SPECIFIC PLAN PREPARATION OF THE DEVELOPMENT AND ADAPTATION IN LAND-USE WATERFRONT AREA OF BANGLUANG MARKET RATTANAKOSIN ERA 122

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ABSTRACT

Bangluang market rattanakosin Era 122 is situated along Tha Chin River and flood frequently occurs in every year during rainy season. In the past, local people did not have to adapt themselves much since the market was the place where goods were traded and provided for only people in the community and neighborhood. However, at present, national development and tourism development leads to land utilizations and alterations of building usage. That is, utilization for commercial purposes is getting intense to support tourists and visitors from outside. Therefore, products and furniture in households are relatively valuable which are at risks of being damaged by instant flood and failure to relocate such items out of the areas when natural disaster emerges. The 1st research question is how area in Bangluang market rattanakosin Era 122 are utilized, the second question is what the figure and building mass analysis in Bangluang market rattanakosin Era 122 looks like and the 2nd question is which plan is appropriate to be determined as specific plan of Bangluang market rattanakosin Era 122. The objectives of this research are 1) to examine condition of land utilization, 2) to analyze figures and mass of buildings in Bangluang market rattanakosin Era 122 and 3) to provide an alternative plan for adaptation in land land-use waterfront areas of Bangluang market rattanakosin Era 122 to be determined as a specific plan. The discovery will be beneficial to planning in dealing with potential flood in each year. The community has a guideline to support decision on spatial development or area improvement for safety and flood prevention in Bangluang market rattanakosin Era 122. Additionally, it reduces risks of losing areas in architecturally and historically valuable old market of Thailand and enhances safety for local residents.

Concepts

Information systems → Database management system engines. Guideline to support decision on spatial development or improvement for safety and flood prevention in Bangluang market rattanakosin Era 122.

KEYWORDS: Specific Plan, Land-use, Waterfront Area & Bangluang Market Rattanakosin Era 122

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1. INTRODUCTION

Bangluang market rattanakosin Era 122 is a historic community situated near Tha Chin River, Bang Luang Sub-district, Banglen District, Nakhonpathom Province. It is the community with foundation from Chinese people who settled down her about hundred years ago. With combination of Thai-Chinese traditions and cultures, land utilization and buildings were mostly employed for residential and commercial purposes so, the general condition is marketplace. Architecture of buildings was 2-floor wooden housing facing each other consisting of 130 units. The features of this community are existence of wooden housing with two-layered galvanized iron roof. Currently, these

buildings remain beautiful and perfectly ancient.

At present, flood issues in Bangluang market rattanakosin Era 122 were frequent. For instance, in 2012, the heavy rain fell in Nakhon Pathom Province and local villagers prevented flood by blocking water way with sand bags and using water pumps to remove water from Bang Luang Market Area. Such area was mostly utilized for residential and commercial purpose. When the rain falls for long time, water in Tha Chin River will flow over the sand bags and turn Bang Luang Market flooded especially in parts of residential and commercial buildings for 100 units. It is urgent for the country to call for the water resources plan and management using advanced technologies [1].

Nevertheless, the researcher realized importance of the areas and recurrent issues. The research thus conducted a research study on providing special plan in accordance with development and adaption for land land-use waterfront areas of Bangluang market rattanakosin Era 122 based on requirements of planning measures and physical details (Form-Based Codes) in developing such area. It would help to plan about spatial development and clear town planning. In this study, the researcher focused on providing a plan consistent with the development and adaptation for land land-use waterfront areas to support and prevent floods in Bangluang market rattanakosin Era 122 which could be implemented with real areas concretely.

The questions are how to utilize lands in Bangluang market rattanakosin Era 122, how to analyze figures and building mass in Bangluang market rattanakosin Era 122 and which alternative plan is suitable to be determined as a specific plan of Bangluang market rattanakosin Era 122. The research objectives are to study conditions of land utilization in Bangluang market rattanakosin Era 122, to analyze figures and building mass in Bangluang market rattanakosin Era 122 and to provide an alternative plan for adaptation in land land-use waterfront areas of Bangluang market rattanakosin Era 122 to be determined as a specific plan.

The discoveries will be beneficial to planning in order to handle flood in each year. The community will have a guideline to support decision on spatial development or improvement for safety and flood prevention in Bangluang market rattanakosin Era 122. Additionally, it could reduce risks of losing old market areas with architectural and historical values of Thailand and increase safety for local people

2. RESEARCH OBJECTIVE

- To study condition of land utilization in Bangluang market rattanakosin Era 122
- To analyze figures and mass of buildings in Bangluang market rattanakosin Era 122
- To provide an alternative plan for adaptation in land land-use waterfront areas of Bangluang market rattanakosin Era 122 to define a specific plan.

3. METHODOLOGY

As this study is spatial research to provide a specific plan in accordance with development and adaptation in land land-use waterfront areas of Bangluang market rattanakosin Era 122, the samples were physical areas in Bangluang market rattanakosin Era 122 and neighborhood during the time specified by the researcher.

3.1 Research Instrument

Instruments for data collection in this research

- Physical spatial survey form
- ArcGIS10, Microsoft Access, Microsoft Excel and Illustrator Programs to analyze and present overall image of physical condition, figures and building mass in Bangluang market rattanakosin Era 122.
- Requirements of planning measures and physical details
- Specific plan process

Questionnaire and questions for in-depth interview. The questions reflect that the inquirer pondered about words to use and questioning method so that the respondents would not get confused [2].

3.2 Data Collection

The researcher contacted and coordinated with responsible sectors, the community leader and local people in Bangluang market rattanakosin Era 122 and collected data from observation of physical environment that may be at risk of flood in the community.

4. RESEARCH ANALYSIS

The analysis from the 1st research objective: To study condition of land utilization in Bangluang market rattanakosin Era 122 with following details

Settlement of Bang Luang Market Community had factors mostly related to water transport where products could be conveniently shipped to nearby communities. Initially, the buildings were constructed along new roads as the core line for transporting and connecting with nearby piers, known as Upper Market Community. Later, spaces of the old market were not sufficient to respond the needs, spaces for buildings and roads were expanded from the pier with same pattern but the spaces were larger and buildings were constructed to support more needs. It was consistent with the concept of factors influencing pattern of settlement. Technological influence included road system affecting local development, transportation route with influence on distribution of the community and settlement sources including buildings, construction technology developed by ages such as temples and residences etc. [3]. The area was on southside of the old market which currently is Lower Market Community. After that, the empty space in the middle part between the upper and lower market was filled with new roads and buildings or known as middle market at present. The patterns of buildings and utilization were similar to buildings of the upper and lower market resulting in connection of all areas and becoming a large community containing buildings with most similar styles called as Bang Luang Market Community although buildings in sub-community of Bang Luang Market were not constructed simultaneously. This is in line with the concept of Wilawan Pamornsuan [4] mentioning that changes and transitions meant natural attributes to occur and one thing was transformed from existing condition to the new condition. It consisted "time" as a determiner and an important sign of changes. Changes could happen with everything including both natural and manmade articles. Even though incidents in human society are similar and occur in similar time, it is not possible for every society to have the same changes with dissimilarity in persons and geographic, economic, social and cultural conditions as demonstrated in figure 1.

Figure 1: Location of Bang B.E. 2495 Market Community [5].

Figure 2: Location of Bang Luang Market Community.

The analysis of land utilization in Bangluang market rattanakosin Era 122 could be summarized as follows

The study of settlement of Bang Luang Market Community from gathering data in different source including satellite photograph in the past from Royal Thai Survey Department and current satellite photographs.

The study of dynamism of Bang Luang Market Community, process of town transition by times and major incidents from the period of market flourishing when a number of people came to do trading until the period when the market community was decelerated due to people having other options to do trading. It is necessary for Bang Luang Market Community to adapt to service at present. The analysis was based on major incidents bring about transition of the community as follows

4.1 Town Construction of the Community

4.2 Expansion of the Community

Figure 3: Piers of Bang Luang Market Community [6].

Figure 4: Buildings for Public Benefits in Bang Luang Market Community.

4.3 Transition of Transport in the Community

Figure 5: Land Transport Instead of Water Transport in Bang Luang Market Community. [6].

Figure 6: Land Transport Instead of Water Transport in Bang Luang Market Community.

4.4 Fire in Bang Luang Market Community

Figure 7: Buildings Affected by Fire in Bangluang Market Rattanakosin Era 122 Communities in 2016.

4.5 Bang Luang Market was used as a Drama Shooting Venue

4.6 Lands in the Community were Sold to Investors

The data analysis from the 2nd research objective: To analyze figure and mass of buildings in Bangluang market rattanakosin Era 122 with following details

The spatial analysis in Bangluang market rattanakosin Era 122 consisted of requirements to be in accordance with objectives of the principle town plan, density or building mass/ empty space as well as planning standard and physical details. According to the analysis of building mass/ empty space and empty space/ building mass in 2018 in areas of Bangluang market rattanakosin Era 122, the researcher employed a geographic information system named “ArcGIS” and computer graphic program to present architectural works with understandable photos and graphics as shown in figure 8: building mass/ empty space and figure 9: empty space/ building mass.

Figure 8: Building Mass/ Empty Space in 2018.

Figure 9: Empty Space/ Building Mass in 2018.

According to the analysis, mass of buildings in Bangluang market rattanakosin Era 122 Community was mostly little and placed continuously along the roads and some buildings had middle and large mass.

Data analysis from the 3rd research objective: To provide an alternative plan for adaptation in land land-use waterfront areas of Bangluang market rattanakosin Era 122 to determine a specific plan

From Data analysis about alternative plan making for adaptation in land land-use waterfront areas of Bangluang market rattanakosin Era 122, a layout and project were provided to maintain some certain places or related businesses for benefits of town planning.

This research will provide an alternative plan for specific plan determination in following procedures.

- Studying objectives of land utilization and requirement of principle city plan
- Examining Town Planning Act
- Gathering fundamental data of areas to be placed and made as a specific plan
- Defining survey district for mapping by GIS [7]
- Exploring current condition and searching complete data of planning

Data analysis for alternative plan making for adaptation in land land-use waterfront areas of Bangluang market rattanakosin Era 122 and specific plan provision.

Providing an alternative city plan for specific plan determination relied on analysis of changes in land utilization in Bang Luang Market Community, study of community background from the past till present which was an old land-use waterfront community. The spatial analysis was conducted based on concepts, theories and related studies

of settlement especially the settlement of waterfront community to acknowledge patterns of settlements, and physical compositions of the community. The analysis was performed together with the concept of community dynamism to realize factors or incidents affecting the settlement and land utilization in order to analyze changes in land utilization from the past till present. The result could lead to future land utilization of Bangluang market rattanakosin Era 122 Community

5. RESEARCH FINDINGS

Findings from the 1st objective: To examine condition of land utilization in Bangluang market rattanakosin Era 122 with following details

Bangluang market rattanakosin Era 122 encountered major incidents leading to changes in land utilization of the town until present. Bang Luang Market Community consisted of variety of land utilization with combination of Chinese and Thai cultures bring about identity of the community. From the study of land utilization in Bang Luang Market Community categorized by current land use, a map of building utilization in Bang Luang Market and neighborhood (Figure10) could be provided as follows

Figure 10: Map of Building Utilization in Bangluang Market Rattanakosin Era 122 Community.

The plan of building utilization in Bang Luang Market Community could be divided in following aspects.

Residences: the land of residences in Bang Luang Market Community mostly was where original residents or their heirs stayed. The styles of buildings were one-and-two-floor wooden houses with original pattern even though some modern materials were used for renovation. Location of residences of Bang Luang Market Community is disperse around Tha Chin River on the westside and near Bang Luang Canal including spaces around commercial areas along secondary roads of the community. Changes in utilization of residences were not much which could be observed from most belongings and utensils with similar styles to the period of high growth of Bang Luang Community.

Figure 11: Residences in Bang Luang Market Community.

Residences in waterfront area originally had a boat in front of the houses for water transport. When it was deprioritized, the spaces were no longer used as a pier but they remain the same. However, these spaces were adjusted to be waterfront parlor for recreational purposes or doing family businesses. Some parts were used to store household utensils and belongings since there were no sufficient spaces for storing these articles.

Figure 12: Adaptation of Old Piers in Bang Luang Market Community.

Commerce: land of commerce in Bang Luang Market Community is not wide. Main factors are that the buildings with trading activities in Bang Luang Market Community are mostly residential-commercial buildings. The styles of commercial buildings in the community are one-floor building simply constructed without fixed pattern and no residents could stay. Mostly, it is trading activity to support local people (figure 13) except public raft near Tha Chin River constructed by the local administrative organization to sell food and services for tourists to embrace good atmosphere along Tha Chin River (figure 14)

Figure 13: Commercial Buildings in Bang Luang Market Community.

Figure 14: Public Raft Near Tha Chin River.

The original fresh market used to be a market where products were sold to residents in Bang Luang Market Community. It is located in the lower part and currently, it is cancelled for trading in the buildings due to changes in consumption behavior of people in the community having bizarre as a choice circulating the community. Therefore, at present, it becomes parking space of people in the community but its condition remains the same without repair or renovation for specific use (figure 15)

Figure 15: Old Market Around the Lower Market Community.

The Bang Luang Old Cinema (Wig Nang Bang Luang) is an old cinema located near Bang Luang Canal which has been opened since 1929. It has been administrated by Sangsurachai Movie and it is an old cinema that still provides services until present. With hot weather in the cinema, it is not popular among people so, it provides services in only special occasions (figure 16)

Figure 16: Bang Luang Old Cinema (Wig Nang Bang Luang).

- **Industry and warehouse**

Land of industry and warehouse in Bang Luang Market Community included one of the most outstanding places like Nam Sin Thai Bang Luang Mill located on northside of the market community on Tha Chin River. It has run the business of rice milling since the age of prosperity of Bang Luang Market Community until present. Due to its location near Tha Chin River, agricultural products were transported here. Although, currently, transporting through boats in Tha Chin River is degraded, this rice mill is still in operations and it improved from transporting by boats to transporting by trucks (figure 17)

Figure 17: Nam Sin Thai Bang Luang Mill.

- **Residential-commercial building**

This type was residential-commercial building. They included two wooden buildings facing each other along main road in the past of the community known as Tessaban 3, 5 and 7 Roads. In these buildings, trading activities were done and people domiciled together as identity of Bang Luang Market Community called as “Ban Kao Lao Teng Mai”. The ground floor was where trading occurred and spaces on the second floor were for residential purposes. Most styles of the building’s architecture were still originally maintained but renovated in terms of details and usage or. It included

selection of modern materials that did not affect original style of the buildings (figure 18) and these were the goals of people's assembly to conserve old-style buildings as identity to attract tourists outside the community. Trading activities in these buildings were mostly about food for tourists during holidays but they could be provided for local people during workdays. The members in this community would select famous shops to display on tourism map of the community.

Figure 18: Residential-Commercial Buildings in Bang Luang Market Community..

Additionally, during holidays, a number of tourists used spaces in front of the building to trade products, foods and sundry goods etc. (figure 19)

Figure 19: Kiosks in Front of Residential-Commercial Buildings in Bang Luang Market Community.

- **Educational institution**

Land of educational institutions in Bang Luang Market Community included 2 locations which were Wat Bang Luang School located on the westside of the community and Jian Hua School, located on the northside of Bang Luang Market. In the past, there was only Wat Bang Luang School that provided education for youths in Bang Luang Community. Later, when Chinese people settled down in Bang Luang Community. Not being unable to use Thai and studying in Wat Bang Luang School, these Chinese people raised funds to construct a school where Chinese was used for communication which was Jian Hua School. Currently, That is increasingly used in this school because most villagers can use more Thai for communication (figure 20).

Figure 20: Educational Institutions in Bang Luang Market Community.

- **Religious institution**

Cultures in Bang Luang Market Community were combination of Chinese and Thai cultures resulting in

religious institutions such as Chao Mae Thabthim Shrine, BuanHokTueng Vegetarian House where Chinese people gathered to elevate their minds (figure 21). Bang Luang temple as Thai temple was included and Chinese and Thai people raised fund for constructing the temple (figure 22) leading to good relationship of Chinese people who immigrated to settle down and Thai locals. Locations of religious venues in Bang Luang Community were around original residences of the community and they were easily accessibly by water and by road.

Figure 21: Religious Institution of Chinese People.

Figure 22: Religious Institution of Thai People.

Good relationship of Chinese and Thai people led to combination of culture as identity of the community as well as architecture in a mixed religious dimensions such as a cemetery as storage of ancestors' remains. This place was constructed based on combined beliefs of Chinese and Thai cultures (figure 23).

**Figure 23: Architecture Based on Religious Beliefs of
Bang Luang Market Community.**

- **Government institute, public utility and public assistance**

The land of government institutes, public utility and public assistance in Bang Luang Community was partly employed to support local residents such as public danger prevention and mitigation center, water supply storage (figure 24) etc. From two incidents of fire in Bang Luang Market Community, due to buildings made of wood easily combusted, it is necessary to prevent or mitigate the dangers as soon as possible. So, a multi-purpose parlor of the community along the main road of Bang Luang Market Community was used as a sub-point of the danger prevention and mitigation center to be convenient to access areas when an incident occurs. Furthermore, a new multi-purpose parlor was constructed opposite to the main road.

Figure 24: Public Utility and Public Assistance in Bang Luang Community to Support Community Residents.

Public assistance in Bang Luang Community was partly employed to support tourist for facilitation. It was sponsored by the local administrative organization such as local toilets, tourist service center, parking space, bus terminal, and traffic service center etc. (figure 26) to bring convenience to the tourists.

Figure 25: Public Utility and Public Assistance in Bang Luang Community to Support Tourists.

- **Open space for recreational purpose and environmental quality maintenance**

This land utilization in Bang Luang Market Community included 2 locations as exercise area for local people. The local administrative organization placed exercise equipment in open waterfront area at the north and the south of the community. The space is not much and most users came this place in the morning and evening of every day (figure 26)

Figure 26: Open Spaces for Recreational Purpose and Environmental Quality Maintenance in Bang Luang Market Community.

- **Other building utilization**

This kind of utilization is buildings under renovation for other purposes in the future (figure 27) which are not many.

Figure 27: Other Building Utilization in Bang Luang Market Community.

The findings from 2nd objective: to analyze figure and mass of buildings in Bangluang market rattanakosin Era 122 as in following details

The figure and mass of buildings in Bangluang market rattanakosin Era 122 were the old buildings along main river since in the past, a pier existed in the waterfront community and people mainly travelled with boats. When the time passed, urban growth expanded to the waterfront communities leading to road development into these communities. As a result, Bang Luang Market was accessed with road system which was expanded to connect new and old communities. So, current figures and masses of the buildings in Bangluang market rattanakosin Era 122 were dense along land transport routes especially along the main roads to sub-alleys of the community. Buildings are located along the road connected with the waterfront community as shown in figure 28.

Figure 28: Buildings along Road Connected with Bangluang Market Rattanakosin Era 122 Community.

The findings from 3rd objective: To provide an alternative plan for adaptation in land land-use waterfront areas of Bangluang market rattanakosin Era 122 utilization to define a specific plan.

The result was found that areas with high risks of flood included wooden building community in Bang Luang Market in middle and lower zones as such areas would be flooded when level of Tha Chin River rose. Water would flow into the community combined with rainwater from neighborhood in such area. Due to the road level higher than the community's land, when the rain falls, rainwater would flow and remain in the community. If level of Tha Chin River and Bang Luang Canal is high, the water logged cannot be drained to Tha Chin River and Bang Luang Canal as displayed in figure 29.

Figure 29: Flood-Prone Area.

Figure 30: Guideline of Adaptation in land Land-use Waterfront Areas.

6. CONCLUSION SAND RECOMMENDATIONS

Areas of Bangluang market rattanakosin Era 122 were located near Tha Chin River which were usually and recurrently flooded in rainy season. In the past, local people did not adapt much as this market was where products were traded among people in the community and neighborhood. However, currently, national and tourism development leads to alterations of land and building utilization. That is, utilization for commercial purposes are more intense to support tourists from outside. Thus, products and furniture in households are relatively precious being at risk of being damaged by floods and urgent relocation out of flood homes when natural disasters occur.

From the findings, Bangluang market rattanakosin Era 122 Community in the middle and lower zones should be prepared for property relocation local people evacuation. Furthermore, adaptation of land utilization was as follows

The old market with ancient style of wooden buildings should not be architecturally adjusted as it is essential to preserve original architectures. However, adaptation should be focused in terms of space use on the 1st floor including modifying floor plan, elevating furniture made of waterproof materials with light weight.

For houses of the elderly or bed-ridden patients, they should be on the 2nd floor and stairs should be conveniently designed to facilitate the elderly or be suitable for transporting bed-ridden patients.

Absorptive lands should be maintained so that rainwater can be absorbed directly to reduce water log

It is necessary to inspect drainage system from nearby communities to area of Bang Luang Market Community so that water easily flows into Tha Chin River.

A newly constructed house should be elevated from ground level but the architectural identity of wooden building such as air vent, doors, windows and colors of the building etc. still remains.

So it requires application of geographic information system to define vulnerable areas for database used for vigilance by the communities and government units [8]. The discoveries would be beneficial to sectors regarding flood safety planning for the waterfront communities. Additionally, people would have more alternatives to adapt and get prepared for great flood to reduce risks to life and property of the people in flooded communities.

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