

Global environment-related initiatives and green growth – investigating the integration of their goals into government policies and prospects for delivery

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Thesis submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy in Sustainable Futures

under the supervision of Professor Dr. Damien Giurco and Adjunct Associate Professor Dr. Scott Kelly

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November 2021

Certificate of original authorship

I, *Bishal Baniya* declare that this thesis, is submitted in fulfilment of the requirements for the award of *Doctor of Philosophy (Sustainable Futures)*, in the *Institute for Sustainable Futures* at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis. This document has not been submitted for qualifications at any other academic institution.

This research is supported by the Australian Government Research Training Program.

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Date: 16 November 2021

Acknowledgement

Firstly, I would like to thank my supervisors, Professor Dr. Damien Giurco and Adjunct Associate Professor Dr. Scott Kelly, for accepting my request to be my supervisors and for their continuous guidance and support throughout the course of this dissertation. Thank you for showing me a path to completion by providing intellectual support that helped me in refining and strengthening my thinking. I also appreciate my supervisors' continuous commitment that instilled the energy and enthusiasm I needed during my candidature.

I would also like to thank the Institute for Sustainable Futures for providing a very supportive academic environment that contributed to my willingness to learn and translate my thinking into academic research. I would also like to thank Professor Dr. Jason Prior and Dr. Keisuke Nansai for providing useful feedback during candidature stage assessments. Thank you to Mr. Rupert Legg for moral support and to Mr. Prem Prakash Aryal for helping me during the field visit to Nepal.

I greatly appreciate the University of Technology Sydney, and the Commonwealth of Australia for their financial support in the form of scholarship.

Finally, I am grateful to my parents and my wife (Samjhana) for their endless moral support and for always being by my side.

List of Publications

This thesis consists of three published papers, (I) as Chapter 4, (II) as Chapter 5 and (IV) as Chapter 7 and one paper (III) under review as Chapter 6 accompanied by an exegesis. The list of published and to-be-published papers is as follows:

- (I) Baniya, B., Giurco, D., & Kelly, S. (2021). Changing policy paradigms: How are the climate change mitigation-oriented policies evolving in Nepal and Bangladesh? *Environmental Science and Policy*, 124, 423–432. <https://doi.org/10.1016/j.envsci.2021.06.025>.
- (II) Baniya, B., Giurco, D., Kelly, S. & Aryal, P. P (2021). Mainstreaming climate mitigation actions in Nepal: influencing factors and mainstreaming process, *Environmental Science and Policy*, 124, 206–216. <https://doi.org/10.1016/j.envsci.2021.06.018>.
- (III) Baniya, B., Giurco, D., & Kelly, S. (2021). Linking climate policy across economic sectors: A case for green growth in Nepal, Submitted to *Natural Resources Forum* (in a second review stage after the submission of a revised manuscript that responded to initial reviewer comments).
- (IV) Baniya, B., Giurco, D., & Kelly, S. (2021). Green growth in Nepal and Bangladesh: Empirical analysis and future prospects. *Energy Policy*, 149. <https://doi.org/10.1016/j.enpol.2020.112049>.

A conference paper and an additional journal paper were also produced during the doctoral research but not included in the thesis:

- (V) Baniya, B., Kelly, S, &. Giurco, D. (2017). Analysis of resource productivity and decoupling in Nepal and Bangladesh, World Resources Forum. Geneva, Switzerland.
- (VI) Baniya, B. & Giurco, D. (2021). Resource-efficient and renewable energy transition in the five least developed countries of Asia: a post-COVID-19 assessment, *Sustainability: Science, Practice, and Policy*, <https://doi.org/10.1080/15487733.2021.2002025>.

Declaration by co-authors

In the case of Paper (I)

Baniya, B., Giurco, D., & Kelly, S. (2021). Changing policy paradigms: How are the climate change mitigation-oriented policies evolving in Nepal and Bangladesh? *Environmental Science and Policy*. 124, 423–432. <https://doi.org/10.1016/j.envsci.2021.06.025>.

The undersigned agree that the nature and extent of the contributions to the work was as follows:

Co-author	Nature of contribution	Extent of contribution (%)	Signature	Date
Bishal Baniya	Conceptualization, Methodology, Software, Formal Analysis, Investigation, Writing – original draft, Visualization, Project administration.	80	Production Note: Signature removed prior to publication.	30/6/2021
Damien Giurco	Conceptualization, Methodology, Validation, Writing - review & editing.	10	Production Note: Signature removed prior to publication.	30/6/2021
Scott Kelly	Conceptualization, Methodology, Validation, Writing - review & editing.	10	Production Note: Signature removed prior to publication.	30/6/2021

This paper represents Chapter 4 of this thesis.

In the case of Paper (II)

Baniya, B., Giurco, D., Kelly, S. & Aryal, P. P (2021). Mainstreaming climate mitigation actions in Nepal: influencing factors and mainstreaming process, *Environmental Science and Policy*, 124. <https://doi.org/10.1016/j.envsci.2021.06.018>

The undersigned agree that the nature and extent of the contributions to the work was as follows:

Co-author	Nature of contribution	Extent of contribution (%)	Signature	Date
Bishal Baniya	Conceptualization, Methodology, Software, Formal Analysis, Investigation, Writing – original draft, Visualization, Project administration.	75	Production Note: Signature removed prior to publication.	30/6/2021
Damien Giurco	Conceptualization, Methodology, Validation, Writing - review & editing.	10	Production Note: Signature removed prior to publication.	30/6/2021
Scott Kelly	Conceptualization, Methodology, Validation, Writing - review & editing.	10	Production Note: Signature removed prior to publication.	30/6/2021
Prem Prakash Aryal	Methodology, Project administration	5	Production Note: Signature removed prior to publication.	30/6/2021

This paper represents Chapter 5 of this thesis.

In the case of Paper (III)

Baniya, B., Giurco, D., & Kelly, S. (2021). Linking climate policy across economic sectors: A case for green growth in Nepal, Submitted to *Natural Resources Forum* (in a second review stage after the submission of a revised manuscript that responded to initial reviewer comments).

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Bishal Baniya	Conceptualization, Methodology, Software, Formal Analysis, Investigation, Writing – original draft, Visualization, Project administration.	80	Production Note: Signature removed prior to publication.	30/6/2021
Damien Giurco	Conceptualization, Methodology, Validation, Writing - review & editing.	10	Production Note: Signature removed prior to publication.	30/6/2021
Scott Kelly	Conceptualization, Methodology, Validation, Writing - review & editing.	10	Production Note: Signature removed prior to publication.	30/6/2021

This paper represents Chapter 6 of this thesis.

In the case of Paper (IV)

Baniya, B., Giurco, D., & Kelly, S. (2021). Green growth in Nepal and Bangladesh: Empirical analysis and future prospects. *Energy Policy*, 149. <https://doi.org/10.1016/j.enpol.2020.112049>

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Damien Giurco	Conceptualization, Methodology, Validation, Writing - review & editing.	10	Production Note: Signature removed prior to publication.	30/6/2021
Scott Kelly	Conceptualization, Methodology, Validation, Writing - review & editing.	10	Production Note: Signature removed prior to publication.	30/6/2021

This paper represents Chapter 7 of this thesis.

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Glossary

Carbon productivity	Carbon productivity is defined as the specific value of economic output (GDP) generated per unit of carbon dioxide emissions equivalent over the same period (Kaya and Yokobori, 1999; Lu et al., 2018).
Domestic Material Consumption (DMC)	Domestic material consumption measures the total amount of materials directly used by an economy and is calculated as the annual quantity of raw materials extracted from domestic territories, plus all physical imports minus physical exports (Eurostat, 2021). In this thesis, DMC includes biomass, fossil fuels, metal ores, and construction materials.
Energy productivity	Energy productivity is expressed as the amount of economic output generated in terms of gross domestic product (GDP) per unit of energy consumed in terms of TPEC (AAEP, 201).
Environmental policy integration	Environmental policy integration refers to the incorporation of environmental objectives in non-environmental policy sectors, such as energy, forestry, agriculture, industry, and transport (Lafferty and Hovden, 2010).
Government policies	In this research, government policies refer to environment and climate-specific policies and non-environment sector policies.
Green growth	In a general sense, green growth refers to the model of economic growth, which also aims to achieve significant environmental protection (Jacobs, 2013).
Mainstreaming	Mainstreaming refers to integrating environmental and climate-specific objectives, policies and strategies into sectoral planning and decision-making processes (Saito, 2013; Rauken et al., 2015).
Material productivity	Material productivity is expressed as the amount of economic output generated in terms of gross domestic product (GDP) per unit of materials consumed in terms of DMC (OECD, 2021).
Non-environment sector policies	Non-environment sector policies are the policies of non-environmental policy areas, such as energy, forestry, agriculture, industry, and transport (Persson et al., 2018).
Policy coherence	Policy coherence refers to reducing conflicts and promoting synergies between and within different sectoral policies for achieving jointly agreed policy goals (Nilsson et al., 2012).
Resource	In the literature, resource as a term has been used to refer to the combination of biomass, metal ores, industrial minerals, construction minerals, and fossil fuels (Schandl and West, 2010) and in a broader sense, resource can also include water

	and land (van Ewijk, 2018). However, in this thesis, the specific focus is on energy resources comprising biomass and fossil fuels. Therefore, this research uses the term ‘resource’ to refer to biomass and fossil fuels.
Resource efficiency	Resource efficiency refers to minimising material inputs and maximising economic outputs via material loss prevention (van Ewijk, 2018). If resource efficiency improves, more economic prosperity can be attained without increasing overall resource use (Duro et al., 2018).
Resource productivity	Resource productivity describes the economic output generated per unit of resource use. Resource productivity is a widely used sustainability indicator that combines economic and environmental information, and a high value signals a resource-efficient economy (Steinberger and Krausmann, 2011).
Total Primary Energy Consumption (TPEC)	Total primary energy consumption refers to the total energy demand of a country, which covers consumption of the energy sector itself, transformation and distribution losses, and the final consumption by end users (Eurostat, 2021). In this thesis, TPEC includes all forms of energy resources.

Abbreviations

GJ	Gigajoule (= 10^9 joule)
ha/year	Hectare per year
km	Kilometre (= 10^3 metre)
koe	Kilogram of oil equivalent (= 10^3 grams of oil equivalent)
ktoe	Kilo tonnes of oil equivalent (= 10^9 grams of oil equivalent)
ktons	Kilo tonnes (= 10^9 grams)
MJ	Mega joule (= 10^6 joules)
MtCO ₂ e	Million tonnes of carbon dioxide equivalent (= 10^9 grams of carbon dioxide equivalent)
MW	Megawatt (10^6 watts)
tCO ₂ e	Tonnes of carbon dioxide equivalent (10^3 grams of carbon dioxide equivalent)
USD	United States Dollars

Abstract

Global environment-related initiatives (GEI) such as international climate agreements and the Sustainable Development Goals (SDGs), together with the green growth (GG) model of economic development, are encouraging policymakers in Nepal and Bangladesh to deliver reductions in greenhouse gas (GHG) emissions. While the concept of green growth aims to reconcile the tension between policies focussed on economic growth and on delivering climate mitigation actions (e.g. reductions in GHG emissions and non-renewable resource), it has notable flaws in its application. For example, the application of green growth may not address the absolute reduction of non-renewable resource and GHG emissions issues while prioritising economic growth. Nonetheless, in addition to GEI, GG is often an important subject in both countries' environmental policy discourse. For low-income countries such as Nepal and Bangladesh, we know little about how the GEI and GG related policy discourse influences the knowledge and ideas of policy actors, the policymaking processes, or the extent to which it incentivises government policies to incorporate common objectives of GEI and GG such as climate mitigation actions. There is also a lack of sufficient country-specific studies about GG despite it being an important agenda for notable international development organisations active in many low-income and developing countries.

While delivering climate mitigation objectives of the GEI and GG, Nepal and Bangladesh venture to achieve transition from United Nations least developed country (LDC) status by increasing their economic output (e.g. gross national income per capita). Therefore, to identify ways to navigate the complexity of implementing policies focusing on economic growth and climate mitigation objectives, this study uses quantitative empirical research and predictive modelling of resource use and GHG emissions for a range of future policy and economic growth rate scenarios. Content analysis of existing sectoral, climate, and environmental policies of Nepal (n=17) and Bangladesh (n=18) that consider the inclusion of climate mitigation actions provide insights into a reorientation of the focus of policies, their goals, and the extent to which government policies frame climate mitigation actions. Semi-structured interviews (n=12) with policy actors in Nepal, including central and local level policymakers, and

representatives from the private sector and non-government international development organisations provided insights regarding the influence of GEI and GG narratives on government policies.

This research generated two key findings. First, national policy discourse on GEI and GG influences policy actors' knowledge and ideas, thereby changing the national policy paradigm, which is the model for policy formulation. A new climate mitigation-based policy paradigm that emerged post-2005 now co-exists with the previous climate adaptation-based policy paradigm in both countries. The new climate mitigation-based policy paradigm has three key features: 1) a shift from finance via official development assistance (ODA) to internal funding; 2) a focus on other benefits of climate mitigation such as access to clean energy, sustainable transportation, and sustainable agriculture; and 3) higher transparency of climate actions that are communicated to the global community. However, the trend of rising GHG emissions in both Nepal and Bangladesh in the last two decades contradicts the presence of climate mitigation-based policy paradigms. The contradiction contributes to the long-standing debate about when to consider a paradigmatic change from adaptation to mitigation in government policies and highlight the need to link the framing and delivery of climate mitigation actions.

This research found that the framing of climate mitigation actions into government policies, without sufficiently considering the delivery prospect, is largely a consequence of the requirements of GEI. Second, even with significant improvements in energy, material, and carbon productivity, and despite structural changes in both Nepal and Bangladesh economies, the greening of growth does not appear sufficient in the absolute sense. For example, the projected increase in total primary energy consumption will range from 8-15% for Nepal and 46-68% for Bangladesh between 2016 and 2030. Similarly, the absolute increase in domestic material consumption will range from 26-40% for Nepal and 56-61% for Bangladesh between 2016 and 2030. This finding corroborates the empirical limitation of GG in delivering the climate mitigation objectives in an absolute sense. Thus, this research suggests two key actions to deliver climate mitigation objectives in an absolute sense, which will also enable the new climate mitigation-based policy paradigms to function effectively in both countries whilst graduating from the LDC status.

The first action is mainstreaming climate mitigation across policies of various economic sectors. Mainstreaming climate mitigation implies prioritisation of climate mitigation objectives, making them overriding objectives. The prioritisation of climate mitigation as an overriding objective in sectoral policies presents a better solution than simply framing climate mitigation objectives into sectoral policies, which pertains to the concept of policy integration. This research explored the conceptual limitation of policy integration to find that mainstreaming, which is often used interchangeably with policy integration, is different and better because sectoral policies make climate mitigation objectives their key focus. For example, despite contributing almost half of the nation's GHG emissions, the agriculture sector policies and NDCs (2016 and 2020) of Nepal have framed climate mitigation objectives without sufficiently including the climate mitigation targets. In the business-as-usual (BAU) scenario, GHG emissions from the agriculture sector are likely to increase by 8.5 MtCO₂e in 2030 compared to 2015. In the nationally determined contribution (NDC) scenario, the increase in GHG emissions from Nepal's agriculture sector is same as in the BAU scenario, as the NDC documents (2016 and 2020) have insufficiently considered mitigation actions in this sector. Thus, the GHG emissions from Nepal's agriculture sector are projected to remain the same (33.5 MtCO₂e) in both the NDC scenario in 2030 and the BAU scenario in 2030. It implies that even if the NDC is implemented, the agricultural sector's GHG emissions are unlikely to reduce. Further, this research found that policy integration is primarily policy formulation-oriented, whereas mainstreaming has some focus on policy implementation, thus shedding light on the conceptual nuance between the two concepts. The second action, for Nepal, is a renewable energy transition—from low-energy intensity biomass-based to high-intensity hydroelectricity—coupled with minimising transmission and distribution electricity. For Bangladesh, the suggested action is a transition from using biomass and fossil fuels to using more renewable energy resources, which will reduce biomass and fossil fuels use and the associated GHG emissions.