Challenges of Urban Forest Development in Makassar City Indonesia

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Abstract: Urban forests have numerous environmental, economic and social benefits, contributing enormously to the health and welfare of everyone who lives and works in urban areas. Realizing these functions, the Indonesian government require that each city should have at least 10% of its green open space made up of urban forest. In 2008, the Makassar City Government designated 10 areas for urban forest, however, none has been developed. The first part of the paper examines the urban forest regulations by using document analysis. The second part analysed the biophysical conditions of designated urban forest areas in Makassar city through field observation. The study reveals that there are numerous laws related to urban forest giving rise to confusion and overlapping of powers. Field study indicates that not all areas are suitable for urban forest. Finally, the paper raises challenges in developing the urban forests.

Keywords: urban forest, Makassar city, urban forest regulation, biophysical condition.

1. Introduction

Urban forests and trees are defined as living organisms that are located in urban areas [13,6]. It includes the trees on public and private land that is not used [10]. Although most people would regard urban forest as street trees and ornamental woody plants, it is actually a complex system of trees and smaller plants, wildlife, associated organisms, soil, water and air quality in and around a city [12]. Urban forests as part of urban green space have important benefits for urban areas. In the early 19th century urban forest was very much used for recreational purpose especially among the mid-European bourgeoisie. By the first half of the 20th century, as the living conditions of the working class improved, more people recognised the need for outdoor recreational activity. Most cities in Europe began to provide green space both for recreational and aesthetic benefits. The heightened awareness of climate change has cities developed an integrated urban forest due to its benefits, such as the control of air and noise pollution, and microclimatic modification. Urban forest thus has a fundamental role in maintaining environmental balance of the city as well as safeguarding biodiversity. Urban forest if well managed will provide a number of advantages for the city as a more pleasant, healthier and provide a comfortable environment for working and activities [2]. Thus the presence of the urban forest is needed to support sustainable urban development.

Urban forestry is not a new concept, but it is one which appears to have growing potential. For developing countries this is highly relevant as urbanization is occurring at a rapid rate and the number of urban dwellers increased manifold. By 2025, the proportion of urban population is predicted to be 61%. Uncontrolled urbanization in many developing countries already resulted in social and environmental consequences. The contribution of urban trees may seems at first thought to be insignificant, however urban forestry may provide Third World town and city dwellers with significant environmental and material benefits.

However, the construction and development of urban forests is not easy especially for those cities which do not retain their primary forest. Some of the problems frequently encountered are the high cost of land, land ownership diversity, social and environmental pressures, and spread of financing sources and other resources in the planting and maintenance of urban forests [3]. In cities of developing countries, one of the crucial issues is the availability of land. Indonesia for example is a country faced with tremendous development pressure. It is the fourth most populous nation in the world with 242 million people with the median age of 28. With marked increase of educational attainment, the country requires appropriate facilities to accommodate the people. The provision of green space in several major cities is inadequate with less than 10% in the city of Jakarta, 8% in Medan, 9% in Bandung and 10% in Makassar [4]. Although the government regulations stipulate that each city should have at least 30% green open space with 10% of it as urban forest, most cities in Indonesia have yet to fulfil this requirement. Against this background, this paper examines some of the
challenges in developing urban forests in Makassar City, Indonesia. In 2008, the Mayor of Makassar City declared that ten urban forest will be developed in various sites in the city. However, until now, none of the urban forest is in existence. This paper therefore reviews the situation in Makassar city in two main aspects. Firstly, the complexity due to legal requirements in terms of urban forest provision and secondly, the condition of the designated sites.

2. Background of the Study Area

Makassar as the capital city of South Sulawesi also serves as education, industry, services, and trade centre of eastern Indonesia. In 1990, the population was 0.94 million and by 2013, it has reached 1.4 million, i.e. an increase of 15% in 13 years. With an area of 175.77 km², the population density is 7792 people per km² [8]. Makassar experienced rapid urbanisation in the last two decades and is now the fifth largest city in Indonesia. Besides natural growth, population increase is also driven by rural-urban migration due to rapid growth and high urbanisation rate of the city. The last 5 years witnessed an average economic growth of 9% per annum which is much higher than the national growth of 6-6.5%. Makassar city also experiences rapid land use change. Between 1990-2000, as much as 24% of the total agriculture land and 16% of the paddy cultivation area has been converted to other uses namely housing and commercial. Another consequence of urbanisation is the increase number of motor vehicle. In 2012, the number of cars is 1.7 million, i.e. a growth rate of 12% per annum. Inadequate infrastructure in terms of road network and poor public transportation system are the main cause of frequent traffic jam in the city. In addition, Makassar city which is in the tropics has a peak temperature of 33 °C during the day. A reduction of 2°-4°C can be achieved by having parks and street trees in the urban environment [15] while at some sites in extreme climatic conditions the cooling effect may reach up to 5-8°C [9]. The vegetation cooling effect is particularly important in hot climates due to its impact on heat stress reduction. Although there are several open green spaces in Makassar city, most are grass areas and have very little dense wooded areas. Thus, the presence of urban forest in the city will significantly contribute in absorbing and storing carbon, improve air quality, improve water management, as well as many other benefits [2,10].

3. Methods

This research was undertaken using two different methods. Document analysis was done to examine the legal and institutional context of urban forest program. Relevant legal and policy documents issued by the central, provincial and local governments regarding spatial and land use planning; land or forest administration were reviewed. The review include both the legal provisions and policy context particularly on responsible authorities, planning, development and maintenance of urban forest. The other aspect of the paper i.e. the biophysical condition of designated urban forest areas was examined using field observations and spatial analysis using ArcGIS 10.1. Evaluation is based on biophysical extent and location of urban forest stated by the authorities. Observations on vegetation and canopy coverage were made by projecting wide canopy cover of 0.1 hectare.

4. Results and Discussions

4.1. Legal Aspect

Not all countries in the world have laws on a specific subject of urban forest. For most countries, the legal structures that contribute to urban forest governance form three distinct areas namely law, policy and planning which eventually present a wide array of regulations on urban forest and its governance [7]. Indonesia has a similar albeit complex legal structure pertaining to urban forest. Article 33 paragraph (3) of the Constitution of Indonesia 1945 gives the government the right to the nation, water, space and natural resources contained therein for the prosperity of the people. The right is further explained in the Act No.5 of 1960 the Basic Provisions concerning the Fundamentals of Agrarian Affairs which confers the authority to:
a. regulate and administer the allocation, use, supply, and maintenance of the earth, water, and airspace;
b. determine and regulate legal relationships between people and the earth, water, and airspace;
c. determine and regulate legal relationships among people as well as legal acts concerning the earth, water, and airspace.

The authority to implement the State’s right of control can be delegated, as required, and provided that it is not contrary to the national interest, to Autonomous Regions and to native law by way of a Government Regulation. The Act therefore allows the regional government to prepare a general plan concerning the supply, allocation, and use of the earth, water, and airspace as well as the natural resources for their area.

The set of laws and regulations pertaining to urban forest can be categorised into two. Firstly, laws directly related to urban forest i.e. (1) Law No.41/1999 on forestry; and (2) Government Regulation No. 63/ 2002 on Urban Forest. Secondly, laws which are indirectly related to urban forest i.e. Law No. 26 of 2007 regarding Spatial Planning; and (2) Government Regulation No. 63/ 2002 on Urban Forest. The laws and regulations are briefly examined below.

1. Law No. 41/ 1999 on Forestry

This is the legislation governing the national forests and forestry in Indonesia and the main law for the management of forest resources. The law stipulates that for the purpose of maintaining the microclimate, aesthetic and water infiltration, every city should designate a specific area as an urban forest. However, the law did not make it mandatory for urban government to develop the urban forest. The law was amended to make it mandatory to plan as well as implement the urban forest program.

Provisions on developing the urban forest are detailed out in the Government Regulation.

2. Government Regulation No. 63/ 2002 on Urban Forest

The regulation is made up of 8 chapters i.e. (1) general provisions relating to urban forest, (2) maintenance of urban forest, (3) construction and supervision, (4) community participation, (5) finance, (6) sanctions, (7) transitional provisions and (8) closing. The regulation defines an urban forest as an expanse of land having compact and dense trees in urban areas designated by the authority. The process of developing an urban forest includes the designation, development, determination and management by the city mayors based on the Urban Spatial Plan. Private land designated as urban forest is given compensation in accordance with the relevant laws and regulations. Location of urban forests can be based on total urban area, population, level of pollution and the physical condition of the city. The minimum size of urban forest is 0.25 hectares or at least 10% of the total urban area or adapted to local conditions.

3. Law No. 26 of 2007 regarding Spatial Planning

The law stipulates explicitly the authority of provincial governments and of district governments in spatial planning without the intervention of the central government. The law introduced the principle of accountability to reflect the need for more transparent and accountable system of government. It also stipulates the minimum standard of services in spatial planning in response to the dissatisfaction of the people over the poor quality of services from the government during the New Order Regime. One of the important provisions of the Spatial Planning Law 26/2007 is the requirement of at least 30% of urban areas for open spaces. The open spaces can be public and private open spaces. More specifically, public open spaces account for at least 20% of urban areas while forest areas must be at least 30% of river stream areas. To enhance the development control, the authority is empowered to utilise zoning, planning permits, implementation of incentive and disincentive and imposing sanctions including administration and criminal sanction. The law also emphasised the importance of public participation by providing detailed regulations on the rights, obligations and the forms of public participation in spatial planning.

4. Minister Regulation No. 1/ 2007 on Spatial Planning – Green Open Space

This regulation provides for the implementation of Government Regulation No.47/1997 on National Spatial Plan specifically on urban green space. The regulation gives a wide definition of green open spaces, ranging from road buffer to natural open space. Thus it includes among others city parks, botanical gardens, residential/commercial/office open space, sports fields, cemeteries, agriculture areas and urban forest. The plan for urban green space covers its planning, utilization and maintenance and is supposed to be part of the city spatial plan. The plan for the development of urban green space will be further fleshed out in the Long Term Development Plan, Medium Term Development Plan and Local Government Work Plan.

From the various regulations outlined above, it is clear that developing an urban forests needs to be preceded by consensus between the city
government and the people. To date no regulation on urban forest designation is formulated.

In accordance with these regulations, in 2008, the city government designated several locations as Makassar urban forest, namely by Mayors no. 552.4 / 753 / Kep / X / 2008, no. 522.4 / 807 / Kep / XI / 2008 and no. 661/664 / Kep / III / 2011. Such designation is however not in conformity with the law since Makassar City have yet to formulate a local regulation on urban forest. This indicates that the city of Makassar is lagging behind other smaller cities in Indonesia such as Bontang in East Kalimantan, the city of Surabaya in East Java, as well as the city of Palembang in Sumatra, which have their own local regulations on urban forest.

The current situation of decentralized Indonesia, have resulted in complex legal hierarchy of providing control over urban forest. The above discussion demonstrate that policies formulated as presidential regulations and/or decrees have less weight than laws or government regulations. As part of exercising their decentralized authority regulated by law, provincial and local governments may issue different policies that can contradict those issued by the president. The increase in the level of authority of local governments should provide strong leverage to improve land use and natural resource governance. For example, not all local government consider urban forest as highly critical compared to other urban services, thus no local regulations need to be formulated. This is a dismal situation since more developing countries for example China and Malaysia have started to have strict laws on trees conservation, environmental management and forestry sectors [1]. The local governments actually need to follow a complex process to gazette an area as a protected or cultivated area as part of their spatial plans.

4.2. Biophysical Conditions of Designated Urban Forest

The location designated as urban forests are presented in Table 1. These urban forest vary in size, the largest is the UNhas campus area, while the smallest is Darul Arqam. However, Darul Arqam does not meet the criteria of urban forests as defined in the Government Regulation which should be at least 0.25 ha.

The current biophysical condition of the designated areas also varies. In terms of canopy coverage, only UNHAS more than 80% canopy coverage which is categorised as good. Five other locations namely UNM, UMI, Metro Street, GOR and KNPI are considered moderate as their canopy coverage range from 50 to 80%). The remaining locations namely Darul Arqam, Awwalul Islam and Jeneberang River banks have vegetation with poor canopy coverage i.e. less than 50% and these are categorised as poor. Another feature which is also examined is accessibility. Areas which can be accessed easily either by walking or by using both public or private vehicle are considered good. All designated areas located in the three campuses are categorised as having good accessibility as they are located near the main road. Both Cadikka and Jeneberang River banks have poor accessibility as they can only be reached using private vehicles and located far from the main road. The rest of the designated areas are categorised as moderate because they can only be reached by private vehicles although they are located near the service road.

In terms of tree species, UNHAS has up to 102 species which is considered good because of the wide variety [14]. There are mature trees from Samanea saman types that have been planted in the late 1980s when the campus opened. Endemic species such as Dyospiros celebica Sulawesi and Tectona grandis which are well known for timber can also be found. This area therefore has the potential to be developed as an arboretum due to its canopy as well as a wide diversity of tree species. As UNHAS is easily accessible, it attracts a lot of people who go there for mainly for recreational activities.

At present both UNM and KNPI have mature trees which may remain stagnant if there is no further planting. Metro street and GOR have trees that are still in the process of growth. This means that although the canopy for Metro street and GOR are currently categorized as moderate, it will improve when the trees mature. Jeneberang and Cadikka have some pretty big trees trees but are not well maintained. Cadikka is problematic due to poor quality soil. The soil is relatively thin and rocky and it is not good enough to support plant growth.

Our analysis conclude that the variation of biophysical conditions of these location are influenced by various factors, including ownership, current use and management. The ownership of land, which has been designated urban forest can be categorized into three groups; 1) urban forest land management authority under the city government, 2) urban forest land management authority under the city government other than the government (eg, provincial government, or university under the ministry of education research, technology, and higher education), as well as, 3) urban forest land management authority under the control of non-governmental institutions. From ten locations that have been designated urban forest, the urban forest quality is quite varied, especially in terms of vegetation coverage conditions. Which is quite
surprising is the fact that the urban forest is classified as not good in conditions is under the direct authority of the city government. This indicates that the city authorities themselves had apparently not serious enough to develop this urban forest.

Table 1. Makassar Designated Urban Forest and their Attributes

<table>
<thead>
<tr>
<th>Designated areas</th>
<th>Area (ha.)</th>
<th>Ownership</th>
<th>Canopy Coverage</th>
<th>Tree Species</th>
<th>Accessibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universitas Hasanuddin (UNHAS)</td>
<td>20</td>
<td>Ministry of Education</td>
<td>More than 80%</td>
<td>More than 120 species</td>
<td>Good</td>
</tr>
<tr>
<td>Caddika</td>
<td>5.6</td>
<td>City Government</td>
<td>Less than 50%</td>
<td>Samanea saman</td>
<td>Poor</td>
</tr>
<tr>
<td>Youth Committee Building (KNPI)</td>
<td>5</td>
<td>Provincial Government</td>
<td>50-80%</td>
<td>Samanea saman</td>
<td>Moderate</td>
</tr>
<tr>
<td>Sport Building (GOR)</td>
<td>2</td>
<td>Provincial Government</td>
<td>50-80%</td>
<td>Samanea saman</td>
<td>Moderate</td>
</tr>
<tr>
<td>Universitas Muslim Indonesia (UMI)</td>
<td>2</td>
<td>Private</td>
<td>50-80%</td>
<td>Samanea saman</td>
<td>Good</td>
</tr>
<tr>
<td>Jeneberang River Bank</td>
<td>1.8</td>
<td>City Government</td>
<td>Less than 50%</td>
<td>Samanea saman</td>
<td>Poor</td>
</tr>
<tr>
<td>Awwalul Islam</td>
<td>1.5</td>
<td>Private</td>
<td>Less than 50%</td>
<td>Samanea saman, Palm sp</td>
<td>Moderate</td>
</tr>
<tr>
<td>Metro Street</td>
<td>1</td>
<td>City Government</td>
<td>50-80%</td>
<td>Samanea saman</td>
<td>Moderate</td>
</tr>
<tr>
<td>Universitas Negeri Makassar (UNM)</td>
<td>1</td>
<td>Ministry of Education</td>
<td>50-80%</td>
<td>Samanea saman</td>
<td>Good</td>
</tr>
<tr>
<td>Darul Arqam</td>
<td>0.2</td>
<td>Private</td>
<td>Less than 50%</td>
<td>Acacia mangium</td>
<td>Moderate</td>
</tr>
<tr>
<td>Total Area</td>
<td>40.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.3 Challenges of Developing Urban Forest

This paper examines the legal aspects in carrying out urban forest program as well as the biophysical conditions of designated urban forest location in Makassar city. Our analysis raise the following issues:

a) Regulation of urban forests

The Indonesian government regulations stipulates that the implementation of urban forest must be provided by the local regulations. The government regulation was introduced 16 years ago when Makassar was just a city with below 1 million population. However Makassar is now categorized as a metropolitan city with a population of more than 1.5 million. To date, no regulations on urban forest of Makassar city has been formulated and tremendous development pressure means that land availability for urban forest is sorely limited. In addition, the designation of urban forest was made without any form of consensus with the people, but rather an initiative of the city government.

b) Status of Designated Urban Forest

The designation of urban forests was carried out not in exact conformity with the law. With such status, the urban forest program is not guaranteed.

The land can be converted at any time. Moreover, there are no real steps taken by any parties either the government or the private sector to build these urban forest. The slow development of the urban forest in Makassar is apparently also affected by the lack of pressure from the public to encourage city governments to expand forest areas in the city. This means that public awareness related to the needs of the urban forest is still very low.

c) Size and Quality of Designated Urban Forest

The total area that has been designated as urban forests is 40.1 hectare or 0.22% of the total city area. This area is much smaller than the requirement of the Government Regulation which is 10% of the total city area. Strategies to increase the area of land controlled by the city government seems difficult given the high price of land. The current condition of the designated urban forests also have varying qualities. Several locations may not be categorized as urban forests due to lack of vegetation. A more systematic design, construction and maintenance are required for these areas. It also calls for periodic evaluation to monitor the development of the urban forest as a whole.

d) Planning and Management of Urban Forest

At present, there is no specific authority responsible for urban forest management. The
current green open spaces (including the urban forest) are managed in accordance with the functions attached to them. Most green open spaces are managed by the Department of Park and Cleanliness. Thus planning and management has not been done in a comprehensive manner. On the other hand, the urban forest is not seen as an object to be managed intensively, thus some urban forests are almost without management. Well-managed urban forest e.g. UNHAS is managed by the university itself.

5. Conclusion

This paper sets out to review the legal issues in developing an urban forest in Indonesia. Apart from the numerous regulations which create confusion and cause overlapping of control, the main challenge to urban forest development is to increase awareness and understanding about the value and benefits of urban forests, the proper care of urban forests, and the need for urban forests to be considered as an essential infrastructure when planning and managing communities. Without this awareness and understanding there will be lack of support for implementation and funding of urban forestry programs. Management challenges include maintaining tree and planting site inventories, quantifying and maximizing the benefits of trees, minimizing costs, obtaining and maintaining public support and funding, and establishing laws and policies for trees on public and on private land. The study has shown that although Makassar city government has designated the urban forest areas, it faces a much more difficult challenge in developing those areas into urban forests. Underlying the above challenges is the challenge of integrating information from many different perspectives and coordinating the roles, responsibilities, policies and projects of city departments, utility agencies, and partners for planning and managing the urban forest.

6. References

[8] Makassar in Figure. Makassar dalam Angka, 2012 (BI).