73082	0.74191	0.25186	0.99377	1.25964
GLCM Mean Layer 5	129.11800	120.14500	2.38615	29.07154	0.63987	0.31789	0.95775	1.23249
GLCM Mean Layer 6	128.09500	134.62600	14.24887	44.47787	0.18158	0.07696	0.25853	0.45564
GLCM Mean Layer 7	129.77200	137.11400	10.64784	67.37378	0.17272	0.18802	0.36074	0.60568
GLCM Mean Layer 8	127.06600	135.77400	10.47416	41.08383	0.36769	0.10865	0.47634	0.75789
GLCM Correlation Layer 1	126.93500	125.65400	9.83465	28.39267	0.01073	0.06719	0.07792	0.14993
GLCM Correlation Layer 2	127.37300	117.31200	4.75213	45.14084	0.50720	0.26627	0.77348	1.07719
GLCM Correlation Layer 3	0.59482	0.62461	0.02703	0.01744	0.00499	0.01189	0.01688	0.03348
GLCM Correlation Layer 4	0.63679	0.63036	0.01449	0.01748	0.00032	0.00220	0.00252	0.00503
GLCM Correlation Layer 5	0.68829	0.66236	0.01350	0.01971	0.00506	0.00889	0.01395	0.02770
GLCM Correlation Layer 6	0.62369	0.61083	0.00559	0.04281	0.00085	0.22380	0.22465	0.40241
GLCM Correlation Layer 7	0.65799	0.57458	0.00602	0.04566	0.03365	0.22185	0.25550	0.45095
GLCM Correlation Layer 8	0.66366	0.57500	0.00473	0.04770	0.03749	0.27860	0.31609	0.54201

Table A37 J value water body and building and settlement area.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1155.76800	1733.37600	14834.20397	17841.76287	2.55257	0.00213	2.55470	1.84457
Mean Layer 1	1665.12000	2012.19600	26324.60884	102497.45560	0.23378	0.10756	0.34133	0.57835
Mean Layer 2	1982.50800	2128.28300	80686.62151	40154.76871	0.04396	0.02984	0.07380	0.14229
Mean Layer 3	1990.85000	2104.12100	136906.86820	44005.89594	0.01773	0.07653	0.09426	0.17990
Mean Layer 4	1743.95000	3325.61000	44851.55109	179227.66370	2.79103	0.11142	2.90245	1.89022
Mean Layer 5	1516.09200	3932.11700	31830.54168	397830.64730	3.39638	0.32331	3.71970	1.95152
Mean Layer 6	80.77700	144.52200	298.80845	211.81677	1.98944	0.00736	1.99680	1.72846
Mean Layer 7	100.33600	130.92700	34.45612	586.06291	0.37703	0.39043	0.76745	1.07161
Mean Layer 8	166.52500	89.23200	322.91541	151.57566	3.14769	0.03493	3.18262	1.91705
Max. diff.	1.69900	2.25040	0.01505	0.05496	1.08575	0.09823	1.18398	1.38788
Standard deviation Layer 1	44.98700	230.48100	365.55569	10326.57254	0.80452	0.50608	1.31060	1.46068
Standard deviation Layer 2	56.26400	211.84300	483.00212	5707.42907	0.97751	0.31142	1.28893	1.44887
Standard deviation Layer 3	71.51700	250.84100	1136.50100	9955.20214	0.72480	0.25001	0.97481	1.24547
Standard deviation Layer 4	124.18600	248.94700	8201.09163	10936.52616	0.20333	0.00516	0.20849	0.37639
Standard deviation Layer 5	101.17200	259.32300	4690.16502	10080.82249	0.42333	0.03573	0.45906	0.73624
Standard deviation Layer 6	9.15520	13.03910	41.82114	23.13802	0.05805	0.02159	0.07964	0.15310
Standard deviation Layer 7	6.25910	9.75780	12.05007	6.57930	0.16427	0.02255	0.18682	0.34081
Standard deviation Layer 8	7.36440	9.55800	16.17177	5.36850	0.05585	0.07243	0.12828	0.24079
Ration Layer 1	0.18055	0.14461	0.00013	0.00024	0.89103	0.02468	0.91571	1.19954
Ration Layer 2	0.21391	0.15334	0.00020	0.00002	4.16485	0.23963	4.40448	1.97555
Ration Layer 3	0.21386	0.15177	0.00038	0.00011	1.95889	0.09087	2.04976	1.74247
Ration Layer 4	0.18886	0.24105	0.00023	0.00124	0.46316	0.15876	0.62192	0.92618
Ration Layer 5	0.16483	0.28281	0.00039	0.00095	2.59052	0.04769	2.63820	1.85702
Ration Layer 6	0.00892	0.01055	0.00001	0.00000	0.07173	0.04838	0.12012	0.22637
Ration Layer 7	0.01101	0.00941	0.00000	0.00000	0.12021	0.00166	0.12187	0.22947
Ration Layer 8	0.01808	0.00652	0.00000	0.00000	7.84049	0.05564	7.89613	1.99926
Area	174.70000	28.50000	39580.67778	210.05556	0.13429	0.96575	1.10005	1.33429
Border length	70.80000	29.60000	1643.73333	182.04444	0.23243	0.25606	0.48849	0.77290
Width	11.60410	5.14480	52.22826	4.96342	0.18238	0.28720	0.46958	0.74947
Asymmetry	0.51831	0.54890	0.07180	0.02142	0.00251	0.08637	0.08888	0.17009
Border index	1.35670	1.22590	0.05597	0.06811	0.03447	0.00241	0.03688	0.07241
Shape index	1.53370	1.38250	0.13578	0.08429	0.02597	0.01407	0.04004	0.07851
GLCM Homogeneity Layer 1	0.03437	0.01942	0.00020	0.00009	0.19806	0.03987	0.23793	0.42349
GLCM Homogeneity Layer 2	0.03283	0.01703	0.00008	0.00002	0.60478	0.10625	0.71103	1.01772
GLCM Homogeneity Layer 3	0.03311	0.01732	0.00010	0.00007	0.36799	0.01003	0.37802	0.62956
GLCM Homogeneity Layer 4	0.04096	0.01958	0.00032	0.00004	0.31613	0.21563	0.53176	0.82486
GLCM Homogeneity Layer 5	0.25455	0.23747	0.00038	0.00001	0.18452	0.56270	0.74722	1.05264
GLCM Homogeneity Layer 6	1155.76800	1733.37600	14834.20397	17841.76287	2.55257	0.00213	2.55470	1.84457
GLCM Homogeneity Layer 7	1665.12000	2012.19600	26324.60884	102497.45560	0.23378	0.10756	0.34133	0.57835
GLCM Homogeneity Layer 8	1982.50800	2128.28300	80686.62151	40154.76871	0.04396	0.02984	0.07380	0.14229

Table A37 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.08887	0.02386	0.00392	0.00012	0.26138	0.54166	0.80304	1.10407
GLCM Contrast Layer 2	0.07695	0.01925	0.00694	0.00005	0.11904	0.90704	1.02608	1.28318
GLCM Contrast Layer 3	0.08867	0.02049	0.00769	0.00006	0.15011	0.87995	1.03006	1.28603
GLCM Contrast Layer 4	2949.91900	4153.94800	1658584.28400	2987749.23300	0.07800	0.02134	0.09935	0.18914
GLCM Contrast Layer 5	2943.11400	3812.36200	1596316.75400	248119.21720	0.10242	0.19105	0.29346	0.50865
GLCM Contrast Layer 6	2812.11500	3643.05600	1770516.09900	554849.58640	0.07423	0.07981	0.15404	0.28553
GLCM Contrast Layer 7	3376.09900	4235.65200	4700693.74700	8617612.11100	0.01387	0.02262	0.03649	0.07166
GLCM Contrast Layer 8	4214.86200	3866.67100	8639713.87600	1037410.32600	0.00313	0.24003	0.24317	0.43172
GLCM Dissimilarity Layer 1	3357.36800	3303.85700	3781270.90300	1729968.27900	0.00013	0.03728	0.03741	0.07344
GLCM Dissimilarity Layer2	4218.78200	3672.56500	2756373.39800	2363595.42100	0.01457	0.00148	0.01604	0.03183
GLCM Dissimilarity Layer 3	3324.26000	3635.16300	3873154.13400	457870.71920	0.00558	0.24310	0.24868	0.44035
GLCM Dissimilarity Layer 4	39.79000	50.47100	64.95211	126.05825	0.14932	0.02699	0.17631	0.32328
GLCM Dissimilarity Layer 5	39.71400	49.50300	78.66029	18.27436	0.24714	0.12279	0.36992	0.61842
GLCM Dissimilarity Layer 6	38.59100	48.23700	90.95588	26.47507	0.19809	0.08971	0.28779	0.50017
GLCM Dissimilarity Layer 7	40.06200	50.80200	319.45457	333.12315	0.04419	0.00011	0.04430	0.08666
GLCM Dissimilarity Layer 8	43.11500	45.42800	423.90292	32.63595	0.00293	0.33153	0.33446	0.56856
GLCM Entropy Layer 1	40.48200	45.40200	226.24120	91.65382	0.01904	0.04938	0.06842	0.13226
GLCM Entropy Layer 2	47.54900	48.41700	179.76865	122.84625	0.00062	0.00901	0.00963	0.01916
GLCM Entropy Layer 3	40.89700	47.96700	252.31516	15.74456	0.04662	0.37724	0.42386	0.69096
GLCM Entropy Layer 4	6.39240	5.38880	0.90793	0.44333	0.18635	0.03145	0.21780	0.39143
GLCM Entropy Layer 5	6.30270	5.44580	0.78871	0.36527	0.15907	0.03615	0.19523	0.35471
GLCM Entropy Layer 6	6.36910	5.44010	0.76102	0.34440	0.19518	0.03830	0.23348	0.41646
GLCM Entropy Layer 7	6.35250	5.41310	0.98694	0.46131	0.15233	0.03531	0.18765	0.34218
GLCM Entropy Layer 8	5.02710	4.11910	1.25673	0.28992	0.13327	0.12388	0.25715	0.45349
GLCM Mean Layer 1	4.80980	5.17550	0.78066	0.30699	0.03074	0.05257	0.08331	0.15988
GLCM Mean Layer2	5.03550	5.18450	1.04399	0.37256	0.00392	0.06362	0.06754	0.13061
GLCM Mean Layer 3	4.95240	5.19760	0.90127	0.34982	0.01201	0.05401	0.06602	0.12778
GLCM Mean Layer 4	120.18200	121.06300	26.93388	31.63656	0.00331	0.00162	0.00493	0.00984
GLCM Mean Layer 5	120.28300	121.70900	28.73082	17.79561	0.01093	0.01421	0.02513	0.04964
GLCM Mean Layer 6	120.14500	122.17000	29.07154	17.71024	0.02191	0.01520	0.03711	0.07286
GLCM Mean Layer 7	134.62600	128.81500	44.47787	86.08881	0.06466	0.02678	0.09143	0.17475
GLCM Mean Layer 8	137.11400	120.66500	67.37378	18.70474	0.78582	0.09630	0.88212	1.17219
GLCM Correlation Layer 1	135.77400	133.27200	41.08383	8.64882	0.03147	0.13850	0.16997	0.31261
GLCM Correlation Layer 2	125.65400	121.60400	28.39267	56.98727	0.04803	0.02974	0.07777	0.14965
GLCM Correlation Layer 3	117.31200	123.89700	45.14084	50.60427	0.11322	0.00082	0.11404	0.21555
GLCM Correlation Layer 4	0.62461	0.46016	0.01744	0.00854	0.26023	0.03124	0.29147	0.50567
GLCM Correlation Layer 5	0.63036	0.44285	0.01748	0.01206	0.29756	0.00854	0.30610	0.52738
GLCM Correlation Layer 6	0.66236	0.48636	0.01971	0.02087	0.19083	0.00021	0.19104	0.34780
GLCM Correlation Layer 7	0.61083	0.52938	0.04281	0.02899	0.02310	0.00944	0.03254	0.06404
GLCM Correlation Layer 8	0.57458	0.48757	0.04566	0.02347	0.02738	0.02720	0.05458	0.10623

Table 38 J value water body and field crop.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1155.76800	1519.20600	14834.20397	7791.45380	1.45948	0.02548	1.48496	1.54698
Mean Layer 1	1665.12000	1407.32200	26324.60884	1706.01482	0.59274	0.36891	0.96165	1.23548
Mean Layer 2	1982.50800	1669.33600	80686.62151	3772.87214	0.29031	0.44196	0.73227	1.03836
Mean Layer 3	1990.85000	1516.93200	136906.86820	21117.63853	0.35532	0.19245	0.54777	0.84353
Mean Layer 4	1743.95000	4176.82400	44851.55109	660161.72103	2.09885	0.35857	2.45743	1.82869
Mean Layer 5	1516.09200	3019.85800	31830.54168	56229.48708	6.41980	0.01997	6.43977	1.99681
Mean Layer 6	80.77700	196.21400	298.80845	602.17883	3.69753	0.03008	3.72761	1.95190
Mean Layer 7	100.33600	83.49200	34.45612	455.70677	0.14471	0.33541	0.48012	0.76258
Mean Layer 8	166.52500	83.66300	322.91541	61.38982	4.46657	0.15549	4.62206	1.98033
Max. diff.	1.69900	2.69950	0.01505	0.14298	1.58355	0.26628	1.84983	1.68547
Standard deviation Layer 1	44.98700	26.41000	365.55569	121.75531	0.17705	0.07202	0.24907	0.44094
Standard deviation Layer 2	56.26400	40.28400	483.00212	285.62138	0.08306	0.01706	0.10011	0.19053
Standard deviation Layer 3	71.51700	54.79900	1136.50100	825.13468	0.03562	0.00638	0.04200	0.08226
Standard deviation Layer 4	124.18600	185.98400	8201.09163	3112.73600	0.08439	0.05650	0.14088	0.26282
Standard deviation Layer 5	101.17200	83.75800	4690.16502	1212.12617	0.01284	0.10664	0.11948	0.22524
Standard deviation Layer 6	9.15520	6.06310	41.82114	8.87132	0.04715	0.13726	0.18441	0.33681
Standard deviation Layer 7	6.25910	5.19310	12.05007	3.41751	0.01837	0.09330	0.11167	0.21132
Standard deviation Layer 8	7.36440	2.87180	16.17177	3.00483	0.26313	0.15940	0.42253	0.68922
Ration Layer 1	0.18055	0.11622	0.00013	0.00007	5.28810	0.02109	5.30919	1.99011
Ration Layer 2	0.21391	0.13776	0.00020	0.00009	5.05885	0.03721	5.09606	1.98776
Ration Layer 3	0.21386	0.12551	0.00038	0.00028	2.94863	0.00599	2.95462	1.89580
Ration Layer 4	0.18886	0.34173	0.00023	0.00244	2.18723	0.28790	2.47513	1.83170
Ration Layer 5	0.16483	0.24878	0.00039	0.00038	2.28296	0.00006	2.28302	1.79605
Ration Layer 6	0.00892	0.01612	0.00001	0.00000	1.98428	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 7	0.01101	0.00694	0.00000	0.00000	1.44748	#DIV/0!	#DIV/0!	#DIV/0!
Ration Layer 8	0.01808	0.00693	0.00000	0.00000	10.07699	#DIV/0!	#DIV/0!	#DIV/0!
Area	174.70000	222.30000	39580.67778	9300.23333	0.01159	0.12102	0.13261	0.24839
Border length	70.80000	89.00000	1643.73333	253.55556	0.04365	0.19244	0.23609	0.42057
Width	11.60410	13.50670	52.22826	36.01383	0.01026	0.00859	0.01884	0.03733
Asymmetry	0.51831	0.61741	0.07180	0.06772	0.01760	0.00021	0.01781	0.03531
Border index	1.35670	1.34440	0.05597	0.01607	0.00053	0.09159	0.09212	0.17600
Shape index	1.53370	1.56960	0.13578	0.09491	0.00140	0.00797	0.00937	0.01865
GLCM Homogeneity Layer 1	0.03437	0.03142	0.00020	0.00009	0.00761	0.03662	0.04423	0.08654
GLCM Homogeneity Layer 2	0.03283	0.03542	0.00008	0.00004	0.01377	0.03150	0.04528	0.08854
GLCM Homogeneity Layer 3	0.03311	0.03558	0.00010	0.00005	0.01011	0.03066	0.04076	0.07989
GLCM Homogeneity Layer 4	0.04096	0.03205	0.00032	0.00002	0.05869	0.37563	0.43432	0.70460
GLCM Homogeneity Layer 5	0.25455	0.25653	0.00038	0.00002	0.00242	0.41786	0.42028	0.68628
GLCM Homogeneity Layer 6	1155.76800	1519.20600	14834.20397	7791.45380	1.45948	0.02548	1.48496	1.54698
GLCM Homogeneity Layer 7	1665.12000	1407.32200	26324.60884	1706.01482	0.59274	0.36891	0.96165	1.23548
GLCM Homogeneity Layer 8	1982.50800	1669.33600	80686.62151	3772.87214	0.29031	0.44196	0.73227	1.03836

Table A38 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.08887	0.07105	0.00392	0.00186	0.01372	0.03401	0.04773	0.09322
GLCM Contrast Layer 2	0.07695	0.06888	0.00694	0.00087	0.00208	0.23175	0.23383	0.41701
GLCM Contrast Layer 3	0.08867	0.12134	0.00769	0.00366	0.02351	0.03364	0.05715	0.11110
GLCM Contrast Layer 4	2949.91900	1997.14400	1658584.28400	333414.92043	0.11393	0.14610	0.26002	0.45793
GLCM Contrast Layer 5	2943.11400	1844.71100	1596316.75400	181066.55065	0.16970	0.25130	0.42100	0.68721
GLCM Contrast Layer 6	2812.11500	1660.13000	1770516.09900	267203.10244	0.16281	0.19646	0.35927	0.60363
GLCM Contrast Layer 7	3376.09900	1799.18100	4700693.74700	40511.59017	0.13112	0.84619	0.97731	1.24735
GLCM Contrast Layer 8	4214.86200	1448.58300	8639713.87600	163903.01402	0.21731	0.65404	0.87134	1.16322
GLCM Dissimilarity Layer 1	3357.36800	1854.38300	3781270.90300	87701.09291	0.14597	0.60586	0.75183	1.05699
GLCM Dissimilarity Layer2	4218.78200	1886.69700	2756373.39800	152586.25722	0.46740	0.40385	0.87125	1.16315
GLCM Dissimilarity Layer 3	3324.26000	2227.62900	3873154.13400	213011.79312	0.07358	0.40531	0.47889	0.76106
GLCM Dissimilarity Layer 4	39.79000	33.72900	64.95211	31.58301	0.09514	0.03181	0.12695	0.23844
GLCM Dissimilarity Layer 5	39.71400	31.46700	78.66029	14.90920	0.18172	0.15600	0.33772	0.57321
GLCM Dissimilarity Layer 6	38.59100	30.05500	90.95588	23.48709	0.15917	0.10676	0.26593	0.46701
GLCM Dissimilarity Layer 7	40.06200	31.64100	319.45457	2.99374	0.05498	0.82561	0.88059	1.17093
GLCM Dissimilarity Layer 8	43.11500	24.63400	423.90292	15.74749	0.19422	0.49487	0.68909	0.99593
GLCM Entropy Layer 1	40.48200	32.96200	226.24120	5.78997	0.06093	0.58243	0.64336	0.94895
GLCM Entropy Layer 2	47.54900	32.91900	179.76865	12.43899	0.27839	0.35459	0.63298	0.93799
GLCM Entropy Layer 3	40.89700	36.31200	252.31516	19.13144	0.01936	0.33481	0.35417	0.59648
GLCM Entropy Layer 4	6.39240	6.96510	0.90793	0.13964	0.07827	0.19298	0.27125	0.47516
GLCM Entropy Layer 5	6.30270	7.03680	0.78871	0.19496	0.13696	0.11327	0.25024	0.44277
GLCM Entropy Layer 6	6.36910	7.11650	0.76102	0.15457	0.15253	0.14438	0.29691	0.51378
GLCM Entropy Layer 7	6.35250	7.26090	0.98694	0.14770	0.18182	0.19801	0.37983	0.63205
GLCM Entropy Layer 8	5.02710	5.91170	1.25673	0.13357	0.14071	0.26434	0.40505	0.66611
GLCM Mean Layer 1	4.80980	5.42650	0.78066	0.71961	0.06338	0.00041	0.06379	0.12359
GLCM Mean Layer2	5.03550	5.39460	1.04399	0.32784	0.02350	0.07954	0.10304	0.19583
GLCM Mean Layer 3	4.95240	4.29780	0.90127	0.59166	0.07176	0.01099	0.08275	0.15883
GLCM Mean Layer 4	120.18200	127.10500	26.93388	2.01281	0.41393	0.33793	0.75186	1.05702
GLCM Mean Layer 5	120.28300	127.11500	28.73082	2.73161	0.37089	0.28711	0.65800	0.96422
GLCM Mean Layer 6	120.14500	127.24700	29.07154	1.71762	0.40955	0.38933	0.79888	1.10033
GLCM Mean Layer 7	134.62600	126.55900	44.47787	2.21945	0.34840	0.42721	0.77560	1.07915
GLCM Mean Layer 8	137.11400	127.26600	67.37378	2.87492	0.34514	0.46288	0.80802	1.10852
GLCM Correlation Layer 1	135.77400	125.86600	41.08383	2.84209	0.55872	0.35464	0.91336	1.19765
GLCM Correlation Layer 2	125.65400	127.85500	28.39267	3.46456	0.03802	0.23688	0.27490	0.48070
GLCM Correlation Layer 3	117.31200	126.89400	45.14084	4.69514	0.46058	0.26872	0.72930	1.03551
GLCM Correlation Layer 4	0.62461	0.64018	0.01744	0.01003	0.00221	0.01890	0.02110	0.04176
GLCM Correlation Layer 5	0.63036	0.67954	0.01748	0.00569	0.02610	0.07489	0.10099	0.19212
GLCM Correlation Layer 6	0.66236	0.72606	0.01971	0.00489	0.04124	0.11270	0.15394	0.28536
GLCM Correlation Layer 7	0.61083	0.70700	0.04281	0.00066	0.05319	0.70416	0.75735	1.06218
GLCM Correlation Layer 8	0.57458	0.78780	0.04566	0.00486	0.22497	0.26405	0.48902	0.77355

Table A39 J value water body and forest area.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1155.76800	1361.15700	14834.20397	4860.82820	0.53547	0.07407	0.60955	0.91281
Mean Layer 1	1665.12000	1283.41800	26324.60884	932.59988	1.33631	0.50590	1.84221	1.68307
Mean Layer 2	1982.50800	1451.23000	80686.62151	2841.38796	0.84480	0.50730	1.35210	1.48260
Mean Layer 3	1990.85000	1275.86900	136906.86820	1190.61388	0.92543	0.84396	1.76939	1.65913
Mean Layer 4	1743.95000	3922.79500	44851.55109	92203.98903	8.65957	0.03178	8.69134	1.99966
Mean Layer 5	1516.09200	2592.84400	31830.54168	28402.83169	4.81210	0.00081	4.81291	1.98375
Mean Layer 6	80.77700	207.83400	298.80845	22.27116	12.56969	0.33850	12.90818	2.00000
Mean Layer 7	100.33600	73.12300	34.45612	7.00273	4.46556	0.14428	4.60984	1.98009
Mean Layer 8	166.52500	82.14200	322.91541	11.69544	5.31998	0.50076	5.82074	1.99407
Max. diff.	1.69900	2.82510	0.01505	0.00680	14.50851	0.03846	14.54698	2.00000
Standard deviation Layer 1	44.98700	17.33500	365.55569	13.73434	0.50399	0.49225	0.99624	1.26147
Standard deviation Layer 2	56.26400	29.48300	483.00212	25.58353	0.35256	0.41375	0.76631	1.07055
Standard deviation Layer 3	71.51700	19.48600	1136.50100	57.75680	0.56672	0.42308	0.98980	1.25669
Standard deviation Layer 4	124.18600	191.51100	8201.09163	1215.10192	0.12034	0.19987	0.32021	0.54801
Standard deviation Layer 5	101.17200	54.31100	4690.16502	225.78528	0.11167	0.43534	0.54702	0.84266
Standard deviation Layer 6	9.15520	3.95300	41.82114	0.47401	0.15996	0.77904	0.93901	1.21797
Standard deviation Layer 7	6.25910	4.55540	12.05007	0.61919	0.05728	0.42058	0.47786	0.75978
Standard deviation Layer 8	7.36440	1.76970	16.17177	0.31491	0.47464	0.64775	1.12239	1.34900
Ration Layer 1	0.18055	0.11805	0.00013	0.00002	6.67260	0.18045	6.85305	1.99789
Ration Layer 2	0.21391	0.13337	0.00020	0.00001	7.91793	0.46690	8.38482	1.99954
Ration Layer 3	0.21386	0.11732	0.00038	0.00001	5.89988	0.51314	6.41302	1.99672
Ration Layer 4	0.18886	0.35987	0.00023	0.00010	22.26672	0.04544	22.31216	2.00000
Ration Layer 5	0.16483	0.23800	0.00039	0.00002	3.26396	0.44203	3.70598	1.95085
Ration Layer 6	0.00892	0.01911	0.00001	0.00000	3.76914	0.40105	4.17019	1.96910
Ration Layer 7	0.01101	0.00673	0.00000	0.00000	1.48580	0.33282	1.81862	1.67550
Ration Layer 8	0.01808	0.00757	0.00000	0.00000	7.96377	0.23250	8.19626	1.99945
Area	174.70000	396.60000	39580.67778	58820.71111	0.12510	0.00975	0.13484	0.25230
Border length	70.80000	140.00000	1643.73333	2475.55556	0.29062	0.01041	0.30103	0.51989
Width	11.60410	20.40440	52.22826	43.33958	0.20259	0.00217	0.20476	0.37032
Asymmetry	0.51831	0.53568	0.07180	0.05233	0.00061	0.00623	0.00684	0.01363
Border index	1.35670	1.69850	0.05597	0.05526	0.26259	0.00001	0.26260	0.46190
Shape index	1.53370	1.83230	0.13578	0.08368	0.10157	0.01451	0.11607	0.21918
GLCM Homogeneity Layer 1	0.03437	0.02320	0.00020	0.00001	0.15137	0.40190	0.55327	0.84987
GLCM Homogeneity Layer 2	0.03283	0.02264	0.00008	0.00001	0.27209	0.18106	0.45315	0.72876
GLCM Homogeneity Layer 3	0.03311	0.02516	0.00010	0.00006	0.09520	0.01274	0.10794	0.20463
GLCM Homogeneity Layer 4	0.04096	0.02139	0.00032	0.00001	0.29076	0.50811	0.79888	1.10033
GLCM Homogeneity Layer 5	0.25455	0.25190	0.00038	0.00002	0.00430	0.38152	0.38582	0.64021
GLCM Homogeneity Layer 6	1155.76800	1361.15700	14834.20397	4860.82820	0.53547	0.07407	0.60955	0.91281
GLCM Homogeneity Layer 7	1665.12000	1283.41800	26324.60884	932.59988	1.33631	0.50590	1.84221	1.68307
GLCM Homogeneity Layer 8	1982.50800	1451.23000	80686.62151	2841.38796	0.84480	0.50730	1.35210	1.48260

Table A39 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.08887	0.04940	0.00392	0.00010	0.09686	0.58938	0.68624	0.99307
GLCM Contrast Layer 2	0.07695	0.04146	0.00694	0.00008	0.04482	0.77364	0.81846	1.11778
GLCM Contrast Layer 3	0.08867	0.15928	0.00769	0.00180	0.13145	0.12180	0.25325	0.44745
GLCM Contrast Layer 4	2949.91900	2574.37300	1658584.28400	73489.04847	0.02036	0.45425	0.47461	0.75574
GLCM Contrast Layer 5	2943.11400	2460.72800	1596316.75400	177072.49820	0.03280	0.25575	0.28855	0.50130
GLCM Contrast Layer 6	2812.11500	2108.30700	1770516.09900	108952.22130	0.06589	0.38031	0.44620	0.71989
GLCM Contrast Layer 7	3376.09900	2672.58900	4700693.74700	44149.58097	0.02608	0.82507	0.85115	1.14615
GLCM Contrast Layer 8	4214.86200	1645.13500	8639713.87600	119103.88290	0.18848	0.73130	0.91979	1.20279
GLCM Dissimilarity Layer 1	3357.36800	2729.50400	3781270.90300	79518.72916	0.02553	0.62929	0.65481	0.96092
GLCM Dissimilarity Layer2	4218.78200	2973.43200	2756373.39800	198792.39400	0.13120	0.34560	0.47680	0.75847
GLCM Dissimilarity Layer 3	3324.26000	2283.70700	3873154.13400	141961.03300	0.06742	0.49799	0.56541	0.86375
GLCM Dissimilarity Layer 4	39.79000	40.09900	64.95211	5.22219	0.00034	0.32228	0.32262	0.55150
GLCM Dissimilarity Layer 5	39.71400	38.74400	78.66029	12.03387	0.00259	0.19396	0.19655	0.35688
GLCM Dissimilarity Layer 6	38.59100	35.85200	90.95588	14.10297	0.01785	0.19150	0.20935	0.37778
GLCM Dissimilarity Layer 7	40.06200	40.65100	319.45457	4.05334	0.00027	0.75150	0.75177	1.05693
GLCM Dissimilarity Layer 8	43.11500	27.65300	423.90292	9.18167	0.13801	0.62221	0.76022	1.06487
GLCM Entropy Layer 1	40.48200	41.55000	226.24120	3.92704	0.00124	0.67546	0.67670	0.98341
GLCM Entropy Layer 2	47.54900	43.11900	179.76865	10.36894	0.02580	0.39468	0.42048	0.68654
GLCM Entropy Layer 3	40.89700	37.44500	252.31516	12.34829	0.01126	0.43161	0.44286	0.71561
GLCM Entropy Layer 4	6.39240	7.20030	0.90793	0.14702	0.15468	0.18362	0.33830	0.57403
GLCM Entropy Layer 5	6.30270	7.55770	0.78871	0.27969	0.36855	0.06436	0.43291	0.70276
GLCM Entropy Layer 6	6.36910	7.18090	0.76102	0.11267	0.18857	0.20000	0.38858	0.64396
GLCM Entropy Layer 7	6.35250	7.75800	0.98694	0.38845	0.35907	0.05248	0.41155	0.67475
GLCM Entropy Layer 8	5.02710	6.32080	1.25673	0.37300	0.25674	0.08705	0.34379	0.58184
GLCM Mean Layer 1	4.80980	5.36390	0.78066	0.04587	0.09287	0.39057	0.48344	0.76668
GLCM Mean Layer2	5.03550	5.62310	1.04399	0.04847	0.07901	0.44357	0.52259	0.81403
GLCM Mean Layer 3	4.95240	3.72870	0.90127	0.24130	0.32765	0.10148	0.42913	0.69785
GLCM Mean Layer 4	120.18200	127.63100	26.93388	1.54123	0.48716	0.39645	0.88361	1.17342
GLCM Mean Layer 5	120.28300	127.78900	28.73082	5.31070	0.41376	0.16029	0.57405	0.87352
GLCM Mean Layer 6	120.14500	127.41700	29.07154	1.18873	0.43689	0.47268	0.90957	1.19461
GLCM Mean Layer 7	134.62600	126.85600	44.47787	7.88714	0.28823	0.16749	0.45572	0.73202
GLCM Mean Layer 8	137.11400	127.61100	67.37378	3.82963	0.31707	0.39794	0.71501	1.02163
GLCM Correlation Layer 1	135.77400	126.17200	41.08383	6.41662	0.48525	0.19017	0.67542	0.98211
GLCM Correlation Layer 2	125.65400	127.77300	28.39267	5.24849	0.03337	0.16028	0.19365	0.35211
GLCM Correlation Layer 3	117.31200	127.75100	45.14084	1.14534	0.58858	0.58448	1.17306	1.38116
GLCM Correlation Layer 4	0.62461	0.54193	0.01744	0.00399	0.07975	0.12534	0.20509	0.37085
GLCM Correlation Layer 5	0.63036	0.58872	0.01748	0.00794	0.01705	0.03790	0.05496	0.10694
GLCM Correlation Layer 6	0.66236	0.62994	0.01971	0.00178	0.01223	0.29824	0.31048	0.53380
GLCM Correlation Layer 7	0.61083	0.57380	0.04281	0.00141	0.00775	0.52376	0.53151	0.82457
GLCM Correlation Layer 8	0.57458	0.76240	0.04566	0.00256	0.18290	0.40142	0.58432	0.88503

Table 40 J value water body and paddy field.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1155.76800	1321.03100	14834.20397	8597.03472	0.29140	0.01837	0.30978	0.53278
Mean Layer 1	1665.12000	1304.21400	26324.60884	442.12358	1.21656	0.68342	1.89998	1.70086
Mean Layer 2	1982.50800	1524.75100	80686.62151	913.79552	0.64197	0.77924	1.42121	1.51716
Mean Layer 3	1990.85000	1331.44600	136906.86820	1571.55178	0.78498	0.77594	1.56093	1.58012
Mean Layer 4	1743.95000	3676.98600	44851.55109	324461.02860	2.52945	0.21287	2.74232	1.87116
Mean Layer 5	1516.09200	2368.87000	31830.54168	40450.86540	2.51527	0.00358	2.51886	1.83890
Mean Layer 6	80.77700	197.51400	298.80845	195.67825	6.88973	0.01112	6.90085	1.99799
Mean Layer 7	100.33600	71.31400	34.45612	47.39534	2.57258	0.00633	2.57890	1.84829
Mean Layer 8	166.52500	93.14700	322.91541	65.04105	3.46967	0.14577	3.61545	1.94619
Max. diff.	1.69900	2.71520	0.01505	0.05576	3.64604	0.10029	3.74634	1.95279
Standard deviation Layer 1	44.98700	23.25300	365.55569	103.70462	0.25165	0.09326	0.34492	0.58344
Standard deviation Layer 2	56.26400	37.11800	483.00212	415.02597	0.10205	0.00144	0.10348	0.19662
Standard deviation Layer 3	71.51700	37.16500	1136.50100	524.67636	0.17759	0.03644	0.21404	0.38537
Standard deviation Layer 4	124.18600	232.63600	8201.09163	4277.92832	0.23562	0.02602	0.26164	0.46042
Standard deviation Layer 5	101.17200	78.78000	4690.16502	1518.79980	0.02019	0.07558	0.09577	0.18264
Standard deviation Layer 6	9.15520	6.75160	41.82114	1.82859	0.03309	0.45729	0.49038	0.77521
Standard deviation Layer 7	6.25910	5.34680	12.05007	0.84514	0.01614	0.35165	0.36778	0.61547
Standard deviation Layer 8	7.36440	3.41510	16.17177	2.98850	0.20351	0.16034	0.36384	0.61000
Ration Layer 1	0.18055	0.12399	0.00013	0.00008	3.82653	0.01045	3.83698	1.95688
Ration Layer 2	0.21391	0.14482	0.00020	0.00008	4.29810	0.04749	4.34559	1.97407
Ration Layer 3	0.21386	0.12661	0.00038	0.00011	3.85925	0.08947	3.94872	1.96144
Ration Layer 4	0.18886	0.34623	0.00023	0.00081	5.93341	0.09288	6.02629	1.99517
Ration Layer 5	0.16483	0.22396	0.00039	0.00002	2.12310	0.42267	2.54577	1.84317
Ration Layer 6	0.00892	0.01869	0.00001	0.00000	3.55910	0.55863	4.11773	1.96744
Ration Layer 7	0.01101	0.00681	0.00000	0.00000	1.12472	0.05875	1.18348	1.38758
Ration Layer 8	0.01808	0.00890	0.00000	0.00000	4.33889	0.01874	4.35764	1.97438
Area	174.70000	127.30000	39580.67778	4486.67778	0.01275	0.25142	0.26417	0.46431
Border length	70.80000	64.00000	1643.73333	326.22222	0.00587	0.14823	0.15410	0.28563
Width	11.60410	9.46880	52.22826	18.32484	0.01616	0.06564	0.08180	0.15708
Asymmetry	0.51831	0.58648	0.07180	0.10895	0.00643	0.01079	0.01721	0.03413
Border index	1.35670	1.24700	0.05597	0.02492	0.03719	0.03986	0.07706	0.14832
Shape index	1.53370	1.48400	0.13578	0.08576	0.00279	0.01308	0.01587	0.03148
GLCM Homogeneity Layer 1	0.03437	0.02684	0.00020	0.00007	0.05401	0.06775	0.12176	0.22927
GLCM Homogeneity Layer 2	0.03283	0.03102	0.00008	0.00016	0.00332	0.02977	0.03309	0.06509
GLCM Homogeneity Layer 3	0.03311	0.03272	0.00010	0.00029	0.00010	0.06691	0.06701	0.12962
GLCM Homogeneity Layer 4	0.04096	0.03085	0.00032	0.00004	0.07117	0.22665	0.29782	0.51513
GLCM Homogeneity Layer 5	0.25455	0.25038	0.00038	0.00008	0.00943	0.14821	0.15764	0.29169
GLCM Homogeneity Layer 6	1155.76800	1321.03100	14834.20397	8597.03472	0.29140	0.01837	0.30978	0.53278
GLCM Homogeneity Layer 7	1665.12000	1304.21400	26324.60884	442.12358	1.21656	0.68342	1.89998	1.70086
GLCM Homogeneity Layer 8	1982.50800	1524.75100	80686.62151	913.79552	0.64197	0.77924	1.42121	1.51716

Table 40 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.08887	0.04793	0.00392	0.00010	0.10408	0.57740	0.68148	0.98826
GLCM Contrast Layer 2	0.07695	0.05129	0.00694	0.00024	0.02291	0.51315	0.53606	0.82990
GLCM Contrast Layer 3	0.08867	0.10096	0.00769	0.00041	0.00466	0.41469	0.41936	0.68506
GLCM Contrast Layer 4	2949.91900	2522.80900	1658584.28400	861951.58320	0.01809	0.02631	0.04440	0.08686
GLCM Contrast Layer 5	2943.11400	1919.87000	1596316.75400	351187.18160	0.13441	0.13138	0.26579	0.46680
GLCM Contrast Layer 6	2812.11500	2116.22400	1770516.09900	969739.43570	0.04418	0.02232	0.06650	0.12867
GLCM Contrast Layer 7	3376.09900	1746.53200	4700693.74700	155852.09090	0.13670	0.52137	0.65807	0.96430
GLCM Contrast Layer 8	4214.86200	1751.64500	8639713.87600	546012.97020	0.16513	0.37444	0.53957	0.83400
GLCM Dissimilarity Layer 1	3357.36800	1792.04000	3781270.90300	239048.23140	0.15237	0.37436	0.52673	0.81894
GLCM Dissimilarity Layer2	4218.78200	2098.56000	2756373.39800	208103.14920	0.37910	0.33573	0.71483	1.02145
GLCM Dissimilarity Layer 3	3324.26000	1852.10900	3873154.13400	332699.22740	0.12882	0.30828	0.43710	0.70818
GLCM Dissimilarity Layer 4	39.79000	38.81600	64.95211	64.21736	0.00184	0.00001	0.00184	0.00368
GLCM Dissimilarity Layer 5	39.71400	33.42600	78.66029	40.50734	0.08295	0.02704	0.10998	0.20830
GLCM Dissimilarity Layer 6	38.59100	33.95100	90.95588	87.62090	0.03014	0.00009	0.03023	0.05955
GLCM Dissimilarity Layer 7	40.06200	31.45100	319.45457	16.26548	0.05522	0.42265	0.47787	0.75979
GLCM Dissimilarity Layer 8	43.11500	27.74900	423.90292	40.27068	0.12717	0.28727	0.41444	0.67858
GLCM Entropy Layer 1	40.48200	32.23800	226.24120	25.41635	0.06752	0.25321	0.32073	0.54876
GLCM Entropy Layer 2	47.54900	35.13300	179.76865	11.94529	0.20102	0.36343	0.56445	0.86266
GLCM Entropy Layer 3	40.89700	32.45900	252.31516	39.83365	0.06093	0.18821	0.24914	0.44105
GLCM Entropy Layer 4	6.39240	6.51230	0.90793	0.18287	0.00329	0.14577	0.14907	0.27697
GLCM Entropy Layer 5	6.30270	6.61840	0.78871	0.20432	0.02509	0.10629	0.13138	0.24623
GLCM Entropy Layer 6	6.36910	6.63920	0.76102	0.28551	0.01743	0.05781	0.07524	0.14495
GLCM Entropy Layer 7	6.35250	6.76010	0.98694	0.22184	0.03436	0.12797	0.16233	0.29968
GLCM Entropy Layer 8	5.02710	5.37560	1.25673	0.23476	0.02036	0.15849	0.17884	0.32753
GLCM Mean Layer 1	4.80980	5.67340	0.78066	0.05179	0.22398	0.36377	0.58775	0.88885
GLCM Mean Layer2	5.03550	5.42510	1.04399	0.06784	0.03413	0.36833	0.40246	0.66266
GLCM Mean Layer 3	4.95240	4.55770	0.90127	0.18242	0.03594	0.14496	0.18090	0.33097
GLCM Mean Layer 4	120.18200	127.90600	26.93388	1.62600	0.52224	0.38455	0.90679	1.19236
GLCM Mean Layer 5	120.28300	128.16300	28.73082	1.50958	0.51334	0.41557	0.92891	1.21003
GLCM Mean Layer 6	120.14500	127.75800	29.07154	4.56848	0.43072	0.18905	0.61977	0.92386
GLCM Mean Layer 7	134.62600	127.35800	44.47787	12.21853	0.23292	0.09780	0.33072	0.56319
GLCM Mean Layer 8	137.11400	127.28500	67.37378	3.03856	0.34301	0.45020	0.79321	1.09522
GLCM Correlation Layer 1	135.77400	126.84000	41.08383	13.14596	0.36795	0.07711	0.44506	0.71843
GLCM Correlation Layer 2	125.65400	126.96800	28.39267	11.23173	0.01089	0.05193	0.06282	0.12178
GLCM Correlation Layer 3	117.31200	127.53900	45.14084	10.98614	0.46587	0.11563	0.58150	0.88188
GLCM Correlation Layer 4	0.62461	0.57745	0.01744	0.03393	0.01082	0.02718	0.03800	0.07458
GLCM Correlation Layer 5	0.63036	0.67906	0.01748	0.01710	0.01715	0.00003	0.01718	0.03406
GLCM Correlation Layer 6	0.66236	0.66943	0.01971	0.01841	0.00033	0.00029	0.00062	0.00123
GLCM Correlation Layer 7	0.61083	0.75530	0.04281	0.00192	0.11665	0.45139	0.56803	0.86672
GLCM Correlation Layer 8	0.57458	0.76544	0.04566	0.00555	0.17782	0.23752	0.41533	0.67976

Table 41 J value water body and rangeland.

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1155.76800	1401.62700	14834.20397	1182.33660	0.94350	0.32413	1.26763	1.43701
Mean Layer 1	1665.12000	1316.44200	26324.60884	1022.57206	1.11142	0.48453	1.59594	1.59456
Mean Layer 2	1982.50800	1524.27900	80686.62151	2029.22079	0.63462	0.58658	1.22120	1.41025
Mean Layer 3	1990.85000	1335.04600	136906.86820	1991.59127	0.77409	0.71824	1.49233	1.55030
Mean Layer 4	1743.95000	3954.73300	44851.55109	21128.39829	18.51912	0.03461	18.55372	2.00000
Mean Layer 5	1516.09200	2718.93400	31830.54168	6964.61549	9.32351	0.13226	9.45577	1.99984
Mean Layer 6	80.77700	204.66400	298.80845	12.86756	12.31085	0.46078	12.77163	1.99999
Mean Layer 7	100.33600	77.11500	34.45612	7.75892	3.19326	0.12768	3.32095	1.92776
Mean Layer 8	166.52500	81.81000	322.91541	4.96431	5.47200	0.70483	6.17683	1.99585
Max. diff.	1.69900	2.76610	0.01505	0.00396	14.97549	0.10409	15.07958	2.00000
Standard deviation Layer 1	44.98700	30.99300	365.55569	159.92665	0.09317	0.04155	0.13472	0.25208
Standard deviation Layer 2	56.26400	52.49200	483.00212	224.32657	0.00503	0.03589	0.04092	0.08019
Standard deviation Layer 3	71.51700	56.89400	1136.50100	1083.43332	0.02408	0.00014	0.02422	0.04787
Standard deviation Layer 4	124.18600	309.81100	8201.09163	6500.71848	0.58593	0.00337	0.58929	0.89056
Standard deviation Layer 5	101.17200	98.15300	4690.16502	813.30705	0.00041	0.17141	0.17182	0.31575
Standard deviation Layer 6	9.15520	8.45560	41.82114	10.67308	0.00233	0.10850	0.11083	0.20981
Standard deviation Layer 7	6.25910	7.65650	12.05007	3.58733	0.03122	0.08664	0.11786	0.22236
Standard deviation Layer 8	7.36440	3.88860	16.17177	4.69709	0.14473	0.09000	0.23473	0.41843
Ration Layer 1	0.18055	0.11744	0.00013	0.00001	7.30494	0.31088	7.61582	1.99901
Ration Layer 2	0.21391	0.13594	0.00020	0.00001	7.49860	0.53636	8.03496	1.99935
Ration Layer 3	0.21386	0.11905	0.00038	0.00001	5.78295	0.66971	6.45266	1.99685
Ration Layer 4	0.18886	0.35266	0.00023	0.00006	23.22844	0.11185	23.34029	2.00000
Ration Layer 5	0.16483	0.24247	0.00039	0.00001	3.72034	0.51568	4.23602	1.97107
Ration Layer 6	0.00892	0.01826	0.00001	0.00000	3.20556	0.46025	3.66580	1.94883
Ration Layer 7	0.01101	0.00688	0.00000	0.00000	1.44187	0.51548	1.95735	1.71754
Ration Layer 8	0.01808	0.00730	0.00000	0.00000	9.20210	0.59507	9.79717	1.99989
Area	174.70000	123.60000	39580.67778	3840.48889	0.01503	0.28291	0.29795	0.51532
Border length	70.80000	86.60000	1643.73333	873.82222	0.02479	0.02455	0.04934	0.09628
Width	11.60410	12.18080	52.22826	23.87806	0.00109	0.03735	0.03844	0.07542
Asymmetry	0.51831	0.62722	0.07180	0.06069	0.02238	0.00177	0.02415	0.04772
Border index	1.35670	1.76590	0.05597	0.23248	0.14512	0.11729	0.26241	0.46161
Shape index	1.53370	2.01710	0.13578	0.40081	0.10887	0.06991	0.17878	0.32742
GLCM Homogeneity Layer 1	0.03437	0.02676	0.00020	0.00006	0.05580	0.07369	0.12948	0.24290
GLCM Homogeneity Layer 2	0.03283	0.02383	0.00008	0.00001	0.22276	0.26296	0.48572	0.76949
GLCM Homogeneity Layer 3	0.03311	0.03683	0.00010	0.00010	0.01682	0.00005	0.01687	0.03346
GLCM Homogeneity Layer 4	0.04096	0.02431	0.00032	0.00003	0.19933	0.29315	0.49247	0.77777
GLCM Homogeneity Layer 5	0.25455	0.24848	0.00038	0.00010	0.01915	0.11107	0.13022	0.24420
GLCM Homogeneity Layer 6	1155.76800	1401.62700	14834.20397	1182.33660	0.94350	0.32413	1.26763	1.43701
GLCM Homogeneity Layer 7	1665.12000	1316.44200	26324.60884	1022.57206	1.11142	0.48453	1.59594	1.59456
GLCM Homogeneity Layer 8	1982.50800	1524.27900	80686.62151	2029.22079	0.63462	0.58658	1.22120	1.41025

Table 41 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.08887	0.03455	0.00392	0.00011	0.18302	0.56691	0.74993	1.05520
GLCM Contrast Layer 2	0.07695	0.02949	0.00694	0.00004	0.08063	0.96545	1.04609	1.29738
GLCM Contrast Layer 3	0.08867	0.08441	0.00769	0.00133	0.00050	0.17130	0.17180	0.31570
GLCM Contrast Layer 4	2949.91900	2456.83500	1658584.28400	656967.37660	0.02625	0.05179	0.07804	0.15014
GLCM Contrast Layer 5	2943.11400	2376.29200	1596316.75400	452281.99900	0.03921	0.09344	0.13265	0.24846
GLCM Contrast Layer 6	2812.11500	1930.86400	1770516.09900	461552.86980	0.08698	0.10536	0.19235	0.34996
GLCM Contrast Layer 7	3376.09900	2424.00700	4700693.74700	386301.68100	0.04455	0.31763	0.36218	0.60768
GLCM Contrast Layer 8	4214.86200	2418.07500	8639713.87600	582673.99190	0.08752	0.36018	0.44770	0.72181
GLCM Dissimilarity Layer 1	3357.36800	2152.12800	3781270.90300	300436.01180	0.08897	0.32480	0.41377	0.67769
GLCM Dissimilarity Layer2	4218.78200	2488.80500	2756373.39800	329598.74770	0.24245	0.24085	0.48330	0.76652
GLCM Dissimilarity Layer 3	3324.26000	2402.77400	3873154.13400	864290.88640	0.04481	0.12912	0.17393	0.31929
GLCM Dissimilarity Layer 4	39.79000	37.89000	64.95211	47.56176	0.00802	0.00604	0.01407	0.02794
GLCM Dissimilarity Layer 5	39.71400	37.71500	78.66029	25.26965	0.00961	0.07660	0.08621	0.16520
GLCM Dissimilarity Layer 6	38.59100	32.47500	90.95588	37.50783	0.07279	0.04752	0.12031	0.22671
GLCM Dissimilarity Layer 7	40.06200	38.63400	319.45457	33.19985	0.00145	0.26888	0.27033	0.47374
GLCM Dissimilarity Layer 8	43.11500	33.89300	423.90292	35.67547	0.04626	0.31259	0.35885	0.60304
GLCM Entropy Layer 1	40.48200	35.95900	226.24120	31.83543	0.01982	0.20951	0.22933	0.40986
GLCM Entropy Layer 2	47.54900	39.29400	179.76865	27.24956	0.08229	0.19565	0.27795	0.48532
GLCM Entropy Layer 3	40.89700	37.70700	252.31516	73.44047	0.00781	0.08971	0.09752	0.18583
GLCM Entropy Layer 4	6.39240	6.68920	0.90793	0.11894	0.02145	0.22311	0.24456	0.43390
GLCM Entropy Layer 5	6.30270	6.81690	0.78871	0.14442	0.07084	0.16192	0.23276	0.41531
GLCM Entropy Layer 6	6.36910	6.69390	0.76102	0.10714	0.03038	0.20941	0.23979	0.42642
GLCM Entropy Layer 7	6.35250	6.84400	0.98694	0.15071	0.05309	0.19430	0.24739	0.43832
GLCM Entropy Layer 8	5.02710	5.45730	1.25673	0.14034	0.03312	0.25440	0.28752	0.49976
GLCM Mean Layer 1	4.80980	5.92890	0.78066	0.09354	0.35815	0.24044	0.59859	0.90083
GLCM Mean Layer2	5.03550	5.93980	1.04399	0.02244	0.19170	0.62407	0.81577	1.11541
GLCM Mean Layer 3	4.95240	4.67110	0.90127	0.66348	0.01264	0.00584	0.01848	0.03663
GLCM Mean Layer 4	120.18200	129.52300	26.93388	3.70265	0.71201	0.21391	0.92593	1.20767
GLCM Mean Layer 5	120.28300	130.02500	28.73082	3.24967	0.74191	0.25186	0.99377	1.25964
GLCM Mean Layer 6	120.14500	129.11800	29.07154	2.38615	0.63987	0.31789	0.95775	1.23249
GLCM Mean Layer 7	134.62600	128.09500	44.47787	14.24887	0.18158	0.07696	0.25853	0.45564
GLCM Mean Layer 8	137.11400	129.77200	67.37378	10.64784	0.17272	0.18802	0.36074	0.60568
GLCM Correlation Layer 1	135.77400	127.06600	41.08383	10.47416	0.36769	0.10865	0.47634	0.75789
GLCM Correlation Layer 2	125.65400	126.93500	28.39267	9.83465	0.01073	0.06719	0.07792	0.14993
GLCM Correlation Layer 3	117.31200	127.37300	45.14084	4.75213	0.50720	0.26627	0.77348	1.07719
GLCM Correlation Layer 4	0.62461	0.59482	0.01744	0.02703	0.00499	0.01189	0.01688	0.03348
GLCM Correlation Layer 5	0.63036	0.63679	0.01748	0.01449	0.00032	0.00220	0.00252	0.00503
GLCM Correlation Layer 6	0.66236	0.68829	0.01971	0.01350	0.00506	0.00889	0.01395	0.02770
GLCM Correlation Layer 7	0.61083	0.62369	0.04281	0.00559	0.00085	0.22380	0.22465	0.40241
GLCM Correlation Layer 8	0.57458	0.65799	0.04566	0.00602	0.03365	0.22185	0.25550	0.45095

Table 42 J value water body and perennial tree and orchard.

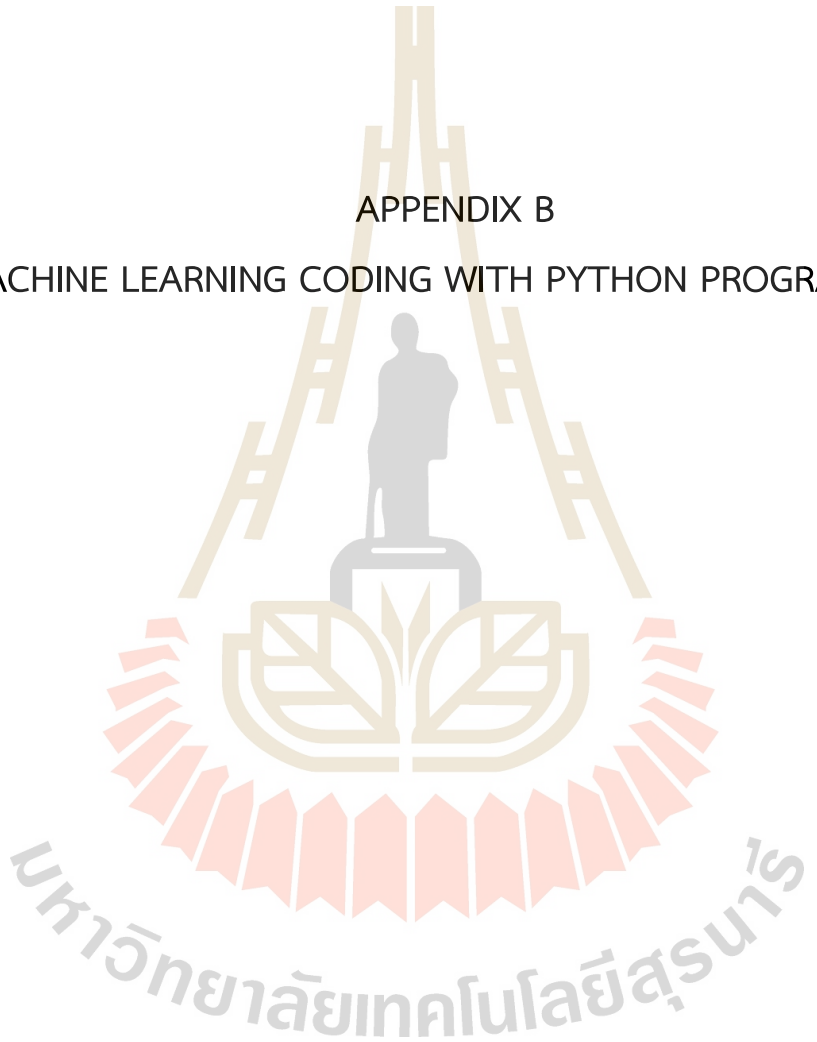
Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
Brightness	1155.76800	1366.98100	14834.20397	5005.38201	0.56215	0.07040	0.63255	0.93753
Mean Layer 1	1665.12000	1279.21100	26324.60884	738.32725	1.37574	0.56072	1.93646	1.71157
Mean Layer 2	1982.50800	1444.40500	80686.62151	2485.55389	0.87035	0.53862	1.40896	1.51121
Mean Layer 3	1990.85000	1293.66600	136906.86820	4592.44727	0.85878	0.51865	1.37742	1.49554
Mean Layer 4	1743.95000	3934.46400	44851.55109	247864.91930	4.09812	0.16397	4.26209	1.97181
Mean Layer 5	1516.09200	2620.88000	31830.54168	118523.44450	2.02947	0.10104	2.13051	1.76245
Mean Layer 6	80.77700	206.29700	298.80845	177.75476	8.26505	0.01667	8.28172	1.99949
Mean Layer 7	100.33600	73.90800	34.45612	316.99093	0.49683	0.25982	0.75665	1.06153
Mean Layer 8	166.52500	83.01000	322.91541	114.45838	3.98672	0.06442	4.05114	1.96520
Max. diff.	1.69900	2.82380	0.01505	0.07843	3.38354	0.15389	3.53742	1.94182
Standard deviation Layer 1	44.98700	15.89100	365.55569	24.80074	0.54218	0.35888	0.90107	1.18773
Standard deviation Layer 2	56.26400	22.72800	483.00212	38.41324	0.53924	0.32459	0.86383	1.15691
Standard deviation Layer 3	71.51700	22.28990	1136.50100	194.49417	0.45517	0.17374	0.62891	0.93365
Standard deviation Layer 4	124.18600	126.34700	8201.09163	537.95547	0.00013	0.36626	0.36639	0.61353
Standard deviation Layer 5	101.17200	57.89300	4690.16502	537.36591	0.08958	0.24930	0.33888	0.57486
Standard deviation Layer 6	9.15520	3.22540	41.82114	0.88459	0.20584	0.62790	0.83374	1.13116
Standard deviation Layer 7	6.25910	3.25440	12.05007	0.44018	0.18071	0.49878	0.67948	0.98624
Standard deviation Layer 8	7.36440	1.83417	16.17177	0.47305	0.45935	0.55080	1.01015	1.27167
Ration Layer 1	0.18055	0.11731	0.00013	0.00005	5.54222	0.04194	5.58416	1.99249
Ration Layer 2	0.21391	0.13237	0.00020	0.00006	6.40901	0.07734	6.48635	1.99695
Ration Layer 3	0.21386	0.11862	0.00038	0.00009	4.83154	0.12485	4.95639	1.98592
Ration Layer 4	0.18886	0.35913	0.00023	0.00115	5.23615	0.14660	5.38275	1.99081
Ration Layer 5	0.16483	0.23927	0.00039	0.00066	1.32214	0.01643	1.33857	1.47556
Ration Layer 6	0.00892	0.01888	0.00001	0.00000	3.29122	0.19229	3.48351	1.93860
Ration Layer 7	0.01101	0.00677	0.00000	0.00000	0.81792	0.00044	0.81836	1.11769
Ration Layer 8	0.01808	0.00765	0.00000	0.00000	5.46002	0.01441	5.47443	1.99161
Area	174.70000	308.30000	39580.67778	32593.34444	0.06183	0.00235	0.06418	0.12433
Border length	70.80000	84.00000	1643.73333	584.00000	0.01955	0.06414	0.08369	0.16057
Width	11.60410	16.27000	52.22826	18.30678	0.07716	0.06576	0.14292	0.26635
Asymmetry	0.51831	0.43772	0.07180	0.06217	0.01212	0.00130	0.01341	0.02665
Border index	1.35670	1.16470	0.05597	0.00978	0.14017	0.17004	0.31021	0.53342
Shape index	1.53370	1.23320	0.13578	0.01757	0.14720	0.22544	0.37264	0.62218
GLCM Homogeneity Layer 1	0.03437	0.02526	0.00020	0.00001	0.09932	0.35383	0.45315	0.72875
GLCM Homogeneity Layer 2	0.03283	0.03161	0.00008	0.00008	0.00234	0.00043	0.00277	0.00554
GLCM Homogeneity Layer 3	0.03311	0.03381	0.00010	0.00006	0.00076	0.01443	0.01519	0.03016
GLCM Homogeneity Layer 4	0.04096	0.03170	0.00032	0.00002	0.06263	0.33853	0.40115	0.66090
GLCM Homogeneity Layer 5	0.25455	0.25456	0.00038	0.00006	0.00000	0.17922	0.17922	0.32816
GLCM Homogeneity Layer 6	1155.76800	1366.98100	14834.20397	5005.38201	0.56215	0.07040	0.63255	0.93753
GLCM Homogeneity Layer 7	1665.12000	1279.21100	26324.60884	738.32725	1.37574	0.56072	1.93646	1.71157
GLCM Homogeneity Layer 8	1982.50800	1444.40500	80686.62151	2485.55389	0.87035	0.53862	1.40896	1.51121

Table 42 (Continued).

Feature	Mean B	Mean FC	Variance1	Variance2	B1	B2	B	J
GLCM Contrast Layer 1	0.08887	0.09501	0.00392	0.00044	0.00216	0.25515	0.25731	0.45374
GLCM Contrast Layer 2	0.07695	0.08631	0.00694	0.00025	0.00304	0.50325	0.50629	0.79454
GLCM Contrast Layer 3	0.08867	0.19886	0.00769	0.00491	0.24094	0.01242	0.25337	0.44764
GLCM Contrast Layer 4	2949.91900	2667.94800	1658584.28400	471380.52280	0.00933	0.09301	0.10234	0.19456
GLCM Contrast Layer 5	2943.11400	1912.37700	1596316.75400	353896.56100	0.13619	0.13016	0.26635	0.46766
GLCM Contrast Layer 6	2812.11500	1971.07100	1770516.09900	382827.40660	0.08212	0.13416	0.21629	0.38899
GLCM Contrast Layer 7	3376.09900	1746.48500	4700693.74700	357465.99680	0.13126	0.33418	0.46543	0.74427
GLCM Contrast Layer 8	4214.86200	1392.14300	8639713.87600	164675.59650	0.22624	0.65290	0.87915	1.16973
GLCM Dissimilarity Layer 1	3357.36800	1867.86700	3781270.90300	427959.51120	0.13177	0.25173	0.38350	0.63706
GLCM Dissimilarity Layer2	4218.78200	2126.10200	2756373.39800	321144.56370	0.35575	0.24598	0.60173	0.90427
GLCM Dissimilarity Layer 3	3324.26000	2313.96400	3873154.13400	841101.36930	0.05413	0.13347	0.18759	0.34210
GLCM Dissimilarity Layer 4	39.79000	40.32600	64.95211	28.58496	0.00077	0.04097	0.04174	0.08176
GLCM Dissimilarity Layer 5	39.71400	33.00100	78.66029	34.49814	0.09956	0.04131	0.14087	0.26280
GLCM Dissimilarity Layer 6	38.59100	33.12000	90.95588	35.64009	0.05911	0.05297	0.11207	0.21204
GLCM Dissimilarity Layer 7	40.06200	31.16400	319.45457	32.60547	0.05622	0.27255	0.32878	0.56039
GLCM Dissimilarity Layer 8	43.11500	23.72400	423.90292	14.54818	0.21440	0.51331	0.72771	1.03397
GLCM Entropy Layer 1	40.48200	32.70800	226.24120	31.99977	0.05851	0.20854	0.26705	0.46873
GLCM Entropy Layer 2	47.54900	34.70800	179.76865	21.19251	0.20513	0.24365	0.44878	0.72319
GLCM Entropy Layer 3	40.89700	35.57100	252.31516	57.83041	0.02287	0.12490	0.14776	0.27473
GLCM Entropy Layer 4	6.39240	6.97150	0.90793	0.06010	0.08661	0.36428	0.45089	0.72588
GLCM Entropy Layer 5	6.30270	7.13730	0.78871	0.06973	0.20285	0.30222	0.50507	0.79307
GLCM Entropy Layer 6	6.36910	6.94450	0.76102	0.06750	0.09990	0.30156	0.40147	0.66132
GLCM Entropy Layer 7	6.35250	7.50380	0.98694	0.18137	0.28363	0.16130	0.44493	0.71826
GLCM Entropy Layer 8	5.02710	6.09360	1.25673	0.15546	0.20136	0.23421	0.43557	0.70621
GLCM Mean Layer 1	4.80980	4.67950	0.78066	0.20913	0.00429	0.10140	0.10569	0.20059
GLCM Mean Layer2	5.03550	4.79510	1.04399	0.07212	0.01294	0.35494	0.36789	0.61561
GLCM Mean Layer 3	4.95240	3.62000	0.90127	0.34819	0.35521	0.05452	0.40973	0.67234
GLCM Mean Layer 4	120.18200	128.18700	26.93388	1.15833	0.57026	0.46108	1.03135	1.28695
GLCM Mean Layer 5	120.28300	127.80300	28.73082	1.25413	0.47149	0.45767	0.92916	1.21023
GLCM Mean Layer 6	120.14500	127.76300	29.07154	1.51925	0.47428	0.41678	0.89106	1.17956
GLCM Mean Layer 7	134.62600	126.43800	44.47787	3.91073	0.34638	0.30338	0.64976	0.95566
GLCM Mean Layer 8	137.11400	127.80600	67.37378	0.78392	0.31779	0.77264	1.09043	1.32785
GLCM Correlation Layer 1	135.77400	125.63200	41.08383	4.53173	0.56373	0.25687	0.82061	1.11967
GLCM Correlation Layer 2	125.65400	128.65100	28.39267	4.61679	0.06803	0.18287	0.25089	0.44379
GLCM Correlation Layer 3	117.31200	127.69000	45.14084	4.53136	0.54207	0.27595	0.81802	1.11739
GLCM Correlation Layer 4	0.62461	0.53505	0.01744	0.02085	0.05237	0.00198	0.05435	0.10581
GLCM Correlation Layer 5	0.63036	0.68206	0.01748	0.00834	0.02588	0.03341	0.05929	0.11513
GLCM Correlation Layer 6	0.66236	0.65596	0.01971	0.01320	0.00031	0.00997	0.01028	0.02046
GLCM Correlation Layer 7	0.61083	0.74075	0.04281	0.00649	0.08560	0.19575	0.28134	0.49046
GLCM Correlation Layer 8	0.57458	0.79586	0.04566	0.00420	0.24551	0.29408	0.53960	0.83403

APPENDIX B

MACHINE LEARNING CODING WITH PYTHON PROGRAMMING



Support Vector Machine

```
import pandas as pd
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
from sklearn.metrics import classification_report,confusion_matrix
from sklearn.metrics import accuracy_score
from sklearn.metrics import cohen_kappa_score
from sklearn.model_selection import GridSearchCV
print( 'Start SVM')
df=pd.read_csv(r'E:\1THESIS\Optimum_parameter\Building\BD_SUM.csv')
X=df.drop('Class_No', axis=1)
X=df[['Brightness','Mean_Layer 1','Mean_Layer 2','Mean_Layer 3','Mean_Layer
4','Mean_Layer 13 'Mean_Layer 6','Mean_Layer 7','Mean_Layer 8','Max. diff.','STD_Layer
1','STD_Layer5',
2','STD_Layer 3','STD_Layer 8','Pixel-baseLayer 1','Pixel-baseLayer 2','Pixel-baseLayer
3',
'Pixel-baseLayer 4','Pixel-baseLayer 5','Pixel-baseLayer 6','GLCM Homogeneity
_Layer 6','GLCM
Homogeneity _Layer 7','GLCM Homogeneity _Layer 8','GLCM Contrast_ Layer 2',
'GLCM Dissimilarity_ Layer 5','GLCM Dissimilarity_ Layer 6','GLCM Entropy_ Layer 2',
'GLCM Entropy_ Layer 5','GLCM Entropy_ Layer 7','GLCM Mean_Layer 6',
'GLCM Correlation_Layer 4']]
y=df['FEATURE']
X_train,X_test,y_train,y_test=train_test_split(X,y,test_size=0.3,random_state=101)
param_grid={'C':[0.01,0.02,0.03,0.04,0.05,0.06,0.07,0.08,0.09,0.1,0.2,0.3,0.4,0.5,0.6,0.7
,0.8,0.9,1,
10,100], 'gamma':[100,90,80,70,60,50,40,30,20,10], 'kernel':['rbf']}
grid=GridSearchCV(SVC(),param_grid,refit=True, verbose=3)
```

```
25 grid.fit(X_train, y_train)
26 grid.best_params_
27 grid.best_estimator_
28 print(grid.best_params_)
29 grid_predictions=grid.predict(X_test)
30 print(classification_report(y_test,grid_predictions))
31 print(confusion_matrix(y_test,grid_predictions))
32 accuracy = accuracy_score(y_test, grid_predictions)
33 print('\nAccuracy:\n',accuracy)
34 cohen_kappa = cohen_kappa_score(y_test, grid_predictions)
35 print('\nCohen Kappa:\n', cohen_kappa)
36 print('Finish')
```

Random Forest

```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import classification_report,confusion_matrix
from sklearn.metrics import accuracy_score
from sklearn.metrics import cohen_kappa_score
from sklearn.model_selection import GridSearchCV
from osgeo import ogr, gdal
print( 'Start RF')
df = pd.read_csv(r'E:\1THESIS\Optimum_parameter\Building\BD_SUM.csv')
print (df.head())
print (df.info)
print(list(df.columns.values))
X=df.drop('FEATURE', axis=1)
X=df[['Brightness','Mean_Layer 1','Mean_Layer 2','Mean_Layer 3','Mean_Layer 4',
'Mean_Layer 5','Mean_Layer 6','Mean_Layer 7','Mean_Layer 8','Max. diff.','STD_Layer
1',
'STD_Layer 2','STD_Layer 3','STD_Layer 8','Pixel-baseLayer 1','Pixel-baseLayer 2',
'Pixel-baseLayer 3','Pixel-baseLayer 4','Pixel-baseLayer 5','Pixel-baseLayer 6',
'GLCM Homogeneity _Layer 6','GLCM Homogeneity _Layer 7','GLCM Homogeneity
_Layer 8',
'GLCM Contrast_ Layer 2','GLCM Dissimilarity_ Layer 5','GLCM Dissimilarity_ Layer 6',
'GLCM Entropy_ Layer 2','GLCM Entropy_ Layer 5','GLCM Entropy_ Layer 7',
'GLCM Mean_Layer 6','GLCM Correlation_Layer 4']]
y=df['FEATURE']
X_train, X_test, y_train, y_test = train_test_split(X,y,test_size = 0.30)
```

```
28 from sklearn.tree import DecisionTreeClassifier
29 dtree = DecisionTreeClassifier ()
30 dtree.fit(X_train,y_train)
31 predictions = dtree.predict(X_test)
32 from sklearn.metrics import classification_report,confusion_matrix
33 print(classification_report(y_test,predictions))
34 print(confusion_matrix(y_test,predictions))
35 parameters={'n_estimators':[50,100,200,400,500,600,700,800,1000]}
36 grid=GridSearchCV(RandomForestClassifier(),param_grid=parameters,refit=True,
verbose=3)
37 grid.fit(X_train, y_train)
38 grid.best_params_
39 grid.best_estimator_
40 print(grid.best_params_)
41 grid_predictions=grid.predict(X_test)
42 print(classification_report(y_test,grid_predictions))
43 print(confusion_matrix(y_test,grid_predictions))
44 print(grid.score(X_test,y_test))
45 accuracy = accuracy_score(y_test, grid_predictions)
46 print('\nAccuracy:\n',accuracy)
47 cohen_kappa = cohen_kappa_score(y_test, grid_predictions)
48 print('\nCohen Kappa:\n', cohen_kappa)
49 print('Finish')
```

Decision Tree Code

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
df = pd.read_csv(r'E:\1THESIS\Optimum_parameter\Building\BD_SUM.csv')
print (df.head())
print (df.info)
print(list(df.columns.values))
from sklearn.model_selection import train_test_split
X=df[['Brightness','Mean_Layer 1','Mean_Layer 2','Mean_Layer 3','Mean_Layer
4','Mean_Layer 11 'Mean_Layer 6','Mean_Layer 7','Mean_Layer 8','Max. diff.','STD_Layer
1','STD_Layer 5',
'STD_Layer 3','STD_Layer 8','Pixel-baseLayer 1','Pixel-baseLayer 2','Pixel-baseLayer
3',
'Pixel-baseLayer 4','Pixel-baseLayer 5','Pixel-baseLayer 6','GLCM Homogeneity
_Layer 6',
'GLCM Homogeneity _Layer 7','GLCM Homogeneity _Layer 8','GLCM Contrast_ Layer
2','GLCM
Dissimilarity_ Layer 5','GLCM Dissimilarity_ Layer 6','GLCM Entropy_ Layer 2','GLCM
Entropy_
Layer 5','GLCM Entropy_ Layer 7','GLCM Mean_Layer 6','GLCM Correlation_Layer 4']]
y=df['FEATURE']
X_train, X_test, y_train, y_test = train_test_split(X,y,test_size = 0.30)
from sklearn.tree import DecisionTreeClassifier
dtree = DecisionTreeClassifier ()
dtree.fit(X_train,y_train)
predictions = dtree.predict(X_test)
from sklearn.metrics import classification_report,confusion_matrix
print(classification_report(y_test,predictions))
print(confusion_matrix(y_test,predictions)
```

K Nearest Neighbor

```
1  import pandas as pd
2  import seaborn as sns
3  import matplotlib.pyplot as plt
4  import numpy as np
5  df = pd.read_csv(r'E:\1THESIS\Optimum_parameter\Building\BD_SUM.csv',index_col
= 1)
6  print (df.head())
7  print(list(df.columns.values))
8  from sklearn.preprocessing import StandardScaler
9  scaler = StandardScaler()
10 scaled_features = scaler.fit_transform(df.drop('FEATURE', axis=1))
11 df_feat = pd.DataFrame(scaled_features,columns = df.columns[:-1])
12 print (df_feat.head())
13 from sklearn.model_selection import train_test_split
14 X_train,X_test,y_train,y_test =
train_test_split(scaled_features,df['FEATURE'],test_size =
15 0.30,random_state= 101)
16 from sklearn.neighbors import KNeighborsClassifier
17 knn = KNeighborsClassifier(n_neighbors = 1)
18 knn.fit(X_train,y_train)
19 pred = knn.predict(X_test)
20 from sklearn.metrics import classification_report,confusion_matrix
21 print(confusion_matrix(y_test,pred))
22 print(classification_report(y_test,pred))
23 error_rate = []
24 for i in range (1,40):
25 knn = KNeighborsClassifier(n_neighbors = i)
26 knn.fit(X_train,y_train)
27 pred_i = knn.predict(X_test)
28 error_rate.append(np.mean(pred_i != y_test))
```

```
29 plt.figure(figsize = (10,6))
30 plt.plot(range(1,40),error_rate,color =
'blue',linestyle='dashed',marker='o',markerfacecolor
    ='red',markersize = 10 )
31 plt.title('Error Rate vs. K Value')
32 plt.xlabel('K')
33 plt.ylabel('Error Rate')
34 knn = KNeighborsClassifier(n_neighbors = 1)
35 knn.fit(X_train,y_train)
36 pred = knn.predict(X_test)
37 print(confusion_matrix(y_test,pred))
38 print(classification_report(y_test,pred))
```

APPENDIX C

EXAMPLE OF LULC IN MODELING AND TESTING AREA

Table C1 Example of building and settlement areas in modeling area.

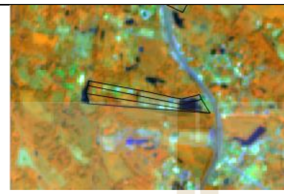
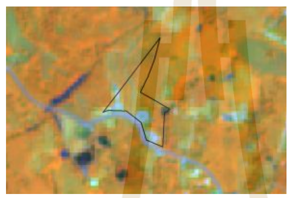
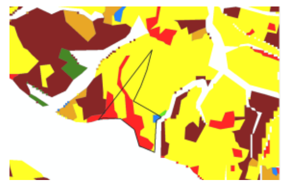
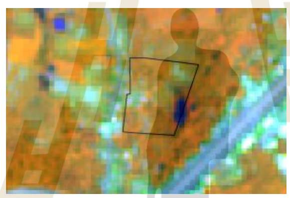
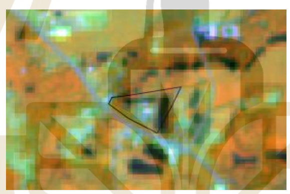
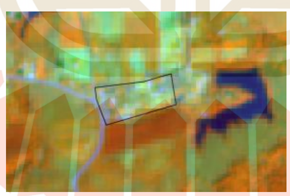
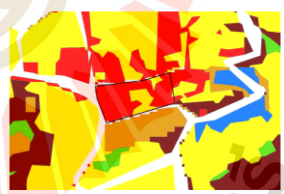
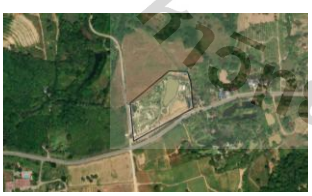
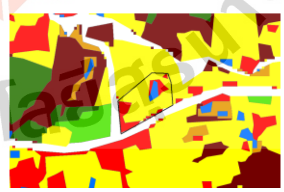
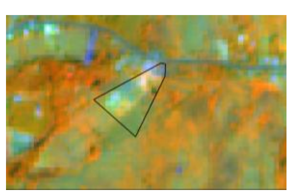
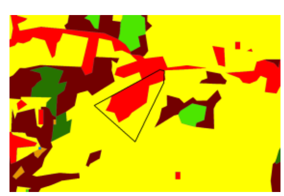
Building and settlement areas	Sentinel -2A	RF classification	Field Check
			
			
			
			
			
			
			

Table C1 (Continued).

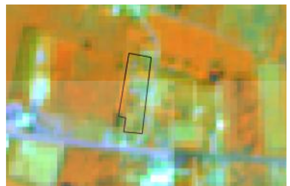
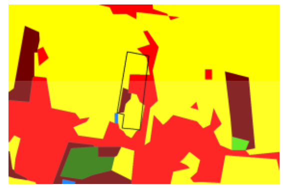
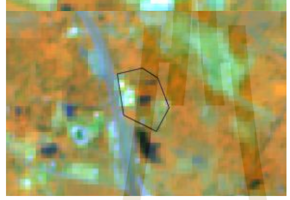
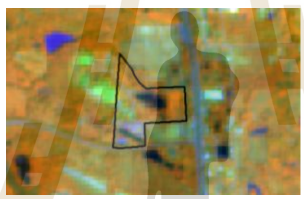
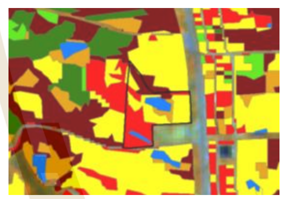
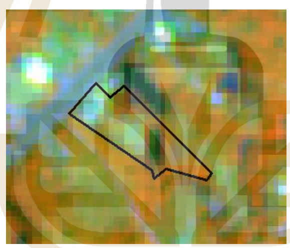
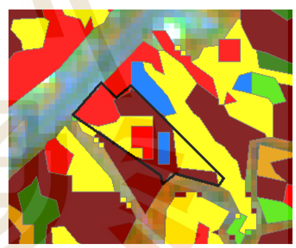
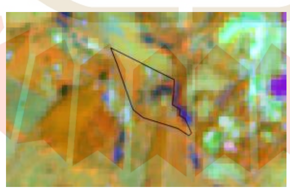
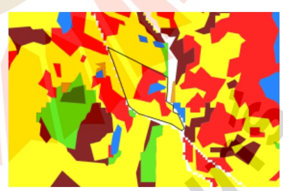
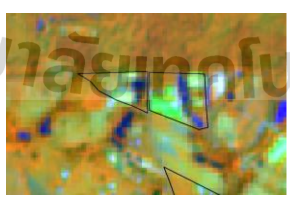
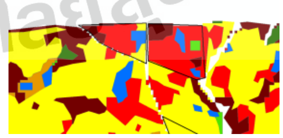
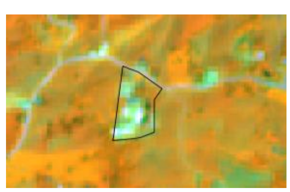
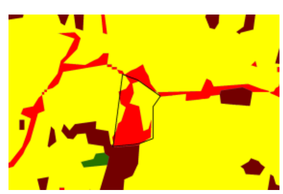
Building and settlement areas	Sentinel -2A	RF classification	Field Check
			
			
			
			
			
			
			

Table C2 Example of field crops and perennial trees and orchards in modeling area.

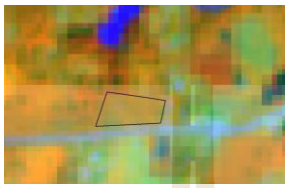
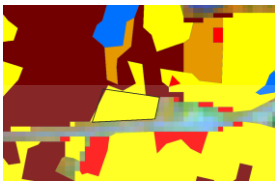
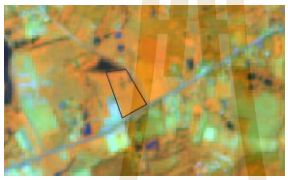
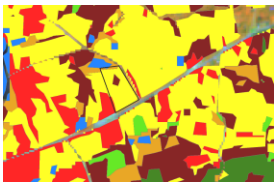
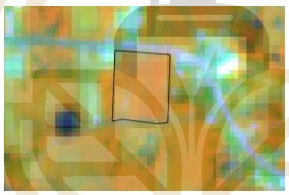
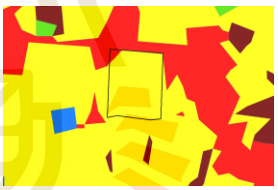
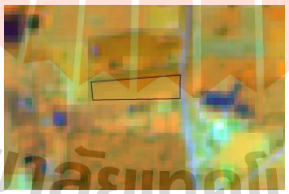
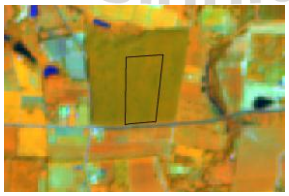
Field crops	Sentinel -2A	RF classification	Field Check
			
			
			
			
Perennial trees and orchards			
			
			

Table C3 Example of forest area, water body and rangeland in modeling area.

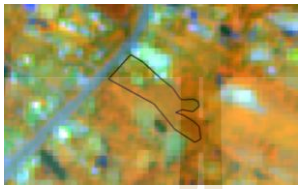
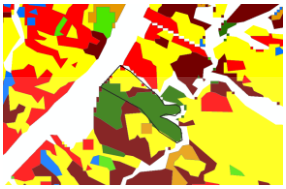
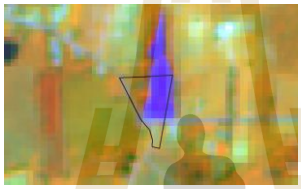
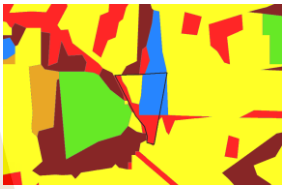
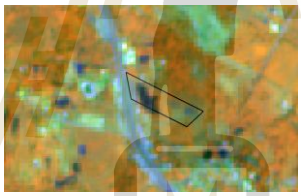
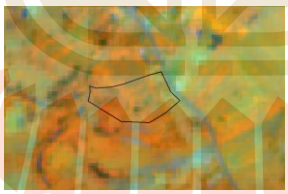
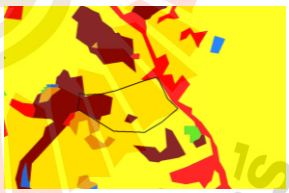
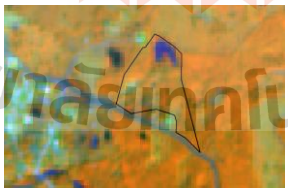
Forest area	Sentinel -2A	RF classification	Field Check
			
Water body			
			
			
Rangeland			
			
			

Table C4 Example of building and settlement area in testing area.

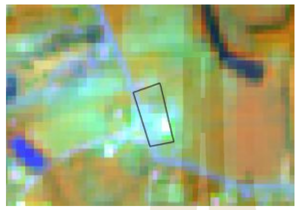
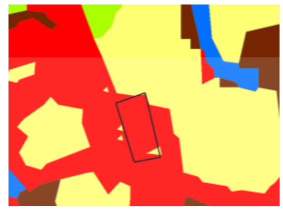
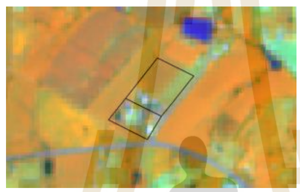
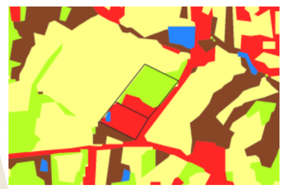
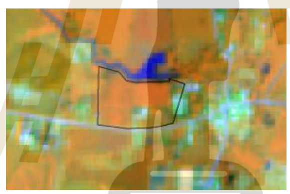
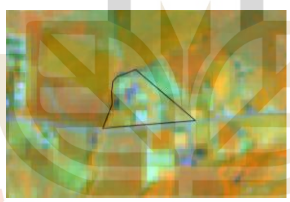
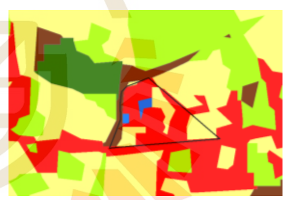
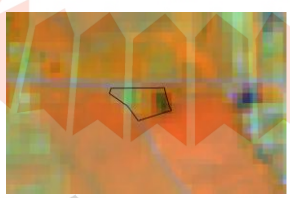
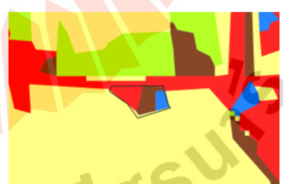
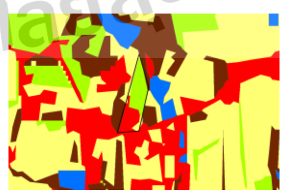
Building and settlement areas	Sentinel -2A	RF classification	Field Check
			
			
			
			
			
			

Table C5 Example of field crops and perennial trees and orchards in testing area.

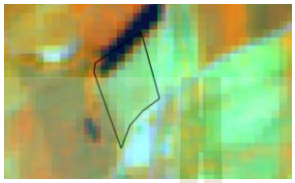
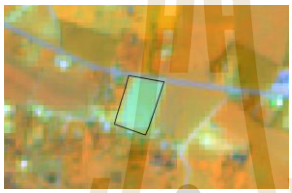
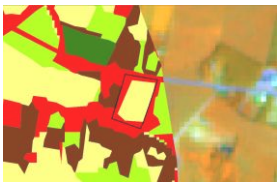
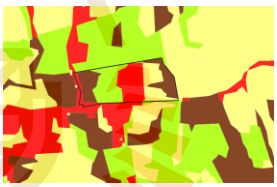
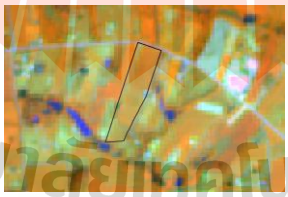
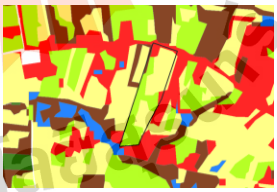
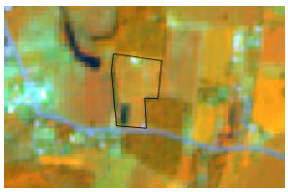
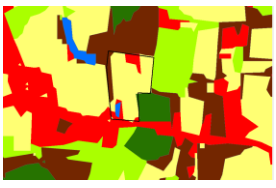
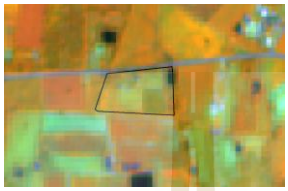
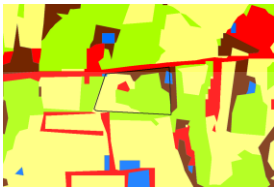
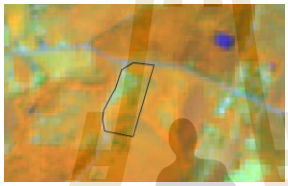
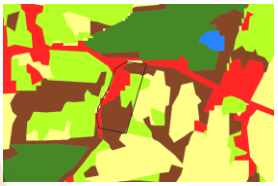
Field crops	Sentinel -2A	RF classification	Field Check
			
			
			
			
Perennial trees and orchards			
			
			

Table C6 Example of water body and rangeland in testing area.

Water body	Sentinel -2A	RF classification	Field Check
			
Rangeland			
			

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