



**CLEAN DEVELOPMENT MECHANISM  
SMALL-SCALE PROGRAMME OF ACTIVITIES DESIGN DOCUMENT FORM  
(CDM-SSC-PoA-DD) Version 01**

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NOTE:

- (i) This form is for the submission of a CDM PoA whose CPAs apply a small scale approved methodology.
- (ii) At the time of requesting registration this form must be accompanied by a CDM-SSC-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-SSC-CPA-DD (using a real case).



**SECTION A. General description of small-scale programme of activities (PoA)**

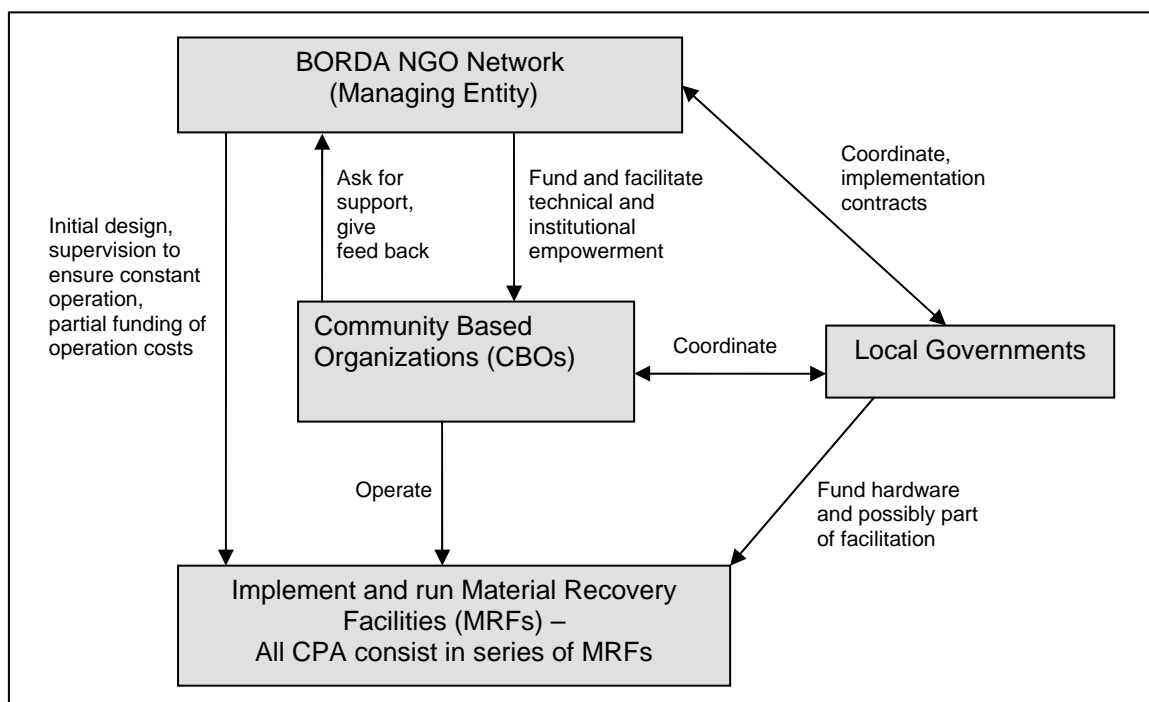
**A.1 Title of the small-scale programme of activities (PoA):**

KIPRAH community based integrated waste management project, Indonesia

**A.2. Description of the small-scale programme of activities (PoA):**

>> *The following information shall be included here:*

1. General operating and implementing framework of PoA



**Figure 1:** The general operating and implementing framework of PoA

The BORDA NGO Network (BNN) enables the communities seeking to solve their waste problems to build and operate small community based composting facilities (called MRFs = Material Recovery Facilities) where household waste is separated, recycled and the organic component is aerobically composted.

The BNN uses carbon funding under this PoA for the community facilitation by forming CPAs consisting in several MRFs.

Once a community decides to tackle its waste problem through the installation of an MRF the BNN starts to provide the required competence for community facilitation (capacity building, training of the community and workers) and guides the community through the entire CDM process. The community facilitation is a long and demanding process, which is crucial to the later success of the project. Together with a community development expert (CDE) and a community facilitator provided through the BNN the community starts negotiation with the local government.

All three parties agree on a community action plan (CAP) where the following criteria are met:



- Land available for MRF
- Community demand expressed in formal letter of intention
- Community willingness to adopt KIPRAH system by an arrangement to pay waste collection fees. The amount of fees is decided later on by community themselves, facilitated by the CDE.

As a result of the CAP, a community based organization (CBO) is founded. Accompanying the CAP, the local government signs a contract with the BNN, which assures the funding of the MRF infrastructure. Meanwhile, the CBO as the legal representative of the community signs a contract with BNN on support and use of carbon funding.

The MRF is run on the principle of cost-recovery. Each household is asked for a monthly fee ranging between Rp 5,000-7,000. Additional income is gained from compost and recyclable sales. However, due to elevated costs caused by the application of aerobic composting technology, a part of the operation costs will also be funded by BNN through carbon funding.

## 2. Policy/measure or stated goal of the PoA

The PoA seeks to reduce greenhouse gases that are released to the atmosphere by dumping of organic waste. Therefore, the PoA will facilitate the implementation of small community based composting facilities (called MRFs) where organic waste is separated from household waste and composted by applying aerobic composting technology.

By introducing waste management, the PoA will further help to avoid health problems caused by inadequate waste dumping, create jobs, support community empowerment, reduce the volume of non-organic waste by recycling usable materials and provide compost as natural fertilizer for farming.

## 3. Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity.

It is hereby confirmed that all members of the BORDA network as mentioned under A.3 implement the PoA as a voluntary action.

### **A.3. Coordinating/managing entity and participants of SSC-POA:**

>> The following information shall be included here:

#### 1. Coordinating or managing entity of the PoA as the entity which communicates with the Board

The coordinating entity is a network of Indonesian NGOs coordinated by BORDA Indonesia, also including the German not-for-profit company atmosfair gmbH:

BORDA Indonesia is the Indonesian branch of a Germany-based NGO providing development assistance in Eastern Asia, in the areas of renewable energy, sanitation and water supply.

BORDA, “Bremen Overseas Research and Development Association”, Kayen No. 176, Jl., Kaliurang km 6.6, 55283 Yogyakarta, Indonesia, [www.borda-net.org](http://www.borda-net.org)

Contact: Jati Kusumowati ([jati@borda-sea.org](mailto:jati@borda-sea.org)), Frank Fladerer ([fladerer@borda.de](mailto:fladerer@borda.de)), Stefan Reuter ([reuter@borda.de](mailto:reuter@borda.de))



The BORDA NGO network currently includes the following Indonesian NGOs:

- **BEST** (Tangerang and Surabaya): Bina Ekonomi Sosial Terpadu (Institute for integrated economic and social development) is an NGO registered in Indonesia in the field of basic needs services for low income urban communities concerning solid waste management and sanitation. BEST is a BORDA cooperation partner since 1992.  
Tangerang Office:  
Melati Mas, Blok O2 No. 14 , Serpong, Tangerang 15323– Indonesia,. <http://www.best.or.id/>  
Contact: Hamzah Harun Al Rasyid, [best.126@dnet.net.id](mailto:best.126@dnet.net.id)
  
- **LPTP Lembaga PEMBANGUNAN Teknologi Perdesaan** (Foundation for the development of rural technologies) is an NGO registered in Indonesia working in the field of decentralized waste water treatment and community based solid waste management, being a BORDA cooperation partner since 1989.  
Jalan Anggajaya I/282; Gejayan/ Condong Catur, Yogyakarta 55283  
<http://www.cbtech-lptp.org/>  
Contact: Popo Riyanto, [dewats@idola.net.id](mailto:dewats@idola.net.id)
  
- **BALIFOKUS** is an NGO registered in Indonesia working in the field of community based sanitation and solid waste management, being a BORDA cooperation partner since 2002.  
Mandalawangi No.5  
Jalan Tukad Tegal Wangi, Sesetan  
DENPASAR 80223 – Bali, <http://www.balifokus.asia>  
Contact: Yuyun Ismawati, [balifokus@balifokus.asia](mailto:balifokus@balifokus.asia)

The BORDA NGO network further includes:

- **atmosfair gGmbH**: A German not-for-profit company developing CDM Gold Standard projects and funding them by voluntary offsets for greenhouse gas emissions from air travel.  
atmosfair gGmbH; Zossener Strasse 55-58; 10961 Berlin, Germany; [www.atmosfair.org](http://www.atmosfair.org)  
Contact: Robert Müller, [mueller@atmosfair.de](mailto:mueller@atmosfair.de)

Within the BORDA NGO network, the focal point for communication with the Board is:  
atmosfair gGmbH

Contact: Robert Müller, [mueller@atmosfair.de](mailto:mueller@atmosfair.de)

2. Project participants being registered in relation to the PoA. Project participants may or may not be involved in one of the CPAs related to the PoA.

<b>Name of Party involved (*) ((host) indicates a host Party)</b>	<b>Private and/or public entity(ies) project participants (*) (as applicable)</b>	<b>Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)</b>
Indonesia	BORDA Indonesia	No
Germany	BORDA e.V., Germany	No
Germany	atmosfair gGmbH	No



**A.4. Technical description of the small-scale programme of activities:**

**A.4.1. Location of the programme of activities:**

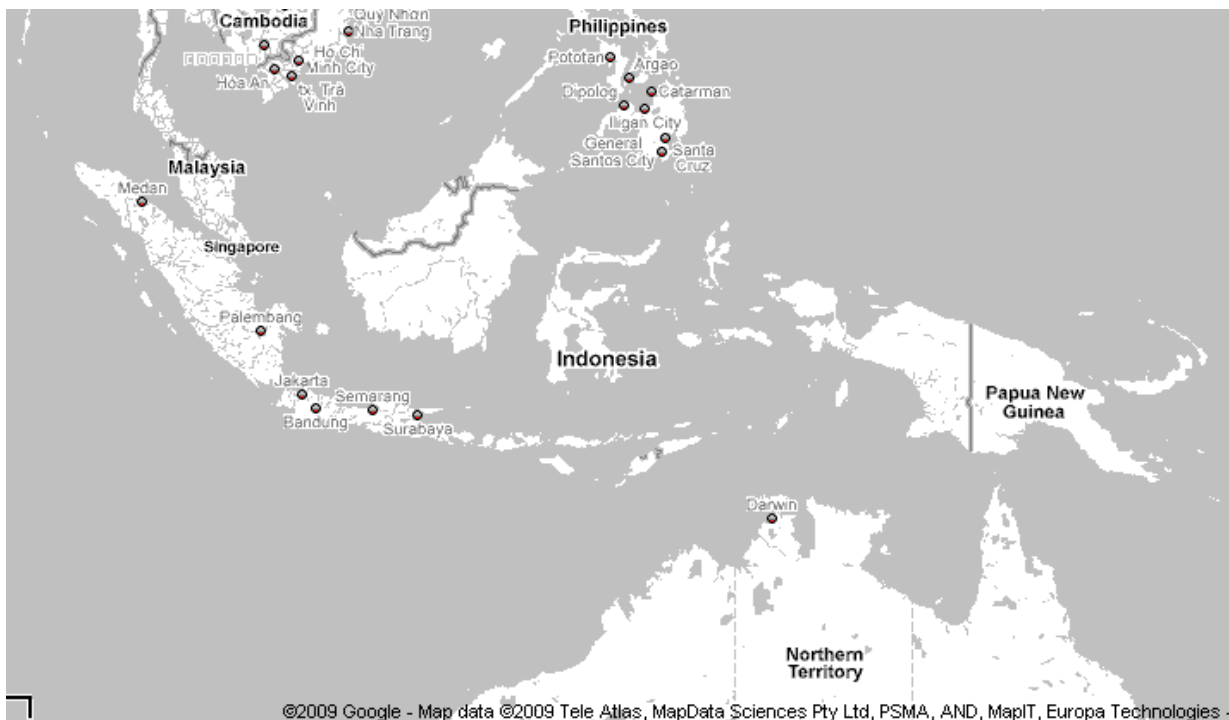
**A.4.1.1. Host Party(ies):**

Indonesia

**A.4.1.2. Physical/ Geographical boundary:**

>> *Definition of the boundary for the PoA in terms of a geographical area (e.g., municipality, region within a country, country or several countries) within which all small-scale CDM programme activities (SSC-CPAs) included in the PoA will be implemented, taking into consideration the requirement that all applicable national and/or sectoral policies and regulations of each host country within that chosen boundary;*

The boundary of the PoA corresponds to the administrative limits of Indonesia. The PoA will be implemented in densely populated urban areas.



The locations where the programme will be implemented are spread across Indonesia.

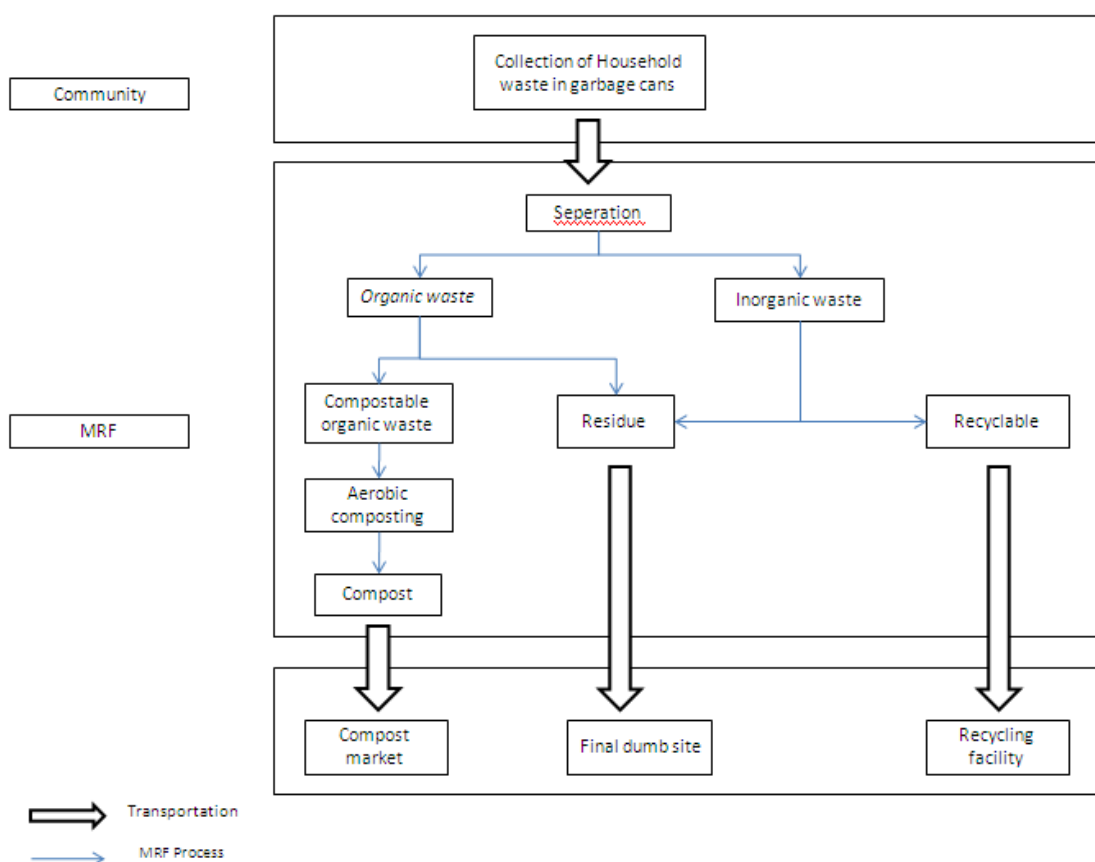


**A.4.2. Description of a typical small-scale CDM programme activity (CPA):**

**A.4.2.1. Technology or measures to be employed by the SSC-CPA:**

The technology applied to avoid methane emissions is aerobic composting of organic household waste. The composting is carried out in so called Material Recovery Facilities (MRF). MRFs are built in densely populated urban poor areas that lack waste management systems, serving generally 1,000 – 2,000 households (HHs) and treating in average 2-5 tons of waste per day.

The entire waste management is run by communities as displayed in the flow chart below:



After the waste is collected (mostly by using motor tricycles) and received at the MRF, the waste is separated into compostable organic waste, recyclable waste and residues. The separation is done manually usually employing four workers per ton of waste processed daily. The compostable organic waste is generally shredded to assure a greater surface of the material, mixed with mature compost and animal dung acting as starters and then left for natural composting under aerobic conditions.

Generally, composting occurs in so-called Takakura boxes or in bamboo aerator piles. Other methods may be applied as long as monitoring makes sure that composting occurs under aerobic conditions.



Takakura boxes (ca. 50cm x 50cm x 50cm) can each hold up to 30kg of organic waste and are stacked on top of each other to use space most effectively. Stacking also assures that the amount of waste in the boxes is consistent. The boxes are permeable to air. Organic waste is left for 1-1.5 month until composting is completed.

The bamboo aerator method is carried out by piling the organic waste on top of a triangle shaped aerator construction (1.5 to 2m length, 30cm height). The pile (2m length, 1.5m wide and 1.5-2m height) holds up to 3 tons of organic waste. The piles are compiled within 3 days and turned around during the 2<sup>nd</sup> – 5<sup>th</sup> week. Compost will be ready in the 1.5-2 month.

MRFs are simple, open constructions (see picture below) consisting of a concrete floor covered by a permanent roof to prevent exposure to rain and thereby avoiding leachate. Small facilities for equipment storage and a small office for administrative purposes are also included. Leachate hardly occurs; possible leachate is collected under aerobic conditions and used as a starter for the compost.

Each MRF is supervised by an operational coordinator who is also a member of the community.

The dimension of a MRF depends on the number of HHs served and ranges between 200-500m<sup>2</sup>.



The final compost is filtered and generally packed for selling. There may be differences in composting technologies, but aerobic composting conditions in all MRFs and the PoA are assured by measuring oxygen during spot checks.



**A.4.2.2. Eligibility criteria for inclusion of a SSC-CPA in the PoA:**

>> *Here only a description of criteria for enrolling the CPA shall be described, the criteria for demonstrating additionality of CPA shall be described in section E.5*

All CPAs consist in groups of MRFs. The maximum number of MRFs included in a CPA is 100.

MRFs that are included in a CPA must meet the following criteria:

- The MRF is managed and operated by communities or cooperatives, not by private entities.
- An aerobic composting technology is applied in accordance to the description in A.2.1.
- The MRF does not serve more than 5,000 households.
- A contract is signed between the representative of the community running the MRF and the managing entity of the PoA (BNN), stating that expected CERs are ceded to the BNN and used to fund community empowerment and a part of operation costs.

**A.4.3. Description of how the anthropogenic emissions of GHG by sources are reduced by a SSC-CPA below those that would have occurred in the absence of the registered PoA (assessment and demonstration of additionality):**

>> *The following shall be demonstrated here:*

- (i) *The proposed PoA is a voluntary coordinated action;*
- (ii) *If the PoA is implementing a voluntary coordinated action, it would not be implemented in the absence of the PoA;*
- (iii) *If the PoA is implementing a mandatory policy/regulation, this would/is not enforced;*
- (iv) *If mandatory a policy/regulation is enforced, the PoA will lead to a greater level of enforcement of the existing mandatory policy/regulation.*

*The information presented here shall constitute the demonstration of additionality of the PoA as a whole.*

It is hereby confirmed that all members of the BORDA NGO network as mentioned under A.3 implement the PoA as a voluntary action.

There is no legislation demanding the coordinating entities of the PoA to implement the programme; all coordinating entities are NGOs that are not responsible by law for implementing projects of any kind.

Since 2008, there is a general law on waste management “Act of The Republic of Indonesia Number 18, Year 2008, Regarding Waste Management” placing responsibility of waste management to both national government and local governments<sup>1</sup>. The law encourages local governments to facilitate the reduction and treatment of waste. Waste reductions activities include 3Rs (Reduce, Reuse, and Recycle) and waste treatment activities include waste collection, transport, separation, processing, and final processing. However, no details are given in the law on how waste should be handled in the future; especially no suggestion is made on alternatives to the current practise of open dumping. Therefore no considerable changes in waste treatment can be expected in consequence in the law. On the local level, regulations regarding Municipal Waste Management are still missing.

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<sup>1</sup> [http://www.menlh.go.id/dokumen\\_sampah/Waste%20Management%20Act%20Number%2018%20Year%202008.pdf](http://www.menlh.go.id/dokumen_sampah/Waste%20Management%20Act%20Number%2018%20Year%202008.pdf)



The implementation of MRFs as planned under this PoA is in line with the suggestions of the law but not demanded by it.

As part of the decentralization in 2001, Indonesia introduced the Specific Allocation Grant (“Mekanisme dan penggunaan dana alokasi khusus”, DAK<sup>2</sup>). DAK is a mechanism to transfer funds from the central to regional governments, aiming especially at increasing the availability of physical facilities and infrastructure in the regions in accordance with national priorities as well as decreasing the discrepancy in growth rates between regions and between service sectors. The amount of DAK is subject to change according to urgency of national priority.

In 2010, the central government has allocated Rp 600 millions-1 billion (~ US\$ 60,000-100,000) to each designated province/municipality for DAK Sanitation in 2010. DAK Sanitation aims at the provision of facilities and services for community toilets, solid waste management and drainage.

For the implementation of MRFs under this PoA, the hardware will be funded by local governments making use of the DAK funds. The PoA will empower communities to run MRFs; the BNN will support the design and planning of MRFs, facilitate community organization, provide capacity building for composting under aerobic conditions and supervise that MRFs keep on operating in the future.

MRFs can not be expected to be implemented and operated in absence of the PoA:

Until present, only 7 MRFs have been implemented as pilot projects with support of the BNN using external grants<sup>3</sup>. No comparable facilities are properly operating in Indonesia without support of the BNN.

A comparison with the situation of waste water treatment shows that also in the future, MRFs can not be expected to run without external support for community empowerment:

Despite of a series of efforts during the last years<sup>4</sup>, community based wastewater treatment does still not work independently from external funding. Up to date, 376 decentralized, community based wastewater treatment plants (called DEWATS) have been implemented by BORDA Partners under the SANIMAS program<sup>5</sup>. All DEWATS are depending on technical and institutional support by the BNN; no DEWATS or comparable facilities have been implemented without the BNN. The funding structure for DEWATS is comparable to the planned funding structure for MRFs:

The total costs of the hardware (300mio rupiah) are covered by national and local governments (contributing 100 Million and 200mio rupiah respectively). The cost for community empowerment are approx. 30% of the hardware cost, of these, 50% is covered by the local government and 50% by the BNN, stemming from ODA funds.

Beside the financial support BORDA Indonesia has an important key role to disseminate the DEWATS technology, to improve the quality of the community based sanitation projects by implementation of the internal quality management system and support the Partner in capacity development of the staff (design engineers, supervisors), linking the BORDA partner offices, etc.

The situation of MRFs can be expected to be the same; no implementation and operation of MRFs or similar facilities will occur without the continuous and qualified support for community empowerment provided by the BNN.

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<sup>2</sup> [http://www.bkpm.go.id/file\\_uploaded/uu\\_33\\_2004\\_en.pdf](http://www.bkpm.go.id/file_uploaded/uu_33_2004_en.pdf)

<sup>3</sup> Grants provided by IDRC, Canada and the German Federal Ministry for Economic Cooperation and Development, evidence provided to the DOE.

<sup>4</sup> [http://waspola.org/vf/index.php?option=com\\_content&task=view&id=14&Itemid=29](http://waspola.org/vf/index.php?option=com_content&task=view&id=14&Itemid=29)

<sup>5</sup> <http://www.borda-sea.org/modules/cjaycontent/index.php?id=6>, further evidence provided to the DOE



**A.4.4. Operational, management and monitoring plan for the programme of activities (PoA):**

**A.4.4.1. Operational and management plan:**

>> *Description of the operational and management arrangements established by the coordinating/managing entity for the implementation of the PoA, including:*

- (i) *A record keeping system for each CPA under the PoA.*

The BNN, who is the managing entity of the PoA and also of each CPA will keep an electronic database listing all CPAs and all MRFs included in the CPAs. This electronic database has already proven to be well suitable for community based projects within the BORDA NGO Network as it has been used for the monitoring of decentralized waste water treatment systems (DEWATS). A more detailed explanation on the structure and management of the database is given in E.7.2.

- (ii) *A system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA,*

As indicated stated in A.2.2, each MRF included in each CPAs signs a contract with the managing entity BNN stating that they will not claim emission reductions under the CDM (or any VER standard) and that all CERs are ceded to the BORDA NGO network.

- (iii) *The SSC-CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity.*

The PoA as a whole will not pass the small scale limit of an annual reduction of 60,000t CO<sub>2</sub>e; this will be ensured by continuously summing up the ERs of all MRFs included in all CPAs

- (iv) *The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA;*

Each MRF included in each CPAs signs a contract with the managing entity BNN stating that they agree to be part of the PoA.



#### **A.4.4.2. Monitoring plan:**

>> *The following information shall be provided here:*

- (i) *Description of the proposed statistically sound sampling method/procedure to be used by DOEs for verification of the amount of reductions of anthropogenic emissions by sources or removals by sinks of greenhouse gases achieved by CPAs under the PoA.*
- (ii) *In case the coordinating/managing entity opts for a verification method that does not use sampling but verifies each CPA (whether in groups or not, with different or identical verification periods) a transparent system is to be defined and described that ensures that no double accounting occurs and that the status of verification can be determined anytime for each CPA;*

The DOE will verify each of the CPAs by making site visits of at least 15% of the MRFs included under a CPA; in any case, a minimum of five MRFs included in a CPA will be visited during each CPA verification. MRFs visited during verification will be randomly chosen from the central database.

A database will include information on emission reduction of all MRFs included under the PoA by recording the amount of organic waste processed in each MRF. The database will be updated on a monthly base, allowing for determining the status of verification anytime for each CPA and avoiding double counting.

#### **A.4.5. Public funding of the programme of activities (PoA):**

BORDA received funding by the public Canadian corporation IDRC for CDM project development which was used for paying research CDM related activities, hiring national and international researchers and field trainers for CDM development, organize the stakeholder meeting and cover a part of the validation costs<sup>6</sup>. This ODA funding is exclusively used for the CDM development of this PoA. No CERs will be delivered to IDRC or the Canadian government in consequence of the obtained funding.

National public funding is provided by local governments for MRF hardware by the Indonesian Government Specific Allocation Grant (DAK)<sup>7</sup>. DAK is a mechanism to transfer funds from the central to regional governments, aiming especially at increasing the availability of physical facilities and infrastructure in the regions in accordance with national priorities as well as decreasing the discrepancy in growth rates between regions and between service sectors. The amount of DAK is subject to change according to urgency of national priority.

The central government has allocated Rp 600 millions-1 billion (US\$ 60,000-100,000) in each designated province/municipality for DAK Sanitation in 2010. DAK Sanitation aims at the provision of facilities and service for community toilette, solid waste management, and drainage. DAK Sanitation is proposed to finance infrastructure of MRFs which approximately cost US\$ 45,000. Allocation of DAK Sanitation for project activity and other proposed sanitation project will be discussed and decided by mid of December by provincial's legislative council.

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<sup>6</sup> evidence provided to the DOE

<sup>7</sup> [http://www.bkpm.go.id/file\\_uploaded/uu\\_33\\_2004\\_en.pdf](http://www.bkpm.go.id/file_uploaded/uu_33_2004_en.pdf)



**SECTION B. Duration of the programme of activities (PoA)**

**B.1. Starting date of the programme of activities (PoA):**

December 2009

**B.2. Length of the programme of activities (PoA):**

28 years, until December 2037

**SECTION C. Environmental Analysis**

**C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:**

1. Environmental Analysis is done at PoA level
2. Environmental Analysis is done at SSC-CPA level

Each MRF under each CPA requires an individual environmental analysis as a low impact project (Indonesian Environmental Management Law No 23 Year 1997<sup>8</sup>).

**C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:**

As MRFs are similar in construction and operation; the outcome will be similar for all MRFs included in any CPA under the PoA. Copies of all EIAs will be stored by the BNN and will be accessible to the DOE.

The Ministry of Environment for Indonesia, according to the Indonesia Environmental Management Law No 23 Year 1997<sup>7</sup> requires an Environmental Management and Monitoring Plan for each activity which falls under low environmental impact project (which is the case for MRFs).

<sup>8</sup> [http://pkditiempdn.depdag.go.id/download/index.php?UU%20No.%2023%20th%201997%20\(eng\).pdf](http://pkditiempdn.depdag.go.id/download/index.php?UU%20No.%2023%20th%201997%20(eng).pdf)



Based on the assessment of the pilot MRFs the following aspects are considered in the project design:

<b>Environmental or Social Impact</b>	<b>Adopted Environmental Mitigation and Management Measures</b>
Air emission and odour control	<ol style="list-style-type: none"> <li>1. Waste is treated in the same day as waste load</li> <li>2. Aerobic composting method</li> <li>3. Immediate transport of residues to the landfill</li> <li>4. Regular washing of work areas and equipments</li> <li>5. Infrastructure is built with good air circulation design</li> </ol>
Control of leachate	<ol style="list-style-type: none"> <li>1. Treatment of waste at the same day as waste load to minimize leachate generation.</li> <li>2. Leachate generated from windrow composting is collected in concrete line compartment and covered.</li> <li>3. Reuse of leachate for compost windrows</li> </ol>
Worker health and safety	<ol style="list-style-type: none"> <li>1. Health and hygiene training</li> <li>2. Safety equipment</li> <li>3. Adequate lighting and ventilation</li> <li>4. Maintenances of working equipments</li> </ol>
Economic	<ol style="list-style-type: none"> <li>1. Create job opportunities for the community</li> </ol>
Aesthetics	<ol style="list-style-type: none"> <li>1. Concrete wall and tree as buffer zone at the boundary of the plant</li> </ol>

**C.3. Please state whether in accordance with the host Party laws/regulations, an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA);**

The Ministry of Environment for Indonesia, according to the Indonesia Environmental Management Law No 23 Year 1997<sup>7</sup> requires an Environmental Management and Monitoring Plan for each activity which falls under low environmental impact project, which is the case for all MRFs being part of any CPA.



**SECTION D. Stakeholders' comments**

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**D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:**

1. Local stakeholder consultation is done at PoA level  X
2. Local stakeholder consultation is done at SSC-CPA level

*Note: If local stakeholder comments are invited at the PoA level, include information on how comments by local stakeholders were invited, a summary of the comments received and how due account was taken of any comments received, as applicable.*

The stakeholder consultation has been undertaken at the PoA level. Formal local CDM stakeholder consultations are not necessary since all MRFs are community based activities; communities as well as local governments are actively involved in the planning and implementation of MRFs.

During the stakeholder consultation on the PoA level, also representatives of the communities participated.

**D.2. Brief description how comments by local stakeholders have been invited and compiled:**

The stakeholder comments have been received during a stakeholder meeting in Yogyakarta on 25 November 2009. Both national and local level stakeholders took part<sup>9</sup>. National stakeholders were represented by officials of the Ministry of Environment. Local stakeholders were represented by local government officials (including Local Environmental Body, Head of District, KIMPRASWIL, DKP) and community leaders from pilot project activities and proposed composting site. During the meeting, BORDA and the BNN presented the PoA, including composting technology and carbon funding scheme and invited comments from community representatives and local government officials. Technical data on MRFs were presented according to the experience from seven pilot projects that were implemented earlier across Indonesia.

Participants were asked to discuss on scores (positive, negative or neutral) on environmental, social and economical criteria of the Gold Standard sustainability matrix.

Also a number of issues were discussed including current practise of CDM projects in Indonesia, responsibilities by several parties to be involved in composting activity, budgetary commitment of local authorities, CDM funding allocation, and view and opinions on carbon financing on solid waste management activities.

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<sup>9</sup> detailed meeting report according to the Gold Standard rules provided to the DOE.



**D.3. Summary of the comments received:**

The project was welcomed as it would improve sanitation, hygiene, livelihood, and reduce pollution in any location where MRFs will be implemented.

All criteria of the Gold Standard sustainable development matrix received positive scores, with exception of the point “access to affordable energy service” which was given a neutral score.

Stakeholders identified positive effects of the project on air, water and soil condition, biodiversity, quality and quantity of employment, livelihood of the poor, human and institutional capacity and technology transfer.

Stakeholders were also asked for and discussed about CDM matters; they were especially concerned about requirements for CDM monitoring. Regarding technical issues, stakeholders asked on how to properly handle hazardous waste, explanations were given by representatives of the BNN.

Also implications of the requirements of aerobic composting technology were discussed.

**D.4. Report on how due account was taken of any comments received:**

No changes will be necessary regarding the environmental, social or economical impacts of the project. Regarding CDM matters, a very simple and user friendly documentation method for monitoring data is being developed to avoid confusion and loss of time in the communities that manage MRFs.

**SECTION E. Application of a baseline and monitoring methodology**

This section shall demonstrate the application of the baseline and monitoring methodology to a typical SSC-CPA. The information defines the PoA specific elements that shall be included in preparing the PoA specific form used to define and include a SSC-CPA in this PoA (PoA specific CDM-SSC-CPA-DD).

**E.1. Title and reference of the approved SSC baseline and monitoring methodology applied to a SSC-CPA included in the PoA:**

*NOTE: The approved SSC baseline and monitoring methodology should be approved for use in a PoA by the Board.*

Small scale methodology AMS.III.F, version 8 will be applied (“Avoidance of methane emissions through controlled biological treatment of biomass”). It has been approved for use in a PoA.

**E.2. Justification of the choice of the methodology and why it is applicable to a SSC-CPA:**

*NOTE: In the case of CPAs which individually do not exceed the SSC threshold, SSC methodologies may be used once they have first been reviewed and, as needed, revised to account for leakage in the context of a SSC-CPA.*

The project applies composting which is explicitly mentioned in AMS-F.III. Even the whole PoA will not exceed the small scale level of a CO<sub>2</sub> reduction of 60,000CO<sub>2</sub>e per year.



### E.3. Description of the sources and gases included in the SSC-CPA boundary

The project will avoid methane from anaerobic decay of organic waste.

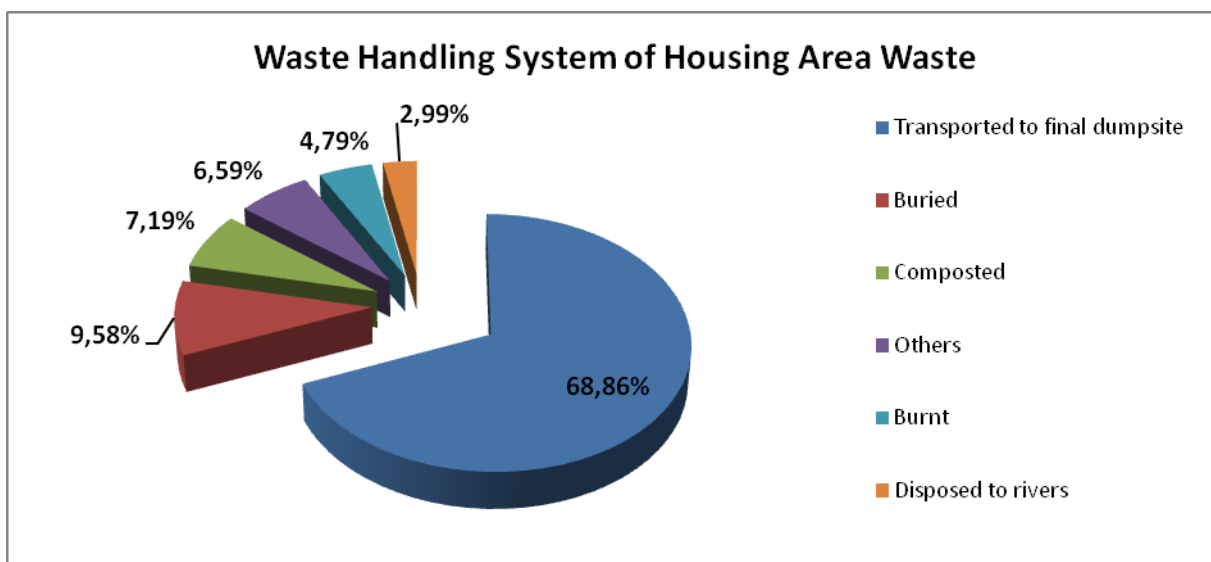
### E.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

A standard baseline scenario is assumed for any MRF implemented under the PoA. In absence of the PoA, household waste is handled in several ways in Indonesia, including open dumping, on centralised landfills, dumping on informal sites, burying, burning, dumping into rivers and composting.

The forms of waste handling vary even within small neighbourhoods. It would not be feasible to determine a different individual baseline for each MRF implemented under the PoA, since this would require extent, sophisticated and expensive surveys of the complex current situation.

The Indonesian Domestic Solid Waste Statistics 2008 estimate an annual generation of 38.5 million tons of waste where 43.37% (16.7 million tons) of the waste stem from the housing area<sup>10</sup>.

The following graphic shows the percentages of household waste treated in different ways. Data are taken from Indonesian Solid Waste Statistic Year 2008, page 8, figure 6.



All different forms of waste handling shown in the graphic lead to different baseline emissions. 15% of the household waste is composted, burned or disposed to rivers; these practises lead to very little methane emissions due to mostly aerobic conditions. At final dumping sites, highly anaerobic conditions are found because waste piles use to have heights clearly above 5 meters. Also burying waste leads to clearly anaerobic conditions. 78.44% of all household waste is handled this way.

We base the conservative national baseline on the assumption that 68.86% of the waste which is handled at MRFs would be brought to unmanaged waste disposals with heights over 5 meters.

To be conservative, we do not account for the 9.58% of waste that is buried and can also be supposed to decay under anaerobic conditions.

<sup>10</sup> [http://www.menlh.go.id/dokumen\\_sampah/Indonesian%20Domestic%20Solid%20Waste%20Statistics%202008.pdf](http://www.menlh.go.id/dokumen_sampah/Indonesian%20Domestic%20Solid%20Waste%20Statistics%202008.pdf)



**E.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the SSC-CPA being included as registered PoA (assessment and demonstration of additionality of SSC-CPA): >>**

**E.5.1. Assessment and demonstration of additionality for a typical SSC-CPA:**

>> Here the PPs shall demonstrate, using the procedure provided in the baseline and monitoring methodology applied, additionality of a typical CPA.

Additionality is demonstrated by applying the additionality tool, version 5 (<http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>). It is shown that the implementation of a typical MRF and any CPA would not be possible without CDM funding.

***Step1: Identification of alternatives to the project activity consistent with current laws and regulations***

***Sub-step 1a) Define alternatives to the project activity***

**Alternative 1:**

CPA implemented as Non-CDM.

**Alternative 2:**

Continuation of the current situation (no project activity undertaken).

***Sub-step 1b) Consistency with mandatory laws and regulations***

The two alternatives described above comply with all applicable legal and regulatory requirements, which is evident from the fact that, in the past, seven MRFs have been implemented with support of BORDA funded by ODA.

Alternative 2, the continuation of the current situation, is obviously common practice and basically in line with legislation.

***Step2: Investment analysis***

Instead of an investment analysis, a barrier analysis is conducted.

***Step3: Barrier analysis***

***Sub-step 3a) Identify barriers that would prevent the implementation of the proposed project activity***

**a) Investment Barrier**

For the implementation of MRFs under this PoA, the hardware will be funded by local governments making use of the DAK funds. In average, hardware costs for an MRF are ~ 400mio rupiah (~45,000 US\$). The BNN will empower communities to run MRFs by supporting the design and planning of MRFs, facilitating community organization, providing capacity building for composting under aerobic conditions and supervising that MRFs keep on operating in the future. Cost for this “soft component” are



around 120mio rupiah or 30% of the hardware costs. Among others, funds for the soft component are used to pay the formation of the community based organization that will run the MRF, with the help of a community development expert and a community facilitator, as well as workshops on technical and institutional empowerment, travel costs, the supervision of construction and continuous monitoring of operation.

At least 50% of the “soft component costs”, approx. 7,000US\$ will be provided upfront by the BNN through carbon funding, the remaining 50% shall also be covered by local governments (by other than DAK funds).

For the contribution of the BNN, upfront funding is needed which will be provided by the project participants (or atmosfair or the BNN) based on expected CER revenues.

MRFs can not be expected to be implemented and operated in absence of the PoA:

Until present, only seven MRFs have been implemented as pilot projects with support of the BNN using external grants<sup>11</sup>. No comparable facilities have been implemented and are properly operating in Indonesia without support of the BNN. There are however examples for similar facilities that have been constructed independently from the BNN but are not running due to lack of community facilitation as shown in point b) just below.

#### **(b) Management Barrier**

Community empowerment and continuous support are preconditions for the operation of MRFs. There are several examples in Indonesia for MRFs that have been constructed independently from the BNN and are not running due to lack of community facilitation, e.g.:

1. Province DIY, Yogyakarta city, Sorosutan village
2. Province DIY, Sleman District, Triharjo village
3. Province Banten, Serang city, Sepang village
4. Province Banten, Cilegon City, Sukmaja village
5. Province Bali, Denpasar City, Pamogan village
6. Province East Java, Pasuruan City, near Gading Market

The seven pilot MRFs have been implemented and are currently operating with the help of grant funding paying for community empowerment.<sup>12</sup>

A comparison with the situation of waste water treatment shows that also in the future, MRFs can not be expected to run without external support for community empowerment:

Up to date, 376 decentralized, community based wastewater treatment plants (called DEWATS) have been implemented by BORDA Partners under the SANIMAS program<sup>13</sup>. All of them are depending on technical and institutional support by the BNN; no DEWATS or comparable facilities have been

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<sup>11</sup> Grants provided by IDRC, Canada and the German Federal Ministry for Economic Cooperation and Development, evidence provided to the DOE.

<sup>12</sup> Grants provided by IDRC, Canada and the German Federal Ministry for Economic Cooperation and Development, evidence provided to the DOE.

<sup>13</sup> <http://www.borda-sea.org/modules/cjaycontent/index.php?id=6>, further evidence provided to the DOE



implemented without the BNN. The funding structure for DEWATS is comparable to the planned funding structure for MRFs:

The total costs of the hardware (300mio rupiah) are covered by national and local governments (contributing 100 Million and 200mio rupiah respectively). The cost for community empowerment are approx. 30% of the hardware costs, of these, 50% are covered by the local government and 50% by the BNN, stemming from ODA funds<sup>14</sup>.

Besides the financial support, BORDA Indonesia has an important key role to disseminate the DEWATS technology, to improve the quality of the CBS projects by implementation of the internal quality management system and support the partners in capacity development of the staff (design engineers, supervisors, ...), linking the BORDA partner offices and others...

The situation of MRFs can be expected to be the same; no implementation and operation of MRFs or similar facilities will occur without the continuous and qualified support for community empowerment provided by the BNN.

### **(c) Technological Barrier**

The BNN leads the initial design of MRFs and helps communities to develop the adequate technology and procedures according to circumstances and needs. Also capacity building and constant monitoring provided by the BNN are necessary to ensure that composting occurs under aerobic conditions.

It is cheaper and less work intensive to compost waste in large piles that are not moved during a large time period, thus becoming anaerobic. In case MRFs would work without support of the BNN (which is currently not the case), they can be expected to apply anaerobic composting technology.

***Sub-step 3 b. Show that the identified barriers would not prevent the alternatives (except the proposed project activity):***

The identified barriers would obviously not prevent alternative 2 (no PoA).

#### ***Step 4. Common practice analysis***

In the past, no MRFs have been installed that are operating without external funding. The seven pilot MRFs have been implemented and are currently operating with the help of grant funding paying for community empowerment.<sup>15</sup>

Thus, it is not common practice to implement and operate MRFs or similar facilities without external funding.

In point b), a list is given of MRFs that have been constructed independently from the BNN and are not running due to lack of community facilitation.

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<sup>14</sup> Evidence provided to the DOE

<sup>15</sup> Grants provided by IDRC, Canada and the German Federal Ministry for Economic Cooperation and Development, evidence provided to the DOE.



**E.5.2. Key criteria and data for assessing additionality of a SSC-CPA:**

>> Here the PPs shall provide the key criteria for assessing additionality of a CPA when proposed to be included in the registered PoA. The criteria shall be based on additionality assessment undertaken in E.5.1 above. The project participants shall justify the choice of criteria based on analysis in above section.

It shall be demonstrated how these criteria would be applied to assess the additionality of a typical CPA at the time of inclusion.

*NOTE: Information provided here shall be incorporated into the PoA specific CDM-SSC-CPA-DD that shall be included in documentation submitted by project participants at registration of PoA.*

Each MRF included in a CPA must meet the following criteria:

- The MRF must be managed and operated by communities or cooperatives, not by private entities.
- An aerobic composting technology must be applied in accordance to the description in A.2.1.
- The MRF must serve a maximum of 5,000 households.
- A contract must be signed between a MRF and the managing entity of the PoA, stating that expected CERs are ceded to the managing entity of the PoA and used to fund community empowerment and a part of operation costs.
- Carbon funding provided by the managing entity of the PoA to each MRF for community empowerment must surpass 10% of the total investment for MRF construction.
- Carbon funding provided by the managing entity to each MRF to support operating costs and/or monitoring must surpass 20% of the average operating costs of the MRF.

**E.6. Estimation of Emission reductions of a CPA:**

**E.6.1. Explanation of methodological choices, provided in the approved baseline and monitoring methodology applied, selected for a typical SSC-CPA:**

**Baseline emissions:**

MRFs receive unseparated household waste. In average 50% (referring to weight) of this waste is organic waste (this percentage will be verified regularly in any MRF, see also Indonesian Solid Waste Statistic Year 2008).

Baseline emissions are derived by applying the “Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site”, version 04, to 68.86% of the organic waste treated at a MRFs. The value of 68.86% is chosen according to the conservative assumption described in E.4 that 68.86% of the household waste would be brought to final dumpsites in absence of MRFs.

**Project emissions:**

Fuel consumption due to waste collection does not lead to higher emissions than in the baseline scenario, because the MRF is typically located much closer to the source of waste than the final dump site.

Also diesel fuel is consumed by shredders. The consumption will be monitored and is preliminarily estimated to 2 liters of diesel per HH and year.

Project emissions due to methane generation during the composting procedure are expected to be set to zero as oxygen content of the composting process is above 8% which will be monitored.

Methane emissions from runoff water (leachate) are negligible as hardly any leachate occurs and, if it is the case, leachate is stored under aerobic conditions and used as starter for the composting process.



**E.6.2. Equations, including fixed parametric values, to be used for calculation of emission reductions of a SSC-CPA:**

**Baseline emissions:**

Baseline emissions of a typical MRF are calculated by applying the “Tool to determine methane emissions avoided from disposal of waste at a solid waste disposal site”, version 04:

$$BE_{CH_4,SWDS,y} = \phi \cdot (1-f) \cdot GWP_{CH_4} \cdot (1-OX) \cdot \frac{16}{12} \cdot F \cdot DOC_f \cdot MCF \cdot \sum_{x=1}^y \sum_j W_{j,x} \cdot DOC_j \cdot e^{-k_j(y-x)} \cdot (1-e^{-k_j}) \quad (1)$$

Where:

- $BE_{CH_4,SWDS,y}$  = Methane emissions avoided during the year  $y$  from preventing waste disposal at the solid waste disposal site (SWDS) during the period from the start of the project activity to the end of the year  $y$  (tCO<sub>2</sub>e)
- $\phi$  = Model correction factor to account for model uncertainties (0.9)
- $f$  = Fraction of methane captured at the SWDS and flared, combusted or used in another manner
- $GWP_{CH_4}$  = Global Warming Potential (GWP) of methane, valid for the relevant commitment period
- $OX$  = Oxidation factor (reflecting the amount of methane from SWDS that is oxidised in the soil or other material covering the waste)
- $F$  = Fraction of methane in the SWDS gas (volume fraction) (0.5)
- $DOC_f$  = Fraction of degradable organic carbon (DOC) that can decompose
- $MCF$  = Methane correction factor
- $W_{j,x}$  = Amount of organic waste type  $j$  prevented from disposal in the SWDS in the year  $x$  (tons)
- $DOC_j$  = Fraction of degradable organic carbon (by weight) in the waste type  $j$
- $k_j$  = Decay rate for the waste type  $j$
- $j$  = Waste type category (index)
- $x$  = Year during the crediting period:  $x$  runs from the first year of the first crediting period ( $x = 1$ ) to the year  $y$  for which avoided emissions are calculated ( $x = y$ )
- $y$  = Year for which methane emissions are calculated

The parameters are chosen as follows:

- $\Phi = 0.9$
- $f = 0$  (currently, no flaring system is in use at the Indonesian landfills)
- $GWP_{CH_4} = 21$
- $OX = 0$
- $F = 0.5$
- $DOC_f = 0.5$
- $MCF = 0.8$  (for unmanaged deep solid waste disposal sites)
- $W_{j,x} =$  defined in monitoring, for preliminary calculations set **344.3** per MRF (1,000 tons \* 50% organic waste \* 68.86% baseline factor)
- $DOC_j = 15$  for wet kitchen waste representing the main fraction of organic waste
- $k_j = 0.4$  for kitchen waste in tropical humid climate



**Project emissions:**

Project emissions due to diesel consumption are calculated by multiplying the volume of diesel consumed for waste processing with the density of diesel, 0.85kg/l and multiplying the result with the default value 3.2kgCO<sub>2</sub>/kg to obtain CO<sub>2</sub> emissions.

<b>E.6.3. Data and parameters that are to be reported in CDM-SSC-CPA-DD form:</b>
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Only the two data mentioned below are needed because all MRFs have a similar design.

<b>Data / Parameter:</b>	Number of MRFs to be implemented
Data unit:	Number
Description:	Number of MRFs to be implemented
Source of data used:	Central data base at the BNN, based on the procedure of MRF site selection together with partners
Value applied:	Depending on CPA, up to 100
Justification of the choice of data or description of measurement methods and procedures actually applied :	Local governments and communities will express interest in MRF implementation; based on this and available funding, a number of MRFs to be implemented under a CPA will be defined. These MRFs will be included in the central data base.
Any comment:	

<b>Data / Parameter:</b>	Conservative standard value for baseline emissions
Data unit:	Percentage
Description:	Percentage of waste treated in an MRF that would be brought to deep unmanaged waste disposals in the baseline scenario.
Source of data used:	See section E.4 of this PoA-DD, based on "The Indonesian Domestic Solid Waste Statistics 2008" ( <a href="http://www.menlh.go.id/dokumen_sampah/Indonesian%20Domestic%20Solid%20Waste%20Statistics%202008.pdf">http://www.menlh.go.id/dokumen_sampah/Indonesian%20Domestic%20Solid%20Waste%20Statistics%202008.pdf</a> ).
Value applied:	68.86%
Justification of the choice of data or description of measurement methods and procedures actually applied :	See section E.4 of this PoA-DD
Any comment:	



**E.7. Application of the monitoring methodology and description of the monitoring plan:**

**E.7.1. Data and parameters to be monitored by each SSC-CPA:**

<b>Data / Parameter:</b>	Number of MRFs operating
Data unit:	number
Description:	Number of MRFs operating
Source of data to be used:	Central database at the BNN
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Depending on CPA
Description of measurement methods and procedures to be applied:	The data will be taken from the centralized electronic data base at the BNN.
QA/QC procedures to be applied:	Contracts signed with communities running MRFs centrally, stored at the BNN, operation is ensured by monitoring sheets received by MRFs.
Any comment:	

<b>Data / Parameter:</b>	Tons of organic waste processed
Data unit:	ton
Description:	Tons of organic waste processed under the whole CPA
Source of data to be used:	Central database at the BNN
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Depending on monitoring results
Description of measurement methods and procedures to be applied:	The data will be taken from the monitoring sheets collected from CBOs (community organisations running MRFs) and summed monthly in the centralized data base at the BNN.
QA/QC procedures to be applied:	Cross checking for each MRF with the number of households served and amount of compost produced.
Any comment:	



<b>Data / Parameter:</b>	Diesel consumption for waste processing
Data unit:	liters
Description:	Diesel consumption for waste processing in all MRFs, mainly for shredding
Source of data to be used:	Central database at the BNN
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Depending on monitoring results
Description of measurement methods and procedures to be applied:	The data will be taken from the monitoring sheets collected from CBOs (community organisations running MRFs) and summed monthly in the centralized data base at the BNN.
QA/QC procedures to be applied:	Cross checking for each MRF with the amount of organic waste processed and expenses for purchasing fuel.
Any comment:	

<b>Data / Parameter:</b>	Diesel density
Data unit:	Kg/l
Description:	Diesel density
Source of data to be used:	Special Issues Paper 9; 2004, <a href="http://www.iea.org/Textbase/work/2004/eswg/SIP9.pdf">http://www.iea.org/Textbase/work/2004/eswg/SIP9.pdf</a>
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.8516
Description of measurement methods and procedures to be applied:	n.a.
QA/QC procedures to be applied:	Indicated maximum value chosen in order to be conservative.
Any comment:	



<b>Data / Parameter:</b>	Emission factor of diesel
Data unit:	Kg CO <sub>2</sub> /kg
Description:	Emission factor of diesel
Source of data to be used:	CDM Small scale methodology AMS-1.B.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	3.2
Description of measurement methods and procedures to be applied:	n.a.
QA/QC procedures to be applied:	n.a.
Any comment:	

<b>Data / Parameter:</b>	O <sub>2</sub> content of organic waste during the composting procedure
Data unit:	percent
Description:	O <sub>2</sub> content of organic waste during the composting procedure
Source of data to be used:	Spot checks conducted by BNN staff
Value of data applied for the purpose of calculating expected emission reductions in section B.5	> 8%
Description of measurement methods and procedures to be applied:	Application of a portable oxygen meter can be used with lancets of at least 1 m length.
QA/QC procedures to be applied:	Sampling with a maximum margin of error of 10% at a 95% confidence level.
Any comment:	



### **E.7.2. Description of the monitoring plan for a SSC-CPA:**

The purpose of the monitoring plan (MP) is to provide a standard by which the BORDA NGO Network (BNN) will conduct monitoring. A CDM Management Unit has been established within the BNN organizational structure to manage the preparation and implementation phases of the proposed PoA. During the implementation the BNN will be responsible for organizing and supervising all of the monitoring activities and conduct certain parts of the monitoring through own staff. BNN will ensure the quality of data collection by intensive training of the MRF workforce during the capacity building phase and regular site visits.

#### **Monitoring by MRF workforce**

The first line of responsibility for monitoring is the CBO (community based organization). The BNN will supply CBOs with standardized monitoring sheets before the start of the first crediting period. These standardized monitoring sheets consist of two different parts; one financial report sheet and one operational monitoring sheet. The person responsible for filling in the monitoring sheets will be the MRF's supervisor. Completed monitoring sheets will be collected by BORDA's partner NGOs monthly. Parameters asked for in these monitoring sheets are as follows:

- Total quantity of waste treated in an MRF: Continuous monitoring will be volumetric by counting tricycle or truck loads of a defined volume brought to the MRF and applying a density factor to derive the weight. Every six months, the density factor will be calibrated by weighing tricycle/truck loads on a regular scale.
- The quantity of organic waste will be derived by applying a typical percentage to the total quantity of waste treated at the MRF. Every six months, the percentage will be verified by weighing the organic waste after separation from the total waste.
- Amount of fossil fuels (mainly diesel) consumed for the waste processing (shredding).

The information given on the monitoring sheets will be cross-checked by:

- The weight of compost produced. This will be measured by counting standardized boxes/packs of compost and applying a density factor to derive the weight.
- MRF income consisting of:
  - Compost sales
  - Recyclables sales
  - Household fees
- MRF costs consisting of:
  - Salaries for workforce, security
  - Machinery and vehicle service
  - Consumable goods
  - Fuel, Electricity, Water, Telephone
  - Transport of residue to TPA



### Monitoring by BNN workforce

The BNN will be the managing and coordinating entity and mainly work on the data aggregation as well as the operation of the electronic data management system. However, the BNN will also be responsible for those monitoring parts that need more sophisticated measurement techniques and those measurements not directly linked to the MRF's operation, respectively. These being:

- Oxygen content of compost; the oxygen content of a MRF's compost is measured annually to ensure zero emissions<sup>16</sup> from the organic waste. Measurements are conducted with a hand held oxygen meter with a lance (> 1m length) following the AMS-III-F methodology requirements on measuring the methane emissions during composting.
- In case of significant leachate (runoff water) from composting, volume and COD of runoff water will be measured annually. But pilot projects show that leachate is negligible.
- Soil application of compost.

### Data management system

The great number of MRFs under the PoA results in many sources of data generation, which requires a centrally managed database.

The CBOs report monthly to BORDA's partners NGOs by sending in the completed monitoring sheets where they are stored. Thereafter, BORDA's partners NGOs aggregate CBO data into quarterly reports and hand them over to BORDA where the data are integrated into the centralized electronic database. The centralized electronic database that will be used for the data storage has already proven to be suitable for community based projects within the BORDA NGO Network as it has been used for the monitoring of decentralized waste water treatment systems (DEWATS).

BORDA validates the data and, if necessary, requests missing data from BORDA's Partner NGOs. Once data collection is completed BORDA sends the Partner NGOs an updated version of the database.

<b>E.8 Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)</b>
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Date of completion: 18 December 2009.

Responsible:

Robert Müller, atmosfair gGmbH  
Jati Kusumowati, Wilko Smidt, Frank Fladerer, all BORDA

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<sup>16</sup> Emission factor for composting of organic waste can be set to zero, according to the AMS-III-F methodology p.8, when oxygen content of the composting process is above 8%.



**Annex 1**  
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**Annex 2**

**INFORMATION REGARDING PUBLIC FUNDING**

**Annex 3**

**BASELINE INFORMATION**

**Annex 4**

**MONITORING INFORMATION**

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