論文題目　　　Assessment of urban ecosystem services in Pyin Oo Lwin, Myanmar
　　　　　　　(ミャンマー・ピンウールウィンの都市生態系サービスの評価)

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Myanmar is undergoing an urban transition under an embryonic stage of development in its urban policy framework. Due to the Lack of a coherent urban policy framework, it has resulted in an extensive and largely uncontrolled land use/cover change, loss of urban ecosystems and services, and environmental deterioration.

Such urban challenges have prompted city authorities and decision-makers in Myanmar to steer urban development towards a sustainable future through the development of proper urban plans and policy frameworks. However, while there are some such efforts in major cities such as Yangon, Mandalay and Nay Pyi Taw, there is little initiative and capacity to deal with such challenges in many secondary cities of the country. In fact, despite the fast-growing big cities, an equally significant urban growth is expected in its secondary cities. Harnessing growth in its secondary cities would be also instrumental in Myanmar's urban transition.

At the same time, Myanmar's national government has launched a green economy transition to reduce the pressures on overexploitation of natural resources where the country's economy has heavily relied on it. Investing in natural capital and sustainable cities are two of the three key priority areas in enabling green economic transitions in Myanmar.

In urban contexts, the development and maintenance of green spaces and green infrastructure is a major intervention that can facilitate green economic transitions. This is because urban green spaces such as parks, urban forests, golf course, and urban farms provide numerous ecosystem services that can enhance the quality of life in cities.

Ensuring comprehensive research would provide useful information to not only formulating proper urban plans and

policies but also contributing options to a green economy development in Myanmar. In this research, Pyin Oo Lwin, one of the secondary cities of Myanmar, has been taken as an example to examine the urban land use change status, the benefits of urban green spaces and how these urban green spaces provide a contribution to a green economic transition of Myanmar.

To achieve this, the overall research aims to understand how urban ecosystems are serving to contribute to a green economy transition in Myanmar. Detailed objectives involve to:

(1)   Understand the green economy discourse in Myanmar and how cities are featured in this discourse;

(2)   Track the urban land use and land cover (LULC) change in Pyin Oo Lwin over the past decades;

(3)   Assess and valuate in economic terms the ecosystem services that different green spaces provide to urban residents in Pyin Oo Lwin;

(4)   Provide policy recommendations on how urban ecosystems can contribute to a green economy transition in Myanmar.

To fulfil the research objectives, a mixed method approach was conducted that includes green economy stakeholder analysis (23 expert interviews), land use/cover (LULC) change analysis through QGIS, assessment of the different urban ecosystem services (125 urban park visitor surveys, 78 monastery user surveys, 64 golf player surveys, 141 farmer surveys, 66 biomass surveys, and 231 green space surrounding household surveys) and valuation of urban ecosystem services in monetary terms of economic values (travel cost method – TCM, hedonic pricing method – HPM, contingent valuation method – CVM, and market price).

The thesis is structured along seven main chapters, including this Introduction. Chapter 1 introduces the main concepts used in this thesis. In particular it outlines the main transitions occurring in Myanmar related to economic liberalization and urbanization, and how they have provided an impetus for the promotion of the Green Economy agenda. It identifies the importance of cities in this debate and how urban green spaces can contribute to this transition by providing multiple valuable ecosystem services.

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Chapter 2 outlines the study area and the different methodological tools used in the different chapters. In particular it introduces the main green spaces, including the botanical gardens, a golf course, three monasteries with urban forest fragments, and different types of urban farms. The different data collection and analysis tools are explained in greater depth including remote sensing, soil analysis, ecological surveys, expert interviews, and household surveys that are analysed through a series of analytical techniques such as descriptive statistics, travel cost method, hedonic pricing methods, and contingent valuation method, among others.

Chapter 3 unravels the green economy discourse and its evolution in Myanmar. Through institutional analysis the main milestones and stakeholders involved in the green economy processes are identified. Expert interviews are used to elicit the perspectives of the different stakeholders on the drivers, priorities, challenges and future opportunities associated with green economy processes in the country. This chapter identifies five interrelated critical points for ongoing and future green economy efforts, namely the need to (a) strengthen some functions within the stakeholder network; (b) involve meaningfully some underrepresented stakeholders such as the private sector and local government; (c) strengthen the visibility of certain thematic areas; (d) strengthen capacity building and public awareness; (e) promote coordinated and inclusive policy formation and implementation approaches.

Chapter 4 tracks land use change in the city between 1988-2018. Through remote sensing analysis the extensive land transformation in the urban and peri-urban area is identified for the main land use categories, namely built up land and different types of green spaces such as forest land, grassland and agricultural land. It has revealed that the urban green spaces have largely consumed by the uncontrolled urban expansion. With this regard, the built-up area expanded 7.19% in 1988 to 35.50% in 2018, resulting 5-folds of urban expansion within 3 decades. At the same time, urban green spaces have reduced with substantial amount (for example, urban forest declined 2-folds between 1988 and 2018). Furthermore, this study also observed that the national policies such as 1988 market economic liberalization policy and the 2008 constitution law are found as the causes of urbanization. Another interesting cause of urbanization is that the urban green spaces are playing as catalysts that promotes tourisms and favors the increased investment in real estate.

Chapter 5 and 6 assess and valuate in economic terms the different ecosystem services provided by the different urban green spaces. Depending on the different green spaces a series of provisioning, regulating and cultural services are assessed using different techniques such as ecological surveys, soil analysis and household surveys. Selected ecosystem services are valuated using techniques such as market prices, hedonic price method, travel cost method and contingent valuation. Urban farm products and carbon storage in different urban green spaces are evaluated by using market prices. In this case, the nursery has the highest economic values and the botanical garden has the largest carbon storage and its economic values. By using hedonic pricing method, the economic values of urban green spaces are evaluated by using the property values from the surrounding houses. As a result, the botanical garden has the biggest hedonic values among other urban green spaces. Another method such as travel cost method is used especially for recreational services of the botanical garden and it shows the high economic values. The contingent valuation method was applied to check the green space users' willingness to pay for the maintenance of golf course and urban forests inside the monasteries. In this case, monastery users have more willingness to conserve the green space than the golf course users.

Chapter 7 synthesises the main findings across the different chapters and offers some recommendations that can increase the potential of urban green spaces, and the ecosystem services they provide, to catalyse green economic transitions in Myanmar. It proposes some future research to further improve the knowledge base at the interface of urbanization, green spaces, and green economy in Myanmar.

In addition, developing proper urban plans and policies are necessary for Myanmar to address its uncontrolled urbanization and conserve urban green spaces to achieve a sustainable urban development. Understanding the economic value of urban green spaces, and the ecosystem services they provide, can provide important information to assist decision-makers and practitioners on how to prioritize green spaces for sustainable urban development according to the needs and criteria of the city.