

Biofuel Value Chain Development in an African Oil Palm Plantation

Case: HONDUPALMA



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Introduction

This document summarises the systematisation of the project “Sustainable Biofuel Value Chain Development in an Existing African Oil Palm Plantation”, executed by SNV¹, WWF and HONDUPALMA, from October 2007 to March 2009, in El Negrito, Yoro, Honduras.

The purpose of the systemisation was to analyse the process followed in the design and implementation of the project and to identify the factors and key elements of: i) best agricultural practices (BAP) in production of African oil palm; ii) cleaner production (CP) in oil extraction and production plant; iii) bio-gas recovery project for the Clean Development Mechanism (CDM), in order to replicate and enlarge this experience at national and regional levels so as to share the lessons learnt throughout the process.

This document is divided into five sections. The first section presents a summary of the methodological process followed to carry out the systematisation of the project. The second section makes reference to the context in which it was developed.

The initial vision project (concepts, objectives, expected results, central themes, methodology and participants) is described in the third section.

The fourth section deals with the formulation, formalisation and execution of the process, focusing on three main subjects: Cleaner Production (CP), Best Agricultural Practices (BAP), and Clean Development Mechanism (CDM); and one cross cutting subject: Business Model with a Value Chain Focus.

Finally, the document includes the lessons learnt from the phases and the main subjects of the project, from which recommendations were derived to improve the implementation of the planned activities and achievements.

¹ A Dutch social enterprise that offers innovative solutions based on market demand, consultancies and technical assistance to eliminate poverty and inequity.

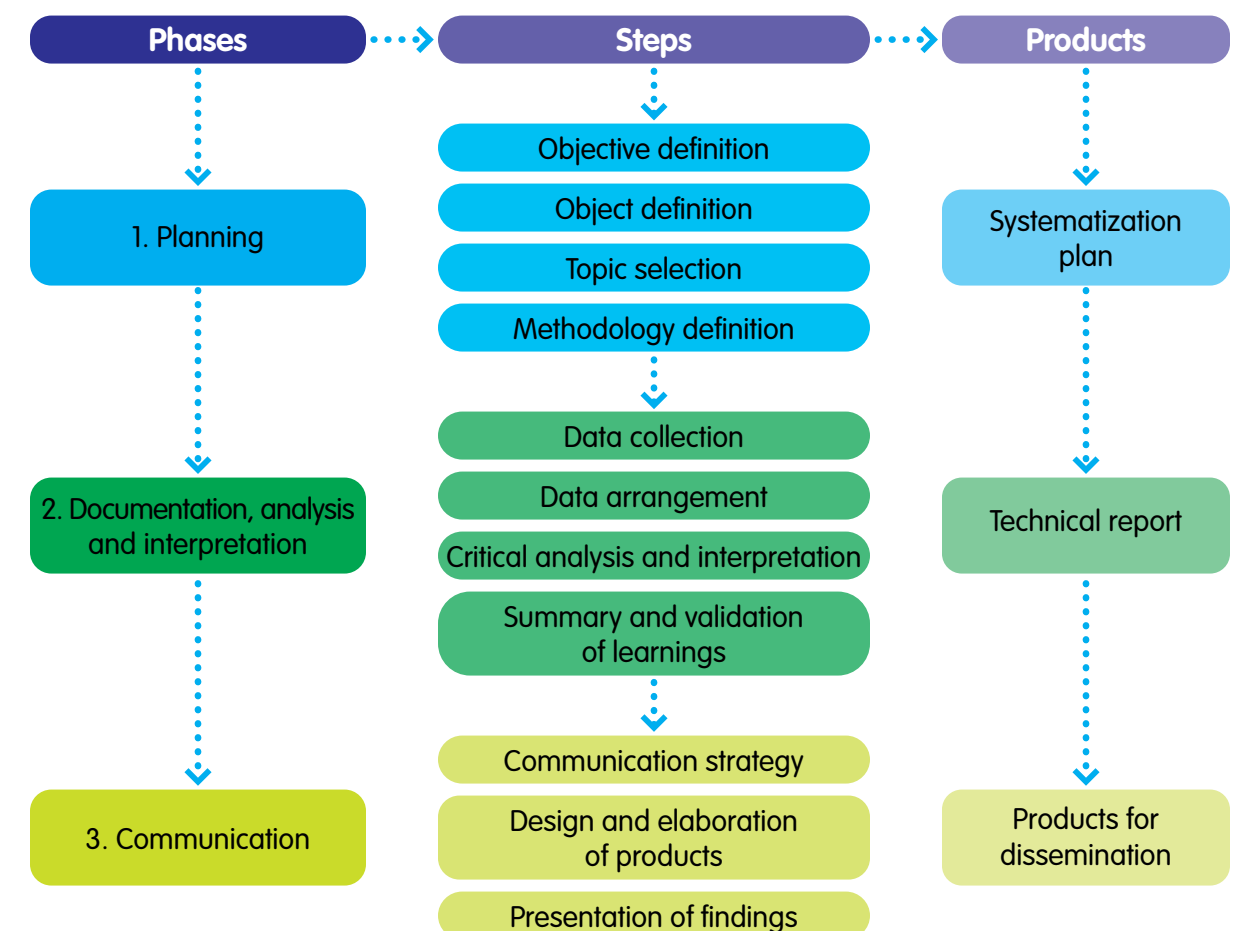
I. Methodological Note

The systematisation, as a process where reflection and critical analysis about an experience is made by its participants, allows to find the key elements that influence outcomes, through the identification of achievements and shortcomings of the projects and their participants; and,

therefore, to share lessons that could help to improve future interventions.

The method followed in order to systematise this experience identifies key periods that can be summarised in three phases: planning; recovery, analysis and interpretation; and communication (Fig. 1, below).

Figure 1. General outline of the systematisation process*



* *Guía Metodológica de Sistematización* (Methodological Guide to Systematise). Programa Especial de Seguridad Alimentaria. (FAO, 2004).

The knowledge recovery process required four work meetings during the life of the project in order to discern the best practices, to analyse the relationship among parties (WWF-SNV-HONDUPALMA), and to advise on how to improve project performance in relation to the main and cross cutting subjects:

Main Subjects

- CP in oil extracting and processing plants.
- » BAP in the production of African palm.
- » CDM in the obtaining of carbon credits by means of biogas recovery out of the effluents from the oil extraction plant.

Cross Cutting Subject

- » Develop a business model with a value chain focus.



The fruit of the African palm is transported to the extraction plant at HONDUPALMA.

II. Context

Although the tropical climate of Honduras favours the production of several commercial crops, the country continues to import most of its agricultural products. Nevertheless, the Government has adopted the cultivation of African palm, an established product for many years in the North Coast of Honduras, as part of its strategy to reduce poverty, to generate country's employment and revenues, and, at the same time, to solve the energy problem by means of biofuel production for the national public transportation sector.

The Government's strategy for biofuel production was based initially on the plantation of African palm, expecting to reduce the dependence on fossil fuel imports from its cultivation and conversion process to oil and later on to biodiesel.² This would allow the country to invest in initiatives to develop the national economy, creating new jobs³ and new alternatives for the generation of revenues in an economic growth sector; to promote rural agricultural development; to reduce the emissions of greenhouse gases, and to generate additional revenues under the Clean

Development Mechanism (CDM) of The United Nations Framework Convention on Climate Change (UNFCCC).

It is estimated that in the next 10 years the global demand for edible oils will increase substantially.⁴ For countries like Honduras, these products (edible oils) have a fundamental role in the growth of the national economy. However, the environmental impacts of this production will have to be evaluated to assure the balance between the natural, economic and social costs and the benefits.

In the area of environmental management, the country houses some of the largest tropical forests and biological reserves in Central America, which are a fundamental part of its natural and social capital. Therefore, the increase in food production and bio-energy in Honduras demands an opportune and appropriate addressing of the negative environmental and social impacts that can be generated by biofuel production and the expansion of the agricultural plantations.

² Fossil fuels represent 17.1% of the imports of goods and services of the country. Presentation, Presidential Adviser - Special Projects, Tegucigalpa 2007.

³ It has been estimated around 300,000 new posts have been created. *Idem*.

⁴ <http://www.fao.org/docrep/010/ah864s/ah864s07.htm>



Waste water treatment
at HONDUPALMA.
El Negrito, Yoro.

It was in this context that SNV and WWF in Honduras visualised that their work in this productive sector is an opportunity to leverage their capacities and contacts in order to mobilise investors, the corporate sector, communities, civil society organisations, public sector and consumers, to support sustainable practices such as implementation of Cleaner Production measures, development of CDM projects, and development of Best Agricultural Practices.

III. Project's Initial Vision

This section sums up the project as it was initially conceived (concepts, objectives, main subjects, methodology, and expected results).

3.1. Guiding Concepts

Best Agricultural Practices (BAP): this refers to the best practices used in the agricultural production to guarantee the quality and health safety of the final product. The purpose of these practices is to prevent risks that come from the environment or from the implementation of modern agricultural methods. Therefore, they include regulating the use of fertilisers, pesticides and measures to avoid the possible contamination of soil, water, etc.⁵

Cleaner Production (CP): this is an integrated preventive strategy that is applied to the processes, products and services in order to increase their efficiency and competitiveness, while reducing the risks for human beings and the environment.⁶

CP related to processes means:

- » Conservation of raw materials and energy.
- » Elimination of toxic raw materials use.
- » Reduction of the quantity and toxicity of all emissions and waste before they exit the processes.

CP related to products means:

- » Impact reduction along the life cycle of the products, from the extraction of raw material through to conclusion.⁷

Clean Development Mechanism (CDM): this is a mechanism under the Kyoto Protocol (KP), which allows governments and companies of industrialised countries (individuals or corporate entities, public or private organisations) to subscribe to agreements which fulfill the targets in reduction of greenhouse gas emissions, by investing in emission reduction projects in developing countries as a way to buy Emissions Reduction Certificates (ERCs) at lower costs than in their own markets.⁸

⁵ http://www.fao.org/ag/agn/food/quality_gap_es.stm

⁶ Programme of the United Nations for the Environment (PNUMA) 2005.

⁷ <http://www.pnuma.org/industria/documentos/pmlcp03b.pdf>

⁸ Mecanismo de Desarrollo Limpio: Conceptos Básicos. SNV, 2009.

The purposes of the Mechanism are: i) to assist developing countries to achieve a sustainable development; and ii) to assist the industrialised countries, signatories of the KP, to achieve their emissions targets.

HONDUPALMA. These small producers are participating in the emerging biofuels sector of Honduras, by means of a sustainable management of natural resources and climate change mitigation.

3.2. Project Objective

The objective is to generate more jobs and additional income opportunities for 30 cooperatives and companies formed by 600 small producers of African palm oil, brought together under the umbrella organisation

3.3. Expected results

The project set results for one, two and three years in the fields of employment and revenue generation, environmental aspects, policy development and enforcement, and knowledge management (see tables 1-4).

Table 1. Expected results in employment and revenue generation

After one year	<ul style="list-style-type: none"> » Reduction of health risks due to a lower exposure to chemicals by applicators, pickers and palm producers. » Need of additional employees (0.5 jobs / ha / year) in palm plantation. » Creation of 50 jobs for the conversion of organic waste. » Creation of 20 jobs for the conversion of dangerous residuals (petroleum and metal waste products).
After two years	<ul style="list-style-type: none"> » Net financial benefits coming from the sale of carbon credits for HONDUPALMA and its beneficiaries. » Revenues through the sale of electricity. » Contribution to the energy needs of the country by selling electricity. » Temporary job opportunities during the construction period.
After three years	<ul style="list-style-type: none"> » A 15% revenue increment for 600 beneficiaries due to cost reduction. » Revenues from organic processed rubbish sale. » Reduction of fertilizer and chemicals costs by 50%, which means a reduction of 50% of fertilisers and chemicals in the ecosystems and the surrounding environment (long term ecosystem functioning). » Savings of 5% of energy costs (cost reduction of up to 35% once the biogas plant is operating). » Savings in the cost of water extraction of 10%. » Savings in chemical and agricultural inputs of 15%. » Savings by means of the recovery of raw materials. » A reduction of a 5 to 10% in the costs of production of HONDUPALMA through the implementation of cleaner production.

Source: Project paper (WWF-SNV), 2007.

Table 2: Expected results in environmental aspects

After two years	<ul style="list-style-type: none"> » Reduction of the bunker use (extremely dirty fossil fuel) and consequently reduction in costs of imported fuels. » Reduction in greenhouse effect gases. » Improvement in air quality for the community (reduction of foul odors in the communities).
After three years	<ul style="list-style-type: none"> » Reduction of water consumption by 10%. » Reduction of energy consumption by 10%. » Reduction of hazardous materials by 10%. » Reduction of hazardous residuals by 25%. » 70% of organic products used in the productive process.

Source: Project paper (WWF-SNV), 2007.

Table 3: Expected results in policy development and enforcement

After one year	<ul style="list-style-type: none"> » The capacity of SERNA will be strengthened in CP policies (rules and regulations) and in the elaboration of guidelines for best practices for this emerging sector.
After two years	<ul style="list-style-type: none"> » HONDUPALMA and SERNA play an active role in CP and CDM lobbying.

Source: Project paper (WWF-SNV), 2007.

Table 4: Expected results in knowledge management

After one year	<ul style="list-style-type: none"> » Systematisation of the processes and identification of best practices with the objective of replicating and enhancing the experience to national and regional levels. » Dissemination of the lessons learnt in this emerging sector: among small producers, palm oil and other oil extractor plants, businessmen, as well as the government.
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Source: Project paper (WWF-SNV), 2007.

3.4. Project Components

The design of the project was based on five components that were synthesised in three main areas: Best Agricultural Practices (BAP), Cleaner Production (CP) and Clean Development Mechanism (CDM).

Conceived as an integral project, it would link the actions of the Ministry of Natural Resources and Environment (SERNA) and would strengthen knowledge development through systematising activities, producing videos and documenting case studies.

The **five components** that are described in the project paper are:

- » Implementation of Best Agricultural Practices (BAP) by HONDUPALMA's palm fruit producers.
- » Cleaner production (CP) to improve the competitiveness of HONDUPALMA, economically benefitting 600 producers of African palm.

- » Implementation of cleaner production technologies for the reduction of toxicity of the effluents and other environmental impacts in the process of palm oil recovery, contributing to operation cost reduction, modernisation of production structures, and technological innovation.
- » An initial analysis for a CDM Project related with the biogas recovery with the purpose of providing heat and electricity to cover HONDUPALMA's energy needs.
- » Capacity building for the elaboration of the National Policies for Cleaner Production by the Ministry of Natural Resources and Environment (SERNA) linking the emerging biofuels sector and its value chain.



The diagnosis and training were key activities in the analysis of the process.

3.5. Methodology

The project design indicates that the methodology would be based on consulting services, technical assistance, capacity building, political incidence, and dissemination of results as follows:

- » Assessment services and technical assistance in BAP to the beneficiaries.
- » Analysing the recovery plants *in situ* to make recommendations about cleaner production by measuring inputs and outputs.
- » Consulting and technical assistance services in the development of a business model which would demonstrate the financial and social benefits of CP and implementation of a CDM for HONDUPALMA.
- » Capacity building on processes and the development of CDM projects.
- » A systematisation (CD + documentation) of the learning processes and lessons learnt for the replication of the model.
- » Advocacy work on the part of SNV and WWF, together with other public/private groups involved and local capacity builders, with the purpose of promoting BAP, CP and CDM in the biofuel value chain.
- » Capacity building services for SERNA on palm oil production and biofuels sector related with cleaner production policies.
- » Final event, field visits with the press and exchange trips with the purpose to spread the acquired knowledge.

3.6. Foreseen Parties

WWF: The main focus of WWF is the conservation of natural resources by means of the Mesoamerican Agriculture Reef Programme (MAR), which seeks to establish collaborations and associations from grassroots to government level to develop a sustainable production of African palm, among other crops, through the voluntary implementation of Best Agricultural Practices⁹ (BAP).

WWF offers support to small producers of oil palm through the implementation of better management practices. WWF also carries out studies orientated towards promoting better management practices among producers of palm oil in the basin of the Aguán river.

WWF envisages that a structured planning of soil use and management (taking into account the forest landscapes, catchment areas and natural habitats) and better practices in the management of existing crops in the region can achieve conservation priorities. Through the Climate Change Programme, WWF also promotes the capture of Carbon Dioxide (CO₂) and sources of renewable energy, with the objective of developing mitigation strategies and adaptation for the global climate change.

SNV: The main approach of SNV is employment and revenue generation that support governmental and private initiatives in the cultivation of raw energy materials, focusing on sustainable and inclusive practices that take into account the environmental and social impacts of this productive activity.

SNV offers capacity building services in the biofuels sector through the promotion of public and private connections to implement spatial planning related with the production and expansion of raw material production, including the development of value chains and policies for national biofuel production and cleaner production.

⁹ Best Agricultural Practices implemented by WWF focus on oil palm cultivation and its production.

HONDUPALMA: it is an enterprise counting on some 30 cooperatives and company partners that bring together 600 associate members and 125 independent producers.

HONDUPALMA has an extraction plant of African palm oil that bases its operation in approximately 6,000 hectares of palm plantations with a production of 89,282 tonnes of fresh fruit a year, in turn producing 15,200 tonnes of palm oil a year.

This cooperative has a very participative businesses model and it is a leading agro-industrial producer. Its main products include vegetable oil, several forms of non-saturated fats and biodiesel made from the palm oil of low quality that cannot be sold as vegetable oil, but it is used as fuel for the routine operations of the company.

HONDUPALMA, in conjunction with two other companies, was involved in a government's pilot project to produce biodiesel and to supply fuel with a mixture of 20% palm oil to 500 public transportation buses in four of the main cities of the country.

SERNA: it is the regulating entity of environmental matters in the country. In relation to the project activities, it has the responsibility of facilitating voluntary initiatives of CP; making policies and evaluating the environmental impacts related to the emerging biofuels sector in Honduras.

It is also the national authority that endorses the projects proposed to the Clean Development Mechanism.

IV. Phases

This section presents the process followed during the design and development of the project, identifying actions, motivations, interests, limitations, achievements and results in each stage and subject.

The phases in which the process is divided are: i) project formulation and approval; ii) formalisation of agreements and commitments; and iii) implementation.

4.1. Project Formulation and Approval

The idea of the project arose out of the corporate alliance between WWF and SNV who signed an agreement¹⁰ to work together on environmental topics, market access and bioenergy.

One of the companies that fulfilled the requirements to be part of the project was HONDUPALMA because of it being a cooperative formed by small producers.

WWF was also interested in including this company among their allies because it is located in the area of influence of its Agricultural Programme in the Region of the Mesoamerican Reef (MAR).

Despite the contacts made on a technical level by SNV, WWF and HONDUPALMA, the board of HONDUPALMA did not participate in the initial conceptualisation of the project. The relationship with the board of directors began once the project was approved.

The selection and approval of the project was formally communicated to WWF and SNV in September 2007, the date in which they proceeded to form teams and appoint a coordinator for each organisation.

Once the coordinating team was installed, it began to establish the relationship with the HONDUPALMA board of directors. During this tripartite dialogue (September-October 2007), they defined the structure of the agreement that would formalise the working relationship between SNV, WWF, and HONDUPALMA. This agreement was negotiated in such a way that the three parts obtained benefits, allowing the execution of activities to begin immediately.

At that time, the motives and objectives of each party involved in the process were different but complementary:

SNV in Honduras was interested in the integrated approach to the African palm production chain, which takes into account

¹⁰ The purpose of the alliance is to put at the disposition of the national offices of WWF and SNV funds that can be obtained in a competitive way by means of the presentation of projects proposals in line with the guidances set at a world level by this alliance.

the small producers, likewise the added value that would be obtained by the generation of employment and increased revenues.

WWF was not so interested in working in the biofuels sector, but the opportunity was visualised as introducing the topic of best agricultural practices into African palm production, as well as the impact that could

be generated by making contact with the producers involved in the project.

Although HONDUPALMA did not participate in the initial formulation of the project, its interest was stirred by the integral approach linking environment management, agricultural practices and productivity, and business competitiveness.

Table 5. Facilitating and Restrictive aspects, achievements, and results of the formulation phase

Restrictive aspects	<ul style="list-style-type: none"> » An atmosphere of trust did not exist initially among the three parties; it was the beginning of a relationship in which there were also particular interests in each one of the institutions. » There was not a consolidated relationship among the parts to sign an agreement, and HONDUPALMA needed sufficient time to analyse and to make the decision to be involved in the project.
facilitating aspects	<ul style="list-style-type: none"> » Before the project was approved, a representative of WWF visited HONDUPALMA, and exchanged some ideas with the managers of the company that facilitated the taking of decisions. » The opportunity to have a study in progress on Gold Standard certification. » The openness in the communication style of SNV and WWF, establishing clear rules, as well as the fact of having a project deadline (one year). » WWF and SNV could demonstrate that it was feasible to wait so that HONDUPALMA could study the project in depth, demonstrating respect to the principles of the company and its internal governance (process of shared decision making).
Achievements and results	<ul style="list-style-type: none"> » Approval of project proposal at SNV and WWF corporate level. » Creation of an atmosphere of trust and respect among the three parties. » HONDUPALMA's approval to formalise a tripartite agreement.

4.2. Formalisation of Agreements and Commitments

The process of the signing of the tripartite agreement that formalised the execution of the project was a lengthy process. Within HONDUPALMA, the decision of being part of the project was made by the entire board of directors in conjunction with its general assembly, demanding a large investment of time and effort.

WWF also had protocols to follow for the signing of agreements, which needed the approval and signature of their office in Washington DC, USA.

SNV was responsible for the adaptation, translation, and negotiation of formats, but each party carried out its own internal revision and proposal process which showed several internal communication problems between national and corporate or international level.

Table 6. Restrictive and facilitating aspects, achievements and results of the formalisation of agreements and commitments phase

Restrictive aspects	<ul style="list-style-type: none"> » The fact that the formalisation of the agreements would demand a lengthy negotiation process was ignored during the planning process. » HONDUPALMA was worried about information confidentiality and they asked for more explicit clauses to be included in the agreement. » The communication channels between WWF and SNV were not clearly defined, as well as WWF internal communication channel. » The contribution offered by HONDUPALMA (a study for CDM project) needed an alternative method of acceptance by the parties that was not defined in the tripartite agreement.
Facilitating aspects	<ul style="list-style-type: none"> » Flowing communication and trust among the parties. » An acceptable alternative method was defined allowing all the parties to recognise HONDUPALMA's contribution to the execution of the project. » Decision making was undertaken jointly.
Achievements and results	<ul style="list-style-type: none"> » The signing of the tripartite agreement (January 2008). » Recognition of HONDUPALMA's contribution (February 2008).

4.3 Project Implementation

To begin with the activities planned in the project, WWF and SNV met to define 2008 operational and budgetary planning. They also set general deadlines for the project.

Cleaner Production:

The terms of reference elaborated by SNV and WWF for the recruiting of consultancies for the diagnosis of cleaner production in the extraction, oil refining and packing plant were revised. In a selection process by direct invitation to several companies, the three parties agreed to hire the National Center of Cleaner Production and Environmental Technologies of Colombia.

Links with SERNA were established to present the project and gain the involvement of this Ministry in the implementation of it. Action was taken to formalise the relationship between SERNA and SNV.

After hiring the National Centre of Cleaner Production and Environmental Technologies of Colombia (CNPMLTA), the project set its timescale and began information gathering before the first work visit of the experts.

The formal activities began when the authorities of SERNA (Dirección de Gestión Ambiental - DGA) visited HONDUPALMA and presented the Cleaner Production Policy and its repercussions on companies .

During the first field trip, HONDUPALMA's staff, SNV advisors, and DGA/SERNA officials were trained on Cleaner Production by CNPMLTA experts, who also carried out activities of information gathering for the diagnosis.

One of the results of SERNA's visit to HONDUPALMA was the participation of HONDUPALMA and SNV in the workshop on voluntary agreements of CP promoted by SERNA.

HONDUPALMA committed itself to the development of CP measures, even considering hiring a person specifically to implement these measures because of the amount of work required.

During the second field trip, in which officials of SERNA and SNV advisers were also present, CNPMLTA experts identified opportunities in the extraction, oil refining and packing plant. They concluded the activity with a presentation before the board of directors of HONDUPALMA, where several recommendations were made in order to reduce biofuel consumption and the residuals from the plant with minimum costs for the company.

The technical personnel of HONDUPALMA could verify the company's loss by using bunker fuels, in comparison with diesel. The energy instability was emphasised because of energy lost in form of steam.

In the methodological part, they gathered information on the environmental impacts, characterising each one of the identified points, assigning grades in order to consolidate the diagnosis of the company's environmental impact.

In this opportunity, HONDUPALMA committed to revise the control of smoke emissions into the atmosphere, analysing some technological (but inexpensive) proposals to complete the quantitative part of this aspect.

They also decided to begin with the implementation of the obvious measures to reduce the environmental impacts derived from the productive process.

Between the second and third field trip of CNPMLTA, SNV in coordination with SERNA organised the company's participation in a national event on Cleaner Production in which they would present the goals achieved by HONDUPALMA in this topic.

However, due to an internal situation caused by the unexpected absence of the General Manager, the presentation was made by SNV.

During the third field trip of CNPMLTA, HONDUPALMA began the execution of the plan for the integral handling of rubbish (with the separation of rubbish at the source and location of deposit sites). Improvements were made in the heating, in the network system plant, and leaks were detected. They concluded the diagnosis matrix on environmental aspects; responsibilities were assigned for follow up in the plant; gas meters were installed; mixtures of ash with cement for brick tests were made and tests of mud were made using a decanter¹¹, for mixtures with almond flour for concentrate. All the above mentioned was part of the recommendations based on the diagnosis on CP developed jointly among the personnel of HONDUPALMA, SNV and CNPMLTA.

Best Agricultural Practices: activities began after signing a bilateral agreement between WWF-CA and HONDUPALMA. Prior to the signature of the agreement, high-priority areas had been identified:

1. **Nutrition:** production of organic compost with rubbish from the plant.
2. **Ground cover cultivation:** to reduce the erosion of soil and use of pesticide.

Once the base line was established, a consultant was hired to carry out pilot trails and define a protocol for compost production.

This protocol shows that the process of oil extraction from the palm produces an important quantity of organic (solids and liquids) waste that can easily be recycled after a composting process.

On average, 1 metric tonne of processed fruit bunches produces around 0.2 metric tonnes of empty bunches, that are thrown away after the fruits have been removed during the fruit separation process.

Similarly, during the oil extraction process of 1 metric tonne of fruit bunches; about 500 kilogrammes produces (around 0.5 m³) of liquid waste, the majority in the form of liquid effluents from the extraction plant.

To better understand the process implemented, an exchange of experiences took place with a similar company to HONDUPALMA in Guatemala, in which technical personnel of HONDUPALMA and the WWF and SNV advisory team participated.

Table 7. Cleaner Production: Restrictive and facilitating aspects, achievements and results

Restrictive aspects	<ul style="list-style-type: none"> » Linking SERNA with the project was difficult due to personnel change and the still ongoing processes in the formulation of the CP Policy. » At the beginning, the meanings of CP and CDM were not clear to HONDUPALMA's members. » The time that was invested by each one of the plant managers for the development of CP practices demanded an additional effort above and beyond their ordinary responsibilities » Filling out some of the formats for the diagnosis was somewhat complex for the personnel of HONDUPALMA. » The absence of the General Manager of HONDUPALMA held advances back; therefore decision making became a little more complex. » There is no a department responsible for the development of CP measures and the continuity of the project.
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¹¹ The separation Funnel is a conical glass recipient. It presents an inferior drainage whose flow can be regulated by means of a tap or valve... (http://es.wikipedia.org/wiki/Embudo_de_decantaci%C3%B3n)

Facilitating aspects	<ul style="list-style-type: none"> » The formalisation of a work agreement between SERNA and SNV through the involvement of the Environmental Management Office and the Unit of Climate Change in the activities of the project. » The visit of SERNA to HONDUPALMA contributed towards clarifying CP and CDM concepts. » The training on CP offered by SNV and CNPMLTA boosted HONDUPALMA commitment on this matter. » Working with SNV and CNPMLTA involved more people in this topic. This contributes to the continuity and sustainability of future measures. » The availability of the SNV advisers in supporting data collection at HONDUPALMA. » The joint work between CNPMLTA and HONDUPALMA to complete information required for the diagnosis. » The willingness of the parties to adjust the timing and planning of activities and the participation of new members of HONDUPALMA's board of directors and General Manager. » An environmental management position was proposed to the board of directors and General Manager, who were open to considering this proposal.
Achievements and results	<ul style="list-style-type: none"> » SERNA recognised that the project is a pioneer in the implementation of CP policies. » The training on CP helped to improve awareness of the economic losses of the company and the importance of competitiveness, besides awareness of the environmental impacts of the productive process. » Technical personnel of HONDUPALMA were able to internalise the main concepts linked to CP and the terminology related to water management, energy, and solid and liquid wastes. » This internalisation allowed personnel opinion to be influenced about the financial implications for the company. It also raised awareness about the importance of mitigating environmental impacts. » The internalisation of the CP component and the need to take actions that allow an increase in the competitiveness of the company. » Inside the structure of HONDUPALMA, a working group called the CP team was formed during the diagnosis. » There were aspects identified to improve the productive process and generate savings for the company. » The personnel involved in the development of the diagnosis and the activities of the project could take on the activities and finish them. » The CP diagnosis was concluded and it includes recommendations to improve the productiveness of the company.

As a result of this exchange, HONDUPALMA was ready to register statistical data and to proceed to the compost addition to the soil using the following available materials:

1. Solid residuals. Empty Fruit Bunches (RFV).
2. Liquid residuals. Effluents from the extraction process coming from the extraction plant and deposited in the anaerobic lagoons (EPE).

The compost technology proposed in this project is part of several activities to reduce the potential contamination by the residuals from oil palm extraction in the atmosphere, soil, and underground water, by using the aerobic composting of solid residuals (RFV) and the extraction plant effluents (EPE).

The production and use of compost will reduce considerable quantities of methane that otherwise would be released in an uncontrolled way to the atmosphere; and its addition to the soil will contribute significantly to recycle important volumes of organic material and to add its qualities to soil fertility: important quantities of nutrients that reduce the use of chemical fertilisers, without reducing the potential yield.

With the objective of developing the composting technology out of the residuals (RFV) and effluents generated by the extraction plant (EPE) of HONDUPALMA, using local available technological resources, the estimated data obtained is presented in Chart 1:

Chart 1. Estimated production of solid (RFV) residuals and liquids (EPE) of HONDUPALMA extractor plant

Waste type	Extraction Plant Capacity of HONDUPALMA (80 MT/h)		
	per hour	per day	per year
(RFV) Empty Fruit Clusters (MT)	20	320	3,840
(EPE) plant Effluents (m ³)	40	800	9,600

Source: WWF-CA, 2008.

Solid and liquid wastes to be used in the compost process. Empty fruit bunches and effluents from the extraction plant deposited in the anaerobic lagoons.



The activities in this theme concluded with a workshop on Best Agricultural Practices that included the socialisation of the approach of the roundtable discussions about the Sustainable Development of African Palm in the region; and HONDUPALMA's working experience in cleaner production as better management practice.

Table 8. Best Agricultural Practices: Restrictive and facilitating aspects, achievements and results

Restrictive aspects	<ul style="list-style-type: none"> » The communication between WWF and SNV lacked fluency throughout the process. » All the components of this theme were defined, but there were no deadlines established to accomplish achievements. » Insufficient raw materials for activities dealing with BAP.
facilitating aspects	<ul style="list-style-type: none"> » There are good interinstitutional relationships: honesty, frankness and respect among the parties. » Responsibilities for the flaws were accepted and a commitment to improve was taken. » Deadlines were established for the implementation of activities and a planning and exchange of experiences meeting.
Achievements and results	<ul style="list-style-type: none"> » A Work Plan agreed. » Work issues identified with HONDUPALMA to implement BAP. » An exchange of experiences was carried out with an homologous company of HONDUPALMA in Guatemala to know the process of composting. » The methodology was developed and a protocol for compost making was outlined (taken from the example shown in Guatemala).

Clean Development Mechanism

The activities started when HONDUPALMA shared with SNV the feasibility study for its CDM project that was identified as a contribution of HONDUPALMA to the project.

SNV committed itself to advising HONDUPALMA in the analysis of alternatives for the development of its CDM project, for which they contacted different companies developing projects and they offered services of intermediation for the buying and selling of Emission Reduction Certificates (ERCs).

At the same time, SNV established and formalised relationships with the Climate Change Unit (CCU) of SERNA to organise a training activity for HONDUPALMA's Board of Directors and technical personnel on the role of this Ministry in relation to the CDM process.

As a result of this meeting, SNV with the help of the CCU contacted the United Nations Development Programme (UNDP). At that moment, UNDP was identifying projects with high social and environmental impact to support the development of CDM projects.

SNV promoted and accompanied UNDP's first visit to HONDUPALMA in which UNDP introduced its offer to the company. This contact was an opportunity for HONDUPALMA to know other options to take into consideration during the decision making process regarding the CDM project.

After analysing options and offers from different companies and organisations, HONDUPALMA decided to work with UNDP. At the end of 2008, they negotiated and signed the Emissions Reduction Purchase Agreement (ERPA).

While the UNDP worked on the Project Idea Note (PIN) and the Project Design Document (PDD), SNV was involved in all the phases of the project and continued with its consultancy service of monitoring prices of the EUAs (European Union Allowances) and ERCs (Emissions Reduction Certificates) for HONDUPALMA.

Also, as a product of this experience, SNV with the endorsement of SERNA published a guide on CDM targeted towards the business sector.

Table 9. Clean Development Mechanism: Restrictive and Facilitating aspects, achievements and results

Restrictive aspects	<ul style="list-style-type: none"> » Little understanding of the company's staff on the CDM cycle project and the different alternatives for developing the project, as well as brokering the purchase and sale of ERCs. » Reduced access to financial sources for project infrastructure. » Difficulties in carrying out further monitoring on performance and deadlines established with UNDP.
facilitating factors	<ul style="list-style-type: none"> » The training offered by the UCC/SERNA helped HONDUPALMA for a better understanding of the CDM cycle projects, including the role of this Ministry. » SNV technical assistance in the analysis of the different market options for the development of CDM projects. » The creation of the HONDUPALMA Renewable Energy Company has allowed them to obtain benefits from the Renewable Energy Law. » SNV commitment to provide technical assistance and monitoring until the project is finished.
Achievements and results	<ul style="list-style-type: none"> » With the support of SERNA and SNV it was possible to identify and to analyse the proposal of UNDP and others coming from different project developers. » UNDP was selected as a CDM project developer. » HONDUPALMA knows the trends of international carbon market through fortnightly and monthly bulletins that SNV elaborates and sends to them.

Business Model with Value Chain Focus

In early 2008, it was necessary to conduct a study to identify strategic opportunities arising from environmental mechanisms that could add value to the current chain and benefits to the competitiveness and profitability of the value chain in HONDUPALMA.

Terms of reference were written for the selection of a researcher that could work on the chain approach of the project as a cross cutting subject (see project methodology).

Masters-level students from several universities in Europe, the United States and Latin America were invited to participate. The student's profile requirements were: Master graduate with experience in the environmental, management or agro-industrial sectors; experience and knowledge in development of value chains in the agricultural industry and biofuels sector; experience in the analysis of the Latin American context, as well as Spanish language knowledge¹².

¹² The final selection was a student of the Master of Science, Environment and Development of London School of Economics and Political Science (LSE).

The Study analysed the following elements:

1. The synergy between the implementation of better agricultural management practices and cleaner production, focusing on their economic, social and environmental benefits.
2. The development of businesses services necessary to improve the development of the value chain and its competitiveness.
3. The development of businesses to improve current chain and its competitiveness.
4. The current value chain of HONDUPALMA and the opportunities and limitations to improve competitiveness.

Among the activities undertaken the most important ones were:

- » Preliminary discussion on the focus of the study with HONDUPALMA, SNV and WWF project team.
- » Definition of objectives and expected results and elaboration of the work plan.
- » Preliminary investigation (bibliographical) about the possibilities of adding value to the palm oil productive chains.
- » Analysis of value chains of the African palm of HONDUPALMA (design of instruments and methods for gathering and analysis of information, definition of key points and competitive advantages of the value chain).
- » Qualitative investigation that was carried out interviewing several key participants working with palm producers and cooperatives.
- » Qualitative and quantitative field investigation by means of questionnaires and in depth interviews with small local producers to have an idea of the current situation, capacities and trends (and the possible resistance) of the producers.

- » Analysis of the gathered information, writing up results (draft).
- » Discussion of preliminary results with the interested parties.
- » Formal presentation of the results in digital and printed form.

The Study identifies strategies that focus on environmental, social and economic sustainability.

These strategies were classified as follows:

1. To increase innovation and efficiency of internal operations:

It presents methods to increase the competitiveness of HONDUPALMA's internal operations considering the production and current value chain, analysing local, national and international activities that can also contribute to the competitiveness in view of future expansion in the biofuels production in HONDUPALMA.

- » African palm plantation productivity.
- » Extraction plant productivity.
- » Competitiveness of the national biodiesel chain.
- » International initiatives for biodiesel competitiveness.

2. Replacement of cooking oil with biodiesel production

It provides an analysis of factors to take into account and scenarios associated with the substitution of cooking oil with oil for biodiesel production.

3. Expansion of palm cultivation

It proposes a business model and financial cost analysis as an instrument for decision making in the company.

V. Lessons Learnt

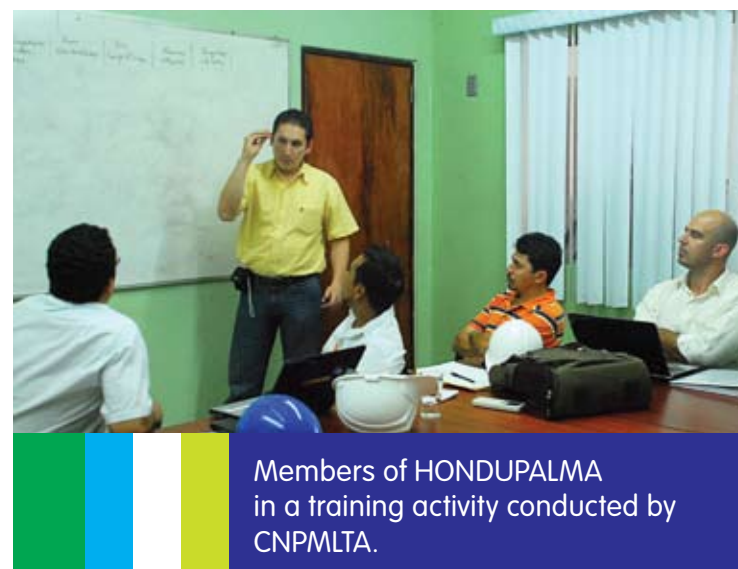
The following lessons were identified in each phase:

Project Formulation

- » To involve the interested party (the client) from the beginning of the proposal and to know better its work philosophy and its internal governance.
- » When planning a project, it is necessary to strike a balance between proposed results, period of execution and budget (in this particular case, project results were over-estimated and the budget was undervalued).

Formalisation and Signature of Agreements

- » It is necessary to understand the other party's views to be flexible in the development of the activities in order to find ways through bottle necks, without setting back the process. Innovation, creativity and communication are key elements.
- » It is important to clarify or to accurately define the administrative procedures at an international level in order to avoid setbacks while conducting activities. It is also important to be administratively prepared for the management of the projects; for SNV this experience has been a challenge.
- » During the planning phase of a project it is important to consider an adequate period of time for the formalisation of relationships, foreseeing difficulties and inconveniences in this matter.



Members of HONDUPALMA in a training activity conducted by CNPMLTA.

Project Implementation

Democratic decision making, benefiting team work and project execution are necessary to overcome small obstacles caused by different opinions.

- » Those responsible for each organisation should not delegate their functions in the decision making process, since institutional representation is their responsibility.
- » It is important to look for pro-activity in the entire agreement and decision making process. The consent or the approval of the parties that have not expressed their opinion in the proposed time frame cannot be assumed.
- » The systematisation undertaken parallel to the execution of the project allows for critical reflection of the process in order to improve actions. It also guarantees documentation of the process.

Cleaner Production:

- » Each institution and organisation involved in the activities of this subject assumed its roles and commitments appropriately (balance) allowing for important achievements and easily overcoming process limitations.
- » The CP diagnosis was undervalued in the budget planning; however, negotiation in the terms of reference and certain flexibility in budget handling allowed the development of the proposed activities and achieve expected results.
- » The role of SERNA as a companion and SNV as an adviser was relevant as HONDUPALMA assumed the voluntary commitment to apply the clean production policy in its production processes.

- » The diagnosis work on CP counted on the support of SNV for filling the forms (remotely), but it would have been opportune if this was offered on site as a way to strengthen technical personnel skills of HONDUPALMA. In similar experiences, the HONDUPALMA personnel can assume this type of responsibility without the supervision of an external organisation.
- » The board of directors, General Manager and technical personnel of HONDUPALMA recognised that the implementation of several CP measures (denominated as “obvious”) did not require a big investment, only making small changes that increase company’s competitiveness.
- » HONDUPALMA proved that they had many plant losses that were considered as “normal” before the diagnosis process. Now it is aware that this situation can be improved.
- » Management involvement and appointing a department that could take charge of CP measures development are important actions. Thus it is necessary to consider a detailed budget for putting into practice the recommendations of the diagnosis.
- » The involvement of SNV during the diagnosis could have been more direct; it could have participated in a more active way during its execution.
- » The diagnosis has revealed great saving opportunities for the company; it can achieve a better energy balance and an economic recovery out of waste separation.



Best Agricultural Practices looks to improve the conditions the African Palm is being produced.

Best Agricultural Practices:

- » Since they didn’t have the experience or knowledge of the subjects dealing with, the two advising organisations of the project should have had a joint responsibility for all of them. It was agreed that BAP subject would be assumed by WWF due to its experience; however, SNV could have played a more active role by contributing to the strengthening of BAP activities and to improve the general operation of the project.
- » It is important to carry out combined planning and fulfill the planned activities in a responsible way. Time represents an economic investment and this should be taken full advantage of.

- » The company was committed to carrying out the compost tests; however greater involvement and commitment was needed by WWF to achieve the expected results.
- » It is important to show the advantages of implementing BAP to HONDUPALMA partners and members in order to implement them in a sustainable way, according to the methodology and protocol developed within the project.

Clean Development Mechanism:

- » The agreement among several sectors and SNV’s support helped to analyse more options for decision making in HONDUPALMA CDM subject. The role of SERNA was important for the establishment of links with UNDP, a developer of CDM projects with a focus in projects with a wide social impact.
- » The general development of activities has allowed the company to rely on other available opportunities to develop CDM projects or to increase the potential of the project that is already in progress. In this sense the alliance between SNV and HONDUPALMA has allowed a win- win relationship.

Abbreviations and Acronyms

CER	Certificate of Emission Reduction
CNPMLTA	National Centre of Cleaner Production and Environmental Technologies of Colombia
UNFCCC	The United Nations Framework Convention on Climate Change
DGA	Environmental Management-Natural Resources and Environment Secretary
EPE	Extraction Plant Effluents
ERPA	Emissions Reduction Purchase Agreement
EUA	European Union Allowances
EUR	Emissions Units for Reduction
GEG	Greenhouse Effect Gases
HONDUPALMA	Oil Palm Company S.A., Honduras
CDM	Clean Development Mechanism
MAR	Mesoamerican Reef Programme or Agricultural Programme in the Region of the Meso-American Reef
BAP	Best Agricultural Practices
CP	Cleaner Production
PDD	Project Design Document
PIN	Project Idea Note
UNDP	United Nations Development Programme
KP	Kyoto Protocol
PP	Project Proponent
EFC	Empty Fruit Clusters
SERNA	Natural Resources and Environment Secretary
UCC	Unit of Climate Change - Natural Resources and Environment Secretary
WWF	World Wildlife Fund

