Quarterly Newsletter on Sustainable Landscape Program in Central Java Province

SUSTAINABLE LANDSCAPE NEWSLETTER

Issue 12 - June 2019

KENDENG LANDSCAPE

A Bone of CONTENTION

editorial

Indonesia is characterized with extensive landscape of karst ecosystem. Data from Bappenas in 2013 recorded a total of 15 million hectares of karst regions distributed across the country's islands. Karst has an important function as water reservoir, which cannot be substituted by other storage infrastructure such as tanks (embung).

One of the renowned karst regions in Indonesia is Kendeng Karst. Kendeng karst formation stretches along two mountain ranges, i.e. northern karst mountain range (referred to as the North Kendeng) and Kendeng mountain range (referred to as the South Kendeng). Conflict has arised in the Kendeng mountain ranges, especially in North Kendeng, between the local communities and cement industry currently operating mining activities in the region.

One of the factors contributing to the conflict is unclear boundaries of Kendeng karst landscape, unclear policy on Kendeng management, and lack of information concerning the condition of the aquifers in the region. Aquifers like caves, underground rivers, springs, and groundwater basin, are common in karst landscape. However, proper mapping of both overground and underground aquifers in Kendeng mountains is not available.

Local communities have been concerned about the disappearance of their sources of water as a result of karst mining activities in Kendeng. Most of these communities work in agricultural sector, which relies heavily on water supplies from nature. Kendeng areas have great potential to become agricultural areas. However, dry surfaces of the karst landscape only allow for the cultivation of crops that can survive the dryness, such as maize, soybean, groundnut, and sweet potato.

The current edition of Newsletter gives an insight about the condition and potentials of Kendeng landscape, especially concerning agricultural sustainability in the region.

SUSTAINABLE LANDSCAPE NEWSLETTER is a non-profit publication to support the efforts of Provincial Government of Central Java to realize sustainable landscape, by disseminating information on sustainable landscape and activities that have been conducted towards the achievement

Cover Image
North Kendeng Karst

Source of Cover Image
Wikipedia

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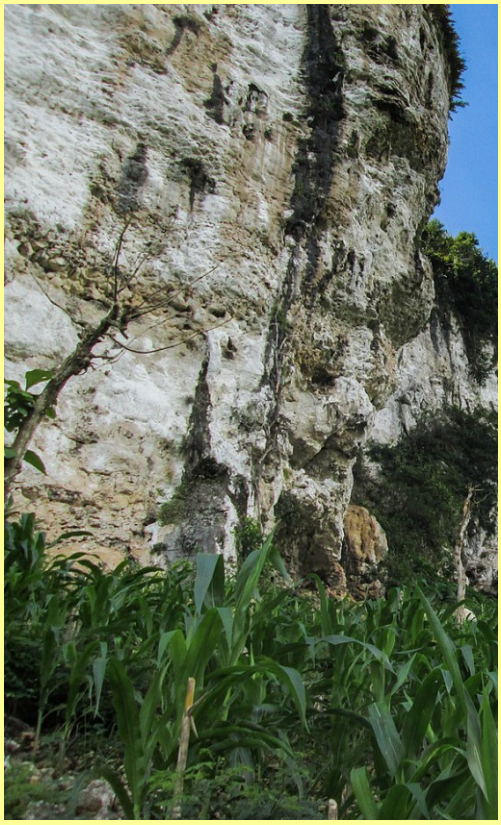
UNCLARITY ABOUT KENDENG LANDSCAPE MANAGEMENT



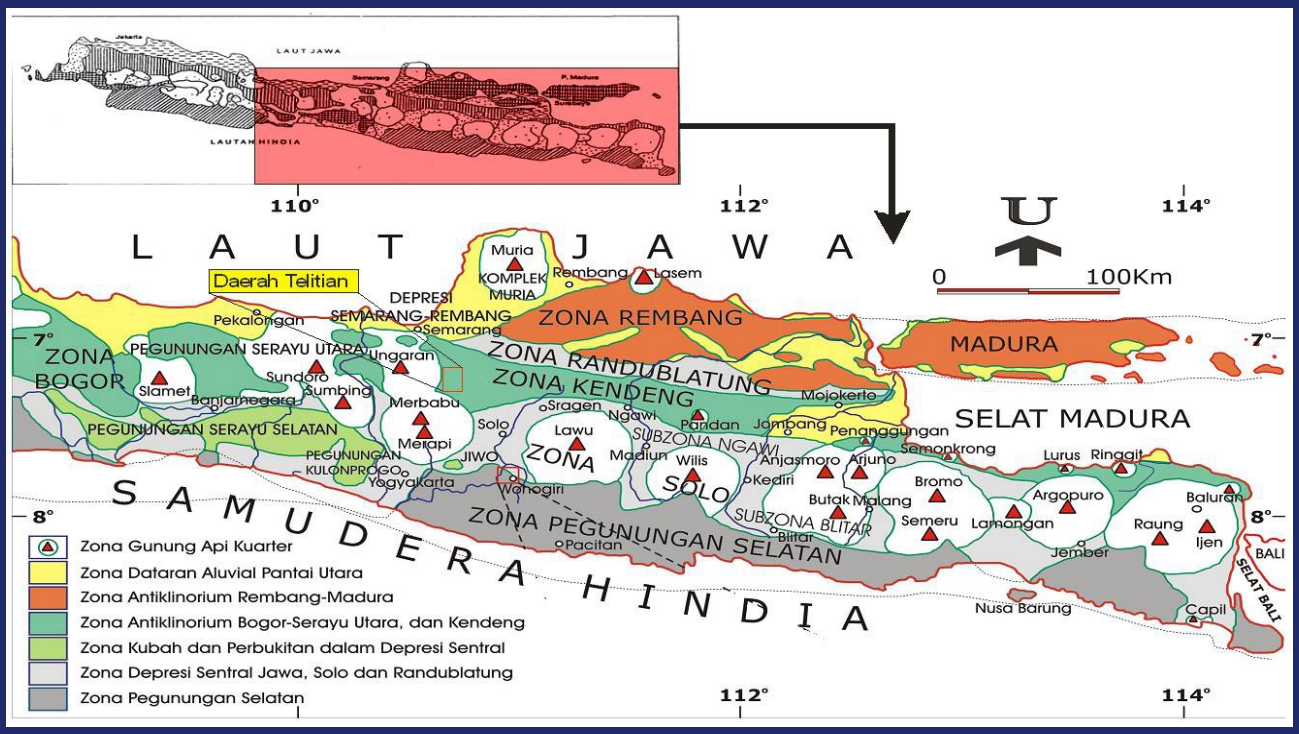
Kendeng is one of karst landscapes in Indonesia that is located in Java Island. The landscape extends through Central Java province and East Java province covering the Kendeng Mountain Range and North Karst Mountain Range.

Where is The Landscape Situated?

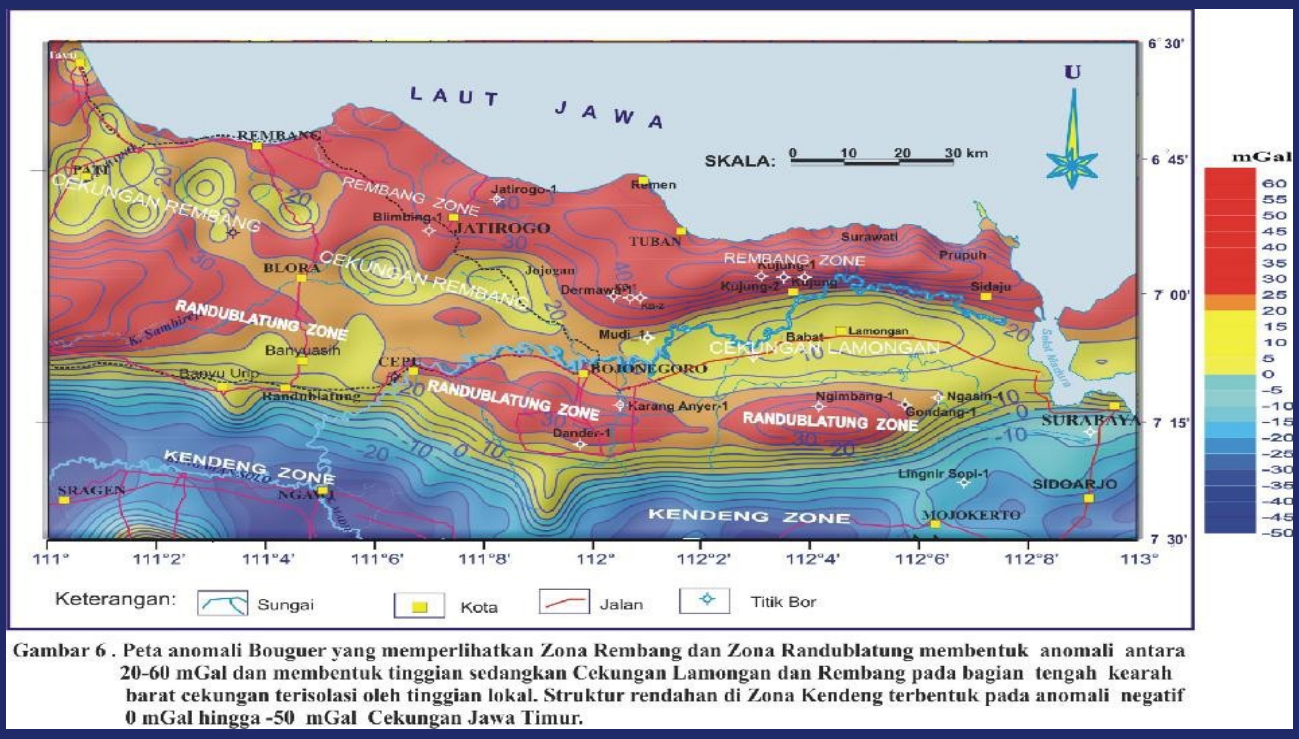
The North Karst mountain range is also called North Kendeng mountain range as it is lying in the northern part of Kendeng mountain range in parallel with the Kendeng mountain range. Meanwhile, Kendeng mountain range, known as the South Kendeng mountain range, is often used to represent both mountain ranges.

In the Central Java Provincial Spatial Plan for 2009 – 2029, the Provincial Government of Central Java indicated that the North Kendeng mountain range covers an area of 5 districts, that is Grobogan, Blora, Rembang, Pati, and Kudus while the South Kendeng mountain range covers Boyolali, Sragen, Grobogan and Blora districts.

Some have argued, however, that Rembang district should not be part of North Kendeng mountain range based on a map published by van Bemmelen in 1949. The map indicates that Kendeng Zone covers areas that stretch from the west of Ungaran mountain in Central Java to Jombang District of East Java. Kendeng Zone makes up of what is considered by some as the Kendeng mountain range. Meanwhile Rembang Zone is situated far in the north of Kendeng Zone, separated by the depression zone of Randublatung.



Physiology of the Central and Eastern Parts of Java Island by Van Bemmelen (1949)



Gambar 6 . Peta anomali Bouguer yang memperlihatkan Zona Rembang dan Zona Randublatung membentuk anomali antara 20-60 mGal dan membentuk tinggian sedangkan Cekungan Lamongan dan Rembang pada bagian tengah kearah barat cekungan terisolasi oleh tinggian lokal. Struktur rendahan di Zona Kendeng terbentuk pada anomali negatif 0 mGal hingga -50 mGal Cekungan Jawa Timur.

Source: Scientific paper on “Prospek Migas pada Cekungan Jawa Timur Dengan Penagamatan Metode Gaya Berat [The Prospect of Oil and Gas in East Java Depression using Gravity Method]” by the Centre of Geological Survey (2010)

In addition, a research in 1983 by Harsono Pringgoprawiro indicated that the North Kendeng mountain range was formed by Rembang Basin while the South Kendeng mountain range was formed by Kendeng Basin. A map from a research in 2010 by Panjaitan showed that Rembang Basin is located between the Randublatung and Rembang Zones around the districts of Pati, Blora, and the southern part of Rembang district. The Central Java provincial government may have used both researches as the basis in including Rembang district as part of the North Kendeng mountain range.

Conflicting Policies

Unclarity has not only concerned with the boundaries of Kendeng regions. Confusion also remains concerning the policies on the management of natural resources in Kendeng, which has led to prolonged conflict between cement industry and the local communities.

A research by the Central Java Provincial Office for Mining in 1998 demonstrated that Watuputih mountain, which is located in the North Kendeng mountain range, classifies as karst landscape with natural caves and underground rivers.

The Decision of the Minister for Energy and Mineral Resources Number 0398/40/MEM/2005 however stipulates that karst landscape only covers the districts of Grobogan, Blora, and Pati. It is likely that the policy has led cement industry to set foot in other Kendeng regions, including Rembang district. This is how conflict begins between local communities in Kendeng region and cement industry.

The Indonesian Law Number 26 of 2007 stipulates that Karst Landscape classifies as protection area. The Law has been used by the Central Java provincial government as the basis for the development of the Provincial Spatial Plan for 2009-2029. The provincial government has also used the Decision of the Minister for Energy and Mineral Resources as the basis for developing the plan for Sukolilo karst area.

Article 60 of the Central Java Spatial Plan even stipulates that Sukolilo karst landscape, which covers the area within the administrative boundaries of Pati, Grobogan and Blora districts, is a protected area. In addition to that, water catchment areas in Randublatung, Watuputih, Lasem, Pati-Rembang, and Kudus Basins also constitute geological protected areas.

Meanwhile, Article 80 provides that the North Kendeng mountain range (which the areas in Grobogan, Blora Rembang, Pati, and Kudus districts) and South Kendeng mountain range (which cover the areas in Boyolali, Sragen, Grobogan, and Blora districts) are mining areas.

The provisions in the provincial Spatial Plan can also mean that mining activities in karst areas outside of Sukolilo are not prohibited. In 2012, however, the Minister for Energy and Mineral Resources revoked the Decision of the Minister for Energy and Mineral Resources Number 398 of 2005 and replaced it the Regulation Number 17 of 2012 that defines karst landscape as geological protected areas that form parts of the national protected areas. The regulation is in line with the findings of the research by the Central Java provincial Office of Mining in 2012.

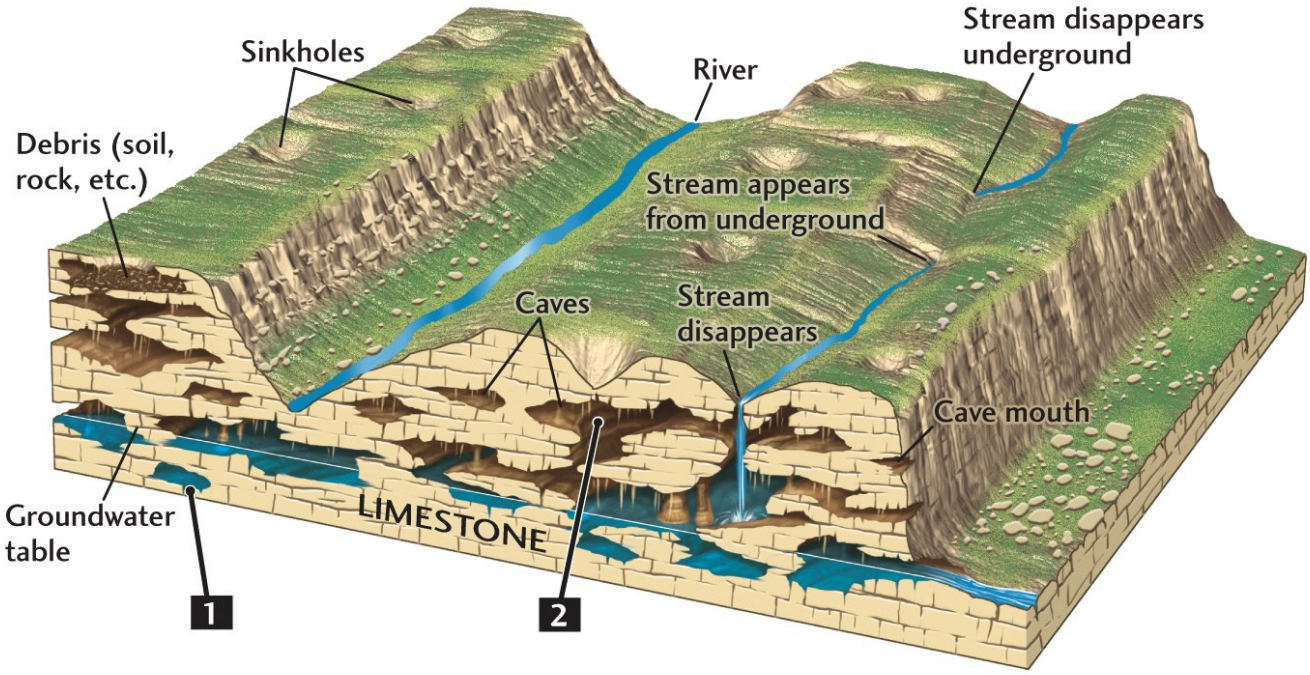
However, there remains the need for the revision of the provincial Spatial Plan related with Kendeng landscape areas. Latest update shows that in October 2018, the revised draft of the Spatial Plan was approved during the Plenary Session of the local parliament.

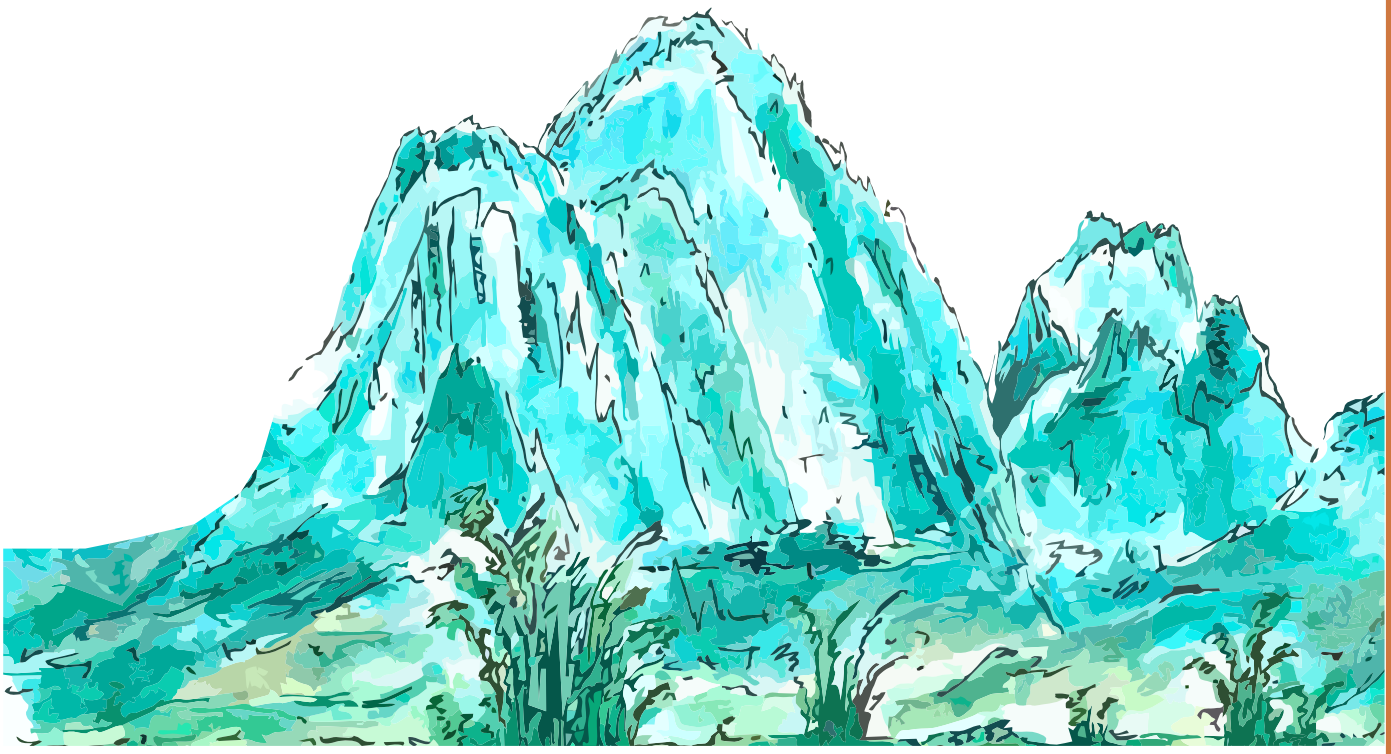
INTRODUCING KARST

Karst is also known as limestone rock formation. Karst is formed through series of thousands and even million years of natural processes. Initially karst was formed by sedimentary limestone rock deposits on the ocean floor or plant and animal fossils that contain limestone.

Subduction of the earth's plates caused the plates to be uplifted, taking the sediments to the surface. It is not surprising to find sea animal or plant species in karst areas although some karst regions do not entirely come to the surface and are still covered with soil.

Typically covering extensive areas, karst ecosystem plays a significant function as groundwater reservoir. In spite of that, karst is characterized by





barren and rocky surfaces that easily dissolve in rain water, creating sinkholes or even natural caves on the surface. Rain water seeps down through the cracks and creates underground streams or rivers. As karst landscape typically reserves water, it becomes a water infiltration area for the surrounding areas.

On the other hand, karst provides the source of raw materials needed to produce cement, an essential material in infrastructure and housing construction. Increased demand for housing, public facilities and better road access has meant increased demand for cement. As a result, karst has become the bone of contention among cement industry and local communities living around the karst areas who have been benefiting from the ecosystem.

RICE FIELDS ARE THE PREDOMINANT LAND USES IN KENDENG LANDSCAPE

North and South Kendeng mountain ranges stretch from Central Java province to East Java province. In Central Java, Kendeng mountain range is located in the centre of the mainland while in East Java, part of Kendeng mountain range stretches along the coast. The different locations of the mountain range also mean the different characteristics of local communities in Kendeng mountain ranges.

People living in Kendeng mountain range within Central Java administrative area – covering the districts of Grobogan, Pati, Rembang, Kudus and Blora (North Kendeng), and Boyolali and Sragen (South Kendeng) - are agrarian community. Agriculture Census in 2013 recorded that a total of one million households work in agricultural sector in the 7 districts mentioned above. In addition, people also rely their livelihoods on plantation, forestry, and fishery.

Agriculture is a sector that relies on the condition of the environment. The condition of the soil, rainfall, air temperature, and sun rays are some of the factors of the environment that affect agriculture. In addition, the cycle of pests are also influenced by changes in weather.

Farmers are aware that they cannot survive natural challenges on their own and therefore they choose to assemble in community groups. Decisions on types of plants, growing time, and many more agriculture-related considerations are made in group meetings. Farmers will usually feel that they are faced with increased uncertainties when making decisions that are different from the groups. That explains the same type of plants grown in one agricultural area, especially in areas with similar soil condition. This is the typical condition found in Kendeng regions.

Rice is one of the most popular commodities grown by farmers in Kendeng regions, including farmers in Central Java. In 2017, the total areas of rice fields in 7 districts in Kendeng regions constitute one third of the total rice field areas in Central Java. Most of the rice fields in Kendeng regions are irrigated agricultural areas, except some areas in Rembang district which are mostly rain-fed. Agricultural areas constitute around 40% of the total size of each district, except Pati, Blora, and Boyolali.

In addition, since karst landscape is characterized with barren surfaces, some dry-land commodities such as maize, soybean, legumes, and sweet potatoes are relatively preferred by farmers in Kendeng regions. The north part of Kendeng is in fact popular as one of the largest soybean- producing region, including Grobogan district the main producer of soybean in Central Java. Neighboring regions such as Pati, Rembang, Kudus, and Blora are also known as potential regions for soybean cultivation. In 2017, soybean production from these 5 districts contributed to 60% of the total production of soybean in Central Java.

Soybean is usually grown almost at the same time across one district, except for

Grobogan which is more advanced in soybean cultivation compared to other regions. In Grobogan, soybean is cultivated throughout the year through different crop rotation patterns in each sub-district.

Located in the southern part of Kendeng, Boyolali and Sragen are also soybean producing regions although they have less potential than the other five districts. Bordering directly with other landscapes - Boyolali with Merapi volcano and Sragen with Solo Zone, these districts have slightly different condition of environment compared with the regions in the northern part of Kendeng. As a result, these two districts also have different main commodities in agriculture.

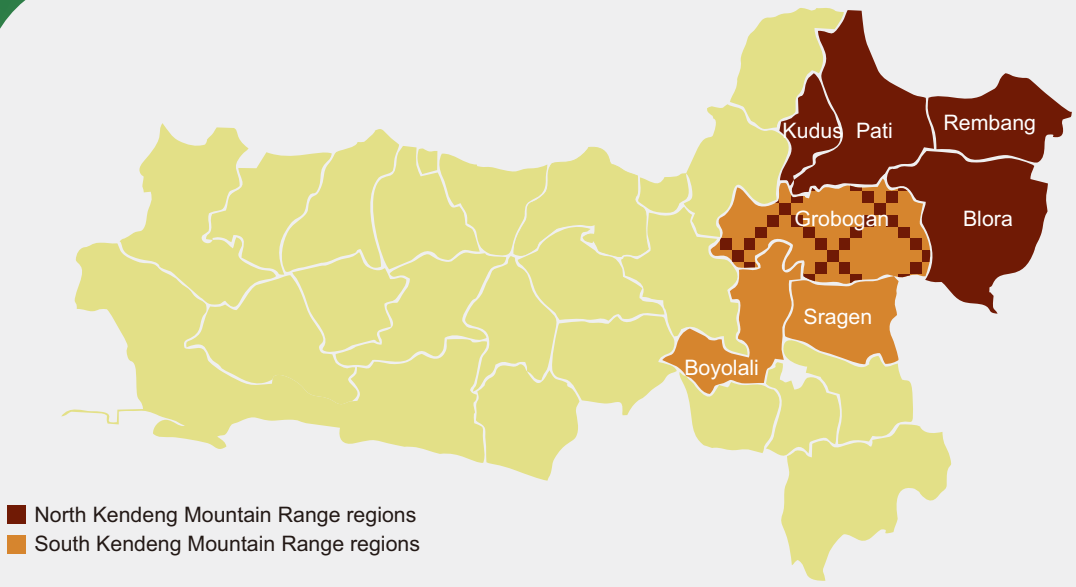
Unlike other districts in Kendeng, Blora is predominantly covered with forest.

Blora is known as teak wood producing region. Teak wood from Blora is the most sought after for their finer texture and strong durability compared with teak wood from other regions. Teak woods in Blora come from teak wood plantation managed by the state-owned forestry enterprise (Perhutani). Information from Perhutani website indicates that Randublatung Management Unit (KHP) alone has a total of 27,300 hectares of teak wood plantation. Most teak wood plantation areas are within Blora district while the rest are located in Grobogan.

In addition to teak wood, Kendeng is also known as Indian rosewood (sonokeling wood) producing region, especially in Rembang area. Sonokeling woods also come from forest areas managed by the Perhutani under Rembang Forest Management Unit.

infographic

agriculture in kendeng landscape



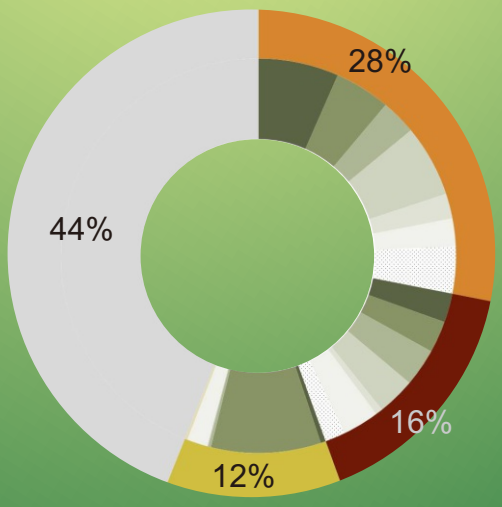
North Kendeng and South Kendeng mountain ranges extend from Central Java to East Java covering 7 districts in Central Java

Farmers Households

Grobogan	264,144	Kudus	51,359
Blora	170,299	Boyolali	170,529
Rembang	108,399	Sragen	142,187
Pati	189,967		

Land Use

Karst landscape is characterized by dry surfaces. Local community make use karst mountain range for dry-land farming during the rainy season to grow maize, soybean, groundnut and sweet potato. In areas with good irrigation system, rice is the main crop commodity with cash crops as second commodities.



Unlike other districts, Boyolali and Blora have different preference of commodities. Farmers in Boyolali, especially those who live on the slopes of Merapi and Merbabu volcanoes, prefer horticulture cultivation. Meanwhile, with the most extensive areas of forest, Blora is known for its forest products, especially teak.

Source: Compilation from various sources

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KENDENG AQUIFERS

The underground rivers in Kendeng areas have long become the source of polemic. Environmental groups strongly argue that there are many underground rivers in Kendeng that have not been mapped properly. On the other hand, cement industry in Kendeng also insists that they operate in areas where there are no underground rivers or that they operate without trespassing the flow of the rivers.

The people of Kendeng, especially farmers, also believe that there are underground rivers and streams in Kendeng areas that they rely on as their sources of livelihood. For this reason, some of the local communities in Kendeng, with the support of environmental groups, are very strong in voicing their resentment against the construction of cement plant, which they believe will exploit the karst landscape in Kendeng and damage the aquifers underneath.

Karst dissolves quite easily in water. However, because not all parts dissolve in water, sinkholes are formed on the karst surfaces, which may explain the possibility of the emergence of disappearing springs. These springs disappear underground and continue flowing to the sea or reemerge to the surface. The underground springs also form underground natural caves in karst landscape.

Findings from the research by ASC (1994, 2006), Indonesian Speleological Society (ISS), Semarang Caver Association (SCA), and Centre for Karst Study of UPN Veteran University revealed cave systems with underground rivers in Kendeng area, including the Urang Jeblokan Kembang cave system, Pari cave system, and Sumber Kali Gede spring. It was even recorded that Gua-Jeblokan Kembang cave system is 1929 m in length.

Despite her expression of doubt in March 2017 about the existence of underground rivers in Kendeng landscape – as reported by detik.com, in the same year the Minister of Environment and Forestry recognized the existence of cave systems and underground rivers in Kendeng landscape in the Stage II Kendeng Strategic Assessment of the Environment (KLHS) document under her supervision.

Apart from that, karst is usually featured by shallow ground water table level that is stable all year long as evident by the presence of natural wells that never dry around the depression in karst landscape. The local community makes use of the wells to get water for household need.

Over 14,000 Hectares of Perhutani Forest Land Areas in Pati District Are Threatened to Become Potentially Critical

Perhutani is the state-owned enterprise managing state forests. Perhutani manages 22,899.79 hectares of forest land in Pati District. The management of forest land in this region comprises of two Forest Management Unit (KPH): 21.4 thousand hectares of forest areas in Pati and 1.4 thosand hectares of forest areas in Purwodadi.

A research published by the Geodesy Journal of Diponegoro University in 2013 found that Perhutani forest land areas in Pati were dominated by 14,351.74 land areas that could potentially become critical. Severe degradation of forest land areas was most evident in Margorejo Sub-District with 252.02 hectares of critical land areas. Other areas with relatively alarming condition were Sukolilo District with 1,400 hectares of rather critical land areas.

Critical land areas in Margorejo sub-district – which cover exactly Perhutani production forest and limited production forest areas – are under the management of Pati Forest Management Unit (KPH) of Perhutani in Central Java. The same source indicated that land clearing for shifting cultivation by the local community had contributed to the significant size of critical land areas.

Unlike Margorejo, Sukolilo district has experienced different level of degradation of land areas due to illegal mining operations by the local community in the karst areas. Reforestation of critical land was once conducted by growing teak trees, which was not very successful due to the prolonged dry season and unsuitable geographical condition.

Compared with the rate of degradation in 2004, the total areas of critical land in Pati District have declined significantly. On the other hand however, the number of potentially critical land in Pati has increased in a higher rate than the decline of critical land areas.

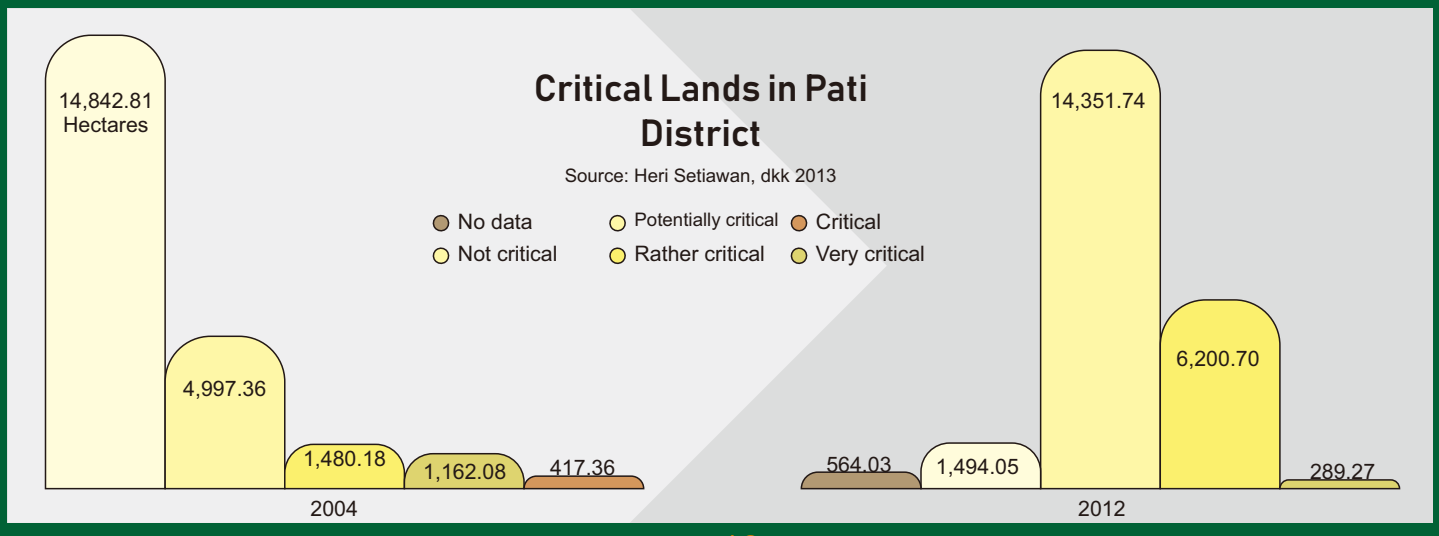
Outside Perhutani forest management areas, things have not been any better. Pati is one of the districts under the Jrateunseluna River Basin, which flows into Kendeng regions. Jratunseluna River Basin is one of the most critical river basins in Indonesia. Data from the Jratunseluna River Basin Agency in 2010 indicated that 12.88% (or 118,526.73 hectares) of the total areas of Jratunseluna river basin are in critical condition. Of the total critical areas, 4500 hectares lie in Pati District.

Land degradation in Jratunseluna River Basin has caused annual flood in the north coast regions in Java. Flood embankments on a number of major rivers are in critical condition, including Serang River, Lusi River, and Juana River that pass through a number of districts in Kendeng areas.

The results of Kendeng Strategic Environment Assessment (KLHS) show that there are three watershed areas in Kendeng Mountains, especially in the northern part, namely the Bengawan Solo Watershed, Serang-Lusi Watershed, and Juwana Watershed. Bengawan Solo Watershed lies within Bengawan Solo River Basin while the other two lies witihin Jratunseluna River Basin.

The Spatial Plan for Java-Bali 2012 mentioned that Bengawan Solo and Jratunseluna River Basins were prioritised for rehabilitation. Watershed areas in Jratun Seluna River Basin are Jragung, Tuntang, Serang, Lusi, Juwana, Bodri, Garang, Randu Guntini, Jambangan, Pandansari, Gandu, and Blitung with Grindulu, Lorong, and Damas watersheds in Bengawan Solo River Basin.

Only little progress has been evident when it concerns land condition in Pati district. Central Java provincial Bureau of Statistics indicated that in 2016, Pati District was recorded as one of the most critical regions in Kendeng landscape. A total of 3,742.50 hectares of its areas fell under critical level category with more than 25 thousand hectares falling under potentially critical category. Other district with rather significant number of critical land areas is Kudus with 2,316.30 hectares of critical land.



infographic

Most forest areas in Kendeng Mountain Ranges, which cover protected forest, production forest and limited production forest areas, are under the management of Perhutani.

The largest Perhutani forest areas are located in the north, which cover Grobogan, Blora, Rembang, and Pati districts with total areas of 206,798.76 hectares

The majority of smallholder forest areas are located in Pati, Boyolali, and Sragen districts. In these 3 districts, there are much more smallholder forest areas than state forest areas

The management of Perhutani forest areas is mandated to a number of Forest Management Units (KPH)

Grobogan	KPH Purwodadi - KPH Gundih - KPH Telawa - KPH Semarang
Blora	KPH Randublatung - KPH Cepu - Blora
Rembang	KPH Mantingan
Pati	KPH Pati
Kudus	KPH Pati
Boyolali	KPH Gundih - KPH Telawa
Sragen	KPH Surakarta

SIZE of FOREST (Hectares)

	Perhutani	Conservation	People's Forest
Rembang	24,044.76	62.20	14,225.65
Pati	22,625.72	-	34,683
Kudus	3,634.86	-	5,469.63
Grobogan	69,691.53	-	19,795.14
Blora	90,549.21	55.40	18,302.31
Boyolali	13,887.79	3,741.51	20,107.97
Sragen	5.232,15	102,48	21.974,99

North Kendeng Mountain Range

South Kendeng Mountain Range

Timber Products

Teak wood trees dominate Perhutani forest areas. In addition to teak wood tress, Perhutani also grow forest timber such as mahogany, Indian rosewood (sonokeling), and sengon. Smallholder forests are mainly grown with sengon timber.

Source: Compilation from various sources

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