

EX-ACT PRACTICAL EXERCISES

Answers Booklet



CORRECTED EXERCISES

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Situation 1: Forestry Reserve in Brazil

General description of the project

Firstly, the **description module** has to be filled in with the information provided in the exercise.

The project takes place in Brazil, <u>South America</u>, under a <u>tropical wet</u> climate. The dominant type of soil found is the "<u>LAC soils</u>" category.

No indication regarding the timeframe is provided. However the activities are led during a long-term period of <u>42 years</u>. For the sake of simplicity, a 42-year period of only implementation phase and no capitalization phase is considered.

Project Name	Reserve project in B	razil
Continent	South America	
Climate	Tropical	
Moisture regime	Wet	
	<u>See "Climate" for Help</u>	
Dominant Regional Soil Type	LAC Soils	
	<u>See "Soil" for Help</u>	
Duration of the Project (Years)	Implementation phase	42
	Capitalisation phase	0
	Duration of accounting	42

Finally the description module in EX-ACT should be filled as follows:

Components of the project

The project is composed of two different activities. The first activity treats the issue of <u>deforestation</u>, the second one deals with <u>afforestation/reforestation</u>. The two activities may impact on carbon emissions. Consequently, the following two modules require completion: **deforestation**, **A/R** (Afforestation/Reforestation).

Deforestation module

The type of vegetation the activity is <u>tropical rain forest</u>. Within EX-ACT there exist two kinds of tropical rain forest: natural or plantation.

Regarding the IPCC classification these two possibilities are described as follows:

- Natural forest: extensive management practices, with reduced or minimum human intervention.

- Plantation: intensive management practices.

The distinction between the two categories also depends on the definitions fixed by the country of interest.

In the case of the exercise we consider that the deforested tropical forest is a natural forest. Indeed we can think that the reserve is first made for a conservation purpose of primary forest.

No information is provided regarding the usual harvested wood products as well as fire use. For the sake of simplicity, it is not brought up in the exercise.

Without the project intervention, <u>350 000 ha</u> of forest will be deforested in the future. With the project intervention <u>80% of the 350 000 ha</u> will stay in place in the future. In both cases the deforested area will be <u>set aside</u> (final use after deforestation).

The deforestation module can be filled as follows:



Afforestation module

The exercise treats tropical rain forest, which is going to be planted. We do not know how this plantation is managed. However as the purpose of the implementation of the reserve may have a conservation purpose of primary forest, we can consider that the reforestation will become natural forest.

Without the project intervention, <u>no area</u> will be reforested. With the project 100 ha of forest are going to be planted during a period of 42 years, hence a total area of reforestation reaching <u>4200 ha</u>.

The afforestation module can be filled in as follows:

							Suggested D	efault Value	s per hecta	ire (/ha)							
Type of Defa	ault forest/plar	tation propose	d within the				Up to 20 year-	old			After 20 year	r-old					
specified Cl	imatic zone						Above-Ground B	iomass Grow th	Below - Grou	nd Biomass gr	Above-Ground	Biomass Gr	Below - Groun	nd Biomass g	Litter total	Dead Wood	Soil C
		Ecological Zon	10	Ecol Zone			tonnes dm	t C	tonnes dm	t C	tonnes dm	t C	tonnes dm	t C	t C	tC	tC
Natural	Natural1	Tropical rain for	est				11.00	5.17	4.07	1.91	3.10	1.46	1.15	0.54	3.65	0	60
Forest	Natural2	Tropical moist d	leciduous forest				7.00	3.29	1.40	0.66	2.00	0.94	0.40	0.19	3.65	0	60
Type	Natural3	Tropical dry fore	est				4.00	1.88	2.24	1.05	1.00	0.47	0.56	0.26	3.65	0	60
.,,,,,	Natural4	Tropical shrubla	ind				4.00	1.88	1.60	0.75	1.00	0.47	0.40	0.19	3.65	0	60
	Plantation1	Tropical rain for	est				15.00	7.05	5.55	2.61	15.00	7.05	5.55	2.61	3.65	0	60
Plantation	Plantation2	Tropical moist d	leciduous forest				10.00	4.70	2.00	0.94	10.00	4.70	2.00	0.94	3.65	0	60
Туре	Plantation3	Tropical dry fore	est				8.00	3.76	4.48	2.11	8.00	3.76	4.48	2.11	3.65	0	60
	Plantation4	Tropical shrubla	ind				5.00	2.35	2.00	0.94	5.00	2.35	2.00	0.94	3.65	0	60
				-												-	_
If you have	your own data	fill the informa	ation	Specific vege	etation 1		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0
See IPCC 20	006 Tables 4.9	and 4.10 for oth	her values	Specific Veg	etation 2		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0
				Specific Veg	etation 3		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0
				Specific Veg	etation 4		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0
																	1
	Conversion det	ails (Previous lar	nd use, use of fire b	etore attoresta	ition/refore	station,)	0. 17	0.11			GHG emitte	d during B	urning	Biomass of	of forests/pla	ntation	ł
	vegetation Ty	pe	Previous use beto	re	Burnt beto	Detault	Specific	501			CH4	N20	Iotai	Annual Bio	omass Grow	Litter+dead	
Name			afforestation/reforest	ation	conversion	Bioma	ss (tC/ha)	K _{soil}	Delta C	tCO2/yr	kg	kg	tCO2 eq	<=20yrs	>20yr	wood	
A/R1	Natural1		Set Aside		NO	5.0		0.82	10.8	2.0	0.00	0.00	0.0	7.1	2.0	3.7	
A/R2	Please specify	the vegetation	Select previous us	e	NO	0.0		0.00	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	
A/R3	Please specify	the vegetation	Select previous us	e	NO	0.0		0.00	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	
A/R4	Please specify	the vegetation	Select previous us	e	NO	0.0		0.00	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	
A/R5	Please specify	the vegetation	Select previous us	e	NO	0.0		0.00	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	
A/R6	Please specify	the vegetation	Select previous us	e	NO	0.0		0.00	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	
A/R7	Specific vegeta	tion 1	Select previous us	e	NO	0.0		0.00	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	
A/R8	Specific Veget	ation 2	Select previous us	e	NO	0.0		0.00	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	
A/R9	Specific Vegeta	ation 3	Select previous us	e	NO	0.0		0.00	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	
A/R10	Specific Veget	ation 4	Select previous us	e	NO	0.0		0.00	0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0]
GHG emissi	ons				<i>a</i>)		0.	<u>.</u>	D' 1		0.1		F ¹				D://
Vegetation 1	ype	Chart	Attorested or ret	orested Area	i (na)	4	Biomas	is Gain	Biomass L	LOSS	Soll	MEAL	Fire	A A Cale	Total Bala	nce	Difference
		Start +0	Without Project	Roto	Fod	Poto	+CO2	*002	+CO2	*CO2	*CO2	+CO2	*CO2	+CO2	*CO2	*002	+002
A /D4		10	Enu	Linger	E110	Linner	1002	0005004	1002	77000	1002	040400	1002	1002	1002	00002	1002
A/R1		0	0	Linear	4200	Linear	0	-3095294	0	77000	0	-218196	0	0	0	-3236490	-3236490
A/RZ		0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	0
A/R3		0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	0
AVR4		0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	0
A/R5		0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	U
A/R6		0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	U
A/R/		0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	0
A/R8		0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	0
A/R9		0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	0
A/R10		0	0	Linear	U	Linear	0	0	0	U	0	0	0	0	0	0	U

Land use and land use change Matrix

The following matrix is proposed, summing up the area information provided by the user:

Mineral s	oils					FINAL					
Wit	thout Pro	ject	Forest/		Cropland		Grassland	Other	Land		
			Plantation	Annual	Perennial	Rice		Degraded	Other	Т	otal Initial
INITIAL	Forest/Pla	antation	0	0	0	0	0	0	350000		350000
		Annual	0	0	0	0	0	0	0		0
	Cropland	Perennial	0	0	0	0	0	0	0		0
		Rice	0	0	0	0	0	0	0		0
	Grassland	ł	0	0	0	0	0	0	0		0
	Other Lar	Degraded	0	0	0	0	0	0	0		0
		Other	0	0	0	0	0	0	4200		4200
										_	
		Total Fina	I 0	0	0	0	0	0	354200		354200
								Or	ganic soils		0
Mineral s	oils					FINAL					
V	Vith Proie	ect	Forest/		Cropland		Grassland	Other	Land		
		_	Plantation	Annual	Perennial	Rice		Degraded	Other	Т	otal Initial
INITIAL	Forest/Pla	antation	280000	0	0	0	0	0	70000		350000
		Annual	0	0	0	0	0	0	0		0
	Cropland	Perennial	0	0	0	0	0	0	0		0
	-	Rice	0	0	0	0	0	0	0		0
	Grassland	E	0	0	0	0	0	0	0		0
	Other Lar	Degraded	0	0	0	0	0	0	0		0
		Other	4200	0	0	0	0	0	0		4200
		Total Fina	l 284200	0	0	0	0	0	70000		354200
-		Total Tina				-		-			001200

The total area of interest reaches 354 200 ha.

Without the project 350 000 ha will be converted from forestland to other land (set aside) and 4200 ha stay set aside.

With the project, 280 000 of forest stay in place. 70 000 ha of initial forest becomes set aside land. Finally, 4 200 ha of set aside lands become forestland. The project implies land use changes.

Results provided by the EX-ACT tool

With the assumptions taken into account in this exercise, the EX-ACT tool indicates the following results:

Project Summary	r		Area (Initial	state in ha)	Area (Initial state in ha)			of the			
Name F	Reserve project	in Brazil	Forest/Plant	ation	350000		Project (years)			
				Annual	0		Implementatio	42			
Continent S	South America		Cropland	Perennial	0		Capitalisation	0			
				Rice	0		Total	42			
Climate T	Fropical Wet		Grassland		0		Total A	\rea			
			Other Land	Degraded	0		Mineral soils	354200			
Dominante Soil L	AC Soils			Other	4200		Organic soils	0			
			Organic soils	/peatlands	0		Total Area	354200			
Components of th	e Proiect	Balance (Project - Baseline)	CC)2	N2O	CH4	Per phase of t	he project	Ν	lean per veai	
		All GHG in tCO2eq	Biomass	Soil	-		Implement.	Capital.	Total	Implement.	Capital.
Deforestation		-211481600 this is a sink	-196935200	-14546400	0	0	-211481600	0	-5035276	-5035276	0
Forest Degradation		0	0	0	0	0	0	0	0	0	0
Afforestation and R	eforestation	-3236490 this is a sink	-3018294	-218196	0	0	-3236490	0	-77059	-77059	0
Non Forest Land Us	se Change	0	0	0	0	0	0	0	0	0	0
Agriculture											
	Annual Crops	0	0	0	0	0	0	0	0	0	0
Agroforestry/P	erennial Crops	0	0	0	0	0	0	0	0	0	0
	Irrigated Rice	0	0	0	0	0	0	0	0	0	0
Grassland		0	0	0	0	0	0	0	0	0	0
Organic soils and p	beatlands	0		0	0	0	0	0	0	0	0
Other GHG Emissie	ons		CO2 (other)							
	Livestock	0		-	0	0	0	0	0	0	0
	Inputs	0	C)	0		0	0	0	0	0
Oth	her Investment	0	C)			0	0	0	0	0
F	Final Balance	-214718090 It is a sink	-199953494	-14764596	0	0	-214718090	0	-5112335	-5112335	0
1	n % of Emissio	n without project: -81.2%					F				
E E	Result per ha	-606.2	-564.5	-41.7	0.0	0.0	-606.2	0.0	-14.4	-14.4	0.0

The first three blocs indicate the description of the project filled in the description module. It sums up the area of interest as well as the duration of the carbon appraisal.

The mitigation potential of the two activities led is reflected:

- The <u>reduction of deforestation</u> proposed with the project should create a **carbon sink** reaching 211.5 million tons of eq-CO2 during 42 years. The sink is due to the expected reduction of CO2 emissions stored in biomass compared to the without project situation. The project allows avoiding the emission of 5 million tons of eq-CO2 per year.

- The <u>reforestation activity</u> implies a **carbon sink** reaching 3.2 million tons of eq-CO2 during 42 years, hence a sink of 77059 tons of eq-Co2 each year. Once again avoided CO2 emissions are stored in biomass.

Finally the two activities gathered represents a **net GHG sink** of 214.9 million tons of eq-CO2 in 42 years or 14.4 tons of eq-CO2/year/ha. It represents the benefits brought by the implementation of the project in comparison of a situation in which the project will not happen. Most mitigation potential comes from the reduction of the deforestation.

Situation 2: Palm trees in Indonesia

General description of the project

Primarily, the **description module** has to be filled in with the information provided in the exercise.

The project takes place in Indonesia, <u>Asia insular</u>, under a <u>tropical wet</u> climate. The dominant type of soil corresponds to <u>LAC soils</u>.

The project will be financed during 3 years, hence an implementation phase of <u>3 years</u>. The capitalization phase is estimated to have a duration of <u>17 years</u>.

Finally the description module in EX-ACT should be filled as follows:



Components of the project

Two different activities are realized. The first one concerns deforestation, the second one; implementation of perennial crops. The two activities may impact GHG emissions. Consequently, the following two modules that shall be completed are: **deforestation and perennial crops**.

Deforestation module

Opposite to previous exercise, an activity, <u>with the project</u>, of deforestation is conducted in order to install a palm trees plantation.

The vegetation considered is <u>natural tropical rain forest</u> that is going to be deforested <u>with fire</u> in the situation "with project" to plant palm trees (<u>perennial crops</u>). In the future, without project, <u>10000</u> <u>ha</u> of forest will remain.

The deforestation module can be filled as follows:

Type of Det	fault forest/pla	ntation proposed	I within the				Suggested Default Values per hectare (/ha)											
specified C	limatic zone						Above-0	Ground Biomass	_	Below-Groun	nd Biomass	-	Litter	_	Dead Wood		Soil C	
		Ecological Zone)	Go to Map			tonnes dm	t C		tonnes dm	t C		t C		tC		tC	
	Forest1	Tropical rain fores	st				350	164,5		129,5	60,9		3,65		0		60	
Natural	Forest2	Tropical moist de	ciduous fores	it			290	136,3		69,6	32,7		3,65		0		60	
Forest	Forest3	Tropical dry fores	st				160	75,2		44,8	21,1		3,65		0		60	
	Forest4	Tropical shrublan	ıd				70	32,9		28,0	13,2		3,65		0		60	
	Plantation1	Tropical rain fores	st				150	70,5		55,5	26,1		3,65		0		60	
Plantation	Plantation2	Tropical moist de	eciduous fores	it			120	56,4		24,0	11,3		3,65		0		60	
1 Iuntution	Plantation3	Tropical dry fores	st				60	28,2		16,8	7,9		3,65		0		60	
	Plantation4	Tropical shrublan	ıd				30	14,1		12,0	5,6		3,65		0		60	
Maria have		a fill the informat		Cassife Ves	A activity		0	0		0	-		0		0		0	1 1
ii you nave	your own data	a ini ule informat		Specific Veg	actation 2		0	0		0		,	0		0		0	
				Specific Veg	getation 2		0	0		0		,	0		0		0	
				Specific Veg	actation 4		0	0		0		,	0		0		0	
				opeone veg	Jeranon 4		U	U		v		,	U		U			1 1
	Conversion de	tails (Harvest wood	d product exp	orted before th	ne convers	ion, use of fire,	final use after	r conversion)		Looses (posit	ive value) and	d gain (nega	ative value) p	oer ha				1
	Vegetation T	ype	HWP	before	F	ire use	Final Use a	fter	Biomass	Biomass		Soil			CH4	N2O	Total	1
Name			tonne	t C exported	yes/no	% released	deforestatio	on	1 yr after	t C	t CO2	ksoil	Delta C	tCO2/yr	kg	kg	tCO2 eq	
Defor.1	Forest1		0	0	YES	0,32	Peren	inial/Tree Crop	10,0	229,0	839,7	1,00	0,0	0,0	761,6	22,4	22,9	1
Defor.2	Please specify	y the vegetation	0	0	NO	0	Select Use	after deforestation	0,0	0,0	0,0	0,00	0,0	0,0	0,0	0,0	0,0	
Defor.3	Please specify	y the vegetation	0	0	NO	0	Select Use	after deforestation	0,0	0,0	0,0	0,00	0,0	0,0	0,0	0,0	0,0	
Defor.4	Please specify	y the vegetation	0	0	NO	0	Select Use	after deforestation	0,0	0,0	0,0	0,00	0,0	0,0	0,0	0,0	0,0	
Defor.5	Please specify	y the vegetation	0	0	NO	0	Select Use	after deforestation	0,0	0,0	0,0	0,00	0,0	0,0	0,0	0,0	0,0	
Defor.6	Please specify	y the vegetation	0	0	NO	0	Select Use	after deforestation	0,0	0,0	0,0	0,00	0,0	0,0	0,0	0,0	0,0	
Defor.7	Specific Vege	tation 1	0	0	NO	0	Select Use	after deforestation	0,0	0,00	0,0	0,00	0,0	0,0	0,0	0,0	0,0	
Defor.8	Specific Vege	tation 2	0	0	NO	0	Select Use	after deforestation	0,0	0,00	0,0	0,00	0,0	0,0	0,0	0,0	0,0	
Defor.9	Specific Vege	tation 3	0	0	NO	0	Select Use	after deforestation	0,0	0,00	0,0	0,00	0,0	0,0	0,0	0,0	0,0	
Defor.10	Specific Vege	tation 4	0	0	NO	0	Select Use	after deforestation	0,0	0,00	0,0	0,00	0,0	0,0	0,0	0,0	0,0	
Vegetation 7	T	Foreste	d Area (ha)			Area defores	ted (ha)	Biomass	loss	Biomass gain	(1vr after)	Soil		Fire		Total Balance		Difference
	Start	Without Project	1	With Project	ct	Without	With	Without	With	Without	With	Without	With	Without	With	Without	With	
	tO	End	Rate	End	Rate			tCO2	tCO2	tCO2	tCO2	tCO2	tCO2	tCO2	tCO2	tCO2	tCO2	tCO2
Defor.1	10000	10000	Linear	0	Linear	0	10000	0	8397217	0	-366667	0	0	0	229376	0	8259926	8259926
Defor.2	0	0	Linear	0	Linear	Ó	0	0	0	0	0	0	Ó	0	0	0	0	0
Defor.3	0	o	Linear	0	Linear	Ó	Ó	0	Ó	Ó	Ó	0	Ó	Ó	Ó	0	Ó	Ó
Defor.4	0	o	Linear	0	Linear	Ó	Ó	0	Ó	Ó	Ó	0	Ó	Ó	Ó	0	Ó	ò
Defor.5	0	o	Linear	0	Linear	Ó	Ó	0	Ó	Ó	Ó	0	Ó	Ó	Ó	0	Ó	ò
Defor 6	0	0	Linear	0	Linear	0	0	0	ō	0	ō	0	0	ō	ō	0	0	ō
Defor 7	0	0	Linear	0	Linear	0	0	0	ō	0	ō	0	0	ō	ō	0	0	ō
Defor 8	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	0	0	0
Defor.9	0	õ	Linear	0	Linear	ő	ő	0	ő	ő	ő	0	ő	ő	ő	Ő	ő	Ó
Defor.10	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	0	0	0
							-		-		-		-				-	
1													-					

Perennial module

The user already indicated that the forest will become perennial crops in the situation with project. The indication is <u>automatically</u> accounted for in the perennial module in "reserved system P1" corresponding to perennial coming from deforestation.

No information is provided regarding the residue/biomass burning practice during the palm tree cultivation. For the sake of simplicity, this information is ignored.

		I I I	esique/biom	455	Aboveground	Diomass	Belowgioui	IO BIOMASS	SOIL Ellect	User delat	in available	CH4	N20	COZey
	Your description	Burning		Tons dm/ha	Growth rat	e (tC/ha)	Growth ra	te (tC/ha)	Default					
			Interval (yr)		Default	Specific	Default	Specific	t CO2/ha/yi		tCO2/ha/yr	kg	kg	t
Reserved system P1	From Deforestation	NO	1	10	10		0		0.7	NO		0	0	0.0
Reserved system P2	Converted to A/R	NO	1	10	0		0		0.7	NO		0	0	0.0
Reserved system P3	OLUC to Perennial	NO	1	10	10		0		0.7	NO		0	0	0.0
Reserved system P4	Perennial to OLUC	NO	1	10	0		0		0.7	NO		0	0	0.0
Perennial Syst 1		NO	1	10	0		0		0.7	NO		0	0	0.0
Perennial Syst 2		NO	1	10	0		0		0.7	NO		0	0	0.0
Perennial Syst 3		NO	1	10	0		0		0.7	NO		0	0	0.0
Perennial Syst 4		NO	1	10	0		0		0.7	NO		0	0	0.0
Perennial Syst 5		NO	1	10	0		0		0.7	NO		0	0	0.0
					Only System P	1 therefore def 1 and P3 are	e considered by	is 0 default not in er	quilibrium					
Mitigation potential														
Mitigation potential Vegetation Type	Areas	_				CO ₂ fluxes fi	rom Biomass	CO ₂ fluxes fro	m Soil	CO2eq emitt	ed from Burni	Total I	Balance	Difference
Mitigation potential Vegetation Type	Areas Start	Without pro	oject	With Proje	ct	CO ₂ fluxes fr Without	rom Biomass With	CO ₂ fluxes fro Without	m Soil With	CO ₂ eq emitt Without	ed from Burni With	Total I Without	Balance With	Difference
Mitigation potential Vegetation Type	Areas Start t0	Without pro	oject Rate	With Proje	ct Rate	CO ₂ fluxes fr Without	rom Biomass With	CO ₂ fluxes fro Without	m Soil With	CO ₂ eq emitt Without	ed from Burni With	Total I Without tCO ₂	Balance With tCO ₂	Difference tCO2eq
Mitigation potential Vegetation Type System P1	Areas Start t0 0	Without pro End 0	oject Rate Linear	With Project End 10000	ct Rate Linear	CO ₂ fluxes fr Without	rom Biomass With -6600000	CO ₂ fluxes fro Without	m Soil With -129500	CO ₂ eq emitt Without	ed from Burni With 0	Total I Without tCO ₂ 0	Balance With tCO ₂ -6729500	Difference tCO2eq -6729500
Mitigation potential Vegetation Type System P1 System P2	Areas Start t0 0	Without pro End 0 0	<mark>Dject</mark> Rate Linear Linear	With Project End 10000 0	ct Rate Linear Linear	CO ₂ fluxes fr Without	rom Biomass With -6600000 0	CO ₂ fluxes fro Without	m Soil With -129500 0	CO2eq emitt Without 0 0	ed from Burni With 0 0	Total I Without tCO ₂ 0 0	Balance With tCO ₂ -6729500 0	Difference tCO2eq -6729500 0
Mitigation potential Vegetation Type System P1 System P2 System P3	Areas Start t0 0 0 0	Without pro End 0 0 0	pject Rate Linear Linear Linear	With Project End 10000 0 0	ct Rate Linear Linear Linear	CO ₂ fluxes fr Without 0 0 0	rom Biomass With -6600000 0 0	CO ₂ fluxes fro Without 0 0	m Soil With -129500 0 0	CO ₂ eq emitt Without 0 0	ed from Burni With 0 0 0	Total I Without tCO ₂ 0 0 0	Balance With tCO ₂ -6729500 0 0	Difference tCO2eq -6729500 0 0
Mitigation potential Vegetation Type System P1 System P2 System P3 System P4	Areas Start t0 0 0 0 0 0 0 0 0	Without pro End 0 0 0 0	bject Rate Linear Linear Linear Linear	With Project End 10000 0 0	ct Rate Linear Linear Linear Linear	CO ₂ fluxes fr Without 0 0 0 0	rom Biomass With -6600000 0 0 0	CO ₂ fluxes fro Without 0 0 0 0	m Soil With -129500 0 0 0	CO2eq emitt Without 0 0 0	ed from Burni With 0 0 0 0	Total I Without tCO ₂ 0 0 0 0	Balance With tCO ₂ -6729500 0 0 0	Difference tCO2eq -6729500 0 0 0
Mitigation potential Vegetation Type System P1 System P2 System P3 System P4 Perennial Syst 1	Areas Start t0 0 0 0 0 0 0 0 0 0 0 0	Without pro End 0 0 0 0 0 0	pject Rate Linear Linear Linear Linear Linear	With Project End 10000 0 0 0 0	ct Rate Linear Linear Linear Linear Linear	CO ₂ fluxes fr Without 0 0 0 0 0	rom Biomass With -6600000 0 0 0 0	CO ₂ fluxes fro Without 0 0 0 0 0	m Soil With -129500 0 0 0	CO ₂ eq emitt Without 0 0 0 0	ed from Burni With 0 0 0 0	Total I Without tCO ₂ 0 0 0 0 0 0	Balance With tCO2 -6729500 0 0 0 0 0 0 0	Difference tCO2eq -6729500 0 0 0 0
Mitigation potential Vegetation Type System P1 System P2 System P3 System P4 Perennial Syst 1 Perennial Syst 2	Areas	Without pro End 0 0 0 0 0 0 0 0	Dject Rate Linear Linear Linear Linear Linear Linear	With Project End 10000 0 0 0 0 0 0 0	ct Rate Linear Linear Linear Linear Linear Linear	CO ₂ fluxes fr Without 0 0 0 0 0 0	rom Biomass With -6600000 0 0 0 0 0 0	CO ₂ fluxes fro Without 0 0 0 0 0 0	m Soil With -129500 0 0 0 0 0 0	CO ₂ eq emitt Without 0 0 0 0 0 0	ed from Burni With 0 0 0 0 0 0 0 0	Total I Without tCO ₂ 0 0 0 0 0 0 0	Balance With tCO ₂ -6729500 0 0 0 0 0 0 0	Difference tCO2eq -6729500 0 0 0 0 0 0 0
Mitigation potential Vegetation Type System P1 System P2 System P3 System P4 Perennial Syst 1 Perennial Syst 2 Perennial Syst 2	Areas Start t0 0 0 0 0 0 0 0 0 0 0 0	Without pro End 0 0 0 0 0 0 0 0 0	Dject Rate Linear Linear Linear Linear Linear Linear Linear	With Project End 10000 0 0 0 0 0 0 0 0 0 0 0	ct Rate Linear Linear Linear Linear Linear Linear Linear	CO ₂ fluxes fit Without 0 0 0 0 0 0 0 0	rom Biomass With -6600000 0 0 0 0 0 0 0	CO ₂ fluxes frod Without 0 0 0 0 0 0 0 0 0	m Soil With -129500 0 0 0 0 0 0 0 0 0 0	CO2eq emitt Without 0 0 0 0 0 0 0 0 0	ed from Bumi With 0 0 0 0 0 0 0 0 0	Total I Without tCO ₂ 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Balance With tCO ₂ -6729500 0 0 0 0 0 0 0 0 0 0 0	Difference tCO2eq -6729500 0 0 0 0 0 0 0 0
Mitigation potential Vegetation Type System P1 System P2 System P4 Perennial Syst 1 Perennial Syst 1 Perennial Syst 3 Perennial Syst 4	Areas	Without pro End 0 0 0 0 0 0 0 0 0 0 0 0	pject Rate Linear Linear Linear Linear Linear Linear Linear	With Project End 10000 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ct Rate Linear Linear Linear Linear Linear Linear Linear Linear	CO ₂ fluxes fit Without 0 0 0 0 0 0 0 0 0 0	rom Biomass With -6600000 0 0 0 0 0 0 0 0 0 0	CO ₂ fluxes fro Without 0 0 0 0 0 0 0 0 0 0 0	m Soil With -129500 0 0 0 0 0 0 0 0 0 0 0	CO2eq emitt Without 0 0 0 0 0 0 0 0 0 0 0	ed from Burni With 0 0 0 0 0 0 0 0 0 0 0 0 0	Total I Without tCO ₂ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Balance With tCO2 -6729500 0 0 0 0 0 0 0 0 0 0 0 0 0	Difference tCO2eq -6729500 0 0 0 0 0 0 0 0 0 0 0 0
Mitigation potential Vegetation Type System P1 System P2 System P3 System P4 Perennial Syst 1 Perennial Syst 2 Perennial Syst 3 Perennial Syst 5	Areas Start 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Without pro End 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	bject Rate Linear Linear Linear Linear Linear Linear Linear Linear	With Project End 10000 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ct Rate Linear Linear Linear Linear Linear Linear Linear Linear Linear	CO ₂ fluxes fr Without 0 0 0 0 0 0 0 0 0 0 0 0 0	rom Biomass With -6600000 0 0 0 0 0 0 0 0 0 0	CO ₂ fluxes fro Without 0 0 0 0 0 0 0 0 0 0 0 0 0 0	m Soil With -129500 0 0 0 0 0 0 0 0 0 0 0 0 0 0	CO2eq emitt Without 0 0 0 0 0 0 0 0 0 0 0 0 0	ed from Burni With 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total I Without tCO ₂ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Balance With tCO ₂ -6729500 0 0 0 0 0 0 0 0 0 0 0 0	Difference tCO2eq -6729500 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Mitigation potential Vegetation Type System P1 System P2 System P3 System P4 Perennial Syst 1 Perennial Syst 3 Perennial Syst 3 Perennial Syst 3 Perennial Syst 5 Total Syst 1-5	Areas Start t0 0 0 0 0 0 0 0 0 0 0 0 0	Without pro End 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	pject Rate Linear Linear Linear Linear Linear Linear Linear Linear Linear	With Project End 10000 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ct Rate Linear Linear Linear Linear Linear Linear Linear Linear Linear	CO2 fluxes fr Without 0 0 0 0 0 0 0 0 0 0 0 0 0 0	rom Biomass With -6600000 0 0 0 0 0 0 0 0 0 0	CO2 fluxes fro Without 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	m Soil With -129500 0 0 0 0 0 0 0 0 0 0 0 0 0	CO2eq emitt Without 0 0 0 0 0 0 0 0 0 0 0 0 0	ed from Burni With 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total I Without tCO2 0	Balance With tCO ₂ -6729500 0 0 0 0 0 0 0 0 0 0 0 0	Difference tCO2eq -6729500 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

The perennial module appears as follows:

Land use and land use change Matrix

						FINAL					
Wit	thout Pro	ject	Forest/		Cropland		Grassland	Other	^r Land		
			Plantatio	Annual	Perennial	Rice		Degraded	Other		Tota
INITIAL	Forest/Pla	antation	10000	0	0	0	0	0	0		10
		Annual	0	0	0	0	0	0	0		
	Cropland	Perennial	0	0	0	0	0	0	0		
		Rice	0	0	0	0	0	0	0		
	Grassland	t i	0	0	0	0	0	0	0		
	Other Lar	Degraded	0	0	0	0	0	0	0		
		Other	0	0	0	0	0	0	0		
										_	
			40000	0	0	0	0	0	0		10
		Total Final	10000	U	0	U	Ŭ	0	0		10
V	Vith Proje	Total Final	Forest/	0	Gropland	FINAL	Grassland	Other	Land]	10
Ľ	Vith Proje	Total Final	Forest/ Plantatio	Annual	Cropland Perennial	FINAL	_Grasslanc	Other Degraded	• Land Other		Total
	Vith Proje	Total Final	Forest/ Plantation	Annual	Cropland Perennial 10000	FINAL Rice	_Grasslanc_	Other Degraded	• Land Other 0		Total 100
	Vith Proje	Total Final	Forest/ Plantation 0	Annual 0	Cropland Perennial 10000 0	FINAL Rice 0 0	_Grasslanc	Other Degraded 0 0	• Land Other 0 0		Total
	Vith Proje Forest/Pla Cropland	Total Final	Forest/ Plantation 0 0 0	Annual 0 0 0	Cropland Perennial 10000 0	FINAL Rice 0 0 0	Grasslanc 0 0 0	Other Degraded 0 0 0	C Land Other 0 0 0		Total 100 (
	Vith Proje Forest/Pla Cropland	Total Final	Forest/ Plantation 0 0 0 0	Annual 0 0 0 0	Cropland Perennial 10000 0 0 0	FINAL Rice 0 0 0 0	Grasslanc 0 0 0 0	Other Degraded 0 0 0 0	C Land Other O O O O O		Total
	Vith Proje Forest/Pla Cropland Grassland	Ct antation Annual Perennial Rice	Forest/ Plantation 0 0 0 0 0	Annual O O O O	Cropland Perennial 10000 0 0 0 0 0	FINAL Rice 0 0 0 0 0 0	Grasslanc	Other Degraded 0 0 0 0 0	Cher Other O O O O		Total
	Vith Proje Forest/Pla Cropland Grassland Other Lar	Total Final Cf Annual Perennial Rice J Degraded	Forest/ Plantation 0 0 0 0 0 0	Annual 0 0 0 0 0 0 0	Cropland Perennial 10000 0 0 0 0 0 0	FINAL Rice 0 0 0 0 0 0 0	Grasslanc 0 0 0 0 0 0	Other Degraded 0 0 0 0 0 0 0 0	CLand Other O O O O O O O O O O O		Total 10
<u>لا</u> NITIAL	Forest/Pla Forest/Pla Cropland Grassland Other Lar	Total Final Cf antation Annual Perennial Rice Degraded Other	Forest/ Plantation 0 0 0 0 0 0 0 0	Annual 0 0 0 0 0 0 0 0	Cropland Perennial 10000 0 0 0 0 0	FINAL Rice 0 0 0 0 0 0 0 0 0	Grasslanc 0 0 0 0 0 0 0	Other Degraded 0 0 0 0 0 0 0 0 0	C Land Other 0 0 0 0 0 0 0 0 0 0 0	•	Total 100 ((((((((((((((((((
<u>v</u> NITIAL	Forest/Pla Forest/Pla Cropland Grassland Other Lar	Annual Perennial Rice Degraded Other	Forest/ Plantation 0 0 0 0 0 0 0 0 0	Annual 0 0 0 0 0 0 0	Cropland Perennial 10000 0 0 0 0 0 0 0	FINAL Rice 0 0 0 0 0 0 0 0 0 0 0 0	Grasslanc 0 0 0 0 0 0 0 0	Other Degraded O O O O O O O	CLand Other O O O O O O O O O O		Total 100 (((((((((((((

The following matrix will be proposed, summing up the area information provided by the user:

The total area of interest is 10 000 ha. In the situation "without project", there is no land use change, the 10 000 ha of forest remain forestlands. With the project, 10 000 ha of forestlands are turned into perennial croplands.

Results provided by the EX-ACT tool

With the assumptions taken into account in this exercise, EX-ACT indicates the following results:

Project Summa	iry		Area (Initial	state in ha)		Duratio	n of the			
Name	palm tree in Indo	nesia	Forest/Plant	tation	10000		Project	(years)			
				Annual	0		Implementati	o 3			
Continent	Asia (Insular)		Cropland	Perennial	0		Capitalisation	า 17			
				Rice	0		Total	20			
Climate	Tropical Wet		Grassland		0		Total	Area			
			Other Land	Degraded	0		Mineral soils	10000			
Dominante Soil	LAC Soils			Other	0		Organic soils	; O			
			Organic soils	/peatlands	0		Total Area	10000			
Components of	the Project	Balance (Project - Baseline)	CC	02	N2O	CH4	Per phase of	the project	Ν	lean per yea	r
	-	All GHG in tCO2eq	Biomass	Soil			Implement.	Capital.	Total	Implement.	Capital.
Deforestation		8259926 this is a source	8030550	0	69440	159936	8259926	0	412996	2753309	0
Forest Degradati	on	0	0	0	0	0	0	0	0	0	0
Afforestation and	Reforestation	0	0	0	0	0	0	0	0	0	0
Non Forest Land	Use Change	0	0	0	0	0	0	0	0	0	0
Agriculture											
	Annual Crops	0	0	0	0	0	0	0	0	0	0
Agroforestry	/Perennial Crops	-6729500 this is a sink	-6600000	-129500	0	0	-377167	-6352333	-336475	-125722	-373667
	Irrigated Rice	0	0	0	0	0	0	0	0	0	0
Grassland		0	0	0	0	0	0	0	0	0	0
Organic soils and	d peatlands	0		0	0	0	0	0	0	0	0
Other GHG Emis	ssions		CO2 (other)							
	Livestock	0		-	0	0	0	0	0	0	0
	Inputs Other Investment	0)	0		0	0	0	0	0
	Other investment	U		,			0	0	0	0	U
	Final Balance	1530426 It is a source	1430550	-129500	69440	159936	7882759	-6352333	76521	2627586	-373667
	In % of Emission without project: 0.0%										
	Result per ha	153.0	143.1	-13.0	6.9	16.0	788.3	-635.2	7.7	262.8	-37.4

The two activities proposed with the project imply different impacts on climate change mitigation:

- The <u>deforestation activity</u> creates a **source of GHG** reaching 8.3 million tons of eq-CO2 in 20 years. The loss of vegetation leads especially to emissions of CO2 (8 million tons of eq-CO2 in 20 years).

-The <u>implantation of palm trees</u> implies a **sink of GHG** reaching 6.7 million tons of eq-CO2. The sink is essentially due to the growth of the trees storing Carbon in biomass and soil.

The sink realized by the perennial crops is not sufficient enough to compensate the source created by the deforestation activity. Accordingly the project is not contributing to mitigation but will amplify the impacts of climate change. The two activities gathered represent a **net source** of 1.5 million tons of eq-CO2, or 7.7 t eq-CO2/year/ha.

Situation 3: Agricultural project in Benin

General description of the project

First of all, the **description module** has to be filled in with the information provided in the exercise.

The project takes place in Benin, <u>Africa</u>. We do not have direct information regarding the dominant climate. However the project deals with cotton crops, therefore we can imagine that the project would happen in North of Benin, which implies a <u>tropical dry</u> climate. The dominant type of soil corresponds to <u>LAC soils</u>.

The project will be financed during 5 years, hence an implementation phase of <u>5 years</u>. The capitalization phase is estimated to occur over a duration of <u>15 years</u>.

Project Name	Agricultural project in	GWP (choose values)		
	-		Official-CDM	
Continent	Africa	CO2	1	
		CH4	21	
Climate	Tropical	N2O	310	
Moisture regime	Dry			
U	See "Climate" for Help			
Dominant Regional Soil Type	LAC Soils			
	See "Soil" for Help			
Duration of the Project (Years)	Implementation phase	5		
	Capitalisation phase	15		
	Duration of accounting	20		
Components of the Project				
Deforestation				
Afforestation and Reforestation				
Non Forest Land Use Change				
Agriculture				
Annual Crops				
Agroforestry/Perennial Crops				
Rice	GO TO RESULT	5		
Grassland				
Other GHG Emissions				
Livestock				
Inputs				
Other Investment				

Finally the description module in EX-ACT should be filled as follows:

Four different activities are realized. The first one treats the <u>development of perennial crops</u> implying <u>land use change</u>, the second one with the <u>decrease of cotton</u> crops, the third with the improvement of <u>annual crops</u> (cassava) and the last one with the use of <u>inputs</u>. The activities may have impacts on GHG emissions. Consequently, the following four modules are going to be filled in: **non-forest LUC**, **perennial crops, annual crops, inputs**.

Non forest land use change module

Perennial crops will be planted on set aside lands. That implies a <u>land use change</u> that has to be indicated <u>first</u> within the non-forest LUC module. This land use change will be achieved with the use of fire.

		Description of I	Description of LUC						Default C Stocks (tC/ha)				Delta (tCO2)	Emitted during Burning	
Name	Your Name	Initial Land Us	9	Final Land Us	•	Alert		conversion	Biom. Ini.	Biom. Fin.	Soil Ini.	Soil Fin.	Biomass	Soil /yr *	CH4 (kg)	N2O (kg)
LUC-1	cashew trees plantatio	Set Aside		Perennial/Tree	Crop			YES	5,0	1,8	32,6	35,0	-11,7	0,4	27,0	7,0
LUC-2		Select Initial Lar	nd Use	Select Final Lar	nd Use	Fill initial L	J	NO	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
LUC-3		Select Initial Lar	nd Use	Select Final Lar	nd Use	Fill initial L	J	YES	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
LUC-4		Select Initial Lar	nd Use	Select Final Lar	nd Use	Fill initial L	J	NO	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
LUC-5		Select Initial Lar	nd Use	Select Final Lar	nd Use	Fill initial L	J	YES	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
LUC-6		Select Initial Lar	nd Use	Select Final Lar	nd Use	Fill initial L	J	NO	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
LUC-7		Select Initial Lar	nd Use	Select Final Lar	nd Use	Fill initial L	J	NO	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
LUC-8		Select Initial Lar	nd Use	Select Final Lar	nd Use	Fill initial L	J	NO	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
LUC-9		Select Initial Lar	nd Use	Select Final Lar	nd Use	Fill initial L	J	NO	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
LUC-10		Select Initial Lar	nd Use	Select Final Lar	nd Use	Fill initial L	J	YES	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
LUC-11		Select Initial Lar	nd Use	Select Final Lar	nd Use	Fill initial L	J	NO	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
LUC-12		Select Initial Lar	nd Use	Select Final Lar	nd Use	Fill initial L	J	NO	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
LUC-13		Select Initial Lar	nd Use	Select Final Lar	nd Use	Fill initial L	J	NO	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
LUC-14		Select Initial Lar	nd Use	Select Final Lar	nd Use	Fill initial L	J	NO	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
LUC-15		Select Initial Lar	nd Use	Select Final Lar	nd Use	Fill initial L	J	NO	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
LUC-16		Select Initial Lar	nd Use	Select Final Lar	nd Use	Fill initial L	J	NO	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Vegetation Type	5	Area concerne	d by LUC			Biomass	Change	Soil Change		Fire	1	Total Balanc	e	Difference		
		Without Project	:t	With Project		Without	With	Without	With	Without	With	Without	With			
		Area	Rate	Area	Rate	tCO2	tCO2	tCO2	tCO2	tCO2	tCO2	tCO2	tCO2	tCO2		
LUC-1	cashew trees plantation	0	Linear	1000	Linear	0	11733	0	-7860	0	2737	0	6610	6610		
LUC-2		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
LUC-3		0	Linear	0	Linear	0	0	0	0	0	0	0	0	U		
LUC-4		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
LUC-5		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
LUC-7		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
LUC-8		0	Linear	0	Linear	ŏ	0	ő	ő	ő	ő	ő	0	ő		
1110-9		0	Linear	0	Linear	ő	ő	0	ő	ő	ő	ő	ő	ő		
LUC-10		ő	Linear	ő	Linear	ő	ő	ő	ő	ő	ő	ő	ő	ő		
LUC-11		ő	Linear	ő	Linear	ő	ő	ő	ő	ő	ő	ő	ő	ő		
LUC-12		ō	Linear	ō	Linear	ō	ō	ō	ō	ō	ō	ō	ō	ō		
LUC-13		0	Linear	0	Linear	0	Ó	0	0	0	0	0	0	0		
LUC-14		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
LUC-15		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
LUC-16		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
															-	
									Other LUC	total		0	6610	6610		

Consequently the non forest LUC module can be filled as follows:

Perennial crops module

The information provided by the user regarding the land use change from set aside to perennial crops is <u>automatically implemented</u> in the perennial module, in the line "reserved system P3". As the biomass/residue will not be burnt during the cashew cultivation, the user does not have any other information to fill in the perennial module.

The perennial module appears as follow	The	perennial	module	appears	as	follows
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		Residue/Biomass			Aboveground	nd Biomass Belowground Biomass		Soil Effect	User default available		CH4	N2O	CO2eq	
	Your description	Burning		Tons dm/ha	Growth rat	e (tC/ha)	Growth ra	te (tC/ha)	Default					
			Interval (yr)		Default	Specific	Default	Specific	t CO2/ha/y	r	tCO2/ha/yr	kg	kg	t
Reserved system P1	From Deforestation	NO	1	10	1.8		0		0.33	NO		0	0	0.0
Reserved system P2	Converted to A/R	NO	1	10	0		0		0.33	NO		0	0	0.0
Reserved system P3	OLUC to Perennial	NO	1	10	1.8		0		0.33	NO		0	0	0.0
Reserved system P4	Perennial to OLUC	NO	1	10	0		0		0.33	NO		0	0	0.0
Perennial Syst 1		NO	1	10	0		0		0.33	NO		0	0	0.0
Perennial Syst 2		NO	1	10	0		0		0.33	NO		0	0	0.0
Perennial Syst 3		NO	1	10	0		0		0.33	NO		0	0	0.0
Perennial Syst 4		NO	1	10	0		0		0.33	NO		0	0	0.0
Perennial Syst 5		NO	1	10	0		0		0.33	NO		0	0	0.0
					The default (tier	s 1 assumpt	ion) is that if the	system	Positive val	ue= gain for s	oil			
					is in equilibrium	therefore de	fault growth rate	is 0						
					Only System P	1 and P3 an	e considered by	default not in e	quilibrium					
Mitigation potential														
Mitigation potential Vegetation Type	Areas	_		_		CO ₂ fluxes	from Biomass	CO ₂ fluxes fro	m Soil	CO2eq emitt	ed from Burni	Total I	Balance	Difference
Mitigation potential Vegetation Type	Areas Start	Without pro	oject	With Proje	ct	CO ₂ fluxes to Without	from Biomass With	CO ₂ fluxes fro	m Soil With	CO ₂ eq emitt Without	ed from Burni With	Total I Without	Balance With	Difference
Mitigation potential Vegetation Type	Areas Start t0	Without pro	oject Rate	With Project	ct Rate	CO ₂ fluxes Without	from Biomass With	CO ₂ fluxes fro Without	m Soil With	CO ₂ eq emitt Without	ed from Burni With	Total I Without tCO ₂	Balance With tCO ₂	Difference tCO2eq
Mitigation potential Vegetation Type System P1	Areas Start t0 0	Without pro	oject Rate Linear	With Project	ct Rate <i>Linear</i>	CO ₂ fluxes to Without	from Biomass With 0	CO ₂ fluxes fro Without	m Soil With	CO ₂ eq emitt Without	ed from Burni With 0	Total I Without tCO ₂ 0	Balance With tCO ₂ 0	Difference tCO2eq 0
Mitigation potential Vegetation Type System P1 System P2	Areas Start t0 0	Without pro End 0	oject Rate Linear Linear	With Project End 0	ct Rate Linear Linear	CO ₂ fluxes i Without 0	from Biomass With 0 0	CO ₂ fluxes fro Without	With 0 0	CO ₂ eq emitt Without	ed from Burni With 0 0	Total I Without tCO ₂ 0 0	Balance With tCO ₂ 0 0	Difference tCO2eq 0 0
Mitigation potential Vegetation Type System P1 System P2 System P3	Areas Start t0 0 0 0	Without pro End 0 0	oject Rate Linear Linear Linear	With Project End 0 1000	ct Rate Linear Linear Linear	CO ₂ fluxes t Without 0 0	from Biomass With 0 0 -112200	CO ₂ fluxes fro Without	With 0 0 -5775	CO ₂ eq emitt Without 0 0	ed from Burni With 0 0 0	Total I Without tCO ₂ 0 0 0	Balance With tCO ₂ 0 0 -117975	Difference tCO2eq 0 -117975
Mitigation potential Vegetation Type System P1 System P2 System P3 System P4	Areas	Without pro End 0 0 0 0	oject Rate Linear Linear Linear Linear	With Project End 0 1000 0	ct Rate Linear Linear Linear Linear	CO ₂ fluxes t Without 0 0 0	from Biomass With 0 0 -112200 0	CO ₂ fluxes fro Without 0 0 0	m Soil With 0 0 -5775 0	CO ₂ eq emitt Without 0 0 0	ed from Burni With 0 0 0	Total I Without tCO ₂ 0 0 0 0	Balance With tCO ₂ 0 0 -117975 0	Difference tCO2eq 0 -117975 0
Mitigation potential Vegetation Type System P1 System P2 System P3 System P4 Perennial Syst 1	Areas	Without pro End 0 0 0 0 0 0	Dject Rate Linear Linear Linear Linear Linear	With Project End 0 0 1000 0 0 0	ct Rate Linear Linear Linear Linear Linear	CO ₂ fluxes Without 0 0 0 0	From Biomass With 0 0 -112200 0 0	CO ₂ fluxes fro Without 0 0 0 0 0	m Soil With 0 0 -5775 0 0	CO ₂ eq emitt Without 0 0 0 0 0	ed from Burni With 0 0 0 0	Total I Without tCO ₂ 0 0 0 0 0	Balance With tCO ₂ 0 0 -117975 0 0	Difference tCO2eq 0 -117975 0 0
Mitigation potential Vegetation Type System P1 System P2 System P3 System P4 Perennial Syst 1 Perennial Syst 2	Areas	Without pro End 0 0 0 0 0 0 0	Dject Rate Linear Linear Linear Linear Linear Linear	With Project End 0 0 1000 0 0 0 0	ct Rate Linear Linear Linear Linear Linear	CO ₂ fluxes s Without 0 0 0 0 0 0 0	from Biomass With 0 0 -112200 0 0 0 0	CO ₂ fluxes fro Without 0 0 0 0 0 0	m Soil With 0 0 -5775 0 0 0 0	CO ₂ eq emitt Without 0 0 0 0 0 0	ed from Burni With 0 0 0 0 0 0 0 0	Total I Without tCO ₂ 0 0 0 0 0 0 0 0	Balance With tCO ₂ 0 -117975 0 0 0 0	Difference tCO2eq 0 -117975 0 0 0 0
Mitigation potential Vegetation Type System P1 System P2 System P3 System P4 Perennial Syst 1 Perennial Syst 2 Perennial Syst 3	Areas	Without pro End 0 0 0 0 0 0 0 0 0	bject Rate Linear Linear Linear Linear Linear Linear	With Project End 0 1000 0 0 0 0 0 0 0	ct Rate Linear Linear Linear Linear Linear Linear Linear	CO ₂ fluxes s Without 0 0 0 0 0 0 0 0	from Biomass With 0 0 -112200 0 0 0 0 0	CO ₂ fluxes from Without 0 0 0 0 0 0 0 0 0	m Soil With 0 -5775 0 0 0 0 0	CO ₂ eq emitt Without 0 0 0 0 0 0 0 0	ed from Burni With 0 0 0 0 0 0 0 0 0	Total I Without tCO ₂ 0 0 0 0 0 0 0 0 0 0 0 0 0	Balance With tCO ₂ 0 -117975 0 0 0 0 0 0	Difference tCO2eq 0 0 -117975 0 0 0 0 0 0
Mitigation potential Vegetation Type System P1 System P2 System P3 Perennial Syst 1 Perennial Syst 2 Perennial Syst 3 Perennial Syst 3	Areas	Without pro End 0 0 0 0 0 0 0 0 0 0 0	pject Rate Linear Linear Linear Linear Linear Linear Linear	With Project End 0 10000 0 0 0 0 0 0 0 0	ct Rate Linear Linear Linear Linear Linear Linear Linear Linear	CO ₂ fluxes 1 Without 0 0 0 0 0 0 0 0 0 0	from Biomass With 0 0 -112200 0 0 0 0 0 0 0	CO ₂ fluxes fro Without 0 0 0 0 0 0 0 0 0 0	m Soil With 0 0 -5775 0 0 0 0 0 0 0 0	CO ₂ eq emitt Without 0 0 0 0 0 0 0 0 0 0 0	ed from Burni With 0 0 0 0 0 0 0 0 0 0 0 0 0	Total I Without tCO ₂ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Balance With tCO ₂ 0 -117975 0 0 0 0 0 0 0 0	Difference tCO2eq 0 0 -117975 0 0 0 0 0 0 0 0 0
Mitigation potential Vegetation Type System P1 System P2 System P3 System P4 Perennial Syst 1 Perennial Syst 2 Perennial Syst 3 Perennial Syst 4 Perennial Syst 5	Areas	Without pro End 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Dject Rate Linear Linear Linear Linear Linear Linear Linear Linear Linear	With Project End 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	t Rate Linear Linear Linear Linear Linear Linear Linear Linear Linear	CO ₂ fluxes Without 0 0 0 0 0 0 0 0 0 0 0	Trom Biomass With 0 0 -112200 0 0 0 0 0 0 0 0 0 0	CO ₂ fluxes fro Without 0 0 0 0 0 0 0 0 0 0 0 0 0 0	m Soil With 0 0 -5775 0 0 0 0 0 0 0 0 0 0	CO2eq emitt Without 0 0 0 0 0 0 0 0 0 0 0 0 0	ed from Burni With 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total I Without tCO2 0	Balance With tCO ₂ 0 0 -117975 0 0 0 0 0 0 0 0 0 0 0 0 0	Difference tCO2eq 0 0 -117975 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Mitigation potential Vegetation Type System P1 System P2 System P3 System P4 Perennial Syst 1 Perennial Syst 2 Perennial Syst 3 Perennial Syst 5 Total Syst 1-5	Areas	Without pro End 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	bject Rate Linear Linear Linear Linear Linear Linear Linear Linear Linear	With Project End 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	t Rate Linear Linear Linear Linear Linear Linear Linear Linear Linear	CO ₂ fluxes Without 0 0 0 0 0 0 0 0 0 0 0 0 0	from Biomass With 0 -112200 0 0 0 0 0 0 0	CO ₂ fluxes fro Without 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	m Soil With 0 -5775 0 0 0 0 0 0 0 0 0	CO2eq emitt Without 0 0 0 0 0 0 0 0 0 0 0 0 0	ed from Burni With 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Total I Without tCO2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Balance With tCO ₂ 0 0 -117975 0 0 0 0 0 0 0 0 0 0 0 0 0	Difference tCO2eq 0 -117975 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Annual module

It is recommended to build the following table while reading the exercise, since it facilitates the completing procedure within the EX-ACT tool.

Type of annual vegetation system	Start (ha)	Future without project (ha)	Future with project (ha)	Practices
Conventional cotton	5000	5000	1000	Residue/biomass burning
Improved cotton			3000	Manure + crop rotation
Conversion to rainfed			1000	Improved seeds and varieties
rice			1000	+ crop rotation
Traditional cassava	1000	1000		
Cassava improved			1000	No tillage + improved agronomic practices

Finally the annual module can be filled as follows:

		User-de	fined practices		Improved agro-	Nutrient	NoTillage/residues	s Water	Manure	Residue/Bio	mass		
	Your description		Name	Rate in tC/ha/yr	-nomic practice	management	management	managemer	n application	Burning	t dm/ha		
Reserved system A1	from Deforestation	NO			?	?	?	?	?	NO	10		
Reserved system A2	Converted to A/R	NO			?	?	?	?	?	NO	10		
Reserved system A3	Annual From OLUC	NO			?	?	?	?	?	NO	10		
Reserved system A4	Converted to OLUC	NO			?	?	?	?	?	NO	10		
Annual System1	conventionnal cotton	NO			No	No	No	No	No	YES	10		
Annual System2	cotton improved	NO			Yes	No	No	No	Yes	NO	10		
Annual System3	rainfed rice	NO			Yes	No	No	No	No	NO	10		
Annual System4	traditionnal cassava	NO			No	No	No	No	No	NO	10		
Annual System5	improved cassava	NO			Yes	No	Yes	No	No	NO	10		
Annual System6		NO			?	?	?	?	?	NO	10		
Annual System7		NO			?	?	?	?	?	NO	10		
Annual System8		NO			?	?	?	?	?	NO	10		
Annual System9		NO			?	?	?	?	?	NO	10		
Annual System10		NO			?	?	?	?	?	NO	10		
			Positive value=	gain for soil	Description/ex	ample of the dif	fferent options			5	See FAOSTA	л	
					Improved agron	omic practices:	using improved va	rieties, exter	nding crop rota	ation			
					Nutrient manag	ement:	precision farming,	improve N u	se effciency				
					Tillage / residue	residues Management Adoption of reduced, minimum or zero tillage, with or without mulching, including Cor							
					Water manager	nent:	Effective irrigation	measure					
					Manure applica	tion	Manure or Biosoli	ds applicatio	n to the field a	is input			
Mitigation potential													
Vegetation	Areas					Soil CO2 mitigate	h	CO2eq emit	tted from Burn	Total B	Balanco	Difference	
Type	Start	Without	t project	With Project		Without	With	Without	With	Without	With	2	
.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	tO	End	Rate	End	Rate					tCO2	tCO2	tCO2	
System A1	0	0	Linear	0	Linear	0	0	0	0	0	0	0	
System A2	0	0	Linear	0	Linear	0	0	0	0	0	0	Ō	
System A3	0	0	Linear	0	Linear	0	0	0	0	0	0	0	
System A4	0	0	Linear	0	Linear	0	0	0	0	0	0	0	
Annual System1	5000	5000	Linear	1000	Linear	0	0	62720	18816	62720	18816	-43904	
Annual System2	0	0	Linear	3000	Linear	0	-80850	0	0	0	-80850	-80850	
Annual System3	0	0	Linear	1000	Linear	0	-5075	0	0	0	-5075	-5075	
Annual System4	1000	1000	Linear	0	Linear	0	0	0	0	0	0	0	
Annual System5	0	0	Linear	1000	Linear	0	-5775	0	0	0	-5775	-5775	
Annual System6	0	0	Linear	0	Linear	0	0	0	0	0	0	0	
Annual System7	0	0	Linear	0	Linear	0	0	0	0	0	0	0	
Annual System8	0	0	Linear	0	Linear	0	0	0	0	0	0	0	
									-	-			
Annual System9	0	0	Linear	0	Linear	0	0	0	0	0	0	0	
Annual System9 Annual System10	0 0	0	Linear Linear	0 0	Linear Linear	0	0 0	0	0	0	0 0	0	

Inputs module

• Use of urea

Presently, the farmers use 15 kg of urea per hectare per year on cotton crops, consequently a total quantity of 15 kg*5000ha = 75 000 kg of urea per year. Nonetheless, the EX-ACT tool asks the quantity of urea in tons/year. One ton corresponds to 1000 kg. Hence a quantity of 75000/1000= $\frac{75}{1000}$ tons/year.

Without the project we can imagine that the farmers will afford the same quantity of urea in the future (<u>75 tons/year</u>).

With the project farmers will bring 50 kg per hectare per year on cotton crops. In the situation with project, there are 4000 ha of cotton crops. Hence the amount of urea in ton/year : 50kg*4000ha/1000= 200 tons/year.

• Use of pesticides

At present time, the farmers use 6l of pesticides including 3l of herbicides and 3l of insecticides per ha per year on cotton crops. For the sake of simplicity we will consider that the previous volume corresponds to the active product and that 1l=1kg. Finally the quantity of herbicides and insecticides used is equivalent to: 3*5000/1000= 15 tons/year.

It is considered that the current application of pesticides will remain in the future without project (therefore a same quantity of <u>15 tons/year)</u>.

Nevertheless, decreasing the consumption of pesticides is recommended, it is expected that farmers will still apply 6 l of pesticides (half herbicides and half insecticides) per hectare per year on cotton crops. However the area of cotton crops changes in the situation with project. Finally the quantity of pesticides used is equivalent to: $3*4000/1000 = \frac{12 \text{ tons/year.}}{12 \text{ tons/year.}}$



The inputs module can be filled as follows:

Land use and land use change Matrix

In the situation without project, there is no land use change, 6000 ha of annual crops remains as annual crops and 1000 of set aside lands remains as set aside lands. With the implementation of the project, there is no land use change regarding the annual crops despite the management change. There is a land use change reaching 1000 hectares from set aside lands to perennial croplands.

Mineral s	oils					FINAL				
Wi	thout Pro	viect	Forest/		Cropland		Grassland	Othe	r Land	
			Plantation	Annual	Perennial	Rice		Degraded	Other	Total Initia
INITIAL	Forest/PI	antation	0	0	0	0	0	0	0	0
		Annual	0	6000	0	0	0	0	0	6000
	Cropland	Perennial	0	0	0	0	0	0	0	0
		Rice	0	0	0	0	0	0	0	0
	Grasslan	d	0	0	0	0	0	0	0	0
	Other La	Degraded	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	1000	1000
		Total Fina	I 0	6000	0	0	0	0	1000	7000
								~		
								OI OI	ganic soils	0
								Oi	ganic soils	0
Minoral o						EINIAL		Oi	ganic soils	0
Mineral s	soils					FINAL			ganic soils	0
Mineral s	soils Nith Proje	ect	Forest/		Cropland	FINAL	Grassland	Othe	rganic soils	0
Mineral s	oils Nith Proje	<u>ect</u>	Forest/ Plantation	Annual	Cropland Perennial	FINAL Rice	_Grassland	Othe Degraded	rganic soils r Land Other	0 Total Initia
Mineral s	oils <i>Nith Proje</i> Forest/Pl	ect antation	Forest/ Plantation 0	Annual 0	Cropland Perennial 0	FINAL Rice 0	_Grassland	Othe Degraded 0	rganic soils r Land Other <i>0</i>	0 Total Initia 0
Mineral s	soils <u>Nith Proje</u> Forest/Pl	antation	Forest/ Plantation 0 0	Annual <i>0</i> 6000	Cropland Perennial 0 0	FINAL Rice 0 0	_Grassland 0 0	Othe Degraded 0 0	r Land Other 0	0 Total Initial 0 6000
Mineral s	oils <i>Nith Proje</i> Forest/Pl Cropland	antation Annual Perennial	Forest/ Plantation 0 0 0	Annual 0 6000 0	Cropland Perennial 0 0	FINAL Rice 0 0 0	Grassland	Othe Degraded 0 0 0	r Land Other 0 0 0	0 Total Initia 0 6000 0
Mineral s	oils <u>With Proje</u> Forest/Pl Cropland	antation Annual Perennial Rice	Forest/ Plantation 0 0 0 0	Annual 0 6000 0 0	Cropland Perennial 0 0 0 0	FINAL Rice 0 0 0 0 0	Grassland	Othe Degraded 0 0 0 0	r Land Other 0 0 0 0	0 Total Initia 0 6000 0 0
Mineral s	Forest/PI Cropland	antation Annual Perennial Rice d	Forest/ Plantation 0 0 0 0 0	Annual 0 6000 0 0 0	Cropland Perennial 0 0 0 0 0 0 0	FINAL Rice 0 0 0 0 0 0 0	Grassland 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Othe Degraded 0 0 0 0	r Land Other 0 0 0 0 0	0 Total Initia 0 6000 0 0 0
Mineral s	Forest/PI Cropland Grassland Other Lat	ect antation Annual Perennial Rice d Degraded	Forest/ Plantation 0 0 0 0 0 0 0 0	Annual 0 6000 0 0 0 0	Cropland Perennial 0 0 0 0 0 0	FINAL Rice 0 0 0 0 0 0 0 0 0 0	Grassland 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Othe Degraded 0 0 0 0 0 0 0 0 0	r Land Other 0 0 0 0 0 0	0 Total Initial 0 6000 0 0 0 0 0
Mineral s	Forest/PI Cropland Grassland Other La	ect antation Annual Perennial Rice d Degraded Other	Forest/ Plantation 0 0 0 0 0 0 0 0 0 0 0	Annual 0 6000 0 0 0 0 0 0	Cropland Perennial 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	FINAL Rice 0 0 0 0 0 0 0 0 0 0	Grassland 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Othe Degraded 0 0 0 0 0 0 0 0	r Land Other 0 0 0 0 0 0 0 0 0 0 0 0	0 Total Initial 0 6000 0 0 0 0 1000
Mineral s	Forest/PI Cropland Grassland Other Lad	antation Annual Perennial Rice d Degraded Other	Forest/ Plantation 0 0 0 0 0 0 0 0 0 0 0 0	Annual 0 6000 0 0 0 0 0 0	Cropland Perennial 0 0 0 0 0 0 1000	FINAL Rice 0 0 0 0 0 0 0 0 0 0	Grassland 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Othe Degraded 0 0 0 0 0 0 0 0	r Land Other 0 0 0 0 0 0 0 0 0 0 0 0	0 Total Initia 0 6000 0 0 0 0 0 1000
Mineral s	Forest/PI Cropland Grassland Other Lat	antation Annual Perennial Rice Degraded Other Total Fina	Forest/ Plantation 0 0 0 0 0 0 0 0	Annual 0 6000 0 0 0 0 0 0 0 0 0 0 0	Cropland Perennial 0 0 0 0 0 0 0 1000	FINAL Rice 0 0 0 0 0 0 0 0 0 0 0 0 0	Grassland 0 0 0 0 0 0 0 0 0	Othe Degraded 0 0 0 0 0 0 0 0 0	r Land Other 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 Total Initia 0 6000 0 0 0 0 0 1000 7000
Mineral s	Forest/PI Cropland Grasslan Other La	antation Annual Perennial Rice d Degraded Other Total Fina	Forest/ Plantation 0 0 0 0 0 0 0 0	Annual 0 6000 0 0 0 0 0 6000	Cropland Perennial 0 0 0 0 0 0 0 0 0 0 0 1000	FINAL Rice 0 0 0 0 0 0 0 0 0 0 0 0 0	Grassland	Othe Degraded O O O O O O O	r Land Other 0 0 0 0 0 0 0 0 0 0	0 Total Initia 0 6000 0 0 0 1000 7000

Results provided by the EX-ACT tool

The improvements proposed in the <u>annual crops</u> lead to a **net sink** of GHG reaching 135 604 tons of eq-CO2 in 20 years. Globally this activity contributes more to mitigation than the activity of <u>planting</u> <u>cashew</u> on 1000 ha, which imply a **net sink** of 117 975 tons of eq-CO2. However, the benefit per hectare is superior for the perennial crops.

The two activities gathered compensate the **source of GHG** due to the operated <u>land use change</u> as well as the consumption of inputs. Finally the implementation of the <u>project</u> allows for contributing to climate change mitigation, with a **benefit** of 240 696 tons of eq-CO2 during 20 years in comparison to a situation in which the project would not happen, or 1.7 tons of eq-CO2 per year per hectare.



Situation 4: Livestock project in Mongolia

General description of the project

Initially, the **description module** has to be filled in with the information provided in the exercise.

The project takes place in Mongolia, <u>Continental Asia</u>. We do not have direct information regarding the dominant climate and soil. A <u>cool temperate dry</u> climate and <u>HAC soils</u> is considered.

The project will be financed during 5 years, hence an implementation phase of <u>5 years</u>. The capitalization phase is estimated to occur during <u>15 years</u>.

Finally the description module in EX-ACT should be filled as follows:

Project Name	Livestock project in M	ongolia				
		0				
Continent	Asia (Continenta	I)				
Climate	Cool Temperate					
Moisture regime	Dry					
	See "Climate" for Help					
Dominant Regional Soil Type	HAC Soils					
	See "Soil" for Help					
Duration of the Project (Years)	Implementation phase	5				
	Capitalisation phase	15				
	Duration of accounting 20					

Components of the project

Two different activities are realized: (1) <u>improvement of livestock</u> and (2) <u>improvement of grasslands</u>. One improvement implies the construction of an irrigation system that will be accounted into an additional module. Consequently, the following three modules are completed: **livestock**, grasslands, other investments.

Livestock module

The project focuses on sheep, cattle, and goats. No indication is directly provided about the type of cattle. The category "other cattle" is chosen since the herd will be mixed (dairy, meat). Mongolia is considered as a developing country with a mean average temperature of 0°C.

It is advised to build the following table while reading the exercise before filling in the numbers in EX-ACT:

	Start	Future without project	Future with project
Type of livestock		Number of heads	
Sheep	=70%x200x10000=1400000	1400000+(50%x1400000)=2100000	1400000
Cattle (other)	=10%x200x10000=200000	200000+(30%x200000)=260000	200000
Goats	=20%x200x10000=400000	400000+(80%x400000)=720000	400000
	Impro	ovements : feeding practices	

Sheep	3%	10%	90%
Cattle	3%	10%	90%

Finally the livestock module can be filled in as follows:

Methane emissions from enteric fermentation													
				He	ad Number			Emissi	on (t CO2eq) p	er year	Total Emission (tCO2eq)		
	IPCC S	pecificDefaul	Start	Vithout	Project	Vith Pro	oject	Start	En	d	AILE	Period	Difference
Choose Livestocks:	factor f	actor Factor	tO	End	Rate	End	Rate		Without	With	Without	With	
Dairy cattle	61	YES	<i>a</i>	<i>a</i>	Linear	0	Linear	0	0	0	0	0	0
Other cattle	47	YES	200.000	260.000	Linear	200.000	Linear	197 400	256 620	197 400	4 984 350	3 948 000	-1 036 350
Buffalo	55	YES		0 000 000	Linear	1100.000	Linear	147,000	000 500	147,000	4,000,050	0.040.000	1 200 250
Sneep Curies (Masture)	5	TES VEC	19001000	2 1111 1111	Linear	190010000	Linear	147 000	220 500	147 000	4 226 200	2 340 000	-1286230
Swine (Iviarket)	1,0	TES VEC		0	Linear	"	Linear	ő	0	0		ů.	
Swine [Breeding]	1,9 B	VEC	100,000	720,000	Linear	100,000	Linear	42,000	75 600	42,000	1420.000	000.049	500 000
Comole	46	YES	*in' inn'	120000	Linear	Acar caur	Linear	42 000	10 600	42 000	1420 000	040 000	-366 000
Camelo	46	VES	0	0	Linear	0	Linear	ŏ	ŏ	ő	ŏ	ŏ	ő
Hear Defined, Specified,	10	NO NO	0	0	Linear	0	Linear	ŏ	ň	ő	ŏ	ŏ	ň
Hear Defined Specified	value	NO NO	0	0	Linear	0	Linear	ŏ	ŏ	ő	ŏ	ŏ	ő
LOOP LIENNED - EQUELONED -	2005	140		L ,	200220		Sub-Tota	386 400	552 720	386 400	10.638.600	7 728 000	-2 910 600
PLEASE SPECIEV II			IF AVAILA	BIF			040 1014		002120			1120 000	2 010 000
Countra "Tane"			Deve	lonina	1								
Mean Annual Tempe	raturo (MA)	T") in 'C	Liest	0	Possible					MAT affects	- Mathana amic	tion from manure	tremencare a
inean Annuar Tempe	Tacare (IMA	.jm C [•	1 OSSIDIE					inin areoc	sterenatie entits.	sonnonnanan	emanagement
Methane emissions	from manur	e managem	ent										
Additional Technica	Methane emissions from manure management Additional Technical Mitination (See IPCC TAB Yol 3 Chanter 8)												
	Additional rechnical Mitigation (See IPCC' IAH Vol 3 Chapter 8)												
]	Percent of	head with p	ractices (O	% = none;100;	E	(t CO2eq) per year		Total Emiss	ion (tCO2eq)	
			Start	Vithout Pr	oject	Vith Proje	ect	Start	End		All Period		Difference
Livestocks	Dominant P	PracticFactor	t0	End	Rate	End	Rate		Without	With	Without	With	
Dairy cattle	Feeding prac	tices 0,073	0%	0%	Linear	0%	Linear	0	0	0	0	0	0
	Specific Age	nts 0,017	0%	0%	Linear	0%	Linear	0	0	0	0	0	0
	Manageme	nt-Bre 0,017	0%	0%	Linear	0%	Linear	0	0	0	0	0	0
	No Option	0,000	100%	100%	Linear	100%	Linear	0	0	0	0	0	0
Other cattle	Feeding prac	tices 0,033	3%	10%	Linear	90%	Linear	-197	-855	-5 922	-15 463	-104 129	-88 666
	Specific Age	nts 0,030	0%	0%	Linear	0%	Linear	0	0	0	0	0	0
	Manageme	nt-Bre 0,033	0%	0%	Linear	0%	Linear	0	0	0	0	0	0
	No Option	0,000	97%	90%	Linear	10%	Linear	0	0	0	0	0	0
Buffalo	Feeding prac	tices 0,100	0%	0%	Linear	0%	Linear	0	0	0	0	0	0
	Specific Age	nts 0,011	0%	0%	Linear	0%	Linear	0	0	0	0	0	0
	Manageme	nt-Bre 0,004	0%	0%	Linear	0%	Linear	0	0	0	0	0	0
	No Option	0,000	100%	100%	Linear	100%	Linear	0	0	0	0	0	0
Sheep	Feeding proc	tices 0,023	3%	10%	Linear	90%	Linear	-103	-515	-3 087	-9 261	-54 280	-45 019
	Specific Age	nts0,001	0%	0%	Linear	0%	Linear	U	0	0	U	U	U
	Manageme	nt-Bre 0,003	0%	0%	Linear	0%	Linear	0	0	0	0	0	0
	No Option	0,000	97%	90%	Linear	10%	Linear	0	1070	0.000	04.704	150,400	100.004
F							Loup-Lota	-300	-1370	-9.009	-29/29	-108 408	-133 684
Peeding practices: e;g. m	ore concentral	tes, adding cer	tian oils of oi	iseeas to the a	iet, improving	pasture quality			Terelation		45440470	40747000	4 400 000
Specific agents: specific	agents and die	tary additives t	o reduces Cl	H4 emisisons	ionophores, v	accines, DST	l 		Total Lives	tocks-	15148176	10717890	-4 430 286
ivianagement-Breeding: I	noreasing proc	succivity throug	in preeding a	na petter mana	gement practi	ces, such as a i	eduction						
in the r	number of repl	acement heifei	IS .										

Grassland module

The livestock activity is carried out on a total area of 2 000 000 ha of grasslands. The grasslands suffer from grazing pressure. The proposed activity should allow for grassland recover. The exercise can be translated as follows:

	Start (ha)	Future without project (ha)	Future with project (ha)
Moderately degraded pasture	2 000 000	505 000	(2 000 000- (500 000 + 5 000)= 1 495 000
Severely degraded pasture		1 495 000	
Improved grassland without inputs, with moderate grazing pressure			(1/4 x 2 000 000)= 500 000
Irrigated and cultivated grassland			5 000

Finally the grassland module can be filled as follows:

Description of Grasslan	d type, their management and an	eas (ha)												
Name of the Systems								Fire used to manage						
		Initial state	9				Final State	e of the grassland			Withou	ut project	With project	
Default	Your name				Without Pr	oject		With Project			Fire*	Interval (yr)	Fire*	Interval (yr)
Reserved system G1	from Deforestation	Non degrad	led		Non degrad	ed	Non degraded			NO	5	NO	5	
Reserved system G2	converted to A/R	Non degrad	led		Non degrad	Non degraded Non degraded				NO	5	NO	5	
Reserved system G3	From OLUC	Non degrad	degraded Non			Non degraded Non			Non degraded			5	NO	5
Reserved system G4	Grassland to OLUC	Non degrad	n degraded Nor			Non degraded No			Non degraded			5	NO	5
Grass-1	Severely degraded without project	Moderately	derately Degraded Sev			egraded		Moderately Degra	ded		NO	5	NO	5
Grass-2	improved	Moderately	derately Degraded Mod			Degraded		Improved without i	inputs mana	agement	NO	5	NO	5
Grass-3	improved through irrigation and culti	Moderately	derately Degraded Mode			Degraded		Improved with input	uts improve	ment	NO	5	NO	5
Grass-4		Select state	ct state Selec			9		Select state			NO	5	NO	5
Grass-5		Select state	ct state Selec			9		Select state			NO	5	NO	5
Grass-6		Select state	в		Select state	e		Select state			NO	5	NO	5
Grass-7		Select state	в		Select state	e		Select state			NO	5	NO	5
Grass-8		Select state	в		Select state	e		Select state			NO	5	NO	5
Grass-9		Select state	в		Select state	e		Select state			NO	5	NO	5
Grass-10		Select state	в		Select state	e		Select state			NO	5	NO	5
											* is fire occ	curing?		
·														-
Default		Start	Without pr	oject	With Proje	ct	Soil C varia	tions (tCO2eq)	Total CO2	eq from fire	Total CO2e	eq	Difference	
		t0	End	Rate	End	Rate	Without	With	Without	With	Without	With	tCO2eq	
System G1	from Deforestation	0	0	Linear	0	Linear	0	0	0	0	0	0	0	
System G2	converted to A/R	0	0	Linear	0	Linear	0	0	0	0	0	0	0	4
System G3	From OLUC	0	0	Linear	0	Linear	0	0	0	0	0	0	0	_
System G4	Grassland to OLUC	0	0	Linear	0	Linear	0	0	0	0	0	0	0	<u> </u>
Grass-1	Severely degraded without project	1495000	1495000	Linear	1495000	Linear	59955729	0	0	0	59955729	0	-59955729	
Grass-2	improved	500000	500000	Linear	500000	Linear	0	-15239583	0	0	0	-15239583	-15239583	
Grass-3	improved through irrigation and culti	5000	5000	Linear	5000	Linear	0	-252977	0	0	0	-252977	-252977	
Grass-4		0	0	Linear	0	Linear	0	0	0	0	0	0	0	
Grass-5		0	0	Linear	0	Linear	0	0	0	0	0	0	0	
Grass-6		0	0	Linear	0	Linear	0	0	0	0	0	0	0	
Grass-7		0	0	Linear	0	Linear	0	0	0	0	0	0	0	1
Grass-8		0	0	Linear	0	Linear	0	0	0	0	0	0	0	1
Grass-9		0	0	Linear	0	Linear	0	0	0	0	0	0	0	1
Grass-10		0	0	Linear	0	Linear	0	0	0	0	0	0	0	
Total Syst 1-10		2000000	2000000		2000000									_
									Graceland	I total	59955729	-15492560	-75448200	

Other investment module

The installation of an irrigation system (5000 ha of solid roll sprinkle irrigation system) to improve a quantity of grassland has to be accounted within the other investment module.

The other investment module can be filled as follows:

Released GHG associated with insta	<u>llation</u> of irriga	tion systems					
Installation of irrigation system		surface (ha)	Type of irrigation system	r Associated tC	02ea		
Without Project		0	Hand moved sprinkle	0,0		1	
With Project		5000	Solid roll sprinkle	427,2			
						Difference	427,2
			IRSS = Irrigation runoff return	i system			
Released GHG associated with build	ing of infrastru	icture					
Type of construction or infrastructure	Default value	Specific	Default	surface (m2)		Emission (t CO	(2ea)
	t CO2 /m2	Value	Factor	Without	With	Without	With
Industrial Buildings (concrete)	0,825		YES			0,0	0,0
Agricultural Buildings (metal)	0,220		YES			0,0	0,0
Agricultural Buildings (metal)	0,220		YES			0,0	0,0
Agricultural Buildings (metal)	0,220		YES			0,0	0,0
Industrial Buildings (concrete)	0,825		YES			0,0	0,0
Road for medium trafic (concrete)	0,319		YES			0,0	0,0
Road for medium trafic (asphalt)	0,073		YES			0,0	0,0
			Quistatal	0.0	0.0	Difference	0.0
			Subiolal	0,0	0,0	Dillerence	0,0
SUB-TOTAL FOR INVESTMENT		Without	0	With	427	Difference	427

Land use and land use change Matrix

The exercise mainly focuses on livestock. Livestock is not reflected inside the matrix of land use change however the project also deals with grasslands. The matrix only represents the area concerned with the implementation of the project. There is no land use change, hence the same numbers are presented in the matrix in the two situations (without and with project). Indeed the project only works on <u>pasture improvements.</u>

Mineral s	oils					FINAL				
Wi	thout Pro	ject	Forest/		Cropland		Grassland	Othe	r Land	
			Plantation	Annual	Perennial	Rice		Degraded	Other	Total Initial
INITIAL	Forest/Pla	antation	0	0	0	0	0	0	0	0
		Annual	0	0	0	0	0	0	0	0
	Cropland	Perennial	0	0	0	0	0	0	0	0
		Rice	0	0	0	0	0	0	0	0
	Grassland	d l	0	0	0	0	2000000	0	0	2000000
	Other La	Degraded	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0
		Total Final	I 0	0	0	0	2000000	0	0	2000000
								O	rganic soils	0
Mineral s	oils					FINAL				
Mineral s	oils Vith Proje	ect	Forest/		Cropland	FINAL	Grassland	Othe	r Land	
Mineral s	oils Vith Proje	<u>ect</u>	Forest/ Plantation	Annual	Cropland Perennial	FINAL Rice	Grassland	Othe Degraded	r Land Other	Total Initial
Mineral s	oils <u>Vith Proje</u> Forest/Pla	ect antation	Forest/ Plantation 0	Annual 0	Cropland Perennial 0	FINAL Rice 0	_Grassland 0	Othe Degraded 0	r Land I Other 0	Total Initial 0
Mineral s	oils Vith Proje Forest/Pla	ect antation Annual	Forest/ Plantation 0 0	Annual 0 0	Cropland Perennial 0	FINAL Rice 0 0	Grassland	Othe Degraded 0 0	r Land I Other 0 0	Total Initial 0 0
Mineral s	oils <u>Vith Proje</u> Forest/Pla Cropland	ect antation Annual Perennial	Forest/ Plantation 0 0 0	Annual 0 0 0	Cropland Perennial 0 0 0	FINAL Rice 0 0 0	Grassland	Othe Degraded 0 0 0	r Land I Other 0 0 0	Total Initial 0 0 0
Mineral s	oils Vith Proje Forest/Pla Cropland	antation Annual Perennial Rice	Forest/ Plantation 0 0 0 0	Annual 0 0 0 0	Cropland Perennial 0 0 0 0	FINAL Rice 0 0 0 0 0	Grassland 0 0 0 0	Othe Degraded 0 0 0 0	r Land I Other 0 0 0 0	Total Initial 0 0 0 0
Mineral s	oils <u>Vith Proje</u> Forest/Pla Cropland Grassland	antation Annual Perennial Rice	Forest/ Plantation 0 0 0 0 0	Annual O O O O O	Cropland Perennial 0 0 0 0 0	FINAL Rice 0 0 0 0 0 0 0	Grassland 0 0 0 0 2000000	Othe Degraded 0 0 0 0 0 0	r Land I Other 0 0 0 0 0	Total Initial 0 0 0 2000000
Mineral s	oils Vith Proje Forest/Pla Cropland Grassland Other La	ect antation Annual Perennial Rice d Degraded	Forest/ Plantation 0 0 0 0 0 0	Annual 0 0 0 0 0 0 0	Cropland Perennial 0 0 0 0 0 0	FINAL Rice 0 0 0 0 0 0 0 0 0	Grassland 0 0 0 2000000 0	Othe Degraded 0 0 0 0 0 0 0	r Land 1 Other 0 0 0 0 0 0	Total Initial 0 0 0 2000000 0
Mineral s	oils Vith Project Forest/Pland Grassland Other Lai	ect antation Annual Perennial Rice d Degraded Other	Forest/ Plantation 0 0 0 0 0 0 0 0 0	Annual 0 0 0 0 0 0 0 0	Cropland Perennial 0 0 0 0 0 0 0 0	FINAL Rice 0 0 0 0 0 0 0 0 0	Grassland 0 0 0 0 0 2000000 0 0 0 0 0 0 0 0 0 0	Othe Degraded 0 0 0 0 0 0 0 0 0	r Land I Other 0 0 0 0 0 0 0 0	Total Initial 0 0 0 2000000 0 0
Mineral s	oils Vith Project Forest/Pla Cropland Grassland Other La	ect antation Annual Perennial Rice t Degraded Other	Forest/ Plantation 0 0 0 0 0 0 0 0	Annual 0 0 0 0 0 0 0 0 0 0	Cropland Perennial 0 0 0 0 0 0 0 0	FINAL Rice 0 0 0 0 0 0 0 0 0	Grassland 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Othe Degraded 0 0 0 0 0 0 0 0 0	r Land 1 Other 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Initial 0 0 0 2000000 0 0
Mineral s	oils Vith Proje Forest/Pla Cropland Grassland Other La	antation Annual Perennial Rice Degraded Other Total Final	Forest/ Plantation 0 0 0 0 0 0 0	Annual 0 0 0 0 0 0 0 0 0	Cropland Perennial 0 0 0 0 0 0 0	FINAL 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Grassland 0 0 0 0 0 200000 0 0 200000 0 200000 0 0 2000000	Othe Degraded 0 0 0 0 0 0 0 0 0 0	r Land 1 Other 0 0 0 0 0 0 0 0 0 0 0 0 0	Total Initial 0 0 0 2000000 0 0 2000000
Mineral s V	oils Vith Project Forest/Pla Cropland Grassland Other Lau	antation Annual Perennial Rice Degraded Other Total Fina	Forest/ Plantation 0 0 0 0 0 0 0	Annual 0 0 0 0 0 0 0 0	Cropland Perennial 0 0 0 0 0 0 0 0 0	FINAL Rice 0 0 0 0 0 0 0 0 0 0 0 0 0	Grassland 0 0 0 0 2000000 0 2000000 2000000 0	Othe Degraded 0 0 0 0 0 0 0 0 0 0	r Land Other 0 0 0 0 0 0 0 0 0	Total Initial 0 0 2000000 0 2000000 0 2000000

Results provided by the EX-ACT tool

The main two activities proposed with the project imply positive impacts on climate change mitigation:

- The <u>livestock improvements</u> create a **sink of GHG** reaching 4,4 million tons of eq-CO2 in 20 years. The sink is due to the reduction of N2O and CH4 emissions.

-The <u>grassland restoration</u> implies a **sink of GHG** reaching 76.4 million tons of eq-CO2 in 20 years. The sink is due to the enhancement of soil carbon content. The installation of an irrigation system creates a insignificant **source of GHG** reaching 427 tons of eq-CO2 in 20 years that is largely compensated by the two previous activities.

Thus the project is contributing to mitigation to climate change. The gathered activities represent a **net sink** of about 79 million tons of eq-CO2, or 2 t eq-CO2/year/ha.

Project Summary		Area (Initial	state in ha)		Duration	n of the			
Name		Forest/Plan	tation	0		Project	(years)			
			Annual	0		Implementatio	o 5			
Continent Asia (Continental	1)	Cropland	Perennial	0		Capitalisation	15			
			Rice	0		Total	20			
Climate Cool Temperate	Dry	Grassland		2000000		Total	Area			
		Other Land	Degraded	0		Mineral soils	2000000			
Dominante Soil HAC Soils			Other	0		Organic soils	0			
		Organic soils	s/peatlands	0		Total Area	2000000			
Components of the Project	Balance (Project - Baseline)	CC	02	N2O	CH4	Per phase of	the project	Ν	lean per yea	r
	All GHG in tCO2eq	Biomass	Soil			Implement.	Capital.	Total	Implement.	Capital.
Deforestation	0	0	0	0	0	0	0	0	0	0
Forest Degradation	0	0	0	0	0	0	0	0	0	0
Afforestation and Reforestation	0	0	0	0	0	0	0	0	0	0
Non Forest Land Use Change	0	0	0	0	0	0	0	0	0	0
Agriculture										
Annual Crops	0	0	0	0	0	0	0	0	0	0
Agroforestry/Perennial Crops	0	0	0	0	0	0	0	0	0	0
Irrigated Rice	0	0	0	0	0	0	0	0	0	0
Grassland	-75448290 this is a sink	0	#########	0	0	-10778327	-64669963	-3772414	-2155665	-4311331
Organic soils and peatlands	0		0	0	0	0	0	0	0	0
Other GHG Emissions		CO2 (other)							
Livestock	-4430286 this is a sink		-	-1325291	-3104995	-632898	-3797388	-221514	-126580	-253159
Inputs	0	C)	0		0	0	0	0	0
Other Investment	427 this is a source	42	27			427	0	21	85	0
Final Balance	-79878149 It is a sink	427	#########	-1325291	-3104995	-11410798	-68467351	-3993907	-2282160	-4564490
In % of Emission	n without project: -106.4%									
Result per ha	-39.9	0.0	-37.7	-0.7	-1.6	-5.7	-34.2	-2.0	-1.1	-2.3

Situation 5: Rice project in Ghana

General description of the project

First of all, the **description module** has to be filled in with the information provided in the exercise.

The project takes place in Ghana, <u>Africa</u>. We do not have direct information regarding the dominant climate and soil. A <u>Tropical Wet</u> climate and <u>HAC soils</u> are considered.

The project will be financed during 5 years, hence an implementation phase of <u>5 years</u>. The capitalization phase is estimated to occur during <u>15 years</u>.

Finally the description module in EX-ACT should be filled as follow:

Project Name	Rice project in Gha	ana	GWP (choose values)	
			Official-CDM	
Continent	Africa		CO ₂	1
			CH ₄	21
Climate	Tropical		N ₂ O	310
Moisture regime	Wet			
	See "Climate" for Help			
Dominant Regional Soil Type	HAC Soils			
	<u>See "Soil" for Help</u>			
Duration of the Project (Years)	Implementation phase	5		
	Capitalisation phase	15		
	Duration of accounting	20		

Components of the project

Three different activities are realized: (1) <u>improvement of flooded rice</u>, (2) <u>improvement of upland</u> <u>rice</u> and (3) the application of <u>fertilizers</u>. Consequently, the following three modules requires completion: **Rice**, **Annual and input**. It is worth observing in that the upland rice is considered as an annual crops whereas the flooded rice is accounted within the irrigated rice module of EX-ACT. Indeed the flooded rice is responsible of high methane emissions.

Annual module

The total area concerned by project is 8500x1,25 = 10625 ha. About 40% of these area is currently under cultivation of upland rice: 10625*0,4 = 4250 ha, whose residue is burnt.

The implementation of the project should lead to improve the current area of upland rice by using better agronomic practices and applying manure.

Without the implementation of the project, it is expected that in the future 70% (4250*0,7 = 2975) of this rice crop area should remain traditional upland rice, whereas 30% (4250x0,3 = 1275) of this area will be given up to other annual crop (called other annual in the following screenshot).

It is advised to build the following table while reading the exercise to fill in the EX-ACT tables:

	Start	Future without project	Future with roject
Traditional upland rice	8 500x1,25x0,4 = 4250	8 500x1,25x0,4x0,7 = 2975	0
Improved upland rice	0	0	8 500x1,25x0,4 = 4250
Other annual	0	8 500x1,25x0,4x0,3 = 1275	0

		User-defin	ned practices		Improved agro-	Nutrient	NoTillage/residue	s Water	Manure	Residue/Bio	mass	
	Your description		Name	Rate in tC/ha/yr	-nomic practice	management	management	management	application	Burning	t dm/ha	
Reserved system A1	from Deforestation	NO			?	?	?	?	?	NO	10	
Reserved system A2	Converted to A/R	NO			?	?	?	?	?	NO	10	
Reserved system A3	Annual From OLUC	NO			?	?	?	?	?	NO	10	
Reserved system A4	Converted to OLUC	NO			?	?	?	?	?	NO	10	
Annual System1	Current system *	YES	Equilibrium	0	* A conservative	approach is to c	onsider this syster	n at equilibrium	or decreasing	YES	10	
Annual System2	traditional upland rice	NO			?	?	?	?	?	YES	10	
Annual System3	improved upland rice	NO			Yes	?	?	?	Yes	NO	10	
Annual System4	other annual	NO			?	?	?	?	?	YES	10	
Annual System5		NO			?	?	?	?	?	NO	10	
Annual System6		NO			?	?	?	?	?	NO	10	
Annual System7		NO			?	?	?	?	?	NO	10	
Annual System8		NO			?	?	?	?	?	NO	10	
Annual System9		NO			?	?	?	?	?	NO	10	
Annual System10		NO			?	?	?	?	?	NO	10	
			Positive value	e= gain for soil	Description/ex	ample of the di	fferent options			5	See FAOSTA	λT
					Improved agrono	omic practices:	using improved va	rieties, extendi	ing crop rotation	n		
					Nutrient manage	ement:	precision farming,	improve N use	effciency			
					Tillage / residue	es Management	Adoption of reduc	ed,minimum or	zero tillage, w	ith or without	mulching, i	ncluding Cons
					Water manager	nent:	Effective irrigation	measure				
					Manure application	tion	Manure or Biosoli	ds application	to the field as i	nput		
Mitigation potential												
Vegetation	Areas					Soil CO2 Change	9	CO2eq emitte	ed from Burning	Total E	alance	Difference
Туре	Start	Without	project	With Project		Without	With	Without	With	Without	With	
-	tO	End	Rate	End	Rate	tCO2	tCO2	tCO2	tCO2	tCO2	tCO2	tCO2
System A1	0	0	Linear	0	Linear	0	0	0	0	0	0	0
System A2	0	0	Linear	0	Linear	0	0	0	0	0	0	0
System A3	0	0	Linear	0	Linear	0	0	0	0	0	0	0
System A4	0	0	Linear	0	Linear	0	0	0	0	0	0	0
Annual System1	0	0	Linear	0	Linear	0	0	0	0	0	0	0
Annual System2	4250	2975	Linear	0	Linear	0	0	39318	6664	39318	6664	-32654
Annual System3	0	0	Linear	4250	Linear	0	-207506	0	0	0	-207506	-207506
Annual System4	0	1275	Linear	0	Linear	0	0	13994	0	13994	0	-13994
Annual System5	0	0	Linear	0	Linear	0	0	0	0	0	0	0
Annual System6	0	0	Linear	0	Linear	0	0	0	0	0	0	0
Annual System7	0	0	Linear	0	Linear	0	0	0	0	0	0	0
Annual System8	0	0	Linear	0	Linear	0	0	0	0	0	0	0
Annual System9	0	0	Linear	0	Linear	0	0	0	0	0	0	0
Annual System10	0	0	Linear	0	Linear	0	0	0	0	0	0	0
Total Syst 1-10	4250	4250		4250								
							Agric, Annual To	otal		53312	-200842	-254154

Finally the annual module can be filled as follows:

Rice module

Flooded rice is cultivated under 60% of the total rice area: 8 500x1,25x0,6=6 375 ha.

The implementation of the project will lead to change the rice management in two different ways. The first way is to export the residue instead of burning it. This will be adopted on 70% of the current flooded rice area, whose water management will not change.

The second way is to act on the water management: during the cultivation period the rice will be intermittently irrigated. This improvement will be conducted on 30% of current area.

The exercise can be translated as follows:

	Start (ha)	Future without project (ha)	Future with project (ha)
Traditional rice	8500x1,25x0,6=6375	8500x1,25x0,6x0,9=5737,5	0
Improved rice rainfed	0	0	8500x1,25x0,6x0,7=4462,5
deepwater			
Improved rice	0	0	8500x1,25x0,6x0,3=1912,5
irrigated			
Private initiative	0	8500x1,25x0,6x0,1=637,5	

Finally the rice module can be filled as follows:

		Cultivatio	n Water Regime		Organic Amendment type (Straw or other)
		period	During the cultivation Period	Before the cultivation period	Cigano Finonanoni (ypo (onan or onior)
	Your description	(Days)	3	need help	
Reserved system R1	from Deforestation	150	Please select water regime	Please select preseason water regime	Please select type of Organic Amendment
Reserved system R2	converted to A/R	150	Please select water regime	Please select preseason water regime	Please select type of Organic Amendment
Reserved system R3	from OLUC	150	Please select water regime	Please select preseason water regime	Please select type of Organic Amendment
Reserved system R4	Rice to OLUC	150	Please select water regime	Please select preseason water regime	Please select type of Organic Amendment
Rice1	traditional rice	150	Rainfed and deep water	Non flooded preseason >180 days	Straw burnt
Rice2	improved rice (70%)	100	Rainfed and deep water	Non flooded preseason >180 days	Straw exported
Rice3	improved rice (30%)	100	Irrigated - Intermittently flooded	Non flooded preseason >180 days	Straw exported
Rice4	private initiative	150	Irrigated - Continuously flooded	Flooded preseason (>30 days)	Straw burnt
Rice5		150	Please select water regime	Please select preseason water regime	Please select type of Organic Amendment
Rice6		150	Please select water regime	Please select preseason water regime	Please select type of Organic Amendment
Rice7		150	Please select water regime	Please select preseason water regime	Please select type of Organic Amendment
Rice8		150	Please select water regime	Please select preseason water regime	Please select type of Organic Amendment
Rice9		150	Please select water regime	Please select preseason water regime	Please select type of Organic Amendment
Rice10		150	Please select water regime	Please select preseason water regime	Please select type of Organic Amendment
* usefull information can	be obtained at www.ir	ri.ora/scier	nce/ricestat and faostat.fao.org		

e.g. Rice crop calendar by country: http://www.irri.org/science/ricestat/data/may2008/WRS2008-AppendixTable04.pdf

CH4 emission from rice	systems					Change over	the period (t	CO2eq)						
Areas (ha) of the different	t options					Soil C c	hanges	CH4 e	mitted	Straw burn	ing	Total		Difference
	Start	Without F	roject	With Proj	ect	All pe	eriod	All p	eriod			t CO2 eq		tCO2eq
Туре	t0	End	Rate	End	Rate	Without	With	Without	With	Without	With	Without	With	
System R1	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0
System R2	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0
System R3	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0
System R4	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0
Rice1	6375	5737.5	Linear	0	Linear	0	0	87472	11982	40134	5498	127606	17480	-110126
Rice2	0	0	Linear	4462.5	Linear	0	0	0	39143	0	0	0	39143	39143
Rice3	0	0	Linear	1912.5	Linear	0	0	0	34794	0	0	0	34794	34794
Rice4	0	637.5	Linear	0	Linear	0	0	86801	0	3848	0	90650	0	-90650
Rice5	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0
Rice6	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0
Rice7	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0
Rice8	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0
Rice9	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0
Rice10	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0
Total Systems 1-10	6375	6375	-	6375		•								
								-			Total	218256	91417	-126839

Input module

The fertilization will be improved for the rice (excepted-upland rice) with 120 Kg/ha/year with the project. A total of 8 500 ha x1,25x0,6x0,12 = 765 T of urea will be used. The private initiative will use more intensive fertilization, with 8500x1,25x0,6x0,1x0,2 = 128 T of Urea.

The input module can be filled as follows:



Land use and land use change Matrix

The exercise mainly focuses annual and rice improvements. There is no land use change, hence the same numbers presented in the matrix in the two situations (without and with project). Indeed the project only works to improve the pre-existing field.

Results provided by the EX-ACT tool

Two of the three activities proposed with the project imply positive impacts on climate change mitigation:

- The <u>upland rice</u> improvements imply a **sink of GHG** reaching 254 154 tons of eq-CO₂ in 20 years. The sink is due to the manure application that stocks Carbon, N_2O and CH_4 .

-The <u>irrigated rice</u> improvements imply a **sink of GHG** reaching 126 839 tons of eq-CO₂ in 20 years. The sink is mainly due to the reduction of CH_4 emissions. The straw management mitigates a significant source of GHG due to the anaerobic degradation of the organic matter that produces methane.

- The growing use of <u>inputs</u> is a **source of GHG**: 43,153 tons of $eq-CO_2$ in 20 years are emitted to improve the yield.

Components of the Project	Balance (Project - Baseline)	CO	2	N20	CH4	Per phase of	the project	1	Mean per yea	
	All GHG in tCO2eq	Biomass	Soil			Implement.	Capital.	Total	Implement.	Capital.
Deforestation	0	0	0	0	0	0	0	0	0	0
Forest Degradation	0	0	0	0	0	0	0	0	0	0
Afforestation and Reforestation	0	0	0	0	0	0	0	0	0	0
Non Forest Land Use Change	0	0	0	0	0	0	0	0	0	0
Agriculture										
Annual Crops	-254154 this is a sink	0	-207506	-12912	-33737	-36308	-217847	-12708	-7262	-14523
Agroforestry/Perennial Crops	0	0	0	0	0	0	0	0	0	0
Irrigated Rice	-126839 this is a sink	0	0	-10652	-116187	-18120	-108719	-6342	-3624	-7248
Grassland	0	0	0	0	0	0	0	0	0	0
Organic soils and peatlands	0		0	0	0	0	0	0	0	0
Other GHG Emissions		CO2 (0	ther)							
Livestock	0			0	0	0	0	0	0	0
Inputs	43153 this is a source	2702	26	16127		6165	36988	2158	1233	2466
Other Investment	0	0				0	0	0	0	0
Final Balance	-337840 It is a sink	27026	-207506	-7437	-149924	-48263	-289577	-16892	-9653	-19305
In % of Emissio	n without project: -120.6%									
Result per ha	-31.8	2.5	-19.5	-0.7	-14.1	-4.5	-27.3	-1.6	-0.9	-1.8

Thus the project is contributing to mitigation to climate change. The gathered activities represent a **net sink** of about 337 840 tons of eq-CO₂, or 31,8 tons eq-CO₂/ha.

Situation 6: Markala Sugar project in Mali

General description of the project

Firstly, the **description module** has to be filled in with the information provided in the exercise.

The project takes place in Mali, <u>Africa.</u> We do not have direct information regarding the dominant climate. Nonetheless, according the IPCC map, we assume a <u>tropical dry</u> climate and <u>LAC soils</u>. Further, the project deals with deforestation, land use change, annuals, inputs as well as different investments.

The project will be financed during 5 years, hence an implementation phase of <u>5 years</u>. The capitalization phase is estimated to occur during <u>15 years</u>.

The description module in EX-ACT should be filled as follows:

Project Name	Markala sugar project in Mali	
Continent	Africa	
Climate	Tropical	
Moisture regime	Dry	
	See "Climate" for Help	
Dominant Regional Soil Type	LAC Soils	
	See "Soil" for Help	
Duration of the Project (Years)	Implementation phase	5
	Capitalization phase	15
	Duration of accounting	20

Components of the project

Six different activities are realized: (1) <u>deforestation</u>, (2) <u>land use change</u>, (3) <u>annuals</u>, (4) <u>irrigated</u> <u>rice</u>, (5) <u>inputs</u> and (6) <u>investments</u>. The activities may have impacts on GHG emissions. Consequently, the following six modules are going to be filled in are: **deforestation**, **land use change**, **annuals**, **irrigated rice**, **inputs and other investments**.

Deforestation module

With the project, 900 ha of tree savannah will be deforested and converted into sugar cane plantations where the conversion is done via fire use. The savannah would have remained as it presently is without the project.

Consequently the deforestation module can be completed as follows:

specified CI	imatic zone									Juuue	sleu Delault	100000	I Heciale i					100
	mildino Lonio						Above-G	round Biomass	_	Below-Groun	nd Biomass	_	Litter		Dead Wood		Soil C	1
		Ecological Zone)	Go to Map			tonnes dm	t C	-	tonnes dm	t C	-	t C		tC		tC	ī.
	Forest1	Tropical rain fores	st				310	145.7		114.7	53.9		3.65		0		35	1
Natural	Forest2	Tropical moist de	ciduous fores	t			260	122.2		62.4	29.3		3.65		0		35	
Forest	Forest3	Tropical dry fores	t				120	56.4		33.6	15.8		3.65		0		35	4
	Forest4	Tropical shrublan	d				70	32.9		28.0	13.2		3.65		0		35	4
	Plantation1	Tropical rain fores	st				150	70.5		55.5	26.1		3.65		0		35	4
Diantation	Plantation2	Tropical moist de	ciduous fores	t			120	56.4		24.0	11.3		3.65		0		35	
Fiantation	Plantation3	Tropical dry fores	t				60	28.2		16.8	7.9		3.65		0		35	
	Plantation4	Tropical shrublan	d				30	14.1		12.0	5.6		3.65		0		35	
						-		_										_
If you have	your own dat	ta fill the informat	tion ->	Specific Veg	etation 1		0	0		0	0)	0		0		0	1
				Specific Veg	etation 2		0	0		0	0)	0		0		0	4
				Specific Veg	etation 3		0	0		0	0)	0		0		0	4
				Specific Veg	etation 4		0	0		0	0)	0		1		0	4
																		_
	Conversion details (Hanest wood product exported before the conversion, use of fire, final use after Vegetation Type HWP before Fire use Final Use aft					conversion)		Losses (posit	ive value) and	d gain (nega	ative value) p	er ha				4		
	Vegetation 1	Гуре	HWP	before	F	ire use	Final Use af	ter E	Biomass (tC/ha)	Biomass		Soil			CH4	N2O	Total	
Name			t DM/ha	t C exported	yes/no	% released	deforestatio	n	1 yr after	t C	t CO2	ksoil	Delta C	tCO2/yr	kg	kg	tCO2 eq	4
Def.1	Forest4			0	YES	0.72	An	nual Crop	5.0	49.7	182.3	0.58	14.7	2.7	342.7	10.1	10.3	1
Def.2	Please specif	fy the vegetation		0	NO	0	Select Use	after deforestation	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	4
Def.3	Please specif	fy the vegetation		0	NO	0	Select Use	after deforestation	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	
Def.4	Please specif	fy the vegetation		0	NO	0	Select Use	after deforestation	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	
Def.5	Please specif	fy the vegetation		0	NO	0	Select Use	after deforestation	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	
Def.6	Please specif	fy the vegetation		0	NO	0	Select Use	after deforestation	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	
Def.7	Specific Vege	etation 1		0	NO	0	Select Use	after deforestation	0.0	0.00	0.0	0.00	0.0	0.0	0.0	0.0	0.0	4
Def.8	Specific Vege	etation 2		0	NO	0	Select Use	after deforestation	0.0	0.00	0.0	0.00	0.0	0.0	0.0	0.0	0.0	4
Def.9	Specific Vege	etation 3		0	NO	0	Select Use	after deforestation	0.0	0.00	0.0	0.00	0.0	0.0	0.0	0.0	0.0	4
Def.10	Specific Vege	etation 4		0	NO	0	Select Use	after deforestation	0.0	1.00	3.7	0.00	0.0	0.0	0.0	0.0	0.0	
																		-
GHG emissi	ons																	4
Vegetation T		Foreste	ed Area (ha)			Area defores	ted (ha)	Biomass	s loss	Biomass gain	(1yr after)	Soil (base	line)	Fire		Total Balance		P
	Start	Without Project	Dette	With Projec	t	Without	With	Without	With	Without	With	Without	With	Without	With	Without	With	
	tU	End	Rate	End	Rate			1002	1002	1002	tCO2	1002	1002	tCO2	tCO2	1002	1002	4
Det.1	900	900	Linear	0	Linear	0	900	0	164043	0	-16500	0	42446	0	9290	0	199279	1
Def.2	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	0	0	
Def.3	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	0	0	4
Def.4	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	0	0	4
Def.5	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	0	0	4
Def.6	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	0	0	4
Def.7	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	0	0	4
Def.8	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	0	0	4
Def.9	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	0	0	4
Def.10	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0	0	0	0	4
																		_

Non forest Land Use Change (LUC)

There are four sub-activities within the LUC activity. In order to avoid confusion, a set-up of the following table is suggested:

Activity	На
Set aside to sugar cane	3231
Degraded to sugar cane	3231
Set aside to food crops	1250
Degraded to paddy rice	1000

As a result the LUC module can be completed as follows:

		Description of I	110					Durathafara	Defeult C f	Staalua (IC(ha)			Dallas (COO		Emitte d duni	na Dumina
Namo	Your Name	Initial Land Lice	.00	Einal Land He		Alort		Burnt belore	Biom Ini	Biom Ein	Soil Ini	Soil Ein	Biomarr) Soil ////*		N2O (kg)
	Set aside to sugar	Sat Asido		Annual Crop	2	Alen		NO	5.0	5.0	22.6	20.2	Diolitass	2.2	0.0	1420 (kg)
1110.2	Degraded to sugar	Degraded Land		Annual Crop				NO	1.0	5.0	11.6	20.3	14.7	1.6	0.0	0.0
LUC-2	Set aside to food groop	Set Asido		Annual Crop				NO	5.0	5.0	22.6	20.3	0.0	1.0	0.0	0.0
	Degraded to paddy rise	Degraded Land		Raddy Rise				NO	1.0	5.0	11.6	20.5	14.7	4.0	0.0	0.0
1004	Degraded to paudy nice	Calast laitial Lan		Fauly Rice		THE SECOND P		NO	1.0	0.0	0.0	30.5	0.0	4.5	0.0	0.0
LUC-5		Select Initial Lan	J USE	Select Final La		Fill initial I		NO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUC-0		Select Initial Lan	J USE	Select Final La		Fill initial I		NO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUC-7		Select Initial Lan	JUSE	Select Final La	id Use	Fill Initial I		NO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUC-0		Select Initial Lan	J USE	Select Final La		Fill initial I		NO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUC-9		Select Initial Lan	JUSE	Select Final La	id Use	Fill Initial I		NO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUC-10		Select Initial Lan	d Use	Select Final La	nd Use	Fill Initial I	10	NO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUC-11		Select Initial Lan	d Use	Select Final La	nd Use	Fill Initial I	10	NO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUC-12		Select Initial Lan	d Use	Select Final La	nd Use	Fill Initial I	10	NO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUC-13		Select Initial Lan	d Use	Select Final La	nd Use	Fill Initial I	10	NO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUC-14		Select Initial Lan	d Use	Select Final La	nd Use	Fill Initial I	10	NO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUC-15		Select Initial Lan	d Use	Select Final La	nd Use	Fill Initial I	10	NO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LUC-16		Select Initial Lan	d Use	Select Final La	nd Use	Fill initial I	10	NO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
										Default Soil I	Native (tC/ha) 35		"Soil effect lim	nited to 20 yea	rs
0110														Positive value	gain for soil	
GHG emissio	ns	•				0.	0	0.1.01						D'//		
vegetation Ty	pe	Area concerned	I BY LUC			Biomas	s Change	Soil Change		Fire		otal Baland	>e	Difference		
		Without Project		With Project		Without	With	Without	With	Without	With	Without	With			
		Area	Rate	Area	Rate	tCO2	tCO2	tCO2	tCO2	tCO2	tCO2	tCO2	tCO2	tCO2		
LUC-1	Set aside to sugar	0	Linear	3231	Linear	0	0	0	126985	0	0	0	126985	126985		
LUC-2	Degraded to sugar	0	Linear	3231	Linear	0	-47388	0	-90704	0	0	0	-138092	-138092		
LUC-3	Set aside to food crops	0	Linear	1250	Linear	0	0	0	49128	0	0	0	49128	49128		
LUC-4	Degraded to paddy rice	0	Linear	1000	Linear	0	-14667	0	-86465	0	0	0	-101131	-101131		
LUC-5		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
LUC-6		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
LUC-7		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
LUC-8		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
LUC-9		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
LUC-10		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
LUC-11		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
LUC-12		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
LUC-13		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
LUC-14		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
LUC-15		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
LUC-16		0	Linear	0	Linear	0	0	0	0	0	0	0	0	0		
															-	
									Other LUC	total		0	-63110	-63110	1	
												-				

Annual crops module

Within the annual crops module, the first four scenarios derived from the deforestation (900 ha) and the LUC sub-activities apart from the paddy rice activity that will be completed within the Irrigated rice section (6462 ha + 1250 ha) are represented in the table beneath. Furthermore, an additional activity is added in the annual crops model; that of 6770 ha of dry cereal that are converted into sugar cane plantations. The residue of the annuals within the current system was burnt.

The Annual crops module can be completed as follows:

	User-defin	ned practices		Improved agro-	Nutrient	NoTillage/residues	s Water	Manure	Residue/Bic	mass	
Your description		Name	Rate in tC/ha/yr	-nomic practice	management	management	management	application	Burning	t dm/ha	
from Deforestation	NO			?	Yes	?	Yes	?	NO	10	
Converted to A/R	NO			?	?	?	?	?	NO	10	
Annual From OLUC	NO			?	Yes	?	Yes	?	NO	10	
Converted to OLUC	NO			?	?	?	?	?	NO	10	
Current system *	YES	Equilibrium	0	* A conservative	approach is to	consider this syster	n at equilibriur	n or decreasing	YES	10	
Dry cereal to sugar c	NO			?	Yes	?	Yes	?	NO	10	
	NO			?	?	?	?	?	NO	10	
	NO			?	?	?	?	?	NO	10	
	NO			?	?	?	?	?	NO	10	
	NO			?	?	?	?	?	NO	10	
	NO			?	?	?	?	?	NO	10	
	NO			?	?	?	?	?	NO	10	
	NO			?	?	?	?	?	NO	10	
	NO			?	?	?	?	?	NO	10	
		Positive value	= gain for soil	Description/ex	ample of the d	ifferent options			5	See FAOSTA	λT
				Improved agron	omic practices:	using improved va	rieties, extend	ling crop rotatio	n		
				Nutrient manag	ement:	precision farming,	improve N us	e effciency			
				Tillage / residue	es Management	Adoption of reduc	ed,minimum o	r zero tillage, wi	ith or without	mulching, ir	ncluding Conse
				Water manager	ment:	Effective irrigation	measure				
				Manure applica	tion	Manure or Biosoli	ds application	to the field as in	nput		
Arees					Soil CO2 Change		CO2og omitt	od from Durning	Total R		Difference
Areas	With out a	naiost	With Project		Soil CO2 Chang	e Mith	CO2eq emitte	ed from Burning	Total B	alance	Difference
Areas Start	Without	project	With Project	Pata	Soil CO2 Chang Without	e With	CO2eq emitte Without	ed from Burning With	Total B Without	With	Difference
Areas Start t0	Without End	project Rate	With Project End	Rate	Soil CO2 Chang Without tCO2	e With tCO2	CO2eq emitte Without tCO2	ed from Burning With tCO2	Total B Without tCO2	With tCO2	Difference tCO2
Areas Start t0 0	Without End	project Rate Linear	With Project End 900	Rate Linear	Soil CO2 Chang Without tCO2 0	e With tCO2 -17955	CO2eq emitte Without tCO2 0	ed from Burning With tCO2 0	Total B Without tCO2 0	With tCO2 -17955	Difference tCO2 -17955
Areas Start t0 0 0	Without End 0 0	project Rate Linear Linear	With Project End 900 0 7712	Rate Linear Linear	Soil CO2 Chang Without tCO2 0 0	e With tCO2 -17955 0 -153854	CO2eq emitte Without tCO2 0 0	ed from Burning With tCO2 0 0	Total B Without tCO2 0 0	With tCO2 -17955 0	Difference tCO2 -17955 0 -159854
Areas Start t0 0 0 0	Without End 0 0 0	project Rate Linear Linear Linear	With Project End 900 0 77712	Rate Linear Linear Linear	Soil CO2 Chang Without tCO2 0 0 0	e With tCO2 -17955 0 -153854 0	CO2eq emittr Without tCO2 0 0 0	ed from Burning With tCO2 0 0 0	Total B Without tCO2 0 0 0	With tCO2 -17955 0 -153854	Difference tCO2 -17955 0 -153854 0
Areas	Without p End 0 0 0 0 0 6770	project Rate Linear Linear Linear Linear	With Project End 900 0 7712 0 0	Rate Linear Linear Linear Linear	Soil CO2 Chang Without tCO2 0 0 0 0	e With tCO2 -17955 0 -153854 0 0	CO2eq emitte Without tCO2 0 0 0 0 0 84923	ed from Burning With tCO2 0 0 0 0 0	Total B Without tCO2 0 0 0 0 0 84923	With tCO2 -17955 0 -153854 0 10615	Difference tCO2 -17955 0 -153854 0 -74308
Areas Start t0 0 0 0 6770 0 0 0 0 0 0 0 0 0 0 0 0	Without End 0 0 0 0 6770 0	Project Rate Linear Linear Linear Linear Linear	With Project End 900 0 7712 0 0 6770	Rate Linear Linear Linear Linear	Soil CO2 Chang Without tCO2 0 0 0 0 0	e <u>With</u> tCO2 -17955 0 -153854 0 0 -135062	CO2eq emitte Without tCO2 0 0 0 0 0 84923 0	ed from Burning With tCO2 0 0 0 0 10615 0	Total B Without tCO2 0 0 0 0 0 84923 0	alance With tCO2 -17955 0 -153854 0 10615 -135562	Difference tCO2 -17955 0 -153854 0 -74308 -135062
Areas	Without p End 0 0 0 0 0 6770 0 0	project Rate Linear Linear Linear Linear Linear	With Project End 900 0 77712 0 0 67770 0	Rate Linear Linear Linear Linear Linear Linear	Soil CO2 Chang Without tCO2 0 0 0 0 0 0 0 0	e <u>With</u> tCO2 -17955 0 -153854 0 0 -135062 0	CO2eq emitti Without 0 0 0 84923 0 0	ed from Burning With tCO2 0 0 0 0 10615 0 0	Total B Without tCO2 0 0 0 0 0 84923 0 0	alance With tCO2 -17955 0 -153854 0 10615 -135062 0	Difference tCO2 -17955 0 -153854 0 -74308 -135062 0
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Irrigated rice module

There are 1000 ha of degraded lands that is converted into paddy rice plantations, intermittently flooded and with a non flooded pre-season of > 180 days, with the straw incorporated long before the cultivation. It is important to verify what <u>type of system</u> that is appropriate. The rice model comes from the LUC model. In that case, the system of <u>Reserved system R3, from OLUC</u>. Further, the rice plantation is <u>Irrigated – intermittently flooded</u>, <u>non-flooded pre season > 180 days</u>, <u>Straw</u> incorporated long (>30 days)before cultivation.

Consequently, the Irrigated rice module can be completed as follows:

		Cultivatio	n Water R	legime						Organic Ar	mendment	type (Straw	or other)			Specific C change	Default IPCC	calculation	Straw
		period	During	the cultiva	tion Period		Before the	cultivation	period						rate	Delta C*	kg CH4	kg CH4	Burnt
	Your description	(Days)					need help								tonne	tCO2eq/ha/yr	per ha/day	per ha	t CO2 eq
Reserved system R1	from Deforestation	150	Please	select wa	ter regime	Please se	ect preseas	on water re	gime	Ple	ease selec	t type of Org	anic Ameno	iment	5.5		0.00	0.0	0.00
Reserved system R2	converted to A/R	150	Please	select wa	ter regime	Please se	ect preseas	on water re	gime	Ple	ease selec	t type of Org	anic Ameno	iment	5.5		0.00	0.0	0.00
Reserved system R3	from OLUC	150	Irrigated	 Intermitte 	ently flooded	Non floo	ded preseas	on >180 di	ays	Straw	/ incorporat	ed long (>30	d) before cu	ultivation)	5.5		0.87	130.3	0.00
Reserved system R4	Rice to OLUC	150	Please	select wa	ter regime	Please se	ect preseas	on water re	gime	Ple	ease selec	t type of Org	anic Ameno	iment	5.5		0.00	0.0	0.00
Rice1		150	Please	select wa	ter regime	Please se	ect preseas	on water re	gime	Ple	ease selec	t type of Org	anic Ameno	iment	5.5		0.00	0.0	0.00
Rice2		150	Please	select wa	ter regime	Please se	ect preseas	on water re	gime	Ple	ease selec	t type of Org	anic Ameno	dment	5.5		0.00	0.0	0.00
Rice3		150	Please	select wa	ter regime	Please se	ect preseas	on water re	gime	Ple	ease selec	t type of Org	anic Ameno	dment	5.5		0.00	0.0	0.00
Rice4		150	Please	select wa	ter regime	Please se	ect preseas	on water re	gime	Ple	ease selec	t type of Org	anic Ameno	iment	5.5		0.00	0.0	0.00
Rice5		150	Please	select wa	ter regime	Please se	ect preseas	on water re	gime	Ple	ease selec	t type of Org	anic Ameno	iment	5.5		0.00	0.0	0.00
Rice6		150	Please	select wa	ter regime	Please se	ect preseas	on water re	gime	Ple	ease selec	t type of Org	anic Ameno	iment	5.5		0.00	0.0	0.00
Rice7		150	Please	select wa	ter regime	Please se	ect preseas	on water re	gime	Ple	ease selec	t type of Org	anic Ameno	dment	5.5		0.00	0.0	0.00
Rice8		150	Please	select wa	ter regime	Please se	ect preseas	on water re	gime	Ple	ease selec	t type of Org	anic Ameno	iment	5.5		0.00	0.0	0.00
Rice9		150	Please	select wa	ter regime	Please se	ect preseas	on water re	gime	Ple	ease selec	t type of Org	anic Ameno	iment	5.5		0.00	0.0	0.00
Rice10		150	Please	select wa	ter regime	Please se	ect preseas	on water re	gime	Ple	ease selec	t type of Org	anic Ameno	iment	5.5		0.00	0.0	0.00
e.g. Rice crop calendar	by country: http://www	v.irri.org/sc	ience/rices	stat/data/n	nay2008/Wi	KS2008-Appendix	Table04.pdf									Positive value= ga	in for soil		
CH4 emission from ric	e systems					Change over th	e period (t	CO2ed)											
CH4 emission from ric	e systems at options					Change over the Soil C cha	e period (t	CO2eq)	emitted	Straw burn	aina	Total		Difference	1				
CH4 emission from ric Areas (ha) of the differen	e systems nt options Start	Without	Project	With Pro	ject	Change over the Soil C change All per	e period (t anges od	CO2eq) CH4 c	emitted	Straw burn	ning	Total t CO2 eq		Difference tCO2eq	l				
CH4 emission from ric Areas (ha) of the differer	e systems t options Start t0	Without End	Project Rate	With Pro	ject Rate	Change over the Soil C	e period (t anges od With	CO2eq) CH4 (All p	emitted period With	Straw burn	With	Total t CO2 eq Without	With	Difference tCO2eq					
CH4 emission from ric Areas (ha) of the differen Type System R1	e systems t options Start t0 0	Without End 0	Project Rate Linear	With Pro End 0	ject Rate Linear	Change over the Soil C cha All per Without	e period (t anges od With 0	CO2eq) CH4 (All p Without	emitted beriod With 0	Straw burn Without 0	ning With 0	Total t CO2 eq Without 0	With	Difference tCO2eq 0					
CH4 emission from ric Areas (ha) of the differer Type System R1 System R2	e systems tt options tt tt 0 0	Without End 0	Project Rate Linear Linear	With Pro End 0 0	ject Rate Linear Linear	Change over the Soil C	e period (t anges od With 0 0	CO2eq) CH4 (All p Without 0	emitted beriod With 0 0	Straw burn Without 0	With 0 0	Total t CO2 eq Without 0	With 0 0	Difference tCO2eq 0 0					
CH4 emission from ric Areas (ha) of the differen Type System R1 System R2 System R3	e systems it options to 0 0 0	Without End 0 0	Project Rate Linear Linear Linear	With Pro End 0 1000	ject Rate Linear Linear Linear	Change over the Soil C change over the Soil C change over the Soil C change of the Soil C cha	e period (t anges od With 0 0 0	CH4	emitted beriod With 0 0 47899	Straw burn Without 0 0 0	With 0 0 0	Total t CO2 eq Without 0 0	With 0 0 47899	Difference tCO2eq 0 0 47899					
CH4 emission from ric Areas (ha) of the differer Type System R1 System R2 System R3 System R4	e systems tt options t0 0 0 0 0	Without End 0 0 0	Project Rate Linear Linear Linear Linear	With Pro End 0 1000 0	ect Rate Linear Linear Linear Linear	Change over the Soil C chi All per Without 0 0 0	e period (t anges od With 0 0 0 0	CO2eq) CH4 (All p Without 0 0 0	emitted beriod With 0 0 47899 0	Straw burn Without 0 0 0	With 0 0 0 0	Total t CO2 eq Without 0 0 0 0	With 0 0 47899 0	Difference tCO2eq 0 47899 0					
CH4 emission from ric Areas (ha) of the differer Type System R1 System R2 System R3 System R4 Rice1	e systems at options 0 0 0 0 0 0 0 0 0 0 0 0 0	Without End 0 0 0 0 0	Project Rate Linear Linear Linear Linear Linear	With Pro End 0 1000 0 0	ect Rate Linear Linear Linear Linear Linear	Change over the Soil C change over the All per Without 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	e period (t anges od With 0 0 0 0 0 0	CO2eq) CH4 (All p Without 0 0 0 0 0	emitted beriod With 0 0 47899 0 0	Straw burr Without 0 0 0 0	With 0 0 0 0 0	Total t CO2 eq Without 0 0 0 0 0	With 0 0 47899 0 0	Difference tCO2eq 0 47899 0 0					
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Inputs module

In order to avoid confusion, the set-up of the following table is recommended before entering the numbers in the EX-ACT tool.

Inputs	Sub category	Start	Without project	With project
Fertilizers	Nitrogen (N)	0	0	(14 132*200)/1000 = 2826,4 T/yr
	Potassium (K)	0	0	(14 132*125)/1000 = 1767 T/yr
	Phosphate (P)	0	0	(14 132*12)/1000 = 170 T/yr
Pesticides	Herbicides	0	0	((6*(0.4*14 132))+(12*(0.6*14 132))/1000 = 135.75 T/yr
	Insecticides	0	0	(2*14 132)/1000 = 28,26 T/yr

Once this is done, the inputs model can be completed is follows:

N ₂ O emissions from N application on	managed soil	ls (except	manure m	anagement	t see Livestoo	ck Module)									
					Amount of	N Applied (t per y	ear)		E	mission	(t CO2eq) p	er year	Total Emission	n (tCO2eq)	
Type of input	IPCC	Specific	Default	Start	Witho	ut Project	Wit	n Project		Start	Er	nd			Difference
	factor	factor	Factor	t0	End	Rate	0	Rate			Without	With	Without	With	
Urea	0.01		YES	0	0	Linear	0	Linear		0.0	0.0	0.0	0	0	0
N Fertiliser (other than Urea)	0.01		YES	0	0	Linear	2826	Linear		0.0	0.0	8761.8	0	153,332	153332
N Fertiliser in non-upland Rice*	0.003		YES	0	0	Linear	0	Linear		0.0	0.0	0.0	0	0	0
Sewage	0.01		YES	0	0	Linear	0	Linear		0.0	0.0	0.0	0	0	0
Compost	0.01		YES	0	0	Linear	0	Linear		0.0	0.0	0.0	0	0	0
*N fertilizer from upland rice should be incl	luded above (N	V fertilizer)						Sub-Total I-3		0.0	0.0	8761.8	0	153332	153332
CO2 equivalent emissions from produc	ction, transpo	ortation, s	torage and	d transfer o	f agricultural	chemicals									
					Amount in t	tonnes of produc	t (active ingr	ediente for Pest	icides)						
Type of input**	Default	Specific	Default	Start	Witho	ut Project	Wit	n Project		Start	Er	nd	Total E	mission	Difference
	factor*	factor	Factor	t0	End	Rate	End	Rate			Without	With	Without	With	
Urea	4.8		YES	0	0	Linear	0	Linear		0.0	0.0	0.0	0	0	0
N Fertiliser (other than Urea)	4.8		YES	0	0	Linear	2826	Linear		0.0	0.0	13472.5	0	235,769	235769
N Fertiliser in non-upland Rice*	4.8		YES	0	0	Linear	0	Linear		0.0	0.0	0.0	0	0	0
Phosphorus synthetic fertilizer	0.7		YES	0	0	Linear	170	Linear		0.0	0.0	124.3	0	2,175	2175
Potassium synthetic fertilizer	0.6		YES	0	0	Linear	1767	Linear		0.0	0.0	971.6	0	17,003	17003
Limestone (Lime)	0.6		YES	0	0	Linear	0	Linear		0.0	0.0	0.0	0	0	0
Dolomite (Lime)	0.6		YES	0	0	Linear	0	Linear		0.0	0.0	0.0	0	0	0
Generic Lime	0.6		YES	0	0	Linear	0	Linear		0.0	0.0	0.0	0	0	0
Herbicides (Pesticides)	23.1		YES	0	0	Linear	136	Linear		0.0	0.0	3133.5	0	54,837	54837
Insecticides (Pesticides)	18.7		YES	0	0	Linear	28	Linear		0.0	0.0	528.5	0	9,248	9248
Fungicides (Pesticides)	14.3		YES	0	0	Linear	0	Linear		0.0	0.0	0.0	0	0	0
* from Lal (2004) Table 5 - central value -t	CO2/t product							Sub-Total I-4		0.0	0.0	18230.4	0	319031	319031
** tonnes of N, P2O5, K2O and CaCO3															
											Total "Innu	its"	(472363	472363

Investment module

There are two sub-activities within the investment module: (1) <u>Use of irrigation</u> and (2) <u>the Industrial</u> <u>Process of sugar cane</u>. With regards to the sub-activity 1, the activity is the installation of central pivot sprinklers, installed on 14 132 ha of sugar cane plantations. Concerning the second sub-activity, there are a few calculations that requires further attention.

• The annual electricity consumption, <u>with the project</u>, derived from the industrial sugar cane remains (that are burnt) is calculated as follows:

(30 MW*24h)*(365/2) = 131 400 MWh/yr

- Initially and <u>without the project</u>, 15 000 m³ of gasoline is produced whilst <u>with the project</u> as a result from the sugar cane plantations, 15 000 m³ of gasoline is substituted by anhydrous ethanol, with a m³ emissions factor equivalent of 0.025 t CO₂.
- With the project, the total consumption of gasoil (accounted for the land preparation) is expected to reach 2544 m³/yr.

The investment module can therefore be completed as follows:

Released GHG asso	ciated with Ele	ctricity Consur	nption							
Origin of Electricity		[C	Other Africa			Losses of ele	ctricity durin	ng transportatio	n
Default values (T CO2	/ MWh)	YES	0.431						10%	
OPTION 1 Total Electricity Cons	(Based on Total	Electricity con	sumption ove	r the whole duration of the Associated tCC	ne project)	I				
Without Project			0	0.0	5204					
Willi Fiojeci			0	0.0						
OPTION 2	(Based on Annu	al Electricity co	onsumption a	t the beginning and acco	ording to dyn	amic change	es)			
Annual Electricity Cor	nsumption (MWh	/yr)			Emission (t	CO2eq)				
Start	Without	Project	End	With Project Poto	All P Without	eriod With				
10	0	Linear	1,31400	Linear	vittiout	1091075				
	Ŭ	2111001	101100	2.11001		1001010				
OPTION1 + OPTION	2 Sub-	Total Without	11.9	Sub-Total With	1091075.2		Difference	1091063.3		
Released GHG asso	ciated with Fue	l consumption	n (agricultur	al or forestry machine	ry, generato	r <mark>s)</mark> ated with inn	uts transporta	ition is not i	ncluded herel F	Rut in "Innut
OPTION 1		(Based on Tot	al consumpt	ion over the whole durat	ion of the pro	ject)				
Total Liquid Fuel Cons	sumption (m3)		Gasoil/Diese	el Gasoline	Associated	tCO2eq				
Without Project			0	0	()				
With Project			0	0	()	l			
OPTION 2		(Based on An	oual Fuel con	sumption at the beginni	ng and accor	ding to dyna	mic changes)			
		(Dased on An		Annual Fuel Consumpt	tion (m3/yr)	ang to ayna	mic changes)		Emission (t C	O2eq)
Type of Fuel	Default value	Specific	Default	Start	Without	Project	With P	roject	All P	eriod
	t CO2 /m3	Value	Factor	tO	End	Rate	End	Rate	Without	With
Gasoil/Diesel	2.63		YES	0	0	Linear	2544	Linear	0	117213
Gasoline	2.85		YES	15000	15000	Linear	0	Linear	855400	106925
Propane	1.53		YES	0	0	Linear	0	Linear	0	0
Butane	1.76		YES	0	0	Linear	0	Linear	0	0
User defined	Ethanol	0.025	NO	0	0	Linear	15000	Linear	0	6563
t	CO2/t dry matte	er		Annual Consumption in	n t dry matter	l	-	τ		
Wood Peat	0.010		YES	0	0	Linear Linear	0	Linear Linear	0	0
	0.000		120	0	Ū	Linour	0	Linda		Ū
OPTION1 + OPTION	2 Sub-	Total Without	855400.3	Sub-Total With	230700.8		Difference	-624699.5		
Released GHG asso	ciated with inst	allation of irri	gation syste	ms						
nstallation of irrigation	n system		surface (ha)	Type of irrigation syste	Associated	tCO2eq				
Without Project			0	Please select	0.0					
With Project			14132	Center-pivot sprinkle	1119.3		Difformer	1110.0	1	
				IRSS = Irrigation runoff retu	rn system		Dillerence	1119.3	l	
Released GHG asso	ciated with bui	lding of infrast	ructure							
Type of construction of	or infrastructure	Default value	Specific	Default	surface (m2)	Emission (t	CO2eq)		
		t CO2 /m2	Value	Factor	Without	With	Without	With		
Please se	elect	0.000		YES			0.0	0.0		
Please se	elect	0.000		YES			0.0	0.0		
Please se	elect	0.000		YES			0.0	0.0		
Please se	elect	0.000		YES			0.0	0.0		
Please se	elect	0.000		YES			0.0	0.0		
Please se	elect	0.000		YES			0.0	0.0		
				Outstatel	0.0		Difference	0.0	1	
				SUBTOTO	1111	11.11	, , , , , , , , , , , , , , , , , , , ,			

Land use and land use change Matrix

Without

In the situation without project, there is a smaller amount of forest plantation (900ha), 6770 ha of dry cereal, 4231 ha of degraded land and 4481 ha of set aside land. With the implementation of the project, 900 ha tree savannah has been deforested and converted into sugar cane plantations. Furthermore, the 6770 ha of dry cereal have also been turned into sugar cane plantations. Moreover, one can observe the shift of degraded and set aside lands to sugar cane plantations (3231 ha + 4481 ha). The hectares in question have an improved nutrient and water management. In addition, 1000 ha of the degraded lands has become paddy rice plantations. The total amount of ha are in both cases 16 382 ha.

855412

With

1322895

Markala sugar project in Mali

Project name

Mineral s	oils					FINAL					
Wi	thout Pro	<u>ject</u>	Forest/ Plantation	Annual	Cropland Perennial	Rice	Grassland	Other Degraded	Other Land Degraded Other		
NITIAL	Forest/Pla	antation	900	0	0	0	0	0	0		
		Annual	0	6770	0	0	0	0	0		
	Cropland	Perennial	0	0	0	0	0	0	0		
		Rice	0	0	0	0	0	0	0		
	Grassland	ł	0	0	0	0	0	0	0		
	Other Lar	Degraded	0	0	0	0	0	4231	0		
		Other	0	0	0	0	0	0	4481		
		Total Fina	900	6770	0	0	0	4231	4481		
	I			0.10				Or	ganic soils		
/lineral s	oils					FINAL		Or	ganic soils		
/lineral s	oils Vith Proje		Forest/		Cropland	FINAL	Grassland	Or	ganic soils [.] Land		
∕lineral s ⊻	oils Vith Proje		Forest/ Plantation	Annual	Cropland Perennial	FINAL	_Grassland	Or Other Degraded	ganic soils • Land Other		
/lineral s NITIAL	oils Vith Proje Forest/Pla	ect	Forest/ Plantation 0	Annual 900	Cropland Perennial 0	FINAL Rice 0	_Grassland	Or Other Degraded 0	ganic soils • Land Other 0		
ineral s لا NITIAL	oils Vith Proje	ect antation	Forest/ Plantation 0	Annual 900 6770	Cropland Perennial 0 0	FINAL Rice 0 0	Grassland	Or Other Degraded 0 0	ganic soils • Land Other 0 0		
Mineral s لا NITIAL	oils Vith Proje Forest/Pla Cropland	ect antation Annual Perennial	Forest/ Plantation 0 0 0	Annual 900 6770 0	Cropland Perennial 0 0 0	FINAL Rice 0 0 0 0	Grassland	Or Other Degraded 0 0 0	ganic soils • Land Other 0 0 0		
Vineral s لا NITIAL	oils <u>Vith Proje</u> Forest/Pla Cropland	antation Annual Perennial Rice	Forest/ Plantation 0 0 0 0	Annual 900 6770 0 0	Cropland Perennial 0 0 0 0 0	FINAL Rice 0 0 0 0	Grassland	Or Other Degraded 0 0 0 0	ganic soils • Land Other 0 0 0 0		
Vineral s لا NITIAL	oils <u>Vith Proje</u> Forest/Pla Cropland Grassland	antation Annual Perennial Rice	Forest/ Plantation 0 0 0 0 0	Annual 900 6770 0 0 0	Cropland Perennial 0 0 0 0 0 0 0	FINAL Rice 0 0 0 0 0 0 0	Grassland 0 0 0 0 0 0 0 0 0	Or Other Degraded O O O O O O O	ganic soils Land Other 0 0 0 0 0		
Vineral s لا NITIAL	oils Vith Proje Forest/Pla Cropland Grassland Other Lar	antation Annual Perennial Rice J Degraded	Forest/ Plantation 0 0 0 0 0 0 0	Annual 900 6770 0 0 0 3231	Cropland Perennial 0 0 0 0 0 0 0 0 0 0	FINAL Rice 0 0 0 0 0 0 0 0 0 0 0	Grassland 0 0 0 0 0 0 0 0 0	Or Other Degraded O O O O O O O O O	ganic soils Land Other 0 0 0 0 0 0 0 0 0		
Vineral s لا NITIAL	oils Vith Proje Forest/Pla Cropland Grassland Other Lar	antation Annual Perennial Rice Degraded Other	Forest/ Plantation 0 0 0 0 0 0 0 0 0 0	Annual 900 6770 0 0 0 3231 4481	Cropland Perennial 0 0 0 0 0 0 0 0 0 0 0 0 0 0	FINAL Rice 0 0 0 0 0 1000 0	Grassland 0 0 0 0 0 0 0 0 0	Or Degraded 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ganic soils Land Other 0 0 0 0 0 0 0 0 0		
/lineral s	oils Vith Proje Forest/Pla Cropland Grasslanc Other Lar	antation Annual Perennial Rice Degraded Other	Forest/ Plantation 0 0 0 0 0 0 0 0 0	Annual 900 6770 0 0 3231 4481	Cropland Perennial 0 0 0 0 0 0 0 0 0	FINAL Rice 0 0 0 0 1000 0 1000 0	_Grassland 0 0 0 0 0 0 0 0 0 0 0 0 0	Or Degraded 0 0 0 0 0 0 0 0 0 0 0 0	ganic soils Land Other 0 0 0 0 0 0 0 0 0		

Results provided by the EX-ACT tool

The improvements proposed in the <u>different modules</u> finally lead to a **net source** of GHG reaching 742 736 tons of eq-CO2 in 20 years. It is mainly due to the deforestation, inputs and investment modules.

Finally the implementation of the <u>project</u> **indirectly** allows for contributing to climate change mitigation of the country since with the LUC, from degraded and set aside lands to sugar cane plantations, Mail will be able to produce green electricity, which is in the long-run a sustainable option even though the project, momentarily emits 742.7 T of CO_2 per year or 2.3 tons of eq- CO_2 per year per ha.

Project Summary			Area (Initia	state in ha)		Duration	of the			
Name Markala su	gar project in M	ali	Forest/Plan	tation	900		Project (years)			
				Annual	6770		Implementatio	5			
Continent Africa			Cropland	Perennial	0		Capitalisation	15	1		
				Rice	0		lotal	20			
Climate Tropical Dry	/		Grassland		0		Iotal A	Area	1		
Deminente Seil AC Seile			Other Land	Degraded	4231		Mineral soils	16382	1		
Dominance Son LAC Sons			Organic coile		4401		Total Area	16393	1		
			Organic solis	s/peatianus	U	l	Total Alea	10002	i		
Components of the Project	Balanc	e (Project - Baseline)	CC	02	N2O	CH4	Per phase of t	he project		∕lean per yea	ar
	AI	I GHG in tCO2eq	Biom a ss	Soil			Implement.	Capital.	Total	Implement.	Capital.
Deforestation	199279) this is a source	147543	42446	2812	6477	199279	0	9964	39856	0
Forest Degradation	0		0	0	0	0	0	0	0	0	0
Afforestation and Reforestatio	<u>n</u> 0		0	0	0	0	0	0	0	0	0
Non Forest Land Use Change	-63110	this is a sink	-62055	-1056	0	0	-62205	-905	-3156	-12441	-60
Agnoulture				000074	00507	507.40	54454	00070 (10050	40001	04700
Annual Ci	-3811/8	this is a sink	0	-306871	-20567	-53740	-54454	-326724	-19059	-10891	-21/82
Agrotorestry/Perennial Ci	<u>ops</u> 0	41-1-1	0	0	0	47000	0	0	2205	1000	0
Ingated R	4/899	this is a source	0	0	0	47899	0843	41057	2395	1369	2131
Organic coils and postlands			0	0	0	0	0	0	0	0	0
Other GHG Emissions	Ű		- CO2 ((other)	U	0	U	0	Ŭ	Ū	0
Livest	ock 0		002 (0	0	0	0	0	0	0
	472363	this is a source	319	031	153332		67480	404883	23618	13496	26992
Other Investn	ient 467483	this is a source	467	483			67743	399740	23374	13549	26649
Final Date	740720		070000	005400	405 577	007	004005	540054	27427	44027	24527
Final Bala	nce /42/36	ntisa source	872003	-265480	1355//	637	224685	518051	3/13/	44937	34537
IN % OF EM	ission without	project: 79.0%	I								
Result per	ha 45.3		53.2	-16.2	8.3	0.0	13.7	31.6	2.3	2.7	2.1
500000 400000 200000 100000 -100000 -200000 -300000	1							-			

Deforestation Forest Degra detoestation and Refore Platest Land Use Changemual Cropegrotorestry/Perennial Cropegrated Rice GrasslandOganic solis and peatlands. Livestock Inputs Other Investment

Situation 7: Agro-forestry project in the Cross-river region, Nigeria

General description of the project

Firstly, the **description module** has to be filled in with the information provided in the exercise.

The project takes place in Nigeria, <u>Africa</u>. We do not have direct information regarding the dominant climate. However the project deals with deforestation, annuals and perennials and we know that the project happens in the Cross-river region, Nigeria, hence a <u>tropical wet</u> climate. The dominant type of soil corresponds to <u>LAC soils</u>.

The project will be financed during 5 years, hence an implementation phase of 5 years. The capitalization phase is estimated to occur during 15 years.

Finally the description module in EX-ACT should be filled as follows:

Project Name	Cross-river project in Nigeria
Continent	Africa

Climate Moisture regime	Tropical Wet
	<u>See "Climate" for</u> Help
Dominant Regional Soil Type	LAC Soils
.	See "Soil" for

Duration of the Project		
(Years)	Implementation phase	5
	Capitalization phase	15
	Duration of accounting	20

Help

Components of the project

Four different activities are realized. The first one deals with the <u>deforestation</u>, the second one with <u>annuals</u>, the third with the improvement of <u>perennials</u> (palm trees) but that will consequently be filled in by the tool according to the deforestation module, the last one with the use of <u>inputs</u>. The activities may have impacts on GHG emissions. Consequently, the following four modules are going to be filled: **deforestation**, **annuals**, **perennials and inputs**.

Deforestation module

Since it is a mixed Tier 1 and Tier 2 exercise, we firstly need to carry out a few calculations. We have primary and secondary forest.

1. Without the project, 1000 Ha of tropical forest with be deforested. In this case, the coefficients are not given and we therefore need to calculate Harvested Wood Production (HWP).

	HWP (T DM/ha)
Vegetation type (Tropical rain forest)	(5*0.8)*10= 40 T DM/ha

2. The Government of Nigeria decided to develop 500 Ha of perennials from set aside land. This needs to be filled according to the Tier 2 approach. Firstly however, the above- and below-ground biomass needs to be calculated.

	Above-ground biomass (T DM)	Below-ground biomass (T/DM)
Specific vegetation type	88/0.47 = 187.2340426 T DM	187.2340426*0.37 = 69.27659574 T
(paim trees)		DIVI

3. The litter, dead wood and soils have the same coefficients as in Tier 1.

Consequently the deforestation module can be completed as follows:

Type of I	Default for	est/plantation	proposed 1	rithin the						Suggeste	d Default	Values p	er hectar	e (/ba) 👘				4 [
specified	Climatic z	one					Above-G	round Biomass		Below-Grou	ind Biomass		Litter		Dead Wood		Soil C	4 1
		Ecological Z	one	Go to Map			tonnes dm	10		tonnes dm	t C		t C		+C		tC.	4 6
	Forest1	Tropical rain for	rest				310	145,7		114,7	53,9		3,65		0		60	(I
Natural	Forest2	Tropical moist d	leciduous for	est			260	122,2		62,4	29,3		3,65		0		60	(I
Forest	Forest3	Tropical dry for	est				120	56,4		33,6	15,8		3,65		0		60	4 I
	Forest4	Tropical shrubla	ind				70	32,9		28,0	13,2		3,65		0		60	(I
	Plantation	Tropical rain for	rest				150	70,5		55,5	26,1		3,65		0		60	4 I
Plantation	Plantation	Tropical moist d	leciduous for	est			120	56,4		24,0	11,3		3,65		0		60	4 I
	Plantation	Tropical dry for	est				60	28,2		16,8	7,9		3,65		0		60	(I
	Plantation	 Tropical shrubla 	ind				30	14,1		12,0	5,6		3,65		0		60	1 1
If you has	re your owi	a data fill the in	formation	Specific Ve Specific Ve	getation 1		187,234	88		69	33		3,65		0		60	1 1
				Specific Ve	getation 2		ů l	, in the second s		ů l			ů č		, e		, and the second se	
				Specific Ve	getation 4		ŏ	ŏ		ŏ	ŏ		ŏ		1		ŏ	
	Conversion	details [Harvest wo	od product o	xported beh	ore the co	nversion, use o	of fire, final use	after conversion]		Losses [posi	itive value] ar	nd gain [ne	gative value] per ha	014		Tatal	-
	Vegetatio	а гуре	NWP I	Derore		re use	rinal Use	arter D	iomass (turnaj	Diomass		301			Cn4	N20	Iotal	
Name			t DM/ha	t U exporte	yes/no	Xerleaned	deforesta	tion	1 yr after	10	1002	Kil	Delta C	tCO2/yr	kg	kg	tCU2 og	4
Def.1	Forest2		40	18,8	NO	0	s	et aside	5,0	136,4	500,1	0,82	10,8	2,0	0,0	0,0	0,0	
Def.2	Please speci	ify the vegetation		0	NO	0	Select Use a	fter deforestation	0,0	0,0	0.0	0,00	0,0	0.0	0,0	0,0	0,0	
Def.3	Please spec	ify the vegetation		0	NO	0	Select Use a	fter deforestation	0,0	0,0	0.0	0,00	0,0	0.0	0,0	0,0	0,0	
Def.4	Please spec	ify the vegetation		0	NO	0	Select Use a	fter deforestation	0,0	0,0	0,0	0,00	0,0	0,0	0,0	0,0	0,0	
Def.5	Please speci	ify the vegetation		0	NO	0	Select Use a	fter deforestation	0,0	0,0	0.0	0,00	0,0	0.0	0,0	0,0	0,0	
Def.6	Please speci	ify the vegetation		0	NO	0	Select Use a	fter deforestation	0,0	0,0	0.0	0,00	0,0	0.0	0,0	0,0	0.0	
Def.7	Specific Veg	getation 1		0	NO	0	Perenn	al/Tree Grop	10,0	124,21	455,4	1,00	0,0	0,0	0,0	0,0	0,0	
Def.8	Specific Veg	getation 2		0	NO	0	Select Use a	fter deforestation	0,0	0,00	0,0	0,00	0,0	0,0	0,0	0,0	0,0	
Def.9	Specific Veg	getation 3		0	NO	0	Select Use a	fter deforestation	0,0	0,00	0,0	0,00	0,0	0,0	0,0	0,0	0,0	
Def.10	Specific Veg	getation 4		0	NO	0	Select Use a	fter deforestation	0,0	1,00	3,7	0,00	0,0	0,0	0,0	0,0	0,0	1
GHG emis	sions																	
Vegetation		Foreste	d Area (ha			Area defo	rested (ha)	Biomass	loss	Biomass gai	n (1yr after)	Soil (bas	eline)	Fire	1	Fotal Balanc	e	Difference
	Start	Without Proj	ect	With Pro	ject	Without	With	Without	With	Without	With	Without	With	Without	With	Without	With	
	10	End	Rate	End	Rate			1CO2	1CO2	+C02	1CO2	+C02	1CO2	1CO2	tC02	1CO2	1CO2	1CO2
Def.1	1000	0	Lincar	1000	Lincar	1000	0	500053	0	-18333	0	34650	0	0	0	516363	0	-516369
Def.2	0	0	Lincar	0	Lincar	0	0	0	0	0	0	0	0	0	0	0	0	0
Def.3	0	0	Lincar	0	Linear	0	0	0	0	0	0	0	0	0	0	0	0	0
Def.4	0	0	Lincar	0	Linear	0	0	0	0	0	0	0	0	0	0	0	0	0
Def.5	0	0	Lincar	0	Lincar	0	0	0	0	0	0	0	0	0	0	0	0	0
Def.6	0	0	Lincar	0	Linear	0	0	0	0	0	0	0	0	0	0	0	0	0
Def.7	500	500	Linear	0	Linear	0	500	0	227718	0	-18333	0	0	0	0	0	209385	209385
Def.8	0	0	Linear	0	Lincar	0	0	0	0	0	0	0	0	0	0	0	0	0
Def.9	0	0	Lincar	0	Lincar	0	0	0	0	0	0	0	0	0	0	0	0	0
Def.10	0	0	Lincar	0	Lincar	0	0	0	0	0	0	0	0	0	0	0	0	0
													D.(-	F46969	209205	205 994

Annual crops module

Firstly, since it is a mixed Tier 2 exercise, we need to calculate the rate in T C/ha/year and also clarify the residue/biomass in T/DM/ha.

Production	Rate in T C/ha/year
Improved Yam production	2.75/5 = 0.55 T C/ha/year

	Residue/Biomass in T/DM/ha
Conventional Yam production	12
Improved Yam production	5

Once we have these numbers, the annual module can be filled as follows:

		User-del	ined practic	es	Improved agr	(Nutrient	NoTillage/resid	, Water	Manure	Residue/B	iomass	1 0
	Your description		Name	ate in tC/ha/yr	-nomic practi	(management	management	managemer	application	Burning	t dm/ha	
Reserved system A	from Deforestatio	NO			?	?	?	?	?	NO	10	
Reserved system A	Converted to A/R	NO			?	?	?	?	?	NO	10	
Reserved system A	Annual From OLU	NO			?	?	?	?	?	NO	10	
Reserved system A	Converted to OLU	NO			?	?	?	?	?	NO	10	
Annual System1	Current system *	YES	Equilibrium	n 0	conservative a	approach is to c	onsider this syste	em at equilibriu	um or decrea	YES	5	
Annual System2	improved producti	YES		0,55	?	?	?	?	Yes	NO	12	
Annual System3		NO			?	?	?	?	?	NO	10	
Annual System4		NO			?	?	?	?	?	NO	10	
Annual System5		NO			?	?	?	?	?	NO	10	
Annual System6		NO			?	?	?	?	?	NO	10	
Annual System7		NO			?	?	?	?	?	NO	10	
Annual System8		NU			?	?	2	2	?	NU	10	
Annual System9		NU			2	?	?	2	?	NU	10	
Annual System10		NO			?	?	?	?	?	NO	10	Ļ
			Positive vi	alue= gain for s	Description	n/example of	the different o	options		5	ee FAUST/	81
					Improved agr	onomic practice	using improved	varieties, exte	enaing crop re	otation		
					Tills on Longide	agemenc	precision rannin	ig, improve N	use encienci			a la cara da calendaria.
					Water manage	ues manageme omonti	Effective irright	acea,minimar	n or zero tila	ge, with or v	without man	ening, merudung
					Manure applic	enteric sation	Mapure or Biog	on measure olide applicati	ion to the fiel	d ag input		
					relatione applie	outon -	relation of blog	ondo applicat	ion to the net	a as inpac		
Mitigation potentia	1											
Vegetation	Areas					Soil CO2 Chang	le	CO2eq emit	ted from Buri	Total E	Balance	Difference
Type	Start	Vithou	t project	Vith Projec	t	Without	With	Without	With	Without	With	
	t0	End	Rate	End	Rate	tCO2	tCO2	tCO2	tCO2	tCO2	tCO2	tCO2
System A1	0	0	Linear	0	Linear	0	0	0	Ó	0	0	0
System A2	0	0	Linear	0	Linear	0	0	0	Û	Ö	0	0
System A3	0	0	Linear	0	Linear	0	0	0	Ú.	Ū	0	0

System A2	0	0	Linear	0	Linear	0	0	0	0	0	0	0
System A3	0	0	Linear	0	Linear	0	0	0	0	0	0	0
System A4	0	0	Linear	0	Linear	0	0	0	0	0	0	0
Annual System1	250	250	Linear	0	Linear	0	0	1568	196	1568	196	-1372
Annual System2	0	0	Linear	250	Linear	0	-8823	0	0	0	-8823	-8823
Annual System3	0	0	Linear	0	Linear	0	0	0	0	0	0	0
Annual System4	0	0	Linear	0	Linear	0	0	0	0	0	0	0
Annual System5	0	0	Linear	0	Linear	0	0	0	0	0	0	0
Annual System6	0	0	Linear	0	Linear	0	0	0	0	0	0	0
Annual System7	0	0	Linear	0	Linear	0	0	0	0	0	0	0
Annual System8	0	0	Linear	0	Linear	0	0	0	0	0	0	0
Annual System9	0	0	Linear	0	Linear	0	0	0	0	0	0	0
Annual System10	0	0	Linear	0	Linear	0	0	0	0	0	0	0
Total Syst 1-10	250	250		250								

Agric. Annual Total 1568 -8627 -10195

Perennials module

The following table demonstrates the perennial module, originating from the deforestation module. Here, it is specified that the above ground biomass growth rate is of 11% per year. This needs to be specified within the perennials module as well as the burning practices.

Your description Burning Interv Interv Reserved system P1 From Deforestation YES Yes Reserved system P2 Converted to A/R	lonsdm/ha val(yr) 1 10 1 10	Default 10 0	e (tUrha) Specific 11	Default 0	ite (tUrha) Specific	t CO2/halyi 0.7	NO	tCO2/halyr	kg	kg	t
Reserved system P1 From Deforestation YES Reserved system P2 Converted to A/R NO	1 10 1 10	10	11	0		0.7	NO		10.4	1.00	0.0
Reserved system P2 Converted to A/R NO	1 10	0					140		10,4	1,00	(0,9
				0		0,7	NO		0	0	0,0
Reserved system P3 OLUC to Perennial NO	1 10	10		0		0,7	NO		0	0	0,0
Reserved system P4 Perennial to OLUC NO	1 10	0		0		0,7	NO		0	0	0,0
Perennial Syst 1 NO	1 10	0		0		0,7	NO		0	0	0,0
Perennial Syst 2 NO	1 10	0		0		0,7	NO		0	0	0,0
Perennial Syst 3 NO	1 10	0		0		0,7	NO		0	0	0,0
Perennial Syst 4 NO	1 10	0		0		0,7	NO		0	0	0,0
Perennial Syst 5 NO	1 10	0		0		0,7	NO		0	0	0,0
		The default (tie	ers 1 assumptio	on) is that if the	system	Positive va	ue= gain for	soil			

The default (tiers 1 assumption) is that if the system Positive v is in equilibrium therefore default growth rate is 0 Only System P1 and P3 are considered by default not in equilibrium

Mitigation potential														
Vegetation Type	Areas					CO ₂ fluxes f	rom Biomass	CO ₂ fluxes fro	om Soil	CO ₂ eq emit	ed from Burr	Total E	Balance	Difference
	Start	Without pro	oject	With Pro	ject	Without	With	Without	With	Without	With	Without	With	
	10	End	Rate	End	Rate							tCO2	tCO ₂	tCO2eq
System P1	0	0	Linear	500	Linear	0	-342833	0	-6125	0	7938	0	-341020	-341020
System P2	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0
System P3	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0
System P4	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0
Perennial Syst 1	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0
Perennial Syst 2	0	0	Linear	0	Linear	0	0	0	0	0	0	0	0	0
Perennial Syst 3	0	0	Linear	0	Linear	0	0] 0	0	0	0	0	0	0
Perennial Syst 4	0	0	Linear	0	Linear	0	0] 0	0	0	0	0	0	0
Perennial Syst 5	0	0	Linear	0	Linear	0	0] 0	0	0	0	0	0	0
Total Syst 1-5	0	0		0				-						

Agric. Annual Total 0 -341020 -341020

Inputs module

The following table demonstrates the total amount of urea and fertilizers (N, P, K).

Fertilizer	Annuals	Perennials	Total/fertilizer	Unit
		Without project		
Urea	1.25	-	1.25	T/year
		With project		
Ν	0.075*250=18.75	0.125*500=62.5	18.75+62.5=81.3	T/year
Р	0.015*250=3.75	0.035*500=17.5	3.75+17.5=21.3	T/year
К	0.01*250=2.5	0.025*500=12.5	2.5+12.5=15	T/year

The inputs module can be filled as follows:

Carbon dioxide emissions fr	om Urea	a applica	ation												
					Amount o	f Urea in to	nnes per y	ear	Emissi	on (t (:02eq)	per yea	Total Emiss	ion (tCO2ec	i)
	IPCC	Specific	Default	Start	Withou	it Project	With	Project	Sta	art	En	id .			Difference
	factor	factor	Factor	t0	End	Rate	End	Rate			Without	With	Without	With	
Urea	0,2		YES	1,25	1,25	Linear	0	Linear	- 0,2	25	0,25	0	5	1	-4
								Sub-Total I-	-2 0,2	25	0,25	0	5	1	-4
								-							
N ₂ O emissions from N appli	cation o	n manao	aed soi	ls fexce	ept manui	re manager	ient see L	ivestock M	oduleì						
		-	_		Amount	of N Applie	d (t per ye	ear)	Emissi	on (t (CO2eq)	per yea	Total Emiss	ion (tCO2ed	a)
Type of input	IPCC	Specific	Default	Start	Withou	it Project	With	Project	Sta	art	Ēn	d			Difference
	factor	factor	Factor	t0	End	Rate	0	Rate			Without	With	Without	With	
Urea	0,01		YES	1	1	Linear	0	Linear	1,	8	1,8	0,0	36	5	-32
N Fertiliser (other than Urea)	0,01		YES	0	0	Linear	81	Linear	0,	0	0,0	251,9	0	4 408	4408
N Fertiliser in non-upland Rice	0,003		YES	0	0	Linear	0	Linear	0,	0	0,0	0,0	0	0	0
Sewage	0,01		YES	0	0	Linear	0	Linear	0,	0	0,0	0,0	0	0	0
Compost	0,01		YES	0	0	Linear	0	Linear	0,	0	0,0	0,0	0	0	0
*N fertilizer from upland rice shoul	ld be inclu	ided abov	ve (N fert	ilizer)		_		Sub-Total I-	-3 1,	8	1,8	251,9	36	4412	4376
								-							
CO ₂ equivalent emissions fr	om prod	luction,	transp	ortation	, storage	and transfe	er of agric	ultural cher	nicals						
					Amount	in tonnes o	f product	(active ing	rediente	e for P	esticide	es)			
Type of input ^{**}	Default	Specific	Default	Start	Withou	it Project	With	Project	Sta	art	En	d	Total Er	nission	Difference
	factor"	factor	Factor	t0	End	Rate	End	Rate			Without	With	Without	With	
Urea	4,8		YES	1	1	Linear	0	Linear	2,	8	2,8	0,0	56	7	-49
N Fertiliser (other than Urea)	4,8		YES	0	0	Linear	81	Linear	0,	0	0,0	387,3	0	6 778	6778
N Fertiliser in non-upland Rice"	4,8		YES	0	0	Linear	0	Linear	0,	0	0,0	0,0	0	0	0
Phosphorus synthetic fertilizer	0,7		YES	0	0	Linear	21	Linear	0,	0	0,0	15,6	0	273	273
Potassium synthetic fertilizer	0,6		YES	0	0	Linear	15	Linear	0,	0	0,0	8,3	0	144	144
Limestone (Lime)	0,6		YES	0	0	Linear	0	Linear	0,	0	0,0	0,0	0	0	0
Dolomite (Lime)	0,6		YES	0	0	Linear	0	Linear	0,	0	0,0	0,0	0	0	0
Generic Lime	0,6		YES	0	0	Linear	0	Linear	0,	0	0,0	0,0	0	0	0
Herbicides (Pesticides)	23,1		YES	0	0	Linear	0	Linear	0,	0	0,0	0,0	0	0	0
Insecticides (Pesticides)	18,7		YES	0	0	Linear	0	Linear	0,	0	0,0	0,0	0	0	0
Fungicides (Pesticides)	14,3		YES	0	0	Linear	0	Linear	0,	0	0,0	0,0	0	0	0
* from Lal (2004) Table 5 - central	value -tC	:02/t prod	luct			_		Sub-Total I	-4 2,	8	2,8	411,1	56	7202	7146
** tonnes of N, P2O5, K2O and C	aCO3														
											Total "In	nputs 👘	97	11615	11518

Land use and land use change Matrix

In the situation without project, there is a smaller amount of forest plantation (500ha) and 1000 ha of set aside land that would become deforested due to poor agricultural yield. With the implementation of the project, 1000 ha forest will remain tropical moist forest, acting as a sink of carbon emissions. Further, with the project, 250 ha of conventional Yam production will be improved via manure application and no burning practices. The total amount of ha is in both cases 1750 ha.

Cross-river project in Nigeria

Project name

lineral soils FINAL <u>Without Project</u> Forest/ <u>Cropland</u> Grassland Of Plantation Appual Perepriat Rice Degra	
Without Project Forest/ Cropland Grassland Or Plantation Appual Perennial Rice Degra	
Plantation Appual Perennial Rice Degrad	her Land
	ded Other
VITIAL Forest/Plantation 500 0 0 0 0	1000
Annual <u>0 250 0</u> 0 0 0	0
Cropland Perennial 0 0 0 0	0
Rice 0 0 0 0 0	0
Grassland 0 0 0 0 0	0
Other Lar Degraded 0 0 0 0 0 0	0
Other 0 0 0 0 0	0
Total Final 500 250 0 0 0 0	1000
	Organic soils
ineral soils FINAL	
With Project Forest/ Cropland Grassland Of	herland
Plantation Annual Perennial Rice Degrad	ded Other
IITIAI Excest/Plantation 1000 0 500 0 0 0	0
	0
Annual 0 250 0 0 0 0	
Annual 0 250 0<	0
Annual 0 250 0<	0 0
Annual 0 250 0<	0 0 0
Annual 0 250 0<	0 0 0 0
Annual 0 250 0<	0 0 0 0
Annual 0 250 0<	0 0 0 0

Results provided by the EX-ACT tool

The improvements proposed in the <u>deforestation and annual crops module</u> lead to a **net sink** of GHG reaching 658 200 tons of eq-CO2 in 20 years. Globally this activity contributes more to mitigation than deforesting 1000 ha of primary forest.

Organic soils

0

The two activities gathered compensates for the **source of GHG** due to the consumption of inputs, which is 11 518 tons of eq-CO2 per year and per ha. Finally the implementation of the <u>project</u> allows for contributing to climate change mitigation, with a **benefit** of 646 682 tons of eq-CO2 during 20 years in comparison to a situation in which the project would not happen (a net source of 518 034 eq-CO2), or 18.5 tons of eq-CO2 per year per ha.

Project Summary				Area (Initial state in ha)				Duratio	n of the			
Name	Nigeria tier 2			Forest/Plan	itation	1500		Project	(years)			
					Annual	250		Implementat	ti 5			
Continent	Africa			Cropland	Perennial	0		Capitalisatio	r 15			
					Rice	0	-	Total	20			
Climate	Tropical Wet			Grassland		0		Total	Area			
				Other Land	Degraded	0		Mineral soils	1750			
Dominante Soil	ILAC SOIIS			0	Other	0		Organic soil:	s 0			
				Organic so	ils/peatlands	0		Total Area	1750			
Components of the Project		Balance	(Project - Baseline)	seline) CO2		N2O	CH4	Per phase of	f the project	1	lean per yea	r
		All G	GHG in tCO2eq	Biomass	Soil			Implement.	Capital.	Total	Implement.	Capital.
Deforestation		-306984	this is a sink	-272334	-34650	0	0	-306984	0	-15349	-61397	0
Forest Degradation		0		0	0	0	0	0	0	0	0	0
Afforestation and Reforestation		0		0	0	0	0	0	0	0	0	0
Non Forest Land	Use Change	0		0	0	0	0	0	0	0	0	0
Agriculture												
	Annual Crops	-10195	this is a sink	0	-8823	-380	-992	-1456	-8739	-510	-291	-583
Agroforestry/P	erennial Crops	-341020	this is a sink	-342833	-6125	4557	3381	-40074	-300946	-17051	-8015	-20063
Orecelerat	Irrigated Rice	0		0	0	0	0	0	0	0	0	0
Grassiano	d sectles de	0		0	0	0	0	0	0	0	0	0
Other CHC Emis	u peallanus	U			(other)	0	0	0	0	0	0	0
Other GHG Linia	Livestock 0				0	0	0	0	0	0	0	
	Inputs 11518 this is a source		7142		4376		1645	9872	576	329	658	
Other Investment		0		· · · · ·	0			0	0	0	0	0
	Final Balance	646600	It is a sink	600026	40500	0662	2200	246070	200042	20224	60274	40007
	Final Balance	-04008Z	TUIS & SITIK	-008020	-49598	8000	2089	-340870	-299812	-32334	-09374	-19987
in wor christion without project124,8%												
	Result per ha	-369,5		-347,4	-28,3	4,9	1,4	-198,2	-171,3	-18,5	-39,6	-11,4



Main mistakes to avoid

Filling EX-ACT modules step by step

Before filling in any data the user has to complete the description module. If the user forgets this, the tool does not calculate anything as the used default coefficients depends on climate, soil and continent.

Possible mistakes within the situation 1 (Brazil)

- EX-ACT asks for the forested areas that remain and not the areas that disappear
- 2 different activities \rightarrow 2 different EX-ACT modules (Deforestation and A/R)
- A/R module: ha x year = 100*42= 4200 ha reforested during 42 years

- Natural vs plantation: It is advised to check the country definition

Possible mistakes within the situation 2 (Indonesia)

- Be careful: with project= deforestation, without project = forest remains (it is the contrary of the previous situation in Brazil)

- 2 kinds of "fire use": one for the land use change, one used during the cultivation of palm trees.

Possible mistakes within the situation 3 (Benin)

- Only the irrigated rice (flooded permanently or part of the year) is accounted in the rice module. Non flooded rice such as upland rice or pure rainfed rice are considered as annual crops and thus accounted in the annual module.

- All data filled in the other land use module are implemented automatically in the related new land use systems in the blue lines.

Possible mistakes within the situation 4 (Mongolia)

- Inputs used for livestock such as antibiotics, concentrate feed, etc, have to be accounted among the livestock module and not in the input module.

- Regarding the additional technical mitigation options, it is not the exact quantity of antibiotics that is accounted but the use or not of it for a certain percentage of the herd.

- Only the installations of **new** irrigation systems are accounted in the investment module with the default coefficients.

- In the livestock module, don't forget to fill in the country type (developed/developing) and the mean average temperature. It will have importance on the coefficients used.

Possible mistakes within the situation 5 (Ghana)

- Upland rice is accounted among the annual module and not in the rice module.

- Only the mineral fertilizers are accounted in the input module, manure is accounted in every annual system.

Other precisions

Fuel consumption associated with inputs transportation is already embodied in input module, thus it should not be accounted in the investment module.