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PALEMBANG GREEN URBAN MANAGEMENT : BEST PRACTICES OF MITIGATION STRATEGIES IN TIME OF CLIMATE CHANGE

By. Hilda Zulkifli*

Abstract

Local wisdom is supreme values that apply in the governance of community life, among others, to protect and manage the environment sustainably. In this regard, the development of community's local knowledge has a very important role to prevent environmental damage. Palembang as a big city with a typology of swamp ecosystems have major challenges in urban development, both in aspects of housing and settlements as well as in environmental cleanliness. Preservation of culture in building houses, that adapt to both swamp area and the increase culture of mutual cooperation to fulfill a green city, is a great way to conserve the environment. Integrated development plan involving various stakeholders, government, private and community while promoting local wisdom is an alternative solution to mitigate climate change impacts.

Palembang is the capital of South Sumatra Province, the 5th largest city in Indonesia, after Jakarta, Surabaya, Medan, Makassar, and Semarang. The city can be reached by direct flight with a time 45 minutes from Jakarta, 50 minutes from Singapore and 1.15 hour from Kuala Lumpur. Palembang has a population of around 1.4 million people with an average of 1.58% in population growth. The total area is 400.061 km², consisting 16 districts and 107 sub-districts, with a population density of 3.537/km². GRDP with oil and gas value was recorded Rp. 42,252,619,- (4.450 USD) with the economic growth of 6.70% (with oil) and 8.24% (without oil), income/capita was recorded Rp. 14,712,175 (oil) with inflation rate 8.21%. The primary sector is dominated by the industrial sector, trade and services. Human Development Index of Palembang was recorded 75.01 (highest in South Sumatra Province) (Palembang in Figures, 2009). Palembang have a vision " Palembang , An international city, prosperous and civilized, in 2013) with the motto: "Clean, Green and Blue."

Biology Department, Faculty of Mathematics and Science of Sriwijaya University Jalan Raya Prabumulih Km 32 Inderalaya – Ogan Komering Ilir, South Sumatera Province Email : hilda.zulkifli@yahoo.com

Palembang is the oldest city in Indonesia with age to reach 1.327 years, proved by the "Prasasti Kedukan Bukit". The name Palembang comes from the Malay Pe/Pa mean a "place" and Lembang or Lembang means land under water or swamp. So, Palembang can be interpreted as a place that was always flooded (swamp ecosystem). This indicated the existence of a large river, Musi River (influenced by tides) that divides the city of Palembang. Therefore vital mode of transportation, economical, efficient and high speed were applied. With the approximately 70% of land flooded or called swamp

ecosystem, the data in 1990 recorded approximately 52.24% of land still flooded, and in line with the needs of urban development, then 2009 facted that the flooded land continues to decrease and now remains lesser than 20%.

Palembang is known as the capital of the Sriwijaya Kingdom, which is a political and economic power in Southeast Asia in the 7th and 9th century. In this decade it was proven that the urban population lived on rafts along the river without taxes being applied, while the leader live in the mainland with "rumah panggung". Kingdom of Sriwijaya was recorded slowly began to collapse in the 12th century. Islamic empires that had small part of the Sriwijaya empire, later developed the empire into another great empire like those in Aceh and Peninsular Malaysia.

Since a long time ago Palembang is known as the safest port where the best application of rules, because the leadership (Sultan) were firmly keep the waters. Palembang became an important trading port-city. This is proven by the establishment of "Benteng Kuto Besak" by Sultan Mahmud Badaruddin II in 1780 that serves as a defense territory. This legacy can still be proven by the persistence of "Benteng Kuto Besak" on the banks of Musi river, which now become a tourist attraction in the city of Palembang. Palembang has Ampera bridge that connects the upstream part to the downstream part, built in 1962 and completed in 1965, where development funds came from Japanese war reparations.

As a city with a typology (swamp ecosystem), most parts of the city of Palembang are flooded areas so that people's lives adapted with the existing conditions. "Rumah Rakit" / floating house is one form of adaptation that is owned by residents. This house is floating on the River Musi and influenced by tides. The house is made of wood and bamboo with a *nipah* awning, *sirap* and most recently with the tin roof (a lighter material). Floating house is a form of oldest house in the city and historically has been discovered in the Age of the Kingdom of Sriwijaya. In the Age of Chinese Books such as Ming Dynasty (1368 - 1643) book 324, noted about the floating house which likely have not much changed until now.

Noted also in the history, that in periode of the "Kesultanan Palembang", all foreigners must live in floating houses, including citizens of Britain, Spain, Holland, China, Campa, Siam, and even the first Dutch Den Haag Office were completely built on the floating house. This floating house other than as a residence also serves as a home industry of craft, because it is more healthy and where we can look at lifes along the River Musi directly. *Pustaka*

One of the other characteristics that are preserved until now is a house of wood which has a pit, known as "Rumah Panggung" / "stage house". This building reflects the life of the house in a swamp area where the floor has no direct contact with the bottom part, the water. To preserve this type of house, many new model construction were made with a variety of architectural models with a current selling price of 1.5 million/m² for orders from Jakarta. This prove that the architecture with local culture has indeed a lot of interest.

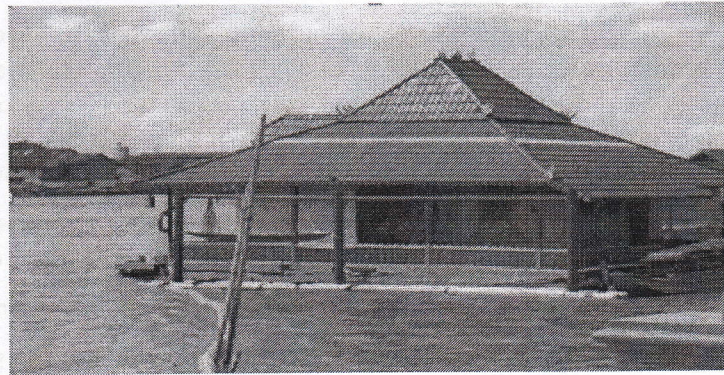


Figure 1. "Rumah Rakit" in the waters of the Musi river



Figure 2. "Rumah Panggung"

The peoples must adapt to the conditions of the influence of tides, so Rumah Panggung is a type of house that is common in riverside settlements. From the environmental aspect, it has an important ecological advantage: it can maintain the water catchment areas in the region. Nevertheless it is inevitable that with the increase of the density settlement, the low degrees of sanitation becomes the main problem in this region that were largely inhabited by low income community .

MDGs Indicators of housing is defined as the creation of secure tenure for low income community (MBR). Secure tenure is a warranty for the community to live in one place because there is evidence of lease certificate, or rent housing, either individually or in groups. With the secure tenure, the society will not have a sense of concern over the possibility of being expelled or land/building occupation by other parties. Thus, local governments are required to address the housing problem especially in urban area (Bappenas, 2008).

Slum alleviation has become an integral part of the city development. This program not only requires substantial funds, but also requires a strong commitment from various parties in order to achieve the mission of "Cities Without Slums". Palembang municipality

government has a strong commitment in addressing urban problems by providing proper sanitation assistance, either through funding local government, central government and aid donors to create "Traditional Living Area of Palembang Village Integrally waterfront as Public Open Space". In realizing that the government has a housing and settlement development program that aims to:

1. Providing decent and affordable houses for the people of Palembang city, especially for people who do not own their own home.
2. Improving the environmental quality of housing and settlements,
3. Encouraging the development of the region, especially in sub-urban areas as well as reduce the burden on the city center,
4. Increasing economic activity through multiplier effects the building sector,
5. Reducing the slums, especially in downtown.

The strategies are:

1. Housing and settlement development in an integrated implemented by the government, private and public.
2. For areas in the suburbs of large-scale housing construction, while for the downtown area was built flats and environmental improvement.
3. Infrastructure and housing facilities assisted by the City.
4. Given various incentives to the developers: ease of location permits, certificates of land, IMB, peil flooding.

For example, in an effort commitment to provide housing for the Low Income Community, the government together with the Central Government (Directorate General of Cipta Karya of Public Works and Housing Ministry); Bank of South Sumatra and Civil Society Organizations (Community self-help body) has been carrying out various ways to deal with slum area along the Musi river with the local wisdom principled community. Slum settlement sporadically performed on the 4 districts (Kecamatan Ilir Barat I; Ilir Barat II; Ilir Timur I and II). One program has been started since 2007 in which the Government has made arrangement of Palembang city in an integrated region including three districts (Kecamatan Seberang Ulu I; Seberang Ulu II and Kertapati). In 2008 the City has made improvements in the slums area of 3/4 ulu, Kecamatan Seberang Ulu I which has a density 17.810 peoples with 712 peoples/ha from the total area about 5 ha, where 83.5% is a slum area.

In 2008, the government has implemented lands acquisition valued at 1.44 billion rupiah for lands in the slum area of 3/4 ulu (swamp) on an area of 2 ha for the construction of 140 housing units with 2 types: type landed on dry land at a price of 36 millions rupiah/ unit and type of land flooded, the house at a price of 40 million rupiah/ unit, with installments of 10,000 rupiah until 15.000 rupiah/unit/day for 15 years. Cooperation between the institutions of central government subsidies to produce each worth 5 million - 9 million rupiah /unit (Ministry of Public Housing, 2008). Furthermore,

in the year 2010 the Government of South Sumatra Province also began building settlements for low-income communities with a target of 2,000 units on an area of swamp by using the principle of "Rumah Panggung". This settlement is for the community of informal workers who can get a home with daily installments, where the certificate granted by the government land is for free. In addition the government also provides housing facilities and infrastructure needs such as: proper sanitation, access to clean water, electricity, garbage disposal system and others to provide an appropriate housing.

Adequate sanitation must be provided by the government. People who live on the bank of the river have a habit to carry out daily activities including bathing, defecated, washing and using river water as a source of water for cooking. In addition to that, people's habit discarding garbage into the of the river also causes the degradation of river water quality. At the time when the number of residents who live along the river has not increased as at present, the activities of the community are still limited, including waste accepted by waters, because homeostatic mechanism can still work well where the function of aquatic biota still running well. Include the microorganisms that can degrade organic materials. However, with increasing density of the people, the carrying capacity of the river was decreased and resulted the environmental degradation. Research shows that in densely populated areas, Musi river water quality was not identified in accordance with its allocation under the applicable local regulations (South Sumatra Governor Regulation number 16/2005 regarding Allotment of water and river water quality standard in South Sumatra Province). The high content of fecal coliform bacteria (more than 10.000/100 ml.) indicates that the Musi river was polluted from fecal waste. This disturbed the life of biota in the water, including the communities of plankton, benthos and fish and of course disrupt the balance of the ecosystem. Thus, improvements in the settlement area along the banks of the river are needed of government attention. Providing on-site sanitation is the responsibility of the government and the community, to prevent more severe damages to the aquatic environment.

Surface water quality monitoring include the Musi river basin in South Sumatra Province has been conducted from 72 surface water monitoring points in the region by Environment Board of South Sumatra Province. Data shows that there has been a decline in the Musi river surface water quality since 2007 (63.88%); in 2008 (69.44%) and decreased in 2009 (67.5%). Results showed that most surface water quality parameters that have exceded a predetermined standard are: microbiological parameters (fecal coliform and coliform bacteria); content of orthophosphate and the residue suspended (all of which are characteristic due to domestic activities, related to the low public sanitation facilities especially those who live alongside the river). It is known that the city does not have sewerage treatment plant (domestic waste water treatment system) so that discharge wastewater into the river without processing. Palembang City in the near future to build systems with help from the center government which is currently being implemented Feasibility Study.

Another form of the best experiences the city of Palembang is the establishment of " Green Village " which is based on the mutual cooperation ("gotong royong") is very high among residents. The village is located in the Kelurahan Sukodadi, District Sukarami. Sukarami district is one large district with an area of 36,980 km² with a population density of 104.700 peoples and 2.831 peoples/km² which 96.18% were woman. Kelurahan

Sukodadi with a total area of 789 ha has 3.000 the number of family households. (Palembang in Figures, 2009).

Looking at custom of family life in this location, the Government of Palembang city that has the motto Clean, Green and Blue, through the Agency for Community Empowerment Village Palembang facilitate community empowerment through the Village Green which involve women in 2007. Government's initial program is to provide knowledge on how to keep garden plants as well as environmental hygiene and garbage management. This program continued with facilitation from the Environment Board of Palembang that teaches how to compost the garbage household and the program is welcomed by the local community.

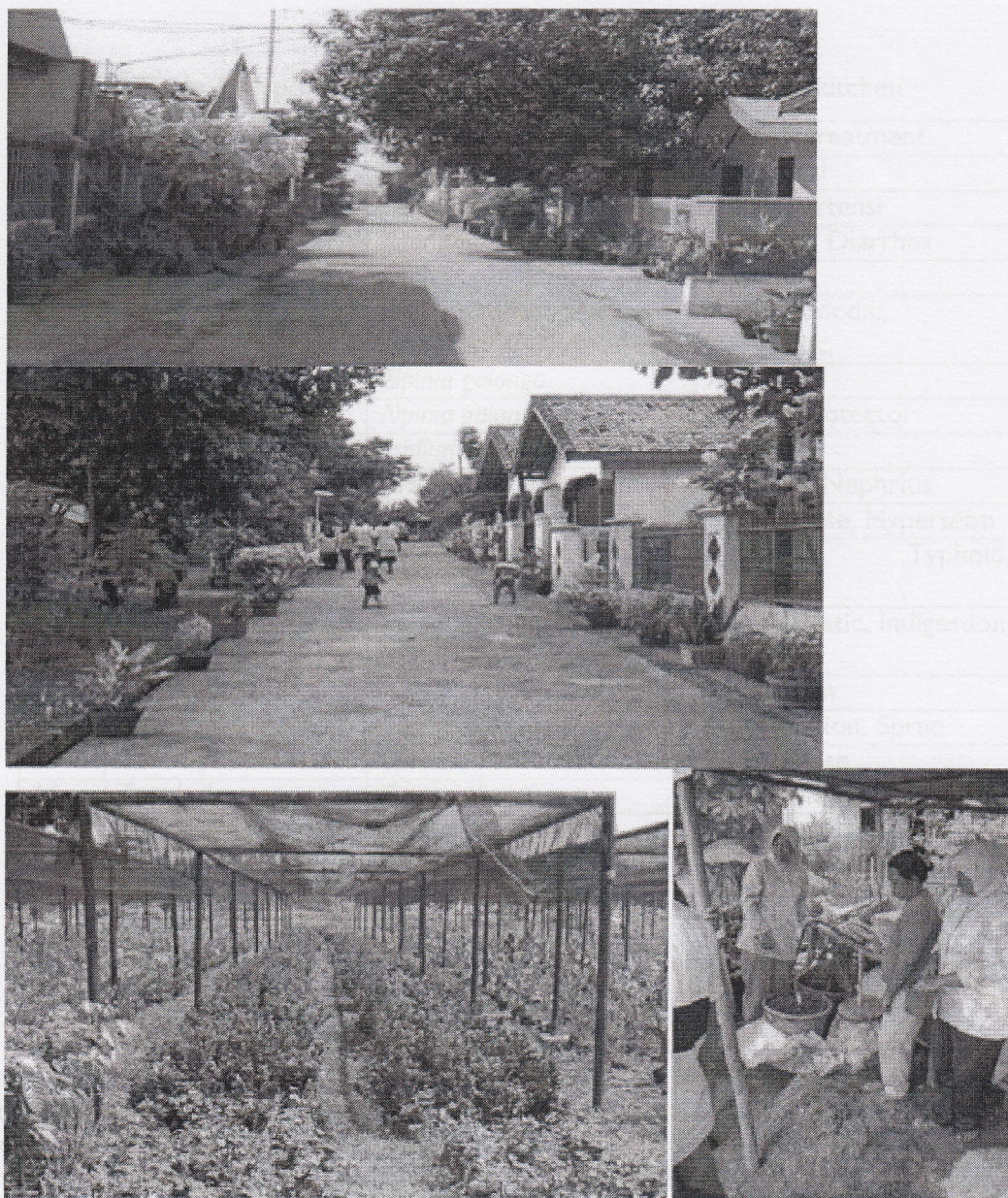


Figure 3. Green village (kelurahan Sukodadi)

To develop the spirit of togetherness (mutual cooperation) with their village cleaning every sunday, including land as a park of medicines and herbs. Since then they use the park for drugs as a fertilizer to their plants. About 60 species of medicinal plants were noted (exp. jahe, kunyit, kencur, sereh, rosella, temulawak, lengkuas, jambu biji, kumis kucing, mahkota dewa etc), and herbs planted in this location (Table I).

Table 1. Type of medicinal plants and plats for seasoning kitchen

No	Local Name	Latin name	Medical treatment
1	Jahe	<i>Zingiber officinalis</i>	Antifungal
2	Kunyit	<i>Curcuma domestica</i>	Antihypertensi
3	Kencur	<i>Kaempferia galanga</i>	Influenza, Diarrhea
4	Sereh	<i>Andropogon nardus</i>	Analgesic
5	Rosela	<i>Hibiscus sabdariffa</i>	Antispasmodic, Antiseptic,
6	Lengkuas	<i>Alpinia galanga</i>	Antifungal
7	Temulawak	<i>Alpinia galanga</i>	Hepatoprotector
8	Jambu biji	<i>Psidium guajava</i>	Diarrhea
9	Kumis kucing	<i>Orthosiphon aristatus</i>	Diuretic, Nephritis
10	Mahkota dewa	<i>Phaleria macrocarpa</i>	Skin disease, Hypertensi
11	Sambiloto	<i>Andrographis paniculata</i>	Hepatitis, Typhoid, Diarrhea
12	Bunga pukul delapan	<i>Turnerae ulmifoliae</i>	Antireumatic, Indigestion
13	Bunga tai kotok	<i>Tagetes erecta</i>	Indigestion
14	Ketepeng cina	<i>Cassia alata</i>	Constipation, Sprue
15	Temu putih	<i>Curcuma zedoaria</i>	Skin disease
16	Tapak dara	<i>Cataranthus roseus</i>	Leucemia, Diabetes
17	Pohon salam	<i>Syzygium polyanthum</i>	Diabetes, Artitis gout
18	Dadap	<i>Erythrina crista galli</i>	Anti inflammatory
19	Meniran	<i>Phyllanthus urinaria</i>	Diuretic

To maintain the sustainability of these programs they create the organizational structure for the management of environmentally friendly village. Maintenance of environmental attitudes has effect to children by the way of sorting garbage (organic waste) and dry waste (an-organic waste). Composting organic waste is all housewives work with using the existing land (given as a charity by local community) within the village, and the results are used directly as fertilizers in nursery park, gardens and medicinalis park. Nursery plants are also planted in this place and have produced about 2,000 seedlings of shady plants (Table 2).



Figure 4. Plant nursery at green village

Table 2. Type of shady and fruit plants in the nursery.

No	Local Name	Latin name
1	<i>mahoni</i>	<i>Switebia mahagoni</i>
2	trembesi	<i>Alstonia sp</i>
3	tanjung	<i>Mimusops elengi</i>
4	kihujan	<i>Felcium decipien</i>
5	acasia	<i>Acasia mangium</i>
6	angsana	<i>Pterocarpus indicus</i>
7	bungur	<i>Lagerstroemia speciosa</i>
8	matoa	<i>Pometia pinnata</i>
9	asam	<i>Tamarindus indica</i>
10	mangga	<i>Mangifera indica</i>
11	jambu air	<i>Eugenia aquea</i>
12	belimbing	<i>Averrhoa carambola</i>
13	flamboyan	<i>Delonix regia</i>
14	ketapang	<i>Terminalia cattapa</i>
15	dadap merah	<i>Erythrina crista galli</i>

Development of an environmentally friendly village is the first step to generate community's routine to live together cleanly, which will be a small part of community who will become awareness for other community groups so that in time environmentally friendly village will be the smallest unit and will tremendously developed into the "green city".

As a commitment by Palembang City Government, the Green Village area function has also been established in the Spatial Planning of Palembang 2009-2029. Thus, the

designated space reflected on the environmental criteria will be acquired to prevent the negative impacts of climate change.

Finally, the settlement program of Palembang City has truly become piloting program for other big cities in Indonesia to start thinking of housing and shelter development which are suitable for this kind of community. Therefore the government together with various existing stakeholders will continue to develop local wisdom that was already possessed by the community.
