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# Using *EC-Assess* to Assess a Small Biofuels Project in Honduras

FRANKLIN CHAMDA NGASSA

## Abstract

Biofuels may contribute to both rural economic development and climate change mitigation and adaptation. The Gota Verde Project in Yoro, Honduras, attempts to demonstrate the technical and economic feasibility of small-scale biofuel production for local use by implementing a distinctive approach to feedstock production that encourages small farm sizes, mixed cropping of biofuel feedstock from *Jatropha* and food crops, particularly corn and beans, grown side by side on the same farmland and the total involvement of small rural farmers. But is the project sustainable? Using *EC-Assess*, the Earth Charter ethics-based assessment tool, to assess the sustainability of this project, the author found that in some assessment categories the actions surpassed the intended objectives, showing that the project was achieving certain Earth Charter goals without specifically stating its intention to address them.

**Keywords:** *EC-Assess*, biofuel sustainability, Yoro, Honduras, Earth Charter

Donors are supporting many small biofuel projects in rural areas of developing countries, designed to both assist in the sustainable development of poor rural

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communities and to reduce greenhouse gas emissions by providing renewable fuels. The Earth Charter International Secretariat has produced an open-source ethics-based assessment tool called EC-Assess that can be used to make a qualitative assessment of whether a project is sustainable and in line with the Earth Charter principles. This study applies the assessment tool to a small biofuel project in Honduras.

## THE GOTA VERDE PROJECT

The Gota Verde Project in Yoro, Honduras, attempts to demonstrate the technical and economic feasibility of small-scale biofuel production using *Jatropha curcas*<sup>1</sup> (see Image 1). It produces biofuel for local use by implementing a distinctive approach to feedstock production that encourages small farm sizes, mixed cropping of biofuel feedstock from *Jatropha* and food crops, particularly corn and beans, grown side by side on the same farmland and the total involvement of small rural farmers.



**Image 1** A farmer at the Gota Verde Project practicing mixed cropping with coffee, corn and oli-yielding plants

**Source:** Author's own.

Its objective is to demonstrate whether small-scale biofuel projects are feasible and have the potential to transform poor local economies into self-sustaining communities in Honduras (Moers 2010).

Its specific objectives are to:

- Develop optimal agricultural processes for oil-yielding crops (Jatropha and Castor bean);
- Develop the knowledge to manufacture machinery for a biofuel processing plant and adapt engines to use pure plant oil (PPO);
- Develop a local trade network and local-currency-based on the production of biofuels;
- Establish a legal enterprise run by local partners, to coordinate the production chain in the long run;
- Transfer know-how on the improvement of biofuel production and marketing system to other similar projects.

Biocombustibles de Yoro Sociedad Anónima (BYSA) was created on 9 August 2008, as a local legal enterprise to manage the production process and sale of final products, which will include PPO, biodiesel, biogas, soap, glycerin, animal feed and electricity.

## METHODOLOGY

The methodology used in this study is outlined in EC-Assess (AtKisson et al. 2008). It is based on the Earth Charter Principles 5–16 as well as their supporting principles, in addition to the three ‘pillars’ under which the principles are grouped (See Appendix in this issue of the journal for the complete text of the Earth Charter, including principles, supporting principles and pillars). The EC-Assess methodology calls for qualitative interviews with stakeholders to assess how important each principle is to the project and how strongly the principle is supported by action in the project.

The goal is to identify areas where there is a gap between declared interest and action taken. Often there is a declared interest in a specific principle, but no evidence of action to put it into practice, a lack of interest in some principles, or a match indicating success. Situations also exist where actions are taken without any declared interest.

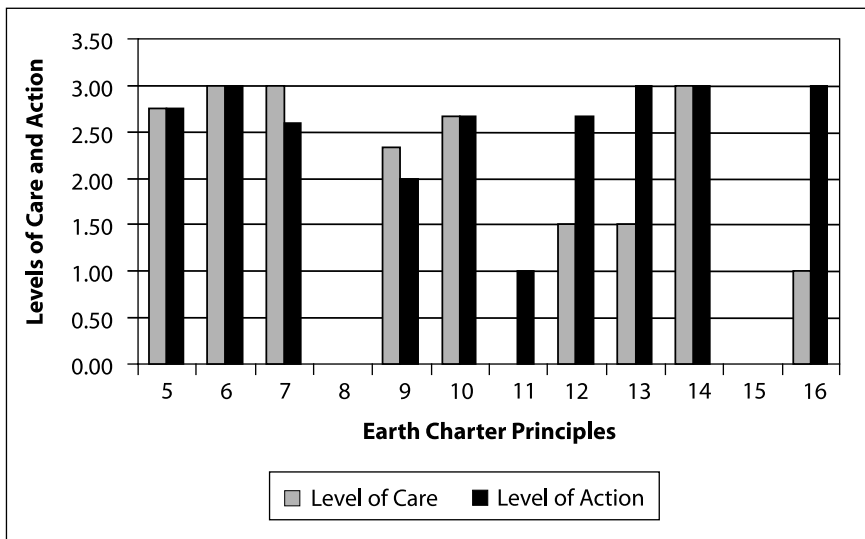
Data used in this study were collected through interviews and surveys carried out during project meetings and public presentations that involved project staff, Jatropha farmers and local inhabitants. Attendance during meetings ranged from 50 to 100 participants.

Information was also collected at a meeting with a women’s group that is part of the Gota Verde Project, as described later in this article. The women cultivate Jatropha and other short-cycled crops like corn and beans on abandoned, overgrazed and deforested land obtained from the Honduran government. Verbal answers to a questionnaire were collected from the group of 15 women, mostly from Centro Poplado, a small village 15 kilometers from the town of Yoro.

The questionnaire used in a second survey on negative peace in Honduras was derived from common themes emerging during discussions with different groups of people, both in and out of the project, living in the town of Yoro. This survey was administered to 200 people of different ages and occupations.

## RESULTS

Figure 1 shows the relationship between the declared level of care and the actual level of engaged action at the Gota Verde Project for the Earth Charter Principles 5–16.<sup>2</sup> For four principles, the care and action had the same score and for two principles the action lagged behind the care. Surprisingly, for three principles (12, regarding the right of all to a natural and human environment supportive of human dignity; 13, regarding strengthening democratic institutions; and 16, regarding promoting a culture of peace and nonviolence) the action far exceeded the stated concern about the principle, while in one principle (11, regarding gender equality), there was no concern stated.



**Figure 1** Levels of care and action for earth charter principles

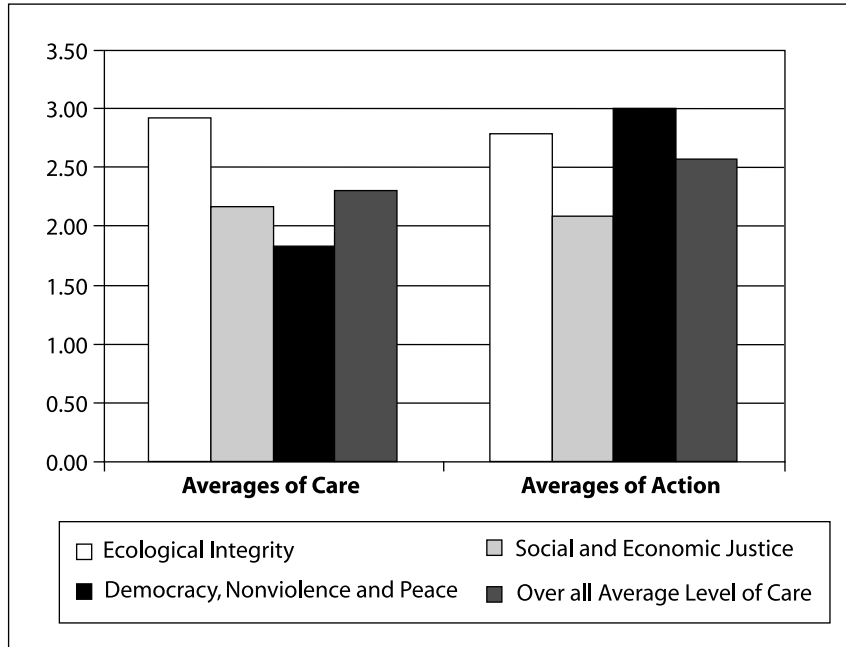
**Source:** Author's own.

This discrepancy can be explained by the fact that the Gota Verde Project manifests some characteristics of the Earth Charter's principles that had not been declared as main objectives of the project. However, as the project developed, these 'neglected sections' became integral and determinant areas of the project's success. For example, the indicators that make up the declared actions in Principle 16: 'Promote a culture of tolerance, nonviolence, and peace' can be identified in the project's activities even without a clear desire to manifest them.

Thus, the project has covered broader issues directly related to rural development within the context of Honduras. Some pertinent elements of sustainable rural development may have been omitted from the project's action plan because they were not part of the original targets of the donor organisations, but somehow these issues were addressed indirectly. For example, there is no declared objective for gender equality and female participation as in Principle 11: 'Affirm gender equality and equity as

prerequisites to sustainable development and ensure universal access to education, health care, and economic opportunity', but the project deals with issues directly related to female empowerment and participation.

Figure 2 shows the averages for care and action for each of the three pillars (1. Ecological integrity, 2. Social and economic justice and 3. Democracy, nonviolence and peace) in addition to the overall averages for care and action.



**Figure 2** Relationships between averages of care and averages of action

**Source:** Author's own.

## ANALYSIS OF APPLICATION OF EARTH CHARTER PRINCIPLES

The principles that scored the highest level of equal interest and performance were Principles 5: 'Protect and restore the integrity of Earth's ecological systems, with special concern for biological diversity and the natural processes that sustain life', 6: 'Prevent harm as the best method of environmental protection and, when knowledge is limited, apply a precautionary approach', 10: 'Ensure that economic activities and institutions at all levels promote human development in an equitable and sustainable manner' and 14: 'Integrate into formal education and life-long learning the knowledge, values, and skills needed for a sustainable way of life'.

Apart from producing a carbon-neutral fuel with feedstock grown on abandoned, overgrazed and deforested land, one of the main achievements of the project was the creation of a legal and independent enterprise, owned by the local community, to

manage the transformation and commercialisation of the biofuel production chain. BYSA was created with the assistance of STRO (Social Trade Organization) and a local development organization, FUNDER (Fundación para el Desarrollo Empresarial Rural), to increase the flow of capital within the local communities of Yoro, with capital generated from biofuel production and other subsistence agricultural activities.

The Honduran law on biofuels stipulates that biofuel production should be encouraged in Honduras because it has the potential to fight poverty, encourage sustainable development and reduce energy dependency on petroleum imports (Poder Legislativo de Honduras, Decreto no. 144–2007). Nevertheless, the frequent fluctuations in petroleum prices are a threat to BYSA's economic stability because BYSA's policy is to sell biodiesel at a price 5 per cent less than the price of diesel at the pump. Consequently, the selling price always competes with the prices of petroleum products but does not always cover the cost of biofuel production.

In order to gain more economic stability, the project intends to diversify its product range to include fertilizers, concentrates for animals, electricity and biogas production. In addition, edible oilseeds like soya bean and ground nut shall be cultivated and processed to produce vegetable oil which will be exchanged at restaurants for used vegetable oil. Additional measures to reduce production costs include running the transformation plant with energy generated from recycled waste during the production process.

The radio, television and internet (for instance, the website <http://www.gotaverde.org>) are frequently used by the project to advertise its ideas. In order to publicise the project's method of producing biofuels and participate in the debate on the sustainability of biofuels as a source of renewable energy for rural development, a presentation was organised at the Universidad Nacional Agrícola Catacamas, Olancho. Similarly, regular training sessions are organised during which students at the vocational school in Yoro CEVER (Centro de Educación Vocacional Evangélico y Reformado) are trained on how to adapt diesel engines to use PPO; fabricate huskers used in shelling *Jatropha* seeds; produce PPO from *Jatropha* seeds; and process biodiesel from PPO (etherification) (see Images 2 and 3).

The principle that scored the lowest level of interest and action was Principle 11: 'Affirm gender equality and equity as prerequisites to sustainable development and ensure universal access to education, health care, and economic opportunity'.

Although gender inequality and domestic violence affecting women are major problems in Honduras, the project has no declared strategy on how to tackle them. Of 250 active participants in the project, 25 (10 per cent) are women (FUNDER 2008). Efforts to mainstream gender equality by encouraging female participation and creating equal chances of participation often fail because of the cultural setting in Honduras. In most rural areas of Honduras, women limit their activities to domestic functions/roles and find it difficult to move away from these functions, even when opportunities are created for them, because these roles have been socially constructed and accepted.

However, organised women's groups are now participating in the project. Participants, mostly single mothers, obtain land from the government—mostly abandoned and degraded land—to produce oilseeds. These women mutually assist each other in cultivating both oilseeds and food crops while benefiting from technical assistance





**Image 2** A student from CEVER (Centro de Educación Vocacional Evangélico y Reformado) titrates chemicals required in the etherification of PPO (pure plant oil) to produce biodiesel

**Source:** Author's own.

offered by the project. They will sell the oilseeds to BYSA as an additional source of income for their families.

Interestingly, Principle 16: 'Promote a culture of tolerance, nonviolence, and peace', showed a low level of declared interest but a high level of action. By addressing issues directly related to rural poverty in Yoro, the project inevitably addressed one of the most important elements that can contribute to peace and economic development.

Jeong (2000) uses the term 'negative peace' which he defines as peace without effective measures to eradicate social ills such as poverty, which can result in dissatisfaction, frustration and conflict. Although direct violence may not be occurring, a negative peace can exist in a situation where oppression is used to obtain peace, as conflict is merely suppressed.

A separate survey was conducted in the town of Yoro, to understand the origin of 'negative peace'. Figure 3 shows that of the 200 people surveyed, 45 per cent chose 'solidarity and hope for a better tomorrow' as a possible reason, whereas 12 per cent chose 'the acceptance of poverty as a way of life'. The results of this survey demonstrate that there is hope in the minds of poor rural farmers who want to experience a better tomorrow, despite the fact that reductions in governmental expenditures in the rural sector have resulted in a drastic reduction in services for poor farmers (IFAD 2009). Although the Honduran government has failed to provide human and





**Image 3** CEVER students adapt a regular diesel engine to the direct use of PPO from processed *Jatropha* seeds

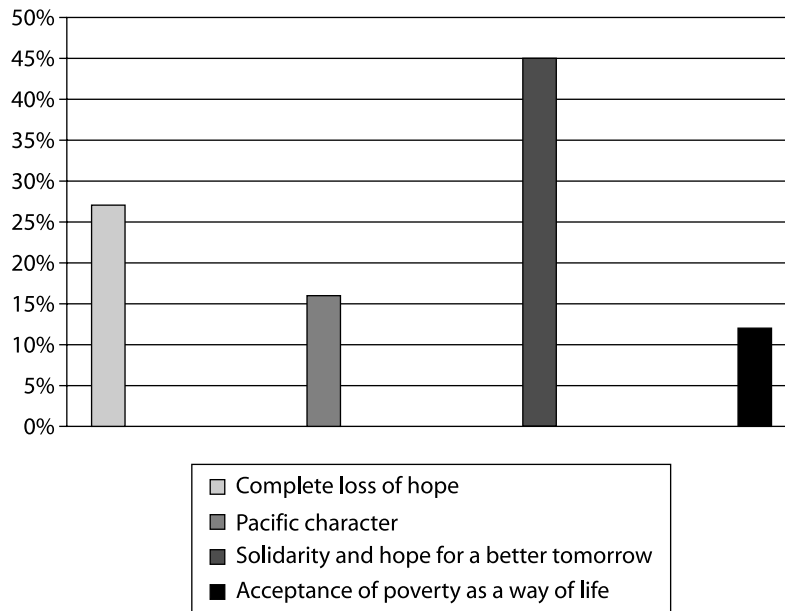
**Source:** Author's own.

environmental security for its citizens, initiatives such as the Gota Verde Project can attempt to undertake the difficult task of restoring hope to poor rural communities.

Like the dimension of peace and nonviolence, environmental protection and conservation were not explicitly addressed in the project's objectives. Nonetheless, the project's activities emphasise the integration of environmental conservation and rehabilitation through the cultivation of abandoned deforested land, the exploitation of existing *Jatropha* live fences and the cultivation of marginal lands and slopes to prevent erosion and reduce the consequences of devastating natural events.

In addition, the project assists poor farmers in installing sustainable irrigation systems, which support both the production of biofuel feedstock and the production of subsistence food crops such as corn and beans.

Nonetheless, more actions need to be taken to protect the environment and human health. During one of the project meetings, a survey was carried out in which 84 per cent of farmers declared that neither did they have an idea of the chemical composition of fertilizers and other chemical farm inputs provided by the project, nor did they know the impact of fertilizers and other chemical farm inputs used on the land which they cultivate and on their health.



**Figure 3** Why is there 'negative peace' in Honduras?

**Source:** Author's own.

International standards and preventive measures in the transformation plant are not applied, particularly during the process of etherification to produce biodiesel from PPO, a process potentially dangerous to human health.

## CONCLUSION AND RECOMMENDATIONS

In Honduras, biofuel production can assist in sustainable rural development only when policies and strategies that encourage sustainable practices can be effectively applied. These policies must guarantee the sustainable development of poor rural communities while reinforcing human and environmental security. The Gota Verde Project could be an opportunity to demonstrate the confluence between foreign technical and financial assistance and local participation in sustainable management of land resources for the production of biofuels.

To be more compliant with the Earth Charter's Principles and the wider idea of sustainability, the Gota Verde project should address the following issues:

- Develop appropriate strategies to mainstream gender equality in the project through increased female participation.
- Use the Earth Charter Principles as a guiding document, where possible, in project management. Complying with the principles of the Earth Charter will

- help strengthen the newly created biofuel enterprise, BYSA, by assuring an equitable redistribution of benefits to communities involved with the project.
- Follow international occupational health standards in the application of pesticides and fertilizers in production and agricultural processes.

## Notes

- 1 Based on data collected from FACT Foundation, by Jongh (2006), the term 'Jatropha' is used in this document to refer to the species *Jatropha curcas*, which belongs to the Euphorbia family. There are approximately 170 known species of *Jatropha* considered to be wild and uncultivated through a variety of research. The *Jatropha* plants and its seeds are toxic to animals and humans due to the presence of the chemicals 'curcin' and 'diterpine'. In most countries of Latin America, *Jatropha* is used as a live fence to protect agricultural fields from animals.
- 2 Only indicators of the EC-Assess directly related to declared objectives of the Gota Verde Project were considered for assessment and represented in the final results. Earth Charter Principles that were not used during this study have not been represented on the graph.

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