

UNIVERSITI PUTRA MALAYSIA

DEFORESTATION, ENVIRONMENTAL QUALITY AND ECONOMIC GROWTH IN SOUTHEAST ASIAN COUNTRIES

SUNMONU OLAYIWOLA TEMITAYO

FEP 2014 20



DEFORESTATION, ENVIRONMENTAL QUALITY AND ECONOMIC GROWTH IN SOUTHEAST ASIAN COUNTRIES



By

SUNMONU OLAYIWOLA TEMITAYO

Thesis submitted to the school of graduate studies, Universiti Putra Malaysia, in the fulfilment of the Requirement for the Degree of Master of Science

October 2014

COPYRIGHT

All material contained within the thesis, including without limitation text, logos, icons, photographs, and all other artwork, is copyright material of Universiti Putra Malaysia unless otherwise stated. Use may be made of any material contained within the thesis for non-commercial purposes from the copyright holder. Commercial use of material may only be made with the express, prior, written permission of Universiti Putra Malaysia.

Copyright © Universiti Putra Malaysia



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the Degree of Master of Science

DEFORESTATION, ENVIRONMENTAL QUALITY AND ECONOMIC GROWTH IN SOUTHEAST ASIAN COUNTRIES

By

SUNMONU OLAYIWOLA TEMITAYO

October 2014

Chair: Abdul Rahim Bin Abdul Samad, PhD

Faculty: Economics and Management

Environmental quality is one of the factors in the sustainable development of any economy. Of the various environmental problems, deforestation has held a special position because it is intertwined with other forms of environmental problems.

Unfortunately, more than half of the regressions published since 1992 do not corroborate Environmental Kuznets Curve for deforestation, this has made authors to be unsatisfied with the current literature on deforestation EKC and have called for further developments. Most importantly, the studies undertaking to explain the determinants of deforestation have not been empirically sound. Deforestation determinants are classified to belong to different level categories, however, most studies do not provide this clear picture of the classifications as causes belonging to different level categories are being included in one deforestation model, whereby the result creates confusion over the cause-effect relationships.

Considering the increasing trend of the forest area loss and its consequences in Southeast Asia, this research set out to validate the Environmental Kuznets Curve for deforestation, investigate the main cause of deforestation as well as to outline the impact of its underlying factors for seven (7) countries of the Southeast Asian region namely Malaysia, Thailand, Philippines, Indonesia, Vietnam, LAO and Brunei over 1985 to 2010 with the aim of proposing plausible policy recommendations. The methodology in estimating non-stationary heterogeneous panels, the Panel ARDL, proposed by Peseran was adopted. So far, no research has been conducted using the methodology in deforestation for the region. The advancement in the methodology has helped to influence the outcome positively.

As per the underlying factors, rural population growth, liberalization policies (through term of trade) and lucrative export prices (agricultural product export value) causes agricultural land expansion to swell. These outcomes is strengthened by the result obtained from the technology variable which shows that increase in yield is as a result of agricultural land expansion. This means that, for the economy to increase output to feed increased population, to enjoy favourable term of trade and high export value, she has to expand land for agriculture, hence deforestation. The impact of the modernization theory through the economic growth variable could be fully

C

ascertained because of the insignificant coefficient of the variable in the main model. Lastly, the estimation outcome validates EKC hypothesis for deforestation.

The result obtained in the research does not wholly represent a particular / specific economy within the region, however, an insight into the overall outlook of the region has been observed where-in policy measure has been outlined to guide and channel this region towards curbing excessive agricultural land expansion with the overall goal of ensuring reduction in deforestation, hence enhancing good environmental quality. These policies are improved agricultural technology, enhanced forest protection, forest management power decentralization, off farm employment opportunities, payment for environmental services amongst others.



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia adalah bagi memenuhi syarat keperluan untuk Ijazah Master Sains

PENEBANGAN HUTAN, KUALITI ALAM SEKITAR DAN PERKEMBANGAN EKONOMI DI NEGARA-NEGARA ASIA TENGGARA.

Oleh

SUNMONU OLAYIWOLA TEMITAYO

Oktober 2014

Pengerusi: Abdul Rahim Bin Abdul Samad, PhD

Fakulti: Ekonomi dan Pengurusan

Kualiti alam sekitar adalah salah satu faktor dalam mengekalkan pembangunan mana-mana ekonomi. Berdasarkan pelbagai masalah alam sekitar, penebangan hutan merupakan masalah utama kerana ia saling berkaitan dengan lain-lain masalah alam sekitar.

Malangnya, lebih daripada separuh kajian yang diterbitkan sejak tahun 1992 tidak menyokong 'Kuznets Curve' Alam Sekitar untuk penebangan hutan, ini menyebabkan penulis tidak berpuas hati dengan sastera semasa di hutan 'Kuznets Curve' Alam Sekitar dan berhasrat untuk perkembangan lanjut. Paling penting, kajian yang dijalankan adalah untuk menjelaskan penentu bagi penebangan hutan yang belum empirik bunyi. Penentu bagi Penebangan hutan dikelaskan mengikut tahap kategori yang berbeza, bagaimanapun, kebanyakan kajian tidak memberi gambaran yang jelas bahawa pengelasan ini sebagai punca milik kategori tahap yang berbeza sedang dimasukkan ke dalam satu model hutan, di mana keputusan menimbulkan kekeliruan terhadap hubungan sebab-akibat.

Memandangkan corak kehilangan kawasan hutan semakin meningkat yang berlaku di Asia Tenggara, kajian ini dijalankan bagi mengesahkan 'Curve Kuznets' Alam Sekitar untuk penebangan hutan bagi menyiasat punca utama penebangan hutan dan juga untuk menggariskan kesan faktor-faktor bagi tujuh (7) negara-negara di rantau Asia Tenggara iaitu Malaysia, Thailand, Filipina, Indonesia, Vietnam, LAO dan Brunei lebih 1985-2010 dengan tujuan untuk mencadangkan garis panduan yang munasabah. Metodologi dalam menganggarkan panel heterogen tidak bergerak, Panel ARDL, yang dicadangkan oleh Peseran telah diterima pakai. Setakat ini, tiada kajian yang telah dijalankan menggunakan kaedah ini dalam penebangan hutan bagi rantau ini. Kemajuan dalam metodologi telah membantu memberi keputusan positif.

Sebagaimana faktor-faktor asas, pertumbuhan penduduk luar bandar, dasar liberalisasi (melalui jangka perdagangan) dan harga eksport yang lumayan (nilai eksport produk pertanian) menyebabkan peningkatan pengembangan tanah pertanian. Hasil ini diperkukuhkan oleh keputusan yang diperolehi daripada pembolehubah teknologi yang menunjukkan bahawa peningkatan dalam hasil pertanian adalah hasil daripada pengembangan tanah pertanian. Ini bermakna, untuk membolehkan

ekonomi meningkatkan pengeluaran untuk menampung peningakatan penduduk, untuk menikmati jangka menggalakkan perdagangan dan nilai eksport yang tinggi, tanah pertanian harus diperluaskan, dengan cara penebangan hutan. Kesan teori pemodenan melalui pembolehubah pertumbuhan ekonomi dapat dipastikan sepenuhnya kerana pekali pembolehubah yang tidak signifikan dalam model utama. Akhir sekali, hasil anggaran mengesahkan hipotesis EKC untuk penebangan hutan.

Keputusan yang diperolehi dalam kajian ini tidak mewakili keseluruhan ekonomi yang tertentu / spesifik di rantau ini, bagaimanapun, kefahaman tentang keseluruhan prospek di rantau ini telah diperhatikan di mana dasar polisi telah digariskan untuk membimbing dan menyalurkan rantau ini ke arah membendung perkembangan tanah pertanian yang berlebihan dengan matlamat keseluruhan memastikan pengurangan penebangan hutan, dengan itu meningkatkan kualiti alam sekitar. Dasar polisi ini meningkatkan teknologi pertanian, perlindungan hutan, kuasa pengurusan hutan dipusatkan, peluang pekerjaan ladang, pembayaran bagi perkhidmatan alam sekitar di kalangan orang lain.



ACKNOWLEDGEMENT

My sincere acknowledgement goes to the Almighty God for His preservation and the zeal accorded to me during the rigorous times I had while conducting this research.

I would like to express my sincere gratefulness to my supervisor Dr. Abdul Rahim Bin Abdul Samad for his consistent assistance and fatherly encouragement given to me during the cause of my research. This research would not have reached the completion stage without you Sir. Also, to the member of the supervisory committee, Dr. Shaufique Fahmi Bin Ahmad Sidique, i am grateful for your contributions during my presentation, it has formed part of the backbone of this research.

Finally I owe it all to the entire members of my family, my since gratitude and appreciation goes to my dad, Chief S. O. Sunmonu. To my late mum, you had saw me begin this research work, it pains so much that you had to leave untimely, i pray you continue to rest in the Lord. I will like to thank my brother for their help, prayers and understanding during this period that i had to be away for so long.



I certify that a Thesis Examination Committee has met on 2 October 2014 to conduct the final examination of Sunmonu Olayiwola Temitayo on his thesis entitled "Deforestation, Environmental Quality and Economic Growth in Southeast Asian Countries" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

Members of the Thesis Examination Committee were as follows:

Saifuzzaman bin Ibrahim, PhD

Senior Lecturer Faculty of Economics and Management Universiti Putra Malaysia (Chairman)

Law Siong Hook, PhD

Associate Professor Faculty of Economics and Management Universiti Putra Malaysia (Internal Examiner)

Mohd Shahwahid b Hj Othman, PhD

Professor Faculty of Economics and Management Universiti Putra Malaysia (Internal Examiner)

Suriyani Muhamad

Associate Professor School of Social and Economic Development University Malaysia Terengganu (External Examiner)

ZULKARNAIN ZAINAL, PhD Professor and Deputy Dean School of Graduate Studies Universiti Putra Malaysia

Date: 23 January 2015

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

Abdul Rahim Bin Abdul Samad, PhD

Senior Lecturer Faculty of Economics and Management Universiti Putra Malaysia (Chairman)

Shaufique Fahmi Bin Ahmad Sidique, PhD

Associate Professor Faculty of Economics and Management Universiti Putra Malaysia (Member)

> BUJANG BIN KIM HUAT, Ph.D Professor and Dean School of Graduate Studies Universiti Putra Malaysia

Date:

Declaration by graduate student

I hereby confirm that:

- this thesis is my original work
- quotations, illustrations and citations have been duly referenced
- the thesis has not been submitted previously or comcurrently for any other degree at any institutions
- intellectual property from the thesis and copyright of thesis are fully-owned by Universiti Putra Malaysia, as according to the Universiti Putra Malaysia (Research) Rules 2012;
- written permission must be owned from supervisor and deputy vice –chancellor (Research and innovation) before thesis is published (in the form of written, printed or in electronic form) including books, journals, modules, proceedings, popular writings, seminar papers, manuscripts, posters, reports, lecture notes, learning modules or any other materials as stated in the Universiti Putra Malaysia (Research) Rules 2012;
- there is no plagiarism or data falsification/fabrication in the thesis, and scholarly integrity is upheld as according to the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) and the Universiti Putra Malaysia (Research) Rules 2012. The thesis has undergone plagiarism detection software

Signature:

Date:

Name and Metric No.: Sunmonu Olayiwola Temitayo GS33377

Declaration by Members of Supervisory Committee

This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012 2013) are adhered to:

Signature : Name of Chairman of Supervisory	Signature : A A Name of Member of Supervisory
Committee:	Committee:

TABLE OF CONTENTS

	Page
ABSTRACT	i
ABSTRAK	iii
ACKNOWLEDGEMENT	V
APPROVAL	vi
DECLARATION	vii
LIST OF TABLES	xii
LIST OF FIGURES	xiii
LIST OF ABBREVIATIONS	xiv

CHAPTER

1.

2.

3.

INT	RODUCTION	
1.1	Background of study	1
1.2	Deforestation in Southeast Asia	
1.3	Statement of problem	
1.4	Objective of study	10
1.5	Significance of study	11
LIT	ERATURE REVIEW	
2.1	Determinant of Deforestation	13
	2.1.1 Proximate cause of Deforestation	13
	2.1.2 Underlying factors of Deforestation	17
	2.1.3 Determinant of Deforestation: Conecptual	30
	framework	
2.2	EKC for Deforestation	31
	2.2.1 Genesis of EKC	32
	2.2.2 General idea and explanation for the EKC	33
	2.2.3 Policy implication of EKC	34
	2.2.4 EKC: Empirical literature	34
2.3	Determinant of Deforestation and EKC: Methodology	41
	issues	
ME	CHODOLOGY	
3.1	Variables	44
5.1	3.1.1 Measure of Deforestation (explained variable)	44
	3.1.2 The underlying factors (explanatory variables)	44
32	Models	47
5.2	3.2.1 Model 1: Underlying causes of deforestation	
	3.2.2 Model 2: EKC for deforestation	/ 2
33	Robustness check: Alternative deforestation provy	-+0 ∕\0
5.5	3.3.1 Dercentage change in forest area model	+9 50
	J.J.1 I EICEINAGE CHAINGE III IOIEST AIEA IIIOUEI	50

Percentage change in forest area model 3.3.2 Total forest area model 51 52

Estimation procedure 3.4

Step 1: Preliminary panel unit root tests 3.4.1 52 Step 2: Panel ARDL estimation procedure 3.3.2 53

4.	ESTIMATION RESULT AND DISCUSSION		
	4.1	Preliminary test outcome	56
	4.2	Underlying causes of deforestation	59
	4.3	EKC for deforestation	67
5.	CON	ICLUSION AND POLICY RECOMMENDATION	
	5.1	Conclusion	70
	5.2	Sumary	71
	5.3	Policy recommendation	72
		Policies to improve impact of technology varaiable	
		on agricultural land expansion	
		5.3.1 Improved agricultural technology	73
		Policies to reduce effect of trade liberalization and	
		export value on agricultural land expansion	
		5.3.2 Forest protection and effective land zoning	74
		5.3.3 Power decentralization in forest management	76
		Policies to reduce effect of population variable	
		on agricultural land expansion	
		5.3.4 Off –farm employment opportunity	77
		Other recommendations	
		5.3.5 Payment for environmental services	79
		5.3.6 General policy	80
	5.4	Area for further studies	80
REF	EREN	CES	81
APP	ENDIC	TES	108
BIO	DATA	OF STUDENT	135
LIST	Г ОF PU	UBLICATION	136

C C

 \bigcirc

LIST OF TABLES

Table	Page
1.1 Deforestation in Southeast Asian countries, 1990-2005	7
4.1 Unit Root Test	56
4.2 Cointegration test for Deforestation proxy: Agricultural land	
expansion	57
4.3 Cointegration test for Deforestation proxy: Percentage change in	
forest area forest	58
4.4 Cointegration test for EKC variables	59
4.5 Determinants of deforestation. Deforestation proxy: Agricultural	
land expansion	60
4.6 Determinants of deforestation. Deforestation proxy: Percentage	
in forest area forest	61
4.7 Breakdown of organically managed agricultural land	65
4.8 EKC estimation output	68

C

LIST OF FIGURES

Figure	Page
1.1 Deceasing Trend of South East Asia Forest Area	5
1.2 Empirical analysis of EKCs for deforestation	10
2.1 The Determinants of deforestation	15
2.2 EKC for Deforestation	32

T.



LIST OF ABBREVIATIONS

ADF	Augmented Dickey Fuller	
ARDL	Autoregressive Distributed Lag	
ASEAN	Association of South East Asian Nations	
DGSI	Directorate General of Small Industry	
EKC	Environmental Kuznets Curve	
EF	Ecological Footprint	
FAO	Food and Agriculture organization	
ITP	Income Turning Point	
UNEP	United Nations Environmental Programme	
FRA	Forest Research Assessment	
GDP	Gross Domestic Product	
GLS	Generalized Least Squares	
GMM	Generalized method of moments	
MG	Mean Group	
OECD	Organization for Economic Co-operation and Development	
OLS	Ordinary Least Square	
PES	Payment of Environmental Services	
PMG	Pooled Mean Group	
PP	Phillips Perron	
SME	Small and Medium Enterprise	
ТР	Turning Point	
WCED	World Commission on Environment and Development	
WRI	World Research Institute	

3

CHAPTER ONE

INTRODUCTION

1.1 Background Of Study

"The thinning, changing, and elimination of forests – deforestation, no less – is not a recent phenomenon; it is as old as the human occupation of the earth, and one of the key processes in the history of our transformation of its surface" Williams (2002).

In the history of development economics, environmental quality has been thought of as one of the key factors needed for the sustainable development of an economy. The issue of economic development and environmental quality cannot be discussed without reference to sustainable development.

The concept of sustainable development was first introduced in 1987 in the report titled "Our Common Future" submitted by the Brundtland Commission (Sujit, 2010); however, Theodore Roosevelt in 1910 had understood the concept of sustainability prior to the Bruntland Commission's report when he said in his speech "… I recognize the right and duty of this generation to develop and use the material resources of our land; but I do not recognize the right to waste them, or to rob, by wasteful use, the generations that come after us."

Accordingly, Daly (1988) and Daly (1990) viewed sustainable development as the development without throughput growth beyond environmental carrying capacity and that which is socially sustainable; it is seen as the development that meets the need of the present generation without compromising the ability of future generations to meet their own needs as well (The Brundtland Commission, 1987). World Wildlife Fund (1993)'s definition is also similar; they explained it as improvement in the quality of human life within the carrying capacity of supporting ecosystems.

Sustainable development should integrate the social and economic aspect of sustainability along with environmental sustainability to achieve all round sustainability. As economic sustainability is only concerned about the maximum level of utility that can be achieved over time with a particular level of natural endowment according to the economic theory of sustainability provided by Stiglitz (1974) and Dasgupta and Heal (1974) in (Markulev and Long, 2013), environmental sustainability is needed to ensure that the environmental carrying capacity and the life support systems of these natural endowment such as the forest, soil, water, atmosphere, and other natural resources, are kept in good condition and maintained in the hunt of achieving economic sustainability. Similarly, environmental sustainability is a prerequisite for social sustainability because environmental sustainability is needed by humans and it has originated because of social concerns; it seeks not to only uphold the natural physical capacity of the ecosystem, but rather, also to cause improvement in the welfare of human beings by caring for the



homes of the of those raw materials need for human existence (Goodland, 1995). Ultimately, it can be rightly said that there can neither be social sustainability nor economic sustainability without environmental sustainability, thus, environmental sustainability has found its rightful place in ensuring good environmental quality and it supplies the condition for global sustainability to be achieved.

Going down the path, the importance of environmental sustainability has become more paramount because the fall in the environment quality – the global life support systems, inflicts a limitation on everyone within the economy. The need for overall sustainability, through environmental sustainability arises from the acknowledgment of the fact that the extravagant, reckless and unfair present patterns of economic development, if projected into the near future will cause biophysical chaos. Since we do not have the capacity to create a new environment such as taking possession of the sun or invading the moon, efforts must therefore be put together to salvage the leftovers of the our sole environment by investing in the regeneration of our almost damaging environment.

Consequently, with the aim of revitalizing the damaging environment and achieve overall sustainability, numerous problems affecting the environment have been identified, few among them include: forest loss (deforestation), land degradation, pollution, carbon emission, increasing population, and global warming (Rudel and Roper 1997; Culas 2007; Culas 2011). Notably, however, Culas (2007) along host of other studies has opined that forest loss is amongst one of the severe problems of them all in the recent times as deforestation is inextricably linked with all these other environmental problems.

Forest provides habitats for animals and plants ranging from 50 percent to 90 percent of all species on earth; it is one of the richest biotic systems on earth (WCED, 1987). Forest and its resources guarantee the basic essentials of human such as nutrition and shelter in both developed and developing countries. Most of the forest loss (deforestation) recorded has happened in tropical developing countries because the condition for the growth of the economy and income causes an increase in the demand for forest and agricultural derived goods (Culas, 2011). Food and Agriculture Organization (FAO) in 2002 showed that during 1980s, about 15.4 million hectares (Ha) of tropical forests were deforested on an annual basis, in a more recent publication by FAO (2008), it indicated that deforestation had kept up at the rate of about 13 million hectares (Ha) annually. Deforestation, explained as the clearance or removal of forest whereas the land is thereafter converted to a non-forest use, is now a key factor in the reduction of ecosystem stability, loss of biological diversity, broken food chain, climate change, increased flood risk, loss (or outright extinction) of some species that are of economic and medicinal value (DeFries, Achard, Brown, et al. 2007; Skutsch, Bird, Trines, et al., 2007; Van Der Werf, Morton, DeFries, et al. 2009; Eva, Carboni, Achard et al. 2010). As a result of this, deforestation account for approximately 25 percent of the heat trapping emissions globally (Houghton, 1993); it maintains its position as one of the biggest causes of global carbon emissions emitting about 1.6 to 2.4 Pentagrams annually (Fearnside 2000; De Jong, Sam and Hung 2000; Naughton-Treves 2004), it contributes about 17 percent to 18 percent of the overall world's greenhouse gas emissions annually (World Resources Institute, 2008).



Due to the seriousness of forest loss (deforestation) and the important linkage it has with other environmental problems, deforestation has become a topical issue and a critical environmental concern to ecologists and environmentalists both in the developed and developing countries. Macro level study explored in explaining deforestation has followed two essential perspectives. The first perspective looks at the relationship inherent between deforestation and economic growth following the Environmental Kuznets Curve (EKC) hypothesis that was developed far back to the early 1990s; the other perspective looks at the determinants of deforestation in a quest to provide answers to the question "why does deforestation occur?"

The EKC hypothesis postulates that there exist an inverted U shaped pattern of relationship between economic development and environmental quality. In the case of EKC for deforestation, the dominant theoretical explanation is that as the economy strives to grow, the quest to achieve economic growth feeds directly on the natural forest land and its resources through agricultural land expansion and forest resources depletion thereby causing deforestation. But, at an increased level of growth, the demand for healthy environment increases with the risen income which pilots improved quality of the environment and enforcement of environmental regulation that results in flattening off, and then, gradual decline in deforestation.

On the other hand, investigating the determinant of deforestation has also being undertaking for proper understanding and subsequent control of those factors that intensify deforestation. Walker (1987) opined that deforestation results from some multifaceted social - economic courses, and in most of the time, it is very hard to identify a particular origin. This has made understanding the cause of deforestation to be identified as one of the main, if not the key, contentious issue of the global environmental change.

Nevertheless, since the 1980's, numerous effort have been launched to give explanation to the patterns of deforestation (Capistrano and Kiker 1995; Lambin 1997; Ehrhardt-Martinez 1998; Wibowo and Byron 1999; Palo and Uusivuori 1999; Wunder 2000; Mather and Needle 2000). Broadly speaking, major level categories namely, "proximate" and "underlying" causes have been identified as the two different categories of deforestation determinants. According to Turner, Moss, and Skole (1993) in Geist and Lambin (2001), proximate causes are seen to constitute (near-final or final) human activities that directly affect the environment, these proximate causes are wood extraction (logging), agricultural expansion, and expansion of infrastructure. Secondly, the underlying causes of deforestation. The underlying causes can be broadly grouped into five which are: economic factors, demographic factors, policy and institutional factors, technological factors, and a complex of socio-political or cultural factors.

This study therefore sets out to validate the EKC hypothesis for deforestation on the one hand, and also investigate the main proximate cause as well as identify its underlying causes of deforestation.

1.2 Deforestation In Southeast Asia

Southeast Asia, which consists of countries geographically lying within the east of India, south of China, north of Australia and west of New Guinea, is a sub region of Asia. These countries include Malaysia, Indonesia, Thailand, Philippines, Singapore, Cambodia, Laos PDR, Brunei, Myanmar, Vietnam, and East Timor. All of these countries of the Southeast Asian region are members of the Association of South East Asian Nations (ASEAN) apart from East Timor.

Southeast Asia; a tropical hot region with abundant rainfall which has dry and wet seasons as a result of seasonal fluctuations in wind and a daily typical temperature that fluctuates between 70°F to 90°F; is a 3,100 mile long chain of about 20,000 islands strung between Australia and Asia. Its landed area is just about 1.6 million square miles $(4,000,000 \text{ km}^2)$ located on the longitude 95° to 105° east and latitude 20° north to 16° south. Southeast Asia is one of the sparsely settled regions of the Asian continent. In 2010, the population was 593 million out of which 42% of it lived in the urban areas. The population as at 2010 is just twice the proportion in 1970 and had only increased by 84 % over the quarter century since 1985. The population has being projected to grow by 19% (increase by 113 million) over the 20 year period of 2010 - 2030.

Southeast Asia has a biological diversity and wealth incomparable with the African and Amazon rainforests. Southeast Asia is the home for the oldest rainforest in the world (Chui, Abdul Rahim, Hassan, et al, 2010). Furthermore, the region houses 4 of the 25 global biodiversity hotspots in the entire world (Myers, Mittermeier, Mittermeier, et al., 2000) and contains world's third largest tropical forests (with the Amazon being the largest, and the Congo basin in Africa the second largest).

Unfortunately, this region as well is experiencing deforestation faster than any tropical region (Sodhi, Koh, Brook, et al., 2004; Sodhi and Brook, 2006) due to habitat fragmentation, agricultural expansion, forest fires, urbanization and logging (Sodhi, Koh, Clements, et al., 2010). This has put quite a lot of essential percentage of the earth's species in this region under considerable danger of possible extinction (Myers et al. 2000; Brook, Sodhi and Ng 2003; Cardillo, Mace, Gittleman, et al., 2006; Lee and Jetz, 2008)



Figure 1.1 Deceasing Trend of South East Asia Forest Area Source: FAO, 2010

According to Billington, Kapos, Edwards, et al. (1996), nearly the entire Southeast Asia forest was covered 8,000 years ago. The region was one of the biggest reservoirs of biodiversity on earth and home to one of the highest concentrations of endemic species (Sodhi and Brook, 2006). The forest is made up of the tropical rainforests covering just about 60 percent of the total forest area (tropical dry forests and tropical moist deciduous forests accounting for approximately 15 percent each while mountain forests accounts for another 10 percent). Mangrove forests located in the boundary between land and sea in this region corresponds to almost one – third of the total mangrove cover in the world (FAO 2001, FAO 2007), in addition to the available freshwater and peat swamp forests (Miettinen, Shi and Liew, 2011).

Today, only about 50 percent of the original forest area of the Southeast Asia is now covered, nearly all of the countries within this region have faced a swift downward trend in total forest area because forest clearing in the region has persisted at a very fast pace in the last decade and demonstrated little or no sign of reduction. This severe deforestation which causes habitat loss for various endangered species has made the region to have the fewest remaining primary rainforests.

Extensive deforestation in Southeast Asian region started at some point in the 1800s due to expansion in agricultural required for catching up with the growing global and internal demand (Flint, 1994). As such, the planting of perennial export crops, such as oil palm, rubber and coconut accounted for approximately 20 percent to 30 percent of the entire cultivated area of the Southeast Asian region (Flint, 1994).



After 1950, the growing demand for Asian produced timber paved way to the explosion of commercialization of logging activities solely because the region's rainforests are mostly profitable to the logging industry for both exports as well as domestic consumption due to its varied species (Whitmore, 1998). Between the years of 1880 and 1980, Southeast Asia had gone through a typical forest loss of about 0.3 percent annually (Flint, 1994). During the following decades, natural forest loss in the Southeast Asian region had persisted at a rate of about 1.4 percent (WRI 2003; FAO 2001), a rate which was recorded to be higher than the rates of other tropical regions of South America at 0.5 percent, and Central America and the Caribbean at 1.2 percent (WRI 2003). As a matter of fact, Mayaux, Holmgren, Achard, et al. (2005) opined that the Southeast Asian rates of forest degradation and deforestation were calculated to be just about twice of those of Latin America and tropical Africa.

As the measured rate of forest loss in this region has increased, deforestation within tropical Asia has contributed about 49.5 percent of the total released carbons emitted into the atmosphere in the 1990's (Houghton, 2003). As a matter of fact, the Food and Agriculture Organization (FAO 2005) reported that between 1990 and 2005, about 43.6 million hectares (Ha) of land was deforested in the foremost forest countries of Southeast Asia corresponding to a release of million tons of carbon. Specifically, as seen from the Table 1.1 below, the annual carbon emission is recorded at 225.74 million tons for the Southeast Asia countries. Between 2005 and 2010, the total forest area in Southeast Asia had throttled down at 0.5 percent annually as compared to 0.3 percent during the preceding five years. In sum, between 1990 and 2010 the total Southeast Asia forests have shrank by around 33 million hectares (Ha), an area bigger than the size of Vietnam (FAO 2010). The breakdown of the contraction is such that between 2000 and 2010, the primary forest has decreased from 663,000km² to 640,000km² denoting about -0.35 percent per year, while the secondary forest (selected logged, that is, forests left to regenerate naturally according to the FAO) is more evident at -0.67 percent per year denoting a decrease from 1,442,000 km² to 1,348,000 km² (FAO, 2010; Wilcove, Giam, Edwards, et al., 2013).

Country	Forest cover 2005 (1000 Ha)	Average annual change in forest area 1990-2005	Average annual carbon emissions
Country		absolute (1000 Ha)	1990-2005 (MtC)
Cambodia	10,447	-166.6	-20.16
Indonesia	88,495	-1,871.5	-125.39
LAO	16,142	-78.1	-3.83
Malaysia	20,890	-99.1	-16.64
Myanmar	32,222	-466.5	-45.71
Philippines	7,162	-277.5	-30.94
Thailand	14,520	-96.3	-4.72
Vietnam	12,931	237.9	21.65
Papua New	29,437	-139.1	n/a
Guinea			
TOTAL	232,246	-2,906.7	-225.74

Table 1.1 Deforestation in Southeast Asian countries, 1990-2005

Sources: FAO 2005; FAO 2007 as cited in Gibbs, Brown, Niles, et al. 2007.

As a result of the deforestation trend in Southeast Asia, total forest area in the region has been predicted to plunge down from 49 percent in 2010 to 46 percent in 2020, resulting to about 16 million hectares (Ha) loss, an area just about the land size of Cambodia, due to losses in the majority of countries within the region. Furthermore, between 13 percent and 42 percent of its biodiversity is predicted to be lost by 2100, at least, 50 percent of which could signify total extinctions (Sodhi et al. 2004). Three-quarters of its original total forests and about 50 percent of its species has also been predicted to be lost by 2100 (Brook, Sodhi and Ng 2003).

Consequently, deforestation in Southeast Asia has remain a serious problem (Wilcove et al, 2013), its forests have turn out to become a significant focus of international climate change abatement efforts (Uryu, Mott, Foaed, et al., 2008) based on the understanding that the adverse effect of the continued deforestation will not only affect this region alone but may seriously eventually spread over the entire world in the coming decades as the region is the house to one of the utmost concentrations of endemic species (Myers, et al 2000). Unless meaningful action is implemented to tackle key drivers (proximate cause) of forests loss, countless number of countries will fall deficient of forest cover advantages and values related with forests covers will be lost finally.

1.3 Statement Of Problem

Deforestation has become a growing concern as a result of the increase in shrinking rates of total tropical forest areas without counter-measures such as afforestation. Deforestation defined technically by World Resources Institute (2000) as the conversion of forested land to non-forested land, or the reduction of forest cover within a forest, has now, and always been a huge phenomenon in Asia and in all other regions of the world owing to the less importance given to the environmental effect of the "grow first, clean up later" strategy adopted in the quest to achieve economic growth. As a result of this, countries within the Southeast Asian region, notably Indonesia, alongside host of other countries has been mentioned at one time or the other as one of the forefront countries with high rates of deforestation.

The region of Southeast Asia has experienced deforestation faster than any tropical region (Archard et al. 2002; Sodhi, Koh, Brook, et al., 2004; Sodhi and Brook, 2006) due to habitat fragmentation, agricultural expansion, forest fires, urbanization and logging (Sodhi, Koh, Clements, et al., 2010). This has put quite a lot of essential percentage of the earth's species in this region under considerable danger of possible extinction (Myers et al. 2000; Brook, Sodhi and Ng 2003; Cardillo, Mace, Gittleman, et al., 2006; Lee and Jetz, 2008).

As it was rightly stated by Billington et al. (1996), about 8,000 years ago, the entirety of Southeast Asia forest was covered. What we have today is only about 50 percent of the original forest area. Southeast Asia had experienced forest loss of about 0.3 percent annually (Flint, 1994) from 1880 - 1980, and about 1.4 percent at the following decade (WRI 2003; FAO 2001). This rate of forest loss was seen to higher than those of the other tropical regions of South America at 0.5 percent, and Central America and the Caribbean at 1.2 percent (WRI 2003). As a matter of fact, Mayaux, Holmgren, Achard, et al. (2005) opined that the Southeast Asian rates of forest degradation and deforestation were calculated to be just about twice of those of Latin America and tropical Africa

In sum, between 1990 and 2010, the total Southeast Asia forests have shrank by around 33 million hectares (Ha), an area bigger than the size of Vietnam (FAO 2010), one of the countries within the region.

The problems caused by this excessive deforestation, apart from the already highlighted ones, often indirectly inflict substantial costs on the economy in the short run. The source of revenue of more than two hundred million forest settlers and poor inhabitants depending solely on the resources such as food, fibre and fuel obtained from the forest is impaired. This causes inter-temporal opportunity cost to arise in the long run because possible revenues obtainable from the forest and environmental values will be lost by the future generations yet to come. At large, in possess treat on the environmental sustainability.

These problems resulting from deforestation has shown to us that deforestation is a form of resource abuse. It is economically wasteful, environmentally negative and socially undesirable (Culas and Dutta, 2003). Even though some sorts of forest degradation and deforestation lead to some benefits to the society, the costs associated with it exceed the gains. Hence, those types of deforestation are inappropriate (Contreras-Hermosilla, 2000; Culas and Dutta, 2003).

The problems highlighted above do not imply that attempts have not being made to properly study the problem of deforestation. Rather, the ongoing trend and direction of forest loss recorded within the Southeast Asia region has warranted a proper

investigation on the previous works done on deforestation. Unfortunately, majority of the prior macro studies on determinants of deforestation has been built on out-of-order methodology. Prior macro studies have been investigated using the traditional panel estimation procedure which explicitly imposes homogenous assumptions on the countries within the study group, it is not to say that it is not possible for economies to experience homogeneity in there deforestation relationships, however, this important conclusion should be based on adequate empirical testing rather than been explicitly imposed. Furthermore, majority of the deforestation models has based their analysis on the deforestation rate calculated from the total forest area data obtained from the FAO database. This variable however has been well known for its major shortcoming and inadequacies in terms of variable definition and data gathering process, these inadequacies will be fully explained in the second chapter. Similarly, in the attempt to shed light on the forest transition pattern, most studies have also failed to classify the different determinants of deforestation into their rightful classification. As already been pointed out in the introduction, determinant of deforestation can be categorized under the direct (proximate) and the underlying causes. However, most deforestation models has combined factors (variables) belonging to both categories (underlying and proximate causes) in a single deforestation model as highlighted in Culas and Dutta (2003). A typical example is the Mahapatra and Kant (2005)'s conclusion that "population growth, forest area size, agriculture and road construction are the primary determinants of deforestation in forest abundant regions while in regions where forests are only not as abundant, debt service growth was also identified in addition to roads and agricultural expansion as the main causes of deforestation" (Codjoe and Dzanku 2009). This assertion clearly shows that clear distinctions about the different classification of deforestation determinants is still lacking in deforestation literature because road expansion, agricultural land expansion are known to be the direct causes while population growth, debt service and forest area size are known to be the underlying factors. In this kind of model formulation, an independent variable becomes another function of several other independent variables in the model which could lead to a high level of multicollinearity statistically (Culas, 2011). These major shortcomings have been known to blur and create confusion over the cause - effect relationship inherent in deforestation studies, which is needed for the proper policy formulation and implementation.

 \bigcirc

Borrowing from the insights from Kant and Redantz (1997), Angelsen and Kaimowitz (1999), and Angelsen, Shitinidi, and Aarrestad (1999) already implemented in Culas (2011), the authors have suggested that it is of paramount essence to set apart the variables to their different level categories, and then limit the study to a particular level category. This will help to pin-point the missing cause - effect relationship that exists between the categories of the determinant of deforestation. Following from the above fact, and still considering the unrelenting trend in the loss of forest area in Southeast Asia, it is very important and crucial to properly categorize determinants of deforestation, thoroughly identify the proximate cause, and then empirically explaining the underlying factors that result in this proximate cause.

Much been already said about the determinants of deforestation, the empirical result for the EKC for deforestation has not been very fascinating as well. Majority of the EKC studies for deforestation has not supported the EKC hypothesis; According to Choumert, Motel and Dakpo (2013), more than 50 percent of the total published regressions since 1992 (see Figure 1.2) do not agree with the EKC for deforestation. Reiterating the fact about the forest area within the Southeast Asia which has been on the downward path even at the phase of economic growth questions the validity of EKC in this region, it causes doubt in the fact that environmental problems is suppose to subside as the economy grows. This reported trend of mixed result has encouraged several authors to reject the EKC, especially Stern (2004) and Levinson (2002) and their standpoint has a major implication on the general acceptability of the EKC theory.



Figure 1.2 Empirical analysis of EKCs for deforestation

Source: Choumert et al. 2013

Reflecting on the mixed results inherent in the deforestation study regarding the evidence of EKC hypothesis, which has caused several authors to express their dissatisfaction with the current literature, and has also motivated them to request for further empirical developments (Roy Chowdhury and Moran, 2013) due to its implication on the general acceptability of the EKC, it does worth to examine whether improvements made in choice of dependent variable and the econometric estimation procedures have had an effect on the existence of an EKC for deforestation.

1.4 Objective Of Study

The overall objective of the present research is to shed more light inherent in the relationship between economic development and environmental quality in Southeast Asia. In the quest to achieve this overall objective, the following specific objectives will be looked into:

- 1. To investigate proximate determinant of deforestation in Southeast Asia.
- 2. To identify the effect of the underlying causes on the proximate determinant of deforestation in Southeast Asia.
- 3. To validate the EKC hypothesis and estimate the Income Turning Point (ITP) of the EKC trajectories for deforestation in southeast Asia
- 4. To identify relevant policies to combat the proximate determinant of deforestation with the overall aim of ensuring sound environmental quality.

1.5 Significance Of Study

Most of the time, the economic aspect of sustainability has been given too much importance without considering neither the social nor the environmental aspect of it. It should be remembered vividly that it is the combination of these three factors (economic, social, and environmental) that make happen the global sustainability that we all strive to achieve. Therefore, there is need to popularize and to make important and relevant the environmental aspect of the global sustainability that we preach.

The reconciliation of these social, economic, and environmental dimensions of development helps to strengthen the effort to promote development that is sustainable through measures to promote sustainable consumption and production, improve the quality of life, and sustainably manage the natural resource base (forest resources especially). Environmental sustainability is important to achieve and sustain economic development, poverty eradication, and social development.

Of the various forms of environmental quality indicators /problems, deforestation tends to hold a unique appeal because it has a negative consequence upon global climate and biodiversity caused by the collapse of economic systems in reflecting the exact value of the environment and due to the fact that the loss of forest cover (deforestation) is distinctively entwined with almost all other type of environmental problem such as carbon emission, climate change, pollution etc. By studying deforestation with the aim of formulating policy to help reduce its impact, we are indirectly curbing the outbreak of these other environmental problems.

This analysis, solely focused on deforestation aims to extend and improve on prior analyses made on this indicator within the Southeast Asian region. As we might know, most studies have discussed the relationships and linkages between economic development and environmental quality focusing on so many environmental quality indicators such as air pollution and water pollution, with varying and different outcomes but without vivid focus on the main determinant of deforestation. It is important to reiterate here that current developments in the climate change literature has put forward the prospective role of forests cover in mitigation climate change (Stern, 2007), thus the justification to further investigate into deforestation (because deforestation is the clearance of forest lands) with the aim of improving on the present state of environmental chaos . Choumert et al (2013) quoting from Angelsen and Kaimowitz (1999) stated that "the role of forests in mitigating global environmental threats, such

as climate change and biodiversity erosion, is a research imperative and has been motivating considerable efforts towards understanding patterns and causes of the deforestation process and, in fine, to deriving policy implications"

Coming from a different perspective, the livelihood and the sustainability of over millions of forest dwellers and likewise poor settlers are dependent on the resources such as fiber, food, fuel and fodder that are gotten from the forest. These forest dwellers' source of living and most wild forest animals' habitat are being disrupted due to deforestation. This research therefore will provide hope for the forest dweller and help to protect the habitat of the forest animals.

Importantly, in the quest to achieve the aims and objectives of this research, the recent methodology in estimating non-stationary heterogeneous panels proposed by Peseran, Shin and Smith (1999) that permits for slope heterogeneity will be adopted. It is imperative to opine that from the reviewed literature so far, no research has been conducted on deforestation for the countries under study using the methodology to be adopted.

Lastly, the outcome of this study will provide relevant and up to date information as it regards to deforestation in Southeast Asia, and thereby help the relevant authority to propagate and implement relevant policies. The findings of the study are anticipated to contribute immensely to the environmental development and sustainability of Southeast Asia economy.

In the chapter one above, an appropriate introduction has being tendered to explain the issue of economic growth and environmental quality in Southeast Asia. Out of the numerous environmental quality indicators, the author has filtered through the numerous environmental quality indicators and focused on deforestation based on the alarming rate of deforestation within the region under study coupled with some estimation flaws that has being gathered from literature. These flaws were the motivating factor to reinvestigate the issue of deforestation within the region within the region with some specific objectives at heart.

REFERENCES

- Abdul Rahim, A and Mohd Shahwahid, H. (2009). Determinants of deforestation in Peninsular Malaysia: An ARDL Approach. *The Malaysian forester*, 72(2):155-164.
- Abdul Rahim, A and Zariyawati M. (2009). Sustainable Forest management practices and West Malaysian Log market. *Asian Social Science*, 5(6): 69-76.
- <u>Acheson</u>, J., and <u>McCloskey</u>, J. (2008). Causes of Deforestation: The Maine Case. <u>Human Ecology</u>, 36 (6): 909-922.
- Allen, J., and Barnes, D. (1985). The causes of deforestation in developing countries. Annals of the Association of American Geographer, 75(1985):163–184.
- Anderson, D., and Cavandish, W. (2001). Dynamic simulation and environmental policy analysis: beyond comparative statics and environmental Kuznets curve. Oxford Economic Papers, 53(2001): 721–746. doi: 10.1093/oep/53.4.721.
- Andreoni, J., and Levinson, A. (2001). The simple analytics of the Environmental Kuznets Curve. *Journal of Public Economics* 80(2): 269–286.
- Angelsen, A. (1995). Shifting Cultivation and Deforestation: A Study from Indonesia. *World Development* 23, (10): 1713-1729.
- Angelsen, A. (1999). Agricultural expansion and deforestation: Modelling the impact of population, market forces and property rights. *Journal of Development Economics*, 58 (1): 185-218.
- Angelsen, A., and Kaimowitz, D. (1999). Rethinking the causes of deforestation: Lessons from economic models. *World Bank Res. Obs.* 14 (1): 73–98.
- Angelsen, A., Shitinidi, E., and Aarrestad, J. (1999). Why do farmers expand their land into forests? Theories and evidence from Tanzania. *Environment and Development Economics*, 4(1999): 313–333.
- Antle, J., and Heidebrink, G. (1995). Environment and Development: Theory and International Evidence. *Economic Development and Cultural Change* 43(3): 603–25.
- Antons, C. (2010). The role of traditional knowledge and access to genetic resources in biodiversity conservation in Southeast Asia. *Biodiversity and Conservation*, 19(4) 1189 – 1204. doi:10.1007/s10531-010-9816-y)
- Apergis, N., and Payne, J. (2010). Renewable energy consumption and growth in Eurasia. *Energy Economics* 32(2010): 1392–1397.

- Araujo, C., Araujo Bonjean, C., Combes, J. et al. (2009). Property rights and deforestation in the Brazilian Amazon. *Ecological Economics*, 68: 2461–2468.
- Arcand, J., Guillaumont, P., and Jeanneney, S. (2008). Deforestation and the real exchange rate. *Journal of Development Economics* 86 (2): 242–262.
- Awung, W. Underlying Causes of Deforestation and Forest Degradation in Cameroon. Paper presented at the Underlying Causes Initiative Workshop, Accra, Ghana. 26-30 October, 1998.
- Azomahou, T., Laisney, F., and Nguyen Van, P. (2006). Economic development and CO2 emissions: a nonparametric panel approach. *Journal of Public Economics*, 90 (2006): 1347–1363.
- Balooni, K., Pulhin, J., and Inoue, M. (2008). The effectiveness of decentralisation reforms in the Philippines's forestry sector. *Geoforum*, 39 (2008): 2122–2131.
- Barbier, E. (1994). Natural capital and the economics of environment and development.
 In A. Jansson, M. Hammer, C. Folke and R. Costanza (Eds.). *Investing in Natural Capital: The Ecological Economics Approach to Sustainability*. New York: Columbia University Press.
- Barbier, E. (2004). Explaining agricultural land expansion and deforestation in developing countries. *American Journal of Agricultural Economic*, 86(2004): 1347–1353.
- Barbier, E., Burgess, J., and Folke, C. (1995). Paradise Lost? *The Ecological Economics* of *Biodiversity*. London: Earth Scan Publications.
- Barbier, E., and Burgess, J. (2001). The Economics of Tropical Deforestation. *Journal of Economic Surveys*, 15(3): 413–33.
- Barbier, E., Burgess, J., and Grainger, A. (2010). The forest transition: Towards a more comprehensive theoretical framework. *Land Use Policy*, 27(2):98–107.
- Barbosa, L. (2001). The Brazilian Amazon Rainforest: Global Ecopolitics, Development, and Democracy. New York: University of American Press.
- Barraclough, S., and Ghimire, K. (2000). *Agricultural expansion and tropical deforestation*. London: Earthscan.
- Barret, S., and Graddy, K. (2000). Freedom, Growth, and the Environment. *Environment and Development Economics*. 5(2000): 433-456.

- Basu, A., and Nayak, N. (2011). Underlying causes of forest cover change in Odisha, India. *Forest Policy and Economics*, <u>13(7)</u>: 563–569.
- Bawa, K., and Dayanandan, S. (1997). Socio-economic factors and tropical deforestation. *Nature*, 386(1997): 562–563.
- Beckerman, W. (1992). Economic growth and the environment: whose growth? Whose environment? *World Development*, 20(1992): 481-496.
- Benhin, J. (2006). Agriculture and Deforestation in the Tropics: A Critical Theoretical and Empirical Review. AMBIO: A Journal of the Human Environment, 35(1): 9-16. doi: 10.1579/0044-7447-35.1.9.
- Beria L., Hendrayanto, I., Joko, P., and Nanang, R. (2009). Financing mechanisms for sustainable forest management in Indonesia: the role of public financing instruments. In *Strategies and financial mechanisms for sustainable use and conservation of forests: experiences from Latin America and Asia*. Proceedings of an Inter-Regional Workshop Chiang Mai, Thailand, 20-22 Novenmber, 2006. Appanah, S., Mansur, E., and Krezdorn, R.(Eds). Rap Publication.
- Bhattarai, M., and Hammig, M. (2001). Institutions and the environmental Kuznets curve for deforestation: a cross-country analysis for Latin America, Africa and Asia. *World Dev.*, 29 (6): 995–1010.
- Bhattarai, M., and Hammig, M. (2004). Governance, economic policy, and the environmental Kuznets curve for natural tropical forests. *Environment and Development Economics*, 9(2004): 367–382.
- Bickford, D. Supriatna J, Nanda Y, et al. (2008). Indonesia's protected areas need more protection-suggestions from island examples. In N. Sodhi, G. Acciaioli, M. Erb, A. Tan (Eds.). *Biodiversity and human livelihoods in protected areas: case studies from the Malay Archipelago* (pp 53–77). Cambridge: Cambridge University Press.
- Bildirici, M., and Kayikci, F., (2012). Economic growth and electricity consumption in former Soviet Republics. *Energy Economics*, 34 (2012):747–753.
- Bildirici, M., and Kayikci, F. (2013). Effects of oil production on economic growth in Eurasian countries: Panel ARDL approach. *Energy* 49(2013) 156-161.
- Billington, C., Kapos, V., Edwards, M., et al. (1996) Estimated Original Forest Cover Map – A First Attempt. World Conservation Monitoring Centre (<u>http://www.unep-wcmc.org/forest/original.htm</u>.
- Bilsborrow, R., and Geores, M. (1994). Population, land-use and the environment in developing countries. In Brown, K., and Pearce, D. (Eds.), *The causes of tropical deforestation. The economic and statistical analysis of factors giving rise to the loss of the tropical forest* (pp. 106–130). London: UCL Press.

- Bjerke, B. (2000). A typified, culture-based, interpretation of management of SMEs in Southeast Asia. *Asia Pacific Journal of Management*, 17 (2000): 103-132.
- Brook, B., Sodhi, N., and Ng, P. (2003). Catastrophic extinctions follow deforestation in Singapore. *Nature*, 424(2003): 420–423.

Brundtland Commission (1987). Our Common Future. Oxford: University Press.

- Bruvoll, A., and Hege, M. (2003). Factors behind the Environmental Kuznets Curve. *Environmental and Resource Economics* 24(2): 27–48.
- Bui, D., and Hong, B. (2006). Payments For Environmental Services In Vietnam: Assessing An Economic Approach To Sustainable Forest Management. *Economy* and Environment Program for Southeast Asia Research Report No. 2006-RR3.
- Buitenzorgy, M., and Mol, A. (2011). Does Democracy Lead to a Better Environment? Deforestation and the Democratic Transition Peak. *Environmental and Resource Economics*, 48(1):59-70. doi: 10.1007/s10640-010-9397-y.
- Bulte, E., and Barbier, E. (2005). Trade and Renewable Resources in a Second Best World: An Overview. *Environmental and Resource Economics*, 30(4): 423-463. doi: 10.1007/s10640-004-5022-2.
- Burns, T., Kick, E., and Davis, B. (1997). Position in the world-system and national emissions of greenhouse gases. *Journal of world-systems research*, 3: 432-466.
- Burns T, Kick E, and Davis, B. (2003). Theorizing and Rethinking Linkages between the Natural Environment and the Modern World-System: Deforestation in the Late 20th Century. *Journal of World-Systems Research*, 357-392.
- Burns, T., Kick, E., and Davis, B. (2006). A quantitative, cross-section of deforestation in the late 20th century: A case of recursion exploitation. In A. Jorgensen and E. Kick, (Eds.) *Globalization and the environment* (pp 37-60). Brill academic press.
- Butler, R., and Laurence, W. (2009). Is oil palm the next emerging threat to the Amazon? *Tropical Conservation Science* 2:1–10.
- Capistrano, A. (1994). Tropical forest depletion and the changing macroeconomy 1967– 85. In K. Brown, D. Pearce, (Eds.) *The causes of tropical deforestation. The economic and statistical analysis of factors giving rise to the loss of the tropical forest* (pp. 65–85). London: UCL Press.
- Capistrano, A. (1990). Macroeconomic Influences on Tropical Forest Depletion: a Cross-Country Analysis. Unpublished Doctoral Dissertation, Department of Food and Resource Economics, University of Florida, Gainsville.

- Capistrano, A., and Kiker, C. (1995). Macro-scale economic influences on tropical forest depletion. *Ecol. Econ.*, 14: 21–29.
- Cardillo, M., Mace, G., Gittleman, J., et al (2006). Latent extinction risk and the future battlegrounds of mammal conservation. Proceedings of the National Academy of Sciences USA 103, 4157–4161.
- Casson, A. (2000). The Hesitant Boom: Indonesia's Oil Palm Sub-sector in an Era of Economic Crisis and Political Change. *Occasional Paper No. 29.* Bogor, Indonesia: Center for International Forestry Research (CIFOR).
- Caviglia-Harris, J., Chambers, D., and Kahn, J. (2009). Taking the "U" out of Kuznets: A comprehensive analysis of the EKC and environmental degradation. *Ecological Economics*, 68(4): 1149-1159. doi: http://dx.doi.org/10.1016/j.ecolecon.2008.08.006.
- CCFM (2001) National Forestry Database. Available at <u>http://nfdp.ccfm.org/default.htm</u>
- Cederroth, S. (1995). Survival and profit in rural Java: the case of an East Javanese village. Richmond: Curzon Press.
- Chomitz, K., Buys, P., De Luca, G., et al., (2007). At loggerheads? Agricultural Expansion, Poverty Reduction, and Environment in Tropical Forests. *World Bank Policy Research Report*. Washington DC: World Bank.
- Choumert, J., Combes Motel, P., and Dakpo, H. (2013). Is the Environmental Kuznets Curve for deforestation a threatened theory? A meta-analysis of the literature. *Ecological Economics*, 90(0), 19-28. doi: <u>http://dx.doi.org/10.1016/j.ecolecon.2013.02.016</u>.
- Chui, C., Abdul Rahim, F., Hassan, F., et al. (2010). Exploring Tourist Experiencescape and Servicescape at Taman Negara (National Park Malaysia). *International Journal of Trade, Economics and Finance*, 1(1): 28-31.
- Codjoe, S., and Dzanku, F. (2009). Long-term Determinants of Deforestation in Ghana: The Role of Structural Adjustment Policies. *African Development Review*, 21(3): 558-588. doi: 10.1111/j.1467-8268.2009.00223.x.
- Cole, M. (2004). Trade, the pollution haven hypothesis and environmental Kuznets curve: examining the linkages. *Ecological Economics*, 48: 71–81.
- Combes Motel, P., Pirard, R., and Combes, J. (2009). A methodology to estimate impacts of domestic policies on deforestation: compensated successful efforts for "avoided deforestation" (REDD). *Ecological Economics*, 68: 680–691.

- Conti, R. The role of business association in the promotion of SMIs: the Philippines' experience. In *Promotion of SMEs. Policy environment and institutional framework* (pp 81-102). ZSIS Regional Workshops, Kuala Lumpur, 12-13 November, 1990.
- Contreras-Hermosilla, A. (2000): The Underlying Causes of Forest Decline. *Occasional Paper 30.* Bogor, Indonesia: Center for International Forestry Research (CIFOR).
- Copeland, B., and Gulati, S. (2004) Trade and the Environment in Developing Countries. In R. Lopez, J. Stiglitz and M. Toman (Eds.). *Sustainable Development: New Options and Policies*. Oxford: University press.
- Copeland, B., and Taylor, M. (2005). Free trade and global warming: a trade theory view of the Kyoto protocol. *Journal of Environmental Economics and Management*, 49(2): 205-234. doi: <u>http://dx.doi.org/10.1016/j.jeem.2004.04.006</u>.
- Corley, R., and Tinker, P. (2003). *The oil palm*, 4th edition. Oxford: Blackwell Publishing.
- Cropper, M., and Griffiths, C. (1994). The interaction of population growth and environmental quality. American *Economic Review*, Vol. 84 (1994): 250-254.
- Culas, R. (2006). Debt and deforestation: a review of causes and empirical evidence. *Journal of Developing Societies* 22 (4): 347–358.
- Culas, R. (2007). Deforestation and the environmental Kuznets curve: an institutional perspective. *Ecological Economics*, 61: 429–437.
- Culas, R. (2011). The underlying causes of deforestation and the pattern of forest transition: implication for the international REDD policy. In J. Daniels (Eds.) *Advances in environmental research*, 7(3): 73-93.
- Culas, R. (2012). REDD and forest transition: Tunnelling through the environmental Kuznets curve." *Ecological Economics* 79(0): 44-51.
- Culas, R., and Dutta, D. (2003). A re-examination of causes of deforestation and environmental Kuznets curve: evidences from Latin America, Africa and Asia. Working paper ECON 2003-2, Discipline of Economics, Faculty of Economics and Business, School of Economics and Political Science, The University of Sydney.
- Daly, H. (1988). On sustainable development and national accounts. In D. Collard, D. Pearce, D. Ulph.(Eds.) *Economics, Growth and Sustainable Environments*. New York: St. Martin's Press.

- Daly, H. (1990). Toward some operational principles of sustainable development. *Ecol. Econ.*, 2:1-6.
- Damette, O., and Delacote, P. (2011). Unsustainable timber harvesting, deforestation and the role of certification. *Ecological Economics*, 70(6): 1211-1219. doi: <u>http://dx.doi.org/10.1016/j.ecolecon.2011.01.025</u>.
- Damette, O., and Delacote, P. (2012). On the economic factors of deforestation: What can we learn from quantile analysis? *Economic Modelling*, 29(6): 2427-2434. doi: <u>http://dx.doi.org/10.1016/j.econmod.2012.06.015</u>.
- Dasgupta, P. (1996). The Economics of the Environment. *Environment and Development Economics*, 1: 387–428.
- Dasgupta, P. and Heal, G. 1974, 'The optimal depletion of exhaustible resources', *Review of Economic Studies*, vol. 41, pp. 3–28.
- Deacon, R. (1992). Controlling tropical deforestation: an analysis of alternative policies. *World Bank Policy Research WP1029*. Washington DC.
- Deacon, R. (1994). Deforestation and the rule of law in a cross-section of countries. Land Econ. 70 (4): 414–430.
- Deacon, R. and Norman, C. (2006). Does the environmental Kuznets curve describe how individual countries behave? *Land Economics*, 82: 291–315.
- DeFries, R., Achard, F., Brown, S., et al. (2007) Earth observations for estimating greenhouse gas emissions from deforestation in developing countries. *Environmental Science and Policy*, 10: 385–394.
- DeFries, R., Rudel, T., Uriarte, M., et al., (2010). Deforestation driven by urban population and agricultural trade in the twenty-first century. *Nature Geosciences* 3: 178–181.
- Deininger, K., and Minten, B. (1999): Poverty, Policies, and Deforestation: The Case of Mexico. *Economic Development and Cultural Change*, 47 (2) : 313-344.
- De Jong, W., Sam, D., and Hung, T. (2006). *Forest rehabilitation in Vietnam: histories, realities and future*. Bogor, Indonesia: Center for International Forestry Research (CIFOR).
- De Koninck, R. (1992). *Malay peasants coping with the world: breaking the community circle*. Singapore: Institute of Southeast Asian Studies.

- Dennis, R., Meijaard, E., Nasi, R., et al., (2008). Biodiversity conservation in Southeast Asian timber concessions: a critical evaluation of policy mechanisms and guidelines. *Ecology and Society* 13, 25 (online).
- Didia, D. (1997). Democracy, Political Instability and Tropical Deforestation. *Global Environmental Change* 7(1):63–76.
- Dinda, S. (2004). Environmental Kuznets Curve Hypothesis: A Survey. *Ecological Economics*, 49(4): 431–455.
- Easterly, W. (2001). The middle class consensus and economic development. *Journal of* economic growth 6(4): 317-335.
- Edmunds, D., and Wollenberg, E. (2003). Local Forest Management: The Impact of Devolution Policies. London: Earthscan.
- Edwards, D., Koh, L., and Laurence, W. (2011). Indonesia's REDD+ pact: saving imperiled forests or business as usual? *Biological Conservation*, 151 (1): 41–44.
- Effendi, T. (1993): Diversification of the rural economy: non-farm employment and incomes in Jatinom, Central Java. In C. Manning, and J. Hardjono, (Eds.). *Indonesia assessment 1993 Labour: sharing in the benefits of growth? Political and Social Change Monograph 20*, (pp 290- 302). Canberra: Research School of Pacific Studies, Australian National University.
- Ehrhardt-Martinez, K. (1998). Social Determinants of Deforestation in Developing Countries. *Social Forces* 77(2):567–86.
- Ehrhardt-Martinez, K. (1999). Social Determinants of Deforestation in Developing Countries— Correction. *Social Forces* 78(2):860–61.
- Ehrhardt- Martinez, K. Crenshaw, E., and Jenkins, J. (2002). Deforestation and the Environmental Kuznets Curve: A Cross- National Investigation of Intervening Mechanisms. *Social Science Quarterly*, 83(1): 226–43.
- Ehrlich, P., and Ehrlich, A. (1981). *Extinction: The Causes and Consequences of the Disappearance of Species* (pp 1-305). New York: Random House.
- Engle, R., and Granger, C. (1987). Cointegration and Error Correction: representation estimation and testing. *Econometrica* 55, 251–276.
- Enters, T., Durst, P., and Victor, M. (2000). *Decentralization and Devolution of Forest Management in Asia and the Pacific.* Bangkok: FAO and RECOFTC.
- Entorf, H. (1997). Random walks with drifts: Nonsense regression and spurious fixedeffect estimation. *Journal of Econometrics* 80(2): 287-296.

- Epule, E., Peng C., Lepage, L., et al. (2011). Forest Loss Triggers in Cameroon: A Quantitative Assessment Using Multiple Linear Regression Approach. *Journal of Geography and Geology*, 3 (1): 30-41.
- Eva, H., Carboni, S., Achard, F., et al. (2010). Monitoring forest areas from continental to territorial levels using a sample of medium spatial resolution satellite imagery. *ISPRS Journal of Photogrammetry and Remote Sensing*, 65: 191–197.
- Evers, H. (1991). Trade as Off-Farm Employment in Central Java. *Journal of Social Issues in Southeast Asia*, 6 (1) 1-21. 21.
- Ewers, R. (2006). Interaction effects between economic development and forest cover determine deforestation rates. *Global Environmental Change*, 16: 161–169.
- Eyzaguirre, J. (2005). Composición de los ingresos familiares de campesinos indígenas. Un estudio en seis regiones de Bolivia. CIPCA, Centro de Investigación y Promoción del Campesinado, La Paz.
- Fairhead, J., and Leach, M. (1995). False Forest History, Complicit Social Analysis: Rethinking Some West African Environmental Narratives. World Development, 23 (6) 1023-1035.
- Food and Agriculture Organisation (FAO) 1993. Forest Resources Assessment 1990: Tropical Countries. Rome: FAO.
- Food and Agriculture Organisation (FAO) 1997. State of the World's Forests. Rome:FAO
- Food and Agriculture Organisation (FAO) 1999. *State of the World's Forests 1999*. Available online at <u>www.fao.org/forestry//foda/pubinfo/pubinf-e.stm</u>.
- Food and Agriculture Organisation (FAO) 2001. FAO Production Yearbook 1999, vol. 53. Rome: FAO.
- Food and Agriculture Organisation (FAO) 2002. *State of the World Forest 2001*. Rome: FAO.
- Food and Agriculture Organisation (FAO) 2003. *State of the World's Forests 2003*. Rome: FAO.
- Food and Agriculture Organisation (FAO) 2005. *Global forest resources assessment:* progress towards sustainable forest management. Rome: FAO.
- Food and Agriculture Organisation (FAO) 2006. *Global Forest Assessment 2005*. Rome: FAO.

- Food and Agriculture Organisation (FAO) 2007. State of Food and Agriculture Report: Paying Farmers for Environmental Services. Rome: FAO.
- Food and Agriculture Organisation (FAO) 2008. *State of the World's Forests* 2007.Rome: FAO.
- Food and Agriculture Organisation (FAO) 2010. *Global Forest Resources Assessment* 2010 Main Report. Rome: FAO.
- Food and Agriculture Organisation (FAO) 2011. State of the World's forests 2011. Rome: FAO.
- Farzin, Y., and Bond, C. (2006). Democracy and environmental quality. Journal of Development Economics, 81(1): 213-235. doi: <u>http://dx.doi.org/10.1016/j.jdeveco.2005.04.003</u>.
- Fausold, C., and Lilieholm, R. (1999). The Economic Value of Open Space: A Review and Synthesis. *Environmental Management*, 23(3): 307-320. doi: 10.1007/s002679900188.
- Fearnside, P. (2000). Global warming and tropical land-use change: greenhouse gas emissions from biomass burning, decomposition and soils in forest conversion, shifting cultivation and secondary vegetation. *Climatic Change*, 46:115–158.
- Ferraro, P. (2001). Global habitat protection: limitations of development interventions and a role for conservation performance payments. *Conserv. Biol.*, 15, 990–1000.
- Flint, E., (1994). Changes in land use in South and Southeast Asia from 1880 to 1980: a data base prepared as part of a coordinated research program on carbon fluxes in the tropics. *Chemosphere*, 29: 1015–1062.
- Foster, A., Rosenzweig, M., Behrman, J. (2002). Population Growth, Income Growth and Deforestation: Management of Village Common Land in India. Department of Economics, Brown University.
- Fukuyama, F. (1999). *The Great disruption : Human Nature and the reconstitution of social order*. London: Profile Books
- Gangadharan, L., and Valenzuela, M. (2001). Inter-relationships between income, health and the environment: extending the Environmental Kuznets curve hypothesis. *Ecological Economics*, 36 (3): 513–531.
- Gawande, K., Berrens, R., and Bohara, A. (2001). A consumption based theory of the environmental Kuznets curve. *Ecological economics*, 37 (1), 101–112.

- Geist, H., and Lambin, E., (2001). What drives tropical deforestation? A meta-analysis of proximate and underlying causes of deforestation based on sub national case study evidence, Louvain-la-Neuve: LUCC International Project Office University of Louvain.
- Gergiou, S., Whittington, D., Pearce, D., et al. (1997). *Economic value and the environment in the developing world*. London: Edward Elgar.
- Gibbs, H., Brown, S., Niles, J., et al. (2007). Monitoring and estimating tropical forest carbon stocks: making REDD a reality. *Environ Res Lett*, 2:1
- Gibson, L., Lee, T., Koh, L. et al (2011). Primary forests are irreplaceable for sustaining tropical biodiversity. *Nature* 478:378–381.
- Goodland, R. (1995). The Concept of Environmental Sustainability. Annual Review of Ecology and Systematics, 26: 1-24.
- Grainger, A. (1995). The forest transition: an alternative approach. Area 27 (3): 242–251.
- Grainger, A., and Malayang, B. (2004). A model of policy changes to secure sustainable forest management and control of deforestation in the Philippines. *Forest Policy and Economics*, 8: 67–80.
- Grainger, A., Francisco, H., and Tiraswat, P. (2003). The impact of changes in agricultural technology on long-term trends in deforestation. *Land Use Policy*, 20(3): 209-223. doi: <u>http://dx.doi.org/10.1016/S0264-8377(03)00009-7</u>.
- Grepperud, S. (1996). Population Pressure and Land Degradation: The Case of Ethiopia. *Journal of Environmental Economics and Management*, 30(1): 18-33. doi: <u>http://dx.doi.org/10.1006/jeem.1996.0002</u>.
- Grossman, G., and Krueger, A. (1991). Environmental impacts of a North American Free Trade Agreement. *NBER Working Paper No. 3914*.
- Grossman, G., and Krueger, A. (1993). Environmental impacts of a North American Free Trade Agreement. In P. Garber (Ed.). *The Mexico–US Free Trade Agreement* (pp. 13–56). Cambridge: MIT Press.
- Grossman, G., and Krueger, A. (1995). Economic growth and the environment. *Quarterly Journal of Economics*, 60: 353–377.
- Heerink, N., Mulatu, A., and Bulte, E. (2001). Income inequality and the environment: aggregation bias in environmental Kuznets curves. *Ecological Economics*, 38(3):359–367.

- Holtz-Eakin, D., and Selden, T. (1995). Stoking the fires? CO2 emissions and economic growth. *Journal of Public Economics*, 57: 85–101.
- Houghton, R. (1993). The role of the world's forest in global warming. In K.Ramakrishna, and G. Woodwell, (Eds.). *The World Forests for the Future* (pp. 21–58.). New Haven: Yale University Press.
- Houghton, R. (1991). Tropical deforestation and atmospheric carbon dioxide. *Climate Change*, 19: 99–118.
- Im, K., Pesaran, M., and Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics*, 115: 53–74.
- Inman, K. (1992). Fueling Expansion in the Third World. Society and Natural Resources, 6:17-39.
- Inman, K. (1993). Fuelling expansion in the third world: population, development, debt and the global decline of forests. *Society and Natural Resources* 6, 17–39.
- Ismail, H., and Nurhajar, Z. (2009). Financing mechanisms for sustainable forest management in Indonesia: the role of public financing instruments. In *Strategies* and financial mechanisms for sustainable use and conservation of forests: experiences from Latin America and Asia. Proceedings of an Inter-Regional Workshop Chiang Mai, Thailand, 20-22 November, 2006. Appanah, S., Mansur, E., and Krezdorn, R.(Eds). Rap Publication.
- Johansen, S., and Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration with applications to the demand for money. *Oxford Bulletin of Economics and Statistics*, 52(2): 169-210. doi: 10.1111/j.1468-0084.1990.mp52002003.x.
- Jorgenson, A. (2006). Unequal Ecological Exchange and Environmental Degradation: A Theoretical Proposition and Cross-National Study of Deforestation, 1990–2000. *Rural Sociology*, *71*(4): 685-712. doi: 10.1526/003601106781262016.
- Jorgenson, A. (2008). Structural Integration and The Trees: An Analysis of Deforestation in Less-Developed Countries, 1990–2005. Sociological Quarterly, 49(3):503-527. doi: 10.1111/j.1533-8525.2008.00126.x.
- Kahn, J., and McDonald, J. (1994). International debt and deforestation. In K. Brown, D. Pearce (Eds.).*The Causes of Tropical Deforestation* (pp. 57–67). Oxford: UCL Press.
- Kahn, J., and McDonald, J. (1995). Third-world debt and tropical deforestation. *Ecol. Econ.*, 12: 107–123.

- Kahuthu, A. (2006). Economic Growth and Environmental Degradation in a Global Context. *Environment, Development and Sustainability, 8*(1): 55-68. doi: 10.1007/s10668-005-0785-3.
- Kant, S., and Redantz, A. (1997). An econometric model of tropical deforestation. J. *Forest Econ.*, 3 (1): 51–86.
- Kao, C. (1999). Spurious regression and residual-based tests for cointegration in panel data when the cross-section and time series dimensions are comparable. *Journal of Econometrics*, 90: 1-44.
- Katila, M. *Modeling deforestation in Thailand*. Paper presented at the IUFRO World Congress, Tampere, Finland. 1995.
- Kaufmann, R., Davidsdottir, B., Garnham, S., et al., (1998). The determinants of atmospheric SO2 concentrations: reconsidering the Environmental Kuznets Curve. *Ecological Economics*, 25: 209 220.
- <u>Kerkvliet, B.,</u> and <u>Porter</u>, D. (1995). Rural Vietnam in Rural Asia. In B. <u>Kerkvliet</u>, and D. <u>Porter</u> (Eds.) *Vietnam's Rural Transformation* (pp 1–37). Boulder: Westview Press.
- Khanna, N. (2002). The income elasticity of non point source air pollutants: revisiting the environmental Kuznets curve. *Economic Letters*, 77 (2002): 387–392.
- Kishor, N., and Belle, A. (2004). Does improvement governance contribute to sustainable forest management? *Journal of sustainable forestry*, 19 (1,2,3): 55-79.
- Koop, G., and Tole, L. (1999). Is there an environmental Kuznets curve for deforestation. J. Dev. Econ., 58: 231–244.
- Koop, G., and Tole, L. (2001). Deforestation, distribution and development. *Global Environmental Change*, 11(3): 193–202.
- Kothke, M., Leischner, B., and Elsasser, P. (2013). Uniform global deforestation patterns An empirical analysis. *Forest Policy and Economics*, 28(0), 23-37. doi: <u>http://dx.doi.org/10.1016/j.forpol.2013.01.001</u>
- Kummer, D. (1992). Remote sensing and tropical deforestation: a cautionary note from the Philippines. *Photogrammetric Engineering and Remote Sensing*, 58: 1469–71.
- Kummer, D., and Turner, B. (1994). The Human Causes of Deforestation in Southeast Asia, *BioScience* 44 (5): 323-328.
- Kurtilla, K., Hyde, W., and Barnes, D. (1995). Urban energy consumption and periurban deforestation. *For. Ecol. Manag.*, 74 (2): 181–195.

- Kuznets, S. (1955). Economic growth and income inequality. *American Economic Review*, 49 (1955): 1-28.
- Lambin, E. (1994). Modelling deforestation processes. A review. *TREES Series B*, *Research Report No.1*. Institute for Remote Sensing Applications, European Commission Joint Research Centre, Ispra, Italy.
- Lambin, E. (1997): Modelling and monitoring land-cover change processes in tropical regions. *Progress in Physical Geography*, 21 (3): 375-393.
- Lantz, V. (2002). Is there an Environmental Kuznets Curve for Clear-cutting in Canadian Forests? *Journal of Forest Economics*, 8(3): 199–212.
- Larson, A. (2002). Natural resources and decentralization in Nicaragua: are local governments up to the job? *World Development*, 30: 17–31.
- Laurin, F. (2012). Trade and regional growth in Spain: panel cointegration in a small sample. *Applied Economics*, 44(4): 435-447.
- Lawrence, W. (2007). Forest destruction in tropical Asia. *Current Science*, 93 (1): 1544-1550.
- Ledec, G. (1985). The political economy of tropical deforestation. In J. Leonard (Ed.). *Diverting Nature's Capital. The Political Economy of Environmental Abuse in the Third World* (179-226). New York: Holmes and Maier.
- Lee, T., and Jetz, W. (2008). Future battlegrounds for conservation under global change. *Proc. R. Soc. B*, 275 (1640): 1261-1270. doi:10.1098/rspb.2007.1732.
- Leonard, H. (1985). *Divesting Nature's Capital. The Political Economy of Environmental Abuse in the Third World.* New York: Holmes and Meier.
- Levinson, A. (2002). The ups and downs of the environmental Kuznets curve. In J. List and A. de Zeeuw (Eds.) *Recent advances in environmental economics*. London: Edward Elgar.
- Li, Q., and Reuveny, R. (2006). Democracy and Environmental Degradation. International Studies Quarterly, 50(4): 935-956. doi: 10.1111/j.1468-2478.2006.00432.x.
- Lopez, R. (1994). The environment as a factor of production: the effects of economic growth and trade liberalization. *J. Environ. Econ. Manage.*, 27: 163–184.
- Lopez, R. (1997). Environmental externalities in traditional agriculture and the impact of trade liberalization: the case of Ghana. *J. Dev. Econ.*, 53: 17–39.

- Lopez, R. and Galinato, G. (2005). Deforestation and Forest-Induced Carbon Dioxide Emissions in Tropical Countries: How Do Governance and Trade Openness Affect the Forest-Income Relationship? *The Journal of Environment Development*, 14(1): 73-100. doi: 10.1177/1070496504273878.
- Lumley, S. (1997). The environment and the ethics of discounting: an empirical analysis. *Ecological Economics*, 20: 71–82.
- Maeso-Fernandez, F., Osbat, C., and Schnatz, B. (2004). Towards the estimation of equilibrium exchange rates for CEE acceding countries: methodological issues and a panel cointegration perspective. *Working Paper Series 0353*. European Central Bank.
- Mahapatra, K., and Kant, S. (2005). Tropical deforestation: a multinomial logistic model and some country-specific policy prescriptions. *Forest Policy and Economics*, 7: 1–24.
- Mainardi, S. (1998). An econometric analysis of factors affecting tropical and subtropical deforestation. *Agrekon.*, 37 (1), 23-62.
- Malky, A., and Espioza, S. (2010). Factibilidad económica y proyeccion de negocio para la producción de cacao en el norte de La Paz. *Conservation Strategy Fund, Serie Técnica 19.* Bolivia: La Paz.
- Malthus, T. (1983). An Essay on the Principle of Population. New York: Penguin Books.
- Manarungsan, S. (1989). Economic Development in Thailand, 1650-1950: Response to the Challenge of the World Economy. Dissertation by faculty Economics, University of Groningen, http://irs.ub.rug.nl/ppn/05528597X.
- Mapedza, E. (2007). Forestry policy in colonial and postcolonial Zimbabwe: continuity and change. *Journal of Historical Geography*, 33: 833–851.
- Markulev, A. and Long, A. 2013 *On sustainability: an economic approach*, Staff Research Note, Productivity Commission, Canberra.
- Marshall, M., and Jaggers, K. (2002). Polity IV Project: Political Regime Characteristics and Transitions, 1800-2002. Dataset Users' Manual. College Park, Maryland, United States: University of Maryland. www.cidcm.umd.edu/inscr/polity.
- Martínez-Zarzoso, I., and Bengochea-Morancho, A. (2004). Pooled mean group estimation of an environmental Kuznets curve for CO2. *Economics Letters*, 82(1): 121-126. doi: http://dx.doi.org/10.1016/j.econlet.2003.07.008

- Mather, A., Needle, C., and Coull, J. (1998). From resource crisis to sustainability: the forest transition in Denmark. *International Journal of Sustainable Development and World Ecology*, 5: 182–193.
- Mather, A., Needle, C., and Fairbairn, J. (1999). Environmental Kuznets Curves and Forest Trends. *Geography*, 84(362):55–65.
- Mather, A., and Needle, C. (2000). The relationships of population and forest trends. *The Geographical Journal*, 166: 2–13.
- May, D. (2006). Financing instruments and financing strategies for sustainable forest management in the Fiji Islands. In *Strategies and financial mechanisms for sustainable use and conservation of forests: experiences from Latin America and Asia*. Proceedings of an Inter-Regional Workshop Chiang Mai, Thailand, 20-22 Novenmber, 2006. Appanah, S., Mansur, E., and Krezdorn, R.(Eds). Rap Publication.
- Mayaux, P., Holmgren, P., Achard, F., et al., (2005) Tropical forest cover change in the 1990s and options for future monitoring. Philosophical Transactions of the Royal Society B, 360, 373–384.
- McCoskey, S., and Kao, C. (1998), A residual-based test of the null of cointegration in panel data. *Econometric Reviews*, <u>17(1)</u>: 57-84. doi: 10.1080/07474939808800403.
- McGrath, D., Nepstad, D., and Stickler, C. (2010). Smallholder, Rural Development and REDD in the Brazilian Amazon, <u>http://www.ipam.org.br/biblioteca/livro/Smallholders-Rural-Developmentand-</u> REDD-in-the-Brazilian-Amazon-/367. Amazon Environmental Research Center (IPAM), Brazil.
- Miettinen, J., Shi, C., and Liew, S. (2011). Deforestation rates in insular Southeast Asia between 2000 and 2010. *Global Change Biology*, 17(7): 2261-2270. doi: 10.1111/j.13652486.2011.02398.x.
- Merlevede, B., Verbeke, T., and De Clercq, M. (2006). The EKC for SO2: Does firm size matter? *Ecological Economics*, 59(4): 451-461. doi: <u>http://dx.doi.org/10.1016/j.ecolecon.2005.11.010</u>.
- Meyer, A., van Kooten, G., and Wang, S. (2003). Institutional, social and economic roots of deforestation: a cross-country comparison. *International Forestry Review*, 5: 29–37.
- Meyer, W., and Turner, B. (1992). Human population growth and global land use/ land-cover change. Annual Review of Ecology and Systematics, 3: 39-61.

- Michaelson, T., Schmidt, R., and Szaro, R. (1998). Capacity building for forestry research: discussion group report. In Proceedings of the International Consultation on Research and Information Systems in Forestry (ICRIS), 7–10 September 1998, Gmunden, Austria. Federal Ministry of Agriculture and Forestry, Vienna, Austria, pp. 144–146.
- Midlarsky, M. (1998). Democracy and the Environment. *Journal of Peace Research*, 35(3):341–61.
- Buitenzorgy, M., and Mol, A. (2011). Does Democracy Lead to a Better Environment? Deforestation and the Democratic Transition Peak. *Environmental and Resource Economics*, 48(1): 59-70. doi: 10.1007/s10640-010-9397-y.
- Man, N., and Sadiya, S. (2009). Off-farm employment participation among paddy farmers in the Muda Agricultural Development Authority and Kemasin Semerak granary areas of Malaysia. *Asia-pacific development journal*, 16 (2): 141-147.
- Mohd Shahwahid, H. (2009), Experiences in Financing Sustainable Forest Management in Asia-Pacific. In Strategies and financial mechanisms for sustainable use and conservation of forests: experiences from Latin America and Asia. Proceedings of an Inter-Regional Workshop Chiang Mai, Thailand, 20-22 Novenmber, 2006. Appanah, S., Mansur, E., and Krezdorn, R.(Eds). Rap Publication.
- Morrison, P. (1993). Transitions in rural Sarawak: off-farm employment in the Kamena Basin. *Pacific Viewpoint*, 34: 45-68.
- Moseley, G. (2001). African evidence on the relation of poverty, time preference and the environment. *Ecological Economics*, 38 (3)17–26.
- Muller, R., Pistorius, T., Rohde, S., et al., (2013). Policy options to reduce deforestation based on a systematic analysis of drivers and agents in lowland Bolivia. *Land Use Policy*, 30 (2013) 895–907.
- Munasinghe, M. (1999). Is environmental degradation an inevitable consequence of economic growth: tunneling through the environmental Kuznets curve. *Ecol. Econ.*, 29 (1): 89–109.
- Munck, G., and Verkuilen, J. (2002). Conceptualizing and Measuring Democracy, Evaluating Alternative Indices. *Comparative Political Studies*, 35(1): 5-34. doi: 10.1177/001041400203500101.
- Munoz, J., Welsh, D., Chan, S., et al., (2014). Microenterprises in Malaysia: a preliminary study of the factors for management success. *International Entrepreneurship and Management Journal*, 1-22. doi: 10.1007/s11365-014-0302-y.

- Mvondo, S. (2006). Decentralised forest resources and access of minorities to environmental justice: an analysis of the case of the Baka in southern Cameroon. *International Journal of Environmental Studies*, 63: 681–689.
- Myers, N. (1991). Tropical forest: Present status and future outlook. *Climate Change*, 19: 3-32.
- Myers, N. (1993). Population, environment and development. *Environmental Conservation*, 20: 205–216.
- Myers, N. (1994). Tropical deforestation: Rates and patterns. In K. Brown and D. Pearce (Eds.). The Causes of Tropical Deforestation: The Economic and Statistical Analysis of Factors Giving Rise to the Loss of the Tropical Forests. Vancouver: UBC Press.
- Myers, N., Mittermeier, R., Mittermeier, C. et al. (2000) Biodiversity hotspots for conservation priorities. *Nature*, 403:853–858.
- Myrdal, G. (1957). *Economic Theory and Under-Developed Regions*. London: G. Duckworth.
- Naito, T., and Traesupap, S. (2006). Is Shrimp Farming in Thailand Ecologically Sustainable? *Journal of the Faculty of Economics, KGU*, 16: 55-75.
- Naughton-Treves, L. (2004). Deforestation and Carbon Emissions at Tropical Frontiers: A Case Study from the Peruvian Amazon. *World Development*, *32*(1): 173-190. doi: http://dx.doi.org/10.1016/j.worlddev.2003.06.014.
- Neumayer, E. (2003). Pollution havens: why be afraid of international capital mobility? London School of Economics and Political Science. London: Mimeo.
- Nguyen Van, P., and Azomahou, T. (2007). Nonlinearities and heterogeneity in environmental quality: An empirical analysis of deforestation. *Journal of Development Economics*, 84(1): 291–309.
- North, D. (1990). Institutions, Institutional Change and Economic Performance. Cambridge: Cambridge University Press.
- Nygren, A. (2005). Community- based forest management within the context of institutional decentralization in Honduras. *World Development*, 33: 639–655.
- Ojima, D., Galvin, K., and Turner, B. (1994): The Global Impact of Land-use Change. *BioScience*, 44 (5): 300-304.
- *Off-farm and non-off farm employment in Southeast Asian transitional economies and Thailand.* Development Analysis Network, 2003.

- Pagdee, A., Kim, Y., and Daugherty, P. (2006). What makes community forest management successful: a meta-study from community forests throughout the world. *Society & Natural Resources*, 19 (1): 33–52.
- Palo, M. (1994). Population and deforestation. In K. Brown and D. Pearce (Eds.). The Causes of Tropical Deforestation. The economic and statistical analysis of factors giving rise to the loss of the tropical forests (42-56). London: University College London Press.
- Palo, M., Lehto, E., and Uusivuori, J. (2000). Modeling causes of deforestation with 477 subnational units. In M. Palo and H. Vanhanen (Eds.). World Forests from Deforestation to Transition? (pp. 101–124). Netherlands: Springer.
- Palo, M., and Lehto, E. (1996). Modeling underlying causes of pantropical deforestation.
 In M. Palo and G. Mery (Eds.). Sustainable forestry challenges for developing countries (pp. 27–62). London : Kluwer Academic Publishers.
- Palo, M., and Uusivuori, J. (1999). *World Forests, Society and Environment*. London: Kluwer Academic Publishers.
- Panayotou, T. (1993). Empirical tests and policy analysis of environmental degradation at different stages of economic development. *Technology and Employment Programme Working Paper WP238*. Geneva: International Labor Office.
- Panayotou, T. (1995). Environmental degradation at different stages of economic development. In I. Ahmed and J. Doeleman (Eds.). Beyond Rio: The Environmental Crisis and Sustainable Livelihoods in the Third World. Geneva: International Labor Office.
- Panayotou, T., and Sungsuwan, S. (1994). An econometric analysis of the causes of tropical deforestation: the case of northern Thailand. In K. Brown and D. Pearce (Eds.). The causes of tropical deforestation: The economic and statistical analysis of factors giving rise to the loss of the tropical forests (pp. 192-210). London: University College London Press.
- Pandey, K., and Wheeler, D. (2001). Structural adjustment and forest resources: the impact of World Bank operations. *World Bank working paper, 2584*. Washington, DC: World Bank.
- Pasha, R., and Beria, L. (2011). *PES and multi-strata coffee gardens in Sumberjaya, Indonesia.* Nairobi, Kenya: World Agroforestry Centre (ICRAF).
- Patel, S., Pinckney, T., and Jaeger, W. (1995). Smallholder wood production and population pressure in East Africa: evidence of an Environmental Kuznets Curve? *Land Economics*, 71(4): 516–533.

- Paudel, K., Zapata, H., and Susanto, D. (2005). An Empirical Test of Environmental Kuznets Curve for Water Pollution. *Environmental and Resource Economics*, 31(3): 325-348. doi: 10.1007/s10640-005-1544-5.
- Pedroni, P. (1997). Panel Cointegration: Asymptotic and Finite Sample Properties of Pooled Time Series Tests, with an Application to the PPP Hypothesis: New Results. Indiana University Working paper.
- Pedroni, P. (1999) Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and Statistics*, 61: 653-670.
- Pedroni, P. (2004). Panel cointegration. asymptotic and finite sample properties of pooled time series tests with an application to the PPP hypothesis. *Econometric Theory*, 20: 597–625.
- Peet, R. (2003). Unholy trinity: The IMF, the World Bank, and the WTO. London: Zed Books.
- Perez, C. (2006). Payment for environmental services: what can we learn from Costa Rica? In Strategies and financial mechanisms for sustainable use and conservation of forests: experiences from Latin America and Asia. Proceedings of an Inter-Regional Workshop Chiang Mai, Thailand, 20-22 November, 2006. Appanah, S., Mansur, E., and Krezdorn, R.(Eds). Rap Publication.
- Perrings, C., and Ansuategi, A. (2000). Sustainability, growth and development. Journal *of Economic Studies*, 27 (1/2): 19 54.
- Pesaran, M., Shin, Y., and Smith, R. (1997). Pooled Estimation of Long-Run Relationships in Dynamic Heterogenous Panels. *DAE Working Papers Amalgamated Series 9721*. University of Cambridge.
- Pesaran, M., Shin, Y., and Smith, R. (2001). Pooled mean group estimation of dynamic heterogeneous panels. J. Am. Stat. Assoc., 94: 621–634.
- Peters, C., Gentry, A., and Mendelssohn, A. (1989). Valuation of an Amazonian rainforest. *Nature* 339: 656-657.
- Pirard, R., and Belna, K. (2012). Agriculture and Deforestation: Is REDD+ Rooted In Evidence? *Forest Policy and Economics*, 21(0): 62-70.
- Posa, M., Diesmos, A., Sodhi, N., et al. (2008). Hope for threatened tropical biodiversity: lessons from the Philippines. *Bioscience*, 58:231–240. doi:10.1641/B580309.
- Post, J., and Snel, M. (2003). The impact of decentralized forest management in charcoal production practices in Eastern Senegal. *Geoforum*, 34: 85–98.

- Radetzki, M. (1992). Economic growth and environment. In P. Low (Ed.). *International Trade & the Environment*. The World Bank, Washington, DC.
- Ramankutty, N., Foley, J., and Olejniczak, N. (2002). People on the Land: Changes in Global Population and Croplands during the 20th Century. *AMBIO: A Journal of the Human Environment*, 31(3):251-257.
- Ranjan, R., and Upadhyay, V. (1999). Ecological problems due to shifting cultivation. Current *Science.*, 77 (10): 1246-1250.
- Repetto, R., and Gillis, M. (1988). *Public Policies and the Misuses of Forest Resources*. New York: Cambridge University Press.
- Ribot, J., Agrawal, A., and Larson, A. (2006). Recentralizing while decentralizing: how national governments reappropriate forest resources. *World Development*, 34: 1864–1886.
- Rigg, J. (1991). Grass-roots development in rural Thailand: a lost cause? World Development, 19: 199–211.
- Rigg, J. (1998). Rural-urban interactions, agriculture and wealth: a Southeast Asian perspective. *Progress in Human Geography*, 22(4): 497-522. doi: 10.1191/030913298667432980.
- Ritchie, M. *The village in context: arenas of social action and historical change in northern Thai peasant classes.* Paper presented at the Fifth International Thai Studies Conference, SOAS, London. July, 1993.
- Ritchie, M. Centralization and diversification: from local to non-local economic reproduction and resource control in northern Thailand. Paper presented at the Sixth International Conference on Thai Studies, Chiang Mai, Thailand. October 14-17, 1996.
- Robalino, J., and Herrera, L. (2010). <u>Trade and deforestation: A literature review</u>. WTO Staff Working Paper ERSD-2010-04.
- Rock, M. (1996). The stork, the plow, rural social structure and tropical deforestation in poor countries? *Ecol. Econ.*,18:113–131.
- Rodrik, D. (2000). Trade Policy Reform as Institutional Reform. In Hoekman (Ed.) *Developing Countries and the Next Round of WTO Negotiations*. London:Oxford University Press.
- Rosyadi, S., Birner, R., and Zeller, M. (2005). Creating political capital to promote devolution in the forestry sector: a case study of the forest Communities in

Banyumas district, Central Java, Indonesia. *Forest Policy and Economics*, 7: 213–226.

- Roy Chowdhury, R., and Moran, E. (2012). Turning the curve: A critical review of Kuznets approaches. *Applied Geography*, 32(1): 3-11. doi: <u>http://dx.doi.org/10.1016/j.apgeog.2010.07.004</u>)
- Rudel, T. (1989). Population, Development, and Tropical Deforestation: A Cross-National Study. *Rural Sociology*, 54:327–38.
- Rudel, T. (1998). Is there a forest transition? Deforestation, reforestation, and development. *Rural Sociol.*, 63 (4): 533–552.
- Rudel, T., and Roper, J. (1997). The paths to rain forest destruction: cross-national patterns of tropical deforestation, 1975–90. *World Development*, 25(1): 53–65.)
- Rudel, T., Coomes, O., Moran, E., et al. (2005). Forest transitions: towards a global understanding of land use change. *Global Environmental Change*, 15(1): 23–31.
- Ruitenbeek, H. (1992). The rainforest supply price: a tool for evaluating rainforest conservation expenditures. *Ecological Economics*,6 (1): 57-78.
- <u>Rupasingha</u>, A., <u>Goetz</u>, S., <u>Debertin</u>, D., et al. (2004). The environmental Kuznets curve for US counties: A spatial econometric analysis with extensions. <u>Papers</u> <u>in Regional Science</u>, 83(2) 407-424.
- Salam, M., and Noguchi, T. (1998). Factors influencing the loss of forest cover in bangladesh: An analysis from socioeconomic and demographic perspectives. *Journal of Forest Research*, 3(3): 145-150.
- Sandler, T. (1993). Tropical deforestation. Markets and market failures. *Land Economics*, 69 (3): 25-233.
- Schofer, E., and Hironaka, A. (2005). The Effects of World Society on Environmental Protection Outcomes. *Social Forces*, 84 (1): 25-47.doi: 10.1353/sof.2005.0127.
- Scrieciu, S. (2007). Can economic causes of tropical deforestation be identified at a global level? *Ecological Economics*, 62: 603–612.
- Selden, T., and Song, D. (1994). Environmental quality and development: Is there a Kuznets curve for air pollution emissions? *Journal of Environmental Economics* and Management, 27: 147–162.
- Shafik, N. (1994). Economic development and environmental quality: an econometric analysis. *Oxford Economic Papers*, 46 (1994): 757-773.

- Shafik, N. and Bandyopadhyay, S. (1992). Economic growth and environmental quality: time series and cross-country evidence. *Background Paper for the World Development Report 1992*. Washington, DC: The World Bank.
- Shandra, J. (2007). International Nongovernmental Organizations and Deforestation: good, bad, or irrelevant? *Social Science Quarterly*, 88: 665–689.
- Shandra, J. (2007a). Economic dependency, repression, and deforestation: a quantitative, cross national analysis. *Sociological inquiry*, 77(4): 543-57.
- Shandra, J. (2007b). The world polity and deforestation: A cross-national analysis. International *Journal of Comparative Sociology*, 48(1): 5–28.
- Shleifer, A., and Vishny, W. (1998). *The Grabbing hand: Government pathologies and their curves*. Cambridge: Harvard University Press.
- Sikor, T., and Thanh, T. (2006). Exclusive versus inclusive devolution in forest management: insights from forest land allocation in Vietnam's Central Highlands. *Land Use Policy*, 24: 644–653.
- Silva Chavez, G. (2005). Reducing emissions from Tropical deforestation by applying compensated reduction to Bolivia. In P. Moutinho and S. Schwartzman (Eds.). *Tropical Deforestation and Climate Change*. Washington, DC: Amazon Institute for Environmental Research, USA.
- Skonhoft, A. and Solem, H. (2001). Economic growth and land-use changes: the declining amount of wilderness land in Norway. *Ecological Economics*, 37: 289–301.
- Skutsch M, Bird N, Trines E et al. (2007) Clearing the way for reducing emissions from tropical deforestation. *Environmental Science & Policy*, 10(4), 322-334. doi: <u>http://dx.doi.org/10.1016/j.envsci.2006.08.009</u>
- Sodhi, N., Koh, L., Brook, B., et al., (2004). Southeast Asian biodiversity: an impending disaster. *Trends in Ecology and Evolution*, 19: 654–660.
- Sodhi, N., Acciaioli, G., Erb, et al., (2007). *Biodiversity and human livelihoods in protected areas: case studies from the Malay Archipelago*. Cambridge: Cambridge University Press.
- Sodhi, N., Lee, T., Koh, L., et al. (2008). A meta-analysis of the impact of anthropogenic forest disturbance on Southeast Asia's biotas. *Biotropica*, 41(1): 103–109.
- Sodhi, N., and Brook, B. (2006). *Southeast Asian Biodiversity in Crisis*. Cambridge: Cambridge University Press, UK.

- Sodhi, N., Koh, L., Clements, R., et al., (2010). Conserving Southeast Asian forest biodiversity in human-modified landscapes, *Biological Conservation*, 143 (2010): 2375–2384.
- Soon, T., and Huat, T.(1990). Economic policy and the development of small industries—comparison among five Southeast Asian countries. *Journal of Small Business & Entrepreneurship*, 7(4): 46-55. doi: 10.1080/08276331.1990.10600360.
- Southgate, D. (1994). Tropical deforestation and agricultural development in Latin America. In K. Brown and D. Pearce (Eds.). *The causes of tropical deforestation. The economic and statistical analysis of factors giving rise to the loss of the tropical forest* (pp. 134–143). London: UCL Press.
- Southgate, D. (1990). The causes of land degradation along 'spontaneously' expanding agricultural frontiers. *Land economics*, 66(1): 93-101.
- Southgate, D., Sierra, R., and Brown, L. (1991). The causes of tropical deforestation in Ecuador: A statistical analysis. *World Development*, 19: 1145-1151.
- Stern, D. (2004). The rise and fall of the environmental Kuznets Curve. World Development, 32: 1419–1439.
- Stern, N. (2007). *The economics of climate change: the Stern review*. Cambridge: Cambridge University Press.
- Stern, P., Young, O., and Druckman, D. (1992). *Global environmental change. Understanding the human dimensions.* Washington, D.C: National Academy Press.
- Stern, D., Common, M., and Barbier, E. (1996). Economic growth and environmental degradation: the environmental Kuznets curve and sustainable development. World Development, 24:1151–1160.
- Stiglitz, J. (1974). Growth with exhaustible natural resources: Efficient and optimal growth paths. *Review of Economic Studies*, vol. 41, pp. 123–137.
- Sujit, L. (2010). Environment, Sustainable Development and Climate Change: A Critical Review. *Journal of Peace Studies*, 17 (2/3)
- Sundar, N. (2001). Is devolution democratization? World Development, 29: 2007–2023.
- Sunmonu, O., and Abdul-Rahim, A. Environmental Kuznet Curve for Deforestation: A Panel ARDL Approach. In Making an Impact through Business and Economic transformation. Proceeding of the global conference on business and economic

research, Selangor, Malaysia. October 18-20, 2013. Faculty of Economics and Management, Universiti Putra Malaysia, 2013.

- Templeton, S., and Scherr, S. (1999). Effects of demographic and related microeconomic change on land quality in hills and mountains of developing countries. *World Development*, 27 (6): 903–918.
- Tiffen, M., Mortimore, M., and Gichuki, F. (1994). More people, less erosion: environmental recovery in Kenya. Chichester, New York: Wiley.
- To, P., Dressler, W., Mahanty, et al. (2012). The Prospects for Payment for Ecosystem Services (PES) in Vietnam: A Look at Three Payment Schemes. *Human Ecology*, 40(2): 237-249.
- Tole, L. (1998). Sources of deforestation in tropical developing countries. Environmental Management 22, 19–33.
- Torras, M., and Boyce, J. (1998). Income, inequality, and pollution: a reassessment of the Environmental Kuznets Curve. *Ecological Economics*, 25: 147–160.
- Turner, B., Clark, W., Kates, R., et al., (1990). The earth as transformed by human action. Global and regional changes in the biosphere over the past 300 years. New York: Cambridge University Press (with Clark University).
- Turner, B., Moss, R., and Skole, D. (1993). *Relating land use and global land-cover change*. A proposal for IGBP-HDP core project (IGBP Report; 24/HDP Report; 5).
- United Nations Development programme (UNDP) 1994. *Human Development report*. New York: Oxford University press.
- Uryu, Y., Mott, C., Foaed, N., et al. (2008). *Deforestation, forest degradation, biodiversity loss and Co2 emissions in Riau, Sumatra, Indonesia.* Jakarta: Indonesia Technical Report, WWF.
- Van Der Werf, G., Morton, D., DeFries, R., et al. (2009). CO2 emissions from forest loss. *Nature Geoscience*, 2: 737–738.
- Walker, R. (1987). Land Use Transition and Deforestation in Developing Countries. *Geographical Analysis*, 19 (1):18-30.
- Walton, J., and Ragin, C. (1990). Global and National Sources of Political Protest: Third World Responses to the Debt Crisis. *American Sociological Review*, 55 (6): 876-890.
- Wiedman, T., Minx, J., Barrett, J., et al. (2006). Allocating ecological footprints to final consumption categories with input–output analysis. *Ecological Economics*, 56 (1): 28–48.

- Wiler, H., and Kilcher, L. (2009). *The World of Organic Agriculture. Statistics and Emerging Trends 2009.* IFOAM, Bonin and FiBL, Frick.
- Whitmore, T. (1998). Tropical Rain Forests. New York: Oxford University Press.
- Wibowo, D., and Byron, R. (1999). Deforestation Mechanisms A Survey. *International Journal of Social Economics*, 26 (1/2/3): 455-474.
- Wilcove, D., Giam, X., Edwards, D., et al. (2013).Navjot's nightmare revisited: logging, agriculture, and biodiversity in Southeast Asia. *Trend in Ecology and Evolution*, 28(9):531-540.
- Willer, H., and Kilcher, L. (2009). *The world of organic agriculture, statistics and emerging trends 2009*. International Federation of Organic Agriculture Movements (IFOAM).
- Williams, M. (2002) Deforestation in historic times. In I. Douglas (Eds.). *Encyclopedia* of global change (pp. 259-264). Cambridge: Cambridge university press.
- World Commission on Environment and Development, (1987). *Our common future*. Oxford: Oxford University Press.
- World Bank, (1990). Indonesia: Sustainable Development of Forests, Land, and Water. Washington, DC: World Bank.
- World Bank, (1992). World Development Report 1992: Development and the Environment. New York: Oxford University Press.
- World Bank, (1996). Poverty reduction and the World Bank: Progress and challenges in the 1990s. Washington, DC: World Bank.
- World Bank, (2000). World development indicators. Washington, DC: World Bank.
- World Resources Institute, (1990). World Resources 1990–1991. New York: Oxford University Press
- World Resources Institute (WRI), 1999. Forest Resources: Temperate and Boreal Forests. Washington DC: World Resources Institute.
- World Resource Institute (WRI), 2000. World Resources. Oxford: Oxford University Press.
- World Resource Institute (WRI), 2003. World Resources 2002–2004: Decisions for the Earth: Balance, Voice, and Power. United Nations Development Programme, United Nations Environment Programme, World Bank and World Resources Institute.

- World Resource Institute (WRI), 2005. *EarthTrends—The Environmental Information Portal.* Washington, DC: World Resource Institute. http://earthtrends.wri.org/
- World Resource Institute (WRI), 2008. Trees in the Greenhouse: Why Climate Change is Transforming the Forest Products Business. Washington, DC: World Resources Institute.
- World Wildlife Fund, (1993). Sustainable Use of Natural Resources: Concepts, Issues and Criteria (pp1-32). Switzerland: Gland.
- Wunder, S. (2000). *The Economics of Deforestation: The Example of Ecuador*. New York: St. Martin Press.
- Wunder, S., and Verbist, B. (2003). *The impact of trade and macroeconomic policies on frontier deforestation*. Bogor, Indonesia: ICRAF South East Asia.
- Xepapadeas, A. (2005). Economic growth and the environment. In D. Maler and J. Vincent (Eds.). *Economywide and International Environmental Issues* (pp. 1219–1271). Elsevier.
- Young, C., and Bishop, J. (1995). Adjustment policies and the environment: a critical review of the literature. *CREED Working Paper Series 1*, International Institute for Environment and Development, London and the Institute for Environmental Studies, Vrije University, Amstersdam.
- Zea O'Phelan, M., Guachalla Argandona, J., and Molina, F. (2002). Medición de la efectividad del manejo del Sistema Nacional de Áreas Protegidas. Servicio Nacional de Áreas Protegidas. Bolivia : La Paz.
- Zhao, S., Peng, C., Jiang, H., et al. (2006). Land use change in Asia and the ecological consequences. *Ecological Research*, 21(6), 890-896. doi: 10.1007/s11284-006-0048-2.
- Zwane, A. (2007). Does Poverty Constrain Deforestation? Econometric Evidence from Peru. *Journal of Development Economics*, 84 (1): 330–49.