JI MONITORING REPORT
(for reporting period 01.01.2008 - 31.12.2011)

Position of the head of the organization, institution, body, which prepared the document

Director of Evo Carbon Trading Services Ltd		**N.L. Egorova**
(position)	(signature) PS	(name and patronymic, last name)

Position of the economic entity – owner of the source, where the Joint Implementation Project is planned to be carried out

Director LLC "BETA-AGRO-INVEST"		**V.A. Hnennyi**
(position)	(signature) PS	(name and patronymic, last name)

MONITORING REPORT OF JI PROJECT

Monitoring period:
01/01/2008 – 31/12/2011

Version 02
26 October 2012

Reduction of CO_2 emissions by systematic utilization of No-till technologies in agricultural industry

CONTENTS

A. General project activity and monitoring information

B. Key monitoring activities

C. Quality assurance and quality control measures

D. Calculation of GHG emission reductions

E. Results of monitoring of GHG emission reductions

ANNEXES

Annex 1: “Parameters of Monitoring Plan”

Annex 2[1]: “Calculations of CO_2 emissions reduction through systematic utilization of No-till technologies at Beta-Agro-Invest LLC”

[1] Annex 2 is provided in electronic form

SECTION A. General project activity and monitoring information

A.1. Title of the Project:

Reduction of CO_2 emissions by systematic utilization of No-till technologies in agricultural industry

A.2. Information on approval and registration of the Project:

JI Project "Reduction of CO_2 emissions by systematic utilization of No-till technologies in agricultural industry" was determinated by the Bureau Veritas Certification, determination report No. UKRAINE-DET /0525/2012 from 07/06/2012.
The project received approval from Ukraine (the host country for the project) in July 2012 (Letter of Approval No. 1968/23/7, issued by the State Environmental Investment Agency of Ukraine on 24/10/2012), and also from Estonia, country participant (Letter of Approval No. № 12-1/8546-2, issued by the Ministry of the Environment of Estonia on 24/10/2012).

A.3. Brief Description of the Project:

The **purpose of the Joint Implementation (JI) Project** is to reduce anthropogenic greenhouse gas (GHG) emissions resulting from agricultural activities by changing the agricultural land management system, namely replacement of traditional soil tillage in agriculture with No-till technology.

Historical development of Beta-Agro-Invest Service LLC
In 2007, the Farm started to grow crops applying No-till technology (also referred to as "direct sowing technology"). This technology differs from the traditional technology with fewer technological procedures, which prevents the topsoil from a major disturbance, as well as with the way to utilize plant residues. The number of technological procedures of plant growing and harvesting is almost the same in the two technologies, the main difference being that the traditional technology separates fertilizer application, land ploughing, cultivation furrowing and seeding (multiple passage of the machinery in the field) in contrast to direct sowing with simultaneous fertilizer application (single passage of the machinery). The lower number of technological procedures in No-till provides for **up to 60% lower fuel consumption in internal combustion engines of tractors and other agricultural machinery.**

Prior to the project, "Beta-Agro-Invest" LLC used traditional land cultivation system. This system involves tillage that provides for turning over of topsoil to create homogeneous and mellow seedbed. The basic operation causing CO_2 emissions is ploughing during which crop residues are buried in the soil and weeds are removed.
The Project provides for reduction of GHG emissions as a result of:

- to lower carbon dioxide emissions from farmland by lower (almost zero) topsoil disturbance by tillage in the course of crops growing.

The project implies the change in crops growing technology. This includes the following measures:

- change of soil cultivation and sowing technology
- change of plant residue management
- equipping the machine-tractor fleet with high-efficiency equipment to meet the No-till technology requirements.

The Project provides for commissioning of the following equipment:

- seed drills for direct seeding;
- special tractors;
- herbicide sprayers;
- seed and fertilizer drill systems;
- combine harvesters and other machinery required by the technology.

In accordance with the collected data, the following GHG reduction was reached in the monitoring period:

Table 1. Reduction of GHG emissions during monitoring period

Monitoring period (01/01/2008 – 31/12/2011)	Baseline emissions (t CO_2 e)	Project emissions (t CO_2 e)	Emission reduction (t CO_2 e)
2008	41 719	0	41 719
2009	76 191	0	76 191
2010	108 602	0	108 602
2011	151 395	0	151 395
Total (t CO_2 e)	**377 907**	**0**	**377 907**

A.4. Monitoring period

- Beginning of monitoring period : 01/01/2008.
- End of monitoring period: 31/12/2011.

A.5. Methodology used by the Project:

A.5.1. Baseline Methodology:

Project activities are directed at reduction of GHG emissions by the fields of “Beta-Agro-Invest” LLC as a result of implementation of the new direct sawing technology.

When the project was under development, there were no approved CDM methodologies for this type of activity. Therefore, the proposed project applies a specific approach According to the “Guidance on criteria for baseline setting and monitoring”, Version 03[2], approved by the JI Supervisory Committee.

Calculation of greenhouse gas emissions due to mechanical tillage when traditional farming technology is applied:

- *2006 IPCC Guidelines for National Greenhouse Gas Inventories, Chepter 5, Vol. 4, 5.2.3. Soil Carbon (Agriculture, Forestry and Other Land Use)* [3]
  These provisions determine the type of greenhouse gas subject to control by project participants, i.e. carbon dioxide.
- *“Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities” (Version 01.1.0).*[4]

Provisions of this Tool are used for calculation of CO_2 emissions due to mechanical tillage in the course of crops production.

The scope of activities is represented by the annual scope tilled lands at “Beta-Agro-Invest” LLC.
Within the baseline, project participants control the following GHG emission sources:
- *mechanical tillage* in the course of crops growing;

Soil organic carbon (humus) oxidation that occurs due to mechanical tillage causes most GHG emissions in the project. Emissions from diesel fuel combustion by tractors and agricultural machinery are beyond the control of project participants.
The estimated GHG emission reduction due to fewer technological procedures in the project is about 1% of the total GHG emission reductions and is not included into calculations under the conservative principle.
Greenhouse gas emissions in the project are calculated based on the “Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities” (Version 01.1.0).[5]

[2] http://ji.unfccc.int/Ref/Documents/Baseline_setting_and_monitoring.pdf
[3] http://www.ipcc-nggip.iges.or.jp/public/2006gl/russian/pdf/4_Volume4/V4_05_Ch5_Cropland.pdf
[4] http://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-16-v1.1.0.pdf
[5] http://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-16-v1.1.0.pdf

The content of humus in the soil for the baseline scenario is calculated, taking into account its linear decrease over time, under the condition of the use of conventional mechanical tillage that involves ploughing.
Data on humus content in 2002-2006 for fields cultivated by baseline tillage technology, with similar crop rotation patterns were taken as historical data to establish the baseline.

A.5.2. Monitoring Methodology:

Inspection of Emission Reduction Units and Baseline Scenario
The proposed project applies a JI specific approach in accordance with the JI Guidance on criteria for baseline setting and monitoring, Version 03, of the Joint Implementation Supervisory Committee – JISC that meets the requirements of Resolution 9/CMP.1., Annex B Criteria for choosing the baseline and monitoring.
Monitoring plan for this project was developed on the grounds of monitoring the content of soil organic carbon in case of using both the traditional tillage and the direct sowing technology.

The key variables subject to monitoring are: the content of humus (organic carbon) in the soil of the field cultivated using No-till technology; area of the field cultivated using No-till technology.

Indicator of the Project's implementation
The most objective and cumulative factor that provides a clear picture of whether the emission reduction is change of humus content in agricultural soils.

Inspection of Project performance indicators
"Beta-Agro-Invest" LLC collects and stores the "Beta-Agro-Invest" LLC data on the area of the field cultivated using No-till technology, and the data of agrochemical inspections conducted in the fields in order to determine humus content. Information on the area of fields and the content of humus shall be included into the monitoring reports with all the relevant documentation
The described monitoring approach clearly demonstrates that:

1) data and parameters that are not monitored during the whole crediting period, but are established only once and are accessible at the stage of PDD development include:

$k_{b,i,y}$	humus content in the soil of field *i* cultivated using traditional tillage in period *y*, %
ρ_i	soil density at field *i* cultivated using traditional tillage before the start of the project, t/m^3
$h_{b,i}$	Depth of soil layer disturbance at field *i* when conventional tillage is applied, м

2) data and parameters that are not monitored during the whole crediting period, but are established only once and are not accessible at the stage of PDD development: N/A.

3) data and parameters controlled during the whole period of crediting:

$S_{p,i}$	area of field *i* cultivated using No-till technology, ha;
$k_{p,i,y}$	Humus content in the soil of field *i* cultivated using No-till technology in period *y*,%

A.6. Status of implementation including principle stages of the Project:

The date on which the first emission reduction units were generated, namely 01/01/2008, was taken as the starting date of the crediting period. The end date of the crediting period is 31 December 2012. Thus, the length of the crediting period is 5 years/ 60 months.

The status of the project's implementation during the reporting period 01/01/2008 – 31/12/2011, including its principal stages and the schedule of implementation, is provided in Table 2 and Table 3 of this Monitoring report.

Table 2. Status of implementation of the area of project lands of "Beta-Agro-Invest" LLC

Years	Area	
	ha	share in the total farmlands of the Farm, %
2008	13350,70	65,7
2009	17838,30	87,8
2010	19554,00	96,27
2011	20311,15	100

Table 3. Schedule of the JI project implementation at "Beta-Agro-Invest"

	Ha by Farms					
Years	**Oksamyt**	**Novoselivka**	**Novokalynove**	**Rozivka**	**Pravdivka**	**Vozdvyzhenka**
2008	4600	2586,9	3993,8	2088	82	-
2009	4651	4169	4694,3	2611	243	1470
2010	5025	4350,6	5214,4	2710	705	1549
2011	5120	4654,60	5397,55	2885	705	1549

Project implementation is performed in accordance with the Project plan provided in PDD Version 03 that underwent determination.

A.7. Possible deviations or revisions of the registered version of PDD:

Deviations or changes of the registered PDD are not applicable.

A.8. Possible deviations or revisions of the registered monitoring plan:

Deviations or changes or the registered plan of monitoring are not applicable.

A.9. Persons responsible for the preparation and submission of monitoring report:

"Beta-Agro-Invest" LLC
Donetsk region, Ukraine
Ocheretyne urban-type settlement, Yasynuvatskyi district
Vitalii Anatoliiovych Hnennyi, Director
Telephone: (+38 06247) 21646
Fax: (+38 06247) 21646
"Beta-Agro-Invest" LLC is a project participant.

EVO CARBON TRADING SERVICES LTD
869 High Road, London, United Kingdom, N12 8QA
Natalia Egorova
Telephone: +447500828771
E-mail: negorova@evocarbontrading.co.uk

CEP Carbon Emissions Partners S.A.
52 RoutedeThonon, Geneva, Casepostale 170 CH-1222 Vésenaz, Switzerland
Fabian Knodel
Telephone: +41 (76) 3461157
E-mail: 0709bp@gmail.com

SECTION B. Key monitoring activities

The key variables that are subject to monitoring are the content of humus (organic carbon) in the soil cultivated using No-till technology, and area cultivated by No-till technology. Other parameters are obtained through calculations or from the statistical data.

Humus content

Humus (organic carbon) content of the soil cultivated using No-till technology are measured annually after the September harvesting by Biotekhnika Engineering Institute, which is subject to certification in accordance with the state standards of Ukraine (certificate #RO -083/2012).

Area of field

To establish area of field, data from the Land Inventory are applied. If the area of the field cultivated in the corresponding year changes, the field areas are measured by agro-technicians and verified by accountants of “Beta-Agro-Invest” LLC using GPS equipment installed in John Deere agricultural machinery used by “Beta-Agro-Invest” LLC.

Soil density

Soil density in fields where No-till technology was implemented was determined by by Biotekhnika Engineering Institute once, prior to the beginning of project technology implementation. Soil density was determined using standard bottle method by by Biotekhnika Engineering Institute engineers.

B.1. Types of measurement equipment:

To conduct measurement of humus content in accordance with state standards of Ukraine 4289:2004 “Soil quality. Methods for determining organic matter” the following equipment shall be used:

1. Photoelectric colorimeter (Fig. 1)

Fig. 1 Photoelectric Colorimeter

Photoelectric colorimeter type KFK-2, allowed value limit of fundamental absolute error of colorimeter while measuring the transmission coefficient Δ = ± 1 %T. Spectral range from 315 to 980 nm.

2. Torsional Weighting Machine WT-2 (Fig. 2)

Fig. 2 Torsional Weighting Machine

Produced in Poland. Measurement error does not exceed 1 mg.

3. Ashless filters

Fig. 3 Ashless filters

Other equipment and the necessary chemical reagents are on the balance sheet of Biotekhnika Engineering Institute Laboratory.

GPS equipment is used to measure area of the fields:
To measure project areas, GPS GreenStar2 System is installed on each “Beta-Agro-Invest” tractor. This system provides for determination of the area of each field and more effective usage of the time spent in the field.

GPS System includes the principle devices as follows.

1. StarFire iTC is the receiver that helps to locate machinery and is compatible with signals of all satellites used in our days. The receiver has built-in module for location adjustment of terrain conditions and adjusts all the positions based on signals of the satellite taking into account the irregularities of soil and skew surfaces. It uses RTK signals with proximity of ±2 cm from passage to passage.

Fig. 4 Receiver StarFire iTC

2. Display of GreenStar2 System reflects all activities in the field. The installed software, GreenStar Basics, provides for manual navigation, and also the screen display of field maps and for the data saving option.

Fig. 5 GreenStar2 Display

B.1.2. Calibration procedure:

In accordance with the effective Law of Ukraine "On the Metrology and Metrology Activities"[6], all measuring devices in Ukraine should comply with the mentioned standards and undergo the periodic calibrating procedures.

Calibration of all the necessary devices for determination of the level of humus contents shall be performed by Odessa Regional Center for Standardization and Metrology state enterprise on the annual basis.

The equipment for determination of area of the field does not require calibration. All GPS equipment is being supervised by the service managers of "Beta-Agro-Invest" LLC.

B.1.3. Invitation of the third parties:

Odessa Regional Center for Standardization and Metrology state enterprise performs calibration of all devices for measuring the level of humus.

If necessary, John Deere[7] experts shall be invited to regulation and necessary adjustments of GreenStar2 system.

B.2. Data collection (reconciled data for the whole period of monitoring):

The data that was used for the calculation of emission reductions are provided in the Table of Section B.2.1 (List of stable, variable and predetermined values) in Annex 1 "Monitoring Plan Parameters" and Annex 2 "Calculations of reduction of tCO_2e emissions as a result of implementation of No-till technology" at "Beta-Agro-Invest" LLC to this monitoring report.

All parameters required for the calculation of emission reductions are provided in Tables of Section B.2.1 of this Monitoring Report.

B.2.1. List of stable, variable and predetermined values:

Table 4. List of stable, variable and predetermined values

№	Symbol	Parameter	Measuring unit	Measured (m), calculated (c), or evaluated (e)	Comments
1	$S_{p,i}$	area of field *i* cultivated	ha	m	2007-2011 Field Registry

[6] http://zakon.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=1765-15
[7] http://www.deere.ua/wps/dcom/uk_UA/regional_home.page

		using No-till technology			of the Farm
2	$k_{p,i,y}$	humus content in the soil of field *i* cultivated using No-till technology in period *y*	%	m	Protocols of measurements of soil quality indicators
3	$k_{b,i,y}$	humus content in the soil of field *i* cultivated using traditional tillage in period *y*	%	c	Calculated using data defined for every field *i* prior to the start of the project
4	ρ_i	soil density at field *i* cultivated using traditional tillage before the start of the project	t/m^3	m	Protocols of measurements of soil quality indicators
5	$h_{b,i}$	depth of soil layer disturbance at field i when conventional tillage is applied	m	m	Prior to the start of the project activity

B.2.2. Data on GHG emissions by the sources of Project's activities:

Project emissions are not applicable.

B.2.3. Data on GHG emissions by the sources of baseline scenario:

Table 5. Parameters related to GHG emissions by the sources of baseline scenario

	Symbol	Parameter	Measuring unit	Measured (m), calculated (c), or evaluated (e)
1	$S_{p,i}$	area of field *i* cultivated using No-till technology	ha	m
2	$k_{p,i,y}$	humus content in the soil of field *i* cultivated using No-till technology in period *y*	%	m
3	$k_{b,i,y}$	humus content in the soil of field *i* cultivated using traditional tillage in period *y*	%	c
4	ρ_i	soil density at field *i* cultivated using traditional tillage before the start of the project	t/m^3	m
5	$h_{b,i}$	depth of soil layer disturbance at field i when conventional tillage is applied	m	m

B.2.4. Data on the leaks:

Leaks are not applicable

B.2.5. Data on environmental and social influences:

According to the law of Ukraine "On Environmental Protection"[8] and DBN A.2.2-1-2003 «Composition and content of the materials of environment impact assessment (EIA) for design and construction of

[8] http://zakon.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=1264-12

plants, buildings and structures»[9], "Beta-Agro-Invest" LLC is not obliged to carry out EIA development for this type of project.

In general, the project will have positive impact on the environment because the replacement of conventional tillage with No-till technology will result in lower GHG emissions into the atmosphere and lower diesel fuel consumption for "Beta-Agro-Invest" LLC farmland cultivation.

Transboundary impacts due to the project activity according to their definition in the text of "Convention on transboundary long-range pollution", ratified by Ukraine, will not take place.

Impact on water medium
The impact on water medium is absent.

Impact on air environment
Permanent, insignificant. Harmful emissions from technological equipment during the implementation of No-till technology. Since the number of technological procedures associated with diesel fuel combustion will decrease, greenhouse gas emissions will shrink. In addition, the implementation of No-till technology will reduce carbon dioxide emissions from humus decomposition (oxidation).

Impact on land use
The project will have a positive impact on land use, increasing humus content in the soil. Soil rich in humus brings better yields of crops which are more resistant to diseases and harmful environmental factors and provide better quality of products.

B.3. Data processing and archiving:

All the data is processed and archived in electronic or (and) in paper form.

B.4. Extraordinary situation and technological violations:

In the course of four years no extraordinary situations have occurred at "Beta-Agro-Invest" LLC (from 1 January 2008 up to and including 31 December 2011).

B.5. Procedures for identification and elimination of break-ups at "Beta-Agro-Invest" LLC:

Upon discovering the break-up, tractor driver informs the master of "Beta-Agro-Invest" LLC. Should it be impossible to repair the break-up at the same time (due to absence of the necessary parts, engine failure, etc.), the Commission shall be created consisting of the representatives of technical department, chief engineer, and senior engineers. Accordingly, defect of failure protocol shall be generated based on the type of failure; the protocol shall afterward be transferred to the department of "Beta-Agro-Invest" LLC; equipment repairs shall be performed.

B.6. Level of error of measuring equipment:

The level of error should be established for each type of measuring equipment. In majority if cases this level is low. Deviation of devices for determination of humus content complies with the standards of Ukraine. All the equipment for determination of humus content corresponds with DSTU 4289:2004 "Soil quality. Methods of determination of organics".

[9] http://www.budinfo.com.ua/dbn/8.htm

Section C. Measures of ensuring quality control and quality guarantees

C.1. Documented procedures and structure of governance

C.1.1. Functions and obligations

To implement the project the operational structure was created; it includes LLC "Beta-Agro-Invest" agrotechnicians and engineers (responsible for accounting of area treated with No-till technology), the Biotekhnika Engineering Institute (responsible for provision of agrochemical data for project monitoring), LLC "Beta-Agro-Invest" chief agrotechnician (recording and reporting data in the table), and LLC "Beta-Agro-Invest" manager (data processing and archiving). The data subject to monitoring and required for the determination and further verification will be archived and stored in paper and electronic form at LLC "Beta-Agro-Invest» for two years after the transfer of emission reduction units generated by the project.
The structure of monitoring data collection is presented as follows:

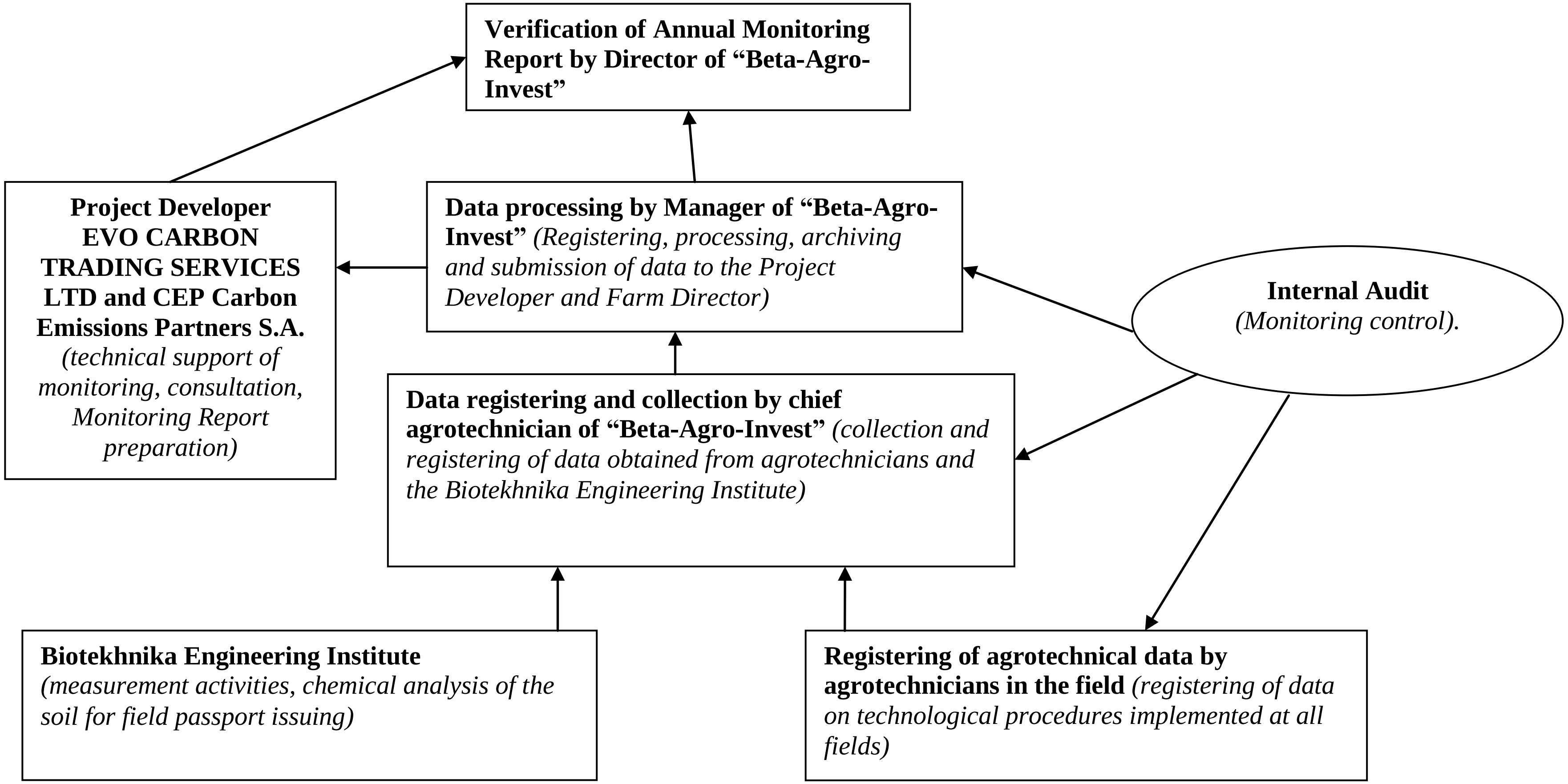

Fig. 6. Operational structure and data collection scheme for project monitoring

C.1.2. Trainings:

Given the fact that the principal activity of "Beta-Agro-Invest" LLC did not change after joint implementation of the Project, the special technical trainings for the technical personnel of the enterprises are not required. The technical personnel of the enterprise have respective knowledge and experience for project implementation and equipment repairs.

In case of installation of the new equipment (that was never operated by the enterprise before) the manufacturing company should conduct training for personnel. In the course of monitoring period the equipment was installed that would require the specialized training of the personnel.

"Beta-Agro-Invest" LLC conducts re-training of the personnel in accordance with Labor protection norms. Labor protection unit at the enterprise is responsible for improvement of the qualification of personnel and for trainings.

C.2. Stakeholders' comments:

LLC "Beta-Agro-Invest" informed the community through mass media. All comments received were positive.

No negative comments on the project have been reported.

C.3. External audit and methods of control:

Measurement devices used for monitoring are subject to annual state calibration. Calibration of all the necessary devices for establishment of humus level is conducted by Odessa Regional Center for Standardization and Metrology state enterprise on the annual basis.

If necessary, John Deere[10] experts shall be invited to regulation and necessary adjustments of GreenStar2 system.

Personnel of "Beta-Agro-Invest" LLC shall be subject to periodical inspection of the knowledge of the following norms:

- data collection in compliance with monitoring report (the procedure of data collection for monitoring purposes corresponds with the regular practice of data collection);
- labor protection;
- labor safety.

Each quarter the developers of CEP Carbon Emissions Partners S.A. and EVO CARBON TRADING SERVICES LTD project conducts internal audit at "Beta-Agro-Invest" LLC.

The plan of internal audit of "Beta-Agro-Invest" LLC includes the following measures:

1. Audit of areas of fields on which No-till technology is implemented;
2. Humus level measurements audit;
3. Audit of the terms of calibration of devices for humus level measurement;
4. Inspection of the terms of calibration of devices for humus level measurement.

[10] http://www.deere.ua/wps/dcom/uk_UA/regional_home.page

SECTION D. Calculations of GHG emission reductions

This section documents the formulae used for calculation of project emissions, baseline emissions, and general reductions of emissions as provided below.

D.1.1. Project emissions:

Greenhouse gas emission under the Project scenario: none.

$$PE_y = 0 \quad (1)$$

where

PE_y – project GHG emissions in period y, tCO_2e;

[y] – monitoring period.

D.1.2. Baseline emissions:

GHG emissions in the Baseline scenario:

GHG emissions in the baseline scenario in the period y are calculated according to the following formula**:**

$$BE_y = BE_{A,y} \quad (2)$$

where

BE_y – baseline GHG emissions in period y, tCO_2e;

$BE_{A,y}$ – baseline GHG emissions due to baseline land cultivation technology, in period y, tCO_2e;

[y] – monitoring period;

[A] – baseline land cultivation technology.

Baseline emissions due to application of baseline land cultivation technology can be calculated as follows:

$$BE_{A,y} = \sum BE_{A,i,y} \quad (3)$$

where

$BE_{A,y}$ – baseline GHG emissions due to baseline land cultivation technology, in period y, tCO_2e;

$BE_{A,i,y}$ – baseline GHG emissions due to baseline land cultivation technology, in period y, tCO_2e;

[y] – monitoring period;

[A] – baseline land cultivation technology;

[i] – number of fields.

Baseline GHG emissions due to baseline land cultivation technology, which involves tillage, for field *i* are calculated using the formula, according to the “Tool for estimation of change in soil organic carbon stocks due to the implementation of A/R CDM project activities” (Version 01.1.0)[11]:

$$BE_{A,i,y} = 0{,}9 \times S_{p,i} \times (SOC_{p,y,i} - SOC_{b,y,i}) \times \frac{44}{12}, \quad (4)$$

where

$BE_{A,i,y}$ – baseline GHG emissions due to baseline land cultivation technology, in period y, tCO_2e;

$S_{p,i}$ –area of field *i* cultivated using No-till technology, ha;

$SOC_{p,y,i}$ – soil organic carbon content in the soil of field *i* cultivated using No-till technology in period *y*, t C/ha;

$SOC_{b,y,i}$ – soil organic carbon content in the soil of field i cultivated using traditional tillage technology in period y, t C/ha;

44/12 – CO_2 to C molecular masses ratio;

0.9 – factor that takes account of 10% of emissions from the project activity, which includes creation of anti-fire furrows and minimal topsoil disturbance when No-till technology is implemented;

[11] http://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-16-v1.1.0.pdf

[y] – monitoring period;
[b] – baseline technology;
[p] – project technology;
[A] – baseline tillage technology;
[i] – number of fields.

Soil organic carbon content in soil of field *i* cultivated using No-till technology is calculated by the following formula:

$$SOC_{p,y,i} = h_{b,i} \times \rho_i \times k_{p,i,y} \div 1.724 \times 10000 \div 100\% \qquad (5)$$

where
$SOC_{p,y,i}$ – soil organic carbon content in the soil of field i cultivated using No-till technology in period y, t C/ha;
$h_{b,i}$ – depth of soil disturbance in field *i* cultivated using traditional tillage, m;
ρ_i– pre-project soil density in field *i*, cultivated using traditional tillage in period *y*, t/m^3;
$k_{p,i,y}$ – humus content in the soil of field *i* cultivated using No-till technology in period *y*, %;
1,724 – organic carbon to humus conversion coefficient (according to GOST 23740*)
10000 – m^2 to ha conversion coefficient;
[y] – monitoring period;
[b] – baseline emissions;
[p] – project emissions;
[i] – system of number of fields.

Soil organic carbon content in soil of field i cultivated using No-till technology is calculated by the following formula:

$$SOC_{b,y,i} = h_{b,i} \times \rho_i \times k_{b,i,y} \div 1{,}724 \times 10000 \div 100\%, \qquad (6)$$

where
$SOC_{b,y,i}$ – soil organic carbon content in the soil of field *i* cultivated using traditional tillage technology in period *y*, t C/ha;
$h_{b,i}$ – depth of soil disturbance of field *i* cultivated using traditional tillage, m;
ρ_i – soil density in field *i*, cultivated using traditional tillage, in period *y*, t/m^3;
$k_{b,i,y}$ – humus content in the soil of field *i* cultivated using traditional tillage in period *y*, %;
1,724 – organic carbon to humus conversion coefficient (according to GOST 23740*[12])
10000 – m^2 to ha conversion coefficient;
[b] – baseline emissions;
[y] – monitoring period;
[i] – system of number of fields.

The content of humus in the soil in the baseline scenario is calculated using historical data over a five-year period. Linear dependence proved to be the most reliable (100%) of them all. It provides for the extrapolation of humus content to years of the project life. As a result of linear approximation, the dependence is as follows (extrapolation is performed for each field individually):

$$k_{b,i,y} = a \cdot y + b, \qquad (7)$$

Coefficients a, b (see Annex No. 2) are determined using Microsoft Excel features by building a trend line on the basis of historical data over the 5 years prior to the project. The linear dependence has the lowest function error.
where
$k_{b,i,y}$ – humus content in the soil of field *i* in period *y* cultivated using traditional tillage, %;
a – coefficient of linear dependence;
b - coefficient of linear dependence;
y – monitoring period;
[b] – baseline emissions;
[i] – number of fields;

[12] http://www.complexdoc.ru/text/%D0%93%D0%9E%D0%A1%D0%A2%2023740-79

[y] – monitoring period.

D.1.3. GHG emission reductions:

General reduction of emissions is the difference between baseline emissions and project emissions. Emission reductions resulting from the project activity are calculated using the following formula:

$$ER_y = BE_y - PE_y \qquad (8)$$

where

ER_y - GHG emission reductions due to the project activity in period *y*, t CO_2e;

BE_y - baseline GHG emissions in period *y*, t CO_2e;

PE_y - project GHG emissions in period *y*, t CO_2e.

[y] – monitoring period

D.1.4. Leaks:

There are no Project-related leaks.

SECTION E. Results of the GHG emission monitoring

E.1. Project GHG emissions

Project emissions are absent.

E.2. Leaks

There are no Project-related leaks.

E.3. Baseline GHG emissions

Calculations of baseline emissions are made in Annex No. 2, the supporting document in Excel format in accordance with the formulae provided in section D.2 of the Monitoring Report. The results of the calculations of baseline GHG emissions in the reporting period are presented in Table 6:

Table 6. Baseline emissions for the period of 1 January 2008 to 31 December 2011

Years	Baseline emissions (t CO_2 e)
2008	41 719
2009	76 191
2010	108 602
2011	151 395
General baseline emissions in the course of crediting period of 2008-2011 (tons equivalent of CO_2e)	**377 907**

E.4. Reduction of emissions as a result of project implementation during the period of monitoring

Reduction of emissions as a result of project implementation shall be calculated as the difference between baseline and project emissions. Calculations of emission reductions were made in Annex No.2, the supporting document in Excel format in accordance with the formulae provided in section D.3 of the Monitoring Report. As a result of implementing project measures emissions were reduced as follows:

Table 7. Results of calculation of emission reductions for the period of 1 January 2008 – 31 December 2011.

Year	Project emissions (t CO_2 e)	Estimated leakage (t CO_2 e)	Baseline emissions (t CO_2 e)	Emission reduction (t CO_2 e)
2008	0	0	41 719	41 719
2009	0	0	76 191	76 191
2010	0	0	108 602	108 602
2011	0	0	151 395	151 395
Total (t CO_2 e)	**0**	**0**	**377 907**	**377 907**

The actual amount of emission reductions is slightly different from the values as provided in PDD. This is explained by the fact that as of the instance of writing PDD it was impossible to receive the exact data necessary for the calculations of GHG emission reductions. To calculate GHG for the monitoring period, all the necessary information was provided that made it possible to establish the volume of emissions under baseline and project scenarios.

Annex 1 – Monitoring Plan Parameters

Data in this Annex is provided in accordance with parameters of Monitoring Plan.

Data/ Parameter (according to Monitoring Plan)	$S_{p,i}$
Data unit	ha
Description	Area of field *i* cultivated using No-till technology
Value in the monitoring period	See Annex 2 «Calculation of tCO_2e emissions reductions as a result of implementing No-till technology by "Beta-Agro-Invest" LLC
Method of monitoring	Data from the Land Inventory are applied. If the area of the field cultivated in the corresponding year changes, the actual area is measured using GPS equipment.
Frequency of entries	Annually
Supporting documents	The Main Administration of the State Land Committee in Donetsk region conducts relevant area verification once a year
Method of calculation	N/A
Comments	Annex 2 provides the detailed information on the project areas.

Data/ Parameter (according to Monitoring Plan)	$k_{p,i,y}$
Data unit	%
Description	Humus content in the soil of field *i* cultivated using No-till technology in period *y*
Value in the period of monitoring	See Annex 2 «Calculation of tCO_2e emissions reductions as a result of implementing No-till technology by "Beta-Agro-Invest" LLC
Method of monitoring	Biotekhnika Engineering Institute determines the value of humus content in soil according to the State Standard of Ukraine 4289:2004 and fills in field passports with these data
Frequency of entries	Annually
Supporting documents	Protocols for measuring soil quality indicators
Method of calculation	N/A
Comments	The detailed information on the contents of humus of "Beta-Agro-Invest" LLC farm fields is provided in Annex 2.

Data/ Parameter (according to Monitoring Plan)	ρ_i
Data unit	t/m^3
Description	Soil density at field *i* cultivated using traditional tillage before the start of the project
Value in the period of monitoring	See Annex 2 «Calculation of tCO_2e emissions reductions as a result of implementing No-till technology by "Beta-Agro-Invest" LLC
Method of monitoring	Biotekhnika Engineering Institute determines soil density and fills in protocols of measuring with this data
Frequency of entries	Defined for every field *i* prior to the start of the project
Supporting documents	Protocols of measuring the indicators of soil quality
Method of calculation	N/A
Comments	The detailed information on the density of soil of "Beta-Agro-Invest" LLC farm fields is provided in Annex 2.

Data/ Parameter (according to Monitoring Plan)	$k_{b,i,y}$
Data unit	%
Description	Humus content in the soil of field *i* cultivated using traditional tillage in period *y*
Value in the period of monitoring	See Annex 2 «Calculation of tCO_2e emissions reductions as a result of implementing No-till technology by "Beta-Agro-Invest" LLC
Method of monitoring	Historical data for the 5 years prior to the start of the project (provided in Annexe 2) are obtained from the Biotekhnika Engineering Institute authorized to conduct measurements according to the state standards of Ukraine.
Frequency of entries	Calculated based on the data established per each field *"i"*, prior to the Project's beginning
Supporting documents	Protocols of measuring the indicators of soil quality
Method of calculation	Humus content in the soil for the baseline scenario is calculated taking into account its linear decrease over the time where traditional tillage is applied. This linear dependence is based on historical data using the least square method.
Comments	N/A

Data/ Parameter (according to Monitoring Plan)	$h_{b,i}$
Data unit	m
Description	Depth of soil layer disturbance at field *i* when conventional tillage is applied
Value in the period of monitoring	Company data; ploughing depth is a fixed value (for each crops) for traditional land cultivation.
Method of monitoring	See Annex 2 «Calculation of tCO_2e emissions reductions as a result of implementing No-till technology by "Beta-Agro-Invest" LLC
Frequency of entries	Prior to the start of the project activity
Supporting documents	Company data
Method of calculation	N/A
Comments	N/A