```diff
diff --git a/DESCRIPTION b/DESCRIPTION
index 5543f72..b74e294 100644
--- a/DESCRIPTION
+++ b/DESCRIPTION
@@ -1,6 +1,6 @@
 Package: FijiNFMSCalculations
 Title: Fiji NFMS Calculations
-Version: 1.0.6
+Version: 1.0.7
 Authors@R:
     person(given = "Michael",
            family = "Green",
diff --git a/NAMESPACE b/NAMESPACE
index bdbb881..79ee423 100644
--- a/NAMESPACE
+++ b/NAMESPACE
@@ -91,6 +91,8 @@ export(calcEmissionFactors)
 export(calcFRLAdjustedAreas)
 export(calcFRLAfforestation)
 export(calcFRLBurning)
+export(calcFRLBurningAlg)
+export(calcFRLBurningRun)
 export(calcFRLContributions)
 export(calcFRLDeforestation)
 export(calcFRLDegradation)
diff --git a/R/Burning.R b/R/Burning.R
index 3f90fa3..c4c430c 100644
--- a/R/Burning.R
+++ b/R/Burning.R
@@ -19,20 +19,25 @@
 CalcEstEmFire <- function(Age,
                           MAIBsw, # Mean Annual Increment Biomass softwood
                           RootToShootDryLandSmall,
-                          Area) {
+                          Area,
+                          local_CombustFactor = CombustFactor,
+                          local_GWP_CO2 = GWPCO2, local_EF_CO2 = EFCO2,
+                          local_GWP_CH4 = GWPCH4, local_EF_CH4 = EFCH4,
+                          local_GWP_N2O = GWPN2O, local_EF_N2O = EFN2O
+                          ) {
   # Estimate AGB
-  AGB <- Age * (MAIBsw / (1 + RootToShootDryLandSmall))
+  AGB <- Age * (MAIBsw * (1 - RootToShootDryLandSmall))
   # Estimate BGB
   BGB <- Age * (MAIBsw * RootToShootDryLandSmall)
-  # CO2 ABG emissions
-  EmCO2AGB <- Area * AGB * CombustFactor * GWPCO2 * EFCO2  * 0.001
-  # CO2 BGB emissions
-  EmCO2BGB <- Area * BGB * CombustFactor * GWPCO2 * EFCO2 * 0.001
-  # CH4 ABG emissions
-  EmCH4 <- Area * AGB * CombustFactor * GWPCH4 * EFCH4 * 0.001
-  # N_2O (above-ground biomass)
-  EmN2O <- Area * AGB * CombustFactor * GWPN2O  * EFN2O * 0.001
+  # CO2 ABG emissions -> CO2e
+  EmCO2_AG <- Area * AGB * local_CombustFactor * local_GWP_CO2 * local_EF_CO2  * 0.001
+  # CO2 BGB emissions -> CO2e
+  EmCO2_BG <- ConvBiomassToCO2e(Area * BGB)
+  # CH4 ABG emissions -> CO2e
+  EmCH4 <- Area * AGB * local_CombustFactor * local_GWP_CH4 * local_EF_CH4 * 0.001
+  # N_2O ABG -> CO2e
+  EmN2O <- Area * AGB * local_CombustFactor * local_GWP_N2O  * local_EF_N2O * 0.001
   # sum emissions for each gas and put into dataframe
-  df <-data.frame(sum(EmCO2AGB), sum(EmCO2BGB), sum(EmCH4), sum(EmN2O))
+  df <-data.frame(sum(EmCO2_AG), sum(EmCO2_BG), sum(EmCH4), sum(EmN2O))
   return(sum(df))
 }
diff --git a/R/CalcFRLBurning.R b/R/CalcFRLBurning.R
index 7b139ea..4ba96a1 100644
--- a/R/CalcFRLBurning.R
+++ b/R/CalcFRLBurning.R
@@ -1,15 +1,45 @@
+
+
 #' @export
-calcFRLBurning <- function() {
+calcFRLBurningAlg <- function(sw_barea,maibp,rdlk1,bioburn_ghgs) {
+  result <- list()
+  result$sw_barea <- sw_barea
+  # Sum of emissions per year
+  result$swfiret$total <- sapply(split(result$sw_barea[,c(1:3)],
+                                        f = result$sw_barea$year),
+     function(x) {
+       return(CalcEstEmFire(x["age_yrs"], maibp, rdlk1,x["area_ha"],
+                            local_CombustFactor = bioburn_ghgs[1,"combustion_factor"],
+                            local_GWP_CO2 = bioburn_ghgs[1,"global_warming_potential"],
+                            local_EF_CO2 = bioburn_ghgs[1,"emission_factor"],
+                            local_GWP_CH4 = bioburn_ghgs[2,"global_warming_potential"],
+                            local_EF_CH4 = bioburn_ghgs[2,"emission_factor"],
+                            local_GWP_N2O = bioburn_ghgs[3,"global_warming_potential"],
+                            local_EF_N2O = bioburn_ghgs[3,"emission_factor"]))
+     }
+  )
+
+
+  # Average annual emissions [tCO2e yr^-1] from biomass burning in Softwood Plantations .
+  result$fd_bb_aae <- mean(result$swfiret$total)
+
+  return(result)
+}
+
+
+
```

```
+#' @export
+calcFRLBurningRun <- function(debug_frl,sw_barea,FRLParams,bioburn_ghgs) {
     # Structure of 'sw_barea'
     if (debug_frl) {
-        print(paste0("==== debug: ", "CalcFRLBurning.R", ":6"))
+        print(paste0("==== debug: ", "CalcFRLBurning.R", ":36"))
         print(str(sw_barea))
     }


     if (debug_frl) {
-        print(paste0("==== debug: ", "CalcFRLBurning.R", ":12"))
+        print(paste0("==== debug: ", "CalcFRLBurning.R", ":42"))
         # Aggregate compartment data for the years 2015 to 2018 ...............................
         ## Total area burnt in year t
         sw_barea_agg <- aggregate(area_ha ~ year, sw_barea, sum)
@@ -23,47 +53,26 @@ calcFRLBurning <- function() {
         print(sw_barea_agg)
     }

-    # Above- and below-ground biomass in compartments
-    # 0.2 = Rdll Root-to-shoot ratio tropical moist deciduous forest < 125 tB ha-1
-    sw_barea$agb <- sw_barea$age_yrs * (FRLParams$maibp / (1 + FRLParams$rdlk1)) # AGB
-    sw_barea$bgb <- sw_barea$age_yrs * (FRLParams$maibp * FRLParams$rdlk1) # BGB
-
     # Table of greenhouse gases
     names(bioburn_ghgs)[1] <- "GHG"

     # Table of greenhouse gases
     if (debug_frl) {
-        print(paste0("==== debug: ", "CalcFRLBurning.R", ":36"))
+        print(paste0("==== debug: ", "CalcFRLBurning.R", ":61"))
         print(bioburn_ghgs)
     }

-    # Emissions (in tCO2e) for each gas (and each compartment)
-    # CO_2 (above-ground biomass)
-    sw_barea$co2agb <- sw_barea$area_ha * sw_barea$agb * bioburn_ghgs[1, 2] *
-      bioburn_ghgs[1, 3] * bioburn_ghgs[1, 4] * 0.001
-    # CO_2 (below-ground biomass)
-    sw_barea$co2bgb <- sw_barea$area_ha * sw_barea$bgb * FRLParams$etacf *
-      FRLParams$etacc * bioburn_ghgs[1, 2]
-    # CH_4 (above-ground biomass)
-    sw_barea$ch4 <- sw_barea$area_ha * sw_barea$agb * bioburn_ghgs[2, 2] *
-      bioburn_ghgs[2, 3] * bioburn_ghgs[2, 4] * 0.001
-    # N_2O (above-ground biomass)
-    sw_barea$n2o <- sw_barea$area_ha * sw_barea$agb * bioburn_ghgs[3, 2] *
-      bioburn_ghgs[3, 3] * bioburn_ghgs[3, 4] * 0.001
-
-    # Sum of emissions per year
-    swfiret <- aggregate(. ~ year, sw_barea[, c(1, 6:9)], sum)
-
-    # Compute totals of gases for each year
-    swfiret$total <- rowSums(swfiret[, -1])
+    fire <- calcFRLBurningAlg(sw_barea,
+                              FRLParams$maibp,
+                              FRLParams$rdlk1,
+                              bioburn_ghgs
+                              )
+
     if (debug_frl) {
-        print(paste0("==== debug: ", "CalcFRLBurning.R", ":57"))
-        print(swfiret)
+        print(paste0("==== debug: ", "CalcFRLBurning.R", ":72"))
+        print(fire$swfiret)
     }

-    # Average annual emissions [tCO2e yr^-1] from biomass burning in Softwood Plantations .
-    fd_bb_aae <- mean(swfiret$total)
-
     # Uncertainty analysis
     # Create vectors that collect the results of the MC simulation
     v_fd_bb_aae <- vector()
@@ -127,33 +136,27 @@ calcFRLBurning <- function() {

     # MC simulation
     for (i in 1:FRLParams$runs) { # i <- 1
-        # Create a copy of 'sw_barea'
-        sw_bareai <- sw_barea
-
-        # Compute AGB and BGB for each compartment .........................................
-        sw_bareai$agb <- sw_bareai$age_yrs * (mcf$maibsw[i] / (1 + mcf$r2s[i]))
-        sw_bareai$bgb <- sw_bareai$age_yrs * (mcf$maibsw[i] * mcf$r2s[i])
-
+
+        bioburn_ghgsi <- bioburn_ghgs
+        bioburn_ghgsi[1, 2] <- mcf[i, "cfsw"]
+        bioburn_ghgsi[1, 3] <- mcf[i, "gefco2"]
+        bioburn_ghgsi[1, 4] <- mcf[i, "gwpco2"]
+        bioburn_ghgsi[2, 2] <- mcf[i, "cfsw"]
+        bioburn_ghgsi[2, 3] <- mcf[i, "gefch4"]
+        bioburn_ghgsi[2, 4] <- mcf[i, "gwpch4"]
+        bioburn_ghgsi[3, 2] <- mcf[i, "cfsw"]
+        bioburn_ghgsi[3, 3] <- mcf[i, "gefn2o"]
+        bioburn_ghgsi[3, 4] <- mcf[i, "gwpn2o"]
+
         # Compute emissions .................................................................
-        # CO_2 (AGB)
-        sw_bareai$co2agb <- sw_bareai$area_ha * sw_bareai$agb * mcf[i, "cfsw"] *
-          mcf[i, "gefco2"] * mcf[i, "gwpco2"] * 0.001
-        # CO_2 (BGB)
-        sw_bareai$co2bgb <- sw_bareai$area_ha * sw_bareai$bgb * FRLParams$etacf *
-          FRLParams$etacc * mcf[i, "cfsw"]
-        # CH_4 (AGB)
```

```diff
-    sw_bareai$ch4 <- sw_bareai$area_ha * sw_bareai$agb * mcf[i, "cfsw"] *
-      mcf[i, "gefch4"] * mcf[i, "gwpch4"] * 0.001
-    # N_20 (AGB)
-    sw_bareai$n2o <- sw_bareai$area_ha * sw_bareai$agb * mcf[i, "cfsw"] *
-      mcf[i, "gefn2o"] * mcf[i, "gwpn2o"] * 0.001
-
-    # Aggregate results ...........................................................
-    swfireti <- aggregate(. ~ year, sw_bareai[, c(1, 6:9)], sum)
-    swfireti$total <- rowSums(swfireti[, -1])
-
+    firei <- calcFRLBurningAlg(sw_barea,
+                               mcf$maibsw[i],
+                               mcf$r2s[i],
+                               bioburn_ghgsi
+                               )
+
     # Annual average emissions ....................................................
-    v_fd_bb_aae[i] <- mean(swfireti$total) # Including AGB and BGB
+    v_fd_bb_aae[i] <- mean(firei$swfiret$total) # Including AGB and BGB
   }

   # Get 90%-confidence bounds of emission estimates (including AGB and BGB)
@@ -162,7 +165,7 @@ calcFRLBurning <- function() {

   # Result table (AGB and BGB) ......................................................
   rs_fd_bb <- data.frame(
-    aa_em_tco2e_yr = fd_bb_aae,
+    aa_em_tco2e_yr = fire$fd_bb_aae,
     lci_aa_em_tco2e_yr = lcifdfsweaae,
     uci_aa_em_tco2e_yr = ucifdfsweaae
   )
@@ -170,14 +173,20 @@ calcFRLBurning <- function() {

   # Show result table
   if (debug_frl) {
-    print(paste0("==== debug: ", "CalcFRLBurning.R", ":170"))
+    print(paste0("==== debug: ", "CalcFRLBurning.R", ":176"))
     print(rs_fd_bb)
   }

   result <- list()
   result$rs_fd_bb <- rs_fd_bb
-  result$fd_bb_aae <- fd_bb_aae
+  result$fd_bb_aae <- fire$fd_bb_aae
   result$v_fd_bb_aae <- v_fd_bb_aae

   return(result)
 }
+
+
+#' @export
+calcFRLBurning <- function() {
+  return(calcFRLBurningRun(debug_frl,sw_barea,FRLParams,bioburn_ghgs))
+}
diff --git a/man/CalcEstEmFire.Rd b/man/CalcEstEmFire.Rd
index 1182ead..9a4926d 100644
--- a/man/CalcEstEmFire.Rd
+++ b/man/CalcEstEmFire.Rd
@@ -4,7 +4,19 @@
 \alias{CalcEstEmFire}
 \title{Emissions From Fire}
 \usage{
-CalcEstEmFire(Age, MAIBsw, RootToShootDryLandSmall, Area)
+CalcEstEmFire(
+  Age,
+  MAIBsw,
+  RootToShootDryLandSmall,
+  Area,
+  local_CombustFactor = CombustFactor,
+  local_GWP_CO2 = GWPCO2,
+  local_EF_CO2 = EFCO2,
+  local_GWP_CH4 = GWPCH4,
+  local_EF_CH4 = EFCH4,
+  local_GWP_N20 = GWPN20,
+  local_EF_N20 = EFN20
+)
 }
 \arguments{
 \item{Age}{The age of the compartment that burnt in the year}
diff --git a/tests/testthat/test-CalcERValues.R b/tests/testthat/test-CalcERValues.R
index 5e58172..f8bec28 100644
--- a/tests/testthat/test-CalcERValues.R
+++ b/tests/testthat/test-CalcERValues.R
@@ -105,7 +105,7 @@ test_that("Test it can be called", {

   # This value does not match the FRL. The FRL uses an average of 2015-2018, this value is 2018 only.
   # Results Table has expected Forest Degradation Estimate
-  expect_equal(round(result$EstEmRemsFDeg), 310218)
+  expect_equal(round(result$EstEmRemsFDeg), 326770)

   ############
   # Enhancement
@@ -117,5 +117,5 @@ test_that("Test it can be called", {
   # Total

   # Results Table has expected Total Estimate
-  expect_equal(round(result$NetEmRems), 3552523)
+  expect_equal(round(result$NetEmRems), 3569075)
 })
diff --git a/tests/testthat/test-CalcEstEmFire.R b/tests/testthat/test-CalcEstEmFire.R
index 5c72364..b7b2774 100644
--- a/tests/testthat/test-CalcEstEmFire.R
+++ b/tests/testthat/test-CalcEstEmFire.R
@@ -1,3 +1,5 @@
```

```
+library(testthat)
+
 ## This test needs to be reviewed/redone ##

 # Test CalcEmFire: Emissions from Biomass Burning
@@ -12,71 +14,286 @@ FDegBurnData2018 <- FDegBurnData[235:294, c("year", "area_ha", "age_yrs")]
 bioburn_ghgs <- read.table("../../data/bioburn_ghgs.txt", header = T)


-# add this and full file from sw_barea[235:294,6:9]***********
+compare_summary_equal <- function(samples, min, qtr1, med, u, qtr3, max, sigfig, ...) {
+  sample_summary <- stats::quantile(samples)
+  sample_summary <- signif(c(sample_summary[1L:3L], mean(samples), sample_summary[4L:5L]), sigfig)
+  names(sample_summary) <- c("Min.", "1st Qu.", "Median", "Mean", "3rd Qu.", "Max.")
+
+  expect_summary <- c(min, qtr1, med, u, qtr3, max)
+  names(expect_summary) <- c("Min.", "1st Qu.", "Median", "Mean", "3rd Qu.", "Max.")
+
+  return(expect_equal(sample_summary, expect_summary, ...))
+}

-# make one of these wrong and see if the cell is given************
-EstEmFireResults2018 <- data.frame(
-  X.EmCO2AGB. = 58505.16630,
-  X.EmCO2BGB. = 15315.02328,
-  X.EmCH4. = 7050.242825,
-  X.EmN2O. = 1962.515072
-)

+get_test_data <- function(yrs,ha) {
+  test_data <- list()
+  #     COMF  i  Gg,i
+  #CO2 0.46    1580
+  #N2O 0.46    6.8
+  #CH4 0.46    0.2
+  test_data$COMF_CO2 <- 0.46
+  test_data$COMF_N2O <- 0.46
+  test_data$COMF_CH4 <- 0.46
+
+  test_data$EF_CO2 <- 1580
+  test_data$EF_N2O <- 0.2
+  test_data$EF_CH4 <- 6.8
+
+  #GWP - AR5
+  #CO2 1
+  #N2O 28
+  #CH4 265
+  test_data$GWP_CO2 <- 1
+  test_data$GWP_N2O <- 265
+  test_data$GWP_CH4 <- 28
+
+  #Annual increment in Pine Plantation (tB ha-1 yr-1)                    10    From Waterloo [1994]
+  #Annual increment in Pine Plantation (tB ha-1 yr-1) Aboveground        8
+  #Annual increment in Pine Plantation (tB ha-1 yr-1) Belowground        2
+
+  #Root:to:Shoott ratio                          0.2
+  test_data$RootToShootRatio <- 0.2
+
+  #MAIB_AGB = 10 * 0.8 = 8
+  #MAIB_BGB = 10 * 0.2 = 2
+  test_data$MAIB <- 10
+  test_data$MAIB_AGB <- test_data$MAIB * (1 - test_data$RootToShootRatio)
+  test_data$MAIB_BGB <- test_data$MAIB * test_data$RootToShootRatio
+
+  expect_equal(MAIBsw,test_data$MAIB)
+
+  test_data$AreaBurnt <- ha
+  test_data$Age       <- yrs
+
+  test_data$AGB_Stock <- test_data$Age * test_data$MAIB_AGB
+
+  test_data$BGB_Stock <- test_data$Age * test_data$MAIB_BGB
+
+  #EM_CO2_ABG = ((AreaBurent * AGB_Stock * COMF_CO2 * EF_CO2) / 1000) * GWP_CO2
+  #EM_CO2_ABG = ((4.9 * 32 * 0.46 * 1580) / 1000) * 1 = 114
+  test_data$EM_CO2_ABG <- test_data$AreaBurnt * test_data$AGB_Stock *
+    test_data$COMF_CO2 * test_data$EF_CO2 * 0.001 * test_data$GWP_CO2
+
+  #EM_CO2_BGB = AreaBurent * BGB * 0.47 * (44/12)
+  #EM_CO2_BGB = 4.9 * 8 * 0.47 * (44/12) = 68
+  test_data$EM_CO2_BGB <- test_data$AreaBurnt * test_data$BGB_Stock * 0.47 * (44/12)
+
+  #EM_N2O_ABG = ((AreaBurent * AGB_Stock * COMF_N2O * EF_N2O) / 1000) * GWP_N2O
+  #EM_N2O_ABG = ((4.9 * 32 * 0.46 * 1580) / 1000) * 1 = 114
+  test_data$EM_N2O_ABG <- test_data$AreaBurnt * test_data$AGB_Stock *
+    test_data$COMF_N2O * test_data$EF_N2O * 0.001 * test_data$GWP_N2O
+
+  #EM_CH4_ABG = ((AreaBurent * AGB_Stock * COMF_CH4 * EF_CH4) / 1000) * GWP_CH4
+  #EM_CH4_ABG = ((4.9 * 32 * 0.46 * 1580) / 1000) * 1 = 114
+  test_data$EM_CH4_ABG <- test_data$AreaBurnt * test_data$AGB_Stock *
+    test_data$COMF_CH4 * test_data$EF_CH4 * 0.001 * test_data$GWP_CH4
+
+  #Em = CO2_AGB + N2O_AGB + CH4_AGB + CO2_BGB
+  test_data$EM <- test_data$EM_CO2_ABG + test_data$EM_N2O_ABG + test_data$EM_CH4_ABG + test_data$EM_CO2_BGB
+
+  ## FRL params
+  test_data$params <- list()
+  test_data$params$etacf    <- 0.47
+  test_data$params$etacc    <- 44/12
+  test_data$params$rdlk1    <- 0.20
+  test_data$params$lcirdlk1 <- 0.09
+  test_data$params$ucirdlk1 <- 0.25
+  test_data$params$maibp    <- 10
+  test_data$params$errmaibp <- 0.25
```

```
+    test_data$params$sdCO2EF   <- 90
+    test_data$params$errghg    <- 0.00001
+    test_data$params$runs      <- 10000
+    test_data$params$qlci      <- 0.05
+    test_data$params$quci      <- 0.95
+
+    return(test_data)
+
+}

-# test_that("2018 Data example", {
-#   expect_equal(CalcEstEmFire(
-#     FDegBurnData2018$age_yrs, MAIBsw, RootToShootDryLandSmall, FDegBurnData2018$area_ha,
-#     bioburn_ghgs
-#   ), EstEmFireResults2018)
-# })

-# # Get an error:
-# test_that("2018 Data example divide by zero", {
-#   expect_equal(CalcEstEmFire(
-#     FDegBurnData2018$age_yrs, MAIBsw, -1, FDegBurnData2018$area_ha,
-#     bioburn_ghgs
-#   ), EstEmFireResults2018)
-# })

-# test_that("2018 Data example", {
-# Error
-# expect_equal(CalcEstEmFire(FDegBurnData2018$age_yrs,  MAIBsw, RootToShootDryLandSmall, FDegBurnData2018$area_ha,
-#                     bioburn_ghgs, BiomassToCarbonConv, CarbonToCO2eRatio), sw_barea[235:294,6:9])
-# })


+test_that("Single Data example", {
+    #PlantingYear_YEAR    AREABURNT         YEARBURN        AGE      AbovegroundBiomass Stock          BelowgroundBiomass Stock        CO2      ℕ
+    #2012                 4.9               2015            4        32                               8                               114      4
+    test_data <- get_test_data(c(4),c(4.9))
+    expect_equal(bioburn_ghgs$combustion_factor[1],test_data$COMF_CO2)
+    expect_equal(bioburn_ghgs$combustion_factor[3],test_data$COMF_N2O)
+    expect_equal(bioburn_ghgs$combustion_factor[2],test_data$COMF_CH4)
+    expect_equal(CombustFactor,test_data$COMF_CO2)
+    expect_equal(CombustFactor,test_data$COMF_N2O)
+    expect_equal(CombustFactor,test_data$COMF_CH4)
+
+    expect_equal(bioburn_ghgs$emission_factor[1],test_data$EF_CO2)
+    expect_equal(bioburn_ghgs$emission_factor[3],test_data$EF_N2O)
+    expect_equal(bioburn_ghgs$emission_factor[2],test_data$EF_CH4)
+    expect_equal(EFCO2,test_data$EF_CO2)
+    expect_equal(EFN2O,test_data$EF_N2O)
+    expect_equal(EFCH4,test_data$EF_CH4)
+
+    expect_equal(bioburn_ghgs$global_warming_potential[1],test_data$GWP_CO2)
+    expect_equal(bioburn_ghgs$global_warming_potential[3],test_data$GWP_N2O)
+    expect_equal(bioburn_ghgs$global_warming_potential[2],test_data$GWP_CH4)
+    expect_equal(GWPCO2,test_data$GWP_CO2)
+    expect_equal(GWPN2O,test_data$GWP_N2O)
+    expect_equal(GWPCH4,test_data$GWP_CH4)
+
+
+    expect_equal(RootToShootDryLandSmall,test_data$RootToShootRatio)
+    expect_equal(MAIBsw,test_data$MAIB)
+    expect_equal(8,test_data$MAIB_AGB)
+    expect_equal(2,test_data$MAIB_BGB)
+    expect_equal(32,test_data$AGB_Stock)
+    expect_equal(8,test_data$BGB_Stock)
+    expect_equal(signif(test_data$EM_CO2_ABG,7),113.9622)
+    expect_equal(signif(test_data$EM_CO2_BGB,5),67.555)
+    expect_equal(signif(test_data$EM_N2O_ABG,5),3.8228)
+    expect_equal(signif(test_data$EM_CH4_ABG,5),13.7330)
+    expect_equal(signif(test_data$EM,6),199.073)
+
+
+
+})

-# From the FRL the average Emissions from Fire for 4 years was calculated to be 157,487.87.
-# For this function below total emissions will be average * 4 (i.e. 2018 - 2015) = 629,951.4765 when using
-# all burn data from the 4 years
+test_that("Multi Data example", {
+    #PlantingYear_YEAR    AREABURNT       YEARBURN       AGE      AbovegroundBiomass Stock             BelowgroundBiomass Stock        CO2      ℕ
+    #2012                 4.9             2015  4        32       8           114     4        14       68
+    #2014                 8.1             2015  2        16       4           94      3        11       56
+    #2015                 25.93           2015  1        8        2           151     5        18       89
+    #2015                 9.7             2015  1        8        2           56      2        7        33
+    #1994                 7.8             2015  22       176      44          998     33       120      591
+    #2002                 15              2015  14       112      28          1221    41       147      724
+    #2001                 6.2             2015  15       120      30          541     18       65       321
+    #1991                 47.8            2015  25       200      50          6948    233      837      4119
+    #2015                 2.4             2015  1        8        2           14      0        2        8
+    #2014                 3.9             2015  2        16       4           45      2        5        27
+    #2012                 5.5             2015  4        32       8           128     4        15       76
+    #2012                 18              2015  4        32       8           419     14       50       248
+    #2012                 41.2            2015  4        32       8           958     32       115      568
+    #Total                196.43 ##   #   792 198 11687 392 1408  6927
+    #Grand Total 20415
+
+    test_data <- get_test_data(c(4,2,1,1,22,14,15,25,1,2,4,4,4),
+                               c(4.9,8.1,25.93,9.7,7.8,15,6.2,47.8,2.4,3.9,5.5,18,41.2))
+
+    expect_equal(c(32,16,8,8,176,112,120,200,8,16,32,32,32),
+            test_data$AGB_Stock)
+    expect_equal(c(8,4,2,2,44,28,30,50,2,4,8,8,8),
+            test_data$BGB_Stock)
+
+    expect_equal(
```

```
+    floor(test_data$EM_CO2_ABG),
+    c(113,94,150,56,997,1221,540,6948,13,45,127,418,958)
+  )
+  expect_equal(floor(sum(test_data$EM_CO2_ABG)),11687)
+
+  expect_equal(
+    floor(test_data$EM_N2O_ABG),
+    c(3,3,5,1,33,40,18,233,0,1,4,14,32)
+  )
+  expect_equal(floor(sum(test_data$EM_N2O_ABG)),392)
+
+  expect_equal(
+    floor(test_data$EM_CH4_ABG),
+    c(13,11,18,6,120,147,65,837,1,5,15,50,115)
+  )
+  expect_equal(floor(sum(test_data$EM_CH4_ABG)),1408)
+
+  expect_equal(
+    floor(test_data$EM_CO2_BGB),
+    c(67,55,89,33,591,723,320,4118,8,26,75,248,568)
+  )
+  expect_equal(floor(sum(test_data$EM_CO2_BGB)), 6927)
+
+  expect_equal(floor(sum(test_data$EM)),20415)
+})

-# swfiret # emissions from each gas type for each year
-# FRLTotal <- sum(swfiret$total) # sum of all gas emissions
+test_that("Test function - Single Data example", {
+  #PlantingYear_YEAR   AREABURNT      YEARBURN        AGE    AbovegroundBiomass Stock        BelowgroundBiomass Stock      CO2    !
+  #2012                4.9            2015            4     32                              8                              114    4
+  test_data <- get_test_data(c(4),c(4.9))

-# test_that("FRL Data example", {
-# Error
-#  expect_equal(sum(CalcEstEmFire(FDegBurnData$age_yrs,  MAIBsw, RootToShootDryLandSmall, FDegBurnData$area_ha,
-#                        bioburn_ghgs, BiomassToCarbonConv, CarbonToCO2eRatio)),FRLTotal )
-# })
+  expect_equal(
+    CalcEstEmFire(
+      c(4),
+      MAIBsw, RootToShootDryLandSmall,
+      c(4.9)
+    ),
+    sum(test_data$EM))
+
+  expect_equal(signif(
+    CalcEstEmFire(
+      c(4),
+      MAIBsw, RootToShootDryLandSmall,
+      c(4.9)
+    ), 6),
+    199.0730)
+
+  expect_equal(signif(CalcEstEmFire(
+    FDegBurnData2018$age_yrs, MAIBsw, RootToShootDryLandSmall, FDegBurnData2018$area_ha
+  ), 6), 98110.7)
+})

-# test_that("FRL Data example", {
-#   expect_equal(CalcEstEmFire(
-#     FDegBurnData$age_yrs, MAIBsw, RootToShootDryLandSmall, FDegBurnData$area_ha,
-#     bioburn_ghgs
-#   ), 629951.4765)
-# })

+test_that("Test Function - Multi Data example", {
+  #PlantingYear_YEAR   AREABURNT      YEARBURN        AGE    AbovegroundBiomass Stock        BelowgroundBiomass Stock      CO2    !
+  #2012                4.9            2015   4       32     8       114     4       14      68
+  #2014                8.1            2015   2       16     4       94      3       11      56
+  #2015                25.93          2015   1       8      2       151     5       18      89
+  #2015                9.7            2015   1       8      2       56      2       7       33
+  #1994                7.8            2015   22      176    44      998     33      120     591
+  #2002                15             2015   14      112    28      1221    41      147     724
+  #2001                6.2            2015   15      120    30      541     18      65      321
+  #1991                47.8           2015   25      200    50      6948    233     837     4119
+  #2015                2.4            2015   1       8      2       14      0       2       8
+  #2014                3.9            2015   2       16     4       45      2       5       27
+  #2012                5.5            2015   4       32     8       128     4       15      76
+  #2012                18             2015   4       32     8       419     14      50      248
+  #2012                41.2           2015   4       32     8       958     32      115     568
+  #Total               196.43 ##   #    792 198 11687 392 1408  6927
+  #Grand Total 20415
+
+  test_data <- get_test_data(c(4,2,1,1,22,14,15,25,1,2,4,4,4),
+                             c(4.9,8.1,25.93,9.7,7.8,15,6.2,47.8,2.4,3.9,5.5,18,41.2))
+  expect_equal(
+    CalcEstEmFire(
+      c(4,2,1,1,22,14,15,25,1,2,4,4,4),
+      MAIBsw, RootToShootDryLandSmall,
+      c(4.9,8.1,25.93,9.7,7.8,15,6.2,47.8,2.4,3.9,5.5,18,41.2)
+    ),
+    sum(test_data$EM))
+
+  expect_equal(signif(
+    CalcEstEmFire(
+      c(4,2,1,1,22,14,15,25,1,2,4,4,4),
+      MAIBsw, RootToShootDryLandSmall,
+      c(4.9,8.1,25.93,9.7,7.8,15,6.2,47.8,2.4,3.9,5.5,18,41.2)
+    ), 6),
+    20415.4)

-# test_that("FRL Data example - divide by zero", {
-# error
```

```
-#   expect_equal(sum(CalcEstEmFire(FDegBurnData$age_yrs,  MAIBsw, -1, FDegBurnData$area_ha,
-#                              bioburn_ghgs, BiomassToCarbonConv, CarbonToCO2eRatio)),FRLTotal )
-# })
+
+   expect_equal(floor(sum(test_data$EM)),20415)
+})

-# test_that("FRL Data example", {
-# error
-#   expect_equal(sum(CalcEstEmFire(FDegBurnData$age_yrs,  MAIBsw, RootToShootDryLandSmall, FDegBurnData$area_ha,
-#                              bioburn_ghgs, BiomassToCarbonConv, CarbonToCO2eRatio)),sw_barea[,6:9] )
-# })

-# sw_barea[,6:9]
+test_that("FRL - test basic call calcFRLBurning", {
+   sw_barea <- FDegBurnData
+   debug_frl <- 0
+   FRLParams <- get_test_data(c(1),c(1))$params
+   #FRLParams$runs <- 100
+   set.seed(08121976) # Seed set to remove random nature of MC Analysis for LCI & UCI
+
+   fire <- calcFRLBurningRun(debug_frl, FDegBurnData,FRLParams,bioburn_ghgs)
+   #expect_equal(floor(fire$rs_fd_bb$aa_em_tco2e_yr),157487)
+   expect_equal(floor(fire$rs_fd_bb$aa_em_tco2e_yr),186535)
+   #expect_equal(floor(fire$rs_fd_bb$lci_aa_em_tco2e_yr),128967)
+   expect_equal(floor(fire$rs_fd_bb$lci_aa_em_tco2e_yr),150304)
+   #expect_equal(floor(fire$rs_fd_bb$uci_aa_em_tco2e_yr),185801)
+   expect_equal(floor(fire$rs_fd_bb$uci_aa_em_tco2e_yr),218021)
+   #expect_equal(floor(fire$fd_bb_aae),157487)
+   expect_equal(floor(fire$fd_bb_aae),186535)
+   #compare_summary_equal(fire$v_fd_bb_aae,107818,144465,156477,156794,168709,219855,6)
+   compare_summary_equal(fire$v_fd_bb_aae,123041,168522,182767,183242,197406,256134,6)
+})
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```