

# **Alternative Solution for Landuse Planning Mismatch in Parangtritis Coastal Area**

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## **ABSTRACT**

Shore and sand dune as integral part of Parangtritis Coastal Area (PCA) are interesting object for tourism activity and also proved have various ecological functions. Unfortunately, this various ecological function not directly linked to economical function. This problem is trigger land conversion in shore and sand dune protected area. Aim of this research are (a) identify land use planning mismatch in PCA, (b) identify factor driving land use planning mismatch in PCA, and (c) propose some local wisdom-based alternatives solution of land use mismatch in PCA.

Spatial analysis using geographic information system is used to define land use planning mismatch in PCA, while descriptive analysis is used to describe driving factors and local wisdom-based solution of land use planning mismatch in PCA. This research found that 14% of shore and sand dune protected area was miss used, such as for settlement, commercial building, and agricultural land. The development of *Pokdarwis* (Local Communities' Committee on Tourism) could be the local wisdom-based and community-based alternative solution can be implement in this area.

**Key word** : *Sand dune, land use planning, coastal area, local wisdom*

## **INTRODUCTION**

Yogyakarta Special Region is a major tourist destination in Indonesia after West Java Province with a number tourists visit 3.7 million tourists / year (BPS, 2013). Yogyakarta has a variety of cultural richness and beauty of the natural scenery of various types, ranging from volcanoes tourism in the north, shopping and cultural tourism in the center, caves and karst tourism in the east, and beaches tourism in the south (Figure 1). The complexity and diversity of the type of tourist is able to attract

many tourists to visit Yogyakarta each year. Of the many attractions there, including one Parangtritis tourist destinations with high tourist traffic of 1.5 million / year (DIY Tourism Office, 2012).

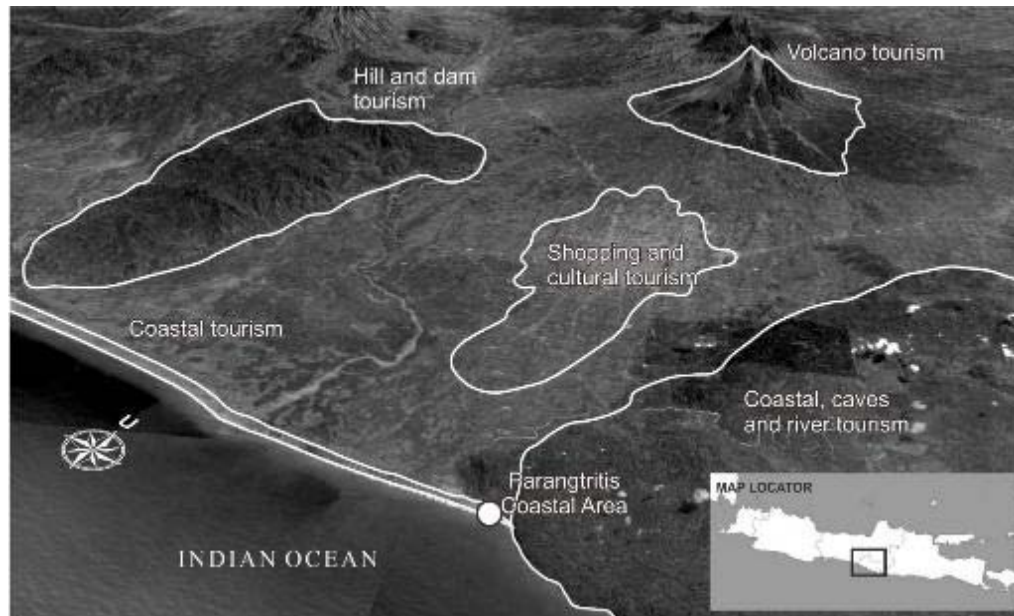


Figure 1. Location of Parangtritis and Spatial Distribution of Tourism in DI Yogyakarta

Parangtritis beach is a tourist icon and one of the major tourist destination of Yogyakarta which is famous for the mythical Queen of the South sea and the beauty of natural coastal scenery . Parangtritis has coastal tourism potential with the natural environment of flora and fauna, karst hills and sand dunes as well as various historical value / myth and socio-art-and the attractions around the beach. Sand dunes are one of the objects contained in the complex Parangtritis tourist area is quite interesting to be visited by tourists.

Sand dunes are mounds of sand formed by wind activity. This object is a natural phenomenon that is unique and quite rare in other parts of Indonesia such as that delivered by Martinez et al (2004) (Figure 2), and because of that many tourists attracted to them. In addition to having the potential of tourism, sand dunes also has another function as water catchment areas and natural barriers to reduce the potentially destructive force of the tsunami that occurred in this area. Seeing its many important functions, the existence of sand dunes is very important to be maintained. In response, in the RTOW (*Rencana Teknis Objek Wisata /Tourisms Technical Plan*)

of Parangtritis prepared by Bantul District Government, Sand dunes included in the preservation area.



Figure 2. Global Distribution of Coastal Sand Dune

(Sumber : Martinez et al., 2004)

Although the sand dunes have many important functions, this object does not provide direct economic benefits to the community. This lead to putting sand dunes land into support facilities for tourism and farming region, resulting in reduced area of sand dunes from year to year. If this situation continues then the sand dunes will be gone at some point along with the loss of the benefits provided by them . So it is necessary to study the spatial mismatch and determine alternative solutions as one of the realization of sustainable development efforts in the tourist area of Parangtritis.

## RESEARCH AIM

The aims of this research are :

1. To identify mismatches use in Parangtritis and the factor that caused it.
2. To Determine alternative solutions of space utilization mismatch in Parangtritis.

## METHODOLOGY

### Study Area Description

This research was conducted at Parangtritis tourism area located in Bantul, Yogyakarta, Indonesia. Parangtritis tourism area is part of the coastal area of Yogyakarta is located in the southern part of Java Island and stretches from west to

east. The dunes Region flanked by Opak River on the west and Gunungsewu Structural hills on the east (Figure 3).

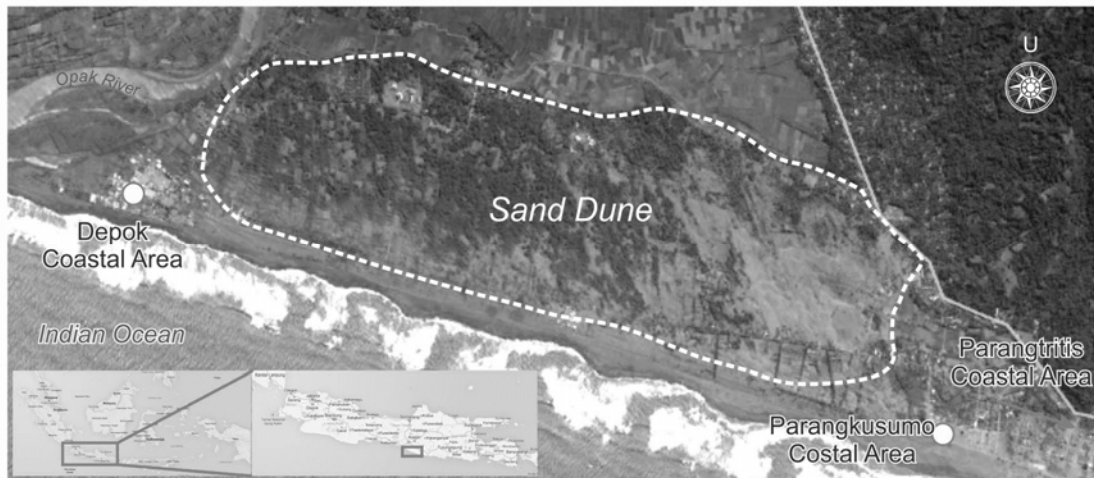


Figure 3. Parangtritis Tourism Area

### **Landuse Mismatch Identification**

Spatial mismatch is a condition where the existing land use in the region is not in accordance with the layout plan that has been determined. Based on the literature, some of the things that cause spatial mismatch in coastal areas such as the gap between government and community planning, a shift in development priorities, there is no discipline that cause deviations spatial layout, and lack of balanced development orientation in determining region (Sjafi 'i et al, 2001) to identify the spatial mismatch that occurs in the region and cause parangtritis used the analysis of high-resolution visual imagery in order to obtain data on the extent of the various kinds of land use in protected areas sand dunes and coastal protected areas. The image used is GeoEye imagery in 2013 which has a resolution of up to 1 meter in color bands appear. The land use is classified into three class which is settlements, fields, and moor. The data obtained then processed using simple calculations and analyzed descriptively.

### **Determining the Alternative Solution of Space Utilization Mismatch**

Literature Study chosen as the method used to achieve the second goal which was to determine alternative solutions in the area of spatial mismatch Parangtritis. The data needed include alternative management sand dunes and/or management of

similar nature in other places that will be adopted to apply to the tourist area Parangtritis, these data were analyzed descriptively.

## **RESULT AND DISCUSSION**

### **Landuse Mismatch and Causing Factors**

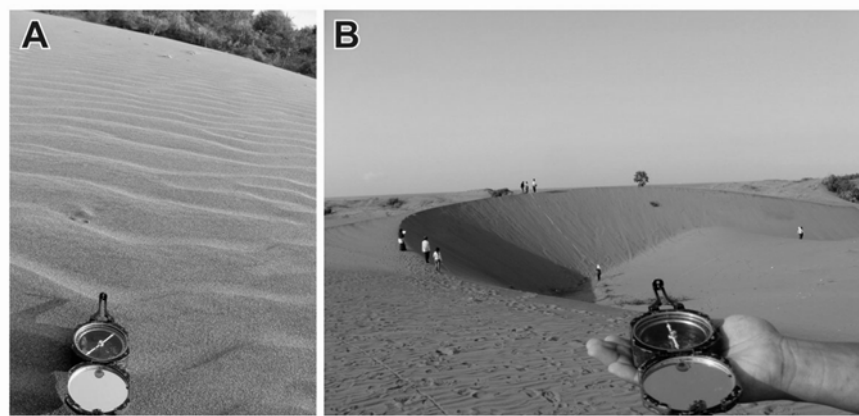
Parangtritis tourism area is an area that has many tourist attractions. The tourist attractions variety in this area include beaches, historical attractions / culture around Parangkusumo, religious attractions in the village of Grogol, Opak River, and educational tourism in the sand dunes conservation area. The high potential of tourism in this Parangtritis responded well by local governments through regional development of tourism. Parangtritis tourism development priorities include the development of the field of eco-tourism, religious tourism, marine fisheries tourism, and artificial tourism.

The Development of tourism in Parangtritis coastal area is quite good and developed, in 2011 there were 2,072,085 people who visited parangtritis (DIY Tourism Statistics 2012). This is because access to coastal areas Parangtritis is easily accessible and has a good infrastructure. The number of these travelers will surely have a positive impact on the increase of revenue and the increase of welfare of the surrounding community, but they also have an adverse impact. These impacts include increase of the amount of waste that left by tourists and settlements and traders building began emerge towards the coast and sand dunes.

Some parts of the tourist areas of Parangtritis in RTOW that is designated as a protected area which is sand dunes protected area and coastal protected area. The sand dune area and the beach area were detemenined as protected areas is not without consideration. The implications of the establishment of protected areas, namely the spatial arrangement that emphasizes the conservation function with limited use.

The sand dunes at Parangtritis coastal area is a rare object and has a characteristic not shared by other coastal areas. Sand dunes are formed at tropical regions have various types such as the type of transverse and barchan-type (Figure 4). Transverse sand dunes type has a characteristic form of ridges and the presence of small valleys, perpendicular to the direction of the wind that formed ripple marks.

Compared with the transverse type, barchan sand dune types have a much larger size. This formation has a characteristic appearance like a crescent moon formed perpendicular to the wind direction. Slopes facing the direction of the wind has a slope steeper than the slope back to the wind direction. Surely this sand dune formations requires various prerequisites to be formed, among which are the fine sand-sized material to coarse in large numbers, there are long dry periods and firm, winds capable of transporting and depositing the material is sand, and the wind was not much movement obstructed by vegetation or other objects (buildings, hills, etc.) (Dibyosaputro, 1997).



**Figure 4.** Sand Dune in Parangtritis, (A) Transversal type, (B) Barchan type

This prerequisite is available at a variety of areas parangtritis but not at other places in Indonesia. Therefore, these formations can not be found in any other place. Sand dunes provide a wide range of ecosystem services such as water catchment areas namely aquifer system sandbanks, sediment supply provider for area pesisir, tsunami disaster risk reduction, educational functions, as well as tourism (Rovicky in Purnamawati, 2012; MEA, 2005). Seeing the many important functions, to preserve this area then the sand dunes RTOW designated as protected areas. Development is possible by promoting the sand dunes visualization. This area is a grassland with part a land area of fields that could be a potential further development.

Beach is an area located at the highest and lowest tide (Bakosurtanal, 2005). As the meeting between land and sea, the coast is very susceptible and vulnerable. The beach is very susceptible to changes that occur as a result of the coastal dynamics. Sunarto in Marfai (2013) states there are at least seven factors causing

coastal dynamics at the region, namely astrodynamic, aerodynamic, hydrodynamic, morphodynamic, geodynamic, ecodynamic, and anthropodynamic. Besides susceptible, Parangtritis beach area is also vulnerable to various kinds of coastal disasters including the tsunami, coastal erosion, and coastal flooding. It is necessary for the protection of environmental conservation efforts as well as efforts to protect coastal communities from the threat of coastal disasters are realized in the management of coastal areas (Beatley, 2002).

Governments realize that one part of the management of coastal areas through legislation and spatial planning documents. Act 26 of 2007 on spatial planning coastal Border States are local protected area that has a primary function as a protected area. In accordance with Act 26 of 2007, Regulation 4 of 2011 Bantul regency has specified that Bantul coastal border covers the area along the shoreline with a minimum distance of 100 meters measured from the landward limit of the highest tide. The next is also described in the same article 73 regulations verse 5 explained that the coastal border area there are various provisions that must be considered, namely (a) prohibited all activities and residential buildings, places of business in coastal areas, (b) prohibited all activities and buildings threatening damage to the coast, (c) nature tourism activities are allowed on the condition does not interfere with the quality of the sea water, (d) allowed the use of space for building the coastal border security environment, supporting the function of recreation parks, (e) allowed the use of space for green open space. RTOW a technical plan tourism area management set by the local government to regulate the balance of tourism in the region. The purpose of this is to be made RTOW physical and environmental quality in tourism can be improved, including layout teresebut quality, land use, planning and architecture wake detailed implementation and financing. The second objective is to encourage the preservation and conservation of the environment at Parangtritis coastal areas through the development of a technical nature. While the third goal is to improve the investment climate and empowerment of local communities.

Based on Parangtritis RTOW documents, the sand dunes protected area has an area of 187.5 hectares while coast has an area of 154.5 hectares. This area should be a sterile area of the entire farming activities, residential buildings, and places of

business but in reality it does not happen. Incompatibility spatial use of sand dunes covers any buildings and agricultural land such as fields, gardens and moor. The results of the visual interpretation of 2013 GeoEye image shows that in the sand dunes protected area there are at least 25582.75 m<sup>2</sup> and 278,524 m<sup>2</sup> used for building and agriculture. While the coastal protected areas covering at least 29437.73 m<sup>2</sup> used for building establishment and 136,296.2 m<sup>2</sup> used for agricultural activities. Spatial mismatch distribution space utilization at Parangtritis area is presented in figure 5, while its range is presented in Table 1.

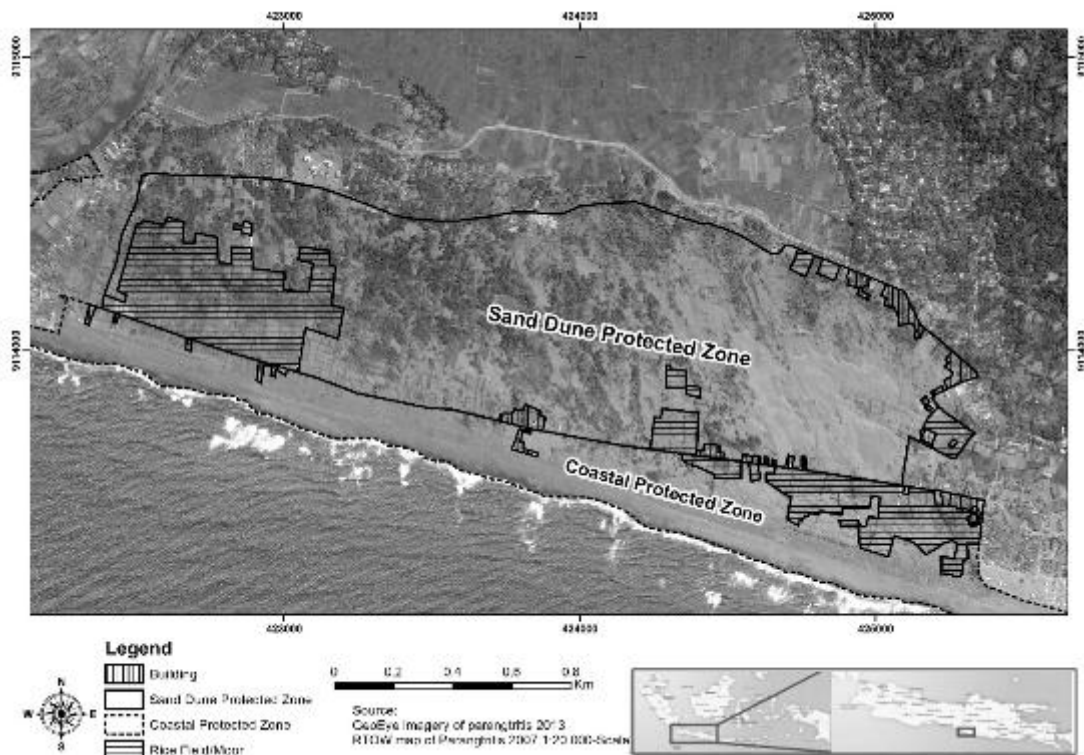


Figure 5. Sand Dune and Coastal Preserve Area Map

Table 1. Preserve Area and Mismatch Land Use Area

No	Preserve Area	Total Preserve Area (m <sup>2</sup> )	Mismatch Area (m <sup>2</sup> )		Remaining preserve area (m <sup>2</sup> )
			Building	Agricultural	
1	Sand dune	1.875.647,11	25.582,76	278.524,8	1.571.539,570
2	Coastal	1.545.085,73	29.437,73	136.296,2	137.93.51,759

(Source: geoeeye imagery analysis, 2013)



The presence of buildings and agricultural crops in the protected area of sand dunes feared could threaten the existence of sand dunes. The building can reduce the velocity of the wind on wind tunnel that can result in low wind activity trinity / eolian consisting of erosion, transportation, sedimentation and sand material. These three activities are the key process for formation of the sand dunes. Furthermore dryland crops in the area of the sand dunes can also inhibit these activities. Besides reducing wind speed, crop can also be a bonding agent of sand material through the root system and a variety of agricultural techniques. Although the extent of mismatch utilization of space in a protected area of sand dunes and the beach is comparatively low, but if decisive action is not done then it can be predicted in the coming years its range will grow and getting uncontrollable.

The presence of existing buildings and rice fields in this parangtritis coastal protected areas caused by people affected by economic pressure. So they use the land in the coastal and sand dunes protected areas as agricultural land. The building in this area, besides being used as settlement, also used as a place of trade, rest and parking area. In coastal areas, these buildings generally used by sport fishing enthusiasts and the sand dune area, this building is used as a parking lot and a resting place for those who were having a pre-wedding photos, given the well-known sand dune area is used as a location for a photo pre-wedding. In addition to homes, parking lots and stores, there are also hotels around the coastal areas and sand dunes.

### **Alternative Solutions for Space Utilization Mismatch**

Sand dune area management in an effort to preserve the ecosystem of sand dunes of sand have been conducted in various countries in the world, one example is in South Korea. Sand dune area management in South Korea is done through the protection of the ecosystem including local flora and fauna as well as the prohibition to do planting alien species of flora or non-local species were deemed able to threaten the existence of native species. In addition, there are strict rules regarding the use of space in the conservation area including the banning of the use of this area for the construction of buildings and agricultural activities. Surely this can be a model for the management of protected areas and protected area of sand dunes in Parangtritis beach.

In addition, other measures that can be taken in preserving the existence of sand dunes that provide additional economic value of the presence of sand dunes through the utilization of sand dunes and areas entity "Parangtritis Landscape" for the purposes of community-based tourism. Community-based tourism is tourism managed by the community through 'Pokdarwis' (*Kelompok Sadar Wisata*/tourism awareness group) and the advantages perceived by the public. Variety of tourism that can be developed further in this area is nature tourism, educational tourism, religious tourism, and cultural tourism and the arts. Even the integrated tourism which consists of the existence of a background sunset Parangtritis, which dominated the area around the sand dunes, and traditional dance Yogyakarta is a complete tourist package and attractive for local and foreign tourists.

One example of a combination of several types of tourism that is a combination of panoramic beauty and wealth of natural and cultural phenomena parangtritis region with art. For example panorama "Landscape Parangtritis" used as a traditional dance background as a concept is applied in the tourist area of Uluwatu, Bali, where the merger between culture and natural beauty into a tourist attraction that has proven successful in attracting many foreign and domestic tourists. Communities in Pokdarwis may play a role in this regard, for example, dancers are local residents who have been trained dance.

Obviously the use of conservation areas for tourism should be tolerant to the surrounding ecosystem. Utilization of sand dunes protected areas was developed with the concept of semi-permanent buildings in harmony with nature so as not to damage the sand dunes. Besides active in exploiting, pokdawris also expected to become the vanguard in the protection of sand dunes and coastal protected areas because the income of Pokdarwis society is determined by the support of the preservation of coastal ecosystems in the tourist sector.

## **CONCLUSION**

The conclusion that can be drawn from this study: (a) there is a mismatch of space utilization in the sand dunes and protected areas as much as 14% of the total that used as building and agricultural activities, (b) alternative solutions that can be applied to the conservation area the strict spatial arrangement with the advanced protection of native ecosystems; integration of nature tourism, education, culture and

art; and the formation of Pokdarwis as the vanguard in the protection of coastal ecosystems Parangtritis.

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