CLEAN DEVELOPMENT MECHANISM
PROPOSED NEW METHODOLOGY: MONITORING (CDM-NMM)
Version 01 - in effect as of: 1 July 2004

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SECTION A. Identification of methodology

A.1. Title of the proposed methodology:

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Production of biodiesel from perennial non-edible oil crops for use as fuel

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A.2. List of category(ies) of project activity to which the methodology may apply:

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Scope 1: Energy industries (renewable/ non-renewable sources)

A.3. Conditions under which the methodology is applicable to CDM project activities:

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This monitoring methodology is to be used in conjunction with approved baseline methodology on *Production of biodiesel from perennial non-edible oil crops for use as fuel*. Project activities must comply with all applicability conditions specified in that methodology.

A.4. What are the potential strengths and weaknesses of this proposed new methodology?

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Strengths: The methodology ensures medium to high accuracy of the calculated emission reductions while keeping transaction costs related to monitoring at a reasonable level.

The main weakness of the methodology is that the uncertainty level of the parameters required for project-specific determination of leakage related to enhanced N cycles ("Net Crop Leakage") is relatively high. This is due to the inherent complexity of N cycles and associated N_2O emissions, and cannot be overcome without increasing the cost of monitoring to a level which would make this project type non-viable for CDM. However, the methodology minimizes the risk of systematic bias in such leakage monitoring by requiring standardized monitoring procedures for the relevant parameters.

SECTION B. Proposed new monitoring methodology

B.1. Brief description of the new methodology:

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Monitoring covers the following main parameters:

- Project activity emissions: amount of fuel and electricity consumed in the biodiesel plant; amount and type of alcohols consumed for esterification.
- Baseline emissions: Biodiesel supplied to consumers, and parameters required to calculate substitution ratio ("efficiency multiplier") of baseline fuel per unit biodiesel;
- Leakage:
  * Amount of methanol consumed;
  * If the net crop leakage is quantified using the default approach: mix of oil processed (by crop type), to calculate whether average standard N input is below the threshold value which determines eligibility for the default approach;
  * If net crop leakage is quantified using the project-specific approach: Average oil yields and N inputs per hectare for each processed crop.

The monitoring of leakage parameters under the project-specific approach is limited to a representative sample of farmers for each crop. A sample is representative if the uncertainty of the resulting leakage does not exceed a specified level, or if the costs related to monitoring and verification of the same parameters reaches a specified percentage of the CER revenue accruing to the project. This limitation of leakage monitoring to a sample is necessary due to the complexity of N cycles, and due to the large number of farmers supplying the biodiesel plant (often several thousand farmers for a medium sized plant).

Note: Compliance with the applicability conditions is an integral part of the monitoring throughout the crediting period (e.g., blending proportions of biodiesel supplied to unidentified consumers). The applicability conditions are not listed in the tables of monitoring parameters below to avoid redundancy.

B.2. Option 1: Monitoring of the emissions in the project scenario and the baseline scenario:

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B.2.1. Data to be collected or used in order to monitor emissions from the project activity, and how this data will be archived:

ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
2.1.1	$M_{P\_fuel\_expel\_i\_y}$ *Fuel consumption for on-site expeller*	*Plant records (purchase*	*t*	*m*	*annually*	*100%*	*E* Data needs to be kept until	*Fuel purchase data must be adjusted for stock changes. Index i denotes different fuels.*

		data)					two years after end of the crediting period.	
2.1.2	$M_{P\_fuel\_other\_i\_y}$ *Fuel consumption other than for on-site expeller*	*Plant records (purchase data)*	*t*	*m*	*annually*	*100%*	*E* Data needs to be kept until two years after end of the crediting period.	*Fuel purchase data must be adjusted for stock changes. Index i denotes different fuels.*
2.1.3	EF_i *Carbon content of fuel*	*Fuel supplier or default values*	*t C /t fuel*	*e*	*Once for each fuel i*	*0%*	*E* Data needs to be kept until two years after end of the crediting period.	*Default values may be derived from IPCC data,[1] or from national statistics, if available.*
2.1.4	$Q_{P\_elec\_expel\_y}$ *Electricity consumption for expeller*	*Plant records (electricity meter)*	*MWh*	*m*	*annually*	*100%*	*E* Data needs to be kept until two years after end of the crediting period.	--
2.15	$M_{Oil\_ester\_y}$ *Amount of oil esterified*	*Plant records*	*t*	*m or c*	*annually*	*100%*	*E* Data needs to be kept until two years after end of the crediting period.	*This is the sum of oil purchased and oil expelled on site, adjusted for oil stock changes. May be calculated from biodiesel output* $M_{BD\_i\_y}$
2.16	$M_{Oil\_purchase\_y}$ *Amount of oil purchased*	*Plant records (purchase*	*t*	*m*	*annually*	*100%*	*E* Data needs to be kept until	--

[1] See IPCC 1996 Revised Guidelines for National Greenhouse Gas Inventories, Reference Manual, p.1.13

		data)					two years after end of the crediting period.	
2.1.7	$M_{Oil\_expel\_y}$ *Amount of oil expelled on-site*	*Plant records*	*t*	*m or c*	*annually*	*100%*	*E* Data needs to be kept until two years after end of the crediting period.	*Measured by weighing, or calculated as the difference of* $M_{Oil\_ester\_y}$ *and* $M_{Oil\_purchase\_y}$
2.18	$Q_{P\_elec\_other\_y}$ *Electricity consumption other than for expeller*	*Plant records (electricity meter)*	*MWh*	*m*	*annually*	*100%*	*E* Data needs to be kept until two years after end of the crediting period.	--
2.1.9	EF_{Elec} *Emission factor for grid electricity*	*Grid supplier data*	*t* CO_2*/MWh*	*c*	*Once or annually*	*100%*	*E* Data needs to be kept until two years after end of the crediting period.	*Determined in accordance with ACM002 or AMS 1.D*
2.1.10	$M_{Alc\_i\_y}$ *Alcohol consumed*	*Plant record (purchase data)*	*t*	*m*	*annually*	*100%*	*E* Data needs to be kept until two years after end of the crediting period.	*Index i denotes different types of alcohol.* *Adjust for stock changes.*
2.1.11	EF_{Alc_i} *Fossil carbon content of alcohol*	*Supplier data*	*t C/t*	*c*	*annually*	*100%*	*E* Data needs to be kept until two years after end of the crediting	*Note conditions specified in the baseline methodology that need to be fulfilled for alcohol C to qualify as renewable.*

							period.	

B.2.2. Description of formulae used to estimate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

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Project activity emissions include three components: CO_2 from consumption of fuels and electricity in the biodiesel plant, and CO_2 emissions from combustion of fossil carbon contained in the alcohols which is chemically bound in the biodiesel during the esterification process, and released upon combustion. The remaining CO_2 emissions resulting from the combustion of the biodiesel are considered climate-neutral.

(1) $$E_{P\_y} = E_{P\_fuel\_y} + E_{P\_elec\_y} + E_{P\_alc\_y}$$

where:

E_{P_y} *Project activity emissions in year y (t CO_2)*
$E_{P\_fuel\_y}$ *Emissions from combustion of fuels in the biodiesel plant (t CO_2)*
$E_{P\_elec\_y}$ *Emissions from electricity consumption in the biodiesel plant (t CO_2)*
$E_{P\_alc\_y}$ *Emissions from combustion of fossil carbon contained in biodiesel ester alcohols (t CO_2)*

(2) $$E_{P\_fuel\_y} = \sum_i (M_{P\_fuel\_expel\_i\_y} \cdot \frac{M_{Oil\_ester\_y}}{M_{Oil\_expel\_y}} + M_{P\_fuel\_other\_i\_y}) \cdot EF_i \cdot 44/12$$

(3) $$E_{P\_elec\_y} = (Q_{p\_elec\_expel\_y} \cdot \frac{M_{Oil\_ester\_y}}{M_{Oil\_expel\_y}} + Q_{P\_elec\_other\_y}) \cdot EF_{Elec}$$

(4) $$E_{P\_alc\_y} = \sum_i M_{Alc\_i\_y} \cdot EF_{Alc\_i} \cdot 44/12$$

The emission factor EF_{Elec} shall be calculated in accordance with the latest version of the following approved methodologies:

- ACM0002 if the consumption exceeds 15 GWh /yr;
- AMS 1.D if the consumption does not exceed 15 GWh /yr.

B.2.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of greenhouse gases (GHG) within the project boundary and how such data will be collected and archived:								
ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
2.3.1	*$M_{BD\_i\_y}$ Biodiesel supplied to consumers*	*Plant records (scale / sales data)*	*t*	*m*	*annually*	*100%*	*E* Data needs to be kept until two years after end of the crediting period.	*Index i denotes different baseline fuels.*
2.3.2	*NCV_{BD} Net calorific value of biodiesel*	*Lab analysis*	*GJ /t biodiesel*	*m*	*once at project start, or when new biodiesel type is introduced*	*Representative sample*	*E* Data needs to be kept until two years after end of the crediting period.	*Determined separately for biodiesel from each different oil crop.* *A sample is representative if the uncertainty of the NCV does not exceed ±5% at 95% confidence level.*
2.3.3	*s_{BD} Specific consumption of biodiesel*	*Consumer data*	*kg biodiesel /vehicle-km*	*m*	*annually*	*100%*	*E* Data needs to be kept until two years after end of the crediting period.	*To be monitored for all vehicles operating on pure biodiesel if the baseline fuel is not petrodiesel. Derived from measured biodiesel consumption and vehicle mileage.*

B.2.4. Description of formulae used to estimate baseline emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

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Baseline emissions from displaced fossil fuels are determined for each baseline fuel i using the following equation:

$$(5) \qquad E_{BL\_y} = \sum_i M_{BD\_i\_y} \cdot efm\_m_i \cdot EF_i \cdot 44/12$$

where:

E_{BL_y} *Baseline emissions in year y (t CO_2)*
$M_{BD\_i\_y}$ *Amount of biodiesel (pure, i.e. before blending) substituting baseline fuel type i (t)*
efm_m_i *Efficiency multiplier (mass basis) for baseline fuel i vs. biodiesel (kg/kg)*
EF_i *Carbon content of baseline fuel i (t C /t fuel)*
44/12 *Molar weight ratio to convert tonnes of carbon to tonnes of CO_2*

The carbon contents of the baseline fuels EF_i should be based on either national statistics or IPCC default values.[2]

For blends of biodiesel with petrodiesel, and generally whenever the baseline fuel is petrodiesel, the efficiency multiplier efm_m_i shall be calculated based on the respective net calorific values of biodiesel and petrodiesel, as shown in Equation (6):

(6) $$efm\_m_i = \frac{NCV_{BD}}{NCV_{PD}}$$

where:

NCV_{PD} *Net calorific value of petrodiesel (GJ/t), determined from national statistics at start of project activity*

If the baseline fuel is different from petrodiesel (only allowed for pure biodiesel used as transport fuel by identified consumers), the efficiency multiplier shall be calculated based on the specific fuel consumptions in the baseline scenario and the project activity scenario, as shown in Equation (7). The specific consumption of the baseline fuel s_{BL} shall be defined at the start of the project activity, based on historic data on fuel consumption and mileage covering at least 3 years prior to the start of the project activity (or prior to the date when the respective consumer first starts using the biodiesel). The historic consumption data must be representative for the type of vehicles and traffic conditions where the biodiesel will be used. If adequate historic consumption data are not available, vehicle manufacturer data shall be used.

(7) $$efm\_m_i = \frac{s_{BL\_fuel\_i}}{s_{BD}}$$

where:

s_{BL} *Specific consumption of baseline fuel i (kg fuel /vehicle-km)*

[2] See Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Reference Manual, p.1.13

If the biodiesel plant produces different types of biodiesel (i.e. from different crops or with different alcohols), project participants shall ensure that the efficiency multipliers are representative for their production mix, or account for each type of biodiesel separately.

B.3. Option 2: Direct monitoring of emission reductions from the project activity:

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Not applicable.

B.3.1. Data to be collected or used in order to monitor emissions from the project activity, and how this data will be archived:

ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
							Data needs to be kept until two years after end of the crediting period.	
							Data needs to be kept until two years after end of the crediting period.	

B.3.2. Description of formulae used to calculate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

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B.4. Treatment of leakage in the monitoring plan:

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B.4.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project activity:								
ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
4.1.1	M_{MeOH_y} *Consumption of methanol*	*Plant records (purchase data)*	*t*	*m*	*annually*	*100%*	*E* Data needs to be kept until two years after end of the crediting period.	--
4.1.2	$M_{Oil\_ester\_i\_y}$ *Oil from crop i esterified*	*Plant records (purchase data)*	*t*	*m*	*annually*	*100%*	*E* Data needs to be kept until two years after end of the crediting period.	--
*4.1.3**	Y_{i_y} *Specific oil yield for crop i*	*Farmer records*	*t oil /ha.yr*	*m*	*annually*	*representative sample***	*E* Data needs to be kept until two years after end of the crediting period.	*Index i denotes different oil crops.*
*4.1.4**	$m_{ON\_i\_y}$ *Organic manure N applied to crop i*	*Farmer records*	*kg N /ha.yr*	*m*	*annually*	*representative sample***	*E* Data needs to be kept until two years after end of the crediting period.	*Index i denotes different oil crops. Excludes residues from the oil crop.*
*4.1.5**	$m_{SN\_i\_y}$ *Synthetic fertilizer N*	*Farmer records*	*kg N /ha.yr*	*m*	*annually*	*representative sample***	*E* Data needs to	*Index i denotes different oil crops.*

	applied to crop i						be kept until two years after end of the crediting period.	
*4.1.6**	$m_{RNEX\_i\_y}$ *Residue N from crop i exported as fertilizer*	*Farmer records*	*kg N /ha.yr*	*m*	*annually*	*representative sample***	*E* Data needs to be kept until two years after end of the crediting period.	*Index i denotes different oil crops.*
*4.1.7**	$m_{RN\_i\_y}$ *Amount of residue N that is returned to any soil*	*Farmer records*	*kg N /ha.yr*	*m*	*annually*	*representative sample***	*E* Data needs to be kept until two years after end of the crediting period.	*Index i denotes different oil crops. Excludes leaves shed by deciduous oil trees.*

* Parameter must only be monitored if Net Crop Leakage $L_{Crop\_net\_y}$ is quantified using the project-specific approach.

** Monitoring of these parameters shall cover the practices of a representative sample of farmers cultivating each oil crop i. The farmers to be included in the sample shall be notified to the verifier prior to the start of each monitoring period. The sample of farmers shall be deemed representative if the following conditions are satisfied:

(i) If the uncertainty of the average ratio $\frac{EF_{N\_i\_y}}{Y_{i\_y}}$ calculated from the sample does not exceed ±20% at 95% confidence level; OR

(ii) If an increase in the sample size does not reduce the uncertainty of that ratio any further, OR

(iii) If the aggregate cost of monitoring and verifying the leakage parameters reaches *p%* of the market value of the CERs accruing to the project activity in an average year of the crediting period. The cost limit *p* depends on the CER volume accruing to the project activity:

CER volume (t CO_2e /yr)	Cost limit p (% of CER market value)
≤ 20,000	3%
20,001 – 35,000	4%
≥ 35,000	5%

The applicable CER volume shall be derived from the PDD for the first monitoring year, and from the actual CERs issued in the previous year for all subsequent monitoring years. The CER volume shall be determined net of the 2% share of proceeds deducted for the adaptation fund. Applicable CER market price as well as the eligible monitoring and verification costs shall be agreed with the verifier.

If the sample of farmers is found not to be representative for any year of the crediting period, the sample shall be increased correspondingly in the subsequent year, and the volume of CERs issued for the non-representative year shall be adjusted retroactively based on the representative leakage parameters.

B.4.2. Description of formulae used to estimate leakage (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

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Leakage calculations cover leakage from production of methanol, and net leakage from oil crop production:

$$L_Y = L_{MeOH\_y} + L_{Crop\_net\_y} \quad (8)$$

where:

L_y *Total leakage from the project activity (t CO_2e)*

L_{MeOH_y} *Leakage from production of alcohols consumed by the biodiesel plant (t CO_2e)*

$L_{Crop\_net\_y}$ *Net leakage from production of oil crops (t CO_2e)*

$$L_{MeOH\_y} = M_{MeOH\_y} \cdot EF_{MeOH\_PC} \quad (9)$$

where:

EF_{MeOH_PC} *Precombustion emission factor for methanol production (t CO_2 /t methanol, see baseline methodology for default value)*

Net Crop Leakage – Default Approach

In the default approach, the net crop leakage is quantified as 15% of the baseline emissions E_{BL_y}:

$$L_{Crop\_net\_y} = E_{BL\_y} \cdot 0.15 \quad (10)$$

Project participants may choose to apply this default approach on the condition that they can demonstrate that the average annual total N input into the plantations of all crops processed by the biodiesel plant $N_{Crop\_average\_y}$ is unlikely to exceed the threshold value of 120 kg N per metric tonne of oil over a

period of 10 years from the date of plantation (or from the starting date of seed collection, if the oil trees already exist). Total N input includes inputs via synthetic and organic fertilisers, as well as the mass of N contained in crop residues which are returned to the plantation soils, such as deoiled seed cake and seed shells.

$$(11) \qquad N_{Crop\_average\_y} = \frac{\sum_i M_{Oil\_ester\_i\_y} \cdot N_{Crop\_i}}{M_{Oil\_ester\_y}}$$

where

$N_{Crop\_average\_y}$ *Weighted standard N input for the oil crop mix processed in year y (kg N /ha.yr)*
N_{Crop_i} *Standard N input for oil crop i (kg N /ha.yr), determined from published sources and / or expert statements*

Net Crop Leakage: Project-Specific Approach

Under this approach, project participants can quantify the net leakage from the production of their oil crops using a combination of monitored data and default values. Net crop leakage $L_{Crop\_net\_y}$ cannot be smaller than zero, i.e. no CERs can accrue for net reductions in leakage under this methodology.

$$(12) \qquad L_{Crop\_net\_y} = E_{P\_N\_y} - E_{BL\_PC\_y} \qquad L_{Crop\_net\_y} \geq 0 \ !$$

where:

$E_{P\_N\_y}$ *GHG emissions due to enhanced N-cycles in the project activity scenario (t CO_2e)*
$E_{BL\_PC\_y}$ *Precombustion emissions from production of fossil fuels in the baseline scenario (t CO_2e)*

Leakage due to enhanced N cycles is calculated for each oil crop i processed by the biodiesel plant on a per hectare basis:

$$(13) \qquad E_{P\_N\_y} = \sum_i \frac{M_{Oil\_ester\_i\_y}}{Y_{i\_y}} \cdot EF_{N\_i\_y}$$

where:

$EF_{N\_i\_y}$ *Emission factor for enhanced N cycle for crop i (t CO_2e /ha)*

The emission factor $EF_{N\_i\_y}$ is composed of three components: Fertilizer N converted to N_2O when applied to the soil, energy consumption for production of synthetic N-fertilizers, and crop residue N converted to N_2O after being returned to the soil.

(14) $$EF_{N\_i\_y} = EF_{FN\_i\_y} + EF_{FP\_i\_y} + EF_{RN\_i\_y}$$

where:

$EF_{FN\_i\_y}$ *Emission factor for N_2O emissions from fertilizer N applied to soil (t CO_2e /ha)*

$EF_{FP\_i\_y}$ *Emission factor for GHG emissions associated with N-fertilizer production (t CO_2e /ha)*

$EF_{RN\_i\_y}$ *Emission factor for N_2O emissions from crop residue N returned to soil (t CO_2e /ha)*

(15) $$EF_{FN\_i\_y} = (m_{ON\_i\_y} + m_{SN\_i\_y}) \cdot EF_1 \cdot 44/28 \cdot GWP_{N2O}$$

(16) $$EF_{FP\_i\_y} = (m_{ON\_i\_y} + m_{SN\_i\_y} - m_{RNEX\_i\_y}) \cdot EF_2$$

(17) $$EF_{RN\_i\_y} = (m_{RN\_i\_y} - m_{RNEX\_i\_y}) \cdot EF_1 \cdot 44/28 \cdot GWP_{N2O}$$

where:

EF_1 *Fraction of fertilizer N converted to N_2O-N (kg /kg; see baseline methodology for default value)*

44/28 *Molar weight ratio of N_2O and 2 x N*

GWP_{N2O} *Global warming potential of N_2O (= 310 t CO_2 /t N_2O)*

EF_2 *Upstream emissions from production of synthetic fertilizer (kg CO_2e /kg N; see baseline methodology for default value)*

(18) $$E_{BL\_PC\_y} = \sum_i M_{BD\_i\_y} \cdot efm\_m_i \cdot EF_{FF\_PC}$$

where

$EF_{FF\_PC\_y}$ *Emission factor for precombustion emissions from production of fossil fuels (see baseline methodology for default value)*

B.5. Description of formulae used to estimate emission reductions for the project activity (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

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Emission reductions are calculated from the baseline emissions, the project emissions and leakage, and adjusted for the following:

- Fraction of biodiesel which is produced from ineligible crops; and
- Fraction of biodiesel which is exported to other countries, or which does not comply with the applicability conditions (e.g., wrong blending proportion).

$$(19) \qquad ER_y = (E_{BL\_y} - E_{P\_y} - L_y) \cdot (1 - f_{BD\_iec\_y}) \cdot (1 - f_{BD\_ex\_y})$$

where:

ER_y *Emission reductions from the project activity (t CO_2)*
$f_{BD\_iec\_y}$ *Fraction of biodiesel that is produced from ineligible crops (--)*
$f_{BD\_ex\_y}$ *Fraction of biodiesel that is exported abroad (--)*

$$(20) \qquad f_{BD\_iec\_y} = \frac{\sum_i M_{BD\_iec\_i\_y}}{M_{BD\_y}}$$

where

$M_{BD\_iec\_i\_y}$ *Amount of biodiesel produced from ineligible crop i (t)*
M_{BD_y} *Total amount of biodiesel produced (t)*

$$(21) \qquad f_{BD\_ex\_y} = \frac{M_{BD\_ex\_y}}{M_{BD\_y}}$$

where:

$M_{BD\_ex\_y}$ *Total amount of biodiesel exported abroad (t)*

B.6. Assumptions used in elaborating the new methodology:

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– The cost of monitoring the leakage parameters should be capped at a level which ensures that the CDM remains a viable option for this type of project activity. The maximum cost levels specified in Section B.4.1 are proposed with a view to other transaction costs accruing to the project participants, such as: PDD, validation, registration / administration fee, adaptation levy, monitoring and verification of other (non-leakage related) parameters.

B.7. Please indicate whether quality control (QC) and quality assurance (QA) procedures are being undertaken for the items monitored:		
Data	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
2.1.1 $M_{P\_fuel\_expel\_i\_y}$	*Low*	*No specific QA/QC procedures, since small impact on total CER volume*
2.1.2 $M_{P\_fuel\_other\_i\_y}$	*Low*	*No specific QA/QC procedures, since small impact on total CER volume*
2.1.3 EF_i	*Low*	*No specific QA/QC procedures, since small impact on total CER volume*
2.1.4 $Q_{P\_elec\_expel\_y}$	*Low*	*No specific QA/QC procedures, since small impact on total CER volume*
2.1.5 $M_{Oil\_ester\_y}$	*Low*	*No specific QA/QC procedures, since small impact on total CER volume*
2.1.6 $M_{Oil\_purchase\_y}$	*Low*	*No specific QA/QC procedures, since small impact on total CER volume*
2.1.7 $M_{Oil\_expel\_y}$	*Low*	*No specific QA/QC procedures, since small impact on total CER volume*
2.1.8 $Q_{P\_elec\_other\_y}$	*Low*	*No specific QA/QC procedures, since small impact on total CER volume*
2.1.9 EF_{Elec}	*Low*	*No specific QA/QC procedures, since small impact on total CER volume*
2.1.10 $M_{Alc\_i\_y}$	*Low*	*Purchase records must cover full amount of alcohol consumed. Cross check with calculated stochiometric alcohol requirements.*
2.1.11 EF_{Alc}	*Low*	*Alcohols must meet the criteria specified in the baseline methodology to qualify as renewable (i.e.* EF_{Alc} *=0). Purchase records must be verifiable.*
2.3.1 $M_{BD\_i\_y}$	*Low*	*Sales records must cover the full amount of biodiesel. Buyers (identified consumers and retailers) must be identified. Measuring instruments must be calibrated annually by an accredited entity.*
2.3.2 NCV_{BD}	*Low*	*Laboratory undertaking the NCV analysis must be certified or accredited according to national standards. Both the sampling and analysis must be undertaken by the laboratory.*
2.3.3 s_{BD}	*Low*	*Must be monitored only for the small minority of consumers which consume pure biodiesel with a baseline fuel other than petrodiesel. Requires complete data on biodiesel consumption and mileage of the relevant vehicles.*
4.1.1 M_{MeOH_y}	*Low*	*Cross check with calculated stochiometric alcohol requirements.*
4.1.2 $M_{Oil\_ester\_i\_y}$	*Low*	*Sum of oil from all crops i must equal* $M_{Oil\_ester\_y}$*. Establish input – output balance for the plant as a whole and for each crop. Cross check measured oil volumes with volumes calculated as seed mass x average oil content of seeds, and with measured biodiesel volumes.*
4.1.3 Y_{i_y}	*Medium*	*Ensure standardized measurement of seed mass and oil content of seeds for each crop. Ensure standardized measurement of cultivation area (ha) in the monitored sample of farmers.*
4.1.4 $m_{ON\_i\_y}$	*High*	*Ensure standardized measurement of organic manure mass. Measure N content of a sample of the manure in an accredited laboratory at least once, and cross-check with published values.*

4.1.5 $m_{SN\_i\_y}$	*Medium*	*Ensure standardized monitoring of amounts and type of synthetic fertilizer applied in the farmer sample. Use manufacturer specification on N content of each fertilizer.*
4.1.6 $m_{RNEX\_i\_y}$	*High*	*Ensure standardized measurement of the exported residue mass and types of each farmer.*
4.1.7 $m_{RN\_i\_y}$	*High*	*Ensure standardized measurement of the exported residue mass of each farmer. Measure N content of a sample of each residue in an accredited laboratory at least once, and cross-check with published values.*

B.8. Has the methodology been applied successfully elsewhere and, if so, in which circumstances?

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No, the methodology has not yet been applied elsewhere.

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