environment.py

This module simply sets vegetation to certain types. See the table below:

Type	Vegetation
1	Bamboo
2	Coniferous
3	Broadleaf
4	Mixed
5	Lichen
6	Deciduous
7	Shrublands
8	Clouds
9	Farmland
10	Household
11	Farm
12	PES
13	Forest
-9999	Outside_FNNR

It also sets elevation deemed to be "out of bounds" of normal monkey movement range. By default, here are the settings:

```
class Elevation_Out_of_Bound(Environment):
    lower_bound = 1000
    upper_bound = 2200
```

land.py

The *GTGP-participation* function
** Once in GTGP, no exit, until contract expires (simulation pauses and parameters reset)**

GTGP-participation

PES_Span = 8*73; ** PES_Span is a global parameter equal to years of planned PES

payment since beginning of simulation—default to 8 years, but changeable. Convert from years to steps. Note this is Okay, but may explain why there are drops of enrollments after some years as pay stops*

YearsPassed = # of steps passed/73; **YearsPassed is a global variable, equal to number of years since start of simulation**

No_Pay_pct = 0.4; ** Change to 0.25 or another value around it A % parameter that decreases GTGP_par_prob (the prob a HH is willing to participate in GTGP) even if payment stops**

minThreshhold =0.3; ** Change to 0.2 or o.25 A % parameter that decreases GTGP_par_prob when the parcel is a GTGP one**

If (YearsPassed < PESSpan) then

[

PayExist=True; **A logical variable that takes true or false**

]

Else

[

PayExist=False; **A logical variable that takes yes or no**

]

[Preset minimum_non-GTGP = 0.3; **minimum area of non-GTGP land each household should hold, meet what observed and handle issues of land scarcity **

Loop through all households:

[

Loop through all land parcels agents for a household:

[***Note loop thru all parcels as GTGP may be returned to non-GTGP*

Calculate total_non-GTGP; ** add up all non_GTGP land **

Calculate hh_size; ** add up all household members**

GTGP_par_prob = 0;

crop_income = land_output * unit_price(with reference to plant_type) ;

Comp_amt = a rea_of_land * unit_comp;

GTGP_net_cash = Comp_amt - crop_income; ** on parcel level

**A logistics function will be used to calculate the probability of GTGP participation on parcel level **

GTGP_par_prob = exp(2.52 - 0.012* Age_1 - 0.29* Gender_1 + 0.01* Education_1 + 0.001* hh_size - 2.45*land_type + 0.0006* GTGP_net_cash + 0.04* time_land)/(1 + exp(2.52 - 0.012* Age_1 - 0.29* Gender_1 + 0.01* Education_1 + 0.001* hh_size - 2.45*land_type + 0.0006* GTGP_net_cash + 0.04* time_land));

If (PayExist=true) then

[

GTGP_par_prob = GTGP_par_prob

]

else

[

GTGP_par_prob = No_Pay_pct*GTGP_par_prob;

]

If (parcel is non-GTGP and total_non-GTGP >= minimum_non-GTGP and random #< GTGP_par_prob) then
[
Remove the parcel from non-GTGP land parcels agents;
Add the parcel to GTGP land parcels agents;

]
else if (parcel is GTGP and random #< GTGP_par_prob*minThreshhold) then
[
Remove the parcel from GTGP land parcels agents;
Add the parcel to Non-GTGP land parcels agents;
]

]

Age_1 + 1; ** age of hh head increment

Calculate total_crop_income ** add up crop_income for all parcels

Calculate total_Comp_amt ** add up all Comp_amtfor all parcels

household_income = total_crop_income + income_local_offfarm + total_Comp_amt + household_ remittances

Report household_income in the output Excel file

]

The *GTGP-policy* function

GTGP-policy

[

Scenario_1: unit_comp = 270;

Scenario_2: unit_comp = 135;

Scenario_3: for rice_puddy, unit_comp = 270;

for dry_land, unit_comp = 135;

Scenario_4: first 4 year unit_comp = 800;

after 4 year unit_comp = 200;

]