

## UTILIZING SATELLITE IMAGERIES TO PROMOTE TOURISM OBJECTS OF NORTH SULAWESI PROVINCE, INDONESIA

EKA WATI S., HASTUTI T.

National Coordinating Agency for Surveys and Mapping (Bakosurtanal), CIBINONG, BOGOR, INDONESIA

### ABSTRACT

Tourism is basically defined as people's activities to visit a certain interesting place. This activity is commonly conducted in spare time or holiday season. The attractive place gives some advantages to visitors, particularly in relation with relaxation purpose. Besides, tourism activities act as a central and important sector influencing the development of a certain area and total of local income. In this case, tourism activities significantly affect the increasing of supporting facilities, for instance food stall, cottage, transportation line, etc. Based on these reasons, local government tries to promote the existing tourism objects in order to increase both local and national income.

North Sulawesi Province is one of tourism destinations in Indonesia. There are many beautiful places located at nine regencies and four cities under administrative authority of North Sulawesi Province. More than 100 tourism objects exist and offer unforgettable scenery. The objects can be differentiated into natural, cultural, man-made, maritime, shopping, historical and religious objects. In terms of visitors, the number of domestic and foreign tourists in this province is also quite high. From January to December 2009, the number of foreign tourist tends to increase. Therefore, this condition requires the improvement of promotion actions to attract the national and international visitors.

Nowadays, the tourism promotion efforts are commonly represented by creating tourism book, booklet, leaflet, and tourism's website. The contents are description of tourism object, map, and photo. The description consists of some information related to location, history, and supporting facilities. That information can be enhanced by involving Remote Sensing (RS) application. RS itself is utilized to expose view of tourism object from space through satellite imageries. In this paper, RS application is used to process several satellite imageries (Landsat, Quickbird, Ikonos) and Shuttle Radar Topographic Mission (SRTM). Landsat images are processed to obtain four combination bands which are 321, 432, 452, and 542 whereas Quickbird, Ikonos, and SRTM images are presented in natural color. Those images are exploited to visualize the present tourism objects in this province whether in terms of absolute and relative location and distribution as well. All processed information is presented through Tourism Atlas from Space of North Sulawesi Province. The similar method is also applied to develop tourism atlas from space for other provinces in Indonesia in order to support promotion of Indonesian's tourism.

Keywords: *Satellite Imageries, Remote Sensing, Tourism, North Sulawesi Province*

### INTRODUCTION

Tourism is a human activity in visiting a certain place out of their origin during a period of time (WTO, 1991 in Williams, 1998). Tourism itself is one of important aspects in human life since it is used to release exhaustibility due to daily routine. Beautiful and amazing places attract people to visit and to enjoy their leisure time so that they can forget the pressure of work and study for a while. Tourism not only gives some advantages to the visitors but also to local government where the tourism objects exist. Tourism activity will influence the regional development related to the number of domestic and foreign visitors who go to those interesting places.

Indonesia has many aspects that support tourism's sector. As an archipelago country located in the equator line, Indonesia has a great opportunity to fascinate a lot of visitors to take pleasure in this country. Tropical climate with natural biodiversity, various ethnics with unique culture and tradition, and hospitality offers unforgettable vacation and holiday in Indonesia. Based on this situation, several kinds of tourism objects which can be chosen are natural object, cultural, maritime, special interest, etc.

One of tourism destinations in Indonesia is North Sulawesi Province. In 2008, the number of international visitors in this area increased 36,34% compared with previous year (Center of Statistical Bureau/BPS, 2010). Generally, the tourism objects in this province are focused on beautiful beach and coastal scenery combined with wonderful coral reef. The most famous tourism object in this area is Bunaken National Park. Nevertheless, there are many objects which can be found around this location, for instance fortress, museum, cave, waterfall, and natural preserve.

The mentioned tourism objects are currently promoted through tourism book and website displaying photo and describing the location of the object and their supporting facilities. Remote Sensing (RS) and Geographic Information System (GIS) are not utilized yet. In fact, this technology is useful to give comprehensive information of tourism object by using satellite imageries and map. Thereby, this paper will explain the use of satellite imageries to assist the tourism promotion action in this province.

### STUDY AREA

North Sulawesi Province is geographically located between 00030' – 04030' N and 123000' – 127000' E. The area is bordered by Philippines in the north, North Maluku Province in the east, Tomini Bay in the south, and Gorontalo Province in the west. The width area of this province is 15,277.16 Km<sup>2</sup> and it is physically dominated by mountain and hills, for example Mount Klabat, Mount Lokon, and Mount Soputan. Besides, there are two famous lakes in this province, i.e. Tondano Lake (4,278 Ha) in Minahasa Regency and Mooat Lake (617 Ha) in Bolaang Mongondow Regency.

In terms of tourism, the number of tourist visiting North Sulawesi Province is quite high. In 2009, there were 29,715 people who went to North Sulawesi through Sam Ratulangi Airport. This number increased compared with the number of visitor in 2008 which was 21,795 people (BPS, 2010). Figure 1 shows that the number of visitors in 2009 is generally higher than in 2008 and 2010 for the same month. Thereby, tourism sector in this province must be improved in order to attract more guests to visit North Sulawesi Province.

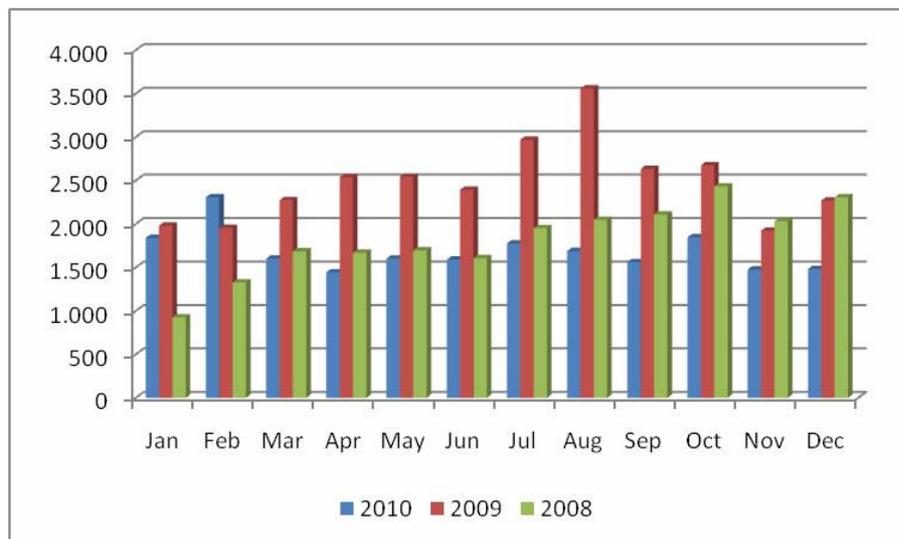


Figure 1. Graph of the Number of Visitors in North Sulawesi Province in 2008, 2009, and 2010 (BPS, 2010)

### METHOD

Tourism Atlas from Space of North Sulawesi Province was developed by harnessing several data. Those data were satellite imageries, maps, photos, and description of tourism object. The satellite imageries used were Landsat ETM+ 2000/2002/2003, Ikonos 2004, Quickbird 2003/2004/2005/2006, and SRTM. On the other hand, the map was taken from topographic map scale 1:250,000 produced by National Coordinating Agency for Surveys and Mapping (Bakosurtanal). In addition, photos and description representing the situation of tourism object were collected through field survey.

Field survey is a preliminary activity in this project. The survey was intended to gather accurate and reliable information about tourism object. Prior to field survey, secondary data (booklet, leaflet, and other tourism object information) were collected in a related institution which is cultural and tourism department. Based on the obtained data, field survey was subsequently done to get recent situation in each tourism object.

After field survey, the project was continued with data processing. In this stage, the collected satellite imageries and maps were processed by using Remote Sensing and Geographic Information System. On the other hand, photos and description of tourism objects were managed by graphical design software and Microsoft office software respectively.

The satellite image processing stage was conducted by utilizing Er Mapper and Arcview Image Analyst. The sequence stages done in Er Mapper are:

a. Developed composite images (321, 452, 432, and 542) of Landsat ETM 7+ to display particular features. This process was intended to show up certain tourism objects. As an example, lake is displayed by using

composite image of 542 or 452 in which lake will be represented by blue color. On the other side, Quickbird and Ikonos image was generated in natural color.

b. Enhanced the composite images to improve the quality of the images. The image enhancement was done by using image enhancement tool.

The next activities were related to simple image analysis carried out by using Arcview Image Analyst as below:

a. Plotted the location of tourism objects on the composite images. In this case, each tourism object was put over the images according to its geographic coordinate.

b. Layout the images to achieve map of satellite images. This map was created for each object.

The following stage was photo enhancement performed to improve the photo quality of tourism objects. Photo enhancement was done by adjusting the brightness, contrast, and adding a certain effect to the photos. Apart from that, the description of each tourism object was also made in order to give brief information about location, route to reach the location, entrance fee, and supporting facilities. The description was created in two languages, i.e. Indonesian and English so the atlas can be used not only by domestic tourist but also international visitor. The last activity was called layout done by employing graphical design software which is Freehand. This session combined all processed data and arranged them attractively.

During the process to produce tourism atlas, quality control was executed as well. This is the important activity since it is used to minimize the mistakes. The quality control was done several times. In this project, quality control was conducted after processing data and layout stage. The processed data must be controlled to make sure that there was no improper result. Apart from that, data which have been arranged into a certain layout should be checked in order to avoid monotonous style.

The atlas was developed by involving some people from several related institutions. Those are National Institute of Aeronautics and Space (LAPAN), Geography Department of University of Indonesia, Ministry of Cultural and Tourism of the Republic of Indonesia, and Daily Newspaper of Republika. Their ideas, experiences, and skills are needed as one of significant inputs to produce a good product.

The content of atlas is arranged by accommodating several aspects, as follow:

a. The brief explanation in relation with remote sensing technology and interpretation key of Landsat image is included since the information in this atlas is dominated by the utilization of satellite images, especially Landsat.

b. The tourism object in each regency/city is arranged regarding to alphabetical order so that the reader can be easier to find a certain object in the atlas. In this case, the order was regarding to Indonesian language. Besides, the profile of each regency/city is also added to give short information related to capital, width area, geographical position, and administrative boundaries.

c. The map in this atlas used various symbols representing some features, for instance the classification of administrative boundaries, road class, elevation class, tourism object symbol, etc. Therefore, a special page explaining the symbols was provided.

## RESULT

North Sulawesi Province has many tourism objects. There are 524 tourism objects located at nine regencies and four cities in this province (Transportation, Communication, and Informatics Department of North Sulawesi Province, 2010). Those objects can be classified into natural, cultural, historical, and special interest object. Natural objects consist of beach, agro tourism, waterfall, hot spring water, natural preserve, cave, mount, plantation, and national park. Cultural objects are commonly related to traditional ceremony whereas historical objects comprise old building, grave, museum, monument, and statue. Special interest objects in this area are golf yard, recreational park, and zoo.

Not all of tourism objects are published in Tourism Atlas from Space of North Sulawesi Province. It is related to data availability obtained during field survey in 2006. There are 91 prominent tourism objects which are included in the atlas. Then, there is no tourism object in North Bolaang Mongondow Regency showed in this book since field survey and secondary data did not find any location where had been developed as recreational spot. The list of those tourism objects can be seen in Table 1.

*Table 1. List of Tourism Objects in Tourism Atlas from Space of North Sulawesi Province*

No	Regency/City	Tourism Objects
1	Bolaang Mongondow	Mooat Lake, Lolan Beach, Molosing Beach, White Sand Beach of Tiga Island, National Park of Bogani Nani Wartabone

2	Sangihe Islands	Kadadima Waterfall, Nguralawo Waterfall, Under Sea Volcano of Mahangetang, Coral Beach of Sarenggihing Lebbo, Kalasuge Beach, Leppe Beach, Maselihe Beach, Pananualeng Beach, Ria Kolongan Beha Beach, The Peak of Lenganeng Village, Dutch Omission House, Recreational Park of Manente
3	Sitaro Islands	Bulangan Hot Spring Water and Beach, The Old Church and Missionary Grave of Paul Keling, Karangetang Volcano, Kisihang Beach, Lanage Beach, Hot Bathing Place of Lehi Beach, Bathing Place of Akasio, Nutmeg Plantation of Siau Island, Tagulandang Zallaca Plantation
4	Talaud Islands	Orchid of Mount Piapi, Arangkaa Cave, Totombatu Cave, Wetta Cave, Widduanne Cave, The Grave of King Passae Tingginehe, Melonguane Beach, White Sand Beach of Bitunuris, White Sand Beach of Sara Island, Tambioe Beach, Teluk Beo Beach, Moronge Ancient Statue, Rangka Batu Ular, Mane'e: The Tourism Object of Catching Fish
5	Minahasa	Kali Waterfall, Kasih Kanonang Hill, Watu Pinawetengan Natural Preserve, Linau Lake, Tondano Lake, Japan Cave, The Grave of Kiai Mojo, Tasik Ria Beach, Korengreng Statue, Hot Bathing Place of Ranpaso, Puri Harsatara, The Grave of Imam Bonjol
6	South Minahasa	Modoinding Agro Tourism, Batu Dinding, Doa Pinaling Hill, Alar Beach, Blangko Beach, Moinit Beach
7	South East Minahasa	Bentenan Beach
8	North Minahasa	Kima Bajo Resort, Batu Nona Beach, Buha Beach, Gangga Beach, Likupang Beach, Kema Beach, Pulisan Beach, Hot Bathing Place of Tumetenden, Archaeological Park of Waruga Sawangan
9	Bitung City	Kumersot Waterfall, Mount Batu Angus, Mount Dua Saudara, The Natural Forest of Danowudu, Nae Mundung Zoo, Sen Bo Kiong Temple, Japanese Monument, Batu Putih Beach, Kungkungan Beach, Tangkoko National Park
10	Kotamubago City	Natural Preserve of Mount Ambang
11	Manado City	Batu Meja, Blue Banter Marina, Mount Tumpa, Ban Hin Kiong Temple, State Museum of North Sulawesi Province, Masyarakat Beach, Bunaken National Park, The Shrine of Tiong Tan Lie Goan Swee, Wenang Golf
12	Tomohon City	Rurukan Agro Tourism, Tumimperas Waterfall, Mount Lokon, Mount Mahawu, Industry of Woloan Traditional House (Podium House)

Regarding to the consideration discussed in the previous chapter, cover and some pages describing brief explanation of remote sensing, interpretation key, the sequence of tourism object based on alphabetic, regency/city profile, and map legend can be seen in Figure 2 – 7 respectively.



Figure 2. Cover

### Sekilas Penginderaan Jauh Remote Sensing Overview

Penginderaan Jauh dapat diartikan "Melihat suatu Obyek Dari Kejauhan" dan bisa diterapkan ke upaya apa saja untuk mengamati fenomena menarik dari kejauhan. Membaca buku atau mengamati gambar bisa juga dianggap menggunakan Penginderaan Jauh. Di bidang sains, Penginderaan Jauh adalah ilmu dan seni memperoleh INFORMASI tentang obyek-obyek, area atau fenomena melalui analisis data yang diperoleh dari alat SENSOR yang ditempatkan pada JARAK tertentu dari suatu obyek, area atau fenomena.

*Remote sensing can be defined as "viewing objects from a distance" and it can be applied to any activities of observing interesting phenomena from a distance. Reading a book or viewing a picture can be assumed as doing a remote sensing. Scientifically, remote sensing is defined as a science and art to obtain information about objects, area, or phenomena through analyzing data that acquired in certain distance from the objects, area, or phenomena.*

Sumber/Source: CCRS/CCT

A. Sumber Energi / Energy Source  
B. Radiasi dan Atmosfer / Radiation and the Atmosphere  
C. Interaksi Dengan Obyek / Interaction with the Target  
D. Perekaman Energi oleh Sensor / Recording of Energy by the Sensor  
E. Transmisi, Penerimaan, dan Pengolahan / Transmission, Reception, and Processing  
F. Interpretasi dan Analisis / Interpretation and Analysis  
G. Aplikasi / Application

Media yang paling umum digunakan dalam kegiatan Penginderaan Jauh untuk menghubungkan obyek dan sensor adalah energi elektromagnetik. Satu contoh bentuk energi elektromagnetik ini adalah CAHAYA yang bisa tersusun dalam berbagai spektrum. Warna merupakan spektrum cahaya pada gelombang kasat mata. Tetapi, sistem Penginderaan Jauh juga menggunakan spektrum pada gelombang lain seperti Infra Merah, Thermal Infra Merah dan gelombang mikro (RADAR).

*Media used in remote sensing to record objects on a sensor is energy electromagnetic. An example of form of energy is ray, and it can be divided into several spectrums. Among the spectrums there are visible spectrums that form color. However, remote sensing used other energy electromagnetic spectrums such as infrared, thermal infrared, and microwave (used in radar system).*

Sumber utama energi elektromagnetik adalah matahari. Cahaya matahari akan berinteraksi dengan obyek di bumi dan direfleksikan sedemikian rupa sehingga bisa dilihat oleh alat sensor. Dalam Penginderaan Jauh aktif, seperti sistem RADAR, energi artifisial akan disebarkan dan energi yang berpendar balik bisa dideteksi.

*The main source of energy electromagnetic in nature is sun. Energy electromagnetic interacts with objects in the earth surface and reflected energy to sensor. In active remote sensing, such as in radar system, artificial energy is emitted to the objects in the earth surface and energy reflected from the objects is recorded by the sensor.*

Alat sensor untuk Penginderaan Jauh bisa berupa kamera, optoelectronic scanner, atau antena Radar. Sensor ditempatkan pada satelit, pesawat terbang, atau balon udara. Gambar yang diperoleh dengan alat sensor ini disebut citra, atau selengkapnya citra Penginderaan Jauh.

*Sensor in remote sensing could be a camera, optoelectronic scanner, or radar antenna. Space sensor is carried out by satellite and aerial sensor is carried out by plane or balloon. Picture generated from those sensors is called as image or remotely sensed imagery.*

Tidak berbeda dari seri atlas from space sebelumnya, Atlas Sulawesi Utara from Space menampilkan gambaran obyek-obyek wisata di Provinsi Sulawesi Utara melalui citra Quickbird, Ikonos, dan Landsat 7 ETM+. Selain itu digunakan juga SRTM (Shuttle Radar Topography Mission) dan foto udara untuk mamperkaya tampilan atlas. Citra Quickbird, Ikonosm SRTM, dan foto udara disajikan sesuai warna aslinya sedangkan citra Landsat 7 ETM+ disajikan dalam beberapa kombinasi band.

*Atlas of North Sulawesi from Space is not different from previous other series of Atlas from Space. It presents some pictures of tourism objects in North Sulawesi Province through the images of Quickbird, Ikonos, and Landsat 7 ETM+. Beside that, there are also used SRTM (Shuttle Radar of Topography Mission) and aerial photos to enrich atlas appearance. The images of Quickbird, Ikonosm SRTM, and aerial photos are presented according to its original color while image of Landsat 7 ETM+ is presented in a few band combinations.*

Sulawesi Utara dari Angkasa

20

North Sulawesi from Space

21

Figure 3. Remote Sensing Overview



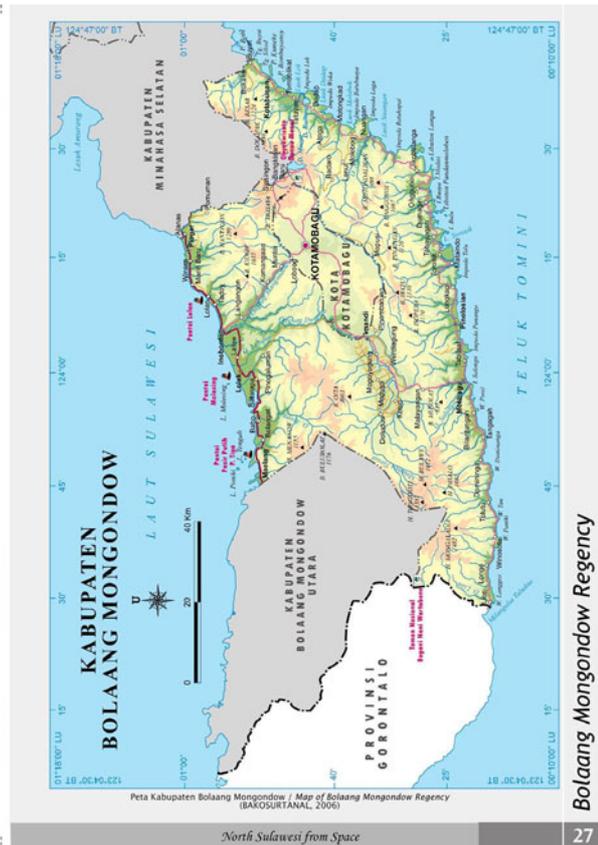


Figure 6. Regency/City Profile

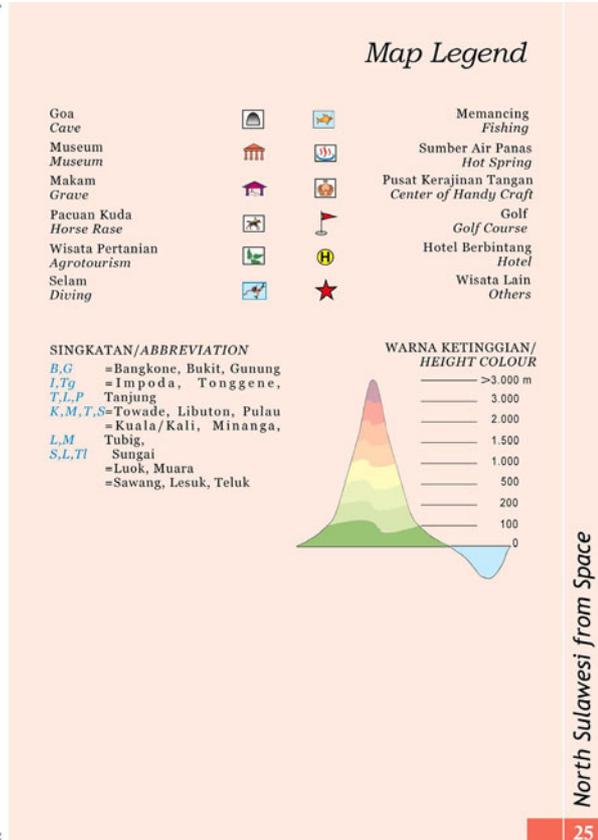


Figure 7. Map Legend

In terms of the appearance of tourism objects, every object in this atlas is equipped by map of satellite image, map, photos, and bilingual description. SRTM is attached at some objects as well. For example, as

seen in the Figure 8, Maselihe Beach is presented through photo from the upper location, SRTM, and map of Quickbird image. The description explains the scenery of the beach and how to reach this location.



Figure 8. Maselihe Beach

For several objects where are close one to another, the objects are shown in the one map. The position of Maselihe Beach in the map is gathered by the other objects (Kalasuge Beach, Ria Kolongan Beha Beach, Leppe Beach, and Panauualeng Beach) as illustrated in Figure 9.

**Pantai Kalasuge Kalasuge Beach**

Coba Anda duduk atau berdiri di pinggiran Pantai Kalasuge. Ketika memandang laut lepas, Anda akan disugahi pemandangan gugusan Pulau Nusa atau Tinakareng dan Pulau Bukide. Kedua pulau tersebut mempunyai pantai pasir putih dan pesona keindahan bawah laut. Pantai Kalasuge, berlokasi di sebelah utara Desa Kalasuge, Kecamatan Tabukan Utara, menawarkan obyek wisata pantai berbatu dan berpasir. Untuk menjangkau Pantai Kalasuge Anda dapat menempuhnya melalui perjalanan darat dari Tahuna ke arah utara sekitar 15 km dengan waktu tempuh kurang lebih 40 menit.

*Try to sit or stand at the seaside of Kalasuge Beach. When looking around the high sea, you will be showed the view of Nusa Island or Tinakareng and Bukide cluster. Both islands are the enhancement of undersea scenery. Kalasuge Beach itself, located in the north of Kalasuge Village, in the Sub District of North Tabukan, is a stony and sandy beach. To reach its location you should take transportation from Tahuna to the north at a distance of 15 kms for about 40 minutes.*

**Pantai Leppe Leppe Beach**

Ada "Tanah Lot" Bali dapat Anda jumpai di Pantai Leppe Anda. Sebutan tersebut diberikan warga sekitar Pelabuhan Petta, Desa Petta, Kecamatan Tabukan Utara itu, untuk menggambarkan keunikan Pantai Leppe. Di pantai ini Anda akan melihat sebetuk batu karang yang di atasnya dibangun tempat istirahat untuk melihat pemandangan Teluk Enemawira dan Kota Petta yang terkenal dengan barang-barang Filipina-nya. Kehadiran batu karang ini mengingatkan pada bentuk Tanah Lot di Pulau Dewata.

Kalau tertarik melihat keunikan ini, siapkan diri untuk menempuh perjalanan darat sejauh 6 km dari Tahuna ke arah timur dengan waktu tempuh kira-kira 15 menit.

Kabupaten Kepulauan Sangihe

48 Sulawesi Utara dari Angkasa

North Sulawesi from Space

Sangihe Islands Regency

**Pantai Kalasuge Kalasuge Beach**

**Pantai Leppe Leppe Beach**

There is "Tanah Lot" in Bali, and also you can see such beach in Your Leppe Beach. It is called like that by people who life around Petta Port, Petta Village, Sub District of North Tabukan, to describe the uniqueness of Leppe Beach. At this beach you can see a form of coral reef where there is rest place area built on it, to see the beautiful scenery of Enemawira Bay and Petta Town which are popular with some goods of Philippines. The attendance of this coral reef remind us at the form of Tanah Lot in Gods Island.

*If you are interested in this uniqueness, lets make preparation to do 15 minutes of 6 kms land journey eastwards from Tahuna.*

**Pantai Kalasuge / Kalasuge Beach**  
(Pusat Atlas, 2006)

**Pantai Leppe / Leppe Beach**  
(Pusat Atlas, 2006)

Kabupaten Kepulauan Sangihe

49 Sulawesi Utara dari Angkasa

North Sulawesi from Space

Sangihe Islands Regency

Figure 9. Map Depicting Location of Maselihe Beach

The other example is portrayed in Figure 10 and 11. Tondano Lake, one of the tourism objects in Minahasa Regency is described by using photo, map, map of Landsat image with 542-band composite, and SRTM. This object is also showed by using Ikonos image covering part of Tondano Lake.

**Danau Tondano Tondano Lake**

Danau Tondano terletak di tengah pegunungan setinggi sekitar 700 m di atas permukaan air laut. Daya tarik dari lokasi ini adalah pemandangan alam Pulau Likri yang terdapat di tengah danau. Udara di sekitar lokasi masih bersih dan sejuk.

*The location of Tondano Lake is in the middle of the hill as high as about 700 meters above sea surface. The fascination of this place is the natural scenery of Likri Island at the center of the lake. We can feel fresh and clean air there.*

Kabupaten Minahasa

98 Sulawesi Utara dari Angkasa

North Sulawesi from Space

Minahasa Regency

**Danau Tondano Tondano Lake**

Danau Tondano terletak di tengah pegunungan setinggi sekitar 700 m di atas permukaan air laut. Daya tarik dari lokasi ini adalah pemandangan alam Pulau Likri yang terdapat di tengah danau. Udara di sekitar lokasi masih bersih dan sejuk.

*The location of Tondano Lake is in the middle of the hill as high as about 700 meters above sea surface. The fascination of this place is the natural scenery of Likri Island at the center of the lake. We can feel fresh and clean air there.*

Kabupaten Minahasa

99 Sulawesi Utara dari Angkasa

North Sulawesi from Space

Minahasa Regency

Figure 10. Tondano Lake

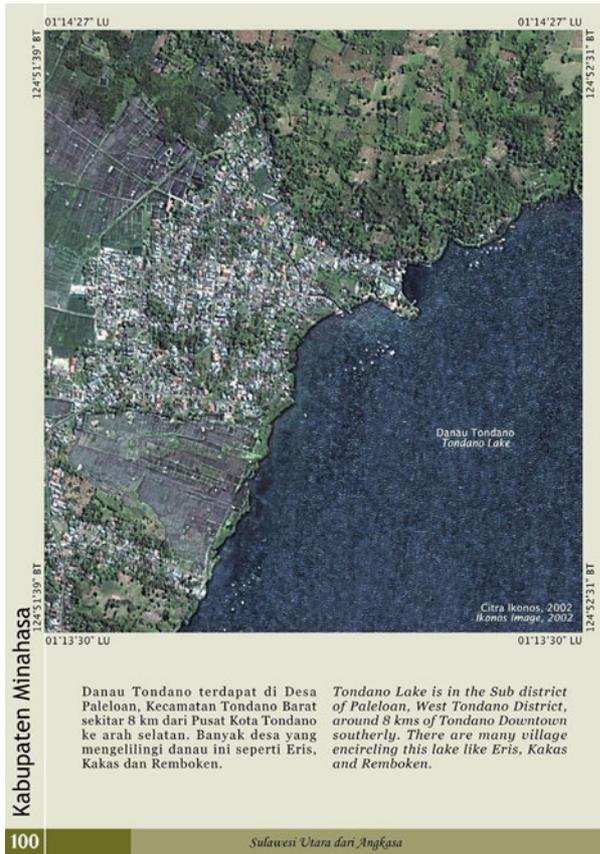


Figure 11. Map of Ikonos Image of Tondano Lake

National Park of Bunaken, the most famous tourism object in this province gets the special part in this atlas. If another tourism object is generally presented on one up to three pages, this object portrayed on four pages. Several photos and Ikonos image representing the whole Bunaken Island (see Figure 12-13).

## Taman Nasional Bunaken Bunaken National Park



Taman Nasional Bunaken /  
Bunaken National Park  
(Pusat Atlas, 2006)

Jika Anda memutuskan akan pergi ke Manado, jangan sampai tidak mengunjungi Taman Nasional Bunaken. Keberadaan Kota Manado tak bisa dipisahkan dari taman ini.

*If you decide to go to Manado, don't miss to visit the National Park of Bunaken. The existence of Manado City cannot be separated by this park.*

Bunaken ditetapkan sebagai Taman Nasional oleh Pemerintah dan diresmikan oleh Presiden Republik Indonesia pada 24 Desember 1991. Taman Nasional ini merupakan kawasan konservasi perairan dengan luas 89,065 ha, terdiri atas dua bagian terpisah, yaitu (1) Bagian utara meliputi lima pulau: Bunaken, Siladen, Manado Tua, Mantehage, dan Nain, serta wilayah pesisir Desa Molas, Meras, Tongkeina, dan Tiwoho. (2) Bagian selatan meliputi pesisir Desa Poopok, Teling, Kumu, Pinasungkulan, Rap-rap, Sondaken, Wawontulap, dan Popareng.

Taman Nasional Bunaken adalah kawasan konservasi yang memiliki keanekaragaman hayati pesisir dan laut yang sangat tinggi. Ada tiga ekosistem utama perairan tropis Indonesia, yaitu terumbu karang, padang lamun, dan hutan bakau. Bahkan terdapat juga hutan tropis di Pulau Manado Tua dan beberapa tempat di daratan lainnya.

Sulawesi Utara dari Angkasa

162

Kota Manado

Yang banyak dikunjungi wisatawan di Taman Nasional Bunaken adalah terumbu karang. Tipe terumbu karang yang ada umumnya merupakan terumbu karang tepi (*fringing reef*). Sebagian terumbu karang di Pulau Mantehage merupakan terumbu karang penghalang (*barrier reef*). Ada juga beberapa gosong karang (*patch reef*) di daerah Arakan-Wawontulap.

Jadi, siapkan waktu untuk menambah kenangan indah di Taman Nasional Bunaken. Untuk ke lokasi cukup mudah karena dapat dicapai dengan menggunakan kapal motor dari Pelabuhan Manado ke arah utara. Kira-kira perlu waktu 20 menit untuk mencapai Pulau Siladen, 30 menit ke Pulau Bunaken, 45 menit ke Pulau Manado Tua, dan sekitar 50 menit ke Pulau Nain.

Sejumlah fasilitas disediakan. Ada tempat penginapan dan tempat bersantai untuk menikmati pemandangan laut, berenang, dan menyelam. Anda juga dapat membeli buah tangan berupa kaos, makanan khas, dan pernik-pernik kerajinan tangan.



Pemandangan Bawah Laut Taman Nasional Bunaken /  
Under Sea Scenery of Bunaken National Park  
(Disnas Pariwisata, 2006)

Many visitors usually go to Bunaken Natinal Park to see coral reef. The type of coral reef existed is generally fringing reef. Part of the coral reef at Mantehage Island is barrier reef type. There are few of patch reefs at Arakan-Wawontulap area.

So, prepare you time to make unforgettable memory at Bunaken National Park. We can reach the location easily by motorboat northwards from Manado Harbour. You need for about 20 minutes to reach Siladen Island, 30 minutes to Bunaken Island, and around 50 minutes to Nain Island.

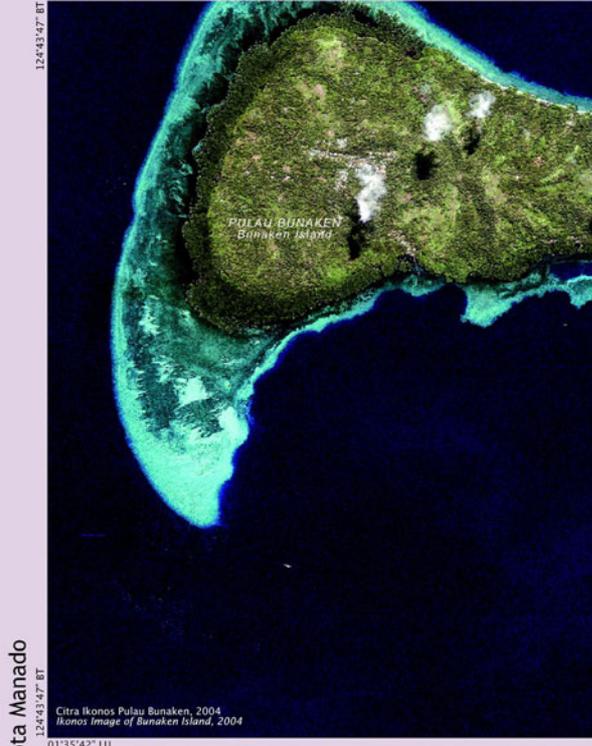
There are some facilities at that place, such as lodging and the places for having pleasure to enjoy sea scenery, swimming, and diving. You can also buy some gifts like t-shirts, traditional food, and handycrafts.

North Sulawesi from Space

163

Manado City

Figure 12. Bunaken National Park



Citra Ikonos Pulau Bunaken 2004  
Iconos Image of Bunaken Island, 2004

Sulawesi Utara dari Angkasa

164

Kota Manado



North Sulawesi from Space

165

Manado City

Figure 13. Map of Ikonos Image of Bunaken Island

CONCLUSION

Tourism atlas from space is a unique version of tourism book. This atlas not only employs photos, maps, and description of tourism objects but satellite imageries as well. This book can be functioned as tourism promotion tool and knowledge-information sharing. Community is introduced by a new approach to show up the beautiful scenery in their location by means of remote sensing technology.

Tourism Atlas from Space of North Sulawesi Province is one of the ways to promote tourism sector in North Sulawesi Province. This product is developed to support the local government policy to increase local income and to enhance regional development in the tourism objects and surroundings. Interest information and picture displayed in this atlas hopefully can attract domestic and foreign people to come and to enjoy the natural beauty of North Sulawesi Province. Besides, local community has a chance to build some supporting facilities as one of the efforts to increase their income, such as food stall, rest area, cottage, restaurant, travel agent, etc.

#### **FUTURE PLAN**

Tourism atlas from space is developed to provide tourism information in Indonesia. It means that the atlas will cover the whole province in Indonesia. Previous tourism atlases from space that have been produced are 1st Volume of Bali from Space (2004), Nusa Tenggara Barat (NTB) from Space (2005), Banten from Space (2006). The North Sulawesi from Space itself was created in 2007 followed by Sumatera Selatan from Space (2008) and 2nd Volume of Bali from Space (2009). In the next years, the development of tourism atlas from space hopefully can be continued in the other provinces.

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