

# BANJARMASIN's WASTE MANAGEMENT :

## An overview, Current State and Issues

バンジャルマシン市における廃棄物管理の概要・現況と課題について



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# Facts & Figures

The city is an island. Banjarmasin is completely encircled by a system of rivers, streams & canals.

## PEOPLE & WATERWAYS

**72,745** SLUM HOUSING UNITS ARE WITHIN 200 M OF WATERWAYS.

**82%** OF RESIDENTIAL AREA IS WITHIN A 5 MINUTE WALK (400 M) OF WATERWAYS.

**84%** OF THE CITY'S TOTAL AREA IS WITHIN 400 METERS OF WATERWAYS.

Banjarmasin is undergoing economic and social transformations due to urbanization and climate change. The city's rivers are both its lifeblood and create risk. Due to the city's isolated location and surrounding waterways, self-reliance is key to decreasing vulnerability in the face of these coming changes.

バンジャルマシン市は、河川と運河に囲まれた島の都市

河川に200m以内に暮らすスラム世帯の数

全世帯の82%が河川から徒歩1分以内に居住

現在、バンジャルマシンは都市化や気候変動への対応策など、大きな経済社会変革期にある。同市を取り巻く河川は生活の源でありリスクでもある。

# Banjarmasin

South Kalimantan  
Indonesia



## POPULATION

BY 2030, THE CITY IS EXPECTED TO NEARLY DOUBLE IN POPULATION TO OVER A MILLION, CAUSING EXTREME DISTRESS ON THE CAPACITY OF THE CITY'S RESOURCES, HOUSING, AND INFRASTRUCTURE.

**720,000**

BANJARMASIN, THE CAPITAL OF SOUTH KALIMANTAN, WAS FOUNDED IN 1526 FOR ITS PRIME RIVER TRADE LOCATION. THE CITY EXISTS ON A DELTA ISLAND.

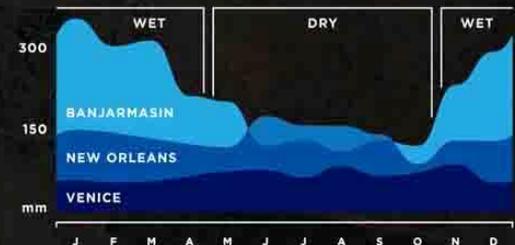
**9681.29 ha**

THE CITY IS HOME TO SOME OF THE DENSEST URBAN SLUMS IN SOUTHEAST ASIA. RIVERFRONT SLUM AREAS ARE AMONGST THE MOST RAPIDLY DENSIFYING AREAS.

**74.37 PERSONS / HECTARE**

## CLIMATE & HYDROLOGY

HAVING A TROPICAL RAINFOR-EST CLIMATE, THE CITY IS INUN-DATED BY FLOODING DURING THE RAINY SEASON. THE DUTCH CONSTRUCTED EXTENSIVE CANAL SYSTEMS FOR DRAINAGE. HOWEVER THESE SYSTEMS ARE NOW ILL-MAINTAINED AND OUT OF DATE WITH CURRENT LAND USES.



**120.2 KM**  
500 KM OF RIVERS AND CANALS COURSE THROUGH THE CITY, MAKING UP 8% OF LAND USE. THE CITY HAS EVOLVED AROUND ITS WATERS.

MOST OF THE CITY SITS -0.16 M BELOW AVERAGE SEA LEVEL, CAUSING THE RIVERS TO BECOME BRACKISH AND SALTY IN THE DRY SEASON DUE TO THE INTRUSION OF SEA WATER.

**16 CM BELOW SEA LEVEL**

# Facts and Figures

## 市の概況



- The real gross domestic product of the city was at around 27,93 trillion IDR (~ 1.88 billion EUR) in 2017  
2017年の同市のGDPは230億円
- The income per capita stood at 36.24 million IDR (~ 2,434 EUR) in 2017.  
2017年の同市の1人あたり所得は31万円
- The economy in Banjarmasin is supported mainly by the financial sector, trade, food and beverage, warehousing and transportation sector and the construction industry.  
経済の中心は、金融、貿易、食品、物流、建設など
- In 2017, more than 255,000 tons of waste were produced in Banjarmasin.  
2017年には同市で255,000トンを超えるゴミを排出
- The generated waste is estimated to be about 715 tons per day.  
1日あたりのゴミの排出量は715トン
- The city expects that the amount of waste grow annually by 1-2 percent until 2020  
ゴミの量は2020年までに年1-2%増加すると予測
- More than half of the waste is organic  
ゴミの半分以上は有機ゴミ
  - Food Waste 食物残渣 55,89%
  - Plastic プラスチック 12,77%
  - Paper, Cardboard 紙・段ボール 9,39%
  - Textiles, 繊維 14,93%
  - Metal, Glass 金属・ガラス 4,07%
  - Wood 木材 0,64%

# Facts and Figures

## 市の概況



- The waste collection in Banjarmasin is mainly organized informal.
- In settlements or in their vicinity the waste is stored in temporary collection points, after delivered by occupants or authorized waste collectors.
- The transport of waste to the landfill is done by employees of the municipal authorities.  
ゴムの埋め立て場までの収集運搬は市の職員が行う
- The City has 38 armroll trucks, 28 large garbage trucks, 16 pickups and 25 motorized tricycles.  
同市はアームロールトラック38台、大型トラック28台、トラック16台、三輪バイク25台を所有
- Part of the fleet is outdated and needs to be repaired or replaced.  
車両は古く修理あるいは代替が必要
- The waste is separated prior the disposal to the Landfill and is sorted, collected and reduced in this way.  
ゴミは回収の際に分別される
- 11 TPS-3R contribute to the reduction of the waste volume by 35 m<sup>3</sup> daily or 1,050 m<sup>3</sup> per month (roughly 260 tons per month).  
3Rによって1日35m<sup>3</sup>あるいは月1050m<sup>3</sup>のゴミ削減に貢献
- In addition, the removal of usable materials through informal garbage collectors takes place both before and during transport as well as directly on the TPA resulting in a decrease of the amount of waste by 30-60 tons per month.  
ウエストピッカーによる「インフォーマル」なリサイクルによって月30-60トンのゴミの削減に貢献
- 234 unit Waste Banks, which are distributed throughout the city, reduce the waste by a further 250 tons. In total the monthly reduction rate is roughly 650 tons or 4.5 percent.  
234か所のゴミバンクの設置により、月650トンのゴミの削減に貢献
- The Waste Banks are operated by volunteers  
ゴミバンクはボランティアによって運営

# Facts and Figures

## 市の概況



- Individual Waste Banks sell their "revenue" to so-called pengepul, intermediaries, which cooperate with the end users of recyclable materials as well as the central waste bank. **各地区ゴミバンクからリサイクル回収業者がゴミを買い上げる**
- The central waste bank, which is organized by DLH handles on the one hand the coordination of the Waste Banks and on the other hand secures the of purchase prices. **市が中央ゴミバンクを運営し買取価格を保証**
- The central bank has a waste storage space, which is used for bridging price fluctuations. In addition, a further sorting, separation and treatment of waste delivered to the central waste bank takes place. **中央ゴミバンクは取引価格の安定化と、ゴミの分別のためにゴミ保管スペースを所有**
- Destination for final disposal is the TPA Basirih, which was first put into operation in 2000. **ゴミの最終処分場バシリは2000年より運営**
- The plant is classified as **a controlled landfill** and was funded by the World Bank. During construction an access route was neglected. As a result incoming trucks can't unload directly on the active part of the landfill. Therefore, the landfill has the **characteristics of an open landfill**

**処分場は世界銀行の支援によってコントロール・ランドフィルとして建設されたものの、車両のアクセス通路が整備されなかったため、処分場の適切な場所にゴミの投棄ができず、結果としてオープンダンピングになっている。**

# Facts and Figures

## 市の概況



- The total area of the plant is **39.5 hectares**.  
処分場の面積は39.5ヘクタール
- The active management zone currently reaches nearly 20 hectares  
稼働中の面積は20ヘクタール近い
- More than 300 waste pickers are active in the city and on the TPA/Landfill.  
ウエストピッカーは市内合計300人以上
- At the landfill, there is a system that captures the methane-containing gases. It can power up more than 80 households in the vicinity of the TPA with free gas.  
ゴミからメタンガス回収装置があり、付近の80世帯にガスを無償で供給
- The plant was planned to operate until 2016, but for lack of alternatives, the system continues to operate.  
処分場は2016年で閉鎖のはずだったが代替地がないため現在も使用される
- After the closure a regional TPA should be built in Banjarbaru (35 km southeast of Banjarmasin) and serve as main disposal site for waste from the city.  
閉鎖後は、35キロ離れたバンジャルバルに新しい処分場が建設される予定
- After commissioning of the plant, the TPA Basirih should be converted to a transfer station (SPA)  
閉鎖後は、ここはトランスファー・ステーションに転換される予定

# Facts and Figures

## 市の概況



- Environmental Agency /DLH holds the main responsibility for the waste management and disposal in Banjarmasin, organization and implementation of secondary and tertiary waste collection and maintenance and operation of TPS and TPS-3R. **ゴミは市の環境局が管轄**
- Local regulatory frame for the organization of waste management is Perda No. 21/2011: It regulates the entire waste management chain from the source to the final disposal at the landfill to the penalties for illegal disposal (up to 3 months in prison or a maximum of 5 million IDR (~ 336 EUR) **市の規制によって廃棄物を管理、不法投棄などの不法行為は3か月の禁固あるいは43,000円の罰金**
- The total budget for the waste sector is less than 40 billion IDR (~ 2.7 million EUR). **市の廃棄物関連予算は3.5億円に満たない**
- The lack of funds doesn't allow the overhaul of the fleet or the employment of more staff. **市の予算の不足により、職員の拡充も車両のメンテナンスもできない**
- Operation of Waste Banks is accomplished partly with CSR donations of private companies **ゴミバンクの運営は、一部民間企業のCSR活動の一環として行われている**

# Waste Management System in Banjarmasin

バンジャルマシン市における廃棄物管理システム



Household Waste  
家庭ごみ



Waste is managed by:  
- Garbage bank  
- Polling Station w/ 3R  
- Community group



ゴミバンク  
ゴミステーション/3Rステーション  
コミュニティグループ による回収

Start Here  
スタート



Taken by  
garbage worker  
ゴミの回収



Transported by  
garbage truck of  
Environmental  
Office  
Banjarmasin

市環境局のゴミ収集  
トラック



End Here!

The rest of the waste is  
disposed of to landfill  
Basirih

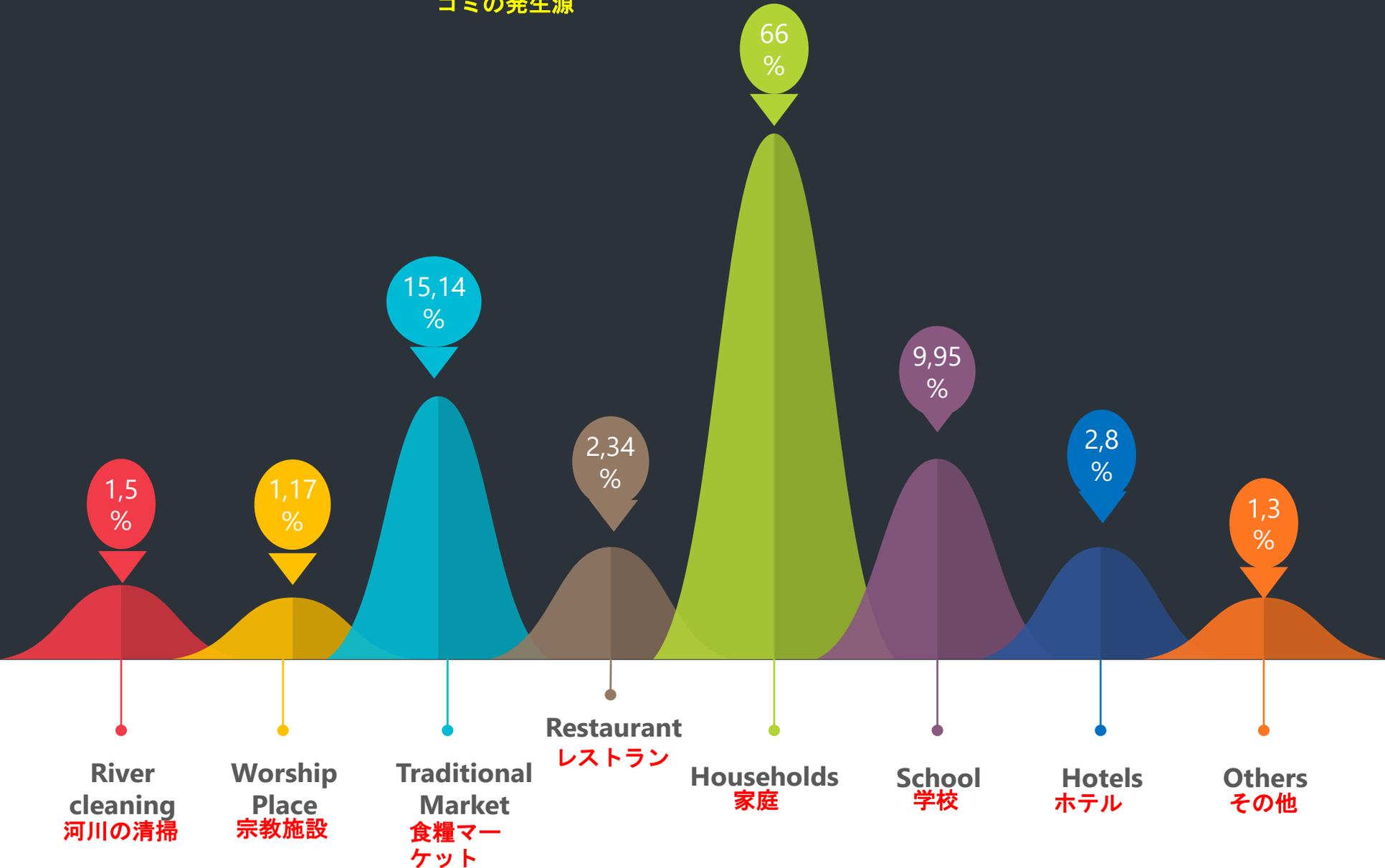
残りのゴミはバシリ  
処分場へ



Time to dispose of  
garbage to polling  
stations :  
20.00 – 06.00  
ゴミの回収時間

# WASTE SOURCES

ゴミの発生源

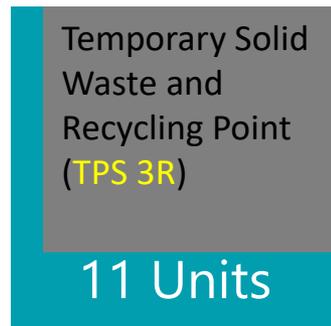


# Waste Management Facilities in Banjarmasin

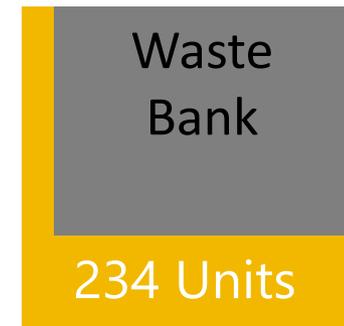
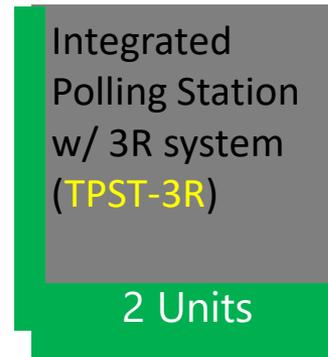
バンジャルマシン市の廃棄物管理施設



ゴミ一時回収ポイント



ゴミ一時回収&リサイクル  
ポイント



ゴミバンク



コンポストハウス



細断施設



埋め立て処分場



運搬車両

# Facilities and Infrastructure for Community-Based Waste Reduction: TPS-3R, TPST, Chopping Houses and Composting Houses

コミュニティ単位のゴミ減量活動施設



Composting Process di TPS-3R



Composting results



Inorganic Waste Sorting Process at TPS-3R



# Waste Banks

ゴミバンク



# TPS3R Daily Activities

日々のゴミ回収活動



1

Handling from  
Housing to TPS3R



2

Transporting



3

Sorting



4

Organic Chopping



5

Composting

# What is the Problems?

課題は何か？



**Sector is strongly underfunded (both investments and operational).** Local government allocations for the waste sector is less than 40 billion IDR (~ 2.7 million EUR) to manage about 260.975 tons waste per year. It's only about **2.6%** of total city budget.

環境分野への予算の不足



**Public awareness** about environmental hygiene is still low. The city strives to arouse environmental awareness among the population.

市民の関心の欠如



There is no standard rules for managing the reduction and sorting of waste starting from the source (household).

ゴミの減量、分別などの基準となるルールがないこと



The use of plastic is still very high. Indonesia is the second country after China as the largest contributor of plastic debris in our oceans

プラスチックごみの増加。インドネシアは中国に次いで世界で2番目に多く海にプラスチックごみを排出している。



# Previous Efforts and Actions

解決に向けたこれまでの  
努力



Trying to find funds other than the budget of the city administration itself, for example funds from the Central Government, CSR from Private sectors and assistance from donor agencies.

市の予算以外の外部資金の模索



The city administration pursues the construction of a waste management with enhanced citizen participation. This will be achieved through more TPS-3R and more Waste Banks.

市民のより積極的な参加



Involving environmental NGOs to help socialize the reduction and sorting of waste starting from home and increasing awareness of environmental hygiene

環境NGO団体などの参画



**Since June 2016** the use of plastic bags in mini-markets has been prohibited by local regulation. This policy successfully reduced the use of plastic bags in modern retail **almost 70%**. Thus, the city goes beyond the national legislation. Banjarmasin became a pioneer in the matter of reducing plastic waste in Indonesia. The ban on plastic bags in the city will be extended to traditional markets starting in early 2019.

2016年6月より市の規制による小規模店舗におけるレジ袋使用の禁止：70%  
近いレジ袋の減量化に成功

- 
- **Terimakasih**
  - **ありがとう**