

Hoang Khanh Linh Nguyen

**Detecting and Modeling the Changes
of Land Use and Land Cover for Land
Use Planning in Da Nang City, Vietnam**

ERDSICHT - EINBLICKE IN GEOGRAPHISCHE UND GEOINFORMATIONSTECHNISCHE ARBEITSWEISEN

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Dedication

To my beloved mother,
who has sacrificed all her life for my progress in study.

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I would like to express my sincere gratitude to Prof. Martin Kappas for giving me opportunity and encouraging me to develop out this book.

Nguyen, Hoang Khanh Linh

April 2018

Preface

The new publication inside the book series „Erdsicht“ focuses on the very hot topic of worldwide urban development (urban sprawl) and its relation to the surrounding countryside. Cities and climate change research are foci of the global research action agenda (e.g. from Future Earth).

On the “Cities and Climate Change Science Conference (CitiesIPCC)” held in Edmonton, Canada, from March 5-7th 2018 a new action agenda was submitted to bring this research forward and stimulate the generation of knowledge on cities and climate change, encourage science- and evidence-based climate action in cities, and create and strengthen partnerships in these areas.

The new “Erdsicht”-book No 24 about “Detecting and Modeling the Changes of Land Use and Land Cover for Land Use Planning in Da Nang City, Vietnam” reacts to this new research agenda and helps to find solutions for fast growing cities and for monitoring the changes in the environment. In short, the book is an example of science we need for the cities we want. Cities account for over 70% of global energy related CO₂ emissions and are vulnerable hotspots of climate change impacts (e.g. weather extremes with severe flooding). The scale of ongoing urban expansion and associated infrastructure provides an opportunity for cities to avoid further dangerous climate change and environmental change. Cities and their surrounding regions may also be cornerstones of future mitigation and adaptation measures.

Using the model CLUE (The conversion of Land Use and its Effects) the Land use change in the Da Nang region was analyzed over a decade of years. The CLUE model is a flexible, generic land use modeling framework which allows scale and context specific specification for regional applications. Typical applications include the simulation of deforestation, land degradation, urbanization, land abandonment and integrated assessment of land use / land cover change (LULC).

To simulate the future changes of LULC at Da Nang City from 2009 to 2030, three scenarios with different missions were devel-

oped, namely, scenario A Development as usual, scenario B Aggressive development, and scenario C Optimal development. All scenarios give a continuous increase in urban area, and a gradual decrease in agriculture, barren, and shrub areas.

Major results are: The change of urban area in 2030 is the highest under scenario B with 17,152.7 ha (99.16%) and the lowest under scenario C with 9,794.23 ha (56.62%). Scenario B results in a major loss of agricultural area 6,098.96 ha (83.61%), while scenario C shows minor loss of agricultural area 1,996.98 ha (27.40%) during the simulated period. Particularly, forest areas decrease by 5,269.19 ha (9.1%) and 5,125.59 ha (8.85%) under scenarios A and B, respectively; meanwhile, scenario C, emphasizing the environmental issue, shows no change in forest area (57,936.2 ha) during the simulated period.

Finally Da Nang belongs to the fastest growing cities in South-East-Asia and the current study is a good example how knowledge about Land Use / Land Cover change and urban growth can be used to achieve a better and more sustainable oriented urban planning in line with its environmental surroundings.

Martin Kappas
April 2018