

UNIVERSITI PUTRA MALAYSIA

ECONOMIC IMPACT OF CLIMATE CHANGE ON MALAYSIAN RUBBER PRODUCTION

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ECONOMIC IMPACT OF CLIMATE CHANGE ON MALAYSIAN RUBBER PRODUCTION



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Abstract of the thesis presented to the senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Masters of Science

ECONOMIC IMPACT OF CLIMATE CHANGE ON MALAYSIAN RUBBER PRODUCTION

By

PARTHAJYOTI BORKOTOKY

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The incidence and intensity of extreme weather will be more frequent, which will likely challenge human and natural systems more than normal change. Agricultural sector falls under the primary damage sector due to climate change and is considered one of the most vulnerable sector to climate change. Climate has been changing in the conventional rubber growing regions of the country and the current temperature is at the higher end of the optimal temperature range for rubber crop. Thus further increases will adversely affected growth and productivity of natural rubber.

The main objective of this study is to estimate the economic impact of climate change on natural rubber in Peninsular Malaysia and to capture the marginal impact of weather conditions on the viability of production systems along with the future climate change impact by predicting the economic impact due to the expected climate change. The present study uses and extends the Ricardian Model to estimate the climate change impacts on Malaysian rubber production using time series data from 1980 -2010. Impacts were estimated by changes in net revenue of rubber for estates and smallholders and combination of both with change in climate. The future impact of change in temperature that is increase in temperature was found to have nonlinear effects on natural rubber production. The results of this study also highlight the importance of precipitation for natural rubber. Marginal impacts of the precipitation and temperature indicate direct and negative relationship between rubber net revenue. The results were in line to what was expected.

Furthermore marginal increase of temperature and precipitating will results in a loss of about RM 208 million in total. Based on future climate change scenarios from Atmosphere/Ocean General Circulation Model (AOGCMs) the rubber industry will bear a loss between RM 239/Ha to RM 805/Ha if no action is taken and in broader scale it losses between RM 246 million to RM 829 million in total.

Abstract of the thesis presented to the senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Master Sains

IMPAK EKONOMIK PERUBAHAN IKLIM TERHADAP PENGELUARAN GETAH MALAYSIA

Oleh

PARTHAJYOTI BORKOTOKY

Februari 2012

Pengerusi: Ismail Abd Latif, PhD

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Pertanian

Kejadian dan kekerapan cuaca buruk yang sudah menjadi kebiasaan akan mencabar sistem ekologi manusia dan semulajadi yang sedia ada. Sektor pertanian adalah yang paling mudah mengalami kerosakan yang disebabkan oleh perubahan cuaca. Cuaca telah berubah dalam kawasan pengeluaran getah utama di Malaysia dan ini akan mempengaruhi pertumbuhan dan produktiviti sektor getah asli. Objektif utama kajian ialah untuk menganggar impak perubahan cuaca terhadap sektor ekonomi getah asli di Semenanjung Malaysia. Kajian juga akan perubahan mendapatkan impak marginal perubahan cuaca terhadap viabiliti sistem pengeluaran dan mengunjur impak ekonomi yang disebabkan oleh keadaan tersebut.

Kajian ini menggunakan Model Ricardian untuk menganggar impak perubahan cuaca terhadap pengeluaran getah Malaysia dengan menggunakan data cuaca dari 1980 – 2010 di lima lokasi di Semenanjung Malaysia. Kesan impak dianggarkan melalui perubahan hasil bersih getah untuk pekebun kecil, estet dan kombinasi kedua sistem tersebut dengan perubahan cuaca.

Keputusan menunjukkan kesan impak perubahan suhu di masa hadapan yang tidak linear terhadap pengeluaran getah. Kajian juga menunjukkan kepentingan hujan dalam sektor getah asli. Impak marginal hujan bertalian secara terus manakala suhu bertalian secara negatif dengan hasil pulangan getah. Keputusan kajian ini adalah saperti yang dijangkakan.

Peningkatan marginal angkubah suhu dan hujan akan menyebabkan kerugian sejumlah RM 208 juta. Berdasarkan scenario perubahan cuaca masa hadapan dari *ATMOSPHERE/OCEAN GENERAL CIRCULATION MODEL*, industri getah akan mengalami kerugian di antara RM 239/ha hingga RM 805/ha jika tiada tindakan mitigasi diambil. Seterusnya ini akan meyebabkan jumlah kerugian terkumpul sejumlah RM 246 juta hingga RM 829 juta untuk tujuh puloh tahun dari 2025 sehingga tahun 2095.

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Finally, my regards and thanks to all those of you who have supported and encouraged me on to reach this level or the ones during my entire masters program. I certify that a Thesis Examination Committee has met on 8 February 2012 to conduct the final examination of Parthajyoti Borkotoky on his thesis entitled "Economic Impact of Climate Change on Malaysian Rubber Production" in accordance with the Universities and University College 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.

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DECLARATION

I declare that this thesis is my original work except for quotations and citations, which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Universiti Putra Malaysia or other Institution.

UPM

PARTHAJYOTI BORKOTOKY

Date: 8 February 2012

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