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BARRIERS TO INTEGRATING CLIMATE CHANGE ADAPTATION INTO URBAN DEVELOPMENT IN INDONESIA

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Abstract

Rapid urbanization as a process of urban development creates an opportunity for the municipalities to boost their economic status. However, there is an increased attention of the risks resulting from climate change. The cities become a hotspot of vulnerability. Integrating climate change adaptation into urban development becomes important as a key policy response to climate change in the context of developing countries. The purpose of this study is to explore barriers to integrating climate change adaptation into urban development in Indonesia. Desk study and semi-structure questionnaire with selected key informants are conducted. The Weight Average Index is used to quantify the degree of barriers. The results reveal that overall barriers are categorized as a high score. The barriers are mainly related to knowledge and information concerns. However, social and behavioral barriers are also significance. Strategies to overcome the identified barriers are recommended, most importantly the need for building the capacity of all stakeholders, increasing a better understanding and awareness of municipality authorities, an and getting acceptance and participation from the public. This study can be useful for

planning and implementation of policy measure in climate change adaptation and urban development.

Keywords

Barriers, Climate Adaptation, Indonesia, Integration, Urban development

1. Introduction

Indonesia, the fourth most populated country in the world, has been experiencing rapid urbanization in the last few decades. A country with a population more 250 million and population growth of 1.35 percent in 2014 has 52 percent living in urban areas (BPS, 2015). The Central Statistics Agency of Indonesia (BPS) estimates that 60 percent of total population of Indonesia will live in urban areas by 2025, compared to 49.8 percent in 2010. Rapid urbanization creates an opportunity for the municipalities to support economy growth. Large metropolitan areas become saturated, and the urban people's demand will increase significantly in medium and small cities. Linking these cities will be important to attracting the investors and attaining shared prosperity. Lewis, 2014 gives empirical a result on urbanization and economic growth in Indonesia. Urbanization can support urban growth and poverty in Indonesia only if adequate infrastructure is available.

In addition, since the regional autonomy and fiscal decentralization reform process, launched under the Law No. 32 of 2004 on Local Government, and the Law No. 33 of 2004 on the Financial Balance between the Central and Local Governments, Government of Indonesia offers a shift from central to local government and creates a greater role of the local governments, including the municipalities, in several main functions and responsibilities. This brings the opportunity for municipality authorities to develop and to improve their economic status. Burnell et al., 2013 studies on the success stories of municipalities in Indonesia in the context of urban development in decentralized Indonesia. It is expected that urban growth in Indonesia will be increasing in coming years due to rapid urbanization, infrastructure development and decentralization system.

However, beside urban growth, there is an increased attention of a challenging issue that could threaten Indonesia's prosperity, which is the risks resulting from climate change. The cities become a hotspot of vulnerability due to high concentration of population, resources,

infrastructures, and economic activity. The risks often affect the efficiency of urban development resources and performance. Considering of this, integrating climate change adaptation (CCA) into urban development becomes important as a key policy response to climate change in the context of developing countries. OECD, 2009 states that CCA becomes a significant development issue. Climate change is not just an environmental issue but also affects the economic and social dimensions of sustainable development. In the synthesis report of the fifth assessment report of the Intergovernmental Panel on Climate Change (IPCC), integration of adaptation into planning and decision-making can create synergies with sustainable development (IPCC, 2014). An integrated response to urbanization provides substantial opportunities for enhanced resilience, and more sustainable development.

The purpose of this study is to explore barriers to integration of CCA into urban development in Indonesia. The output of this study will be useful for urban planners, policy or decision makers as well as the communities with the highlight of integrating CCA into urban development approaches. This paper contributes to the emerging subject of climate adaptation integration by identifying and measuring barriers towards integrating CCA into urban development in Indonesia, and proposing strategies to overcome these barriers. The specific research questions addressed by this study are: (a) what are the barriers to integrating adaptation into urban development? And (b) how can these barriers be overcome?

The paper first presents the concept of integration and adaptation, and the relationship between CCA and urban development (Section 2). In addition, it provides a brief overview of the situation of climate change situation in Indonesia, and Indonesian policy on climate change adaptation. Section 3 describes the research framework and methods, while Section 4 presents and discusses the research findings. Conclusion and recommendation are reported in Section 5.

2. Theoretical Framework

This section provides the concept of integration and adaptation, and the challenges and opportunity of selected case of integrated CCA into urban development. Besides that, the relationship between CCA and urban development is described, including a brief overview of climate change situation and the policy on CCA in Indonesia.

2.1 Concept of Integration and Adaptation

In recent years, climate change policy has generally become a multi-aspects field, appealing for shared responsibilities among different policy domains and raising issues about policy coordination and integration. A discourse on “mainstreaming CCA into development” has emerged. Mainstreaming CCA requires the thorough assessment and implementation of CCA measures in the context of general development policy, planning, and implementation objectives. Although this is becoming an increasingly important concept in the development world, it is still lacking generally applicable theoretical and practical underpinning (Persson & Klein, 2009). Although there is no consensus on a definition of adaptation mainstreaming, the term is often used interchangeably with “integration”. Adaptation seems to be more open to integrating, as compared to mitigation, because the kind of action required differs from adopting self-standing measures. The most common definitions of mainstreaming and/or integrating stress the following features:

- The overall goal, ranging from ensuring “the long-term sustainability of investments” as well as reducing “the sensitivity of development activities to both today’s and tomorrow’s climate” (Klein, 2002; Huq et al., 2003; Agrawala, 2005) to a wider aim as contributing “to human well-being, pro-poor economic growth, and achievement of the MDGs” (UNDP, 2011);
- The very definition of adaptation, from the only reduction of potential development risks to including “take advantage of opportunities” (OECD, 2009, p. 60).

Several definitions regarding adaptation have been perceived by scholars. Burton et al., 2002 considered an adaptation to be the ability of social and environmental systems to adjust to change in order to cope with the consequences of change. Similarly, Smit et al., 2000 suggested an adaptation to be adjustments made in ecological-social-economic systems in response to actual or expected climatic stimuli, their effects or impacts. Based on those definitions, CCA may be defined as the adjustment of a system to moderate the impacts of climate change, to take advantages of new opportunities or to cope with the consequences (Adger et al., 2003). This term refers to changes in processes, practices, or structures to moderate or offset potential damages or to take advantage of opportunities associated with changes in climate. It involves adjustments to reduce the vulnerability of communities, regions, or activities to climatic change and variability.

The efforts to integrate adaptation into development processes at the regional, national,

sectoral and project levels should ideally create a set of conditions, plans and incentives that allow sub-national actors to understand the changing risks they face and take actions to reduce their vulnerability to these risks (top-down). At the same time, however, many of these conditions, plans and incentives should be devised with participation and inputs from sub-national actors themselves, in order to ensure their uptake, sustainability, inclusiveness and overall success (bottom-up). Lessons and experiences with adaptation at the local level must feed into higher levels of decision making to make sure that local strategies remain relevant and appropriate, and provide a basis for transferring knowledge to other sectors and communities. The specific cases in several countries for opportunity and challenge on integrating CCA into urban development that can be investigated are showed in Table 1.

Table 1: *The selected cases of integrated CCA into urban development*

Activity	Opportunity and Challenge
Integrating Climate Change Adaptation into Land Use Planning and Sectoral Management in Cartagena Municipality (http://cdkn.org)	Planning for adaptation requires a close collaboration between scientists researching the impact of climate change, sector professionals, decision makers and political analysts.
Integrating climate change into long-term strategic city development planning: the case of Cape Town (http://weadapt.org)	<ul style="list-style-type: none"> • The complex, systemic, multi-scalar nature of climate change makes it difficult to think and talk about. • People have different entry points into the problem, use different language to describe it, and propose a wide array of solutions/interventions that are difficult to compare and weigh up. • The short-term pressures of political appointment mean that the city leadership is heavily focused on the near-term delivery of public goods and services as quickly and cost-effectively as possible. • From both a planning and management perspective the

	<p>challenge is how to develop a suite of programs and projects that fit the functional units, timeframes and operational capabilities of the city.</p> <ul style="list-style-type: none"> • The fiscal constraints that local governments in South Africa work under limit the public investment that can go into implementing the strategies. • This requires new forms of partnerships and financing mechanisms that are agile and efficient while being transparent and accountable.
<p>Integrating climate risk management into the District Development Planning System in Malawi (www.orbit.dtu.uk)</p>	<ul style="list-style-type: none"> • Limited coordination and reporting of activities on climate change adaptation. • Lack of financial resources and technical capacity at national, district, area and village level to address climate change adaptation challenges. • Lack of training on climate change adaptation. • Linkages and coordination with other partners, including between climate change adaptation partners, not in place. • Lack of coherent national policies on climate change adaptation.
<p>Integrating climate risk management in urban development plans in Senegal (www.orbit.dtu.uk)</p>	<p>Throughout the implementation of the project, consultations with stakeholders have taken place to ensure that the needs and opinions of key stakeholders were taken into Consideration.</p>

Source: compiled by the author from several literatures.

From the example cases above, it can be highlighted some opportunities and challenges regarding to integration of climate change adaptation to urban development such as the need collaboration and coordination among stakeholders, people understanding, and the financial constraints. These typical challenges will also be found in this study and will be input of this study to investigate barriers for integration.

2.2 CCA and Urban Development

To understand on the integration of CCA measure in urban development, it needs to overview the relationship between the impacts of climate change and the process of urban development. For example, urban areas always result some risk of flooding when heavy rainfall occurs. Buildings, roads, infrastructure and other paved areas prevent rainfall from infiltrating into the soil and so produce more runoff. In a well-governed city, this becomes rarely a problem because of its good provision for storm and surface drainage into the urban fabric, with complementary measures to protect against flooding. There is also scope of land use management and incremental adjustments to increase flood water management capacity. But poorly-governed cities, this does not happen. Most residential areas have no good drainage system installed and it is common for buildings or infrastructure to be constructed that actually blocks these drainage channels. Shortly, urban areas have many linkages with climate change (see Figure 1).

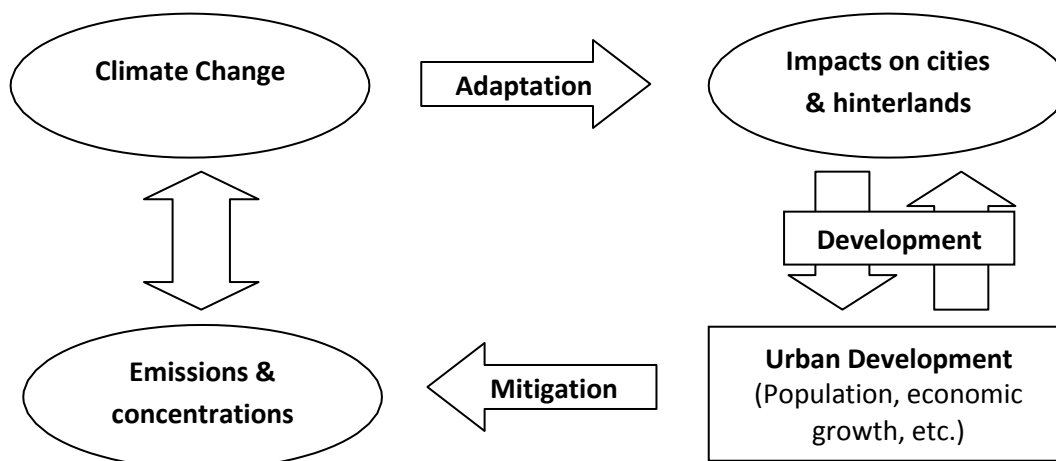


Figure 1: Relationship between urban development and climate change (Source: Adapted from IPCC, 2001)

While some cities are shrinking, many urban centers are seeing rapid and largely uncontrolled population growth, creating a pattern of rapid urbanization. Most of this growth is now taking place in developing countries and is concentrated in informal settlements and slum areas. Therefore, the very urban areas that are growing fastest are also those that are least equipped to deal with the threat of climate change, as well as other environmental and socio-

economic challenges. These areas often have profound deficits in governance, infrastructure, and economic and social equity.

- Climate change in Indonesia

Indonesia is one of the countries that are most vulnerable to climate change impacts. Some evidences of the impacts are occurred, such as the increase of surface air temperature, precipitation change, sea surface temperature rise, sea level rise, and extreme climatic events. According to ICCSR, 2010, the surface air temperature data collected over a period of 100 years from a limited number of stations revealed that the temperature increased around 0.5 degree Celsius during the twentieth century. The projected average temperature increase is 0.8 to 1.0 degree Celsius for the period of 2020 to 2050, relative to the baseline period of 1961 to 1990. The trend in rainfall pattern in general, may be different not only seasonal but also monthly. The average sea surface temperature in sea waters is projected to increase by as much as 0.65, 1.10, 1.70, and 2.15 degree Celsius in 2030, 2050, 2080, and 2100 sequentially. An average SLR of 0.6 to 0.8 centimeter per year has been estimated from the output of GCM models (ICCSR, 2010).

- National climate change adaptation policies and plans in Indonesia

The Government of Indonesia (GOI) has made efforts related to adaptation to climate change impacts, including developing policy guidance to address climate change. Based on Wijaya, 2015, several national policy guidance documents addressing the impacts of climate change have been formulated by related institutions. The GOI has given special attention to environmental management since the early 1980s. In 2004, Indonesia ratified the Kyoto Protocol to Law No. 17 of 2004. Since the early 2000s, the GOI has already carried out several actions which cover mitigation and adaptation efforts, including the Establishment of National Commission on Clean Development Mechanism under the Ministry of Environment (MoE) in 2005, laws and regulations on energy, forest pollution control, and integrated coastal management. In 2007, Indonesia hosted the United Nations Framework Convention on Climate Change Conferences of the Parties-13 (UNFCCC COP-13) in Bali. The GOI recognizes that tackling climate change mitigation and adaptation actions should be taken in a systematic and integrated manner.

The Law No. 32 of 2009 on environmental protection and management also stipulated the need for strategic environmental assessment on the issue of climate change. Some policy initiatives on mitigation and adaptation were undertaken by related ministries, including: (1) National Action Plan on Climate Change (RAN-PI) was prepared by the Moe in November 2007; (2) National Development Plan: Indonesia Responses to Climate Change was prepared by the National Development Planning Board (BAPPENAS) in December 2007 and was revised in July 2008; (3) Indonesia Climate Change Sectoral Roadmap (ICCSR) was published by BAPPENAS in March 2010 (ICCSR, 2010); and (4) National Action Plan for Climate Change Adaptation (RAN-API) in 2012 (RAN-API, 2012).

Beside the above plans and policies, the initiatives supported by international agencies give the influence to the local adaptation measures in Indonesia, such as: (1) the Asian Cities Climate Change Resilience Network (ACCCRN) funded by Rockefeller Foundation which has been adopted since 2009; (2) the Stakeholder Coordination, Advocacy, Linkages, and Engagement for Resilience Program (the SCALE-Resilience) funded by United States Agency for International Development (USAID); (3) Japan International Cooperation Agency (JICA) - Climate Change Capacity Development; and (4) the *Deutsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) - Policy Advice for Environment and Climate Change (PAKLIM). This indicates that mostly adaptation and mitigation programs in Indonesia are still persuaded by international agencies. On the one hand, the local authority could get a benefit and a lesson learned from these programs; on the other hand, the sustainability of programs becomes a crucial problem (Wijaya, 2015).

3. Methodology

The identification of barriers is based on research activities and resulting finding from several previous studies. A synthesis of the barriers adopted for empirical investigation can be seen in Table 2. The barriers can be categorized into four items, which are institutional and managerial, financial and economic, social and behavioral, and knowledge and information. Semi-structured questionnaire survey with specific key informants who are familiar and concerned with the issues of climate change and urban development in Indonesia was conducted in January until March 2015.

Table 2: *Synthesis of the barriers adopted for empirical investigation*

Barrier	Specific barriers
Institutional and managerial	<ul style="list-style-type: none"> • Insufficient planning and management • Inadequate collaboration and coordination • Inadequate capacity building and institutional capacity • Lack of law and regulation enforcement
Financial and economic	<ul style="list-style-type: none"> • Insufficient budget • Lack of financial support • Inadequate financial resources
Social and behavioural	<ul style="list-style-type: none"> • Limited awareness and participation • Behavioural and lifestyle of people • Lack of strong leadership
Knowledge and information	<ul style="list-style-type: none"> • Insufficient information • Limited understanding • Lack of dissemination and knowledge sharing

Source: Adapted from some literatures.

There were 14 representatives involved from several institutions including governmental institutions, such as BAPPENAS, Ministry of Public Work and Housing, Ministry of Environment and Forestry, Agency for Meteorology, Climatology and Geophysics (BMKG), research and academic institutions (Institute of Technology Bandung, and Urban and Regional Development Institute), non-governmental organization (Mercy Corp & GIZ), and profession organization (Indonesian Association Planning). Secondary data was analyzed from literature, related laws, policies and development plans, books, journal articles, and papers. Both quantitative and qualitative techniques were adopted. A Weight Average Index (WAI) was used to measure the degree of barriers. The averages have been scaled into five-scale intervals: (0.00) to (0.20) refers to very low, (0.21) to (0.40) low, (0.41) to (0.60) moderate, (0.61) to (0.80) high and (0.81) to (1.00) very high.

4. Barriers to Integrating CCA into Urban Development

The need to understand the barriers is essential in order to enhance the effectiveness and improvement in the context of decision making and policy analysis.

4.1 Evaluation of Barriers

- Barrier of institutional and managerial

Institutional barriers relate to problems of coordination between different authoritative bodies and levels. Several organizations and institutions were involved in the integration process in Indonesia; different department in the government institutions, professional organization, as well as the academic and research institute. These all have their own priorities, and BAPPENAS is the only one with a particular focus on the policy regarding to development and climate change issues. Managerial barriers relate to the functions, responsibilities, position of management in the process of integration. The specific barriers of this category are insufficient planning and management, inadequate collaboration and coordination, inadequate capacity building and institutional capacity, and lack of law and regulation enforcement. The result shows that the barriers of lack of law and regulation enforcement, inadequate collaboration and coordination, inadequate capacity building and institutional capacity have a high score. Meanwhile, the barrier of insufficient planning and management has a low score. It indicates that legalization, capacity building and collaboration and coordination among stakeholders are still considered in order to achieve a good integration.

- Barrier of knowledge and information

Knowledge and information barriers relate to the understanding and information regarding to the issues of climate change and urban development. There are specific barriers in this category, which are insufficient information, limited understanding, and lack of dissemination and knowledge sharing. The findings reveal that overall barriers have a high score. It means that these barriers have a significant attention in the integration. The knowledge about climate change and the impact to urban development are important to understand. In addition, sharing information towards seminar, dissemination, workshop is also important.

- Barrier of financial and economic

Financial and economic barrier is sometimes really essential in the process of the

implementation and planning of the program, including the process of the integration. Specific barriers in this category are insufficient budget, lack of financial support from government, and inadequate financial resources. The results show that lack of financial support, and inadequate financial resources have a high score. On the other hand, the barrier of insufficient budget to implement adaptation has a moderate score. It means that there is international donor to support the adaptation implementation in Indonesia, such as JICA, Mercy Corp, and GIZ.

- Barrier of social and behavioral

The issue of acceptability is multifaceted, including both the background of the measure and the positive and negative consequences the measure is expected to produce. Where the stakeholders view the issue as unimportant or the measure as ineffective and potentially harming their own interest, the acceptability is expected to be low. Specific barriers of this category are limited awareness and participation, behavioral and lifestyle people, and lack of strong leadership. The results show that the overall barriers have a high score. It means that these barriers should be considered in the way to get a good integration.

4.2 Strategies to Overcome Barriers

Strategies to overcome the identified barriers are recommended, most importantly the need for building the capacity to all stakeholders, increasing a better understanding and awareness of municipality authorities, and getting acceptance and participation from the public on related issues into development of planning, policy and program. This study can be useful for policy makers and planners in the planning and implementation of policy measure for climate change adaptation and urban development.

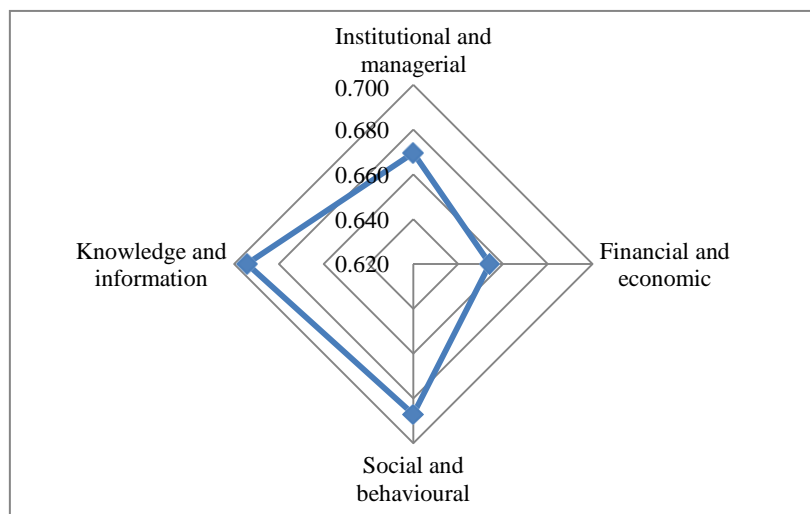


Figure 2: *The degree of barriers to integrating CCA into urban development* (Source: Analysis result, 2015)

5. Conclusions

The present study aims at identifying and measuring barriers to integrating CCA into urban development in Indonesia, and proposing actions to overcome these barriers. As such, it forms an important basis for continued efforts to facilitate increased integration of goods inputs for sustainable urban development in Indonesia. Based on theories on barriers to policy measures in general and in CCA and urban development in particular, the framework analysis included: institutional and managerial, financial and economic, social and behavioral, and knowledge and information. All types are found to have hindered the efforts to implement the integration in Indonesia. The results reveal that overall barriers are categorized as a high score. The barriers are mainly related to knowledge and information concerns. However, social and behavioral barriers are also significance.

As such, this study contributes to a strengthened focus on integration to successful implementation. In suggesting strategies to overcome these barriers, the study ties together different established approaches to urban freight such as most importantly the need for building the capacity to all stakeholders, increasing a better understanding and awareness of municipality authorities, and getting acceptance and participation from the public on related issues into development of planning, policy and program. The study also calls attention to hitherto

unexplored factors and the actors involved (limitations of this study) regarding the importance of institutional, administrative and political issues for implementation and success of integration policy measures. The evaluation framework used in this paper can therefore be a useful template for similar studies to come. It may also serve as a guide for policymakers in the design and implementation of new policy measures for CCA and urban development. Furthermore, it may form a basis for comparisons of implementation of integration measures across cities or countries.

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