

***Campesinos/as* Cultivating Soil: Promoting  
and Adopting Sustainable Agriculture in  
Jinotega, Nicaragua**

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SIT Nicaragua Spring 2009

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## **Introduction:**

*“...Food is different. The question of productivity is epistemic, concerning the ecology of agriculture – not simply environmental stewardship, but also re-embedding agriculture and its knowledges in natural cycles to sustain nutrients in soil and water, and nurture biodiversity, as well as recognizing that farming is a culture, not an abstract technique that can be applied uniformly across a diverse world”*<sup>1</sup>

The emergence of the ‘sustainable development’ and ‘sustainable agriculture’ paradigms during the past few decades can be traced back to the “failure of both left and right versions of developmentism to bring about major transformations in ‘underdeveloped’ areas of the world.”<sup>2</sup> Concepts such as ‘appropriate technology’ and ‘natural resource management’, which are central to sustainable development rhetoric and rooted in the acknowledgement of ecological limits due to industrial growth as exemplified by “developed” areas of the world.<sup>3</sup> Most development schemes have been embedded in the industrialization of agricultural practices, initially designed to increase yield to feed the world’s growing population, though quickly appropriated by corporations and their private interests. They promote the use of technology, such as agrochemicals, fertilizers, fumigation systems and genetically engineered seeds, and thus dependence on industry.

Today, the confluence of the energy, food and climate crises are drawing attention to agriculture as a means of achieving energy independence, food security and the mitigation of green house gas emissions. However, most policies remain rooted in industrial agriculture practices (whether or not organic methods are applied), including monocropping, the application of fertilizers, pesticides, insecticides, and herbicides, as

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<sup>1</sup> McMichael, Phillip, “The Peasant as ‘Canary’? Not too early warnings of global catastrophe.” *Development* 51 (2008): 508.

<sup>2</sup> Kearney, Michael. *Reconceptualizing the Peasantry: Anthropology in Global Perspective*. (Colorado: Westview Press, Inc., 1996), 105.

<sup>3</sup> *Ibid.*

well as the global transport of produce. Corporate neo-liberal policies favor the large-scale producers and largely negate the work of small-scale producers, who are viewed as “expendable in the corporate development vision. That is, the narrative of capitalist modernity assumes peasant obsolescence, and that global ‘food security’ means industrializing agriculture.”<sup>4</sup>

In a June 2008 *Revista Envío* article, Sinforiano Cáceres, a leader of Nicaragua’s agricultural cooperative movement, identified six interrelated factors that are complicating the country’s food crisis: the global energy crisis, trade liberalization, increased demand for food, environmental phenomena, structural adjustment problems and international development aid. Interestingly, he traces all of these problems back to industry. For example, the food crisis is being exacerbated by the search for alternative fuels to resolve the energy crisis. 85% of the world grain trade is in the hands of five multinational corporations (Cargill, Monsanto, Archer Daniels Midland, Bunge, Dupont Agriculture and Nutrition), and thus these companies decide how much grain is used for agro fuels, animal feed and human consumption. These same companies are now developing alliances with transnational oil and auto companies, which complicates the food crisis because land that was once used to produce food is being used to produce fuel and if fuel-grade grain has a higher market price than food-grade grain, fuel production will take precedence. 160,000 of Nicaragua’s 200,000 corn farmers are small-scale producers, but an industry driven emphasis on fuel-grade grain, which is largely transgenic, may result in consolidation and monocropping, both of which are detrimental to the environment and contrary to traditional, sustainable notions of peasant

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<sup>4</sup> McMichael, Phillip, “The Peasant as ‘Canary’? Not too early warnings of global catastrophe.” *Development* 51 (2008): 504.

agriculture. Cáceres argues that the production of agro fuels leads to the loss of self-sufficiency, which results in the transition from a cultural orientation towards production to an orientation towards consumption. He thinks that food crisis should be given a different name because it is “not a food crisis, but a crisis of values” amongst transnational corporations, governments and development aid agencies.<sup>5</sup>

Despite a largely unilateral corporate voice in food politics discourse, a global food sovereignty movement is emerging in order to challenge the “unsustainable impact of industrial agriculture,” and practice, “an alternative agro-ecology that engages modern science and technology but within the decentralized and experimental framework of the peasant way: la vía campesina.”<sup>6</sup> ‘The peasant way’ is both a cultural and a political demand, because not only does it call for the revitalization of increasingly obsolete and culturally-specific human-earth relationships, but also to reverse the industry-driven food policies to support small-scale producers.<sup>7</sup> Cáceres explains that the emphasis on small-scale production in Nicaragua is essential to preventing peasants from losing their ability to feed themselves, an increasingly rare liberty.<sup>8</sup>

The initial move away from small-scale farms was a result of claims made by agricultural corporations about the increased productivity of large-scale, chemical-dependent single crop farms. However, research and practice suggest that small-scale farms are actually more productive than large-scale farms. As Miguel Altieri explains,

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<sup>5</sup> Cáceres, Sinfioriano. “We need more action and less talk about the food crisis.” *Revista Envío* #323 June 2008.

<sup>6</sup> McMichael, Phillip, “The Peasant as ‘Canary’? Not too early warnings of global catastrophe.” *Development* 51 (2008): 505.

<sup>7</sup> McMichael, Phillip, “The Peasant as ‘Canary’? Not too early warnings of global catastrophe.” *Development* 51 (2008): 508.

<sup>8</sup> Cáceres, Sinfioriano. “We need more action and less talk about the food crisis.” *Revista Envío*, June 2008.

In polycultures developed by smallholders, productivity, in terms of harvestable products, per unit area is higher than under sole cropping with the same level of management. Yield advantages range from 20 percent to 60 percent, because polycultures reduce losses due to weeds, insects and diseases, and make more efficient use of the available resources of water, light and nutrients. In overall output, the diversified farm produces much more food, even if measured in dollars. In the USA, data shows that the smallest two hectare farms produced \$15,104 per hectare and netted about \$2,902 per acre. The largest farms, averaging 15,581 hectares, yielded \$249 per hectare and netted about \$52 per hectare. Not only do small to medium sized farms exhibit higher yields, but do so with much lower negative impact on the environment.<sup>9</sup>

Altieri goes on to explain that small farms that treat their soils with organic fertilizers absorb and sequester carbon much more efficiently than industrial agriculture. Specifically, “the conversion of 10,000 small- to medium-sized farms to organic production would store carbon in the soil equivalent to taking 1,174,400 cars off of the road.”<sup>10</sup> Additionally, he cites a study of 360 communities that spans 24 departments in Nicaragua, Honduras and Guatemala, which found that “diversified plots had 20% - 40% more topsoil, greater soil moisture, less erosion, and experienced lower economic losses than their conventional neighbors.”<sup>11</sup> Small-scale agriculture is, therefore, not only a culturally important practice, but also a highly productive alternative to industrial agriculture and it is central to mitigating the effects of global warming.

One of the difficulties facing both large- and small-scale farmers today is that sustainable production practices were largely abandoned during industry-driven development efforts and local knowledge related to crop rotation strategies, natural pest management and weed control, and seasonal cultivation practices was put aside for as many as fifty years. Additionally, industry-based agriculture, as promoted by

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<sup>9</sup> Altieri, Miguel, “Small farms as a planetary ecological asset: Five key reasons why we should support the revitalization of small farms in the global south,” Food First: Institute for Food and Development Policy, [www.foodfirst.org/en/node/2115](http://www.foodfirst.org/en/node/2115).

<sup>10</sup> Ibid.

<sup>11</sup> Ibid.

development agencies and the World Bank's structural adjustment policies, left many small-scale producers landless, also compromising the durability of local agricultural knowledge systems.<sup>12</sup> As a result, small-scale producers who want to make the transition to sustainable agriculture practices may not have the capacity to do so, because the related knowledge that was traditionally passed between generations grew (temporarily) obsolete, as an entire generation grew up using only industry-based agricultural practices. This is especially true for rural, isolated communities, and the problem is compounded by the poor soil quality that has emerged due to years of chemical use, because even if traditional sustainable agricultural knowledge is available, it may not be enough, at least in the short term, to revitalize the soil. For this reason, as part of the peasant agriculture movement there are efforts in peasant communities to teach and learn sustainable agriculture practices combining traditional materials with modern techniques.

This study seeks to address the following question: What pedagogies and theoretical and practical concepts and processes effectively facilitate a transition to sustainable agriculture among *campesinos/as* in rural Nicaragua? From the perspective of both the facilitators and the participants, what makes these methodologies effective and why is this change important? More specifically, I examine how the Cuculmeca, an agency that uses education and communication to promote the sustainable use of the environment and the participation of communities in their own development, approaches the teaching and implementation of sustainable agriculture in five rural communities in the department of Jinotega as well as how the community members respond to these

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<sup>12</sup> Tangermann, Klaus-D, and Ivans Ríos Valdés. *Alternativas Campesinas*. (Managua, Nicaragua: Latino Editores, 1994), 187.

educational initiatives. I examine the implications, for both facilitators, and the participants, of instructing, understanding and implementing a new form of cultivation. For the purposes of this study, ‘facilitators’ are primarily the representatives from the organization Cuculmecca who promote sustainable agricultural practices in rural communities and ‘participants’ are primarily the *campesinos/as* learning about and adopting the sustainable agriculture practices. Additionally, the words ‘*campesinos/as*’ and peasants are used interchangeably throughout this paper. This study concludes that popular education pedagogy is central to promoting sustainable agriculture in rural Nicaragua because learning is personalized, desire to change emerges organically, tools to enable change are addressed, and awareness of the global-reaches of the focal problems are developed. Additionally, it is suggested that not only does sustainable agriculture advance environmental stewardship, food sovereignty, financial stability and public health initiatives, but it also is a means of cultural revitalization and peasant liberation.

### **Methods:**

In January 2009, I enrolled in the School for International Training’s (SIT) program *Nicaragua: Revolution, Transformation and Civil Society*. Three weeks after arriving here, I was dropped off with the other students in the small town of San Ramón in the department of Matagalpa. We were prepared to spend a week in rustic *campo* communities in the mountains beyond San Ramón, and a few hours later I was deposited by a path on the side of a ridge, which led to the tiny village of Cerro Grande. I met my host family, comprised of a mother, three grown daughters, a son and a granddaughter,

and, after hiking over the ridge and around a hill, I was welcomed into their home, an adobe hut about four meters long and three meters wide, dirt floor carefully swept, furniture (two chairs and a bench) neatly arranged and cooking fire burning. There was no electricity and a few wooden planks served as the family's bed. Our verbal interaction was limited; talking for them was more of a practice than a pastime, centered on food and daily chores. However, just being together was enough for their humility and generosity to awe me. Their days were repetitive, their interaction with non-family members was limited, and their dreams were modest: to finish primary school by the age of twenty-four; to be able to go to secondary school. Yet, they treated me, a stranger, a foreigner, as a daughter, cared for me affectionately and shared their food, water, and space liberally. As I left, we cried together. I'd learned that humility is perhaps the most beautiful quality human beings can embody.

As I considered various topics to study for my independent project, I was certain that I wanted to return to the *campo*. I also wanted to look into agriculture – the relationship between *campesinos/as* and the land - and considered living in a community in order to compile a forty or fifty-year agricultural history by interviewing *campesinos/as* and observing cultivation practices. Unfortunately I could not return to Cerro Grande, because my family's principal food supply was not based on subsistence, which was one of the conditions I was interested in evaluating. Eventually, according to the suggestion of my academic director Aynn Setright, I elected to center my project in Jinotega with the organization, Cuculmeca.

When I first arrived at the Cuculmeca, my knowledge of the projects, strategies and goals of the organization was limited to what was published on the website.

However, after a few meetings with Emir López, an agronomist engineer and my project advisor, I learned about the Promotion of Peasant Agriculture Project (*Proyecto “Promoción de Agricultura Campesina”*) that Cuculmecca is initiating in five nearby communities, and because of its emphasis on sustainable and organic practices as well as a holistic approach to educating *campesinos/as* about food, finances and nutrition, I realized it would be interesting to focus my project on the emergence of sustainable agriculture in communities that grow their own food and have been dependent on chemicals for at least one generation. As an Environmental Studies major with a concentration in Global Environment and Social Change, the topic was especially appealing to me because I was eager to see how classroom theory, pertaining to sustainability and development, emerges on the ground.

In order to examine the methodological and practical implications of promoting and adopting sustainable agriculture practices in rural Nicaragua, I employed an array of research strategies, including observation, participant observation, grounded theory, daily reflection and interviews. My principal mode of collecting data was through observation and interviews, both of which took place during the weeks I joined Francisco (Chico) Meza, the project facilitator, in the *campo* for his sustainable agriculture workshops. In total I observed six full workshops, which lasted about eight to twelve hours each, and, on some occasions, spanned two days. During these sessions I took detailed notes on the information being transmitted and how it was being conveyed and received. During breaks I chatted with *campesinos/as* about their reaction to the information and their reasons for adopting sustainable agricultural practices. Additionally, I formally interviewed twenty *campesinos/as* (at least one from each community) about past and

present agricultural practices, and hopes, fears and expectations of the transition to sustainable agriculture. These interviews were conducted on a one to one basis, and at times among two or more *campesinos/as* in order to promote a dialog rather than a formal question and answer dynamic. I also conducted one group interview session, in which I asked five of the oldest members of one community a series of discussion questions and gave them time to dialog about each one before presenting the next. Finally, I conducted regular informal interviews with Chico Meza to understand his educational and theoretical approach to this initiative and formal interviews with Emir López, to understand the degree to which Cuculmeca influences the content and methods of the workshops as compared to the degree to which it is Chico's personal experience and value system that shapes them. Finally, I read through my notes regularly and used grounded theory to identify recurring themes and patterns and I wrote a narrative reflection every evening to summarize and extrapolate on my daily findings and thinking.

Each of my research strategies helped me collect data from different yet complementary angles. However, none of them were flawless. Specifically, my cultural framework as a United States American as well as my preconceived notions of education and sustainable agriculture shaped my observations. Likewise, my interviews with *campesinos/as* were influenced by both of these factors in addition to their association with me to Cuculmeca. I was introduced to them as a student doing research on Cuculmeca's Peasant Agriculture Project with a specific interest in sustainable agriculture and food systems. This association may have dissuaded them from speaking honestly about their reactions to the Cuculmeca's projects. I tried to factor this into my research by varying my interview strategy by involving, at times, more than one person in

order to facilitate a dialog in which my role as a researcher was less dominant.

Additionally, because all of my interviews and all of the workshops I observed were conducted in Spanish, which I am studying as a second language, the language barrier may have hindered my understanding of complex, concepts, inferred connotations, or subtle meanings.

Finally, as a U. S. American, my upbringing, values, and culture have shaped my observations, analyses and reflections in relation to this project. Born and raised in Massachusetts by educated parents in a middle class family, I attended a public charter school for grades seven through twelve that emphasized critical thinking, collaboration and experiential learning. Now a student at a private liberal arts college, education has been and remains at the forefront of my personal interests and endeavors. As an Environmental Studies major, I have spent much of my academic life studying and analyzing various stands of environmentalism, and my personal life revolves around living sustainably, consuming consciously, and advocating for environmental justice fervently. Though I come to this project from a socially and politically liberal orientation and a background in Environmental Studies, it was my priority to maintain academic integrity and honesty as I conducted my research.

**Context:**

*Nicaragua*

Nicaragua has a population of 5.1 million people; 2.3 million of these people live in poverty and 831,000 live in extreme poverty.<sup>13</sup> One in every three Nicaraguan children suffers from chronic malnutrition and 9% of children suffer from severe

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<sup>13</sup> UNICEF, “At a Glance: Nicaragua,” UNICEF, <http://www.unicef.org/infobycountry/nicaragua.html>.

malnutrition.<sup>14</sup> Approximately a quarter of Nicaraguans over the age of 15 are illiterate and 21% of the population does not have access to drinking water.<sup>15</sup> Additionally, Nicaragua has an external debt of \$6.5 billion, the economy is suffering from inflation, and unemployment and underemployment are close to 50%.<sup>16</sup> The economy is heavily based on agriculture, which employs 43% of the population.<sup>17</sup>

Despite agricultural productivity, both food sovereignty and food security in Nicaragua are weak largely due to unclear property rights, a lack of investment in agriculture, and environmental problems.<sup>18</sup> With regards to property rights, during the Somoza family dictatorship (1937 – 1979) large tracts of land were usurped from peasants for private investment. Then, during the Sandinista Revolution the Agrarian Reform policies sought to redistribute the land to peasants in the form of collective ownership, and during the 1990's government efforts to privatize the land and revise property titles left many peasants landless and caused serious and enduring land rights disputes. Today, 44% of *campesinos/as* own 3% of the country's land, and 25% of the land is in the hands of 1% of the population.<sup>19</sup> Additionally, a lack of investment in agriculture and an economy heavily dependent on exportation has generated serious unemployment as world prices for agro-exports drop; in Nicaragua's case, this is especially apparent with regards to coffee. These economic conditions augment the poverty in rural regions and inhibit food security efforts. Finally, environmental degradation is amplified in the agricultural sector due to deforestation, contamination of

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<sup>14</sup> Ibid.

<sup>15</sup> Human Development Reports, "Nicaragua," United Nations, [http://hdrstats.undp.org/countries/country\\_fact\\_sheets/cty\\_fs\\_NIC.html](http://hdrstats.undp.org/countries/country_fact_sheets/cty_fs_NIC.html).

<sup>16</sup> USAID Budget, "Nicaragua," USAID, <http://www.usaid.gov/policy/budget/cbj2005/lac/ni.html>.

<sup>17</sup> "Plan de Acción La Cuculmecca – EF." (Internal Cuculmecca Publication, Jinotega, Nicaragua, 2008), 3.

<sup>18</sup> Ibid.

<sup>19</sup> Ibid.

water and excessive use of agrochemicals (causing soil deterioration), all of which augment the prevalence and damage caused by natural disasters.<sup>20</sup>

### *Jinotega: The Department and the Municipality*

The Department of Jinotega is located in the central northern region of Nicaragua. It has a population of 305,815 of which 78% live in rural areas. Jinotega is comprised of 9,222 km<sup>2</sup> and has a population density of 33 people per square kilometer, which is substantially lower than the national mean of 47 people per square kilometer. Like much of Nicaragua, the economy of Jinotega is largely fueled by agricultural activity, and Jinotegans specialize in the production of coffee, basic grains and horticulture. Additionally, although Jinotega is a highly productive agricultural zone, it receives minimal infrastructural support from the national government, and basic needs of the people, including adequate housing, the availability of potable water and functional latrines, are largely unmet. The rural population of Jinotega is comprised of some of least economically secure people in Nicaragua.<sup>21</sup>

The municipality of Jinotega (the location of this study) consists of a population of 51,000 people and of an area of 1,119 km<sup>2</sup>, which is divided into nine districts. It is located at an altitude of more than 1000 meters above sea level. This altitude classifies Jinotega as a subtropical region, in which three distinct zones exist: dry, intermediate and wet. Consistent with the departmental trends, the cultivation of coffee and basic grains comprises the principal economic activity of the municipality, in addition to small-scale horticulture and the production of milk, beef and eggs. Although agriculture is essential

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<sup>20</sup> “Plan de Acción La Cuculmeca - EF.” (Internal Cuculmeca Publication, Jinotega, Nicaragua, 2008), 3.

<sup>21</sup> “Plan de Acción La Cuculmeca - EF.” (Internal Cuculmeca Publication, Jinotega, Nicaragua, 2008), 4.

to the local economy, it is particularly vulnerable to fluctuating and unpredictable environmental conditions, particularly the availability of water.<sup>22</sup>

### *La Cuculmeca*

A *cuculmeca* is a medicinal plant that grows in the rainforests of northern Nicaragua.<sup>23</sup> It is a root threatened by extinction, and is thus emblematic of the protection of biodiversity. Cuculmeca, the Association of Education and Communication adopted this name to represent the organization's mission of promoting the sustainable use of the environment and the participation of communities in their own development. Founded in 1990 when the adult literacy campaigns endemic to the Sandinista Revolution came to an end, Cuculmeca formed to continue the alphabetization of the region. By 1991, Cuculmeca began to promote additional projects including organic agriculture, healthcare and development in communities in rural Jinotega. Since then the organization has grown markedly and developed an array of projects in the realms of education, agro-ecology and citizen participation.<sup>24</sup> The Cuculmeca is financed by national and international NGOs and operates on an annual budget of US\$ 780,000-800,000.

### *Proyecto "Promoción de Agricultura Campesina"*

#### Project Background and Objectives

In partnership with Entraide et Fraternité, a Belgian humanitarian NGO, the Cuculmeca initiated a program in 2008 called Promotion of Peasant Agriculture Project.

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<sup>22</sup> Alcaldía de Jinotega, "Información General," Alcaldía de Jinotega, [http://www.alcaldiajinotega.gob.ni/info\\_general.shtml](http://www.alcaldiajinotega.gob.ni/info_general.shtml).

<sup>23</sup> "Plan de Acción La Cuculmeca – EF." (Internal Cuculmeca Publication. Jinotega, Nicaragua, 2008), 5.

<sup>24</sup> La Cuculmeca, "History," La Cuculmeca, <http://www.cuculmeca.org/es/historia.htm>.

This project is designed to bring sustainable agricultural practices, food security and autonomy to *campesinos/as* who live in the dry zone of the municipality of Jinotega (a portion of District #8), which is comprised of eight rural communities. A diagnostic review of Dry Zone communities, conducted in 2008, indicates that following factors inhibit the sustainable development of the region and the wellbeing of its people.

- There are high levels of food insecurity and malnutrition.
- Families consume most, if not all, of what they produce.
- The quality of the soil is poor and the availability of other natural resources, especially water, is limited.
- Deforestation is widespread and continuing.
- The roads that connect the communities are impassable during the rainy season (May-December).
- The families do not have sufficient economic resources to purchase seeds, fertilizers or other products or tools that may augment their yields.
- Because the region is considered highly vulnerable to environmental degradation, it has been excluded from the development programs of certain agencies.
- Families do not know how to improve the quality of their land and soil and do not have access to information or resources that may help improve their food and financial security.<sup>25</sup>

In order to support residents of the Dry Zone as they engage in community development, the Cuculmecca and the Entraide et Fraternité are using a series of strategies

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<sup>25</sup> “Plan de Acción La Cuculmecca - EF.” (Internal Cuculmecca Publication, Jinotega, Nicaragua, 2008), 7.

developed by the Cuculmecca that promote economic, social, cultural, environmental, and political sustainability. At the heart of the strategy are Family Production Units, which, after guided formation and technical assistance over the course of four years, will become self-sustaining and self-perpetuating entities, and are meant to serve as a base level of social and political organization. Each Family Production Unit will develop a Sustainable Management Plan. The plan will detail the transformation of the cultivation system into one that carefully manages natural resources through the use of sustainable agriculture and crop diversification, and it must account for the variety of factors required to operate a family farm, including labor hours, the availability and condition of fields and pastures, management of cattle, poultry and swine, production and cultivation practices, and natural resource management. More specifically, the purpose of the plan is for families to apply the strategies for sustainable agriculture they learn during workshops lead by Cuculmecca project facilitators, such as the integration of medicinal plants and fruit trees into their production system as well as reforestation strategies. This plan must also incorporate goals for familial civic engagement, because in four years, when this process comes to a close, Cuculmecca will encourage the *campesinos/as* to increase their social and political organization so they become actors on the municipal level.<sup>26</sup>

Family Production Units are principally funded by an alternative two-part credit system set up by the Cuculmecca. First, the Family Seed Capital Fund provides direct material assistance, in the form of seeds, plants and animals, to Family Production Units and does not have to be repaid. Second, the Community Investment Fund provides financial and material resources to Family Production Units and must be repaid to a Revolving Fund Committee managed by the community in a Revolving Fund System,

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<sup>26</sup> “Plan de Acción La Cuculmecca - EF.” (Internal Cuculmecca Publication, Jinotega, Nicaragua, 2008), 8.

meant to reinforce community organization, transparency and collective responsibility and to enable long-term lending and borrowing within the community.<sup>27</sup>

The principal subjects of this project are 150 families (705 people) who live in five different communities located in the southern part of the municipality of Jinotega: Jocomico Arriba, Jocomico Abajo, La Pita del Horno, Yagualica and Los Calpules, which includes two smaller communities, Paso Ancho and Walasá. The principal mode of subsistence of these families is the cultivation of corn, beans and sorghum. Additionally, some families raise livestock and poultry to produce milk, *cuajada* (a cheese-like curd), eggs and meat, and some grow vegetables, including peppers, potatoes, and cabbage. The majority of the crops grown are consumed by the families, and on occasion sold in local markets. Agriculture is the only source of income for these families, which at most amounts to C\$800 (\$40) per month, though this is rare. 95% of the families own their land, which is generally between .7 and 7 ha. Families primarily eat rice, beans and tortillas, which occasionally is supplemented by *cuajada* and/or eggs. There are high levels of malnutrition in this region, and many children suffer from digestive and respiratory illnesses.<sup>28</sup>

The criteria for selecting the participating families was based on a diagnostic evaluation of their needs as well as their ability and willingness to commit to four years of working with the Cuculmecca and complying to institutional policies. During the course of their participation in the program, these families will acquire the necessary knowledge

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<sup>27</sup> “Plan de Acción La Cuculmecca - EF.” (Internal Cuculmecca Publication, Jinotega, Nicaragua, 2008), 9-10.

<sup>28</sup> “Plan de Acción La Cuculmecca - EF.” (Internal Cuculmecca Publication, Jinotega, Nicaragua, 2008), 7.

and skills to facilitate the conversion to sustainable agriculture among other families in their communities.<sup>29</sup>

### Implementation Methodology and Indicators of Success

On an administrative level, the implementation of this program takes place in the Cuculmeca office in the city of Jinotega and is one of six sustainable agriculture projects currently underway. Emir López, an agronomist engineer and the coordinator of the Cuculmeca's agro-ecology office, is directing the project and Chico Meza is promoting the project in the communities. Chico, who, within the organization, is considered a 'facilitator' or 'promoter', is responsible for gathering diagnostic data about the families including educational background, types of crops grown and the number of hectares cultivated, number and types of animals owned by the families, production methods used and yearly expenditures and revenues of the families. He is also responsible for teaching sustainable agricultural practices in the communities, including the creation of bio-fertilizers and organic composts, and monitoring the execution of the project. He identifies if and when communities need additional instruction, and is responsible for using both his methods of teaching and reinforcing the practices and information as well as those promoted by the Cuculmeca, including hands-on and dialogue-based learning techniques. Additionally, other Cuculmeca facilitators who specialize in health and finances will visit the communities to emphasize improving nutrition and hygiene and developing a Revolving Fund.<sup>30</sup>

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<sup>29</sup> "Plan de Acción La Cuculmeca - EF." (Internal Cuculmeca Publication, Jinotega, Nicaragua, 2008), 11.

<sup>30</sup> Emir López, interviewed by author, "Sustainable Agriculture and the Cuculmeca," May 6, 2009.

The Cuculmecca Unit of Planning, Monitoring and Evaluation ensures that the programs and resources are being used effectively and in accordance with the values and objectives of the organization. Quantitatively, it is expected that 150 Sustainable Management Plans will be created and that 80% of families begin using organic fertilizers and compost, 80% of families diversify their production, 80% of families diminish their costs of production, 80% of families increase their yields, and that 80% of the families become part of the Revolving Fund and that 80% of families consider the change to organic agriculture positive. Additionally, at the end of the project the organization will encourage the local government to accept at least three proposals from the communities in order to further development and promote civic participation. Finally it is a priority that participants are sufficiently prepared to teach other community members the methods they learned in the program, that men and women participate on equal terms and that Dry Zone populations are integrated into local development plans.<sup>31</sup>

## **Research:**

### *Promoting Sustainable Agriculture: The Workshops*

#### Structure

During my research period, I observed and at times participated in six workshops lead by Chico Meza, each of which lasted for between eight and twelve hours and were at times conducted over the course of a two day period. One workshop was conducted in each of the five communities (Jocomico Arriba, Jocomico Abajo, Yagualica, La Pita del Horno, and Los Calpules) and an additional one was held in Paso Ancho, a sub-community of Los Calpules, for the residents of both Paso Ancho and Walasá. These

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<sup>31</sup> “Plan de Acción La Cuculmecca - EF.” (Internal Cuculmecca Publication, Jinotega, Nicaragua, 2008), 12.

workshops were teaching *campesinos/as* how to make bio-fertilizers, and were the first of the project's workshop series. A week before each of the workshops took place I accompanied Chico to each community in order to notify members that the workshop would be the following week and to select the host family who would be responsible for providing a snack and lunch on the day of the workshop (financed by the Cuculmecca) as well as collecting and arranging chairs and a dry-erase board in their home or a community building, such as a community center or school, where the workshop would take place. On the day of the workshop, Chico and I would arrive at the designated workshop location between 7:00 and 8:00 in the morning, wait for a half hour to an hour for everyone to show up, at which point the workshop would commence.

During the workshops, Chico usually stood at the front of a room with the dry-erase board. The *campesinos/as* would sit on chairs or benches in scattered rows or a U shape in front of him, depending on the size of the room and the group. Usually there were between 20 and 25 people present, and often there were two members of a family, which nearly always consisted of the father, who is viewed as the primary producer, and either his wife or an adolescent daughter or son. Generally the wife or children would be responsible for taking notes during the workshop. When wives were present, they often brought younger children too, who they would tend to throughout the workshop. During the hands-on part of the workshop, men, women and children were involved collecting materials, mixing the bio-fertilizers and asking clarifying questions. Again, generally the wife and children were responsible for keeping notes when asked to do so by their husband or father, or chose to do so themselves.<sup>32</sup>

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<sup>32</sup> Based on workshop observations made on 4/23/09, 4/24/09, 4/27/09, 4/28/09, 4/29/09 and 4/30/09.

All of the workshops shared the general structure of practice-theory-practice, in which a two to three hour seminar-like instructional session would be followed by a practical demonstration and a hands-on experiential session. Although all of the workshops I observed shared the practical goal of teaching the *campesinos/as* how to make bio-fertilizers, no two workshops were identical. This variability was intentional because, as Chico explained to me, he feels he can best enable learning by presenting the information and facilitating dialogue in the order he sees fit at any given moment, by gauging the response of the participants and his own conviction as a facilitator about which pieces of information would best promote learning at a specific time.<sup>33</sup> This variability was especially apparent in the order in which information was taught, and to some degree in the information itself as well. However, some concepts came up at every workshop because they were essential to understanding the functionality of bio-fertilizers.

The content of the workshops can thus be categorized into three types: Essential, Supplemental and Practical. I have defined Essential Content as the information that provides direct context for the Practical Content. In other words, it provides a logical justification for the practical information. The Supplemental Content provides depth to the Essential Content by locating it within a social, historical, economic or political context. Finally, the Practical Content is information that can be applied. It may be learned both verbally and experientially and it teaches a hand-on process or a methodology. Both the Essential and the Supplemental Content may also be considered Theoretical Content, which is the term I use to refer to the two.

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<sup>33</sup> Chico Meza, interviewed by author, "Personal History, Sustainable Agriculture, and Teaching Methodologies," May 4, 2009.

In the following two sections, Content and Methodology, I seek to present my observations as an amalgamation of all six workshops. Because the workshops are fundamentally dynamic and multidimensional, based on interaction and other mediums of expression such as drawing and example, it would be impossible to recreate a workshop merely with words. For that reason I have broken up my discussion of the workshops into Content and Methodology, because though they were largely simultaneous and integrated processes (one cannot express content without some sort of methodology, and having only a methodology does not serve as a viable mode of instruction), they are best described separately.

### Content

This section is comprised of a compilation of all of the concepts presented over the course of the six workshops. The Essential Content includes only information that was presented all six times. However, not all of the concepts that were presented six times are designated as Essential, so some are included in the Supplemental section. The additional Theoretical Content is also designated as Supplemental. Worth noting, many of the concepts described below were accompanied by diagrams and pictures drawn during the workshops, which have not been included.

Essential:

- Nitrogen, phosphorous and potassium, the principal components of most chemical fertilizers, are essential nutrients for plants but are not the only nutrients plants need. Plants require access to upwards of 50 minerals to be healthy, including

sulfur, zinc, calcium, boron, iron, copper, magnesium and manganese. When chemical fertilizer is applied to a field, it nourishes the plants enough to enable them to survive, but not to enable them to grow strong enough to protect themselves from diseases, including blights and infestations. When plants have access to sufficient minerals, found only in healthy soils, they are naturally resistant to disease.

- Soil is a living organism. It is far more complex than its component parts and cannot be synthesized by humans. It is comprised of an array of minerals, once in the form of rocks, and microorganisms, bacteria, fungi, worms and insects, that work together to decompose matter, such as fallen trees, dead insects and animals, leaves and brush, all of which are also comprised of minerals. As dead matter is broken down, new life is created, and young plants use minerals from the soil for nourishment to promote growth. This is a cycle. Hundred of thousands of organisms work together to cycle minerals through phases of life and death. Every living organism is comprised of minerals and requires minerals to stay alive.
- Insecticide, herbicide and fungicide (“-cides”) kill not only the insects, weeds and funguses that inhibit the growth of crops, but also the hundreds of thousands of other organisms that maintain the life of the soil. After a few years of spraying chemicals on fields, and growing crops on these fields season after season, the minerals of the soil are depleted; they are transformed into beans and corn. Then, in order to grow more crops, fertilizers are applied to replenish the nutrients in the soil. However, fertilizers do not nourish the soil, they only nourish the plants; they

- only nourish the plants enough to keep them alive until the harvest, not enough to fight disease.
- When soil is filled with minerals, plants are also filled with minerals, which then nourish the people who eat them. The plants will also be strong enough to defend themselves from plagues and infestations, negating the need for “-cides.”
  - Agriculture is fundamentally an activity that depletes the soil of nutrients, because much of the decomposition and re-composition cycle is eliminated due to the harvest (the matter that grew using the soil’s minerals is removed, and thus does not replenish the soil). A fertilizer that maintains the life of the soil is therefore essential.<sup>34</sup>

Supplemental:

- Insecticides, herbicides, and fungicides are designed to kill. They kill most of the living organisms in the soil, and eventually they kill us when they manifest in the form of breast, prostate, lung and colon cancer. Likewise, nitrogen and phosphorous, two of the three principle components of chemical fertilizer, were developed during World War II in order to make bombs – to kill people. Now we are in the midst of a silent war, in which munitions and other products that kill are being spread across our earth. This is an irony. We’re farmers. We say we want to create, to produce, but instead we kill.
- The agro-industry, based primarily in North America, has created and continues to create many of these problems. They produce the “-cides” that kill the soil, and

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<sup>34</sup> Based on workshop observations made on 4/23/09, 4/24/09, 4/27/09, 4/28/09, 4/29/09 and 4/30/09.

fertilizers that just barely replenish it. They produce the face masks and goggles, and impermeable jackets and boots that they tell you to wear when you apply the chemicals. They even produce the seeds that will not be destroyed when sprayed with the “-cides”. This is a business. They want farmers to be dependent on their products.

- Malnutrition is a serious problem in many *campo* communities, in part because the soils in which *campesinos* grow their food are depleted of nutrients. However, it is also related to big businesses that try to change the way we eat. Instead of growing and milling our own corn to make tortillas, we are encouraged to buy Maseca, the transgenic corn flour produced in North America. Instead of making juice with the mangoes and passion fruit that grow in our communities, we are told by the industry to buy Coke and Fanta. These products are not good for us, yet so often we are enticed by the industry.
- Sustainable agriculture is the knowledge of our ancestors. Why do you think the Mayans cultivated beans and corn on the same parcel of land? Because bean plants produce the urea that corn needs to grow. Sustainable agriculture is practiced by peasants around the world. You live closely to the land and can hear it talk if you listen. This is not knowledge brought to you by the university or by the industry. It is knowledge of the people, and, as a result of this knowledge, humanity has been nourished for decades.<sup>35</sup>

Practical:

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<sup>35</sup> Ibid.

- How to make a bio-fertilizer:
- Materials: One 200 liter barrel with a lid, a 20 liter bucket, 1 meter of clear tubing, an iron rod (1cm diameter), a connector, a clear 1 liter empty plastic bottle, wire, 40 liters of fresh cow manure, 4 liters of milk, 4 liters of molasses, 4 pounds of ash, 4 ounces of baking yeast and water. Optional materials: Supplemental minerals in powder form (Zinc, Magnesium, Manganese, Iron, Boron, Copper)
- Process: Heat the iron rod and burn a hole in the top of the lid. Insert the connector into the hole and insert the half of the connector that is protruding from the top of the lid into the hose. Put the manure and about 60 liters of water into the barrel. Mix thoroughly. Mix two liters of water with the milk, molasses, ash yeast and one mineral in the 20 liter bucket. Add the mixture to the barrel and mix well. Secure the lid. Poke a hole in the upper part of the soda bottle and use a wire to connect it to the lid of the barrel. Fill the soda bottle with water and insert the hose into the bottle until it is a few centimeters from the bottom. Observe the level of the water in the hose lower as the level of water in the bottle remains constant. After fifteen minutes to a half hour, observe the emission of bubbles from the end of the hose. This indicates that the fermentation is taking place. Every three days for 30 days open the barrel and add a few liters of water, a liter of milk, a liter of molasses and an additional mineral. Mix well and secure the top. Allow the bio-fertilizer to ferment for at least 30 days. If fermentation stops it means that air is entering the barrel and all possible leaks must be sealed. After thirty days add one

liter of the bio-fertilizer to a 20 liter fumigation pump and spray on soil, not on the leaves of the plants. Apply the bio-fertilizer every six days.

- After this information is both presented verbally and written on the board, everyone participates in the creation of the host's bio-fertilizer, although the men tend to be more involved than the women. Chico uses the iron rod to make a hole in each family's barrel lid and secures the connector in place. The men take turns adding materials to and stirring the contents of the barrel while women sometimes make notes about the process. Then families return to their own homes to prepare the materials and Chico walks from home to home constructing the bio-fertilizers with each family.<sup>36</sup>

### Methodology

This section is comprised of both my own observations of the methods used to promote sustainable agriculture as well as informal and formal interviews with Chico Meza as a facilitator of the project, and Emir López as the coordinator of the project. It is divided into two sections, In Theory and In Practice, which generally mirror one another. Additionally, the In Practice section is divided into additional sections, Formal and Informal, because the promotion of sustainable agriculture exists on both of these levels. In the formal sense, it takes place during the seminar-like theoretical period and the experience-based practical period. In an informal sense, it is manifested as the candid and genuine interactions between the promoters and the peasants.

### In Theory:

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<sup>36</sup> Ibid.

The Cuculmecca has been promoting alphabetization in rural communities since its inception, and has a clearly defined educational philosophy largely based on popular education theory and practices. Social change education, often termed ‘popular education’ in Latin America and ‘critical pedagogy’ elsewhere, uses instructional methodology based on the work of Paolo Freire, a Brazilian philosopher and educator.<sup>37</sup> While there are some distinctions between popular education and critical pedagogy, “the common denominator is that the pedagogy is employed as a tool for engaging people to transform unjust social, political and economic conditions”<sup>38</sup> In other words, it is a pedagogical technique intended to raise awareness in students about how their personal experiences are related to broader social issues. Generally, social change education employs a practice-theory-practice, or action-reflection-action, cycle. More specifically, initially, based on personal experiences, participants identify a problem they face, then reflect on and analyze it to identify the global manifestations of the problem. Then the participants plan and realize an action for change.<sup>39</sup> One of the key elements of popular education is that everyone teaches and everyone learns, so the role of the facilitator is to ensure that learning takes place and that leadership is shared as well as to foster the emergence of a global perspective on the problems discussed.<sup>40</sup>

In a personal interview with Emir López, he explained to me that fundamental to the Promotion of Peasant Agriculture Project, and at the heart of popular education, is using the wealth of knowledge the *campesinos/as* already have to raise awareness and

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<sup>37</sup> Choules, Kathryn, “Social Change Education: Context Matters,” *Adult Education Quarterly* 52 (2007): 160.

<sup>38</sup> Ibid.

<sup>39</sup> Kerka, Sandra, “Popular Education: Adult Education for Social Change,” *Eric Digest* 185 (1997) <http://www.ericdigests.org/1998-1/popular.htm>.

<sup>40</sup> Ibid.

initiate change. This knowledge may be related to crops, growing seasons, and agricultural practices, and the ‘raising awareness’ component may surface when, for example, a *campesino* recalls the production practices of his youth, which were dependent on human labor rather than chemicals as they are now. Likewise, most *campesinos/as* know that the chemicals they purchase are toxic, and they have noticed an increase in breast, prostate and colon cancer in their communities. Popular education techniques seek not only to facilitate an understanding of the value of past production practices or the connection between exposure to chemicals and cancer incidence, but also to both facilitate a desire to change and the capacity to do so.<sup>41</sup> Additionally, the pedagogical methods of the Peasant Agriculture Project are not intended to spark drastic changes immediately, but rather, over time, to develop a knowledge-base or level of awareness from which the social changes can emerge organically.<sup>42</sup> Chico Meza explained that when he promotes sustainable agriculture in the *campo* his priority is to facilitate learning by ‘helping *campesinos/as* use knowledge they already have – that their parents and grandparents had....Knowledge that comes from listening to the earth.’<sup>43</sup> For example, he might ask, ‘What is a plant telling you when its leaves turn yellow?’<sup>44</sup> Undoubtedly, someone would say ‘It’s thirsty.’<sup>44</sup> He also seeks to facilitate the sense of indignation among the participants, by emphasizing absurdity of practices, ideas or circumstances they may be taking for granted, which he believes is necessary to motivate action. For example, in order to illustrate the power of the agro-industry, he demonstrates how the harmful agrochemicals are manufactured by the same companies

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<sup>41</sup> Emir López, interviewed by author, “Sustainable Agriculture and the Cuculmecca,” May 6, 2009.

<sup>42</sup> Ibid.

<sup>43</sup> Chico Meza, interviewed by author, “Personal History, Sustainable Agriculture, and Teaching Methodologies,” May 4, 2009.

<sup>44</sup> Based on workshop observations made on 4/23/09, 4/24/09, 4/27/09, 4/28/09, 4/29/09 and 4/30/09.

that sell the face masks and impenetrable suits and boots (which *campesinos/as* cannot afford), that are supposed to be worn during the application of the chemicals. ‘They are thieves,’ he would say, and the people would realize that they companies not only take their money, but also their lives.<sup>45</sup> In sum, the theoretical methodologies behind the Promotion of Peasant Agriculture project are largely based on popular education techniques, and seek to both raise awareness and initiate change in regards to the cultivation practices of *campesinos/as*.

In Practice:

Formal

The following are specific examples of how popular education is put into practice in the *campo* as part of the Peasant Agriculture Project. Additionally, other methodological approaches are included, which, though they are not necessarily components of Popular Education, proved central to promoting sustainable agriculture in this region.

- The practice-theory-practice, or action-reflection-action, dynamic is the structural basis of the workshops as well as the long-term structure of the program. In a typical workshop, “practice” is usually a five to seven hour process and “theory” is generally a two to three hour process. However, during the theory section, current cultivation practices are used to inform learning, and sustainable cultivation practices are discussed. In other words, practice and theory are integrated throughout the workshop, and while the seminar-like session is more heavily theory and the experiential session is more heavily practice, both sessions include both learning elements.

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<sup>45</sup> Ibid.

- During the classroom-based instruction, real-life metaphors are used to make the information memorable and accessible. For example, to explain why nitrogen, phosphorus and potassium alone are insufficient to grow strong, healthy crops, Chico asks whether humans can live on just one, two, or three nutrients. ‘Why do they tell you to drink milk,’ he’d ask. ‘For the calcium,’ someone would answer. ‘And why are we supposed to eat fruits and vegetables?’ ‘For the vitamins’ a participant would respond. He’d hold up a soda bottle and fresh-squeezed natural juice, and ask people to talk about which they would choose to drink and why. Chico would explain that like humans, plants need an array of vitamins and minerals to survive, and that different plants need different nutrients, so the mere application of nitrogen, phosphorus and potassium is fundamentally lacking. Likewise, some fertilizers, which are advertised to be better for certain crops actually contain only one or two of the three minerals. To illustrate why this is problematic, Chico asked if parents discriminate between their children, feeding one of them rice, beans and tortillas (a.k.a. nitrogen, phosphorous, potassium), another just rice and beans, and a third just rice, and never supplementing any of their diets with fruits or vegetables. Chico uses human biological necessities to teach about plant biological necessities, making the information accessible to the peasants.<sup>46</sup>
- Chico introduces himself and provides information about his background as a *campesino* during every workshop. His intention is to indicate that he is their equal and comes from the same social and economic background as them. Likewise, he emphasizes that the information he presents is fundamentally

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<sup>46</sup> Ibid.

*campesino/a* knowledge and that peasants in every Latin American country are using the sustainable agriculture practices. This knowledge, he emphasizes, was not developed by academia or the private sector; it is simply age-old knowledge improved with modern technologies.<sup>47</sup>

- Throughout the workshops, Chico supplements his explanations with drawings and diagrams in order to engage peasants who may be more accustomed to learning visually. Additionally, he uses simple and un-technical vocabulary to make the concepts interesting for and accessible to the peasants<sup>48</sup>
- After Chico explains how to make the bio-fertilizers, he holds up a booklet of advertisements for Milagro chemical fertilizers and asks the peasants which fertilizers they use. He makes a chart on the board with each of the components of the bio-fertilizer at the top of each column (cow manure, milk, molasses, ash and yeast) and systematically flips through the Milagro advertisements to the fertilizers used by the campesinos, simultaneously indicating which bio-fertilizer ingredients that contain the minerals advertised by the Milagro fertilizers. For example, if a Milagro fertilizer contains nitrogen, phosphorus and potassium, he will list these minerals (using their elemental symbol) under manure and milk, and will list just phosphorus and potassium under molasses and ash, because the latter two ingredients do not contain nitrogen. Other Milagro fertilizers contain calcium, sulfur, iron, boron and magnesium, and as these minerals come up, he continues to indicate in which bio-fertilizer ingredients they can be found.

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<sup>47</sup> Chico Meza, interviewed by Emily Grady, "Personal History, Sustainable Agriculture, and Teaching Methodologies," May 4, 2009.

<sup>48</sup> Ibid.

- Throughout the workshop Chico pauses, asking the *campesinos/as* if they have questions, and encouraging them to express their critiques and concerns. He often emphasizes that this learning is a dialogue ‘between *campesinos/as*’ and that everyone has their own experiences and knowledges to contribute.
- During the practical part of the workshop, Chico generally takes a more passive role, though peasants repeatedly turn to him for instruction. He encourages the peasants to recall the explanation of how to make the bio-fertilizer they had learned in the classroom, but is willing to repeat the information. He explains which materials to add and when, and involves men, women and children in the process.
- During this period he talks with families informally, asking about their animals or crops, where they collect their firewood and what types of food they have been eating recently and how often they are able to eat. Sometime he looks at children’s homework and asks them what they’re learning; he encourages them to continue their studies. Often he is offered a cup of coffee by the families, which he accepts. Additionally, sometimes members of the families who were unable to attend the classroom part of the workshop ask him questions about sustainable agriculture.<sup>49</sup>

Informal:

In addition to the formal methods Chico uses to promote sustainable agriculture, he has an informal methodology too, which he uses to build trusting and respectful

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<sup>49</sup> Based on workshop observations made on 4/23/09, 4/24/09, 4/27/09, 4/28/09, 4/29/09 and 4/30/09.

relationships with the *campesinos/as*. He explained that he tries to befriend the producers, by, explicitly (during the workshops) and implicitly (though friendly and genuine interaction), emphasizing that he is their equal. He believes that it is important to ‘accept and value the idiosyncrasies of every person’ and he adheres to the principle that every individual has something important to contribute- that everyone’s experiences and perspectives can facilitate other people’s learning.<sup>50</sup> In practice, Chico demonstrates these values by being patient with the peasants when the concepts are misunderstood or materials ill-prepared, never rushing, and taking the time to greet and chat with each member of the family. He often works eleven or twelve hours each day to ensure the quality of both his work and interactions with peasant families.

#### *Adopting Sustainable Agriculture: Campesinos/as’ Roles and Responses*

Over the course of the research period, in addition to observing the interaction between Chico and the *campesinos/as*, their approaches to receiving information and their reactions to the information presented, I interviewed twenty *campesinos/as* about their past and present agricultural practices, their thoughts about the workshop and the conversion to sustainable agriculture, and the information they learned during the workshops that they found most interesting. Prior to the point this research began, the interactions between the promoters and the *campesinos/as* were primarily for diagnostic purposes, so the bio-fertilizer workshops were the first formal instruction sessions. Generally the interviews took place on the day of the workshop, though in some cases they took place the day after.

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<sup>50</sup> Chico Meza, interviewed by Emily Grady, “Personal History, Sustainable Agriculture, and Teaching Methodologies,” May 4, 2009.

All but three of the twenty peasants I interviewed grew up in the same community they live in now, and those who did not grew up in neighboring communities, with the exception of one woman who grew up in Matagalpa. Of the seventeen who have remained in the community of their birth, fourteen of them are over the age of thirty, and recall the ‘fertile soil’ of their youths. When asked how the agriculture today differs from that of their childhood, the very first word that all fourteen people said was ‘fertility.’ Many also said that more rain came, and that they didn’t need to apply fertilizers in order for their crops to grow. Additionally, a few recalled picking weeds by hand, and harvesting larger yields. As described by all twenty of my informants, between the years of 1960 and 1990, the *campesinos* of these communities were enticed by the claim that chemicals would help them clear their fields more quickly, and grow more crops. Initially these claims were true, and the use of agrochemicals increased, but for many, within about ten years, plagues and infestations surfaced, and the people became increasingly dependent on insecticides, herbicides and fungicides to maintain sufficient yields. Years of fumigation killed the soil, increasing dependence on chemical fertilizers, and year-by-year, yields began to diminish. The decrease in yield made it impossible for families to sell crops, and now, for about half of the families I interviewed, purchasing fertilizers has become impossible, further diminishing yields. Most of the families eat only one to two meals each day.<sup>51</sup>

Families elected to partake in this project for two principle reasons. First, about half of my informants see it as the only way to increase their yield in order to produce enough food to live on. For the most part these people live in Walasá, Jocomico Abajo and Paso Ancho, and are currently producing just enough to survive. Most of these

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<sup>51</sup> General information gathered during interviews throughout the research process.

people cannot afford fertilizers, and spend the little money they have on insecticides and fungicides (sometimes they don't eat in order to purchase these chemicals), so as not to lose an entire crop to a blight or infestation. For some of the people in this category, although they view participation in this program as an advantage, it is also a risk. 'If the organic methods don't work,' Alba Duarte explained to me, 'we'll have nothing to eat.'<sup>52</sup> Second, the other half of my informants harvest enough to sell a small percentage of their crops in local markets and use the money to buy agrochemicals. However, they recognize that they are stuck in an expensive and futile cycle, and that exposure to the chemicals are both dangerous to their health and are detrimental to the land. They see the project as a way of breaking this cycle, spending less money on chemicals and improving the quality of their land. One of my informants, a member of the second category, is aware of the international demand for organically grown produce, and believes that someday he may be able to export his crops to the United States or Europe, a secondary reason he cited for participating in the project.<sup>53</sup> Across the board, there is a desire among the *campesinos* to restore the fertility of their land and a sense that if they make this change now, life will be better for their children and grandchildren. As Julio Ortiz put it, 'We don't want to poison ourselves, and we certainly don't want to poison our children. If we do this, maybe their lives will be better.'<sup>54</sup> Importantly, though, many people have not put blind faith in this project. Over the years many 'agricultural technicians' have come to them to promote new agricultural practices and state-of-the-art chemicals and technologies. Many are wary of being taught new ways to farm and new products to use. For these people,

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<sup>52</sup> Alba Duarte, interviewed by author, "Past and Present Agriculture Practices and Reactions to Workshop," April 30, 2009.

<sup>53</sup> Denís Blandon, interviewed by author, "Past and Present Agriculture Practices," April 14, 2009.

<sup>54</sup> Julio Ortiz, interviewed by author, "Past and Present Agriculture Practices and Reactions to Workshop," April 30, 2009.

participation in this project was contingent on the entity promoting the new and improved methods, and, in this case, the Cuculmecha has regional and national prestige and a good reputation among Jinotegán *campesinos/as*, which impelled them to give it a chance.<sup>55</sup>

During the workshops the *campesinos/as* were attentive and apparently comfortable with asking questions and critiquing ideas. They participated when prompted during the theoretical instructional sessions and with gusto during the practical sessions. When they understood what was being explained and when they were in agreement with a concept, they would nod their heads, and when Chico made jokes they would laugh aloud. They would comfortably banter with him during theoretical sessions and would try to be helpful during the practical session by having the materials ready when Chico requested them. They treated Chico with respect, but were neither intimidated by him nor especially reverential to him, and were comfortable chatting with him about topics unconnected to the workshops. Their interactions were informal and friendly. Also, once the bio-fertilizers were made, *campesinos/as* would call Chico on his cell phone to tell him (enthusiastically) that they were working well, to learn what to do if the fermentation appeared to have stopped or to find out what to do if they had insufficient milk or molasses to add to the bio-fertilizer every three days. Although these are topics that Chico generally addressed during the bio-fertilizer construction process, *campesinos/as* preferred to call to ensure they were doing the right thing.<sup>56</sup>

During interviews, when asked what the three most interesting things were that they learned during the workshop, all twenty of my informants cited the creation of the bio-fertilizer first. In other words, the practical information was most compelling for

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<sup>55</sup> Yelba Duarte, interviewed by author, “Past and Present Agriculture Practices and Reactions to Workshop,” April 30, 2009.

<sup>56</sup> Based on workshop observations made on 4/23/09, 4/24/09, 4/27/09, 4/28/09, 4/29/09 and 4/30/09.

them, and the most tangible- it was the very first thing that came to mind. About a quarter of my informants had difficulty recalling two additional ‘interesting things’ they had learned, and others cited workshops-to-come, such as how to make organic compost, another practical and tangible item. While the other three-quarters of my informants also cited how to make the bio-fertilizer first, the second two ‘interesting things’ were based on the theoretical information presented in the workshop. The concepts cited most frequently included the notion that the soil is alive, the idea that plants need an array of minerals in order to defend themselves against the “bad” fungi and insects, and the fact that cow manure, milk, molasses and ash contain so many essential minerals for plants, which are then passed on to the people who eat them. Interestingly, Supplemental Content was never cited, and thus, of the Theoretical Content presented, among the twenty people I interviewed parts of the Essential Content and the Practical Content were considered most interesting and were most easily recalled.

Summarized below are two family profiles, one of which is representative of a family that views the transition to sustainable agriculture as their only means of increasing their yield enough to feed themselves and the other is representative of a family that views the transition as a means of abandoning the use of harmful chemicals, and increasing their yield enough to make a small profit. These profiles are compiled based on my observations and interviews as well as the diagnostic evaluations completed by the Cuculmecca.

### Family Profile #1: Secundino Sobalvarro

Secundino Sobalvarro (46) and Alba Duarte (39) live with three of their four children Ileana Sobalvarro (19), Velkelle Sobalvarro (17), Jairo Sobalvarro (13) and their son-in-law, Juan Torrez (25) in the community, Jocomico Abajo. Secundino has not had any schooling and can neither read nor write. Alba can both read and write, and attended school through fourth grade. Ileana, Velkelle and Jairo have all attended high school for at least one year. Secundino grew up in the home the family currently lives in and Alba grew up in the neighboring community, Jocomico Arriba. The family owns their four manzana farm (1 manzana = 0.744 hectares), which they inherited from Secundino's parents. Their home is made of brick and has three rooms with dirt floors, and a portion of the roof is unfinished. They have access to electricity, as well as a latrine and a public well. The family owns one cow, one calf, one donkey, one pig and twelve chickens as well as one machete and one hatchet. All of the family members partake in some of the farm work, although the women tend to focus on tasks based in the home whereas the men focus on tasks based in the field. The family cultivates beans, corn and sorghum, which are the same crops that Secundino's family grew when he was a child, and two of their four manzanas are typically devoted to corn while one manzana is devoted to each of the two other crops. However, over the past few years, their corn crop has diminished substantially and during the past year they have not been able to produce any corn because the quality of their soil is poor.<sup>57</sup> The family uses one pesticide, Cypermethrin, on their sorghum crop to kill white flies and worms, but otherwise they cannot afford

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<sup>57</sup> Secundino Sobalvarro, interviewed by author, "Past and Present Agriculture Practices and Reactions to Workshop," April 30, 2009.

additional insecticides, fungicides, herbicides or chemical fertilizers.<sup>58</sup> The family depends primarily on their production of *cuajada* and eggs in order to get by, and while they consume most of the beans they produce, the majority of their sorghum crop is fed to the animals. They purchase the corn they use to make tortillas. In 2008 the family's total revenue amounted to C\$33,948 (U\$1,697), their total expenditures amounted to C\$24,392 (U\$1,219) and thus their profit for the year was C\$9,556 (U\$477).<sup>59</sup>

Secundino and Velkelle attended the bio-fertilizer workshop (Velkelle took notes for her father), and while Secundino is hopeful that the change to sustainable agriculture will be advantageous for his family, he is concerned that it may also be risky. He explained that if for some reason the sustainable methods don't work and the family loses another crop, such as beans, they will have to purchase all of their food (both beans and corn), something they have never done and don't have the resources to start doing now. Secundino explained that their land is becoming useless. 'It is dried and contaminated,' he said, 'and the majority of the time crops don't come to harvest.'<sup>60</sup> He explained that the family started using agrochemicals and fertilizers in 1990 when agricultural technicians came to the community promising increased yields and heartier crops, a temptation in this historically dry and vulnerable region. By 1998 an array of diseases began to plague their crops, and they became increasingly dependent on chemicals. Then by 2006 they determined that the chemicals were becoming increasingly useless – their crops were still plagued by blights and infestations – so they eliminated the use of most of them. Their yields have suffered, but Alba noted that they are lucky to have a cow and

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<sup>58</sup> "Base de datos\_Entraide – Actualizada," (Internal Cuculmeca Publication, Jinotega, Nicaragua, 2008).

<sup>59</sup> Ibid.

<sup>60</sup> Secundino Sobalvarro, interviewed by author, "Past and Present Agriculture Practices and Reactions to Workshop," April 30, 2009.

chickens, because as they provide their only source on income, which they use to buy corn and send their children to school, a priority for both Alba and Secundino.<sup>61</sup>

Secundino is eager to apply the bio-fertilizer to the family's fields, because he believes it may increase his yield, but he is not sure if he is ready to stop using Cypermethrin. He cited the creation of the bio-fertilizer as the most interesting thing he learned during the workshop, and also found the discussion of the complexity of the soil and the mineral content of cow manure, milk, molasses and ash to be compelling. His biggest hope in relation to the conversion to sustainable agriculture is that it will enable him to grow enough food to sustain his family.

#### Family Profile #2: Denís Francisco Blandón

Denís Francisco Blandón (34) and Gloria Torrez (29) live in Los Calpules with their two children Karol Blandón (6) and Lenís Blandón (2). Both Denís and Gloria can read and write, and have completed third grade. Denís moved to Los Calpules from the nearby community, El Mojón, twenty years ago, and since then he has been cultivating a parcel of land of three manzanas. The family owns the land, and has a title to it. In addition to the land, the family owns a brick home about five meters wide and six meters long, with a dirt floor and two rooms; it does not have access to electricity. They also have latrine and access to a public well. Denís and Gloria both partake in the farm work, which includes growing corn, beans and peppers and tending to their fifteen chickens and one cow. Gloria is also responsible for household work, including cooking and washing. The family grows one manzana of each crop in the spring and a half manzana of beans in

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<sup>61</sup> Alba Duarte, interviewed by author, "Past and Present Agriculture Practices and Reactions to Workshop," April 30, 2009.

the fall, and they own a machete, a mattock, a small silo and a fumigation pump to aid their work. The family began using chemicals about fifteen years ago and the general process they follow for cultivating all three crops is, first, clearing the land with a machete, second, allowing the weeds to grow one foot high, at which point they apply an herbicide, third, they plant the seeds, and when the plants germinate they apply an insecticide and a fertilizer. They apply the insecticides every fifteen days and fertilizers every four days as the plants grow. They also apply a fungicide at various intervals depending on the crop.<sup>62</sup> The most frequent plagues that attack their crops are white flies, worms, and mites and the most frequent diseases that have to deal with are the *mosaico* virus, bacterial infections and fungus. In order to manage the plagues and sicknesses they apply an array chemicals to their crops, including Avaunt, Altona, Actona, Monarca, Carbendacin, Terramycin, Gramoxone, Glyphosate and Fusillade. In 2008, the family's revenue was C\$20,808 (U\$1,404) and their expenditures were C\$13,892 (U\$694). Their profit was C\$6,916 (U\$345) for the year.<sup>63</sup>

Denís was the only member of his family to attend the bio-fertilizer workshop and, in a personal interview before the workshop took place he explained that he sees sustainable agriculture as an advantageous change for his family. In the few years after the family started using chemicals their yields were excellent; however, their yields have shrunk drastically within the past ten years. For example, in the late 1990s he was averaging about 600 sacks of peppers per manzana whereas now he is averaging only 300 sacks. In a post workshop interview, Denís explained that the change to organic agriculture will not only improve his yield, but will also diminish the diseases among his

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<sup>62</sup> Denís Blandón, interviewed by author, "Past and Present Agriculture Practices," April 14, 2009.

<sup>63</sup> "Base de datos\_Entraide – Actualizada," (Internal Cuculmeca Publication, Jinotega, Nicaragua, 2008).

plants. Likewise, in addition to citing the creation of the bio-fertilizer as the most interesting thing he learned in the workshop, he described how organic agriculture will ‘help us recuperate the fertility of the soil...in time it will contain many minerals.’<sup>64</sup> He also said, ‘We’re *campesinos* and the one thing we have is land. The well-being of our family can only come from improving the conditions of our land.’ Since the community began using chemicals, Denís has observed an increase in cancer and respiratory diseases in Los Calpules and while he said that he is fortunate not to be suffering from these sicknesses, he believes his vision has been affected by over-exposure to the chemicals. Denís is eager to start this project and firmly believes that it will bring positive changes to his family, in part because he won’t have to worry about harming his children when they ‘play in a contaminated environment and eat contaminated food.’<sup>65</sup> Also, he has calculated that he will spend about a third of what he spends on chemical inputs on organic inputs, and thus foresees increased profits. Denís hopes that community members who are not partaking in the project will be inspired to adopt organic agriculture practices when they see the results and he is eager to teach more people how to make bio-fertilizers and organic composts. As an afterthought, he also added that he hopes that organic agriculture might enable him to export some of this produce, citing the large market for organic food in the United States.<sup>66</sup>

### **Reflection and Analysis:**

*“The starting point for organizing the program content of education or political action must be the present, existential, concrete situation, reflecting the aspirations of the*

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<sup>64</sup> Denís Blandón, interviewed by author, “Past and Present Agriculture Practices and Reactions to Workshop,” April 30, 2009.

<sup>65</sup> Ibid.

<sup>66</sup> Ibid.

*people. Utilizing certain basic contradictions, we must pose this existential, concrete, present situation to the people as a problem which challenges them and requires a response – not just at the intellectual level, but at the level of action.*<sup>67</sup>

Popular education is an ideal pedagogical technique for promoting sustainable agriculture in rural Nicaragua for the following three reasons. First, because it draws on the life experiences of the participants, learning takes place on a personal level, which makes it memorable and meaningful. Second, the fundamental combination and integration of practice and theory, of action and reflection, not only fosters a desire to change, but equips *campesinos/as* with the tools they need to do so. Finally, it promotes awareness about common struggles among peasants world-wide, enabling *campesinos/as* in isolated communities to realize that the challenges they face are faced by millions of other peasants, generating a sense of solidarity, and perhaps fueling the emerging global peasant movement. This final point locates the grassroots work of organizations like the Cuculmecca in larger social and political contexts, and can thus be viewed not only as the promotion of ecological, financial and communal sustainability, but also as a form of cultural revitalization and peasant liberation.

Learning that takes place in accordance with personal experiences is at the heart of popular education and is integral to promoting sustainable agriculture in peasant communities. The majority of the *campesinos/as* I interviewed had attended school for fewer than three years, and were either illiterate or had very limited reading and writing skills. Likewise, most were unaccustomed to learning from a lecture, which is a fundamentally unilateral mode of education. Therefore, hands-on, interactive education that drew on their own knowledge bases and was intended to facilitate learning by

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<sup>67</sup> Freire, Paulo, *Pedagogy of the Oppressed* (New York: Continuum International Publishing Group, 1970), 95.

making connections between different pieces of existing knowledge in order to both deepen and enhance it was an essential pedagogical strategy. Of course, new pieces of information were introduced to the peasants by the facilitators as well, such as how to make the bio-fertilizer and the notion that the soil is a living organism, but they were founded on conclusions already drawn by the peasants – that chemical fertilizers are both costly and marginally effective, and that their soil is substantially less fertile than it was twenty, thirty or forty years ago. In other words, all new learning must be founded on or comprised of existing knowledge systems, and acquired not through lecture, but through dialogue, experimentation and practice.

The practice-theory-practice, or action-reflection-action, dynamic is also not only fundamental to popular education in general, but also to the promotion of sustainable agriculture. Each individual workshop employed this dynamic and the entire structure of the project was based on it. More specifically, the practical component of every workshop I observed was how to make a bio-fertilizer, and this was achieved first through describing the process, next by demonstrating the process with participant involvement using the host's barrel and materials, and finally through direct action when each family went home to make their own bio-fertilizer units. Likewise, the theoretical component of each workshop took place during the seminar-like learning session, which is when conceptual awareness and knowledge were developed in order to both justify and provide context for the action. On a broader level, the entire framework of the Peasant Agriculture Project was based on the notion that the *campesino/as* practice certain forms of production and that raising awareness of specific processes and ideas has the potential to change their practices. In other words, reflection on one set of actions will ideally

result in a new and improved variety of actions. This methodology was identified by all of the *campesinos/as* I interviewed as both useful and interesting and was described by López and practiced by Meza, which, in confluence with one another, indicate both its functionality and pedagogical importance.

Embedded in the use of personal experience to facilitate learning and the mutually constitutive dynamic of theory and practice in the learning process is increased awareness of the connection between the *campesinos/as*' immediate reality and that of peasants in other communities, departments, regions and countries. This presents an interesting dynamic, in part because the rural Jinotegan peasant lifestyle is the only one that most of my informants knew and thus fathoming a different type of lifestyle proved challenging. That being said, all of my informants were aware that they were poor and many cited daily struggles to eat and send their children to school. In other words, while they were aware of the gravity of their own situation, they had little context in which to situate it, so developing a vision of an improved livelihood was limited. Initiating the emergence of this awareness was thus the role of the facilitator, who would present sustainable agriculture practices as knowledge held by peasants world-wide and the heavy influence of industry in their communities as emblematic of the weight held by industry in agricultural policy and production practices globally. While this element of popular education was apparent in the aforementioned examples, it was not emphasized during workshops observed for this study, in part because the immediate goals of the Cuculmecca's Peasant Agriculture Project are to improve the present situation of the families involved – to make survival a little more feasible. However, I maintain that it is central to the promotion of sustainable agriculture in rural communities, because far from

being an isolated activity, it has global reaches, which may be both inspiring and empowering for peasants. As a facilitator of the project, Chico Meza cited 'the peasant agriculture movement,' implying its worldliness, as a motivating factor for his work.<sup>68</sup> It is vital for him to be able to locate his daily activities, comprised of visiting community after community and teaching about sustainable agriculture, in a broader context, as one essential contribution to the global grassroots peasant movement.

Finally, the ideal and most tangible outcomes of promoting sustainable agriculture include a healthy relationship between peasants and the environment, the ability to not only feed themselves regularly but also to nourish themselves, increased financial stability and public health. These improvements are fundamental to projects such as the Cuculmecca's Promotion of Peasant Agriculture Project, because they are local, measurable and, more or less, immediate. On a broader level though, the promotion of sustainable agriculture has social and political implications as well. It is fundamentally defiant because it excludes industry from small-scale agriculture. It is reformist because it is advancing gradual and broad-based change. Additionally, it is enabling the revitalization of peasant cultures that have been suffocated by industry and neo-liberalism. In short, it is a means of peasant liberation.

### **Conclusion:**

As framed in my introduction, I initially approached this research from a global environmental perspective – the food, energy and climate crises are linked to the land, and are a reflection of the dominating human relationship with it. Changing agricultural practices would therefore diminish environmental degradation, increase food sovereignty

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<sup>68</sup> Chico Meza, interviewed by author, "Sustainable Agriculture Vision," April 24, 2009.

and inspire further research into truly sustainable forms of energy. It turns out that peasant agriculture is a lot more than a global warming solution or a means of solving the world's food and energy crises. Like soil, peasant agriculture is far greater than the sum of its component parts. It is liberation. It is social justice. It is cultural revitalization. These abstract and complex social struggles are rooted in devastating trends of oppression; mere symptoms of this oppression are global warming and food and energy crises. Movements to liberate the oppressed, in this case *campesinos/as* worldwide, are therefore not only integral to alleviating these symptoms but fundamental to improving the health, educational opportunities and autonomy of millions of people. Such movements must be founded on both theory and practice – reflection and action – and must take place on the ground (in the soil, for that matter), brought from one *campesino/a* to another. Peasant liberation is contingent on *campesinos/as* worldwide cultivating the soil.

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### *Observations*

I observed workshops conducted in Yagualica on 4/23/09, Los Calpules on 2/24/09, Paso Ancho on 4/27/09, La Pita del Horno on 2/28/2009, Jocomico Abajo on 4/29/09 and Jocomico Arriba on 4/30/09.