

Corporate Biofuels Training

Honduras, 29 November – 3 December 2010

Training Report (final), February 2011

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SNV

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A word of thanks

The first SNV Corporate Biofuels Training could only be made possible thanks to the organising skills of the SNV/Honduras team. Together with project leader Martijn Veen (SNV/Peru), the team managed to arrange a very useful learning event. The five-day training schedule provided ample opportunity for interaction on biofuels dynamics among colleagues from different regions. The strong focus on field excursions and meetings with partners and farmers was very well appreciated. Thanks go out to all the participants for taking the effort to travel to Honduras backed up with their enthusiasm to absorb the biofuels scene in the country and ready to share valuable experiences. Edward Allen (LIRE, Lao PDR) expressed his gratitude as follows: "It was amazing how good the program was, how much I learnt every single day, from the teaching and all of you. SNV Honduras' contribution was frankly far beyond generous; your work and projects were amongst the finest I have ever seen."



1. Introduction

SNV has been shaping innovative biofuels programmes since 2007. Currently, three SNV regions are actively involved in biofuels activities: Latin America, East & Southern Africa and West & Central Africa. Especially SNV Latin America (SNV/LA) has invested strongly in the sector and has developed successful programmes across the region. Focusing on knowledge development, Inclusive Business, Value Chain Development and Inclusive Public Policy approaches, SNV/LA has gained a lot of experience and knowledge concerning the set-up and implementation of biofuels programmes benefitting local communities (and companies). These experiences can be helpful to other regions and countries which are in an earlier stage of building up a biofuels practice. On the other hand, sharing experiences from other regions contribute to a global picture of the SNV biofuels practice and help identify knowledge improvements to sustain activities, but furthermore have a clearer future perspective of investing in this dynamic sector.

Therefore, the first SNV Corporate Biofuels Training was held from 29 November to 3 December 2010 in Honduras. Honduras was identified as the most appropriate place to have a strong training programme, involving practical field work and interaction with several experienced biofuels advisors.

This training report provides an overview of the training week. It aims to give insight in discussed biofuels feedstocks, value chains and approaches in different contexts, accompanied with field trip experiences; key discussions held, including those with SNV's clients and farmers.

PowerPoint presentations given during the week can be accessed via this report through (double-) clicking of the presentation titles as highlighted in chapters 3 to 7. The presentations are backed up with key introductions, but the latter are only complementary to the PowerPoint presentations.

2. Objectives and methodologies

2.1 General objective

Provide an introduction into the context, opportunities and constraints of biofuel production in relation to poverty reduction, while strengthening the community of SNV advisors (potentially) working on biofuels worldwide.

2.2 Specific objectives

- Get to know and exchange views regarding potential impacts of biofuels production and opportunities for sustainable production with inclusion of small holders.
- Give an introduction in the Inclusive Business concept, methodologies and applications in the biofuels sector, in different value chains (oil palm, jatropha, corozo, sugar cane, coffee waste), with both large and small-scale companies.
- Get an overview of methods and results in fomenting public-private platforms and public policy development regarding biofuels at both national and sub-national level.
- Introduction to experiences in "local production-local consumption" projects of biofuels, attending local biofuels markets and local energy needs.
- Discuss baseline circumstances for SNV intervention in biofuels:
 - Analysis of opportunities and risks;
 - Definition of viable scenarios and value proposition of SNV.
- Joint learning, knowledge exchange and strengthening an interregional network of SNV advisors working on biofuels, building on SNV approaches and orienting roles and working strategies for SNV biofuel programs and possibilities for joint resource mobilization.

2.3 Methodologies

- Learning in practice during field visits;
- Presentations, dialogue and discussions in plenary sessions;
- Coffee breaks, lunches, dinner and joint travelling time allowed for further (one-on-one) knowledge exchange, networking and team building between SNV colleagues.

- Study material (key articles and documents) were provided in anticipation in order for participants to prepare themselves for the event in advance.

2.4 Participants, trainers and support

To email one of the participants, trainers or support staffs, please click their name.

Participants:

Name	Country	Function
Ruben Gallozi	Honduras	SNV Biofuels advisor
Guy Dekelver	Kenya	SNV Regional Network Leader RE/Non-biogas
Edward Allen	Lao PDR	Bioenergy Program Manager at LIRE
Fred Marree	Netherlands	SNV Corporate Knowledge Network Facilitator – RE
Ricardo Balarezo	Peru	SNV Advisor IB and public-private partnerships
Bert van Nieuwenhuizen	Rwanda	SNV Regional RE/Non-biogas Advisor
Tayeb Noorbhai	Tanzania	SNV Renewable Energy/Biogas Advisor
Kapalu Muswala	Zambia	SNV Biofuels advisor
Namakau Mwanangombe	Zambia	SNV Biofuels advisor

Trainers / participants:

Name	Country	Function
Martijn Veen	Peru	SNV Bioenergy advisor
Bella Sosa	Honduras	SNV Advisor bioenergy & clean production
Damien vander Heyden	Honduras	SNV Country manager
Dario Oyuela	Honduras	SNV Biofuels advisor
Evelyn Hernández	Honduras	SNV Public policy/biofuels advisor
Svetlana Samayoa	Honduras	SNV Carbon Finance Advisor
Gina Canales	Honduras	SNV Inclusive Business consultant

Support:

Name	Country	Function
Bessy Carolina Mejia	Honduras	SNV Logistics Officer
Elida Carolina Rápalo	Honduras	SNV General Support Officer
Maria Jimenez	Honduras	SNV Financial Officer
Sobeida Lara	Honduras	SNV Logistics Officer



3. Day 1: Introduction into biofuels, SNV approaches and programmes

Date: 29 November 2010

Venue: SNV office Tegucigalpa

3.1 General introduction into biofuels

A general introduction into the context of biofuels production, types of biofuels opportunities and risks was provided to set the context of the training. Main conclusions were:

- In spite of the economical crisis and criticism, the biofuels sector keeps developing itself, with *large investments* of the private sector and promoted by public sector;
- The sector presents *risks* (food versus fuel; land use change, etc.) but at the same time important *opportunities* for economic development with social inclusion;
- There is a need to contribute to the development of *adequate business models* and the identification of production schemes based on criteria for sustainability and inclusive business that contribute to local economic development;
- *R&D is key*: knowledge development, technical innovation and concrete cases to demonstrate best/next practices. This is most developed in LA, less in Asia and Africa;
- Public-private partnerships and development of *integrated policies* are needed to facilitate a sustainable and inclusive development for the biofuels sector.

3.2 Introduction into Inclusive Business (IB), Inclusive Public Policies (IPP) and Knowledge Development (KD)

The approaches IB and IPP were developed in LA as niche market strategies. KD was an imperative pre-investment to make these approaches operational. A list of RE projects in Honduras (value 1.6 million US\$, 2010-2012) and the rest of Central America (CA) is provided.

Inclusive Business

SNV advises how (large) companies can improve their business by including low-income communities in their value chain, seeking the combination of social impact (e.g. jobs, income, access to finance for small-holders, quality TA) and business impact (e.g. improved access to feedstock, sales increase, access to specialty markets, etc). The IB work is structured in three primary working areas (supply chain management, new markets & growth and new investment opportunities). For example, SNV advises and designs new business models

(considering social impacts and business benefits based on sustainability) together with biofuels companies and assists them to find funds to cover new investment costs. SNV then assists in the implementation of the IB project (after having provided TA in development of IB plan and base line study), according to the needs of the clients and priorities of the donors (such as IADB, an important partner of SNV in implementation of IB programs). More info: www.inclusivebusiness.org

Inclusive Public Policy

Current activities in public policy development (national and sub-national) include: linking SNV advisers to ministries and government departments (national and sub-national level) in Honduras, El Salvador, Nicaragua, Ecuador and Peru to advocate on laws and policies. SNV's work is focused on enabling an inclusive business climate for biofuels development, taking sustainability criteria into account.



Knowledge Development

The knowledge products from SNV/LA includes mainly studies on feasibility assessment, market potential, value chains, feedstock facts, regulatory frameworks and impact assessments of biofuels development. These knowledge products have contributed to the positioning of SNV in the bioenergy sector in LA, and provided an important basis for resource mobilization. Please [click here](#) to view SNV's Renewable Energy Publication Library.

3.3 Carbon markets and its potential for the biofuels sector

Key features of the compliance and voluntary carbon market are elaborated on. A comprehensive example is provided what the expected carbon credits can be from a Jatropha project (providing referential figures for a 10,000 ha plantation). CO₂ emissions can be reduced by reforestation of degraded land with Jatropha trees, and the produced biodiesel, biomass and biogas can substitute fossil fuels in power plants. Information on what can be claimed, which methodology can be used, and demand from the buyer is examined.



Experiences show that it's very important to determine in the beginning of a project who owns the carbon credits. SNV/LA's role in the carbon market is explained (knowledge studies, supporting small initiatives, partnerships). In the IB Jatropha pilot, SNV receives funds from DANIDA to develop a small-scale carbon project (400ha with small-holders) a private company (1,400 ha project in total) to achieve the necessary scale. Goal is to open up the carbon market for small producers.

3.4 Cases: Peru, Honduras and Zambia

Peru: Environmental and socio-economic impact assessments of biofuels production

Based on a global partnership with WWF in bioenergy (with subproject implemented in Asia, Africa and LA), SNV and WWF conducted a project in the Peruvian Amazon to:



- gain better understanding of the sector;
- examine potential environmental and socio-economic impacts and risks;
- get insight in best practices and concrete opportunities;
- promote better understanding within public and private sector and civil society on criteria, strategies and policies for inclusive biofuels promotion;
- define roles and niches of both SNV and WWF.

The conducted Life Cycle Analysis (LCA; environmental impacts including GHG balance) focused on cultivation of oil palm and jatropha in three different scenarios: primary forest, secondary forest and degraded forest land. [Download both the environmental and socio-economic impact assessments here \(written in Spanish; English summary included\).](#)

Peru: IB applications in the biofuels sector, San Martin

The Biofuels Program of the San Martin region (PROBIOSAM) comprises the following key features:

- Environmental sustainability: application of the Economic-Ecologic Zoning (ZEE) study to guarantee implementation of biofuel feedstock in already deforested areas without actual use, assuring food security;
- Inclusive Business: contribute to inclusion of local farmers in biofuel value chains;
- Almost 3 million US\$ investment from the Regional Government to develop the Jatropha value chain in the region (investigation & promotion).



Regional mapping has been done and policies are in place. The pre-feasibility studies include identification of suitable areas (degraded areas without actual use), producers, associations and communities, and a socio-economic baseline. A public-private platform was created for knowledge exchange and to assure sustainable and inclusive development of the biofuel sector. Up to date, some 15 Jatropha initiatives are being implemented in this region within Peru, working together in the platform, with IB focus (that has converted in a main policy of

this region), while in the first stage focusing on research and validation of the agronomic production system of *Jatropha* (with associated food crops), including control of plagues and diseases, harvesting techniques etc. Productivity and profitability need to be assured before promoting large-scale development of *Jatropha*.

[Honduras: Inclusive Business based on sustainable Corozo oil extraction](#)



Cultivation of Corozo palm (a native tree from the Caribbean northern coast of Honduras and Nicaragua) provides an opportunity for low-income communities to get employed and increase their income. Corozo is a local crop and its fruits are harvested after dropping on the ground. SNV initiated a strategic alliance with Dinant (a leading vegetable oil and biodiesel production company) and provides technical assistance to the project (funded by IDB, value 160,000 US\$) in which 300 beneficiaries are included. De-husking (peeling) is now done automatically in 3 collection centres. To make the market commercially viable, the global oil price need to be 80 US\$ per barrel, but the price of vegetable oil has to be taken into account also.

[Zambia: The journey towards renewable energy: a case study of the biofuels sector](#)

The presentation provides a clear and comprehensive overview, including: country energy context, government policies, rationale for SNV's *Jatropha* Programme and its services, and progress and lessons learned.

A strong private sector interest in *jatropha* is now recovering since it boomed in 2007, leaving contracted small-scale feedstock farmers with many issues (seed processing, training, extension, market information). SNV acknowledges the market potential (for soap, biodiesel and fertiliser production) and initial support at that time was focused on: support IB model through contract farming arrangements (outgrower scheme), empowering farmers to establish processing enterprises, and promote community based rural energy enterprises. Example of scheme: 8 year contract, whereby companies provide seedling and pesticides to farmers, who sell the seeds for processing to North Western Bio-power Ltd. Administrative farmer groups make it easier to provide training with help of SNV. Research & Development (R&D) is still imperative, and caution in contract farming is prevailing. Please find full progress-to-date (SNV services and outcomes) in the presentation. Programme activities are claimed to reach out to more than 20,000 *jatropha* farmers and 400 local entrepreneurs.



4. Day 2: AGROIPSA (*jatropha* field visit)

Date: 30 November 2010

Venue: *Jatropha* plantations of AGROIPSA, Choluteca area (Southern Honduras)

[4.1 Inclusive Business *jatropha* project funded by CORDAID and DANIDA](#)

An introduction presentation was given prior to the field visit. In 2008, a *Jatropha* feasibility study showed that small-scale farmers needed financial support to make it a profitable crop. Cordaid covered investment costs (€ 119,525) for a pilot project (including SNV TA costs) for two years and since 2010 DANIDA add funds (\$ 273,000) (372 farmers in total; 400 ha). [AGROIPSA](#) act as anchor Company in this IB and has an active role in the project as such contributing to sustainability of the project. They provide fair prices, technical assistance and pay set revenues (after negotiating) to farmers from biodiesel/carbon credits sales. The farmers have exclusive sales agreements with [AGROENHSA](#) (extraction and processing company under AGROIPSA). A serious support from the company is very important, as past initiatives failed with same farmers. AGROIPSA/AGROENHSA is recognized as a leading company in the *Jatropha* sector, e.g. the first in LA to have experimented and currently engaged in mechanical harvesting (the BEI harvester was demonstrated during our visit) and advanced de-hulling techniques. Local municipality participated to assure the cultivation of suitable land (already deforested areas) and South Pole is involved for the carbon component of the project. In the first two years, maize intercropping takes place. Goal is to produce 5 ton/ha of seeds in the fifth year.

4.2 Developing a project of 15,000 hectares of Jatropha in Southern Honduras

On the way to the AGROIPSA plantation, managing director David Erazo presented more details and the company perspective of the project. His presentation was informative on some key features of jatropha trees and oil, the projected planted area, and their project proposal (Inclusive Business) to partner low-income farmers with firms and corporations through supply chain development, entry into new markets and credit access. More specific, it



includes: seeking (government) funding and (carbon) credit to assist farmers to invest in jatropha plantations in areas where food crops (such as maize) have proved to achieve only marginal production, and plant up to 15,000 ha (Southern Honduras) in 2014 as reforestation (Jatropha is considered as a tree in Honduras) as well as a source of bioenergy. Hereby providing genetic material to farmers at low costs and bonuses to support them in the first three years when harvesting could start. Facilitating trainings for farmer leaders, but also cooperatives and small entrepreneurs is on the agenda. The

ultimate goal of the business model is to generate more social and economic inclusion, while also generating a profitable business for the company.

4.3 Visit with Jatropha farmers and AGROIPSA plantation

Farmers' feedback

Four farmers were invited to share their experiences in working with jatropha and AGROIPSA.

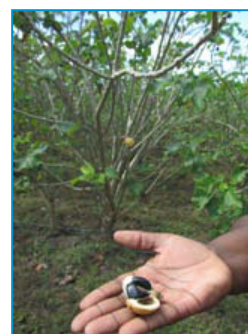


The main conclusions were that this intervention provides important income and employment opportunities. Before jatropha, they cultivated mainly maize and sesame, but that was not enough to support their livelihoods. Farmers need support due to poor soil conditions, so reforestation and opening up the market are important developments. One said it goes beyond jatropha development, because strengthening farmers and cooperatives is perceived as crucial in their community.

Visit AGROIPSA plantation

Jatropha [Cabo Verde variety] is in its third year of growth and they harvest 1 ton/ha (total here 1,000 ha). They recommend to have 15 branches per tree and 2.5 meter spacing between trees to obtain 4/5 ton/ha in the fifth/sixth year. 29% vegetable oil is currently extracted; the residues are being used as solid fuel and fertilizer. (Note: Zambia is on 25% oil from the seed.) The price per litre jatropha oil depends on the global oil price, but farmers receive 245 US\$ per metric ton of seeds which they exclusively sell to AGROENHSA.

AGROIPSA is the first to use a mechanical (track) harvesting machine (prototype) in Central America. The [BEI Jatropha Harvester](#) is developed in the USA and costs US\$ 180,000 (although bought by AGROIPSA with 40% discount, as first tests were done in their fields), investment that is claimed to be compensated in 6 years for a plantation of 250 ha (and less for a larger plantation). 1 ha is processed in 40 minutes (company claims this would be equivalent to 80 workers) and the machine keeps the plant intact. The machine brings harvesting costs down from about 450 to 300 US\$ per ha. The company invests in irrigation (during 5 month dry period) and invest in drainage (during 7 month rain period).



5. Day 3: HONDUPALMA (oil palm field visit)

Date: 1 December 2010

Venue: Oil palm plantations of HONDUPALMA (El Progreso, Northern Honduras)

5.1 Introduction

HONDUPALMA is a social agro-commercial enterprise that started subsidized in 1982 and regroups 30 cooperatives of (originally) small oil palm farmers, representing 600 members (membership is limited to these 600 members). These members employ another 300 direct and 2,000 indirect people. HONDUPALMA itself has 350 employees, 95% of which are at least related to the members.

Focus on African Oil Palm since it has the highest oil yield/acre. Yields are roughly 60,000 Lempira or 3,000 US\$ per ha (18-25 ton/ha). A palm tree has a 28-30 year lifespan and needs more than 1,500 mm of rain more or less equally spread over the year.



Palm fruits are provided by the 600 members (together 7,170 ha) and 254 independent producers (together 2,583 ha). In 2009, the total production was 234,000 tons of fresh fruits out of which roughly 40,000 ton of crude oil was extracted (used for both the domestic and the export market). 70% is associated with HONDUPALMA farmers, the rest from independent farmers.

They want to increase the productivity of the actual plantation since the demand for palm oil surpasses the supply.

Benefits of being a HONDUPALMA member:

- They have a guaranteed buyer;
- Stable payments (2,850 Lempira (145 US\$/ton fruit));
- Access to technical assistance;
- Access to 100,000 cheap seedlings/year (sold at 50 lempira/plant for members vs 70 lempira/plant for outsiders);
- Access to credits at 12% vs 18% interest at banks;
- Easy access to fertilizers and pesticides.

5.2 HONDUPALMA main processing factories

Oil extraction process

- Bunches are cooked and dehydrated;
- Fruits are separated from the bunches;
- Then fruits are pressed (21.5% of oil remains and the remaining fibre is used as a combustible). The fibre will now also be used for compost (with TA from SNV), which will give them a 50 % reduction in fertilizer cost. Crude oil (used for frying): 1,000 US\$/ton. Kernel oil (for detergents): 1,600 US\$/ton;
- 60 fresh fruits ton/hour processing rate;
- Then the oil is brought to the refinery, where chemically acidity is removed and the smell and colour are taken out. This result in 70% liquid for the oil market and 30% solids is for butter/lard. From the fats, soap is produced. Out of the oil, they can make biodiesel (HONDUPALMA has a small biodiesel plant, for own use, not achieving official biodiesel quality standards), but yet that is only interesting when oil is expensive and the price of vegetable oil is down. At present therefore, they do not produce biodiesel.
- The main market brand in Hondupalma is Clavel.



Composting

- Pilot stage: aim to supply cooperative groups with compost to improve soil quality;
- 40,000 ton/year as waste;
- Inputs: bio-slurry and empty (sliced) bunches;
- Cost effective: cost of production is 20 US\$/ton vs. sale value of 28-30 US\$/ton (excluding CDM).

Bio-diesel plant

- Non-functional currently as price is not competitive;
- Use methanol with either potassium or sodium as the alkali;
- Fuel often used in company cars for Hondupalma site only;

Biogas production

- [Biotec](#) is the company that built and administers the biogas plant under a 3 year contract with HONDUPALMA (who owns the plant). Biotec (from Colombia) constructed 5 digesters in Honduras and is market leader in LA (also plants built in Peru and other countries);
- In the biogas plant (cost 3 million US\$), the residual waters of the oil extraction are used as primary matter. The reason for moving into biogas is to reduce the use of fossil fuels (saving them 10 million Lempira, 1 million US\$ per year) and to reduce the negative impact the refinery has on the environment. On top of this, they will probably earn another 300,000 US\$ from carbon credits (verification stage), which are being used for social projects;
- From oil extraction, the water that originally went into lagoons passes a pre-treatment and gets cooled before entering the biogas systems. 20 days HRT gives 90% recovery of methane. The residue passes a biological treatment before being led to the river;
- The 2 digesters have a capacity of 10,000m³ of water per digester and combined gas storage of 30,000m³. The slurry (90 % liquid) is being used to fertilize the fields;
- The biogas is treated (de-sulfurised, cooled and addition of supplements) before being used in boilers (400 m³/hr and per boiler) and a Guascor generator (869 kW) that runs on 100% biogas;
- 24% of current 200,000 m³ of water is being mis-used (leaks, inefficiency).

**5.3 SNV services to HONDUPALMA**

SNV, in partnership with WWF, provided the following assistance (through direct TA and bringing in consultants):

- Better management practices, improved agricultural practices (organic and biological);
- Accomplishment of cleaner production;
 - Solid waste: recycling; treatment; machinery; landfill; compost;
 - Water;
- Reduce toxicity of effluents and other environmental impacts;
- Initial analysis for a CDM project related to biogas recovery (for heat and electricity);
- Cleaner production national policy application.

5.4 Success factors

The success factors of HONDUPALMA are identified by themselves as being:

- The geographical and climatic conditions (soil, land, rainfall);
- The market perspective (pay more to independent farmers as multiple buyers in open market);
- The fact that good land was given to them by government since 1970s;
- Start up subsidy from the government;
- Oil palm is a resistant crop;
- Feel of unity amongst smallholders.

5.5 Continued activities: cleaner production and Better Agricultural Practices (BAP)

Hondupalma, SNV and AECID (Spanish Agency for International Development Cooperation) started to implement the (€200,000 value) Program of Sustainable Environmental-Productive Management. They will focus on efficient use of water and management of solid waste in the oil extraction and refining plants (Cleaner Production Implementation); reduction of chemical use (BPA); and set-up an Environmental Unit. All Better Management Practices (BMP) are described in the presentation.

More information on HONDUPALMA is provided via this [case study](#) and [video](#).

6. Day 4: Gota Verde (jatropha field visit)

Date: 2 December 2010

Venue: Jatropha fields in Yoro (Northern Honduras)

The [Gota Verde project](#) was visited to compare this 4-year-old jatropha project (different business model, focus, climate and biophysical conditions) in the north of Honduras (Yoro) with the AGROIPSA activities and IB project in the south of Honduras. SNV has no involvement in the Gota Verde project, but always maintained close contact with this experience. The city of Yoro lies central in the project area and its climatic conditions (better rainfall) differ from Southern Honduras. Gota Verde is a working partnership between donors (Hivos, EU, Stichting DOEN), international research/ knowledge partners (e.g. FACT Foundation) and local counterparts. [Please click here to download](#) the comprehensive "jatropha handbook: from cultivation to application" published by FACT in 2010. Later on, FUNDER took over the overall coordination of the project from STRO (a Dutch NGO).

6.1 Jatropha field visit: site 1 and 2

- 2 year old jatropha plantation (Indian-Salvadorian variety);
- Invested in pruning, keeping the lanes clean and fertilizer scheme;
- Rainfall is good at this site, not so dry;
- Use 5x2 meter spacing between tree and intercrop with maize. Maize is not preferred according to the agronomist involved, because it provided too much shade for jatropha trees and brought diseases. Farmers experienced good results with beans, peanuts, grasses and watermelon. This choice depends on the market demand and knowledge of cultivation. Conclusion: intercropping is needed in first two years to secure food production because of low jatropha yields;
- Production in first productive year was 730 kg/ha (actually this is the second year; the first year is used for pruning and developing good plant structure).
- Previously, they were aware of 'coyotes', who bought seeds against low prizes from the farmers, because they couldn't transport the seeds themselves;
- This is now improved, because the local company BYSA (in partnership with World Food Organisation) stepped in, bought seeds from farmers, thereby duplicating there income;
- Jatropha is not yet a profitable crop; plagues/diseases and fertilizer for the first year require investments, apart from elevated manual harvesting costs. They harvest twice a year;
- Other investment costs relate to installation (10,000-12,000 Lempira/ha/year) and maintenance (6,000 Lempira/ha/year);
- Labour costs to install, harvest and maintain the plantation are the main cost factor (100 Lempira/day for labour);
- The biodiesel plant is present and working 100%, but not working on jatropha oil yet, but recycled waste oil (e.g. from restaurants);
- Farmers' (328 men, 28 women) plots are on average 7 ha, of which 1 ha jatropha is added as opportunity;
- Pruning: when the moon is in its 4th quarter it's the best timing; then the liquids are in the lower section of the tree and therefore more efficiently used.
- Interesting innovation is the capture of Jatropha branch liquids after pruning. They will just recently start with this, but it is already being done in Brazil and Costa Rica, selling the liquids for medicinal purposes in hospitals.



6.2 Jatropha field visit: site 3

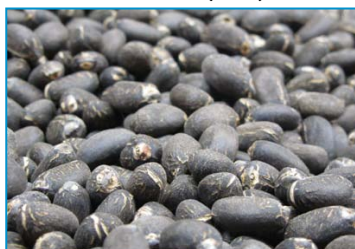
- 5-months old jatropha plantation, pruning took place in the fourth month. They used to prune 3/4 times a year, but that appeared to be too heavy for the tree. Now they aim for 60 branches in year 1.
- Spacing used is 5x1.5 meter and the farmer desires intercropping with maize, although it's a new crop to him (has 1.5 ha of jatropha, which was used before for pasture land for dairy cows (he still has 15 ha with cattle);

- The project's agronomist provides technical assistance (e.g. weed controlling);
- The farmer chose jatropha because of the local company BYSA; they can assist with access to finance, pesticides and fertilizers. So, he's stakeholder of BYSA. BYSA started with a focus on bioenergy, but then became more general company involved in maize, soap and fats. When the project ends, a business plan must be in place. Nevertheless, main objective has not changed: produce jatropha oil from farmers;
- He has a positive perspective of jatropha;
- The local economy is boosted by introduction of a new currency ("Peces"). Selling of seedlings by farmers is paid with this currency, which can only be used between members and in associated stores. The central bank recognizes the Peces and allows to change it into Lempiras. This initiative started in January 2009 through six businesses and extended to 43 businesses, with a circulation of 2,000-3,000 US\$.



6.3 Biodiesel plant visit

- The plant is located within a religious technical education centre. A detailed explanation on the main technical processes were provided, which included:
 - 1) Filtering (120 degrees to get the water out);
 - 2) Adding methanol (2%);
 - 3) Condensate the methanol to get it out again (temp. 75-80 degrees) into separate tank;
 - 4) Leftover biodiesel is washed;
 - 5) Biodiesel is then dried through condensation;
- Three products: glycerine for cleaning, soap and soap cake, but biodiesel is being used in the project vehicles (100%);
- They intend to contract companies to sell biodiesel (e.g. to run busses or grain driers);
- The conversion kits, whereby normal diesel engines can be converted and used for Pure Plant Oil (PPO) are limited;



- The press cakes are intended to be used in a biodigester for heat generation;
- Also, a thermal gasifier is constructed for other biomass;
- They need improved practices; the current processes inside the biodiesel plant are not completely professional enough to avoid accidents from happening.

7. Day 5: Presentations and discussions

Date: 3 December 2010

Venue: San Pedro Sula

On the last day of the training, several cases were presented (mainly focused on the future activities). Discussions about SNV's value proposition in biofuels and resource mobilization were held. The training concluded with a reflection and identifying next steps for 2011.

7.1 Cases: Lao PDR, Peru, Honduras, DR Congo and One Africa (AREA)

Lao PDR: LIRE's Biofuels program

The presentation of [Edward Allen](#), biofuels program leader of the [Lao Institute for Renewable Energy \(LIRE\)](#), provides background information on Lao PDR (including policies) and LIRE itself. LIRE partners with SNV on several topics: local certifying body for ICS program, biogas user surveys and value chain analysis. The main biofuels practical problems (poorly kept jatropha yields, understanding of policy makers and no demand) and opportunities (poor technology and potential increased income) are mentioned. LIRE's biofuels activities focus mainly on:



data analysis, testing and certification. More specifically, they focus on government policy advising, decentralised biodiesel and bioethanol production and Straight Vegetable Oil (SVO) for rural electrification (see case in his presentation).

[Peru: Access to electricity in isolated communities of the Amazon, based on local production of bioenergy](#)



Funded by FACT Foundation and Cordaid, this project focuses on off-grid electricity generation in isolated communities of the Peruvian Amazon, based on local production of biogas and vegetable oil. SNV led the pre-feasibility study, including village selection for a pilot project, which was initially focused on jatropha production (including use of seedcake and biomass residues for biogas). Focus of the pilot project shifted to electrification based on 100% biogas (no longer including vegetable oil); preliminary conclusions: electrification based on biogas feasible considering

manure and agricultural residue availability; management model will be key to success; preliminary design of bioenergy model ready (set of two geomembrane biodigesters of 100 m³ each; 20 kW generator; based on 185 kg cow dung / day). Meanwhile, the project will keep contributing to validation of the Jatropha value chain, facilitating a public-private platform for knowledge exchange and with a demonstration project with INIA (national institute for agricultural innovation) using Jatropha seedcake for biogas production, energy generation and organic fertilization, amongst others.

[Honduras: Bioethanol from coffee residues](#)

The project is part of a larger Central American Programme (PREMACA) financed by DANIDA through the Royal Danish Embassy. SNV's role focuses on process learning accompanying partners FIDE and FUNDER; analysing and disseminating experiences and knowledge. More specifically in the bioethanol project, our role is to design and develop the technology, market study and business model within a coffee's cooperative (200 small coffee producers, COMSA). Honduras has 100,000 small producer families of coffee (average 0.5-20 ha).



Investment in plant is 28,000 US\$ (including e.g. materials and labour), which approximately produces 500 litres of bioethanol (currently for industry use), 23m³ biogas and 75kg of fertilizer all on a daily basis.

Their costs to one litre of bioethanol is 0.20 c\$ against 0.65 c\$ selling. Main lessons learned (for replication of the project): need fulltime technical and administrative project staff member due to the innovative materials and designs; validate potential of other raw materials outside the coffee harvesting period; water consumption and contamination has been reduced; and have centralised de-husking activities.

[DR Congo: Biofuels situation in the Democratic Republic of the Congo \(Africa\): oil palm](#)

Although not present during the training, [Professor Dr. Pierre Lohohola](#), SNV consultant from DR Congo prepared a presentation to share its oil palm perspective for DR Congo (including applications, impact) in relation with SNV's strategy 2010-2012.

A quick market study has been conducted in the Equateur province that confirmed the market viability for palm oil based energy. A workshop is planned in the first half of 2011 to lobby and advocate for a Renewable Energy policy development in the country.

8. General conclusions ¹

The first five-day Corporate Biofuels Training, and in a way the first corporate biofuels network meeting, was perceived as a success. The presentations, discussions and personal interactions, as reflected in this report, provided lots of opportunities to share knowledge, experiences and discuss the future for SNV's biofuels activities. The training facilitated well in connecting the regions and in contributing to a stronger internal knowledge network related to biofuels and bioenergy in general. Furthermore, the informal conversations during the training paved the way for more collaboration between the regions, exchanging views on effective resource mobilization and how to move forward to assure a sustainable future of SNV worldwide.

The following general conclusions were identified during the training week:

- Despite of economical crisis and criticism, the biofuels sector keeps developing, with *large investments* of the private sector and promoted by public sector (especially in LA);
- The sector presents *risks* (food versus fuel; land use change, etc.) but at the same time important *opportunities* for economic development with social inclusion;
- There is a need to contribute to the development of *adequate business models* and the identification of production schemes based on criteria for sustainability and inclusive business that contribute to local economic development;
- *R&D is key*: knowledge development, technical innovation and concrete cases to demonstrate best/next practices. This is most developed in LA, less in Asia and Africa;
- Public-private partnerships and development of *integrated policies* are needed to facilitate a sustainable and inclusive development for the biofuels sector;
- *Carbon credits* provide an opportunity for additional project funding.

¹ [This chapter has been edited considerably due to internal reasoning]