

Requested Additional Information from Senate Inquiry into Food Standards**Amendment (Truth in Labelling—Palm Oil) Bill 2010**

- a) Page CA 27: Senator Xenophon asked whether you had an understanding of ‘significant rest’.**

How long do you need to let the soil rest after the palm oil plantation can be replanted?

Whilst the life expectancy of the oil palm is approximately 22-25 years, it is most productive between the ages of 8 and 15¹ with its peak yield between the ages of 6 and 12.² Thereafter, its yield begins to decline.³ Jannick H Schmidt and K.O Lim state that the oil palm requires replanting after an absolute maximum of 25 years.⁴ Kah-Joo Goh and Rolf Härdter suggest this is a result of decreased yields.⁵ Idris Omar, Azman Ismail and Chang Lin Chong state that replanting at this age is necessary as the height of the oil palms begins to exceed the height of the harvesting pole.⁶ Furthermore, the oil palm becomes more susceptible to pest attack and disease after peak yield.⁷

¹ The United States Department of Agriculture <

<http://www.esajournals.org/doi/pdf/10.1890/100236>>accessed 4 May 2011.

² Azman Ismail and Mohd Noor Mamat, ‘The Optimal Age of Oil Palm Replanting’ Malaysian Palm Oil Board. Available at

<http://www.chgs.com.my/download/Oil%20Palm%20Industry%20Economic%20Journal/vol2%20no1/The%20Optimal%20Age%20of%20Oil%20Palm%20Replanting.pdf> accessed 7 May 2011; *Stephen Talania Keu*, ‘Review of previous similar studies on the environmental impacts of Oil Palm plantation cultivation on people, soil, water and forests ecosystems.’ Available at <<http://anthropology.uwaterloo.ca/WNB/SKeu%20Review%20of%20previous%20studies.htm>> accessed 7 May 2011.

³ Azman Ismail and Mohd Noor Mamat, ‘The Optimal Age of Oil Palm Replanting’ Malaysian Palm Oil Board. Available at

<http://www.chgs.com.my/download/Oil%20Palm%20Industry%20Economic%20Journal/vol2%20no1/The%20Optimal%20Age%20of%20Oil%20Palm%20Replanting.pdf> accessed 7 May 2011.

⁴ Jannick H Schmidt, ‘Life cycle assessment of rapeseed oil and Ph.D. thesis, Part 3: Life cycle inventory of rapeseed oil and palm oil palm oil’ (2007) Department of Development and Planning Aalborg University. Page 83. Available at

<http://people.plan.aau.dk/~jannick/Publications/Thesis_part3.pdf>accessed 2 May 2011. K.O Lim, ‘Oil Palm Plantations: A Plausible Renewable Source of Energy’ RERIC Available at <<http://www.thaiscience.info/journals/Article/Oil%20palm%20plantations%20%E2%80%93%20a%20plausible%20renewable%20source%20of%20energy.pdf>> accessed 2 May 2011.

⁵ Kah-Joo Goh and Rolf Härdter, ‘General Oil Palm Nutrition’

><http://www.aarsb.com.my/AgroMgmt/OilPalm/FertMgmt/NutrDefi/10%20Goh%20and%20H%C3%A4rdter.pdf>> accessed 2 May 2011.

⁶ Idris Omar, Azman Ismail and Chang Lin Chong, ‘Improving Productivity: The Replanting Imperative’ (2001) (1) OIL PALM INDUSTRY ECONOMIC JOURNAL. Available at <

To allow for the regeneration of soil nutrients, no new palms can be planted for several years after a plantation is no longer productive.⁸ Ismail and Mohd Noor Mamat suggest it takes approximately 3 years for the regeneration of the land and for the completion of numerous essential procedures such as weeding and fertilization (Table 1).⁹

Table 1. Tasks involved in preparing land for a palm oil plantation. Source: Azman Ismail and Mohd Noor Mamat, 'The Optimal Age of Oil Palm Replanting' Malaysian Palm Oil Board. Available at <http://www.chgs.com.my/download/Oil%20Palm%20Industry%20Economic%20Journal/vol2%20no1/The%20Optimal%20Age%20of%20Oil%20Palm%20Replanting.pdf> accessed 7 May 2011.

<http://www.chgs.com.my/download/Oil%20Palm%20Industry%20Economic%20Journal/vol1%20no1/Improving%20Productivity-The%20Replanting%20Imperative.pdf>> accessed 7 May 2011.

⁷ Idris Omar, Azman Ismail and Chang Lin Chong, '*Improving Productivity: The Replanting Imperative*' (2001) (1) OIL PALM INDUSTRY ECONOMIC JOURNAL. Available at <
<http://www.chgs.com.my/download/Oil%20Palm%20Industry%20Economic%20Journal/vol1%20no1/Improving%20Productivity-The%20Replanting%20Imperative.pdf>> accessed 7 May 2011.

⁸ Orangutan Outreach Unsustainable Palm Oil and the RSPO< <http://redapes.org/no-palm-oil>>accessed 2 May 2011.

⁹ Azman Ismail and Mohd Noor Mamat, 'The Optimal Age of Oil Palm Replanting' Malaysian Palm Oil Board. Available at
<http://www.chgs.com.my/download/Oil%20Palm%20Industry%20Economic%20Journal/vol2%20no1/The%20Optimal%20Age%20of%20Oil%20Palm%20Replanting.pdf> accessed 7 May 2011.

Cost	Year		
	1	2	3
Non- recurrent Costs:	2 023.09	-	-
Felling and clearing	606.43	-	-
Terracing and platform	216.29	-	-
Road construction	201.26	-	-
Drain construction	84.09	-	-
Lining and holing	199.33	-	-
Planting material	555.41	-	-
Other Non-recurrent Costs	160.28	-	-
Upkeep and Cultivation:	701.15	799.34	674.26
Weeding	150.78	81.32	233.49
Lalang control	26.98	28.71	53.12
Drains	49.95	41.67	33.69
Roads, bridges, paths, etc.	85.06	63.75	73.52
Soil/water conservation	29.57	39.45	13.77
Boundaries and survey	29.20	10.85	5.8
Cover crops	156.16	57.42	56.22
Census and supply	26.94	47.14	23.04
Pruning	15.05	17.83	29.04
Pests and diseases	78.45	96.31	73.1
Castration	16.20	19.33	38.9
Other costs of upkeep	36.81	95.56	40.44
Fertilization:	254.59	447.42	498.84
Fertilizers	197.25	361.85	414.42
Fertilizer application	44.34	73.76	73.87
Soil and water analysis	13.00	11.81	10.58
Total	2 978.83	1 246.76	1 173.13

Replanting involves the removal of old palm trees, management of biomass disposal, field lining and holing, transplanting mature seeds, maintenance and field upkeep and nursery establishment.¹⁰ The removal of old palm generally results in a proliferation of *Oryctes rhinoceros* beetles due to the breakdown of palm oil biomass. The decomposition of palm oil biomass also results in *Ganoderma boninense* disease and increased rat populations. *Ganoderma* species attack the palm roots and spreads to the bole of the stem, causing dry rot and thus preventing nutrients from being absorbed by the soft tissues. Consequently, the palm gradually loses its ability to produce fruits and eventually collapses.¹¹

¹⁰ Environmental Impact Assessment (EIA) Guidelines for Oil Palm Plantation Development State Environmental Conservation Department (ECD), Sabah Malaysia < <http://www.sabah.gov.my/ipas/programs/ecdcab/technical/OP211100.pdf> > accessed 6 May 2011.

¹¹ Ling-Hoak Ooi and Heriansyah, 'Palm Pulverisation in Sustainable Oil Palm Replanting' (2005) 8 (3) Plant Production Science pp.345-348.

b) Page CA 32: Senator Colbeck asked about evidence surrounding the lifecycle of palm oil plantations and yield patterns.

The nature of the palm oil production cycle can generally be divided into three phases: (a) a non-productive phase lasting three years after planting, (b) a period of steadily rising yield reaching a peak between the ages of six and 12, and (c) a period of declining yield. The last phase of the cycle is associated with increased production costs and declining profit.¹²

Do plantations use more water than rainforests?

In general, plantations reduce stream flows and groundwater. Mature plantations require more water than mature native vegetation. Greater water use by plantations means that their development in a predominantly cleared catchment could reduce river flows and groundwater recharge.¹³ As palm oil is a fast-growing crop with high yields, they have very high water requirements. During peak summer, mature plantations may require up to 350 litres per tree daily.

An oil-palm operation starts with the digging of canals to drain the area. This immediately results in a lowering of the water table, shrinking the peat layer by several metres.¹⁴ When established on peat land, palm oil plantations drain the water, therefore destroying the freshwater reservoir function, creating shortages

¹² *Orangutan Outreach* Unsustainable Palm Oil and the RSPO <http://redapes.org/no-palm-oil> accessed 2 May 2011.

¹³ Rodney J Keenan, Adam Gerrand, Sadanandan Nambiar and Mark Parsons, 'Plantations and water: Plantation impacts on stream flow' Australian Government Bureau of Rural Sciences' (2006). Available at <http://www.acera.unimelb.edu.au/materials/brochures/SDM-PlantationsWater.pdf> accessed 2 May 2011.

¹⁴ The United States Department of Agriculture <<http://www.esajournals.org/doi/pdf/10.1890/100236>> accessed 4 May 2011.

during the dry season.¹⁵ Between 1990 and 2010, peatland forest in South East Asia declined from 77% coverage to 36%.¹⁶

What is the ground like after planting?

The oil palm tree is a highly demanding crop for nutrients both for early growth and production, hence requiring high inherent soil fertility status. When planted on soils with low inherent fertility, oil palm requires more agronomic inputs to ensure adequate yields.¹⁷ The large quantities of fertilizer required have a detrimental impact on soil and vegetation.¹⁸ In addition, pesticides & herbicides are extensively used for weed and pest control to maximize crop yield.

Soil loss has been identified as a major impact derived by the oil palm plantation establishment. The very act of eradicating the native vegetation and pulverizing the soil to make it receptive to planted crops renders the soil much more vulnerable to erosion (Freeze, 1980). Most vulnerable is the soil's top layer, which is generally the soil most fertile horizon. The loss of top soil requires farmers use increased amounts of fertilizers to compensate for the reduced natural fertility. The increased application of such chemicals exacerbates the hazard of groundwater and surface water pollution (Williams, 1991). Numerous studies have found reduced levels of nitrogen in the topsoil of oil palm plantations in comparison to topsoil collected from local gardens.¹⁹

How much Carbon is stored in a palm oil plantation?

¹⁵ How palm-oil plantations at Tripa increase disaster risk, contribute to climate change and drive a unique Sumatran-orangutan population to extinction. Value of Tripa peatswamp forest, Aceh, Sumatra, Indonesia (2008). Available at < <http://www.sumatranorangutan.com/webauthor-data/39/Value-Tripa-9MB--15-Nov08.pdf> > accessed 2 May 2011.

¹⁶ Jukka Miettinen, Chenghua Shi, and Soo Chin Liew. 2011. Two decades of destruction in Southeast Asia's peat swamp forests. *Frontiers in Ecology and the Environment*

¹⁷ D.T. Sabrina, M. M. Hanafi, A.A. Nor Azwady & T. M. M. Mahmud, 'Earthworm Populations and Cast Properties in the Soils of Oil Palm Plantations' Malaysian Journal of Soil Science Vol. 13: 29-42

¹⁸ Stephen Tania Keu, 'Review of previous similar studies on the environmental impacts of Oil Palm plantation cultivation on people, soil, water and forests ecosystems.' Available at <<http://anthropology.uwaterloo.ca/WNB/SKeu%20Review%20of%20previous%20studies.htm>> accessed 7 May 2011.

¹⁹ 'Impacts of Oil Palm Activities in the Kokoda and Popondetta Catchments An Initial Environmental Examination' (2006)

<http://www.sprep.org/att/irc/ecopies/countries/papua_new_guinea/100.pdf> accessed 7 May 2011.

While a new oil palm plantation may grow faster and thus sequester carbon at a higher annual rate than a naturally regenerating forest, the oil plantation will still store less carbon (50-90% less over 20 years) than the original forest cover (Table 2). The carbon losses are even greater when the plantation is established on peat lands, which store huge amounts of carbon but release it as they are drained (upon exposure to air, peat rapidly oxidizes, decomposes, and releases carbon dioxide).²⁰ Noordwijk states that "You can vary the numbers, but qualitatively the story remains that the release of forest carbon stock to the atmosphere takes a very long time to be offset by whatever the claims are for plantation growth rates."²¹ It has been estimated that producing 1 tonne of palm oil will cause carbon dioxide emissions of between 15 and 70 tonnes over each 25-year planting lifecycle due to forest clearance, fires drainage and peat decomposition.²²

²⁰ Rhett A. Butler, Indonesian palm oil industry tries disinformation campaign' (2007) <http://news.mongabay.com/2007/1108-palm_oil.html> accessed 7 May 2011.

²¹ Rhett A. Butler, Indonesian palm oil industry tries disinformation campaign' (2007) <http://news.mongabay.com/2007/1108-palm_oil.html> accessed 7 May 2011.

²² Environment: the high price of planting palm oil forests (2007) European Commission: Research and Innovation <http://ec.europa.eu/research/headlines/news/article_07_12_21_en.html> accessed 7 May 2011.

Natural forest stores more carbon than oil palm plantations in Indonesia

Aboveground carbon density (metric tons/hectare)

sources: Sitompul 2000, Lasco 2002, Hainiah 2001, Tjitrosemito 2000, Noordwijk 2000

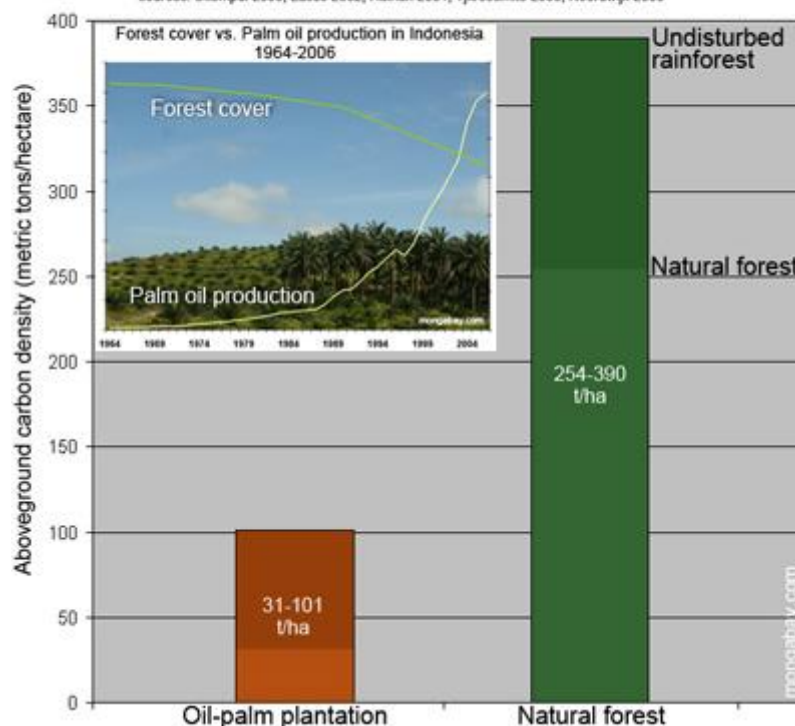


Table 2. Carbon storage of oil palm plantations versus natural forests, based on various sources.²³

Page CA 33: Senator Siewert asked whether you might have information about how useable soil is after a palm oil plantation in term chemical use, depletion of nutrients, et cetera.

The oil palm has a very high nutrient requirement, surpassed by only a few crops, such as banana.²⁴ The removal of palm oil bunches also removes many macro- and micronutrients from the soil. Whilst macronutrients can usually be replaced, micronutrients are far more complicated to restore. Imbalances in their supply can

²³ Rhett A. Butler, Indonesian palm oil industry tries disinformation campaign' (2007) <http://news.mongabay.com/2007/1108-palm_oil.html> accessed 7 May 2011.

²⁴ Soh, K.G. (1997) *Fertilizer Use by Crop: A Global Assessment*. Fertilizer Demand Working Group Meeting - Agro-Economics Committee, 18 May 1997, Beijing. 6p.

cause serious long-term consequences that increase the risk of diseases and instability.²⁵

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²⁵ *Orangutan Outreach* Unsustainable Palm Oil and the RSPO <http://redapes.org/no-palm-oil> accessed 2 May 2011.