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Public Opinions of Residents in Bangkok's Central Business District Towards Environmental Management in the Bangkok Comprehensive Plan of 2013

วรลักษณ์ คงอ้วน
Waralak Khongouan

คณะสถาปัตยกรรมศาสตร์และการผังเมือง มหาวิทยาลัยธรรมศาสตร์ จังหวัดปทุมธานี 12121
Faculty of Architecture and Planning, Thammasat University, Pathumthani 12121, Thailand
E-mail: mumuryoi@hotmail.com, waralak.kh@gmail.com

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Abstract

The objectives of this research article are as follows: 1) to study land use regulations with respect to environmental management under the Bangkok Comprehensive Plan of 2013, and 2) to study people's opinions about environmental management policies stipulated in the Bangkok Comprehensive Plan of 2013. Results from analysis of the main points in the comprehensive plan and a questionnaire show that although some aspects of the plan promote economic development in the Bangkok's central business district, the environmental management regulations concerning this area are only stated in the land use zoning plan, the open space plan, the transportation plan, and the public utility plan. Consequently, the people surveyed were found to be most satisfied with the flood and water management strategy. However, more than 70% of respondents did not know about the biotope area factor (BAF) and floor area ratio bonus (FAR Bonus). This could be due to the plan not being achieved in practice. Guidelines for preparations for the Bangkok Comprehensive Plan in the future, besides having more strict penalties and incentives, as some have recommended, should include, people affected being informed about urban planning measures in an extensive and simple way.

Keywords

Bangkok Comprehensive Plan of 2013
Environmental Management
Central Business District
Bangkok

บทคัดย่อ

บทความวิจัยนี้มีวัตถุประสงค์เพื่อศึกษาข้อกำหนดการใช้ประโยชน์ที่ดินตามกฎหมายกระทรวงให้ใช้บังคับผังเมืองรวม กรุงเทพมหานคร พ.ศ. 2556 ที่เกี่ยวข้องกับการจัดการสิ่งแวดล้อมในพื้นที่ศูนย์กลางธุรกิจและพาณิชยกรรม กรุงเทพมหานคร และเพื่อศึกษาความคิดเห็นของประชาชนที่มีต่อการจัดการสิ่งแวดล้อม โดยมาตรการทางผังเมืองดังกล่าว ผลการวิจัยจากการศึกษาสาระสำคัญของผังเมืองรวมและการจัดทำแบบสอบถาม พบว่า พื้นที่ศูนย์กลางธุรกิจและพาณิชยกรรมกรุงเทพมหานครแม้ได้รับการส่งเสริมให้เกิดการพัฒนาทางเศรษฐกิจ แต่ประเด็นการจัดการสิ่งแวดล้อมยังถูกคำนึงถึงโดยผ่านรายละเอียดการแบ่งประเภทการใช้ประโยชน์ที่ดิน การกำหนดพื้นที่โล่ง การกำหนดโครงการคมนาคม และขนส่งและการกำหนดโครงการกิจการสาธารณูปโภคของแผน ส่งผลให้ประชาชนมีความพึงพอใจระดับมากที่สุดในการดำเนินโครงการเกี่ยวกับการแก้ไขปัญหาน้ำท่วมและการจัดการน้ำเสีย อย่างไรก็ตาม ผู้ตอบแบบสอบถามมากกว่าร้อยละ 70 ไม่รับทราบในเรื่องการกำหนดพื้นที่น้ำซึมผ่านได้เพื่อการปลูกต้นไม้ (Biotope Area Factor, BAF) และการเพิ่มอัตราส่วนพื้นที่อาคารรวมต่อพื้นที่ดิน (Floor Area Ratio Bonus, FAR Bonus) อันอาจเป็นข้อจำกัดให้มาตรการทางผังเมืองไม่สามารถสัมฤทธิ์ผลในทางปฏิบัติ ข้อเสนอแนะแนวทางการปรับปรุงและจัดทำผังเมืองรวมกรุงเทพมหานครในอนาคต นอกจากการกำหนดบทลงโทษที่เข้มงวดและการนำมาตรการทางผังเมืองในลักษณะมาตรการส่งเสริมหรือเหนี่ยวนำ (Incentive or Deductive Measures) มาใช้มากขึ้น เพื่อตอบสนองกับความต้องการของประชาชนแล้ว ยังควรดำเนินการให้ข้อมูลข่าวสารและความรู้แก่ประชาชนในเรื่องมาตรการทางผังเมืองที่กว้างขวางและเข้าใจได้ง่ายอีกด้วย

คำสำคัญ

ผังเมืองรวมกรุงเทพมหานคร พ.ศ. 2556

การจัดการสิ่งแวดล้อม

พื้นที่ศูนย์กลางธุรกิจและพาณิชยกรรม

กรุงเทพมหานคร

1. Introduction

Thailand's capital Bangkok has long been a center for urban development. Bangkok's central business district is area defined by the Department of City Planning during the creation of the Bangkok Comprehensive Plan of 2013 which include Bang Sue, Phayathai, Din Daeng, Patumwan, Satorn, Klong Teoy, Bang Kho Laem, Jatujak, Ratchathewi, Huay Kwang, Bangrak, Wattana, and Yannawa (Department of City Planning, Bangkok, 2013).

This district has a population of more than 1.18 million which is approximately 20% of Bangkok's total population in 2014. It also contains more than 30,000 businesses (30% of Bangkok's total) in 2015. (Strategy and Evaluation Department, Bangkok, 2015) As population and development hubs, the economy of this district has been growing continuously with a concomitant increase in the number of urban problems. For instance, traffic congestion on Silom and Phayathai Road, and air pollution are increasingly urgent issues. Benzene, one of the Volatile Organic Compounds (VOC) known to cause cancer in humans, has been found in a concentration of 1.7 micrograms per cubic meter of air in Patumwan and Din Daeng stations which is well above air quality standards (Kom Chad Luek, 2012).

The public sector is aware of environmental management issues which can be seen in several policies, such as the Bangkok Comprehensive Plan of 2013. Residents and businesses in Bangkok's central business district were asked to provide opinions before the creation of the 2013 plan, yet their satisfaction and needs concerning environmental management are as yet unknown though the plan has been implemented.

This research article aims to study and analyze some of the main points regarding land use regulations from the ministerial regulation on the Bangkok Comprehensive Plan of 2013 concerning environmental management, as well as survey the opinions of people living in the Bangkok's central business district on

environmental management policies contained in the plan. The Bangkok's central business district is the core business district regionally and nationally. Moreover, this area is heavily polluted but no strong resolution and protocol. It is hoped the study will be beneficial when it comes to urban planning evaluation and making the plan more practical in terms of the local communities' needs. (Horayangkura, 2017, pp. 1-11) In addition, the information gathered from people's opinions on the plan is expected to be helpful for future urban planning which intends to encourage the participation of the local community in environmental management.

2. Objectives

1) To study the land use regulations in the ministerial regulation from the Bangkok Comprehensive Plan of 2013 concerning environmental management in Bangkok's central business district.

2) To study the opinions of people living in the Bangkok's central business district towards environmental management policies in the Bangkok Comprehensive Plan of 2013.

3. Literature Review

Related concepts and theories can be categorized into 3 main groups according to objectives and research agendas. The details are as follows:

3.1 Preparation and Creation of the Comprehensive Plan

"Urban Planning Standards" refers to regulations relating to planning, creation, and procedures in accordance with the comprehensive plan. They serve as guidelines for city development and to improve quality of life of residents in the city (Office of the Royal Society, 2011; Bangmo, 1995). The Urban Planning Standards consist of 3 significant measures as follows (Tapananont, n.d.; American Planning Association, 2007):

- *Negative Measures*

These are measures and regulations implemented under lawful authority to control development of private sector actors. It can be divided into 2 genres: regulatory and discretionary.

- *Positive Measures*

This refers to motivational measures by government sectors. Their objective is to support and guide development from the private sector to reach effective and desirable results. Examples of these measures are the improvement of transportation routes, public utilities, public assistance, etc. These measures can also be found in specific areas as development projects.

- *Incentive or Deductive Measures*

These are measures that use beneficiary pay principles. Examples include Floor Area Ratio Bonus (FAR Bonus) and Transfer of Development Right (TDR).

The preparation and development of a comprehensive plan follows certain steps: 1) Analyze problems and the needs of the community; 2) Define the objectives of the comprehensive plan; 3) Collect and analyze data; 4) Create a comprehensive plan; 5) Proceed according to the plan; 6) Follow up and evaluation (Department of Public Works and Town and Country Planning, 2006)

The guidelines for development of the comprehensive plan consist of 1) Land use regulations, 2) Population density control such as Floor Area Ratio (FAR), Open Space Ratio (OSR) regulation, 3) Building regulations such as building setback and Building Coverage Ratio (BCR). (Department of Public Works and Town and Country Planning, 2006)

Considering urban planning measures around the world, USA has effective tools that bring urban planning to implementation such as Capital Investment and Land Use Control. Some examples of land use control are 1) Planned Unit Development or PUD 2) Transfer of Development Right or TDR 3) Special District Bonus or Incentive Zoning 4) Exactions. For the UK, there are effective implementation measures

such as 1) Development Control (Ex. Land Use Class Orders and Land Use Zoning Plan) 2) Development Planning. (Chula Unisearch, Chulalongkorn University, 2004; Wongrat, 2006)

3.2 Environmental Management

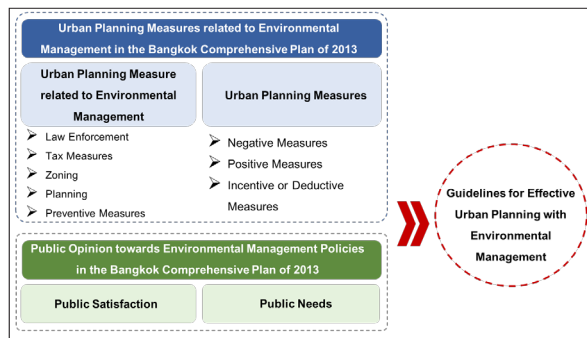
Environmental management refers to the process of proper planning, improvement, correction, and systemization for the environment. These steps are executed for the benefit of natural resources management and to preserve the quality of the environment (Tarasawaspat, 2004). Urban planning for effective environmental management needs to have law enforcement, tax measures, zoning, planning and preventive measures (Tyler, 2002).

3.3 People's Satisfaction and Needs

Satisfaction refers to a feeling or attitude of a person about something (Dejjinda, cited in Worawut, 2005). While, Need is wish or desire. (Office of the Royal Society, 2011). The study on public satisfaction and needs in the Bangkok's central business district on environmental management by the Bangkok Comprehensive Plan of 2013 can be seen as a review of the implementation of urban planning. This can be beneficial for evaluation of comprehensive plan that goes hand in hand with public participation. (Tapananont, n.d.)

4. Research Framework

The study about urban planning measures related to environmental management in the Bangkok Comprehensive Plan of 2013. This study is on the basis of urban planning measure that is related to environmental management, urban planning measures as well as public opinion analysis including public satisfaction and needs. The study will lead to guidelines for effective urban planning with environmental management (Figure 1).



Source: Based on the study of the researcher

Figure 1. Research framework.

5. Research Boundaries

5.1 Content

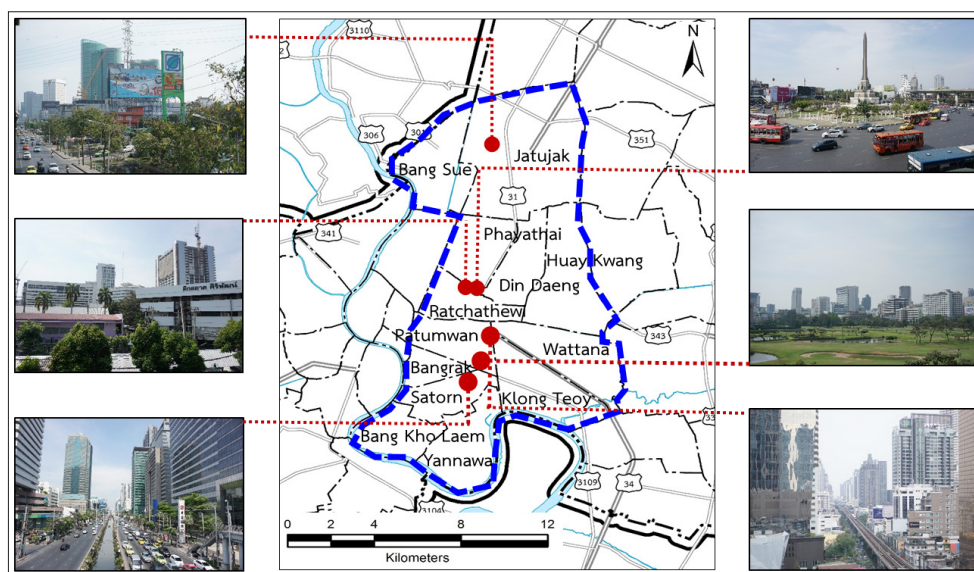
- Concerning people's opinions, the focus is specifically on people's acknowledgement of Urban Planning Standards and their satisfaction and needs concerning environmental management regarding the Bangkok Comprehensive Plan of 2013.

- This study only focuses on the man-made environment or the physical environment such as transport infrastructure, flood rehabilitation and prevention, green space management, coping with global climate change, solid waste and wastewater management as they are important issues learned from the review of land-use regulations under the Bangkok Comprehensive Plan of 2013 that is directly related with urban planning measures.

5.2 Areas Covered

Bangkok's central business district is area defined by the Department of City Planning during the public hearing meeting of the Bangkok Comprehensive Plan of 2013 which include Bang Sue, Phayathai, Din Daeng, Patumwan, Satorn, Klong Teoy, Bang Kho Laem, Jatujak, Ratchathewi, Huay Kwang, Bangrak, Wattana, and Yannawa. Department of City Planning, Bangkok (2013) has categorized the mentioned districts by (1) Land utilizing commercial activities, (2) The center of economic activities in Bangkok and Thailand, and (3) generally physical CBDs looks such as high-rise buildings, various types of transportations and so on.

Those districts are in deep environmental issues for examples traffic jams on Rama IV and Silom roads, the excess particular matter problem at the area of the Government Public Relations department, Phayathai, and water pollution in Bangrak and Klong Teoy. Studies and researches on populations' feedbacks on environment management by the Bangkok Comprehensive Plan of 2013 in Bangkok's central business district led to the guidelines to protect and manage environmental issues in the efficiently procedures and improve quality of lives of the citizens (Figure 2).



Source: Based on the analysis of GIS data from Land Development Department and the field survey in March, 2017

Figure 2. The examples of land use in Bangkok's central business district.

6. Research Tools

This research is qualitative study with following research tools;

1) Survey on public satisfaction and needs with descriptive answers and questionnaire that will allow the informants to answer the questions freely. (Panida Chaipanya cited in Sakon Nakhon Provincial Cultural Office, 2009). Its content validity was tested by 3 experts. The index of items objective congruence (IOC) after analysis was 0.67-1.00, which signifies that all questions were acceptable. Moreover, after the questionnaire was trialed with 10 people in different sample groups and tested for reliability with Cronbach's Alpha, the result was 0.89

The method of design and data collection of the questionnaire is to have 4 main groups of questions: (1) general profile of the samples, (2) basic knowledges of the urban planning, (3) satisfaction of the citizen to regulations in the Bangkok Comprehensive Plan of 2013 relating to environmental management, and (4) the needs for environmental management by urban planning measures. The questionnaire about Urban planning measures (Section 2 and Section 4) is based on Nopanant Tapananont (n.d), American Planning Association (2007), and Miller, G. Tyler (2002) and relevant studies from other countries. While the data of land use regulations regarding Bangkok Comprehensive Plan of 2013 (Section 3) is used as analysis and summary from the core of the Bangkok Comprehensive Plan of 2013 which is related to environmental management, especially for the ordinances that have an effect on all districts of the CBDs.

100 purposive samplings of nonprobability Sampling contain 1) originality in the focused areas, 2) be aware that the individuals' originalities share the same urban planning with the Bangkok Comprehensive Plan of 2013, 3) representing different districts in the area.

2) Geographic Information System (GIS) analysis and field study that focus on the change of

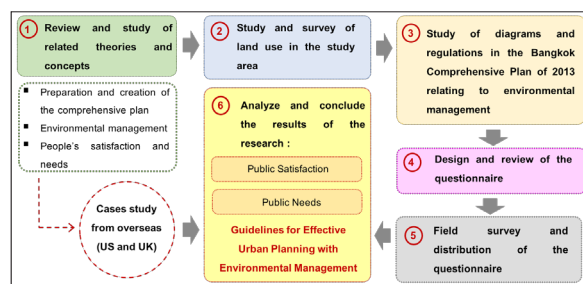
land use in the Bangkok's central business district.

Moreover, the research will review and consider comprehensive plan overseas that can be used for the improvement of Bangkok Comprehensive Plan in the future.

7. Research Procedure

There were 6 main steps in the study procedure:

1) Review and study of related theories and concepts; 2) Study and survey of land use in the study area; 3) Study of diagrams and regulations in the Bangkok Comprehensive Plan of 2013 relating to environmental management; 4) Design and review of the questionnaire; 5) Field survey and distribution of the questionnaire; and 6) Results of the research will be analyzed under the frame of the public opinions and cases study from overseas (US and UK) relating urban planning strategies in environmental management. (Figure 3)



Source: Based on the study of the researcher

Figure 3. Research procedure.

8. Research Results

From the questionnaire, it was found that more than 50% of the samplings did not understand the standard of urban planning and had average satisfactions to land uses regulations of the Bangkok Comprehensive Plan of 2013. Moreover, it also was found that there were special needs for special privileges for construction which provides benefits to public and environment, strict punishment for violations of Urban Planning Standards, and improvement in public relations and information communication of urban planning. The questionnaires

also uncovered the problems of Bangkok municipal urban planning procedures and proceed according to the plan (Tapananont, n.d.) as followed;

8.1 Land Use in Bangkok's Central Business District

Land in Bangkok's central business district is under a variety of uses. Most land use in the area as studied in 2016 was commercial, which totaled approximately 108 square kilometers or 67,540.91 Rai (70.60% of the total area). However, in the previous decade (2007-2016) this was few changes in land use in areas with changes in type of use increasing and decreasing no more than 7% per year except open space type. It was decreasing 43.94 % per year. The studied districts had more vertical expansions than horizontal expansion which is similar to the study of Chumpol Surintraaboon. (2009). that says the vertical expansion in the CBDs is the result from expensive and small area, thus the land utilization must be implemented for maximum usage, so the buildings must be utilized by as many numbers as possible, therefore high-rise buildings in small land. (Table 1)

8.2 The Ministerial Regulation in the Bangkok Comprehensive Plan of 2013 Concerning Environmental Management in Bangkok's Central Business District

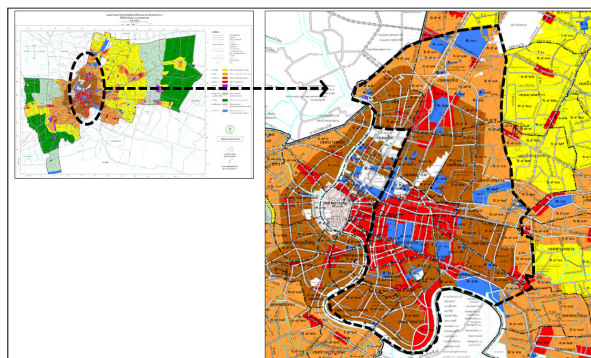
Bangkok's central business district is promoted as center of business activity in the region. The most significant central business district for purposes of this study was found along Silom, Sathorn, Sukumvit, and Asoke roads. According to the regulation in the Bangkok Comprehensive Plan of 2013, land use is classified into 4 types: medium density residential (orange zone: ๕.5-๕.7), high density residential (brown zone: ๕.8-๕.10), commercial (red zone: ๗.3-๗.5), and government buildings, public utilities and public assistance (blue zone: ๙.). In these zones, there is no setback or maximum height requirements. Also, some areas, for example, the ๗.5-1 area in Ratchathewi district has a FAR as high as 10. In addition, since the area is the site of many BTS (sky train) stations, landlords or entrepreneurs in the area are allowed a FAR Bonus up to 20% more than the prescribed FAR in each type of land use regulation. This is apart from an FAR Bonus due to rain water storage or retention

Table 1. Land use in Bangkok's central business district in 2007 and 2016

Types of Land Use in Land Use	2007		2016		Changing		
	Square kilometer, km ²	rai	Square kilometer, km ²	rai	Square kilometer, km ²	rai	percent per year
Residential	1.36	848.38	1.13	706.62	-0.23	-141.76	-1.86
Commercial	119.73	74,829.60	108.07	67,540.91	-11.66	-7,288.69	-1.08
Agriculture	0.00	0.00	0.06	37.21	0.06	37.21	0.00
Industrial	4.62	2,887.67	2.23	1,394.61	-2.39	-1,493.06	-5.75
Recreational	1.67	1,042.40	2.62	1,639.70	0.96	597.30	6.37
Government buildings, Educational institutions, Religious Buildings	14.84	9,277.37	22.82	14,260.47	7.97	4,983.10	5.97
Open Space	0.11	67.77	0.54	335.78	0.43	268.01	43.94
Road	6.04	3,774.94	9.41	5,879.07	3.37	2,104.14	6.19
Water Resource	4.70	2,939.85	6.20	3,873.61	1.49	933.76	3.53
Total	153.07	95,667.97	153.07	95,667.97	0.00	0.00	0.00

Source: Based on the analysis of GIS data from Land Development Department.

areas or plots, energy saving buildings, and providing residential accommodation for low income people or original residents. (Department of City Planning, Bangkok, 2013) (Figure 4).



Source: Department of City Planning, Bangkok, 2013

Figure 4. The land use classification in the Bangkok Comprehensive Plan of 2013

Following research into the rules and regulations of land use classification, open spaces, transportation and logistics, and public utilities projects in the Bangkok Comprehensive Plan of 2013 for the central business district. The main points relating to management of man-made environment were found to be the following (Department of City Planning, Bangkok, 2013):

- *Transportation and Logistics*

Diagrams relating to transportation and logistics in the Bangkok Comprehensive Plan of 2013 focus on prevention and improvement of traffic congestion problems of these areas. This includes a project to expand and connect side streets such as the expansion of the 1.29 Road of Soi 7 Phaholyothin in Phayathai district.

- *Flood Rehabilitation and Prevention Measures.*

Diagrams and standards in the Bangkok Comprehensive Plan of 2013 containing flood rehabilitation and prevention measures for Bangkok's central business district include the BAF which is described as no less than 50% of the OSR. There is another project to improve canal and drainage tunnels to divert water and prevent floods such as in the 1.1-33 Bang Sue canal.

- *Green Space Management.*

The central business district has limited green space. Thus, the Bangkok Comprehensive Plan of 2013 provides regulations and diagram aiming to preserve such space as still exists. The diagram indicated in an annex to the Ministerial Regulation regarding open spaces classifies open space in the central business area into 3 types: 1) Open space for recreational and preservation of environment quality (1.1) such as 1.1-24 Wachirabenchathat Park (Rod Fai Park) Jatujak Park, and Queen Sirikit Park in Jatujak district. 2) Open space for environmental quality alongside roads, rivers, and canals (1.2-1.3) such as 1.2-3 Chaeng Watthana Road and 3) Open space for flood prevention (1.5) such as the 1.5-23 retention pond at Lumpini Park in Patumwan district.

- *Coping with Global Climate Change.*

The Bangkok Comprehensive Plan of 2013 takes into consideration global climate change. This can be seen through its guidelines to develop Bangkok and ministerial land use regulations such as in the BAF requirement in order to increase green space and reduce greenhouse gas emissions.

- *Solid Waste and Wastewater Management.*

Many water treatment plants are located in Bangkok's central business area (e.g. Din Daeng water environment controls). This area is also service area for wastewater treatment and wastewater treatment projects.

8.3 District Residents' Opinions towards Environmental Management Measures in the Bangkok Comprehensive Plan of 2013

- *General information of respondents.*

Most of the respondents were male (51.55%) and aged between 41-50 years old (25.77%). Most of them had completed a diploma/bachelor's degree (43.01%) were living in Din Daeng district (15.46%) and had been living in the area for more than 12 years (43.30%)

● *Basic Information about Urban Planning Standards.*

More than 50% of respondents did not know of any urban planning standards. Moreover, more than 70% did not know or understand about urban planning standards relating to the Biotope Area Factor, BAF and Floor Area Ratio Bonus (71.13% and 72.16% respectively). Lack of knowledge and understanding in urban planning effected in past urban planning in Thailand including public participation, collaborations between relevant offices, lack of budgets to implement the plan, etc. (Tapananont, n.d.; Chula Unisearch, Chulalongkorn University, 2004).

● *People's Satisfaction towards Bangkok land use regulations in the Bangkok Comprehensive Plan of 2013.*

Most respondents (30.93-37.11%) had an average level of satisfaction with the land use regulations relating to environmental management in the Bangkok's central business district contained in the Bangkok Comprehensive Plan of 2013. However, they were most satisfied with the improvement and expansion of canals to drain water and prevent flooding (35.42%) and with projects relating to wastewater treatment plants and wastewater treatment service areas (33.33%) (Table 2).

From the highly satisfied feedbacks, not only the population have demand to cure traffic, water pollution, flood in Bangkok area, it also supports the procedures of Department of Public Works and Town and Country Planning (2006) which states that any plans can hit targets and objectives if the plans follow proper procedures.

Table 2. People's satisfaction towards land use regulations in the Bangkok comprehensive plan of 2013

People's Satisfaction towards Land Use Regulations Regarding Bangkok Comprehensive Plan of 2013*	Percentage**					
	Very good	Good	Medium	Low	Very low	Non-satisfaction
Bangkok as a Healthy Metropolis that Promotes Conservation of Natural Environment	15.46	25.77	<u>36.08</u>	18.56	2.06	2.06
Exemption for factories with area no more than 500 m ² to locate in medium-high density residential zone	18.56	15.46	<u>34.02</u>	22.68	4.12	5.15
Prohibition on public houses in low-medium density residential area	19.59	18.56	<u>37.11</u>	18.56	4.12	2.06
Special privilege for more floor area when providing public park, parking lot around BTS stations, retention area, and energy saving building	26.80	17.53	<u>30.93</u>	20.62	2.06	2.06
Diagram of Open Space which considers flood rehabilitation and prevention	29.90	19.59	<u>32.99</u>	14.43	3.09	0.00
Canal improvement, expansion, and digging to drain water and prevent flooding	<u>35.42</u>	28.13	25.00	6.25	3.13	2.08
Wastewater Treatment Plants and Wastewater Treatment Service Areas	<u>33.33</u>	26.04	25.00	11.46	1.04	3.13
Construction of main roads, sub-main roads and many side-streets branching off major streets	26.04	<u>32.29</u>	23.96	10.42	3.13	4.17

Remark:

* Agendas in the survey is considered from the review on land use regulations under the Bangkok Comprehensive Plan of 2013 that passed Content Validity by experts together with the analysis of Index of Item Objective Congruence: IOC.

** This research will collect the public satisfaction in 6 periods and the results will be analyzed in percentage. Therefore, Mean and SD will not be considered in this research. However, SD of the results is 1.12-1.32.

● *People's Needs Relating to Environmental Management in the Bangkok Comprehensive Plan of 2013.*

Most respondents had an average level of needs in this matter (31.25-37.89%). However, three things that they expressed most need of are 1) Special privileges for construction which provides benefits to public and environment (37.89%), 2) Strict punishment for violations of Urban Planning Standards (35.79%), and 3) Improvement in public relations and information communication of urban planning (35.42%) (Table 3).

9. Conclusions and Discussions

1) There have been few changes in land use in Bangkok's central business district in the past few years. Types of land use have changed no more or less than 7% per year. However, changes have become more vertical (increases in the density and the height of buildings) than horizontal. This is because the areas are limited or are almost fully used.

Table 3. People's needs relating to environmental management regarding the comprehensive plan of 2013

Needs Relating to Environmental Management Measures in the Comprehensive Plan of 2013*	Percentage**					
	Very good	Good	Medium	Low	Very low	No-needs
Special Privileges for Construction with Public and Environmental Benefit.	<u>37.89</u>	31.58	26.32	4.21	0.00	0.00
Increase of Development Projects in Specific Areas Corresponding to the Comprehensive Plan.	27.37	29.47	<u>36.84</u>	6.32	0.00	0.00
Local Assessments of Maintenance for Each Specific Area.	28.42	27.37	<u>34.74</u>	9.47	0.00	0.00
Specifying with clear and easy language activities that are permissible/impermissible/permissible under conditions.	28.42	<u>30.53</u>	28.42	10.53	1.05	1.05
Use of diagram and land use regulations with zoning.	26.32	<u>32.63</u>	29.47	11.58	0.00	0.00
Use of Diagram and land use regulations with building controls.	28.13	29.17	<u>31.25</u>	8.33	2.08	1.04
Urban Planning Standards and Economic Measures.	22.11	31.58	<u>37.89</u>	7.37	1.05	0.00
Increase Public Relations and Provision of Knowledge of Urban Planning	<u>35.42</u>	28.13	28.13	7.29	1.04	0.00
Strict punishment for violation of urban planning standards.	<u>35.79</u>	29.47	23.16	9.47	1.05	1.05
Compensation for those utilizing the property below potential.	31.58	24.21	<u>32.63</u>	9.47	1.05	1.05
The beneficiaries of urban development share the burden of investment with the government.	27.08	28.13	<u>34.38</u>	9.38	0.00	1.00

Remark:

* Agendas in the survey is considered from the review on land use regulations under the Bangkok Comprehensive Plan of 2013 that passed Content Validity by experts together with the analysis of Index of Item Objective Congruence: IOC.

** This research will collect the public need in 6 periods and the results will be analyzed in percentage. Therefore, Mean and SD will not be considered in this research. However, SD of the results is 0.90-1.10

2) The Bangkok Comprehensive Plan of 2013 consists of negative, positive and incentive or deductive measures. It is similar to Urban Planning Standards since it is announced as a law and came into effect upon publication in the Government Gazette (negative measure). There are diagrams which define open space, transportation and logistics, and public utilities. All of these guide and support development from the private sector (positive measure). The Plan also contains a FAR (incentive or deductive measure).

The mentioned urban planning standards have matched the theories of Nopanant Tapananont. (n.d.) and American Planning Association (2007) which leads into the controls private sector developments, supports and guidelines to efficiency in private sector developments and in the controlled direction.

3) Although financial development is promoted in Bangkok's central business district more than other places in Bangkok, issues relating to environmental management such as transportation and logistics, flood rehabilitation and prevention, green space management, coping with global climate change, and solid waste and wastewater management are still recognized through details of land use classification, open space controls, transportation and logistics projects, and public utilities project regarding Bangkok Comprehensive Plan of 2013.

4) Most of the respondents lack a basic understanding of Urban Planning Standards (more than 50% did not know any of the Urban Planning Standards). Besides, more than 70% did not know about Urban Planning Standards relating to BAF and FAR Bonus, which are measures relating to population density and requiring calculation.

5) With many BTS stations in Bangkok's central business areas, buildings in such areas are allowed a greater FAR Bonus if there is a parking lot within 500 meters of BTS terminal stations and important link stations. However, the questionnaire in our survey shows that 72.19% of the sample group did not know about the FAR Bonus. This may be part of the reason for a failure of Urban Planning Standards to be fully successful.

6) According to the results from the questionnaire, people in the area expressed a high degree of satisfaction on the question of construction of main roads, sub-main roads, and the expansion and linking of many side streets (32.29%). They showed greatest satisfaction with the improvement, expansion, and digging of canals to drain water and prevent flooding (35.42%) and with wastewater treatment plants and wastewater service areas (33.33%). These views reflect the effectiveness of guidelines to reduce traffic congestion, prevent flooding, and develop wastewater treatment facilities which are included in measures.

To conclude from the results of our study, guidelines for the creation and improvement of the Bangkok Comprehensive Plan in the future includes the following:

1) Provision of knowledge and basic understanding of Urban Planning Standards for people in a simple and clear format. The scope of this knowledge should include every step of urban planning procedures of Department of Public Works and Town and Country Planning (2006) to analyze the problems and needs of the community, define the aims and objectives of planning, collect and analyze relevant data, prepare, create and implement a comprehensive plan, and follow up and evaluate its implementation. These guidelines would respond to people's highest needs and improve public relations in order to provide knowledge of the comprehensive plan to local people.

2) Ensure strict punishment for violations of Urban Planning Standards in the future. This will not only meet people's most important expressed need but also lead to greater effectiveness of environmental management. The mentioned procedures matched the Environmental management theory of Miller, G. Tyler (2002) which talks about how to utilize land uses and how to execute it.

3) The incentive or deductive measures of urban planning has been applied more and more in conjunction with Floor Area Ratio Bonus (FAR Bonus), Transfer of Development Right (TDR), not only

increasing responding rates from the samplings and engaging cooperation from citizens to manage environment, supports and helps completing the procedures of Department of Public Works and Town and Country Planning (2006).

10. Recommendations for future research

1) The interviews with environmental management experts about environmental management measures in the comprehensive plan by additional questionnaire and revisiting on relevant theories will lead into proper and more effective analysis and improvement for Bangkok Comprehensive Plan in the future.

2) Due to the fact that each district in Bangkok's Central Business District has its own land use regulations, more samples including those who

have got directly affected from urban planning measures, for example, the samples were classified according to the type of land use according to the ministerial regulations, will illustrate clearer picture of the public opinions and make the results of the studies more accurate and more useful.

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