Appendix 2.1 – Fingerprints of drivers of change in Amazonia. Each cell has the explanation for the possible outcomes of each driver shown in Table 2.1. Both tables were designed to be read together. Drivers divided into climatic, atmospheric and ecological.

.		**Climatic**	
\	↑ Dry season intensity	↑ Frequency of droughts (i.e. extreme conditions)	↑ Temperature
Spatial range of impact	Regional	Regional	Regional
.	.	.	.
Impact correlated with	.	Drier climate	Warmer climate
Consequences	gradual and progressive drying	.	.
Mechanism (individual level)	.	.	Alteration to photosynthetic metabolism
Photosynthesis	Decrease for isohydric plans (the ones that close stomata during to avoid hydraulic failure) (McDowell et al. 2008)	Decrease for isohydric plans (the ones that close stomata during to avoid hydraulic failure) (McDowell et al. 2008)	Increase in Rubisco oxygenating reaction, alteration in RuBP regeneration (Lloyd & Farquhar 2008). Potential damage to the photosynthetic apparatus under extremely high temperature
Above-ground Biomass	Increasing mortality (van Mantgem et al. 2009; Phillips et al. 2009) and decreasing growth (Feeley et al. 2007) will decrease AGB.	Increasing mortality (van Mantgem et al. 2009; Phillips et al. 2009) and decreasing growth (Feeley et al. 2007; Feldpausch et al. 2016) will decrease AGB.	Decrease as a consequence of alterations in photosynthetic rates, limited evidence.
Stem density	Increasing mortality (van Mantgem et al. 2009; Phillips et al. 2009) will decrease stem density, but increase in frequency of gaps can increase stem density.	Increasing mortality (van Mantgem et al. 2009; Phillips et al. 2009) will decrease stem density, but increase in frequency of gaps can increase stem density.	Decrease as a consequence of decreased growth and photosynthesis, limited evidence
Woody Productivity	Evidences of decreasing growth related to increase in dry season (Feeley et al. 2007).	Decreasing growth (Feldpausch et al. 2016)	Increase photosynthetic rates increasing growth (Lewis et al. 2004).
Mortality	Increasing mortality (van Mantgem et al. 2009; Phillips et al. 2009)	Increasing mortality (van Mantgem et al. 2009; Phillips et al. 2009)	Increase in forest dynamics, increasing mortality.
Recruitment	Increasing mortality (van Mantgem et al. 2009; Phillips et al. 2009) and decreasing growth (Feeley et al. 2007) might decrease recruitment.	Increasing mortality (van Mantgem et al. 2009; Phillips et al. 2009) and decreasing growth (Feeley et al. 2007) might decrease recruitment.	Increase in forest dynamics will increase recruitment.
Average size	Decrease in small trees following long term drying trend (Fauset et al. 2012).	Canopy trees tend to be more affected considering higher exposition to heat, evidences from Phillips (2010), average size might decrease.	Increase of larger trees, better competitors for light (Coomes et al. 2011).
Large trees	Will gain relatively with the mortality of small trees, evidence from Fauset et al. (2012)	Most likely to die from hydraulic failure (McDowell & Allen 2015).	Expected to increase, since are better light competitors (Coomes et al. 2011).
Small Trees	Most likely to die from carbon starvation and as cannot assess deeper soil-water reserves (Fauset et al. 2012)	Will gain relatively with the mortality of large trees	Expected to decrease, since are worse light competitors (Coomes et al. 2011).
Wood density	Decrease of wood density during long term dry trend in Africa (Fauset et al. 2012)	Pioneers and low density wood trees are more vulnerable to droughts (Phillips et al. 2009);	Light wood density trees may be more likely to suffer from hydraulic failure (McDowell & Allen 2015).
Zoochoric plants	?	?	?
Anemochoric plants	? Anemochory is normally related to dry tolerance.	? Anemochory is normally related to dry tolerance.	?
Compound leaved	? Compound leaves are often related to dry conditions.	? Compound leaves are often related to dry conditions	?
Nitrogen-fixing	?	?	?
Palms	?	?	?
Wet-affiliated taxa	Showed greater reduction in growth under dry season conditions (Rowland et al. 2013); tend to lose in experiments (Engelbretch et al. 2007) and observations (Fauset et al. 2012).	Showed greater reduction in growth under dry season conditions (Rowland et al. 2013); tend to lose in experiments (Engelbretch et al. 2007) and observations (Fauset et al. 2012).	Should lose under increased vapour pressure deficit
Dry affiliated taxa	Showed smaller reduction in growth under dry season conditions (Rowland et al. 2013); tend to gain in experiments (Engelbretch et al. 2007) and observations (Fauset et al.	Showed smaller reduction in growth under dry season conditions (Rowland et al. 2013); tend to gain in experiments (Engelbretch et al. 2007) and observations (Fauset et al.	Should gain under increased vapour pressure deficit
Light dependent taxa	Increase in pioneers and decrease of wood density correlated with drought in Africa (Fauset et al. 2012).	Pioneers and low density wood trees are more vulnerable to droughts (Phillips et al. 2009).	?
Shade tolerant taxa	Decrease in LAI might increase in sub canopy light, disadvantage for shade tolerant species, evidences in Fauset et al. (2012).	Pioneers and low density wood trees are more vulnerable to droughts (Phillips et al. 2009).	?
Canopy taxa	Increase in larger **taxa** in long term droughts (Fauset et al. 2012).	Canopy trees are most likely to die from hydraulic failure (McDowell & Allen 2015), may affect canopy taxa.	Canopy **stems** will be the most affected by heat, which could compromise canopy **taxa**
Understory taxa	Decrease in smaller taxa in long term droughts (Fauset et al. 2012).	Canopy trees are most likely to die from hydraulic failure (McDowell & Allen 2015), may affect canopy taxa.	Understorey **stems** will suffer less, so understorey **taxa** could potentially gain.

Appendix 2.1 – Fingerprints of drivers of change in Amazonia. (Continuation)

.	Atmospheric ↑[CO2]atm			
.				
Spatial range of impact	Global	.	.	
.	.	No stressful condition	.	Under stress
Impact correlated with	.	Resource availability	.	Dry climate
Consequences	.	.	.	.
Mechanism (individual level)	General increase - all community is equally benefited by increase in $[CO_2]_{atm}$	CO_2 Fertilization plants close to light compensation point do better	CO_2 Fertilization winner takes all	Increase of water use efficiency will offset climate stress
Photosynthesis	Tropical trees are CO2 limited and the increase in [CO2] will increase photosynthesis (Lloyd & Farquhar 1996; Farquhar 1980). Observations from intact forest (Grace et al. 1995)	Tropical trees are CO2 limited and the increase in [CO2] will increase photosynthesis (Lloyd & Farquhar 1996; Farquhar 1980). Observations from intact forest (Grace et al. 1995)	Tropical trees are CO2 limited and the increase in [CO2] will increase photosynthesis (Lloyd & Farquhar 1996; Farquhar 1980). Observations from intact forest (Grace et al. 1995)	Greater CO2 concentrations will increase the ratio of carbon gain per water lost
Above-ground Biomass	An increase in growth and recruitment offsetting mortality will increase biomass accumulation (Phillips et al. 1998)	An increase in growth and recruitment offsetting mortality will increase biomass accumulation (Phillips et al. 1998)	An increase in growth and recruitment offsetting mortality will increase biomass accumulation (Phillips et al. 1998)	An increase in growth and recruitment offsetting mortality will increase biomass accumulation (Phillips et al. 1998)
Stem density	Increase in growth should increase stem density	Alleviation from light suppression (Ehleringer and Björkman, 1977) will small plants that would otherwise die to grow	Decrease as a consequence of self-thinning	Increase in WUE is expected to increase photosynthesis which is expected to increase recruitment and decrease mortality and as a consequence increase stem density.
Woody Productivity	Increase in photosynthesis should increase growth (Lloyd & Farquhar 2008).	Increase in photosynthesis should increase growth (Lloyd & Farquhar 2008).	Increase in photosynthesis should increase growth (Lloyd & Farquhar 2008).	Alleviation from moisture-stress should increase growth
Mortality	Fast growth should lead to shorter lifespan (Phillips & Gentry 1994).	Alleviation from light suppression (Ehleringer and Björkman, 1977) will small plants that would otherwise die to survive	Fast growth should lead to shorter lifespan (Phillips & Gentry 1994).	Fast growth should lead to shorter lifespan (Phillips & Gentry 1994).
Recruitment	Increase in growth should increase stem density	Alleviation from light suppression (Ehleringer and Björkman, 1977) will small plants that would otherwise die to grow and attain 10 cm cut-off	Decrease as a consequence of increase in asymmetric competition	Increase in WUE is expected to increase photosynthesis which is expected to increase recruitment.
Average size	Increase as the whole community increase in size	Decrease as a consequence of the increased number of recruits	Increase as large trees dominate	Increase as the whole community increase in size and large trees are released from moisture-stress
Large trees	The whole community is benefit by increase in CO2, no changes in proportions.	? stable	Increase in asymmetric competition will favour large trees	Larger trees, normally more affected by dry conditions considering higher exposition to heat and will have greater advantage
Small Trees	The whole community is benefit by increase in CO2, no changes in proportions.	Decrease in light-compensation point and alleviation from light suppression (Ehleringer and Björkman, 1977) within small, understorey plants.	Increase in asymmetric competition will increase suppression over small trees	With moisture-stress release being greater among large trees, the small ones will proportionally decline
Wood density	The whole community is benefit by increase in CO2, no changes in proportions.	? May alleviate low-wood density, shade-intolerant from light suppression. But understorey trees tend to have high wood-density	Fast-growing species, which have low wood density, are expected have greater competitive advantage.	Fast-growing species, which have low wood density, are expected to take greater advantage from changes in WUE and total wood density tend to decrease.
Zoochoric plants	The whole community is benefit by increase in CO2, no changes in proportions.	? Understorey plants, expected to have advantage, tend to be zoochoric	?	? Anemochory is normally related to dry tolerance. Plants that can tolerate dry conditions will be less benefit by and increase in WUE, and could decrease in comparison to other groups.
Anemochoric plants	The whole community is benefit by increase in CO2, no changes in proportions.	? Understorey plants, expected to have advantage, tend to be zoochoric	?	? Anemochory is normally related to dry tolerance. Plants that can tolerate dry conditions will be less benefit by and increase in WUE, and could decrease in comparison to other groups.
Compound leaved	The whole community is benefit by increase in CO2, no changes in proportions.	?	?	? Compound leaves are normally related to dry tolerance. Plants that can tolerate dry conditions will be less benefit by and increase in CO2, and could decrease in comparison to other groups.
Nitrogen-fixing	?	?	?	?
Palms	The whole community is benefit by increase in CO2, no changes in proportions.	?	?	?
Wet-affiliated taxa	The whole community is benefit by increase in CO2, no changes in proportions.	?	?	May have low stomatal conductance to avoid embolism under dry conditions, increase in WUE is a greater suppression release when compare to dry-affiliated.
Dry affiliated taxa	The whole community is benefit by increase in CO2, no changes in proportions.	?	?	Smaller relative advantage when compared to wet-affiliated
Light dependent taxa	The whole community is benefit by increase in CO2, no changes in proportions.	? May alleviate shade-intolerant from light suppression.	Higher maximal assimilation rates of pioneers relative to shade-tolerant (Cernusak et al. 2013). Fast growth taxa have advantages under high-resource environments (Phillips et al. 1997)	?
Shade tolerant taxa	The whole community is benefit by increase in CO2, no changes in proportions.	? The majority of understorey taxa are shade tolerant, which should gain proportionally.	Higher maximal assimilation rates of pioneers relative to shade-tolerant (Cernusak et al. 2013). Fast growth taxa have advantages under high-resource environments (Phillips et al. 1997)	?
Canopy taxa	The whole community is benefit by increase in CO2, no changes in proportions.	? Proportionally decrease with the increase of understorey taxa.	Increase in asymmetric competition will favour large, canopy taxa.	Canopy trees, normally more affected by dry conditions considering higher exposition to heat and will have greater advantage. Does affecting canopy taxa
Understory taxa	The whole community is benefit by increase in CO2, no changes in proportions.	? Most understorey stems are from understorey taxa.	Increase in asymmetric competition will increase suppression over understorey taxa.	With moisture-stress release being greater among canopy trees, the understorey ones will proportionally decline.

Appendix 2.1 – Fingerprints of drivers of change in Amazonia. (Continuation)

.	. **Atmospheric**		**Ecological**	
.	N deposition	↑[aerosols]atm	Previous disturbances	Hunting pressure
Spatial range of impact	Regional - Forest edges and proximity to industrial centres	Regional - Forest edges, dry periods, related with fires.	Local	Local - forest edges
.	.	.	.	.
Impact correlated with	N availability in the soil	.	.	distance from the edge
Consequences	.	↑ diffuse radiation	Late successional processes	Decrease of seed dispersers and herbivorous
Mechanism (individual level)	.	↓ self -shading of leaves in the canopy		Limited dispersion of zoochoric taxa
Photosynthesis	Decrease because of acid damage to leaves (Cusack et al. 2016)	Increase as a consequence of increase diffuse radiation (Gu et al. 2003; Rap et al. 2015)	stable	stable
Above-ground Biomass	? No change, but data is limited for the tropics (Cusack et al. 2016)	Expected to increase as a consequence of increase in growth	AGB biomass is expected to increase as a consequence of forest succession (Chave et al. 2008)	Reduction in wood density of small size classes will probably lead to a decrease in AGB, evidences from Poulsen et al. (2013).
Stem density	? Seedlings may have advantage (Cusack et al. 2016), which may increase stem density	Increase in growth rates and recruitment is expected to cause and increase in stem density (Lewis et al. 2004)	Is expected to decrease as a consequence of forest succession (Chave et al. 2008).	Increase as a consequence of the decrease in mean tree size
Woody Productivity	stable	Increase photosynthetic rates increasing growth (Lewis et al. 2004).	Increase in tree growth after disturbance, evidences from Chambers et al. (2004). However is expected a decline in growth with time, as a consequence if forest succession (Chave et al. 2008).	stable
Mortality	?	?	Expected to increase as a consequence of forest succession (Chave et al. 2008).	?
Recruitment	? Seedlings may have advantage (Cusack et al. 2016), which may increase recruitment	Diffuse light may favour trees in the understorey (Doughty et al. 2010) increasing recruitment	Expected to decrease as a consequence of forest succession.	Evidences of general decrease found by Poulsen et al. (2013) and Terborgh et al. (2008)
Average size	? May decrease with potential increase in recruitment	Diffuse light may favour trees in the understorey (Doughty et al. 2010) decreasing mean average size	Expected to increase as a consequence of species turnover to a latest successional state evidences in Chave et al. (2008).	?
Large trees	stable	Diffuse light may favour trees in the understorey (Doughty et al. 2010), large trees will proportionally lose.	Expected to increase as a consequence of species turnover to a latest successional state evidences in Chave et al. (2008).	?
Small Trees	? Seedlings may have advantage (Cusack et al. 2016), which may increase abundance among small trees	Diffuse light may favour trees in the understorey (Doughty et al. 2010), large trees will proportionally gain.	Expected to decrease as a consequence of species turnover to a latest successional state evidences in Chave et al. (2008).	?
Wood density	?	?	Expected to increase as a consequence of species turnover to a latest successional state evidences in Chave et al. (2008).	Anemochoric trees are expected to have lower wood density, evidences from Poulsen et al. (2013), increase of this trees will decrease wood density.
Zoochoric plants	?	?	?	Lack of dispersion by mammals and large birds (Wright et al. 2007; Terborgh et al. 2008)
Anemochoric plants	?	?	?	Increase in recruitment of Anemochoric plants when comparing with zoochoric ones (Terborgh et al. 2008).
Compound leaved	?	?	?	?
Nitrogen-fixing	(stable) Proportion has no changed (Heitz et al. 2011) but data is scarce	?	Nitrogen limitation declines with ecosystem maturity (Hedin et al. 2008), N-fixing plats will have less advantage.	?
Palms	?	?	?	?
Wet-affiliated taxa	?	?	stable	stable
Dry affiliated taxa	?	?	stable	stable
Light dependent taxa	?	?	Expected to decrease as a consequence of species turnover to a latest successional state evidences in Chave et al. (2008).	Expected to increase, commonly wind dispersed, evidences in Poulsen et al. (2013).
Shade tolerant taxa	?	?	Expected to increase as a consequence of species turnover to a latest successional state evidences in Chave et al. (2008).	?
Canopy taxa	stable	? Diffuse light favour understory plants, which may favour understory taxa.	?	?
Understory taxa	? Small trees with short roots (Cusack et al. 2016) may have an advantage	? Diffuse light favour understory plants, which may favour understory taxa.	?	?