

# ACTUALIZING A CITY AT THE DOWNSTREAM AREAS OF KALIMANTAN BY HANDIL SYSTEM<sup>1</sup>

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## Abstract

This study is aimed at formulating some alternatives to create a city in a downstream area of Kalimantan by adopting *Handil* system. The formulation study and analysis are based on the previous findings by which a Handil system found in a rural area before it transformed into an urban area. By such findings some alternatives are formulated to create a Handil city in a downstream area in Kalimantan.

## INTRODUCTION

Generally most downstream areas in Kalimantan are areas influenced by rivers tide. In these areas hundreds of settlements developed and constructed that historically grew by the existence of plantations in which the water system adopted a local way called Handil. Now those hundred settlements are transforming into cities and some new settlements which were deliberately designed as transmigrated areas exist.

Along with its development, the development of those settlements did not consider, adopt, and develop the Handil system that now they are narrowed and even lost. By this phenomenon, now some settlement development which transforms into a city is in danger of flooding by tide. In addition, some areas flood when the tide comes. This condition is exacerbated by high temperature that leads water sea rises and the deforesting activities that lead forests at the downstream areas of Kalimantan lost. This causes the upstream water and the downstream of tide converged and this condition occurs intensely year by year at the downstream areas of Kalimantan. Therefore, it is necessary to promote the Handil system as a tool of handling tidal water in developing settlements or in term of making new cities at the downstream areas.

Handil system is a traditional water system which has a simple design with a waterway flows from estuary (Noor, Muhammad 2001). Handil generally has 2-3 meters wide, a 0.5-1 meter deep, and 2-3 kilometers length from the estuary. The distance of one Handil to another is around 200 – 300 meters. Handil is also possible to extend to 20 – 60 hectares. By this Handil system, now is available four different models such as 1) Anjir system, 2) Sisir system, 3) Garpu system, and 4) Polder system. This tidal water system was first used for farming and plantation but along with the development now changes to be settlement areas both naturally or man-made design.

## METHOD

The formulation is based on exploration study at some areas that previously were spots of Handil system before it transformed into cities. Moreover, the exploration also focused on the areas that still have Handil system and on the transmigrated settlements where the location was designed to

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follow tidal water system. The study was conducted by reviewing some previous findings as well as a running research. Some previous findings adopted are such: (1) previous findings for Banjarmasin city development, (2) previous findings for Pontianak city development, (3) previous findings for Kalawa village, and (4) previous findings for transmigrated settlements in Petak Island (this research on Petak island is still running).

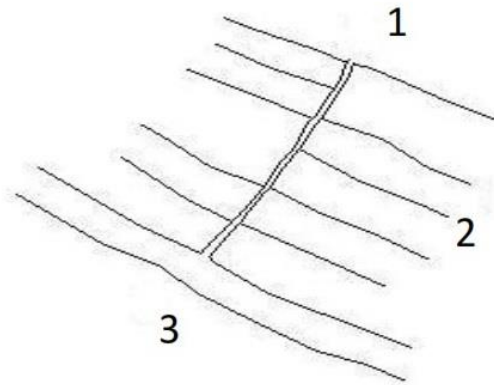


Figure 23. Handil system scheme

## FINDINGS

### Findings from Banjarmasin

Banjarmasin, now as the capital city of south Kalimantan, is geographically located in upstream area by altitude below sea water. This condition influences this city by tidal water in which within 24 hours it happens once low tide and twice tide. This city has a big river; Barito River, three medium rivers; Martapura, Kwin, and Alalak rivers and surrounded by some small rivers. Such rivers first were functioned as natural hydrology that when high water came, it directly flew to the medium and small rivers. By this natural hydrology, this city was free of flooding.



Figure 24. Banjarmasin 1916

Source: [www.kit.nl](http://www.kit.nl)

During its development, Banjarmasin commenced to build a canal or Anjir or Antasan such as big Antasan, small Antasan, Antasan Raden, and Antasan Bondan. In colonialism era, in 1880 J.J Meijer initiated to build Antasan Serapat and executed by W. Broers. This Anjir was finished in 1890. In addition, it was also constructed Anjir Tamban. By this development project, the farmers were motivated to build Handil and Saka, upto 1927 the Handil construction reached hundreds sites (Subiyakto, 2010). In 1940-1950, it was constructed some new Handil. Those Handil were constructed in some areas such as Handil Layap, Handil Pamangkih, Handil Bangkal, Handil Belayung, Handil Pelatar, Handil Jatuh, Handil Bintangur, Handil Malintang, Handil Ditch, Handil Babirik dan Handil Kabuwau. During those Handil construction, it was also constructed Saka. The existence of both Handil and Saka in Banjarmasin supported other natural hydrology systems that were constructed prior to man-made Handil and Saka. These well-constructed systems would reduce or even remove flood since the tidal water distributed to the Handil and Saka.

In the next phase of development starting from 1970, the development of the city did not consider the role of rivers, Handil, and Saka. Land access was commenced to develop by narrowing rivers and Handil. Saka that first was as land boundaries now is hoarded by the land access (paved road) and substituted by wall of lot border. Since 1970 the development of the city tended to be land city-oriented that in turn led this city lost a great amount of Saka and Handil. As a result, when the high water comes, it doesn't directly flow to the Handil and Saka but spilled to the land settlements and to the building environment since the Handil and Saka were lost.

### Findings from Pontianak

Banjarmasin was well-known with its Handil and Saka, Pontianak was also famous with its ditches. At least it was 23 big ditches and hundred small ditches available at past time. The 23 big ditches are; Ditch H. Husin, Ditch Bangka, Ditch Bansir, Ditch Tokaya, Ditch Besar, Ditch Mayor, Ditch H. Yusuf Karim, Ditch Daeng Lasibek, Ditch Langgar, Ditch Kongsi, Ditch Jepon, Ditch Beting, Ditch Semerangkai, Ditch Wan Bakar Kapur, Ditch Tambelan, Ditch Pangeran Pati, Ditch Nipah Kuning, Ditch Wan Salim, Ditch Makmur, Ditch Jawa, Ditch Nanas, Ditch Melayu and Ditch Pangeran. The same as Banjarmasin, ditches in Pontianak were also functioned as a directed watercourse of tide. By these systems, the high water of the river would flow through the ditches line and also to prevent this city from flooding.

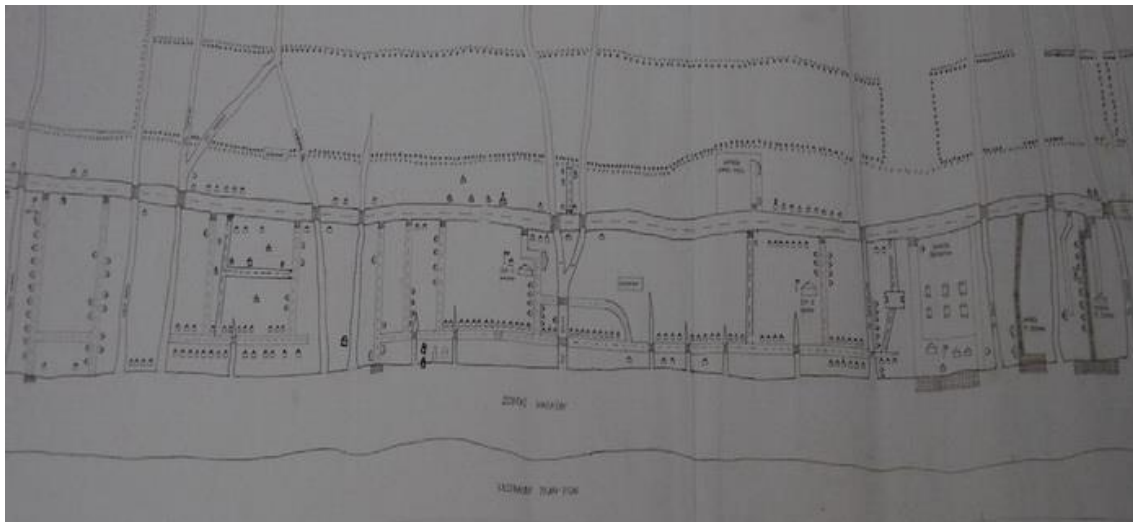


**Figure 25.** Pontianak 1940  
Source : [www.gahetna.nl](http://www.gahetna.nl)

As in Banjarmasin, since 1970 the development of land access (paved road) in certain areas of Pontianak, the existence of such small ditches were gradually lost because of hoarding lands access. While the small ditches were gradually lost, the big ditches were getting narrowed by land access (paved road) enlargement. The small ditches which were functioned as a land boundary became wall of lot border that functioned as land ownership border. As a result, now the great amount of such small ditches could not be identified. Thus, when the tide comes, it will not flow to the ditches but rather flooding the land access and building environment. In the past, the ditches were set in the town and integrated with the city hydrology systems that were able to prevent floods, but now by losing a great amount of such small ditches will open possibility of city flood.

### Findings from Kalawa village in Middle Kalimantan

Kalawa village in middle Kalimantan is located in Pisau Island exactly at a riverside of Kahayan and across the capital City of Pisau Island. Up to now, the village still has twelve Handil. The names of the Handil come from trees, plants, fish, people, and the nature's names. These Handil existed since 1914 and now are still conserved.



**Figure 26.** Kalawa village

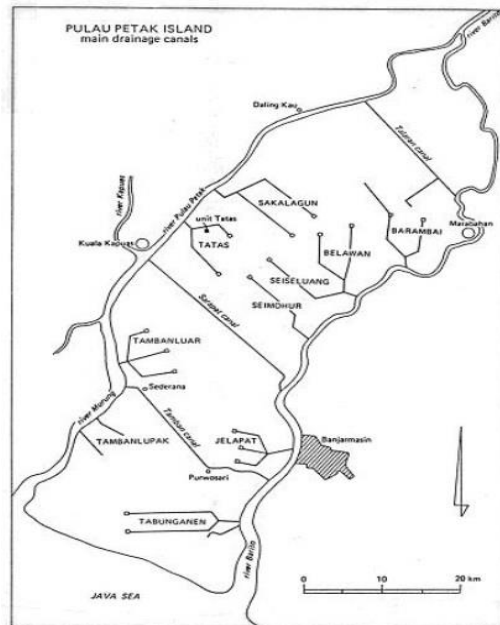
*Source : Kelurahan Kalawa, Kecamatan Kahayan Hilir, Kabupaten Pulang Pisau*

Each Handil in this area is chaired by a chief that administers each activity of Handil regulation, Handil maintenance, and to arrange the land share on the right and left side of the Handil. This chief is supported by some officials such as a head of field and a head of initiator. The head of field has a responsibility of farming at rice planting season while the head of initiator has a responsibility to gather all people when a certain activity needs to be conducted. These functionaries (the chief, head of field, and head of initiator) were voted by all Handil's members. To be a member of the Handil, people should meet (1) disbursing some money to the official by which it will be distributed to the activities for Handil's advancement or to help people in calamity, (2) willing to work together (mutual work) as ordered by the Handil chief based on the meeting acclamation.

**Findings from some transmigrated settlements in Petak Island Middle Kalimantan and South Kalimantan**

Petak Island is a wet land which is bounded by Java Sea on the south, by Kapuas Murung on the west, and Barito River on the east side. Based on jurisdiction, some areas of Petak Island on the west side belong to Middle Kalimantan, and the other areas on the east side belong to South Kalimantan. Petak Island has some transmigrated settlements which was deliberately designed. Some transmigrated settlements are Berambai, Belawan, Seluluang, Seindhur, Selapat, Tabunganem, and Tamban Luar villages.

Based on the design of transmigrated settlement patterns in Petak Island, it is believed that the installation of the transmigrated settlement design was based on the water system pattern of wet land such as Garpu model in which the secondary watercourse was ended by a large pond (around 40x40 meters). This model is a giant model where the pond is located in average around seven kilometers from the river. By this model, the transmigrated settlements on the water system is only located in a certain point of one of primary watercourse.



**Figure 27.** Petak Island  
 Source : Oosterban, 1990

Historically, Handil system was created by local community at a downstream area of Barito River to channel tide to farmlands as what community at Kapuas River did that created ditches to channel the tide to the farmlands. Along with its development when a certain village transformed into a city, the Handil and ditches that were first functioned as water channel changed unexpectedly as water transportation. By this development, Handil and ditches that were watercourses gradually reduced and when the village transformed into a city, the Handil and ditches were functioned as water transportation. According to findings from Pontianak and Banjarmasin, the social perception of Handil and ditches function changed – Handil and ditches first perceived as directed tide flow regulation to the farmlands and now Handil and ditches perceived as the circulation of water transportation – as the society that transformed into an urban society. As a result, in 1970 when the land access was developed and expanded, the

concepts of Handil and ditches were viewed as not relevant that in turn both Handil and ditches were gradually lost. The impact of such phenomena leads some areas of Pontianak and Banjarmasin now flooding due to tidal water.

While in both cities Pontianak and Banjarmasin Handil and ditches were lost, Kalawa village still keep them sustainable since 1914. This is because there has some functionaries (the chief of Handil, the head of initiator, and the head of field) to administer the management of Handil. This condition is always supported by social cooperated work that is decided in every meeting with all members. This activity is also supported by contribution from the members. In its development, now Kalawa village belongs to urban area of the Capital City of Pisau Island which is located across Kalawa village. By including Kalawa village to the urban area of Pisau Island, now it remains question on whether it is possible to keep the Handil since the transformation of a village area outside the city into an urban area outside the city when the development of land access (paved road) is not controllable?. This question of course needs more investigation to answer. However, the local wisdom on the cultivation of the Handil in the village needs to be promoted and adapted to the management of Handil inside the rural settlement and urban settlements.

The Garpu system that has been applied in Patak Island is the development of a modified Handil system. In that giant Garpu system, the settlement is only located in a certain area such as around primary watercourse. This Garpu system that ended by a pond is able to be functioned as fish pond by which the fish will follow the watercourse when the tide comes. In this pond the fish is trapped and in turn will be breeding and proliferating. Thus the availability of water and the uncontaminated water are necessary. However, because the distance of each pond is around seven kilometers from the river, sometimes the pond is dried and sometimes the tide doesn't reach the pond.

For settlement context, Garpu system could be promoted and adopted. The pond that is basically the end of primary watercourse, in the settlement context, is able to be open blue space that is surrounded by open green space. This long and large Garpu system for settlement is able to be shortened and reduced but still has to consider the maximum reach of the tide. This Garpu model system is possible to adopt and is an alternative of settlement model with Handil.

## CONCLUSION

At the downstream area of Kalimantan, almost most of areas are flat lands by declivity of 0 – 8% thus this area is influenced by tidal water of river. The space of water access to the downstream area is possible to reach around ten kilometers from the river. For example, Sampit city that has 50 kilometers away from the coast and Pulung Pisan Island that has seventy kilometers away from the coast are still influenced by tidal water of river within twenty four hours. By this condition and by the findings above, it could be concluded that:

1. In order to create a city at a downstream area in Kalimantan, it is necessary to plan and prepare a layout within urban area that functions as a channel of high water that can prevent the city from the flood.
2. Handil system basically belongs to tidal irrigation system. By this tidal movement on this channel that did not spill over agricultural lands, this can be applied as an alternative to create a city at a downstream area in Kalimantan at which it is influenced by tidal water. At past time, the lands which were not flooding used as farming lands, now for city context, the lands that are not flooding is for establishing city building area.

3. In order to keep the Handil system sustainable, it is necessary to campaign and inform continuously across generations about the main function of Handil as a waterway to channel tidal water to prevent urban building areas from flood.
4. In creating a Handil city, local wisdom from Kalawa village is possible to adopt settlements context. The job-description among local agencies should adopt a Handil functionary's structure. The local agency should also act as chief of Handil community, and the local secretary should act as a head of initiator including the name of local agency that should also adopt the Handil organization's name.
5. At the downstream area in Kalimantan also consists of peat moss where most of them categorize as shallow area (<50) to medium (100 – 200cm) area, and in South Kalimantan exactly at the south of Middle Kalimantan categorizes as thick area (200 – 400cm) to extremely thick area (800 – 1200cm). Conserving these area by not creating a city here is hopefully able to maintain the nature balance and belongs to a good policy to prevent this land from a huge disaster such as flooding.

Note:

Downstream areas in Kalimantan generally have flabby land structure. Thus researches on construction development of land access on flabby land structure, foundation construction on flabby land structure, and on the development of environment sanitation are necessarily conducted in order to facilitate and create the Handil system.

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