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URBAN POLITICAL ECOSYSTEM OF URBAN WILD AREA: CASE STUDY OF WUHAN METROPOLITAN AREA, PEOPLE'S REPUBLIC OF CHINA

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ABSTRACT: *Urban wild area and urban political ecosystem are new areas of urban study and land ecology. An urban wild area is a green infrastructure for urban ecological goods and services, and urban political ecosystem is a view of political mechanism and public policy process for ecological balance keeping of the city. The objective of the study is to integrate the causal relationship between changes in urban wild area, urban development and public policy outcome in Wuhan metropolitan area over the period of 2002 to 2011. Researchers analyze satellite images and Wuhan's statistics. Then, the study applies the theory of urban political ecology and sketches the pathway of land resource metabolism, the political ecosystem of land resource and the urban political ecological relationships of urban wild area study. The results of this study show that the urban political, ecological relationship of changes in urban wild area and urban development is a form of land antagonism because industrial development of Wuhan has resulted in a negative impact upon the urban wild area of the city. Moreover, political mechanism to maintain land resource ecological balance, through public policy, cannot afford to maintain the ecological changes and equilibrium.*

KEYWORDS: Urban Wild, Wuhan City, Land Ecology, Urban Metabolism, Urban Political Ecology And Land Resource Management.

INTRODUCTION

Life needs ecological goods and services for living as they are important factors for living. Every habitat must have ecological goods and service resources and the urban wild area is one kind of ecological resources of the city (UNEP, 2007). Moreover, human well being is deeply related with ecological goods and services, so the urban wild area can be considered environmental capital and a natural infrastructure of the city (Convention on Biological Diversity, 2010). The urban wild area is not only important for humans, but also serves the needs for non-humans (for example flora, fauna and micro-organism) because they need habitats and biological factors for living (Jean-Pierre L. Savard et al., 2000). Thus, we can see that conservation of urban wild areas is an essential issue for urban management and planning.

Urban wild areas are natural lands and natural ecosystems that still maintains wilderness in the midst of developing, and developed, metropolitan areas. In other words, an urban wild area serves as a natural habitat inside a city and where living creatures in an urban wild area can evolve and interact with the urban environment and urban atmosphere (P. O. Cheptou, 2008). Every city has an urban wild area that is different in form and landscape, for each with its own proportions of urban forest, urban green area, rivers, lakes, bays, beaches, urban canopies, wetlands etc. All of the urban wild areas overlap, and coordinate with, urban areas and the city; urban wild area cannot be separated from the city because they are a part of each other (Sabine

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Hofmeister, 2009). Urban wild areas show changes in quality and quantity when over time because of urban economic and industrial development (David Pimentel et al, 1994).

This research shows changes in an urban wild area in the metropolitan area of Wuhan by satellite images from the Computer Network Information Center, Chinese Academy of Science, as captured by Landsat 7, between 19 March 2002 and 9 December 2011 as well as changes in the statistics of Wuhan. Moreover, this study explains that urban wild area changes from analysis of urban political ecology which is an innovation for land resources management and land ecology. Urban wild area conservation is a new area of urban studies and urban ecology, and land political ecology is also an interesting issue for public policy planners and governors. We can solve environmental problems of the city when we understand urban wild area changes and land political ecology.

Urban wild areas are one of the land resources of a city and are also natural resources for metropolitan development (Jussi S. Jauhiainen, 2006). If metropolitan people lose urban wild areas, it means the people will lose ecological goods and services, and human well being also will disappear (Millennium Ecosystem Assessment, 2005). Awareness of urban wild area conservation is important and we must keep and protect the ecological balance of the city for the next generation (The United Nations, 1987). So, urban wild area conservation deeply relates to sustainability and public interest in globalization (The World Bank, 2004). Every country implements sustainability to achieve a national ultimate goal, so this research will be a spark of urban wild area conservation in the future (The United Nations, 2012).

STUDY SITE AND METHOD

Wuhan is the capital and the biggest city of Hubei province. The city is also a hub city in the central region of China because it is a center of transportation, logistics, industry, commerce, economy, education, politics and culture. In China, this city is not only important on a regional level, but also at national level because it is one of the top ten largest cities of China. Wuhan has the unofficial name as “the Chicago of China” (Mark Jacob, 2012). The area of Wuhan is 8,494.41 square kilometers, but its metropolitan area is only 888.42 square kilometers (Pan Jianqiao, 2012). We can zone the Wuhan metropolitan area into three groups: Hankou zone, Hanyang zone and Wuchang zone. Moreover, Wuhan has many urban wild areas such as lakes, pools, rivers, canals, hills, urban forests as well as agricultural areas because Wuhan is situated on a water resource bank of China. Because of it is high number of lakes, the city also has the unofficial name of Wuhan is hundreds of lakes urban areas and urban river basin (Kai Xu et al., 2010). This area does not only have a large urban wild area, but it is also a biologically diverse ecosystem in China because it has approximately 300 species of bird: both endemic and migratory: also 200 species of fish (Jingyun Fang et al., 2006). The area is also the habitat of endangered animals such as the Yangtze River dolphin or, Baiji (*Lipotes vexillifer*) this kind of freshwater dolphin can only be found in the Yangtze River (Gillian T. Braulik et al., 2005). This area has been more than 830 species of indigenous vegetation (Antoine Sambou et al., 2010). Thus, we see that the urban wild area of the metropolitan area of Wuhan is a rich ecosystem.

Urban wild area change study in this research has two study methods that are quantitative study and qualitative study. Both of the studies come from a satellite image analysis and all satellite images are captured by Landsat 7. Quantitative study is urban wild area and urban area counting

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from high quality images and qualitative study is an image comparison with 2002 to 2011. Lansat 7 satellite took Wuhan city images 83 times or days between 19 March 2002 to 9 December 2011 but it had good quality data in 44 days. Researchers use PCI Geomatica program process 44 data to 132 images of different color band processing in three groups that are band 2, 5 and PAN in the first group, brand 2, 4, 5 and PAN in the second group and brand 3, 4, 5, 6 and PAN in the third group. Because three groups of satellite images are good combination and option for false and true color analysis and urban wild area study. Then, they counted urban wild area from 132 satellite images and calculated the average for each period. Moreover, they analyzed and compared the changes of urban wild area in ten years period from all of satellite images.

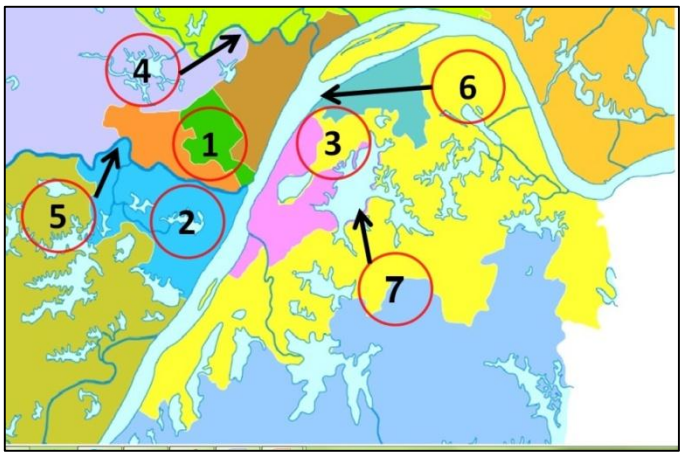

Figure 1 Wuhan City's Metropolitan Areas

Number 1 – Hankou Zone
Number 2 – Hanyang Zone
Number 3 – Wuchang Zone
Number 4 – Fuhe River
Number 5 – Hanshui River
Number 6 – Yangtze River
Number 7 – East Lake

After researchers analyze satellite images in qualitative and quantitative methods, they compare urban wild area changes with Wuhan city statistics in 2002 – 2011 for relationship study. Then, they analyze the relationship between an urban wild area and an urban area using model of urban political ecology. They try to study interaction between both areas as living creature in urban ecosystem and create model for interaction analysis. The understand of relationship will be input of public policy for urban development and urban wild area conservation in the future.

RESULTS

From the study of satellite images of the metropolitan area of Wuhan city in 2002 -2011, Wuhan loses urban wild area in quantity. For example, from figure 2, agricultural areas, represented in green, in Hankou zone, Hanyang zone and Wuchang zone decreased between December 2002 and December 2011. Besides, we can see urban area, represented in pink and dark blue, spreads to replace green areas. So, the evidence from satellite images show that the size of an urban wild area of the metropolitan area of Wuhan city decreases between 2002 and 2011.

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The size of urban wild area in Wuhan was 628.71 square kilometers, or 70.77 percent of total the city area, in 2002 but is 415.45 square kilometers, or 46.76 percent of the total city area, in 2011. This decrease indicates that the metropolitan Wuhan people lose 213.26 square kilometers of urban wild area in 10 years; this change is a 24.01 percent decrease during the 10 year period. The rate of urban wild area loss is 2.4 percent per a year, or 21.33 square kilometers per year. The size of the Wuhan metropolitan area is 888.42 square kilometers, which means most of the Wuhan metropolitan area was urban area in 2011 but was not an urban wild area like in 2002. The people of Wuhan lost many kinds of urban wild areas such as agricultural areas, lakes, and urban forests. Urban wild areas were replaced by urban area and other utilizations by humans (Shukui Tan et al., 2014).

The urban wild area of the metropolitan area of Wuhan has not only changed in quantity, but analysis of the same satellite images shows that urban wild area also changed in quality in the same ten year period. Some environmental changes are consistent changes over time such as species of plant, farmland being replaced by green traffic island, urban forests being replaced by farmland etc. Also during this period are inconstant changes, such as quality of water resources, vacant land, flooded area etc. A negative qualitative change of urban wild area is a negative sign for the environment of metropolitan Wuhan; all of urban wild areas occur slowly as this 10 year period and these changes impacts and affects urban life, urban flora, urban fauna and the metropolitan people in direct and indirect ways (Robert I. Mcdonald et al., 2008).

Figure 2 Wuhan City's Metropolitan Area Satellite Images
Band 3, 4, 5, 6 and PAN in December 2002 and 2011.

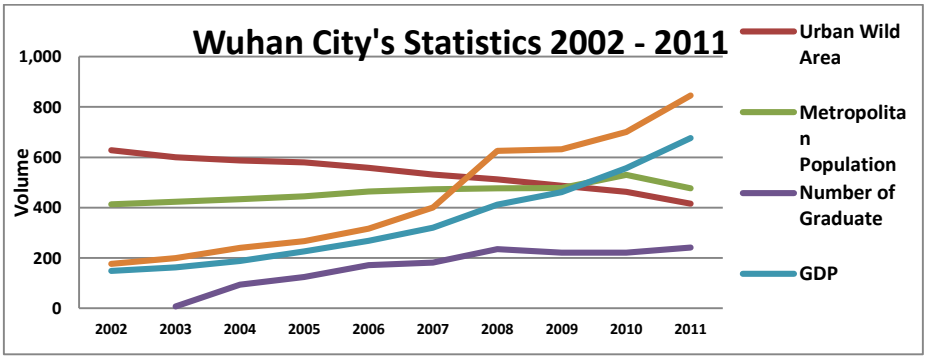

Figure 3 Graph of Changes in Statistics of Wuhan, 2002 – 2011 (Pan Jianqiao, 2012)

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Note: 1. Units of Metropolitan population and numbers of graduates are given in 10,000 persons.
2. Units of GDP of Wuhan and gross industrial output are shown in increments of 1,000 million RMB.
3. Units for Urban wild area are given in square kilometers.
4. Number of graduates is number of higher education graduates.

After urban wild area of metropolitan Wuhan is calculated based on satellite images of 2002 – 2011, and analyzed with some city statistics during the same time, it was found that changes in the urban wild area changes are an opposite in direction as compared with the following: metropolitan population, number of higher education graduate, gross domestic product (GDP), and gross industrial output (Figure 3). From these statistics we can infer that Wuhan truly is an industrial city because it shows the rapid industrial development in this ten year period. GDP and gross industrial output of Wuhan shows fast growth which stimulated many diverse demographic changes within especially, the number of higher education graduates because this city had an increase of higher education institutions, from 48 in 2002 to 79 institutions in 2011. This expansion of education turned Wuhan into a hub of higher education. From these statistics we can infer that the industrial development of metropolitan Wuhan in 2002 -2001 came with a negative impact upon changes in urban wild area.

If we compare the changes of urban wild area in Wuhan with some environmental indicator statistics of the city for 2002 - 2011, we find that urban wild area changes also have a negative correlation with the following: total volume of wastewater discharge, total volume of waste gas emissions and volume of industrial solid waste produced. The increase in these statistics is correlated with the decrease of urban wild area in this period (Figure 4). All wastes came from industrial development and we can infer that industrial wastes had a negative impact upon changes of urban wild area. Moreover, public expenditures of Wuhan in this period does not show the positive impact upon urban wild area because government expenditures of Wuhan increased, and funds for pollution treatment varied, but the urban wild area decreased. It is clear that public expenditures did not support urban wild area protection.

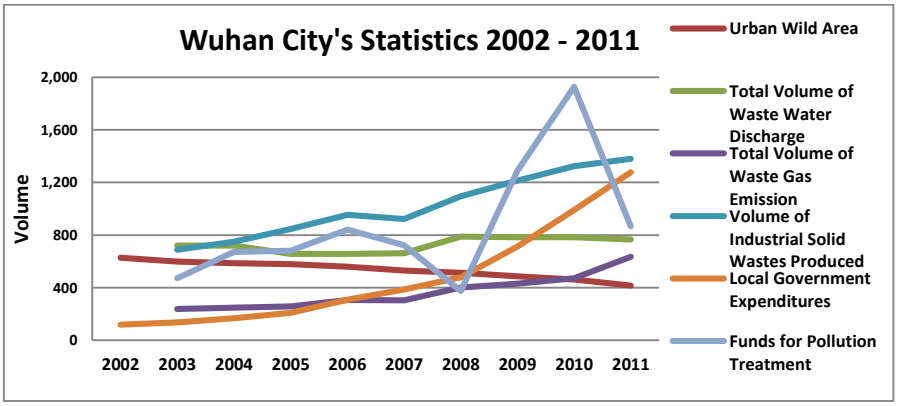

Figure 4 Wuhan City Changes' Statistics Graph in 2002 – 2011 (Pan Jianqiao, 2012)

Note: 1. Units for total volume of waste water discharge are shown in increments of 1 million metric tons.
2. Units for total volume of waste gas emissions are shown in increments of 1 thousand cubic meters.

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3. Units for the volume of industrial solid waste produced are shown in increments of 10,000 metric tons.
4. Units for local government expenditures are 100 million RMB.
5. Units for funds for pollution treatment are 1 million RMB.
6. Units for urban wild area are shown in square kilometers.

At present, all studies and sources of information, so that the urban wild area of the Wuhan metropolitan area changed from 2002 to 2011 because of industrial urbanization. Wuhan lost urban wild area in the metropolitan area which means they did not lose only green areas of the city, but they also lost ecosystem services and natural balance in the city (Per Bolund and Sven Hunhammar, 1999). It does not coincide with methods for sustainable land resources management (FAO, 1993). There is a risk that the city will continue to have more environmental problems, crises in the future (Yajie Song et al., 2009).

DISCUSSION

From urban wild area changes of the Wuhan metropolitan area phenomena, we can use the land resource of urban metabolism for this study as an innovation. Land resource of urban metabolic pathway is a new model that combines between urban political ecology (Nik Heynen et al., 2006) and urban metabolism (Tisha Holmes and Stephanie Pincetl, 2012). The pathway will create a better understanding of the phenomenon of urban wild area changes in the case of Wuhan.

Urban Wild Area Metabolic Pathway

Based on the urban wild area metabolic pathway for the Wuhan metropolitan area (figure 5), the urban wild area can be considered a raw material for urban and industrial development, and the urban wild area is the input of the pathway. Urban wild areas through to urban systems that have three conditions those are:

1. Drivers: Drivers are political and economic factors that interact with changes in an urban wild area. In the case of metropolitan Wuhan, this study has shown a great amount of Wuhan urbanization and industrialization in 2002 – 2011, as evidenced by a dramatic increase in the GDP and gross industrial output of the city during this period. This means that land-use policy and infrastructure decisions supported the urban and industrial development made in Wuhan and the city has an economic role of industry. Thus, divers of Wuhan move further toward industrial development.

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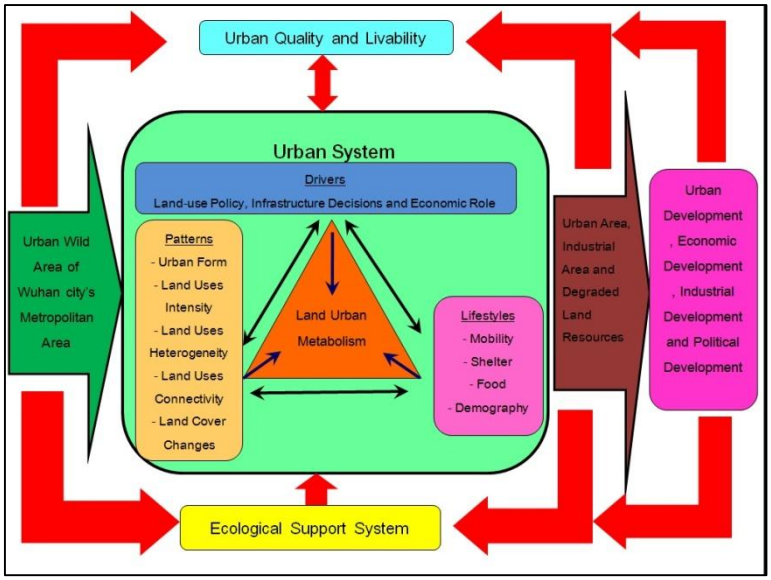

Figure 5 Urban Wild Area Metabolic Pathway of the Wuhan Metropolitan Area
(Jan Minx et al., 2011)

2. Lifestyles: Lifestyles are the human factor, because humans are the key variables of ecosystem dynamics in the city (Mark Hostetler et al., 2011). Wuhan underwent industrial development in 2002 – 2011. It was affected by demographic changes, mobility, and demography of the citizens such as metropolitan population and number of higher education graduates. When demographics change, shelter and food factors also change because humans need habitat and food. This is not only quantitative lifestyle changes, but also changes in quality because as salaries increase, more money is spent toward complacency lifestyles. All conditions will affect changes in the urban wild area in both direct and indirect ways (Jem Bendell and Anthony Kleanthous, 2007).

3. Patterns: Patterns are geological factors and natural land changes. From the Wuhan study, landforms of Wuhan combined with the Yangtze River basin and lacustrine plains (Cheng Weiming and Xia Yao, 2011). It is clear that Wuhan abounds with water resources. Naturally, urban structures spread around water resources, rivers and lakes. From development of industry and the growth of urban areas, the Wuhan metropolitan area transformed from urban wild area to urban area expanded until they became nearly full by metropolitan space in 2002 - 2011. The changes of Wuhan are consistent with studies of satellite imagery over the past 10 years.

All three of these variables interact with each other within existing urban systems and they also impact urban land metabolism. This means that political and economic factors, human factors, and geological factors all influence urban wild area metabolism, urban wild area usage, and urban wild area changes. The output of urban wild area metabolism is urban area, industrial areas, and degraded land resources. Degraded land resources are land areas that are contaminated by pollution. So, output of urban wild area metabolism is negative and we can see the increase of urban area and pollution statistics in the case of Wuhan. Moreover, all outputs transfers to outcomes that are urban, economic, industrial and political developments and all of outcomes affect with metropolitan people and ecosystem. The reflex of Wuhan case is an increase in Wuhan GDP, gross industrial output, and local government expenditures. Outputs and outcomes of GDP, gross industrial output, and government expenditures show

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negative correlation to urban quality, livability, and ecological support systems within the city. Urban quality and livability mutually affect urban systems because they can make changes in drivers, lifestyles and patterns. We can say that urban quality and livability are standards of urban living (Millennium Ecosystem Assessment, 2003). The ecological support system also affects the urban system because the ecological support system is ecosystem services of the city and they live in a similar habitat and ecosystem. At the same time, the urban wild area of metropolitan Wuhan also influences urban quality, livability, and the ecological support system.

From the urban wild area metabolic pathway and the case of the Wuhan metropolitan area, we can see that urban wild area changes are a reflex of changes in both the ecosystem and urban environmental (The Cities Alliance, 2007). The changes are sending bad signals to urban ecosystems and people within the city. The governor and urban planners should be aware of the change in urban wild area because the protection of ecological services' is a role of government (UN-HABITAT, 2013). Urban wild area conservation should also be of interest to the public as it is the public sector, which must take care of, manage and maintain for sustainable uses (Terry L. Cooper, 2004).

Urban wild area metabolism is an explanation and a perception of an urban wild area changes' mechanisms of the city (C. Kennedy et al., 2011). However, urban land metabolism is a subsystem of the urban political ecosystem because land resources are one of the necessities and urban raw materials of urban development (Anna Zimmer, 2010). The researcher wants to focus on an urban wild area of the urban political ecosystem, but the mechanism is not a whole urban political ecosystem; it is not simple to draw out a general urban political ecosystem to encompass all the factors in the development of the city (Tisha Holmes and Stephanie Pincetl, 2012). Every factor has different contexts and conditions, so a model of urban political ecosystems in urban wild areas is created in figure 6.

Urban Political Ecosystem of Urban Wild Area

From figure 6, land urban metabolism, or urban systems, has a two-way relationship with urban wild area because urban metabolism of land can bring positive and negative changes to urban wild areas. Moreover, the urban wild area is consumed by urban metabolism, so both of them are influenced by each other. Metropolitan people use urban wild areas: ecological producer: for urban area development: ecological consumer: and they become degraded land resources, urban pollution, and urban garbage (The World Bank, 2006). This metabolism has two pathways that are outputs of the city move to urban ecosystem: ecological decomposer: or they return to the urban wild area and urban area. The urban ecosystem modifies all pollution and degraded land by natural processes and they will eventually return to urban wild area and urban areas again. We can see that the urban political ecosystem of an urban wild area is a natural cycle as a process of an organic chemistry cycle in the ecosystem and the whole of the process stays inside the urban ecosystem as a natural habitat (HABITAT, 2010).

In the case of metropolitan Wuhan, urban land metabolism creates a change to the urban wild area through economic and industrial developments. The changes affects urban wild areas: ecological producer: and we can see that the effect of this study, for example, if the size of an urban wild area has decreased, increasing the size of the urban area, characteristics of the natural vegetation of the urban wild area changes and water quality of urban wild area changes. So, changes in land ecosystem impact the urban wild area and they also affect metropolitan Wuhan: ecological consumer: because we can see pollution statistics increase in 2002 -2011.

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It looks like a chain reaction. After that, all pollution and degraded land will be converted to urban ecosystem which also gives feedback with urban wild area and urban area.

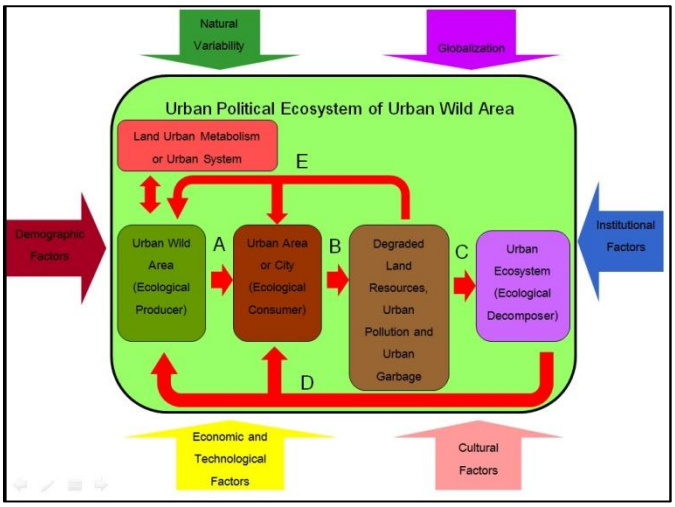

Figure 6 Urban Political Ecosystem of Urban Wild Area (Eric F. Lambin, 2003)

An urban political ecosystem in urban wild areas have conditions that the changes of urban political ecosystem will happen slowly or quickly it will happen according to six variables, all of which act as catalysts in a chemical reaction. The six variables are:

1. Natural variability: Natural environmental changes and variables interact with the urban political ecosystem because the political ecosystems are a subsystem of the natural urban ecosystem (James B. Greenberg and Thomas K. Park, 1994). In the case of metropolitan Wuhan, geophysical conditions are important factors make changes to the urban political ecosystem because Wuhan geography is variable (Wuhan Sustainable Cities Program, 1996). The city has hills, alluvial plains, rivers and lakes in the area. Wuhan climate is a subtropical humid monsoon climate; it is cold in winter and hot in summer. Moreover, summer and winter seasons are long: both seasons are approximately 245 days: but spring and autumn seasons are short: this season is approximately 60 days. The people and government of Wuhan must adapt to, and follow, natural conditions.

2. Demographic factors: Urban population has an influence upon the urban political ecosystem because humans need ecological goods and services from the urban wild area, so demographic changes interact with the ecosystem in direct and indirect ways (The World Bank, 2008). In the case of the Wuhan metropolitan area, the local residential population does not change dramatically between 2002 and 2011 but the latent population, such as students, laborers, immigrants, foreigners, travelers and temporary residents, changes rapidly. The latent population is difficult to count in a census, so this statistic often does not show up in the city report (Catherine Calder et al., 2003). Latent population is a challenge for governors and urban planners in management of demographic factors.

3. Economic and technological factors: The changes of economy and technology create changes in land use and urban political ecosystem (Eric F. Lambin, 2003). The economy impels economic, political and social mechanism, for example prices for commodities, taxes, subsidies, production, capital flow, financial credit, budget etc. All of these mechanisms impact upon urban metabolism of land. Moreover, technology impels human

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behaviors and securities, increasing the consumption of these resources, for example agriculture, food production, residential construction, transportation, logistics, energy, disaster protection etc. All of behaviors and securities also impact the urban metabolism of land. In the case of the metropolitan Wuhan, economic and technological factors make Wuhan an industrial city and urban wild areas become back up of industrial development.

4. Cultural factors: Culture affects upon humans, social systems, nature, and ecosystems, in various ways, such as attitudes, values, beliefs, history, perception, knowledge, development etc (Dorothy Billings and Viacheslav Rudnev, 2011). Every factor impacts the urban political ecosystem via urban systems. If Wuhan changes to industrial city, the culture changes to industrial and metropolitan culture. It affects the urban wild area changes and urban political ecosystems because industrial and metropolitan culture is a culture of capitalism that stimulates only consumption (Peter Calkins, 2006). Growth does not occur in a sustainable way.

5. Institutional factors: The most important factor in the urban political ecosystem area is government and public organizations because they are institutions-decision making and are public choice selectors (Nicholas Henry, 2011). We have many institutional factors at the present time, such as government, state enterprise, non-government organization (NGO), international organizations, and civil society. In the case of metropolitan Wuhan, the study shows Wuhan government as well as public policies support industrial development because GDP and gross industrial output of Wuhan as well as the pollution statistics both increased dramatically, while the urban wild area decreased in 2002 – 2011. However, the city's government was also trying to lead the way of sustainable development because the city joined with the United Nation in a sustainable program in 1996 (Wuhan Sustainable Cities Program, 1996). Moreover, many public organizations, such as universities, World Wide Fund for Nature of P.R. China (WWF China), civil society and etc, are aware of the importance of environmental conservation of Wuhan (Michelle Shi, 2013). All of the programs are indicative that the city will receive attention in the conservation of the environment that much more.

6. Globalization: In the modern world, every country of the world seems to have no boundaries because people can easily have international interactions. Thus, globalization is affecting the city and urban political ecosystem as inevitable (Tatyana P. Soubbotina, 2004). Many current streams come from globalization, for example liberalization, capitalism, consumerism, realism, authoritarianism, industrialization, urbanization, sustainability, McDonaldism etc. Wuhan is also on course toward the globalization way (Janie S. Corum, 2011). This research and statistics show that the city is developing in every sector to globalization supporting and urban wild area changes is a normal phenomenon for metropolis around the world.

All factors go into the urban political ecosystem in the metropolitan of Wuhan and they affect urban wild area changes. It is not only external factors of urban political ecosystems impact the ecosystem, but the internal relationships of urban political ecosystem are also interesting and important (figure 6). In figure 6, symbols A, B, C, D and E are used to represent the transformation of the urban wild areas which is similar to the description of equation in organic chemical changes in the ecosystem and we can explain and analyze every transformation process by relationship focus in figure 7.

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From figure 6 become figure 7, the definition of land resources is covering matter of the earth's surface such as soil, mountain, desert, water, sea, ocean, river and etc. These different regions of the earth are finite, fragile and non-renewable natural resources, and they also are important components of the human habitat, environment, and welfare (UNEP, 2002). Thus, the urban wild area is one kind of land resource where we can analyze the urban political ecological relationship of land resources in an urban wild area (figure 7). From the case study of urban wild area at Wuhan, the study show that the relationship between urban wild area and urban area is antagonism and the antagonism refers to a relationship where one party gets all the benefits while other parties are disadvantaged.

Land antagonism is beneficial to unilateral relationships between urban area and urban wild area (Shukui Tan et al., 2014). On the other hand, both parties take, and give, the benefits of the other, but it is not equal benefit sharing, thus an urban wild area will lose its natural balance in the urban wild ecosystem. From the equation presented in figure 7, the changing summation of A, B and E exceeds the changing summation of A, B, C and D which means that the urban political ecological relationship has more negative land ecological changes, and exceeds those of positive land ecological changes. If an urban political ecosystem has a land antagonistic relationship, the ecosystem will not stay in equilibrium because city government and metropolitan people are not balancing and controlling every factor, change, and processes. The output and outcome form the imbalance of urban political ecosystem are pollution problems, plague, urban heat islands, urban wild area loss etc. Moreover, land antagonism also shows the imbalance of nature or ecological services within the city when positive feedback, or the natural regeneration process is less than negative feedback, or degraded land, pollution, and garbage (figure 5, 6 and 7). Condition for land antagonism is present when city people cannot keep the balance between urban area changes and urban wild area changes, in terms of quantity and quality. This land- eco-relationship indicates that a city has a non-nature friendly public policy, a balancing problem between industrialization, environmental protection and human centric development.

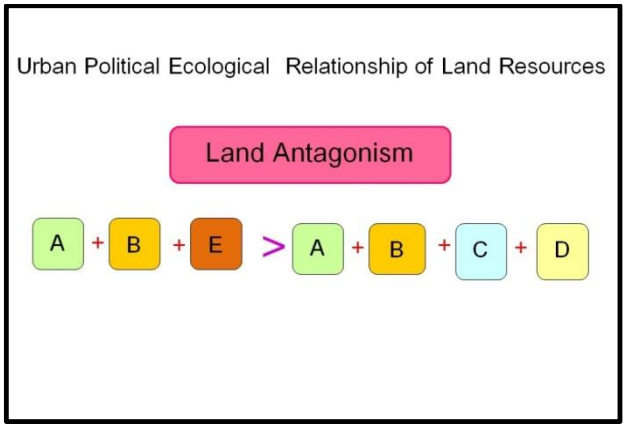

Figure 7 Urban Political Ecological Relationship of Land Resources in Urban Wild Area Study. (Shukui Tan et al., 2014)

A – The changes of urban wild area turn into a city.
B – The changes of land resources of urban areas and cities become degraded land resources, urban pollution and urban garbage.
C – The change of land resources from degraded land resources, urban pollution and urban garbage, into urban ecosystem.

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D – The changes of land resources in urban ecosystem, and the return to urban wild areas, urban areas and city.
E - The changes of land resources of degraded land resources, urban pollution and urban garbage, and their return to urban wild areas, urban areas and city.

In the case of Wuhan metropolitan area in 2002 – 2011, the urban political ecological relationship of land resources, between urban wild area and the urban area, is a land-antagonistic relationship because the urban political ecosystem has negative land ecological changes that exceed the positive land ecological changes. The present study has presented much information that shows the negative outputs and outcomes, which come from the negative impacts of industrial development, such as urban wild area reduction, statistics of pollution consistent have a high number and quality of the urban wild area of Wuhan is in a state of eco-imbalance. So, the way in eco-balance protection and nature friendly city making will be a challenge for Wuhan citizens and the government.

The case of Wuhan is simple phenomena for metropolitan area and industrial cities around the world because city governments and citizens mobilize all their resources to develop the economy and industry (Jun Yang et al., 2014). In this development, the people and government tend to be oblivious to the conservation of urban environment and the natural resources. It is a paradox because humans need economic development at the same time as they seek environmental conservation, and it is not easy to balance these two ends. Equanimity, equilibrium, stability and sustainability are the salvation of nature, and of mankind (The United Nations, 1987).

CONCLUSION

The urban political ecosystem is a process and system of compromise, balance and impartiality and manufacture between humans and nature between politics, economy and society in the city (Nik Heynen et al., 2006). This concept of constant compromise and balance tries to realize changes of the human side and natural side, and it is not a human centric vision. It is one of the best ways for earth protection. Humans have accumulated vast knowledge from the past to the present off natural resources and environmental conservation (Dorothy Billings and Viacheslav Rudnev, 2011); about it has not been forgotten in the face of acquisitiveness, economic competitive frenzy, distorted political systems and the decline of moral systems (Kaemthong Indaratna, 2007).

The social mainstream is based on economy, commerce and political interest, but the social-minor stream tries to stay in the realm of nature, environment and sustainability and many efforts of supranational organizations to globally recognize the importance of sustainable development (Tim O'Riordan, 2004). If the metropolitan government applies sustainable development ideals to its public policy, it will protect and preserve nature and the environment for the next generation. This means the city will create a sustainable urban political ecosystem and it will maintain the earth maintenance and preservation by cosmopolitan (UN-HABITAT, 2014).

This case study of urban wild area changes of the Wuhan metropolitan area is one of normal phenomena in current and it is a reflection of imbalances in development. This case study is inductive research for the understanding of urbanization and the researchers try to integrate an urban political ecological concept from abstract to practice. So, it will be balance keeping

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between urban wild area or natural habitats conservation, and urban development or human habitats (UN-HABITAT, 2012). Moreover, the urban political ecosystem is a view of political mechanisms and public policy processes of ecological balance keeping of the city (Parama Roy, 2011). On the other hand, an urban political ecosystem is the road map to sustainability of a city because it is the urban metabolic pathway of political mechanisms and public policy process. This metabolic pathway will be public policy design technique for urban political ecologists or urban environmental planners. Besides, this research will be one way to make sustainable cities a reality (Niu Wenyuan, 2012).

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