平成 28 年 8 月 24 日

博士論文審査結果報告

Report on Ph.D. / Doctoral Dissertation Defense

政策研究大学院大学
連携教授　江頭　進治

審査委員会を代表し、以下のとおり審査結果を報告します。

On behalf of the Doctoral Thesis Review Committee, I would like to report the result of the Ph. D. / Doctoral Dissertation Defense as follows.

<table>
<tr><td>学位申請者氏名
Ph.D. Candidate</td><td colspan="3">Andrea Juarez</td></tr>
<tr><td>学籍番号
ID Number</td><td colspan="3">DOC13131</td></tr>
<tr><td>プログラム名
Program</td><td colspan="3">防災学プログラム
Disaster Management Program</td></tr>
<tr><td rowspan="8">審査委員会
Doctoral Thesis Review Committee</td><td>主査
Main referee</td><td>江頭　進治
Shinji Egashira</td><td>主指導教員
Main advisor</td></tr>
<tr><td>審査委員
Referee</td><td>ケリー キブラー
Kelly Kibler</td><td>副指導教員
Sub advisor</td></tr>
<tr><td>審査委員
Referee</td><td>大原　美保
Miho Ohara</td><td>副指導教員
Sub advisor</td></tr>
<tr><td>審査委員
Referee</td><td>佐山　敬洋
Takahiro Sayama</td><td>副指導教員
Sub advisor</td></tr>
<tr><td>審査委員
Referee</td><td>家田　仁
Hitoshi Ieda</td><td>副指導教員
Sub advisor</td></tr>
<tr><td>審査委員
Referee</td><td>園部　哲史
Tetsushi Sonobe</td><td>博士課程委員会委員長
Chairperson of the Ph. D. Programs Committee</td></tr>
<tr><td>審査委員
Referee</td><td>宮本邦明
Kuniaki Miyamoto
(筑波大学 教授 / Tsukuba University)</td><td>外部審査員
Referee from outside institutions</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td>論文タイトル
Dissertation Title
(タイトル和訳)※
Title in Japanese</td><td colspan="3">Risk-benefit analyses to balance flood risk, livelihoods and ecosystem services
洪水リスク、生活及び生態サービスの調和を目指すリスク便益解析</td></tr>
<tr><td>学位名
Degree Title</td><td colspan="3">博士（防災学）/ Ph.D. in Disaster Management</td></tr>
<tr><td>論文提出日
Submission Date of the Draft Dissertation</td><td>平成 28(2016)年
6 月 24 日</td><td>論文審査会開催日
Date of the Degree Committee Meeting</td><td>平成 28(2016)年
7 月 22 日</td></tr>
<tr><td>論文発表会開催日
Date of the Defense</td><td>平成 28(2016)年
7 月 22 日</td><td>論文最終版提出日
Submission Date of the Final Dissertation</td><td>平成 28(2016)年
8 月 24 日</td></tr>
<tr><td>審査結果
Result</td><td colspan="3">合格
Pass　　不合格
Failure</td></tr>
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※タイトルが英文の場合、文部科学省に報告するため、和訳を付してください
If the title is in English, please translate in Japanese in order to report MEXT.

1. 論文要旨 Thesis overview and summary of the presentation.

The thesis studies "Risk-benefit analyses to balance flood risk, livelihoods and ecosystem services", and it is composed of seven chapters including introduction and conclusion. Chapter 1 discusses significance and role of this study in academic study field and practical use.

In **chapter 2**, she proposed a conceptual framework to balance livelihoods, ecosystem services and flood management, focusing on a relationship between livelihood benefits and ecosystem services as well as on role of coping capacity in flood-prone lands. In **chapter 3**, she discussed benefits of flood prone-land use and the role of coping capacity in Candaba area, Philippines. Based on a combination of field investigation and inundation simulation (the 2010 wet season), she documented the local economic dependence on rice cultivation and wild-capture fisheries, and characterized when and where in Candaba such activities occur during a 'typical' flood season. Her findings illustrate the socioeconomic benefits associated with direct human use of flood-prone land, in dry and wet seasons, respectively. In **chapter 4**, she proposed a model to predict wild fish catch yields based on inundation depth. She analysed field data collected from local fishermen to evaluate the relationship between wild fish capture yields and flood depth. In **chapter 5,** she combined the results obtained from the discussions performed in former chapters, but added a probabilistic component to the analysis in order to assess flood risks and probabilistic benefits. She analysed long-term rainfall data and created design storms corresponding to 1.33, 2, 5, 10, 25, 50, and 100 year events. She modelled inundation associated with each design storm and computed damages and benefits with respect to rice and wild fish across the range of magnitudes. She combined damages/benefits with probability of occurrence to estimate risks and benefits. She applied the risk-benefit tools to answer the research questions related to the value of flood-prone land and the role of coping capacity in flood risk reduction/benefit maximisation. Her findings indicate that adopting livelihood practices such as adapting rice-planting periods to the flood pulse, or increasing fish catch effort on certain days can reduce flood risk and allow for maximum benefits in flood-prone land. Such results obtaining from the proposed method should help policy makers determine a suitable land use of flood-prone areas and advise residents according to their own specific flood condition. In **chapters 6 and 7** she synthesized the results obtained from this thesis study and analysed their political meanings, showing the potential benefits corresponding to flood-prone land use and relationship between livelihood benefits and

ecosystem services, and elaborating on the concept of integrated assessment of flood risk and probabilistic benefits.

Ms. Juarez-Lucas made a very clear presentation that lasted for about 1 hour and subsequently the referees made several questions and comments.

2. 審査報告 Notes from the Doctoral Thesis Review Committee (including changes required to the thesis by the referees)

The referees made the following comments:

Assistant Professor Kelly Kibler

1) Make sure your research questions are clear. I don't think you need to revise study objectives, but rather in the discussion distinguish how the results of research question 1 and 2 inform land use policies and individual human activities respectively.
2) Add new results from research question 2- coping capacity
3) Please work on clarifying the result. Add a section to discussion that clearly demonstrates what the results mean. For instance,
   a. Are the outcome curves telling us about total potential benefits or net benefits? Why?
   b. What is the utility of understanding the relative scales of risk vs. net benefits? How can this help managers?
   c. Build out the discussion and your synthesis to focus on the policy applications, including your new summary figures.

Associate Professor Miho Ohara

You had better discuss other influencing factors that may have an effect on rice yields, if possible. For example, soil moisture, temperature, evaporation and other social factors may affect agricultural yields. These may be important drivers explaining why people currently do not adapt their calendars in the area to avoid potential damages in wet season.

Associate Professor Takahiro Sayama

Please make clear flood sizes employed in this study.　For example, please highlight that your analyses include not only an extreme event such as the 2011 flood, but also low to medium flood events.

Professor Hitoshi Ieda

This dissertation doesn't treat damages of infrastructures resulting from a large flood and thus, a limitation of present analyses should be clarify.

Professor Kuniaki Miyamoto

You had better explain the difference between flood risks and probabilistic benefits, if possible.

Professor Tetsushi Sonobe

Please make clear definition of coping capacity as well as of probabilistic benefit.

3. 最終提出論文確認結果 **Confirmation by the Main Referee that changes have been done to the satisfaction of the referees**

Ms. Juarez-Lucas has revised her thesis to incorporate the comments of the referees and has provided an explanation of the changes that I attach at the end of this report. The referees are satisfied with the revisions.

4. 最終審査結果 Final recommendation

I recommend that the degree of Ph.D. in Disaster Management be awarded to Ms. Andrea Juarez.