Sustainable Agricultural Programs in Latin America as a Solution to the Issue of Food Security

Countless studies have shown that sustainable agriculture is a viable solution to tackling the problem of food insecurity. In the context of this, the following study looked at three organizations in Latin America that work with sustainable agriculture, to find if there are common elements in the work the organizations do and their approach to the food insecurity issue. Interviews with the organizations and written material from the organizations were used as the main source of information. The findings indicate that despite the differences between the organizations and the programs they carry out, there are certain common themes that encompass their work on sustainable agriculture. These themes include *campesino a campesino* methodology, biodiversity, the environment, and nutrition as main theme of food security programs. The second part of the project entailed the creation of a webpage directory of organizations in Latin America that work with sustainable agriculture and/or agroecology.

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Introduction

The issue of food security is one that entertains the attention not only of academics in the field of agriculture and food, but also of politicians all over the world. With the population expecting to reach almost 10 billion in the next 30 years, there is a growing concern on whether there will be enough food available to feed more mouths. Even with the current population of 7 billion, the issue of food security is one that plagues the world. It is estimated that around 1 billion people go chronically hungry, while there is 3.7 billion people that are malnourished (Azari 2011, 2011).

Within this context, many have come forward with what they consider is the silver bullet to the problem. These solutions go from genetically modified foods to food aid. However, others argue that while modern agricultural methods have increased agricultural production, food insecurity still persists. Furthermore, there is the concern that such practices are also taking a toll on the environment, thus putting into question the long term effect of such practices (Pretty et. al 2002, 219). Among the solutions proposed, one of the most talked about relates to sustainable agriculture. Sustainable food systems are seen as a viable solution that responds to the demands of the developing world of a more efficient use of resources and methods that are less dependent on nonrenewable resources (Azadi 2010, 93).

Literature Review

In the last ten years there has been an increase in research about sustainable agriculture and its positive impact in reducing food insecurity. J.N. Pretty et. al. on their study "Reducing Food Poverty by Increasing Agricultural Sustainability in Developing Countries" have showed empirically that implementing "low cost, locally available and environmentally sensitive practices and technologies," can result in significant increases in food production (Pretty et. al 2002, 218). Azadi et al., in their piece on organic agriculture also note that having a sustainable food system encourages local production and distribution infrastructure as well as making "nutritious food available, accessible and affordable to all." They also note that a system of sustainable food production that works with organic agriculture can confront better some of the issues that agriculture faces today like the impact of climate change, soil degradation and drought, and pest resistance (2011, 92). Consequently, such an approach can promote food security.

Within the same context of sustainable agricultures other scholars have looked at the role that biodiversity plays in food security and how it relates to sustainable agriculture. Toledo and Burlingame remark that given the positive impact of biodiversity on nutrition, in that in provides dietary diversity, it is not surprisingly that the FAO promotes sustainable agricultural practices that enhance and conserve biodiversity (Toledo and Burlingame 2006, 478). Thrupp also notes that agriculture has been able to develop on the basis of diverse biological resources that biodiversity provides like genetic resources, wild resources, edible plants, livestock, and soil organism among others (2000, 266). Moreover, a sustainable agricultural system provides a vehicle for the positive externalities of biodiversity to play out (Thrupp 200, 274).

On another, Altieri and Toledo comment on the limits and vulnerability of the present agricultural industrial system, which result from its low ecological diversity and narrow genetic base and contributes to the problem of food insecurity (2011, 589). Within this context they argue that traditional agroecosystems, the platform of present agroecological projects, have the potential of bringing solutions (Altieri and Toledo 2011, 591). Moreover, studies on traditional and peasant agriculture shows that these systems are "sustainably productive, biologically regenerative, and energy efficient, as well as "equity enhancing, participatory and socially just" (Altieri 1999, 213)(Altieri 2000, 73). Adding to this, Altieri has found that grassroots organizations that implement agro ecological technologies can bring increases in output and more stable levels of production, creating important environmental and economical benefits to small farming and rural communities (2000, 59).

As seen above, the current literature is rich in evidence on the positive impact that sustainable agricultural practices have in increasing productivity and bettering access to food, thus contributing to solving the problem of food insecurity. However, there is little research on exactly how is it that grassroots programs and NGOs go about implementing said programs and the effects that they have on the food security of the communities they work on. Therefore, the main goal of this study will be to provide, through the use of case studies, an overview of the work that sustainable agriculture organization in Latin America carry and look to see if it is possible to identify certain features common to the program they run.

Methodology

The first step of the study was to identify organizations in Latin America that carried out work on sustainable agriculture. Through Internet web research around 30 organizations where first identified. Out of this group a smaller group was selected to serve as potential case studies. The organizations drawn were chosen on the basis of possessing certain characteristics: 1) be a national non-profit organization or grassroots organization 2) work in rural areas 3) have a current project on suitable agriculture. Lastly, fair amount of information on the work of the organization and the projects they carried had to be on their webpage in order have ample information on which to analyze their work on. A preliminary list of 8 organizations was drawn up based on these parameters. Through e-mail all the organizations were contacted and asked for an interview. Five organizations responded, but only 3 interviews took place. The case studies are done on the 3 organizations where an interview was able to take place.

The interviews were done via Skype and each lasted approximately 40 minutes. In the interview, questions regarding the state and success of the projects on sustainable agriculture were based on the common features of traditional agricultural systems identified by Altieri and Toledo: high levels of biodiversity, ingenious systems and technologies of landscape, diversified agricultural systems, agroecosystems that exhibit resilience and robustness, agroecosystems nurtured by traditional knowledge systems and famers' innovation, and lastly, existence of socio-cultural institutions (2000, 591). Moreover, Pretty et al. findings on a set of impacts that they observed in agricultural projects and initiatives were also taken in to account when doing the interview. These include: improvement in social capital (increased water retention in soils, improved organic matter in soils, increased agrodiversity, etc.), improvements to social capital (more and stronger organizations at

local level, new rules and norms for managing collective resources, and better connected to external policy institutions) and improvements to human capital (more local capacity to experiment and solve own problems, better child health and nutrition, reversed migration, etc.). Additional information was drawn up from the respective webpage, documents, videos, etc. of the organization, as well as information provided by the organization by request.

Case Studies [1]

The following is brief description on the three organizations analyzed in this study.

Union de Agricultores Minifundistas de Guatemala[2]

Union of Minifundistas Farmers of Guatemala (UAM) is a union of small farmers in Guatemala. It was born in 1993 as a desire to group the various micro-regional organizations of the country and serve as the directing body. The main goals of the organization are based on the development of the rural sector at the micro and macro level, as well as the identification of the main problems in rural areas and its possible solutions (UAM).

Within the various programs they coordinate is the program of agroecology. The program consists of providing the member associations with agricultural and environmental

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[1] All the information on the organization come from their respective webpages and interviews unless otherwise stated

[2] Roda, Marcos. UAM. Skype Interview. 5 Apr. 2013
Rodriguez, Rudy. UAM. Skype Interview. 5 Apr. 2013.
UAM-Union de Agricultores Minifunditas. Union de Agricultores Minifundistas. http://www.uamxela.org/uampcgi/uammerger.py?m0=/uam.html&m1=items.html&m2=portada.html

conservation services in the form of technical assistance, activities of planning, and management support among others. The main focus of these services rests on organic agriculture and techniques of sustainable agriculture. Within the goals of the program is the attainment of food sovereignty and independence from agrochemical production, involvement by the actors in question solving the problem of poverty, food security and the production of surpluses from the different projects.

The organization carries its work in approximately 10 municipalities and around 75 communities within 6 out of a total 22 departments in Guatemala. These areas do not have basic health institutions; suffer high levels of poverty and have medium-to-low educational levels. The main group the organization works with is small farmers (minifundistas). The production area of these families is of around 440 squared-meters and mainly serves for subsistence farming. Before the organization began working in these communities, farmers were strongly dependant on agrochemical products. Not only did the soils demand an ever-increasing application of these chemicals and eventually become infertile, but also the farmers who used these products suffered the economical consequences of the increasing costs of these products. Therefore, the organization first tries to lessen the dependence on agrochemicals while introducing more sustainable techniques. In areas where the long-term use of agrochemicals has devastated the soil's fertility completely, the work mostly focuses on recuperating the fields (work that can take up to four years) with a gradual disuse of chemicals.

In regards to the techniques used, UAM works a lot on developing natural fertilizers like vermicompost and they are also developing a new type of liquid natural fertilizer. In helping to combat the diseases that plague the fields they are working on the development of "natural drugs" with the use of volcanic rock, and other organic matter. The organization

also works on organic soil management, like keeping the soil's humidity, to respond to the unprecedented periods of drought that some areas in Guatemala are experiencing. One salient aspect of the organization's work is that they strive to revive ancestral techniques of agricultural production. Guatemala has around 23 ethnic group that use their owns agricultural techniques, but which disappeared with the onset of the Green Revolution in Guatemala. Consequently, UAM tries to revive the use of these techniques not only with the goal of implementing techniques more in accord with sustainable agricultural practices, but also with the aim of cultural revival.

Fundación Agrecol Andes[3]

Fundation Agrecol Andes (FAA) is non-profit organization founded in 2001that works in Bolivia and Peru. The work of FAA is centered on bettering the living conditions of the rural Andean societies. This done through training, systematization of the experiences, promotion of methodologies of participation, dissemination of information and assistance to the different processes of change.

The group that FAA mainly works with is indigenous communities (Guarani and Chiquitanos) and small peasant communities in the rural Andes region. While some of the communities they work with have small farmers, there are many families that are not exclusively involved in agricultural production; instead they rely on an external source of income. In this case, the father of the household has left home and began working in the *haciendas,* where livestock is raised, or in the timber industry in the area. Many these

[3] Maldonado, Ruben M. FAA. Skype Interview. 10 Apr. 2013.
Fundación AGRECOL Andes. Fundación AGRECOL Andes, 2008 http://web.agrecolandes.org/

workers have become indebted to these industries, forcing them to continue working there and living the women as the head of household.

Therefore, the communities the organization works with have lost knowledge on how to practice agriculture. Moreover, despite the very fertile lands that these communities live in, they rely on products coming from other parts of the country for their consumption. Attending to this concern, the FAA's aim is to introduce a way of producing food that is more ecologically sound and sustainable in the long run, but which also involves the community into the process. They do this with the implementation of diverse agricultural production, such as with agroforestry systems where various species are planted under tree covers in one plot. This method of production, allows families to harvest some products after two or three months and even more different products with time. Moreover, the FAA, responding to the needs of female heads of household concern with providing for their family, has began the installation of horticulture orchards. These add to the diets of the families and can at times produce excess that can be sold.

Aside from working with women and the community as a whole, FAA is also keen on getting knowledge on agricultural practices to schools in the areas. They have implemented programs that involve the creation of ecological brigades and horticulture orchards, with kids reflecting on the work that their parents do on the fields.

Semilla Nueva[4]

Semilla Nueva, the last organization studied, provides an interesting case because its work touched more upon the commercial sector of agriculture. Semilla Nueva is an organization founded in 2009 in Guatemala by two Americans.

The organization works mainly with communities in costal Guatemala. The communities here were formed during the land reforms of the 50s and 90s, and encompass families of farmers that have been involved in agriculture for generations but are not mainly of indigenous ancestry, but primarily mestizo/ladino ancestry. The farmers are mostly centered on the production of corn and sesame, the former directed towards the domestic market and self-consumption while the latter is for export. Consequently, the farmers Semilla Nueva works with are not subsistence farmer, but instead use their income from selling their crops to buy the food they consume.

The farmers here are strongly dependant on agrochemicals, mainly pesticides and fertilizers. Ms. Lacy, one of the staff at Semilla Nueva, noted that while farmers are aware of the increasing high prices these products; they do not make the connection between this and a decrease of income. Moreover, the farmers do not think that there are any other alternatives to growing food this way. However, the farmers do have come to notice that they have to apply more fertilizer to the fields in order to keep up with production (Semilla Nueva 2012, 3).

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[4] Lacy, Kristin. Semilla Nueva. Skype Interview. 5 April. 2013.
Semilla Nueva. Semilla Nueva. http://semillanueva.org/

Responding to these two main issues, Semilla Nueva focuses mainly on soil, attending to the increasing infertility of the fields. Although the organizations work with sustainable farming techniques like conservation tillage, green manure and cover crops, effective seed spacing and agroforestry with native species, it does not work with strictly organic agriculture. Their long-term goal is to decrease farmer's dependence on agrochemicals, but the organization is aware that it is not possible for famers to switch to organic agriculture overnight. Therefore, the techniques pushed by the organization seek to increase soil fertility, eventually decreasing the amounts of fertilizers and pesticides the farmers have to use and decreasing costs. One example of this is their work with no-till farming, which has increased the soils fertility and has lessen the dependence on heavy machinery, saving farmers a lot of money. Thanks to techniques like these some farmers have seen their cost decrease by almost 50%, allowing farmers to have higher incomes.

Common themes

In analyzing the work on the different organization, some common themes in the programs of the three organizations have surfaced. These include, the *campesino to campesino* approach and other educational schemes, the importance of the environment and biodiversity and nutritional programs to respond to the issue of food insecurity.

Importance of *Campesino to Campesino* and other education schemes

Campesino to Campesino

One the main themes in common is the use of the *campesino to campesino* methodology in helping to introduce the practices of sustainable agriculture. The fact that the three organizations' use of this methodology is important to note because, as remarked

in the interviews, the introduction of new ideas on farming is one of the most challenging barriers that sustainable agricultural projects have to face. Additionally, agroecology and sustainable agriculture being very knowledge-intensive and not developed top-down but based on farmer's knowledge and experimentation (Altieri and Toledo 2011, 588), demands the use of educational programs, just at the one carried by the organizations.

In the case of UAM, they train community leaders that through their work in their plot, using the techniques acquired, give farmers a firsthand experience of how this new style of farming works and what is its outcome. Adding to this they have *escuelas de campo* (field schools), small research schemes done in the small plot of one of the farmers. Here evaluations are done on different products with the aim of showing the people of the community the effectiveness of the new techniques (Rodriguez 2013). Mr. Rodriguez, the coordinator for agroecology for UAM, noted that this sort of process is one of the most important steps in program. Frequently, when introducing new techniques, there is bit of resistance from farmers who have grown dependant on agrochemicals and are skeptical about the effectiveness of this new process of farming. The farmers see sustainable agriculture as just another set of techniques that are externally imposed on them. Therefore, the *escuelas* and the *campesino to campesino* approach, are key to validating sustainable agriculture as a viable alternative (Rodriguez 2013). Moreover, this methodology helps to make people become involved in the process by promoting a space where people can learn to utilize the resources they have and create their own methods and products. Mr. Rodriguez notes that as more people get involved, other farmers become more open using the new techniques.

Semilla Nueva, working inn the framework of providing extension services for agriculture, also uses the *campesino to campesino* approach (Semilla Nueva 2012, 3). This

approach has been very useful in helping to extend technical services to farmers who do not have an able body to go to for questions regarding issues like climate change, new seed varieties, etc (Semilla Nueva 2012, 1). In this context *campesino to campesino* works as "community level extension service". Not only does this approach bridge the gap in knowledge and lessen farmer's dependence on external sources and aid, but it also "builds community empowerment." Moreover, Semilla Nueva trains leaders that have technical knowledge, but who are also civically engaged and communicate with the people in their community.

Other thing to note is that the *campesino to campesino* methodology closes the gap between research and practice. This is important because the role scientific knowledge plays in agricultural practices is almost inexistent in many rural spaces (Valdivia 2009, 1). For instance, Semilla Nueva finds that findings on agriculture from big research institutes, and which otherwise might go unheard of by farmers because of the lack of access to this information, can still be made available to many with the *campesino to campesino approach* (Lacy 2013). Although, Semilla Nueva acts here like the ignition to this, Ms. Lacy notes that after the movement gains strength it can pretty much go on its own.

In the case of FAA, although they work with communities that might not be dedicated to agriculture, introducing new techniques is difficult at first. For one, Mr. Maldonado notes that they have to work with a small number of people first to demonstrate to the rest of the community that such a way of doing agriculture is feasible. Things become easier to implement as families observe that those families that make use of these programs benefit not only from having more nutritious food, but can also create economics gains. The positive impact of their programs is such that some fathers are leaving their jobs

in the haciendas and forestry industries, and returning home to work on agriculture (Maldonado 2013).

Another big point of the *campesino to campesino* approach is that it gives room for innovation and for local knowledge to flourish. For instance, the UAM in working to develop drugs that combat the diseases that plague the fields, have gained from the input of farmers who provided their know-how and rediscovered native plants that have properties that can be extracted to create such drugs (Rodriguez 2013). In the case of the FAA, they have come to realize that a set of practices that work in region, might not work in another. Therefore, the most effective approach is to give some general guidelines and allow families to innovate attending to the different conditions the families face (Maldonado 2013).

Semilla Nueva has also found that the *campesino to campesino* approach creates a space for farmers to "create their own agricultural development," instead of having an outside organization, that "teaches them how to farm." As Ms. Lacy notes, the farmers they work with have a lot more knowledge on what farming entails and the organization just tries to get the conversation started. Although the generation of farmers they worked with grew with the teaching of the green revolution and are therefore largely unaware of traditional farming techniques, some ancient practices have found a new ground. Given is the example of the *cuchubal*, a day communal day for farming where farmers come together to farm. The experiment was largely successful, with some farmers even recalling how this practice is done in the highlands (Lacy 2013). This also notes how engaging more into the cultural interests of farmer can make some practices more successful.

Other Educational Schemes

For the FAA's agricultural programs the educational component is also very important and centers on transmitting the knowledge on agricultural practices. However, unlike other programs that focus on the family or the community actor, the FAA has begun work with the schools in the area. The aim is to get kids involved in creating "ecological brigades" within these educational institutions. Here children start to develop plans of development with an emphasis on ecological risk management, emulating the process their parents go through. The kids also have the opportunity of presenting their proposal to the communities, and even have the change of obtaining economical resources to apply their own programs (Maldonado 2013). Once more, this approach points to the common aim of many agricultural programs of filling the gap in knowledge.

In the specific case of the FAA, it also serves to facilitate the sharing of knowledge between generations, thus creating an environment for agricultural practices that can be applied in the long-term. Additionally, the fact that kids become active players in the programs furthers strengthens the appeal that such schemes have on the community. Lastly, higher education institutions (the University of Santa Cruz this case) have also become involved in the programs helping to certify certain producers that will go on to take part in the campesino to campesino approach (Maldonado, 2013).

Connected to this issue of the importance of education for sustainable agriculture in gaining greater acceptance, UAM works on raising awareness about the negative effects of agrochemicals and industrial agricultural techniques. People dependant on these products have the mentality of "just going to the store" and buying these products, unaware of the negative consequences that these products carry. However, Mr. Rodriguez notes that after

people become aware of the dangers associated with the use of agrochemical they become more responsive to the efforts of the organizations.

Semilla Nueva also had to face the challenge of changing some of the farmers most practiced techniques, like the burning of the soils to help clear the field for the growing season. Not only does is this practice bad for the environment, but it destroys useful "green waste" that could have been introduced to the soil to increase its fertility (Lacy 2013). Similarly with the communities UAM works with, the farmers that Semilla Nueva collaborates with are not aware of how they are part of a bigger system. Therefore, one of the goals of the organization is to get people to become aware of the big companies that provide seeds and agrochemicals, and have a "monopoly on the farmer's production." Therefore, they can present sustainable agriculture as an alternative to people that feel unhappy about this system (Lacy 2013).

Importance of the environment and biodiversity

The programs of the three organizations also have in common the important role they give to the environment and biodiversity. Additionally, they also address the issue of climate change, which is expected to affect agriculture and reduce food security of agricultural in regions like the ones in Latin America (Valdivia et. al. 2009, 1).

One of the key issues that sustainable agriculture works towards is that of increasing biodiversity in farming. Industrial agriculture mostly focuses on monoculture, however, this type of farming creates a dangerous situation not only because it stricken the soil from its main nutrients, but also leaves the farmer's income dependant of only one crop (Rodriguez 2013). UAM observed that many farmers in Guatemala who practices this type of farming were often in a precarious situation when natural disasters affected the fields, destroying

their only source of income. UAM notes that given the power of the seed industry in Guatemala and the widespread use of hybrid seeds, this has lessened the importance given to native seeds and plants, which are not only very nutritious and reproduce easily, but require little maintenance (Rodriguez 2012, 1). Therefore, UAM carries a campaign with the aim of rescuing native seeds. For example, for over 8 to 9 years, coordinating with other organizations, they have carried la *feria nacional de semillas* (national fair of seeds), the first of its kind in Guatemala (Rodriguez 2013).

For FAA the issue of diversification of agricultural production is also one of their key goals. Mr. Maldonado noted that the few families that were involved in agricultural production practiced monoculture of crops like coffee for the purpose of commercialization. However, FAA tries to get families to participate in agroforestry systems that support high biodiversity, thus creating a heaven for multiple sources of food and providing ecosystem services (Thrupp 267, 2000).

Semilla Nueva approach also encompass techniques that are conductive to decreasing the farmers impact on climate change, especially given their focus on decreasing farmers' reliance on inputs that depend on fossil fuels. Moreover, as farmers lessen their reliance on agrochemicals they are able to use other alternatives like green manures and cover crops. These not only provide protection and fertility to the soil, given their high nitrogen content, but also diversify agricultural production since now farmers are growing other crops aside from the main export crops (Lacy 2013).

Climate Change

The other big reason for why sustainable agriculture is seen more positively is because it copes better with the changes observed with climate change. The people at UAM have noticed the changes in weather caused by climate change, especially concerning rain

patterns. Trying to attend to this and connecting to the aim of biodiversity, they have identified certain species that are more resilient to the changes in weather. Recently, one event in Guatemala demonstrated the advantages of working with sustainable agriculture. Early this year, coffee plantations in Guatemala were seen affected by a tree fungus that blighted about 70% of the crop (BBC 2013). The outbreak of this plague was blamed on climate change. However, the coffee growers that UAM had been working with, who employed agroecological technique, were not affected by the plague. Mr. Rodriguez noted that their coffee plants were more robust and resistant.

In the work that FAA does the environment also plays a big role. In line with this they create communal plans with an emphasis on agricultural risk management. In this setting communities first envision a communal vision and the actions that ought to be prioritized. From then, looking at the demands of the community, they can implement techniques that contribute to their vision but are also in accord to the needs of the environment (Maldonado 2013). Additionally, the forestry system parcels they use are structure in way that they can serve the family in the long-term, disincentivizing the practice of burning of forest land for agricultural production, thus stopping environmental degradation and decreasing emissions. Additionally, FAA is indentifying native species and seeds that are resistant to changes brought by climate change, like the longer drought periods and other climatic events.

Nutrition programs and other initiatives to tackle food insecurity

Connected to the issue of sustainable agriculture is always that of obtaining food security. The organizations interview all noted the importance of such efforts and have carried their own campaign aim at introducing more nutritious products to their diets.

Concerning UAM, they have created a *olla nutritional comunitaria* (communal nutritional pot). This nutritional pot, based on the food requirements of the food pyramid and regional differences, provides the ideal diet for a person. However, as Mr. Rodriguez remarks, the *olla nutricional* in Guatemala is conventional and does not attend to community needs. With this in mind, UAM has sough to create a *olla nutricional comunitaria* (nutritional communal pot), which attends to local characteristics. Using the knowledge of plants, that before had not been valued but have been found to have high levels of vitamins, they introduce different foods to the *olla comunitaria* (Rodriguez 2012). This approach of fighting malnutrition resonates with the idea that individual food requirements are not homogenous and therefore, nutrition programs need to accommodate to the diversity of needs of individuals and the community (Toledo and Burlingame 2006, 478).

Connected to this, UAM also has the goal of producing crops that are better quality and are more nutritious. Mr. Rodriguez make the point of how current food production is not effective in solving malnourishment by giving the example of Mexico, a country that is producing food products but of a lower quality (processed foods). He notes that the Guatemalan communities living next to the border with Mexico, taking advantage of the lower prices of imported food from Mexico chose to consume these products instead of their own. Maybe not surprisingly these communities also happen to be the ones with the highest levels of malnutrition (Rodriguez 2013).

Just as with other organizations, FAA has the goal of helping family procure enough quantity of high quality foods with which they can better feed themselves. As noted before, many of the people who were involved in agricultural production practiced monoculture production of coffee. In doing a comparison between how the sale of coffee (to gain income

to procure food) compares to the programs of diversified production in meeting the nutritional needs of the family, they find that given the prices for coffee and the quality of coffee grown, the production of only coffee does not compare with the diversified production system (Maldonado 2013). Adding to this, the FAA pushes for the consumption of foods that are native to the area and very nutritious like sesame. Indeed, in reviewing the diets of the people involved in the program they have found that families have added 4 to 5 new products to their diet. What is more, the families have seen an increase in the productivity of their small plots, as well a reduction in crop losses, which only adds to them having a more stable food source (Maldonado 2013).

In the case of Semilla Nueva, aside from the cover crops, which provide an additional source of food for the household, the organization has also started a program exclusively on security food. One of their efforts entails the growing of pigeon pea, not only used as a green manure crop, but also as food source. Within the program they aim to bring the farmer back to the family and teach women how to cook it and eat through cooking sessions with women's groups to teach them how to incorporate these crops into their diet (Lacy 2013). An interesting fact to note was that the adopting of new food habits was easier when it entailed something that was familiar to the person. Ms. Lacy gives the example of how in trying to get chia to become a more important in food in their diet, farmers were more open to trying it because they recall having consumed it when they were little. Ms. Lacy also remarks that some of the success of their programs rests of the fact that they use simple technologies in their programs versus other initiatives, like that of creating family gardens, which famers do no see as adding to their family's economic well-being. Therefore, they find that it is easy to incorporate something like chia and pigeon pea since it already serves a purpose aside from the nutritional benefits they bring.

Other issue to take into account

One of the issue that came also came apparent for the success of the programs run by the organizations, is that of the economic costs and benefits of implementing sustainable agriculture. In the case of UAM, they see one of the biggest challenges to the recuperation of soils. This process takes some time and at the beginning can be costly to the farmer since he/she cannot continue to produce in the same way as they did before. Therefore, getting farmers to commit to new process given the initial economic cost is one of the biggest they needed to surpass (Rodriguez 2013). The same is seen in the case of Semilla Nueva. Many of the changes they promote are cost saving in the long-term, but it takes while for the results to show (Lacy 2013). This issue pinpoints to the tradeoff that come with transitioning to a more sustainable production system (Azari 2011, 94).

Secondly, is the issue of whether the organization enjoys the support from external actors, like government authorities. The director of UAM noted that in Guatemala the environment is not conductive to sustainable agriculture. The use of agrochemical products and other industrial techniques of agriculture was influenced by media, the government and other commercial actors that pushed for their use of for the production of basic crops (Rodas 2013). However, it should be noted that organizations like Semilla Nueva have been able to connect the local community extensions to the resources that government can provide, making the government more involved in these programs (Lacy 2013). The case of FAA is also an example of an effective integration of regional and local authorities into the programs that they carry which has facilitated the financing of such schemes and the extension of similar programs in other regions (Rodriguez 2013).

Other issue that surfaced is that given how some of practices, like the burning of fields in Guatemala, have become so widespread and “almost a traditional norm,” those

who are willing to try new alternatives are put in an uncomfortable position within their community. For instance, a farmer that work with Semilla Nueva and followed their practices closely was “made fun” by his neighbors for trying new things (Lacy 2013). Additionally, although mainly specific to the case of Semilla Nueva, work by an NGO that is not run by people from the region can be meet with skepticism by farmers who have experience with NGOs that come with their “ideas” only to leave when things fail. This issue shows how important it is for sustainable agriculture to have a community approach (with something like the *campesino to campesino*) so as to lessen friction, and make sustainable farming something that is part of the community.

Conclusion

The analysis on the work that some organizations in Latin America have done in relation to sustainable agriculture shows that despite the different programs that they have executed, there are certain themes that are common in all. This point is important because it helps to understand what approaches are successful when it comes to implementing sustainable agriculture. In the same way, it shows that sustainable agriculture requires an interdisciplinary approach in order for it to work and tackle something like the issue of food insecurity. The study also shows in what ways sustainable agriculture contributes to lessening food insecurity and how this efforts play out in practice.

A further extension on the study would focus more specifically on one of the themes touched upon in the study and how it relates specifically to food security. Moreover, if possible, an empirical study could be carried to measure how the levels of food security change with the implementation of sustainable agricultural programs.

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Part 2: Creative Proposal Project

The second part of the capstone project entailed the creation of an online directory of organizations in Latin America that work with sustainable agriculture and/or agroecology. In the online directory you can see the physical location of the organization, its web page and a small description of the work the organizations does. The directory is created in a way that anyone that wants to contribute to the page can do so by adding an organization to the list.

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