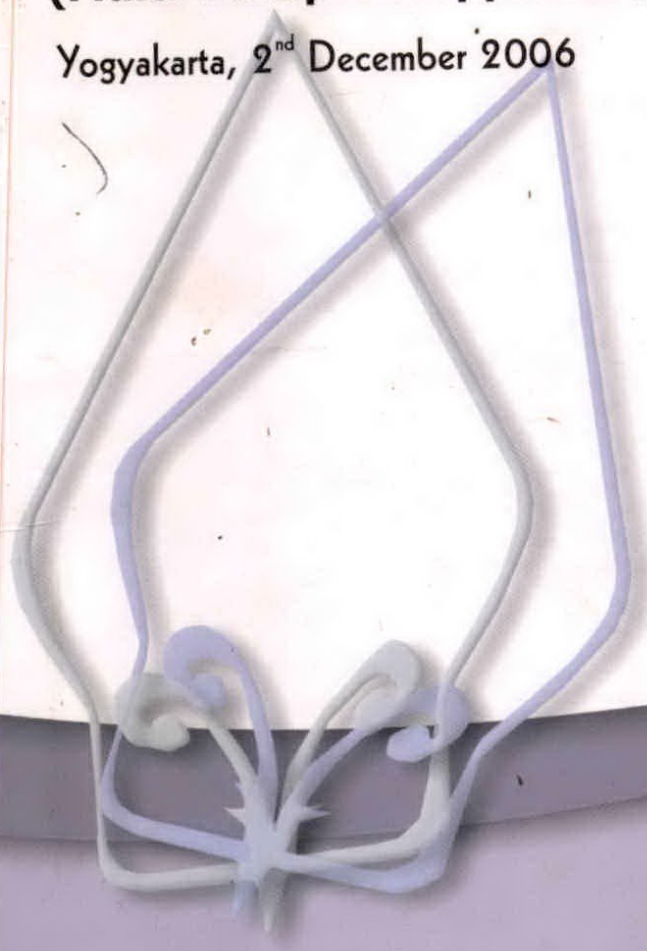


Proceeding

International Joint Seminar

**Muslim Countries and Development :
Achievements, Constraints and Alternative Solutions
(Multi-Discipline Approach)**

Yogyakarta, 2nd December 2006



Organized by:



ISBN 979-3700-10-6

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Universitas
Muhammadiyah
Yogyakarta



International
Islamic
University
Malaysia



Education and
Cultural Attache
Embassy of The Republic
Indonesia in Malaysia

**MESSAGE FROM THE RECTOR OF
UNIVERSITAS MUHAMMADIYAH YOGYAKARTA (UMY)**

Assalamu'alaikum warahmatullahi wabarakatuh

All praise be to Allah SWT, Lord of the world. Peace and blessings on Muhammad SAW, His Servants and Messenger.

First of all, as the rector of Universitas Muhammadiyah Yogyakarta (UMY), I would like to welcome to the honourable guests, Rector, Dean of Postgraduate Studies (CPS), Dean of ISTAC, Dean of IRKHS, Deputy Deans and Head Departments from various Kulliyah, lecturers, postgraduate students of International Islamic University Malaysia (IIUM), and all participants in this joint seminar.

Academic cooperation between UMY and IIUM started several years ago. The cooperation between us is based on a solid foundation; both us are Islamic universities having same missions to develop Islamic society, to prepare future generations of Islamic intellectuals, and to cultivate Islamic civilization. In fact, improving academic quality and strengthening our position as the producers of knowledge and wisdom will offer a meaningful contribution to the development of Islamic civilization. This responsibility is particularly significant especially with the emergence of the information and knowledge society where value adding is mainly generated by the production and the dissemination of knowledge.

Today's joint seminar signifies our attempts to shoulder this responsibility. I am confident to say that this joint program will be a giant step for both of us to open other pathways of cooperation. I am also convinced that through strengthening our collaboration we can learn from each other and continue learning, as far as I am concerned, is a valuable ingredient to develop our universities.

I sincerely wish you good luck and success in joining this program

Wassalamu'alaikum Wr, Wb.

Dr. Khoiruddin Bashori

Rector, UMY

**MESSAGE FROM THE RECTOR OF
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA (IIUM)**

Assalamu'alaikum warahmatullahi wabarakatuh

In the name of Allah, the most Gracious and the most Merciful. Peace and blessings be upon our Prophet Muhammad (S.A.W).

First and foremost, I felt honoured, on behalf of the university to be warmly welcomed and to be given the opportunity to work hand in hand, organizing a respectable conference. Indeed, this is a great achievement towards a warmer bilateral tie between the International Islamic University Malaysia (IIUM) and Universitas Muhammadiyah Yogyakarta (UMY) after the MoU Phase.

I would also like to express my heartfelt thanks to Centre for Postgraduate Studies (CPS), Postgraduate Students Society (PGSS), contributors, paper presenters, participants and our Indonesian counterpart for making this program a prestigious event of the year.

This educational and cultural visit is not only an avenue to foster good relationship between organizations and individuals and to learn as much from one another but a step forward in promoting quality graduates who practices their ability outdoor and master his or her studies through first hand experience. The Islamic platform inculcated throughout the educational system namely the Islamization of knowledge, both theoretical and practical, will add value to our graduates. This comprehensive excellent we strived for must always be encouraged through conferences, seminars and intellectual-based activities in line with our lullaby: The journey of a thousand miles begin by a single step, the vision of centuries ahead must start from now.

My utmost support is with you always. Looking forward to a fruitful meeting.

Ma'assalamah

Wassalamu'alaikum Wr, Wb.

Prof. Dato' Dr. Syed Arabi Iddid

Rector, IIUM

**MESSAGE FROM EDUCATION AND CULTURAL ATTACHE
EMBASSY OF THE REPUBLIC OF INDONESIA
KUALA LUMPUR**

Assalamu 'alaikum warahmatullahi wabarakatuh

All praise be to Allah SWT. This is the moment where implementation of MoU between Universitas Muhammadiyah Yogyakarta (UMY) and International Islamic University Malaysia (IIUM) comes in the form of action by organizing this Joint Seminar. The efforts of both sides to implement the MoU are highly appreciated, especially, in the context of which both universities effort to enhance the quality of education.

Substantially, I believe that this Joint Seminar will bring many benefits. In term of the development of knowledge, it is a means for developing academic quality, for exchanging of information on academic development, as well as for constructing intellectual atmosphere at both universities. In term of international relations, both universities have taken part in increasing close relationship between Malaysia and Indonesia. RUM and UNY as well are using 'soft power' to increase bilateral relations among citizens which brings a lot of benefits for both nations.

Therefore, I hope that both RUM and UMY can make use of this program as a 'kick-off' for other programs in the future, especially in using UMY's vast networks with other Muhammadiyah Universities in various cities in Indonesia as well as IIUM's network. The support of IIUM for UMY also means a progress for IIUM and UMY. I hope such joint program will continue in future for betterment of both Indonesia and Malaysia. Embassy of the Republic of Indonesia in Kuala Lumpur will always support these efforts.

To our honorable guests, Rector, Dean of Postgraduate Studies (CPS), Dean of ISTAC, Dean of IRKHS, Deputy Deans and Head Departments from various Kulliyah, lecturers and students of IIUM, I warmly welcome you to Yogyakarta. I hope you enjoy your stay in the cultural city of Yogyakarta.

Finally, as the Attache of Education and Cultural, Embassy of the Republic of Indonesia, Kuala Lumpur, I sincerely wish you good luck *and a successful program with unforgettable memories.*

*Wabillahit Taufiq Wal Hidayah
Wassalamu 'alaikum warahmatullahi wabarakatuh.*

M.Imran Hanafi

Education and Cultural Attache, Embassy of the Republic of Indonesia

MESSAGE FROM DEAN CENTRE FOR POSTGRADUATE STUDIES

Assalamu'alaikum warahmatullahi wabarakatuh

Praise be to Allah. May the peace and blessings of Allah be on the last prophet and messenger, our master Muhammad and on his household and companions. It is a great privilege for me to foreword this message to this wonderful event that is jointly organized by the Universitas Muhammadiyah Yogyakarta (UMY) and International Islamic University (IIUM).

First and foremost I would like to record my special gratitude to management of Universitas Muhammadiyah Yogyakarta for their co-operation.

In order to obtain comprehensive excellence, the Centre for Postgraduate studies has always facilitates postgraduate students of the university to achieve the highest quality in their academic work. This seminar is one of the many programs that Centre for postgraduate studies has to ensure quality graduates.

I would therefore like to thank all the participants and programme coordinators who have worked hard to realize this event.

May Allah SWT shower His blessing upon us.

Wassalamu'alaikum Wr, Wb.

Prof. Dato' Dr. Wan Rafei Abdul Rahman
Dean, Centre For Postgraduate Studies

**MESSAGE FROM THE ACTIVE
PRESIDENT OF POSTGRADUATE STUDENTS'**

Assalamu'alaikum warahmatullahi wabarakatuh

On behalf of Postgraduate Students' Society (PGSS), my gratitude and appreciation to our beloved Dean of Studies, the Embassy of Indonesia in Kuala Lumpur, Muhammadiyah Yogyakarta and the organizing committee of IIUM and the Universitas Muhammadiyah Yogyakarta for their huge success. Postgraduate Students' Society (PGSS) under the supervision of the Center for Postgraduate Studies (CPG) is pleased to host this event.

As I strongly believe that the initial stages of unity are the key to building the new generation, who will represent the future more, such programs, not only achieve the mission of our universities but to achieve the global mission and vision. Therefore, I believe today, we have to have understanding and then only we can appreciate our diverse cultures. We should acknowledge the different strengths and weaknesses through knowledge in this age of information. I am sure this joint seminar will initiate unity among the future generations along with integrating them.

Thank you,

Mohd Nabi Habibi

Active President Postgraduate Students' Society (PGSS)

MESSAGE FROM PROGRAM DIRECTOR

Assalamu'alaikum warahmatullahi wabarakatuh.

Praise be to Allah. May the peace and blessings of Allah be on the last Prophet and Messenger, our master Muhammad and on his household and companions.

Honestly speaking, we are pleased to be trusted by Postgraduate Students' Society (PGSS) and Centre for Postgraduate Studies (CPS) to organize the programme named Educational and Cultural Visit to Yogyakarta, Indonesia. For this, We express our gratitude to the management of both PGSS and CPS. This programme is of immense value. It has the potentials to promote intellectual endeavor, develop leadership capabilities and enrich cross-cultural understandings. We sincerely believe and hope that program of this kind will be organized in a regular fashion in future.

It is a great privilege for us to play twofold role in organizing this event: *as a host* and *as guest*. In fact, this is a fascinating experience to manage this event. Since our inception here, we have found meaningful interaction of students in an interweaving of cultures into complicated, yet beautiful, embroidery of social fabric. We are proud to say that this dearly loved university has produced graduates of high quality, who are distinct from those of the local universities.

Finally, we wish to express our special thanks to Bapak M.Imran Hanafi, Education and Cultural Attache of Indonesian Embassy, Bapak Herdaus, S.H., Assistant of Immigration Attache of Indonesian Embassy, Bapak Tharian Taharuddin for their immensely valuable assistance and co-operation in making this program a success. I sincerely appreciate all local committees at Yogyakarta, the colleagues and program coordinators and committee members who worked diligently to materialize this event. We wish to pass on good wishes to the PGSS for their valuable efforts it expended for this event.

May Allah s.w.t shower His blessing upon us.

Wassalam,

Nasrullah

Programme Director

Todi Kurniawan

Co-Programme Director

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The Roles of Urban Architectural Landscape on Shallow Groundwater, Case Study Jakarta Indonesia

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Kulliyah of Architecture & Environmental Design
International Islamic University Malaysia

Abstract

The entire world is now suffering from so many fatal problems. One of the most such serious problems is HIV/AIDS. It is not only a very serious medical phenomenon but it is also a grievous problem from ethical perspective. According to Professor Dr. Adeeba Kamarulzaman, the Malaysian AIDS Council (MAC) president, between 1986 and June 2005, a total of 62,597 men were infected with HIV and 9,106 men were diagnosed as AIDS patients in Malaysia. Most of the HIV-positive men are young adults aged between 20 to 29 years. Women, on the other hand, 4,841 were HIV-positive and 938 were living with AIDS. For the worldwide occurrence, it was estimated that there were 1,600 new HIV infections per day, which corresponds to 10 infections per minute. Prof. Dr. Mohd. Kamal Hassan, in one of his speeches said, "Religious authorities and community leaders must be the catalyst to transform the response to HIV/AIDS. We can no longer deny the fact that HIV/AIDS is a growing problem in Muslim communities. Religious leaders, therefore, have the moral duty to be proactive and not remain as spectators." This paper will suggest and explain Qur'anic alternative solutions to be implemented, i.e. the importance of instilling faith and performing prayer, abstinence from shameful deeds, cleanliness of both physical and spiritual dimensions, and use of tayyibat. These measures may curb the spread of HIV/AIDS. The paper will highlight that the measures that are being adopted by Malaysian or world AIDS organizations may not be sufficient to control the problem.

Keywords: HIV/AIDS; ethical perspective; Adeeba Kamarulzaman; Mohd. Kamal Hassan; Qur'anic alternative solutions.

Introduction

By 1900, 14 percent of the world's population was living in urban centres. This proportion increased rapidly after 1950 to reach close to 50 percent today.¹ This was consequently followed by the rapid urban housing developments that incorporated their economic activities, facilities, infrastructures, transportation system, human's basic needs, and energy sources. To ensure the sufficiency of urban people needs, local government is required to provide and control both distribution and allocation of land and water properly. Lessened circumspection on those will impose serious problem of environmental equilibrium.

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¹ Shahab Fazal, "Urban expansion and loss of agriculture land – a GIS based study of Saharanpur City, India," *Environment & Urbanization*, vol. 12, no. 2 (2000): 134; See also William B. Honachefsky, *Land planner's environmental handbook*, (New Jersey: Noyes Publications, 1991), 32.

In fact, agricultural lands were converted into built up areas particularly for housing estates. Expanding of built up areas by most stakeholders of urban development can hardly be stopped properly. The implication of this development has ignored the existence of green spaces proportion and performance such as greenbelt, urban park, urban forest and the like. Fazal predicted the occurrence of agricultural land losses in cities, by 2000, more than 476,000 hectares of agricultural land in a year will be built up in low-middle income countries.² Even, reducing of hazard zones, urban park, and urban forest as well as cutting of street trees was difficult to be controlled. The direct impacts to these conditions are fast increasing of water deterioration, flooding, and urban sedimentation. Efforts to save the environmental equilibrium will be fruitless. Such cases have been found in many big cities of Indonesia, such as in Bandung, Surabaya, Medan, and Jakarta. All the cities are categorized as high density population and occupied by more than two million people.

By 1961, population of Jakarta was 2.9 million people and increased rapidly around 8.0 millions (2004).³ However, in the daylight, million suburban commuters move to this city for working. The average density was 12,000 persons per square kilometre. Jakarta with population around 8.0 million (2004) is one of the mega cities in the equatorial zone⁴ that suffers from fresh water insufficiency. As a capital city of Indonesia,⁵ Jakarta is officially named DKI Jakarta Raya (around 664.5 sq.Km²). According to statistical data of Jakarta (2004), total green space excluding agricultural land is around 2,076 Ha (or 0.3% of Jakarta region) which comprises of 70.2 % for urban parks and recreational areas such as zoo, urban forest, etc.; 2.8 % for riverbanks; and 27.1 % for greenbelts and street sides. The portion of these spaces around 1,506 Ha (72.5 %) are allocated in South and East Jakarta municipalities.

Morphologically, Jakarta is classified as flat region with incline slope to southern part. The pattern of city development expanded to corridor of 'the west-east wing region' (1980s) and finally spread out to the southern one (1990s) which was more agricultural land. The development policy contradicts with 'The greening program' of Jakarta that has established the southern region of Jakarta as a water catchments area.⁶

The economic activities increased tremendously following the fast population growth of Jakarta in the era of 1980s until 1990s. The result of these was that many new high-rise buildings and housing estates were established rapidly and were scattered in west and southern regions. Many agricultural lands in outer ring road have quickly been converted into real estate, apartment, hotel, office, shop-house, shopping mall and others. Hence, the enlargement of urban built up area of Jakarta has almost been doubled, from 35,000 Ha in 1987 to 65,000 Ha in 2004.⁷ Although 'Jakarta master plans' stated that the southern regions were designed for maximum density of 15,000 people per square kilometres,⁸ in the daylight, however the actual average density is now about 18,200 people square kilometres or 182 people per

² Op cit., 134.

³ Centre of Indonesian Statistic Board (BPS), *Jakarta in figure 2004* (Jakarta: Author, 2005), 26.

⁴ Equatorial zone is the region of 11^oNL (North Latitude) to 11^oSL (South Latitude).

⁵ DKI Jakarta - *Daerah Khusus Ibukota Jakarta Raya* - is the official name of capital city of Indonesia that region administratively located in 106^o45'- 106^o52' East Longitude (EL) and 6^o12'- 6^o25' South Latitude (SL). From now and after it is called Jakarta.

⁶ Pemerintah Daerah DKI Jakarta, *RUTR Rencana umum tata ruang kota DKI Jakarta 1965-1985* [General plan of DKI Jakarta province 1965-1985] (Jakarta: Author, 1965), 59.

⁷ Pemerintah Daerah DKI Jakarta, *Jakarta 2005*, 2.

⁸ Pemerintah Daerah DKI Jakarta, *Master plan of Jakarta, 2000*, (Jakarta: Author, 1987), 21.

hectare. It means that the number of people per unit space is over than what is tolerated.

Either to anticipate the acceleration of developments or to accommodate the rapid growth of population, the local government of DKI Jakarta has issued a series of environmental regulations. Some important regulations to control and oversight physical developments related with groundwater can be stated i.e. 'Jakarta Master Plans' of 1985, 2005, and 2010; Local Act (*Perda*) No. 93/76 of the Building Coverage Index called '*KDB or Koefisien Dasar Bangunan*;' and Local Act of 'the Groundwater Conservation Region.'⁹ The fluctuation and storage of shallow groundwater volume as source of people's fresh water in Jakarta are also influenced by the land surface condition, mainly land coverage system such as urban parks and other green spaces.

Environmental Problem and Urban Park Disturbance

The green space of Jakarta has shrunk drastically in three decades either in urban parks, cemetery, conservation zones, or in hazard zone of such as riverbanks, under electric power lines and railways fences. Although local governments has established several regulations of water conservation in above, thousand trees either at lands of government control or at house-gardens of people have been cut for enlarging building and housing spaces by them without replacement appropriately. The developers opted to build all the acquisitioned lands for a maximum profit taking. People who have house-garden and dry land (*tegalan*) at surrounding tend to sell land or to extend their building maximally for rent-houses and or for small business purposes, such as stalls, shop-houses (*ruko*), and the like. The implication of it is as Jellineck said: "...so, Jakarta in dry season becomes hotter, harsher, and to face a fresh water problem permanently. In wet season many places are flooded."¹⁰

Hence, the local government has rectified the 'Jakarta master plan' (2000) that highlighted the proportion of green space becomes merely 13.9 % of the total size of Jakarta.¹¹ Whereas, the previous document of Jakarta master plan (1965) had stated the size of it was 37.2%; in continuous period (1985), then it had determined to be smaller around at 25.8%. Furthermore, the estimated loss of urban park space due to urban expansion in Jakarta was about 0.57 % per year or about 7.4 Ha between in 1965 and 2005. The decreasing of green space portion and urban park reflects the negative perception of people to green city. This condition will threaten the quality of urban environment mainly increasing of temperature, flooded, and decreasing of water table.

In addition, some urban parks have changed into apartments, government offices, stalls, slum houses, and others. The cases in points for examples are apartment buildings in Tebet Park, and gas stations in Taman Mataram Park and Taman Gunung Agung Park. Then converting green space to non-economics purposes occurred. The high-rise building of local government office of South Jakarta has been built at areas of cemetery and flood control pound. In addition, environmentalists delivered some

⁹ See hydrological map of 'Jakarta sheets 1209-4 Jakarta, scale 1:100,000' by Directorate of Environmental Geology, Republic of Indonesia, *Hydrological map of Indonesia*, (Bandung: Author, 1993).

¹⁰ Lea Jellineck, "Jakarta, Indonesia: Kampong culture or consumer culture" in *Consuming cities*, edited by Nicholas Low, Brendan Gleeson, Ingemar Elander, and Rolf Lidskog (London: Routledge, 2000), 278.

¹¹ Pemerintah Daerah DKI, *RUTR, Rencana umum tata ruang kota 2000*, [Master plan of Jakarta], (Jakarta: Author, 1999)

critics addressed to the development of Senayan golf course, about the polemic of which better for water conservation between the lands for trees and for the lawn.

This situation is inline with Kondoh & Nishiyama postulated that urbanization reduces groundwater recharge, but increases indirect runoff, which leads to drying up wells, and urban flood.¹² It is understandable that many urban parks and green spaces will then probably convert into other land uses. Woudstra and Fieldhouse stated "Too often conservation is seen as standing in the way of urban development. The evidence however contradicts this."¹³ For some reasons, limitation of urban space, principle of product efficiency, and high price of land, led the stakeholders of development (especially government and investors) to exploit the possibility of green spaces for saving future developments. Unfortunately, investors do not build urban infrastructure to fit their environment, but they build it according to standardized engineering and financial scheme.¹⁴ The implication of their attitudes is shrinking of vegetated land. In addition, the local government did not share the same attention in response to the people misleading perceptions and the building exertions.

The expansion of urban size or built up area are not automatically followed by adding of green space areas proportionally.¹⁵ It depends on development policy, planning, and commitment to safe their green area. In many cases, urban expansion policies are triggered by economic motive and 'image of development.' The implications are green space area converted. Only the wisdom of soul and religious touch might prevent never-ending exploitations of green space. As Bakadar commented: "...Today, when we are exploiting natural resources injudiciously and moving towards chaos, such understanding must be developed by re-establishing the cultural and religious values in society."¹⁶ Zalewski appealed the scientists to increase the absorbing capacity of ecosystems for water resources.¹⁷ Then Christoff stated, "The town planning profession has also shown increased awareness of problems of water supply, waste disposal, and impact of urban growth on habitat and energy use."¹⁸ This issue connects with urban land use management. Hence, land use planning management can provide a range of tools and techniques to assist the mitigation of drought problem.

One of the main issues of sustainable urban management in Indonesia is how the government can fulfil the daily potable water needs. Presently, most people still retrieve shallow groundwater for potable water by individual 'jet-pumping' or open wells. In dry season, volumes of groundwater become deplete. Even they have experienced deteriorated condition.

The ideal potable water is from water supply system by water treatment plant. In fact, the capacity of water supply systems in Jakarta metropolitan just reaches 42.3

¹² A. Kondoh, & J. Nishiyama, "Changes in hydrological cycle due to urbanization in the suburb of Tokyo metropolitan area, Japan," *Adv. Space Res.* vol. 26, no. 7 (2000): 1173.

¹³ Jan Woudstra & Ken Fieldhouse (Eds.), *The regeneration of public park*, (London: E & FN Spon, 2000), 18.

¹⁴ Gery Moll, "Urban forestry: a nation initiative" in *Urban forest landscape: Integrating multidisciplinary perspectives*, edited by Gordon A. Bradley (Seattle: University of Washington Press, 1995), 13.

¹⁵ Muhammad Koeswadi, *Perlunya penyelamatan ruang terbuka hijau* [The need for safety of green space]. (Jakarta: *Buletin BKTRN*, 2003), 5.

¹⁶ Abubakar Ahmad Bakadar, "Islamic principles for the conservation of the natural environment" in *Islam and the environment*, edited by A.R. Agwan (Kuala Lumpur: Synergy Book International, 1997), 143.

¹⁷ Maciej Zalewski, "Ecohydrology – the use of ecological and hydrological processes for sustainable management of water resources," *Hydrological Sciences-Journal-des Sciences Hydrologiques*, 47 (5), (2002): 828.

¹⁸ Peter Christoff and Nicholas Low, "Recent Australian urban policy and the environment, green or mean?" in *Consuming cities*, Ed. Nicholas Low, Brendan Gleeson, Ingerman Elander, and Rolf Lidskog (Routledge: London, 2000), 249.

% of total population or about 3.16 million inhabitants. Based on the calculation of daily consumption patterns, the households consume with 127-152 litres/person.¹⁹ Compared with standard of daily consumption of 200 litres/person, the diminishing of it should lead the customers to combine with the private groundwater pumping. Even because of under quality of water supply, percentage of people uses groundwater increased regularly. This condition is still occurring in most Indonesian big cities such as Surabaya, Jogjakarta, and Bandung. Thus, most urban people use groundwater for daily consumption. Technically, volume of shallow groundwater fluctuates which is impacted by surface condition of urban land. Potential green space and urban park that have changed to the impervious materials surface such as paving blocks, floor, and buildings, will cause problem of precipitation to infiltrate the soil fast. Then, if withdrawal is bigger than replenished process of groundwater, it might lead to disequilibrium condition. However, vegetations could densely capture much water and release them downward through their roots system. Therefore, the destruction and shrinking of urban parks will reduce the ability of whole system of green spaces to absorb much water for recharging process of shallow groundwater in urban area. The objectives of the research study are to investigate the ability of urban park for recharging of shallow groundwater and to explore the appropriate architectural vegetations that are more valuable to maximize water storage beneath the urban park.

Ecohydrological Approach

Urban parks as landscape feature perform many functions such as recreation, wildlife habitat, and urban facilities. As a part of urban facilities, they are scattered from the inner cities to the fringe areas. Generally, they appear to provide aesthetical function rather than ecological one. Therefore, most people take advantage of psychological and ecological effects directly or indirectly gained from the existence of the urban parks. Lawrence defined urban park as: "*The large areas that contain vegetation in the built-up areas of most cities.*"²⁰ Some of urban parks appear very natural, with their lakes, rolling lawns, and grove of trees alike. These are planted trees to imitate nature on land. The definition implies that urban park has similar character with natural preservation of vegetations and the presence of trees as predominant vegetations that will create a strong green image of urban structure configuration. Furthermore, Amstrong also recommended that urban sustainability could be enhanced by providing more productive landscapes, such as city forests, bio-mass planting for fuel, community woodlands, orchards, etc.²¹ In term of water conservation, the urban parks can be utilized as urban watershed. The protected storage of shallow groundwater is very important matter to overcome the problem of fulfilment of fresh water for the people who are not served well by the urban water pipe system.

Concerning the land of urban parks, it is sensitive to be converted as a future asset by local authority, private, or wrong people, while the beauty and maintenance of plants tend to be neglected by them. In short, they thought that the land is valuable. Dealing with message of sustainable urban development, it should not ignore values

¹⁹ Centre of Indonesian Statistic Board (BPS), *Jakarta in figure 2004* (Jakarta: Author, 2005), 296-298.

²⁰ Henry W. Lawrence, "Changing forms and persistent values: Historical perspectives on the urban forest," in *Urban forest landscapes, integrating multidisciplinary perspectives*, Gordon A. Bradley (Seattle: University of Washington Press, 1995), 23.

²¹ Helen Amstrong, Helen Brown, & Tom Turner, in *Landscape and sustainability*, edited by John F. Benson, & Maggie H. Roe (London: Spon Press, 2000).

of humanity, socio-culture, and environment. The urban community needs to revise the rigid and oppressive urban form, and it is not merely to consider finance and engineering views.²² The 'victim' is vegetated lands. Whereas urban park is manageable spaces for interaction among vegetations, soils, and water. Hence, urban planners development stakeholders include developers are urged to consider general values on ethics and religion that associated with development. Golany said: "Religious value may serve as source of set of ethics."²³

In practice, urban park design never touches the aspect of water conservation. It is still focusing on suitability of vegetation growth and aesthetical view. Meanwhile, understanding of urban park in term of ecosystem aspect is limited. If any, the research will focus on relationship between leaves and reduced pollutions aspect, while it drives to understand water conservation aspect particularly roots system is still rare. Which one of tree or grass is better for water conservation? The question has no answering scientifically. Selected Qur'anic verses (mainly 27:60) and *al-Hadith* (mainly tree) because of thorough investigation serves as the bases of starting point approach of this study technically. Interpretation and assessment of translation of certain verses of vegetations, parks, soil, and water might discover new colour of technical meanings.

In term of biosphere, conservation activity in Islam is obedience for humankind to manage the stability ecosystem that reminded by the *Qur'an* repeatedly. In short, humankind was entrusted to manage and improve the ecosystem as *rahmatan lil alamiin* (peace on universe). Hence, Moslem must promote balance and respect the right of either biotic life or abiotic stability. The balance does not only constitute the prosperity of human life, it should reach the benefit for other biotic creatures (flora and fauna) and serve the sustainability of environmental equilibrium. Thus, the ideal set of values on environment that has been highlighted by the *Qur'an* should be adopted on any vision of developments. The number about vegetations in *al-Qur'an* is around 75 verses (*ayāh*) scattered in 43 chapters (*surah*); which are 13 verses of 12 chapters state the tree (*shajar*), 12 verses of 12 chapters state the cultivated plants (*dhar*), one verse of grass (*abb*) and of shrub (*najm*), and 2 verses of pioneer vegetations (*mar'ā*) in 2 chapters. The remaining verses explain the mechanism of cultivation, the natural propagation and reproduction, the seed, and those that are related to the system of anatomy such as root, stem, leaf, flower etc. Even there are some verses that clearly explain the relationship between abiotic (rain, soils) and biotic creatures (humankind, vegetations, and cattle). God says:

Then let man consider his nourishment: that We pour down the rain in showers, and We split the earth in fragments, and therein make the grain to grow, and vines and herbs, and olives and palms, and gardens of dense foliage, and fruits and fodder – provision for you and your cattle.

(the *Qur'an*, *Abasa*: 24-32).

Or, who has created the heavens and the earth, and Who sends you down rain (*mā'*) from the sky? Yeah, with it We cause to grow (*anbatna*) well vegetation with beautiful landscapes (*hadāiq*) and delight: it is not in your power to cause the growth of the trees (*shajar*) in them. (Can there be another) god besides God? Nay, they are a people who swerve from justice. (the *Qur'an*, *an-Naml*: 60)

²² Cliff Moughtin, *Urban design: Green dimensions*, (Oxford: Architectural Press, 1997), 3; See also Moll, 13.

²³ S. Gideon Golany, *Ethics and urban design, culture, form, and environment*, (New York: John Wiley & Son Inc., 1995), 5.

These verses mention the hydro-cycle process where the landscapes include trees and other vegetations are important actors for the process. The precipitation or rainfall serves three purposes of living of mankind, vegetation, and animal as cited in the following verse: "It is He who sends down rain from the sky; from it ye drink, and out of it (grows) the tree on which ye feed your cattle" (*Al-Qur'ān, an-Nahl: 10*). Tree's roots should hold the existence of water (rainfall). By trees, water is used for evapo-transpiration and released for percolation into the groundwater. The hydro-cycle process occurs in nature perfectly and permanently. However, on behalf of development of settlements or urban activities, the existence of trees is only swerved to fulfil aesthetical functions than to produce prominent ecological one. Lack of green space, primarily trees, in certain regions will result in serious implications. Hence, disturbance to this physical phenomenon will create disharmony and decrease environmental capability, and in turn, it probably threats sustainability of living. The immediate example of shrunk impact of green space is water draught and urban flood.

The green space in urban area, called urban landscape, has various performances such as urban forest, green belt, open space, urban park, and so on. Urban landscape is the area of urban or built environment that is dominated by plants. Urban park and city forest are the immediate examples. Green space development has conventionally been associated with functions of urban recreation, visual quality of cityscape, and the social aspect of environmental quality. Through the setting of spatial planning with terrestrial plant cover patterns, urban green space can be utilized as a catchments area (watershed) that is intended to establish the amount and quality of water providing,²⁴ to develop biodiversity of ecosystem,²⁵ and to maximize water protection and controlled mechanism of erosion and flood. By the roots system of vegetation, certain amount of water will be restrained for their growth sufficiently, while the rest one will naturally flow as percolation into the groundwater.

In regard to the vegetation, The Prophet Muhammad.p.b.u.h. stated in *hadith* narrated by Bukhāri and Muslim: "If any Muslim plants a tree or sows a field, and a human, bird or animal eats from it, it shall be reckoned as charity from him." The prophet also stated another *hadith* narrated by Imam Aīmad, Bukhāri, and AbuDawod "If the resurrection day comes upon any one of you while he has a seedling on hand, let him plant it."²⁶ It indicates the additional function of trees to the environment. Tree is not only valuable for the survival of humankind, but also for animals, especially birds. Birds may be part of the symbioses mutuality process with trees. So, it is very clear that Islam sets and highly appreciates the formation of environment.

In term of spatial structure of urban development, urban park also functions as habitat conservation particularly vegetation. In nature, vegetations have capability to conserve water that infiltrate into their roots zone. Referring to Qur'anic interpretation (27:60) above and the character of vegetation, therefore urban park can support water conservation in urban scale. Technically, it is called a micro urban watershed. Its presence supports the process of water infiltration as well as environmental equilibrium on urban development. Thus, the basic idea of this study is how to **maximize water infiltration** into the shallow groundwater by urban park.

The research comprises macro and micro approach. Macro approach accommodates natural character of urban ecosystem that serves water catchments by

²⁴ Mackenzie L. Davis, & David A. Cornwell, *Introduction to environmental engineering*, (Boston: WCB McGraw-Hill, 3rd edn., 1998), 48; Also see Zalewski, 827.

²⁵ Karen Payne, "Graph theory and open space network design," *Landscape Research*, vol. 27, no. 2 (2002): 167.

²⁶ Bakadar, 74.

vegetated land surface mainly urban park and shallow groundwater in urban scale. The format of elaboration will use analysis of park distributions into the frame of interlinking park and green spaces. Micro approach elaborates relationship between architectural (vertical) class of vegetation and soil water character in roots zone of urban parks. These elaborations use sample of species of tree, shrub, and grass, and field observation with infiltrometer (for infiltration), tensiometer (for water dynamic), and neutron probe (for soil moisture). The research has investigated many urban parks and observed on detail elaboration at Ragunan Park and Pondok Kopi Park in Jakarta Indonesia (2004-2005).

Results

1- Urban Park and Shallow Groundwater

Urban parks can increase shallow groundwater in its surrounding significantly. The quality of urban parks also relates with condition of their vegetations mainly architectural (vertical) class of vegetations i.e. trees, shrubs, and grasses. Therefore, the bigger park and the denser vegetation is the better for water conservation.

Concerning to the urban park development, with exception of heritage parks of Dutch era, no urban park has been well planned neither as 'an eye catching' nor as 'a focal point' of urban spatial structure. In general, the urban parks were developed in small size and scattered on the rest land of a design, such as in the corner, behind, or in marginal space of the housing's block. Even, although many vacant lands, no urban park has been built by inhabitants in their surrounding. This stance indicates the erosion of villagers' appreciation to safe their environment. Furthermore, in land use proportion, Jakarta is dominated by housing area. Nevertheless, the expansion of housing estates or high-rise building is not proportionally parallel with development of urban parks. Then, local government does not have enough mechanisms and coordination to face illegal housings and buildings in hazard zone.

On the urban ecosystem, urban parks are supposed to be a sub system of it. In reality, urban parks existence do not sustain to it in term of: structural distribution, specification of parks character, selection of appropriate vegetations, the securing of legal land status, and suitability with urban soils. Soil information is main assets of the urban ecosystem that able to give direction for landscape development. Even, urban parks in this city are not established to make connected unity with greenbelts and other green space elements presented. So, the performances of urban ecosystem extend to the direction of disconnection from all elements of urban landscape. In other word, the park development has not performed as 'the interlinking parks.'

Tree is main element of vegetations that able to act conserved water and release many environmental advantages. In many cities, urban park acts as eye catching in urban landscape. Hence, in ecosystem point of view, urban park might be as an indicator of people awareness on their environmental quality and condition of natural sources such as groundwater. Unfortunately, many urban parks, hazard zones, and roadside trees are repeatedly assumed as a saving land for future developments. The implication of those assumptions is converted of land uses in many ways.

Government policy of greening program by trees rather directs to beautify urban landscape, to produce fresh air, and to search for protection of flooding mitigation than to provide water conservation and shallow groundwater retention. The trees planting are rather dominant at urban parks in southern region of Jakarta than urban parks in other regions. However, policy of urban park developments does not

specify vegetations for water conservation purposes. Regarding with anatomy of crown or shape of tree, some parks used species of column shape that have generally short branches. For examples are *Glodogan* and *Pinus mercurii* trees. In term of water conservation, using these trees species are less suitable. Long and dense branches are more valuable for water conservation. Because, the crown system will protect splashing of highly precipitation and in turn to transfer flowing water through its twigs, branches, stem, and finally together with trickling of water infiltrate into its roots zone. Sapodilla tree is one good example for water conservation. In ecosystem term, planting of *Tanjung* and *Salam* trees in Jakarta is most appropriate species in term of design of urban park. By this planting, appearance of their yellowish white flowers and fruits will release fragrant and 'exotic snowing panorama.' Unfortunately, populations of *Salam* and *Tanjung* are very few. These trees will become a new habitat for community of birds and insects. Besides that, birds and insects will support pollination of trees and other plants in which allow plants to survive, while they get their foodstuff. There are symbiosis mutuality process and multiplier effect product that *Prophet Muhammad p.b.u.h.* stated about relationship of trees and birds. Thus, understanding to the anatomic characters of plant primarily the tree species will be guidance for policy making and designing of urban landscape.

2- Soil Moisture on Roots Zone

In average, vegetated lands on either of silty clayish loam or clay soil types have the time response to infiltrate water two times faster than the time of bare land needs. It implies the action of roots to absorb water in their surrounding. Therefore, vegetated land with trees is more effective for water conservation as well as flooded prevention than other class of vegetations. The point of it is volume of trees' roots is bigger than volumes of shrubs or grasses' roots.

Soil moisture beneath turf grasses was generally lower than that of trees. Sunlight effect that reached over the depth of root's zone of turf grasses will evaporate soil moisture fast. Then, it will generate 'convergent' dynamic movement of soil water from layer of around 50 cm depths to the top and lower layers. In addition, open tillage system with ridging on shrubs will also bring about the increasing of evaporation and consequently soil moisture on it will decrease lofty up to -7%.

In term of water conservation, the understanding of water store capacity is important input for landscape planning primarily for policy making on watering management. Whereas most soils type of Jakarta are clay soils, so strategy to conserve water should be how to utilize and consider the given soil types that adjusted to appropriate class of vegetations, specifically the tree species. Through the exploration of relationship roots-branches of trees and the degree of tolerance of well growing, the planning and development policy of urban landscape in Jakarta should be rearranged.

From the field observations, clay soil type was scattered dominantly in almost Jakarta region. The rest is silty clayish loam soil that distribute in small part of northern east of Jakarta such as Duren Sawit district; and alluvial soil that distribute in coastal zones such as Kelapa Gading district, Cengkareng district. Physically, either silty clayish loam soil or clay soil are good media for infiltration process. However, clay soil is better media for conserved much water as water store. Thus, in south and east region Jakarta are able to act as water storage in the groundwater either in root zones or in unconfined aquifer (shallow groundwater). It is inline with the decision of

spatial planning – has been stated in all physical master plans Jakarta – to establish conservation region in southern and eastern regions of Jakarta. As previous explanation, these master plans focus mainly to physical development strategy and urban spatial organization guidance. There is lack of vision and strategy of development in term of urban ecosystem. Indeed, some guidance such as conservation of hazard zones, percentage of green area of building lots, etc. have been stated in the master plans. Nevertheless, these aspects relate with spatial dimension terms only. Correlation with trees as the main actor of environment is less consideration. Above all the relationship with water conservation and urban parks performance are short attention.

Recommendation

Due to the problem still occurs, local government is necessary to set up **the master plan of urban ecosystem**. This master plan is supposed to be able to realize the sustainable environmental equilibrium, to enhance environmental quality, and to provide solution to the vital problems of human life in Jakarta environment, primarily water drought, harsh, and regular flooded. The stakeholders of development mainly the central government, local legislative body, developers, and environmental NGOs are required to propound it collectively. Expectedly, Jakarta as the capital city, the master plan becomes the first in Indonesia, then disseminates to other cities that have either physical geography or environmental problem similarly. Hence, local government particularly agencies of ecological aspect, have to immediately begin re-planning and re-evaluating the strategy and policy of urban developments in the frame of urban ecosystem which is comprehensive in nature covering main aspects of social, economics, environment, and urban facility. They must also be firm in upholding local rules and regulations related to the aspects of spatial planning and environment so that they could rebuild green spaces effectively either in parks, hazard zones, preserved area, or other open spaces; and of course integrated with the master plans of physical development previously.

Dealing with the effort for increasing green space up to 13.94% as documented in the master plan Jakarta 2010, and concerning with water drought, the local government of DKI Jakarta province should has **the master plan of urban ecosystem**. This master plan is not merely physical spatial plans. It covers the framework of planning and development strategy of landscape, environmental equilibrium, conserving natural sources, law enforcement and ecological reward, and alert system of ecological degrading. Practically, several parks existing should link with greenbelts or other green space in its vicinity by continuing of intermingling trees on street and by inserting new park nodes development among them. By this model, program of greening movement would become strong impression. It is also more effective to persuade people's do and safe the ecosystem. Achievement indicator of this model – as new idea that has never established in Indonesia – is when a number of communities of birds and insects are **nestling at trees**.²⁷ Fortunately, many ecological problems such as drought of water, harsh condition, and flooded would drop off continuously.

Basic principles of planning and designing of urban parks to provide water conservation mission could be highlighted bellow.

²⁷ See the essence of *Qur'anic, an-Nahl: 68*

1. The landscape agency should enlarge the population density of trees rather than shrubs or groundcovers either at the existing urban parks or at local housing parks belonged to developers. In parks, trees rather than shrubs or turf grasses should dominate vegetations. The species of these trees should have character of drought tolerant, fast growing, attractive crown with flowers, and much branches, such as *Acacia auriculiformis* (Acacia, *Akasia*), *Scheleichera oleosa* (Lour.) Oken (*Kesambi*), and *Diospyros malabarica* (Desr.) Kostel (*Kleco/Kledung*).
2. For developing of coastal parks, the selected species should have coastal habitat character of Indonesia, such as roots tolerant to the wet condition, bad drainage, moderate dense of foliages and the pattern of branch resisting to the speed wind blows. The examples of these species include among others *Terminalia kattapa*, Acacia. Meanwhile, the species for interior landscape parks should have specific character of high soils moisture, fine texture soils, many branches, and broad dense foliages. The examples species are trees of *Salam*, *Tanjung*, *Angsana*, etc. Hence, parks in southern part of Jakarta should enrich with various trees species rather than shrubs or groundcovers including grasses.
3. In order to appear 'urban green image,' government should make serious more the greening of hazard zones by fruity trees. The trees must have character of many horizontal and strong branches such as *Achras zapota* L. (Sapodilla), *Chrysophyllum cainito*, L. (Star apple, *Sawo hijau*), etc.
4. Local government should concentrate more on effort of retaking areas in hazard zones by green space such as riverbanks and under electrical power lines that have been occupied by illegal housings and slums (around 1,970 Ha).
5. To build people awareness of illegal that lives in hazard zones and their implication, campaign of green space through the religious approach, called *da'wah* of environment, may sound possible.
6. All components of society should encourage people to plant the trees – particularly fruity trees – at the rest space of their house's compound through 'the government's greening program.' Furthermore, government should disseminate the slogan of '*secuil tanah untuk pohonan*' ('petite land for trees').
7. All new local legislations of related environment must support the efforts of the enlargement of water infiltration capacity in urban and its hinterland.
8. In connection with enlargement of permeable land surfaces, the policy of housing expansion should be in vertical development rather than horizontal one, such as apartment, town house, and low cost flat, whose proportions of buildings coverage are not more than 60% of their lots.
9. Government could continue for planting of roadside trees with woody trees that have character of drought tolerant, fast growing, buds, and vertical branching such as, *Pterocarpus indicus*, Wild. (Red wood, *Angsana*), *Syzygium polyanthum* (Wight) Walp. (*Salam*), and *Millettia xylocarpa*, Miq. (*Merambu*). These last two species are potential to attract communal birds.
10. Professional landscaper, urban designer, and landscape officer must keep away from planting of roadside trees with fruity trees in order to avoid some traffic accidents caused by the frequent crossing of the people lured by the fruits produced by them. Hence, parking areas at office buildings and malls should be planted with fruity trees instead of roadside fruity trees. Choose species that produce small fruits such as *Manilkara kauki*, (*Sawo manila/Sawo kecil*), *Gnetum gnemon*, (*Melinjo/Tangkil*).

Bibliography

- Ahmad Bakadar, Abubakar (1997). Islamic principles for the conservation of the natural environment. In A.R. Agwan (Ed.). *Islam and the environment* (pp. 71-107). Kuala Lumpur: Synergy Book International.
- Al Buruswi, Ismail Haqqi. (1998). Tafsir ruhul bayaan In MD. Dahlan, Anwar Yuro, & Zaka al-Farisi (Eds. and Trans.). *Tafsir ruhul bayan*. (Vol. 13). Bandung: CV Diponegoro. (Original work published unknown).
- Al Hadits Muslim. Sahih Muslim. *Kitab al musaqah*. Hadith no 2900 and 2904.
- Al Hilali, Muhammad Taqiuddin, & Khan, Muhammad Muhsin. (1993). *The noble Qur'an, in the English language, interpretation of the meaning*. Saudi Arabia: Maktaba Darus Salam.
- Al Himsh, Muhammad Hassan. (1984). *Quran karim. Tafsir wa bayan ma'a asbabin nuzul lis Suyuthi ma'a Faharis Kamilah lil Mawadhi' wal Alfazh* Beirut: Dar ar Rasyid.
- Amstrong, Helen, Brown, Helen, & Turner, Tom. (2000). In John F. Benson, & Maggie H. Roe (Eds.). *Landscape and sustainability* (pp. 157-178). London: Spon Press.
- Christoff, Peter, & Low, Nicholas (2000). Recent Australian urban policy and the environment, green or mean? In Nicholas Low, Brendan Gleeson, Ingerman Elander, and Rolf Lidskog (Ed). *Consuming cities* London: Routledge.
- Davis, Mackenzie L., & Cornwell, David A. (1998). *Introduction to environmental engineering* (3rd edn.). Boston: WCB McGraw-Hill.
- Fazal, Shahab. (2000). Urban expansion and loss of agriculture land – a GIS based study of Saharanpur City, India. *Environment & Urbanization, Vol. 12* No. 2, pp. 133-149.
- Golany, S. Gideon. (1995). *Ethics and urban design, culture, form, and environment*. New York: John Wiley & Son Inc.
- Honachefsky, William B. (1991). *Land planner's environmental handbook*. New Jersey: Noyes Publications.
- Jellinek, Lea. (2000). Jakarta, Indonesia: kampong culture or consumer culture. In Nicholas Low, Brendan Gleeson, Ingermar Elander, & Rolf Lidskog (Eds.). *Consuming cities* (pp. 265-280). London: Routledge.
- Koeswadi, Muhammad. (2003). *Perlunya penyelamatan ruang terbuka hijau* [The need for saving of green space]. *Buletin BKTRN*, 1 and 5.
- Kondoh, A., & Nishiyama, J. (2000). Changes in hydrological cycle due to urbanization in the suburb of Tokyo metropolitan area, Japan. *Adv. Space Res. Vol.26* No. 7, pp. 1173-1176.
- Lawrence, Henry W. (1995). Changing forms and persistent values: Historical perspectives on the urban forest. In Gordon A. Bradley. *Urban forest landscapes. Integrating multidisciplinary perspectives* (pp. 17-40). Seattle: University of Washington Press.

- Moll, Gery. (1995). Urban forestry: A nation initiative. In Gordon A. Bradley. *Urban forest landscapes. Integrating multidisciplinary perspectives* (pp. 12-16). Seattle: University of Washington Press.
- Moughtin, Cliff. (1997). *Urban design: Green dimensions*. Oxford: Architectural Press.
- Payne, Karen. (2002). Graph theory and open space network design. *Landscape Research, Vol.27*, No. 2. 167-179.
- Woudstra, Jan, & Fieldhouse, Ken. (Eds.) (2000). *The Regeneration of Public Park*. London: E & FN Spon.
- Zalewski, Maciej. (2002). Ecohydrology – the use of ecological and hydrological processes for sustainable management of water resources. *Hydrological Sciences-Journal-des Sciences Hydrologiques, 47* (5), 823-832.