

# Organic Huerto Project Report

## Bua de Los Colorados: Jan 2007-April 2007

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This report is the result of my work in the community of Bua de los Colorados. I have been working in Bua as an intern for the last three months, Jan 2007- April 2007. I became connected with Yanapuma after discovering the organization on the Internet, but my internship was specifically organized as a part of the practicum portion of a Study Abroad program through my University in Canada, the Trent in Ecuador Program. The entirety of my work was carried out in the community. I have never even really been acquainted with the office work and procedures of Yanapuma. My Project was originally organized through Andy, and then I was just sent off to the community. Since then, I have had some contact with Asalia, the Project coordinator, but in reality we have never coordinated much together. The majority of my work was organized in the community and in collaboration with the Yanapuma coordinator stationed there, Giovanni.

### Community/Project Profile

Bua de los Colorados is one of only seven remaining communities of the Tsa chila Indigenous nation, and is located about 20km outside of Santo Domingo. There is no official census for the community, but there are about 136 families in the community, and estimating at 4 per family, would result in around 550 people in total living in the community, but the real number could be more or less than that. The community in general suffers from extreme states of poverty; lack of proper water, sanitation, health, education, waste management services; general lack of resources; depletion, colonization and contamination of the environment and their traditional territory; and disintegration of their culture as indigenous peoples.

In traveling to the community one must take a bus from Quito (or whatever city you happen to be in) to St Domingo, which takes about 3 hours (from Quito). In St Domingo there are buses or rancheros that leave making the 1 hour trip to Bua about every two hours. Thus the community is relatively accessible, and is an easy day trip from Quito. The recent pavement of the road, only four years ago, has greatly increased the accessibility of the community by bus, and the relative proximity of St Domingo, which is one of the fastest growing cities in Ecuador, poses increasingly serious threats to the further depletion of the community's culture and resources.

Yanapuma has been working with Bua for the last year and a half through cultural exchanges but has only been working with long term development projects within the community for about the last 8 months. Projects that are in progress in the community at this time surrounding health, sanitation, waste management, education and environment include:

- construction of ecological toilets
- solicitation of private recycling and waste pickup services
- health and sanitation studies, surveys and capacity building
- nutritional investigation and capacity building
- educational capacity building
- English classes oriented around ecotourism
- documentation of medicinal plants
- community mapping
- anthropological studies

While these projects are directed towards the improvement of situations faced by the whole community, and are a result of everyone's combined needs, much of Yanapuma's work and projects however, are carried out in cooperation with and facilitated specifically through the cultural group and project, Shino pi Bolon.

Shino pi Bolon is a group that was initiated and formed by members of the community themselves three years ago in response to the disintegration of their culture and the serious problems facing the community mentioned above. The group's primary and principle goal is the recuperation and revitalization of all aspects of the traditional knowledge and ways of their ancestral culture. Within this initial framework, their objectives also include the development of sustainable initiatives, strategies and projects to better and empower the lives of their community as indigenous peoples. As such they have collaborated with the Yanapuma foundation to achieve these goals. There are 23 families in the Shino pi group, but only about 13 families are actively participating, with then about 35 individual participating members at this time. All of the members of Shino pi however have been working hard over the last three years to develop successful projects and programs surrounding their primary objectives, and to develop networks, cooperation and interest within the rest of the community and neighboring communities to expand the overall project vision.

The base of the Shino pi project essentially operates out of the cultural center, which was built and developed with the initiation of the group. The Shino pi cultural center functions both as a representation of traditional culture, an actualization of various projects and an inspiration for future project expansion into the community. Projects which have been developed at the cultural center include:

- Ethnographic museum
- Ecotourism
- Music and dance center
- traditional processing of sugar cane
- traditional artisans
- cabanas
- ecological rain forest trail
- botanical/medicinal garden
- composting toilet
- rainwater collection systems
- reforestation of native tree species

The cultural center is now host to many cultural and educational events demonstrations and activities, both for the members of Shino pi themselves and for visitors that are either part of other foundations and projects or educational and tourist groups. In addition to these initiatives, a central part of the Shino pi project is the everyday revitalization and participation in Tsa chila culture, including the reintroduction of traditional dress, cooking and sharing of traditional food, and the participation in traditional music and dance. In fact, Shino pi also functions as a music and dance performance arts group that participates in cultural events and performances in both St Domingo and other cities across Ecuador.

Much of the initial and current work of these projects was/is realized through the collaborative efforts of the members of Shino pi themselves by way of mingas and other forms of sharing and collective

contribution. The more recent additional assistance of the Yanapuma foundation also provides access to funding and resources which otherwise would not be available, enabling them to endeavor larger or more resource dependent projects. The funds received from dance and music performances, visits and demonstrations at the cultural center, and volunteers staying in the community also contribute to the groups source of funding.

To be sure, the Shino pi group has benefited immensely from their efforts over the past three years. In terms of financial gains and organization, the group divides and shares the benefits as equally as possible. With the musical and dance performances, half of the funds received are put into a reserve for expenses and endeavors of the cultural group, and the other half is divided equally among all the performers. The funds received from educational groups, visitors or cultural exchange tourists at the center are divided equally among those that come to participate in the demonstrations, music, cooking, caring and guiding of the visitors. The volunteers that stay in the community pay directly to the family that they are staying with, and all members are encouraged and given the opportunity to host volunteers

It is important to note here however, that the benefits of the projects and endeavors of Shino pi are by no means solely something tangible that can be divided or held. The central purpose of their project is about the living and engaging in their culture in daily life, and by working together over the last three years, they have not only begun building something which directly benefits their lives and contributes toward the substance and sustainability of their community, but they have begun the process of rejuvenating community spirit. They have created a collective effort and vision to work together to form solutions from the ground up to better their own lives. They have begun the long journey of recovering that which has been taken from them, the cultures and traditions of their past, awakening also, a spirit of confidence, of possibility, and hope that indeed, there is something they can do, and that their culture, their identity, can be the founding force to develop a more whole, healthy sustainable existence for themselves and for future generations.

Of course the Shino pi project is not only meant to benefit its immediate members either. Although the whole community does not necessarily share their immediate ambitions and ideas, the Shi nopi vision includes cultural revitalization, sustainability, autonomy and viability for all the members of Bua. Moreover, this vision extends to other Tsa chila, Indigenous and Mestizo communities as well. Through their activities and extensive networking and communications, they hope to foster and inspire the recuperation of this community spirit and collectivism in all of their community. To rejuvenate not just the culture, but to invoke the ambition and pride inherent in that culture in forming a foundation from which to build solutions for a viable, vibrant and sustainable existence, thus rejecting and resisting the dominant pathway to an exploitive and culturally destructive development which is infiltrating their community.

## Organic Garden Project

The project in which I have most directly been working during my stay in the community is the creation of an organic garden or “Huerto” for the cultural center. This project originally stemmed from nutritional deficiencies and health problems being experienced throughout the community, and the possibilities of creating sustainable self production of nutritious foods and inspiring organic agricultural practices within the community. It can be seen also as a practical follow up of surveys and studies done by previous interns surrounding health, nutrition, and pesticide use in the community. Recommendations were made in these studies, that can also be found in this binder, for the taking of action and carrying or of practical projects, such as organic gardening to help alleviate these problems. Inspiration for the project also came from other huerto projects that have been carried out successfully

in nearby communities, which have seen substantial benefits in terms of sustainable food production and community participation. However, this project was meant to only be a first experimental step in what will hopefully continue as not only the expansion of the huerto project into the community schools and other individual households, but the initiation of a following related series of projects such as investigation into traditional diets and agricultural methods, nutritional investigation and capacity building and sustainable agriculture education and initiatives.

It had been my original intent to initiate a small portion of some of these complimentary aspects of the garden project. A portion of the research done for my school for example, is specifically orientated around traditional foods, diets and agricultural methods. I had also planned to include as part of my project work two different capacity building workshops, one about ecological agricultural design and the other on vegetarian cooking. In addition to this, I had the idea of hosting one or two potlucks during my stay in the community in order to not only share new nutritional foods, recipes, conversation and fun in a communal way, but also to present or distribute informational sheets on growing vegetables, organic agriculture, nutrition and pesticides. Unfortunately however, these workshops and potlucks have not taken place due to both a lack of funding provided by Yanapuma, time for sufficient planning and additional complications with the project itself.

Activities such as this however would represent feasible direct action that can be taken in beginning the processes of the community empowering themselves in finding solutions to improve their own lives. While survey after survey and report after report is undertaken, only to be put in this book and never actually seen or understood by the community, there is action and initiatives that can be taken now, with direct involvement and participation of the community and little need for outside resources or input that can realize immeasurable benefits and growth in the self sufficiency of the community. Perhaps the majority of real benefits from projects the community has actually seen are those undertaken by the community themselves such as the Shino pi project described above. An example of one such immediate action that could be undertaken by the community themselves, which was discussed during my time in the Bua, is a project of community gathering and storytelling by the elderly to the young to both foster community spirit and recuperate essential traditional knowledge and cultural that are being eroded away. Having community potlucks or undertaking gardening projects that are carried out collaboratively with the community would also represent such positive direct action

My original goals in undertaking the garden project and for my placement as a whole were both immediate and more theoretically based. Working with organic agriculture was one of my main original interests and goals. Indeed, I am extremely interested and inspired in my life with all general issues surrounding organic agriculture, environment, nutrition and food sustainability and security. As such, and through my genuine interest to participate in working with these issues toward the empowerment and improvement of the community, it was one of my most immediate goals to build a successful garden project. I was both anxious and excited to achieve optimum results with successful crops and vegetables in order to inspire and give confidence to the community members for the continuation and expansion of this project and its other components into the rest of the community.

## Project Process

My work with the garden project really began prior to my arrival in the community of Bua, with an assortment of research and information gathering on the Internet about tropical crops and permaculture practices. While I had known from the beginning, when speaking with the director of Yanapuma, that I was going to be working with an organic gardening project, what I didn't know prior to my visit to the community in January was that I was essentially going to be the main person organizing and directing the project. What I had originally been told was that I was coming to assist with a project that was already underway with the direction of an agronomist and other participants in the community. True, there was an agronomist in the community, but he happened to also be the volunteer coordinator who had many other responsibilities and was not officially involved in the garden project, which had itself not yet been organized or initiated.

As, it turns out, I was to be the “expert” in charge of the execution of the garden project. Now, it is not as though I would want to turn down such an opportunity, in fact it was an exciting experience to be able to play such an important role in a community development project. At the same time however, I did not feel as though I was necessarily an “expert” in this field, and was immediately concerned about my lack of experience. While I do have some experience, having worked with the Trent organic rooftop garden and having volunteered in other organic and community gardens; and while yes, I am an environmental studies student and have been involved in community activism, organizations and projects surrounding food issues, I am not an agronomist, have not ever lived in a tropical climate nor am aware of tropical agricultural methods. Perhaps this was my first experience with what is often viewed as some of the typical difficulties, tendencies and problem areas surrounding development work. I have been reading about these issues for years, in this case the assumption of western expertise while neglecting the localized context, and here I was immediately experiencing them in the field for the first time. Nonetheless, I did some research and showed up at the community with information, ideas and a positive attitude

Of course, my direct encounter with development experience was far from over. Shortly after my arrival in the community, the process of my project began with initial project planning meetings between the volunteer coordinator from Yanapuma, the director of the cultural group and myself. Indeed, it was my first time really participating in a community development project meeting between an NGO and a community, and in Spanish at that. Although the process was long, arduous and enduring, it was also exciting and informative as well, and will likely long be remembered as my first field experience in development. Part of the reason for the length and challenge of these initial meetings was because the project was, in some ways, characterized by initial miscommunication and obstacles.

From the beginning, a number of core problems were sited with the proposed project. One of the immediately reconized problems was both my practical knowledge in the area of organic huertos in a tropical climate, and the actual duration of my stay in the community. Not having expertise on tropical crops and climate conditions aside, I was not even going to be in the community for long enough to see the completion and harvesting of a garden. In addition to this, and perhaps even more importantly, the garden was to be attempted during the winter rainy season, a time during which crops are not normally planted in this community and perhaps in this climate region as a whole. As such, the garden would hold severely increased and particular risks such as plants dying from heavy rains, and increased insect infestations. These barriers to the project were something that I had not been aware of before arriving

to the community, and which left me feeling a bit confused and disappointed as to the lack of effective communication which led to these circumstances.

Perhaps these initial obstacles can also be categorized in terms of what my academic studies have described as being common development problems, such as the distance or administrative separation that may occur between a foundation, NGO or development worker, and the community, resulting, perhaps unintentionally, in local knowledge and experience being overlooked or disregarded. Even moreover, through this experience, I realized how important my own role and responsibility is in being aware of the circumstances surrounding a project with which I am to work in or be responsible for, and the need also to take initiative in ensuring that I have the appropriate experience or available time to complete a project. More importantly, that as a development worker or even just a volunteer, it is also my responsibility to be aware of the local context and knowledge surrounding a project, and that the proper participatory planning and consultation processes have taken place.

Due to the obstacles outlined above, it was even considered not to continue with the huerto project at all and have my work be concentrated in something else such as collection of seeds and planting of native tree species. One of the largest factors in making this decision was the evaluation of the potential success of the project in the context of the problems already described. Both the project director and the volunteer coordinator were worried in this regard as to the effects that an unsuccessful project may have on the optimism or motivation of the community. Pointing yet again to the importance of local knowledge, their first hand experience in the community has shown them that the community tends to lose both confidence and interest in further pursuing projects when they don't achieve optimum results the first time. As this project could be highly beneficial to the community and offers potential solutions to some important environmental, health, and nutritional issues, none of us wanted to invoke this type of attitude through failure of the crops.

After much discussion and deliberation however, it was decided to proceed with an organic garden project, but on a smaller scale and in different circumstances. Originally, the ideal manner in which to carry out the project would be with a wide range of members from the community participating in the initiation and building of the garden, contributing ideas, specific crops, and planting methods. Community mingas would be organized to carry out the actual physical work. Even better would be to have the school children involved in the project or have a garden built in the school as well. It was decided however, in the initial meetings, that at that point it would not be a good idea to pursue the project on such a large scale, but rather build a smaller organic garden at the cultural center with only the participation of the members of Shino pi. In that way we could experiment with possible growing methods and results during the winter season. Although this decision was ultimately made by the family who lives in the cultural center, and members of the cultural group Shino pi; having now had more experience in the community, I can see to what extent my original ambitions and determination to continue the project may have had an effect on that decision. This is perhaps due to a dynamic which I became more aware of throughout my work, in which there exists a perceived expertise or superiority of western knowledge, which ends up having a large influence in community development initiatives.

The changes to the initial project idea also meant that we would not be able to pursue many of the diverse crop combinations or ecological design models that I had initially been eager to work with. The main reason for this was that the garden would have to be built in an enclosed space or roof in order to protect the plants from the winter rains, but also included other practical considerations such as problems caused by free running chickens.

The totality of the Initial planning phase of the garden project, including all of the obstacles

encountered can be considered as my first real practicum experience in the process, realities and challenges of development work, and how to attempt to work through and overcome these challenges in a positive way. Moreover, this experience presented me with unexpected personal challenges and insights, such as the need to be open, flexible and adaptive when working and planning in a community development context.

With the plan for the garden set, the next step was to make a tentative work schedule and begin building the garden. A large portion of my work then over the following month consisted of all the aspects of physically building the garden including clearing of land; gathering, bringing, cutting and preparing of materials; construction of a greenhouse structure; digging the land and clearing roots; building raised garden beds; preparing a watering system; compost and soil preparation and of course planting the seeds. A description of these processes can be found below. The initial construction of the garden actually took much longer than I expected due to the various other activities, volunteer groups, visitors and ongoing projects at the cultural center, as well as my return to Sangolqui during the week of Feb 17-24. As such, the seeds were not actually planted until the beginning of March, just under a month before I was scheduled to leave the community.

Over this next month my work consisted of the various aspects of maintaining the garden including watering, weeding, mulching, experimenting with different crop varieties and organic insect controls. During this time, I was also preparing an information booklet in both English and Spanish containing information about the garden construction process, the crops we planted, organic gardening methods, composting, and pesticides. This document and information sheets were originally specifically formatted for the community, but will hopefully serve both the community and the foundation in general knowledge and techniques for the future continuation and improvement of the project.

The following is an excerpt from this booklet and includes processes of the project, outcomes and recommendations for the future:

# ORGANIC GARDEN PROJECT

## BUILDING THE GARDEN

- First, we cleared an area for the garden with machetes, cutting down all weeds and plant matter. The area we cleared was approximately 10m x 6m, but the area can be smaller or larger than that. Any size you like!
- We dug up all the soil in the area with shovels and removed all remaining plant matter and roots.
- We constructed a greenhouse roof with open sides using canas for the frame and used plastic bought in St Domingo for the roof. We then enclosed the structure with a 1m high netting to keep out the chickens





- We brought compost from the compost pile to the garden site using a wheelbarrow and shovels.
- We made raised garden beds by digging up the soil from the areas where the walking paths would be and piling it in the areas for the garden beds. We secured the raised garden beds by surrounding them with cut, flattened pieces of cana and wooden stakes. You can use any shape or size of garden bed you like but it's a good idea to make sure you can access the plants for easy watering. The reason for constructing raised garden beds is to allow for the proper drainage of water in soils that are heavy such as the type we are working with.





- We mixed 2-3 buckets of compost into each garden bed. The amount of compost needed will depend on the the size of the garden bed. For more information about the uses and how to make compost, see sheet below.
- We disinfected the soil by mixing approximately 1 shovelful or 4-5 cups of ash in every garden bed
- We planted different types of seeds in each garden bed. You can plant whatever types of plants you like. What are your favorite type of vegetables? You can also mix flowers, fruits and veggies to make both a visually appealing and appetizing garden. We also used a method called companion planting, of putting plants next to each other that require complimentary nutrients and grow well together. We used a companion planting chart to do this. See chart below.
- We watered all of the beds immediately after planting. At first it is necessary to water the seeds and small seedlings almost everyday. It's better to water in the early morning or late evening to reduce water evaporation by the sun. You can check if there is sufficient water by putting your finger halfway in the soil, if it feels moist, then it is good. When the plants are larger, it will only be necessary to water every 2-3 days.
- We use rain water to water the plants which is collected in tanks that are placed below the plastic roof and we water them using large plastic jugs with holes pierced in them.

## THE PLANTS:

### **Tomato:**

- 5-7 months to mature
- grows up from the soil becoming quite large (up to 6-7 feet, 1.5-2 m), with branches and leaves spreading outwards
- requires a structure to climb
- produces fruits that are green at first and red when ripe
- can be eaten raw or cooked
- seeds are found on the inside of the fruit

### **Pepper**

- 4-5 months to mature
- bushy plants grows up from the soil up to 0.25-0.75m high
- produces green vegetables that are ready to harvest and eat but may later change color to red if left to ripen
- can be eaten raw or cooked
- seeds are found on the inside of the vegetable

### **Basil**

- 2-3 months to mature
- green herb that grows straight up from the ground up to 20-50cm high.
- The leaves are harvested and either chopped and used fresh or dried and saved for later use.
- the leaves grow in sets of two opposite from each other. When a bud or flower begins to form between the two leaves, you can pick it off so that more leaves form and the basil spreads outwards. If you don't pick it, the basil will form flowers and eventually produce seeds

## **cucumber**

- 3-4 months to mature
- grows along the ground in long vines, but you can also use a structure for it to climb and save space
- produces yellow flowers and long green vegetables with little bumps. The vegetable is small and light green at first, and fuller and dark green when mature
- usually eaten raw in salads or sandwiches, but can be cooked as well
- seeds are found on the inside of the vegetable

## **lettuce**

- 1-2 months to mature
- grows in small bushy “heads” above the ground from 15- 40cm high depending on the variety
- the leafs are harvested and eaten raw in salads
- if the lettuce thins out and starts to grow upward rapidly, it is going to produce flowers and seed. If you want the seeds for a later planting then just let it be, but if you want the lettuce for consumption you need to harvest it right away

## **radish**

- 2 weeks-1 month to mature
- long green leaves grow rapidly above the ground to about 20-30cm high but the vegetable grows and is harvested underneath the soil
- the vegetables can be round or oval and are usually red or white
- this spicy vegetable is usually eaten raw in salads or sandwiches

## **carrots**

- 4-5 months to mature
- long feathery leaves grow above the ground to 15-20cm high but the long, ridged orange vegetables grow and are harvested underneath the soil
- can be eaten raw or cooked

## **onions**

- 3-4 months to mature
- grows green shoots above the ground which are thin at first and thicken as it grows
- the round red or white vegetable grows underneath the soil
- both the shoots and the vegetable can be eaten raw or cooked

## **pumpkin**

- 5-6 months to mature
- grows along the ground in long vines, and produces both large flowers and a round vegetable that is green at first and large and orange when ripe
- needs to be cut open and cooked by baking or boiling for consumption
- seeds are found on the inside of the vegetable, which also can be cooked and eaten or saved for planting

## **zucchini**

- 3-4 months to mature
- this plant is a type of summer squash which grows above the ground up to 0.5- 0.75 m high
- produces a long smooth green vegetable that is eaten cooked.
- If the zucchini is left to grow very large it will produce seeds on the inside that can be saved for later planting

## **Cilantro**

- 2 months to mature
- leafy green herb that grows above the ground up to 0.5m high
- leaves are harvested and either used fresh in salads, soups and sauces or cooked into dishes. It can also be dried and saved for later use
- cilantro tends to shoot up quickly and produce flowers and seeds in extreme heat and sun, so its better to put it in a place with filtered sunlight, and harvest it when it starts to shoot up, unless you want the seeds.

## **Ginger**

- 8 months-1.5 years to mature
- bushy plants grow above soil up to 1m high, but the ginger root is produced underneath the soil
- the ginger is mature when all the leaves above the soil have died down
- this spicy herb is either cut or ground up and used raw, cooked, or in teas
- to replant, save a few of the rhizomes (pieces of the ginger root), and cut them apart in the places with growth buds (look like little bumps), so that there is at least one growth bud on each piece. Then simply plant them in the soil

## **parsley**

- 2 months to mature
- perennial
- leafy green herb grows above ground in bunches to 20-30 cm high that get thicker as it grows
- the leaves and stems are harvested and either used fresh in salads soups, sauces or cooked dishes but can also be dried and saved for later use
- when harvesting, don't harvest the whole plant, only some of the stems and leaves, because it will continue to produce more shoots

## **spinach**

- 1-2 months to mature
- dark leafy green grows straight up from the ground to 15-50cm depending on the variety
- leaves are harvested and either eaten raw or cooked

## **beans**

- 3-4 months to mature
- beans can either grow in climbing vines that require a structure to climb or in small bushes
- the beans are harvested from the vines or bushes and can be cooked fresh or dried, dehydrated and saved for later cooking

## **Swiss chard**

- 2-3 months to mature
- broad leafy green grows up from the soil in bunches up to 25-40 cm high
- the outside leaves are harvested for consumption, but don't harvest the whole plant because it will continue to produce more leaves after the outside ones have been harvested
- usually eaten cooked, but can be eaten raw as well

## **sweet potatoes**

- 4-6 months to mature
- fast growing vines that cover the ground grow above the soil, but the potatoes mature and are harvested underneath the soil
- the vines spread out very quickly but can be cutback or harvested regularly for control if you have limited space
- to replant cut one of the shoots or slips from the vines at about 15cm long. Remove all of the leaves except for two at the tip. Cover the entire slip with soil except for the two leaves at the tip. The slip will then root at every leaf node and continue to produce more slips
- A shoot or slip can also be produced in the beginning by either planting a sweet potato directly in the soil or putting it in a glass of water. After the slip forms, repeat the same procedure described above

## **watermelon**

- 3-4 months to mature
- grows along the ground in long vines that produce flowers and large round or oval shaped green fruits that are cut and eaten raw
- the seeds are found on the inside of the fruit

## **RESULTS**

The majority of the seeds we planted began grow, but we did experience problems with some of the seeds:

### **Lettuce:**

The lettuce did not come up at all. This is probably due to the hot, humid climate and heavy soil, as lettuce is usually a cooler climate crop that grows in drier lighter soils

### **Pumpkin:**

Only one seed grew out of four. The reason for this is not certain, but it is possible that the seeds were old and decomposed in the soil, or that they got eaten by insects.

### **Beans (habichuela roja rustica)**

Only 1 plant came up out of 4. The others were eaten in the soil, and the one that did come up also got eaten by insects

### **Carrots and Onions**

The right side of the bed yielded very few plants, which is probably a result of water that is pouring over the side of the roof during strong rains. The plants also seemed to be having trouble coming up and are growing very slowly. This could also be because of the hot climate and heavy soil as these plants are more suited for a cooler climate and lighter soil

### **Pepper**

Only about 60-70% of the seeds came up. The reason for this is not certain, but it is possible that some of the seeds were eaten in the soil. Additionally, all of the plants that did come up, except one, were eaten by insects.

### **Basil**

Not all of the basil came up, and many of those that did got eaten by insects

## Insects

Many of plants, once growing, began to have problems with insects. Specifically we experienced severe problems with insects eating the radish, peppers, basil, swiss chard, beans, spinach and flowers, and to a lesser extent with the pumpkin and watermelon. The cucumber, zucchini, tomato, onion, carrot, ginger, parsley, cilantro and sweet potatoes have not been having any problems with insects

To combat the insect problem, we have tried two different organic pesticide solutions:

1. A solution with garlic, hot pepper and ginger was sprayed on the plants with a plastic bottle after watering in the evening. The insects were continuing to cause problems after this application, but to a lesser extent than before
2. A stronger solution of barbasco and tobacco was applied with a chemical applicator early in the morning. The plants had not been watered the day before and were not watered the day of application. The insects still continued to cause problems after this application, but to a lesser extent.

Specifically, the radish were fine after the application, but the beans, spinach, swiss chard and peppers continued to have problems. The basil and the flowers were essentially eliminated

- The other major problem experienced is that water has been pouring over the edge of the roof during strong rains and onto certain areas of the plant beds. The plants in these areas were either unable to grow in the first place or have been killed by the falling water. This has happened with part of the carrot/onion bed, the watermelons, one side of the swiss chard/ lettuce bed, one part of the tomato bed, and the area with the parsley. Some plants have been able to withstand the water, but many have been damaged or killed.
- Due to all of these problems, we have replanted the portion of the radish that got eaten and replaced the lettuce in this area with more radish and cucumber. We also replanted the swiss chard that got eaten and planted more swiss chard in the lettuce section of that bed. The basil, and some peppers and beans were also replanted. The replanting was done immediately before the first or second applications of organic insecticides.
- The new radish and cucumber are doing well. The swiss chard and the beans however, were eaten again. The results of the pepper and basil are at this point unknown, but it seems like the basil is having problems coming up.
- The next step to deal with the insect problem is to try applying a more concentrated solution of the barbasco

## **GENERAL MANAGEMENT AND NEXT STEPS**

- At first it is necessary to water the seedlings almost everyday, but when the plants are a bit bigger (after 2 weeks-1 month) you can water every 2-3 days. To check if there is enough water, stick your finger halfway into the soil, if it feels moist, then it's good.
- It is a good idea to add more compost or other organic fertilizer from time to time (1-2x per month), especially if the plants look like they are nutrient deficient
- Once the plants are well into their growth cycles or are of a good size, it is necessary to weed and mulch the garden. This is usually about 1-2 months after planting, depending on the size of the plants and the weeds, but it may be necessary to weed before this or more often if the weeds are causing problems or choking out the plants. To mulch, put a dry material such as wood or bark chips, hay or leaves on top of all the garden beds and surrounding all the plants. This will help to prevent the growth of weeds and water evaporation.
- Structures will need to be built for the tomatoes, cucumber and possibly the zucchini and spinach to climb
- The pumpkin and the watermelon need to be directed up the netting and outside so they don't take over the other plants in the garden. The vines of the sweet potatoes also may need to be cut back for this same reason.

## **PROBLEMS AND FUTURE RECOMMENDATIONS**

There have been many problems experienced with the garden mostly because of insect infestations and heavy rains. Due to these problems, we have not experienced ideal results or plant growth. It is yet to be seen how the plant production or harvest will turn out. It would seem that the majority of the problems being experienced are a result of the garden being planted during the off season. It was known from the beginning that we were planting during the winter rainy season, which is not the regularly recommended time to plant in the community and in this type of climate. However, this type of project, if implemented successfully, could be highly beneficial to the community, with organic gardens being made in the schools and other individual households. This garden was initially an experimentation to attempt methods and crops that would be successful. The following are future recommendations for continuation or subsequent attempts at the project to ensure better results

1. It would be best to plant during the regular planting season to avoid severe problems with rains and insect infestations, especially when first trying new organic agricultural methods for the first time. Perhaps when there is more knowledge of or success with specific methods and crops then they will be able to be applied in the off season for year round food production.
2. If planting in the rainy season, you need to make sure that the crops are fully protected from the rain. This would mean either having a fully enclosed greenhouse or making sure that the roof is sufficiently large enough to protect the garden beds. If planting during the summer season, it is probable that a roof would not even be necessary. This would be more logical in saving the work of both building the roof and always watering the garden by hand when it is raining outside.
3. It would be a good idea to try using both physical insect traps and organic sprays to deal with the pests. Additionally, there should be more research or effort put into finding information about different organic pest solutions. The help of someone who has extensive knowledge or experience in these areas could also be solicited
4. Using only tropical, local or crops known to be successful in these types of climates would both yield higher success rates and be more sustainable. It would interesting to experiment with different varieties of tropical crops or inter planting different local crops, such as corn, beans and squash or pumpkin ( a well known, traditional, sustainable, combination crop).
5. Trying different types of organic fertilizer other than just compost might help yield better results
6. It would be best to make contact with others who have had successful garden projects to see what methods that were used.

## Final Discussion

As may have been suspected, the garden did not exactly produce optimum results. The majority of the problems experienced were a result of the insects and heavy rains characteristic of the winter season, which resulted in less than ideal crop growth and survival. It is yet to be seen however, as I did not have sufficient time in the community, how the final results or harvest will turn out.

These results however do not discount the project as an extremely worthwhile experience nor its possibility for successful future continuation and expansion. As expressed earlier, there is the concern that without optimum results, the community will not feel inspired to continue with the project. Since not only does this type of project still hold possibilities for great benefits, but is also something that I am personally passionate about and consider as my work and contribution in the community, I take this concern very seriously. At the same time however, there were still quite few successful crops, and a wide range of interest in the project has been displayed both within Bua and in nearby communities. It is my true hope then that this project will still serve as an initial experience and inspiration for further attempts and expansion of the huerto idea.

In order to realize a truly successful garden project however, I hold to the point that is is first and foremost absolutely essential to involve the community in every stage of project planning and implementation while keeping local knowledge, context and experience as the central foundation to the project. Only in this way will projects be realized that are both successful and truly benefit the community. Had the community truly been the initiators, planners and participants from the very beginning of the process, the project would have been carried out in a completely different manner and have seen completely different results. Not until after becoming involved with the project did I really come to that realization. It should seem obvious that had the community been involved in the planning process or had local context and knowledge been the main driving force behind the project, an organic garden would never have been initiated in the wrong local planting season.

Situations like this may seem obvious and thus easy to avoid, but this type of result is exactly what development work that is non participatory and disregards local context, culture, and knowledge, across the globe has shown. On one hand, the huerto project can be seen to incorporate some aspects of a people focused development because direct interest in this project was initially expressed by the people. On the other hand however, true local initiation, participation and ownership methodologies were not followed, thus resulting in the project being carried out to much less than its actual potential, without real benefits being seen in the wider community. In this way then, I do not consider the huerto project to have overall engaged in true participatory or grassroots development models.

It is my future hope, that this project will indeed be able to be realized in a manner which is empowering to the people. In which their existing knowledge, ideas and needs are taken into consideration. In which they can be the founders in realizing a self empowering initiative that will enable them to gain access to a nutritive food source and a culturally and environmentally sustainable method of food production.

## Notes:

The general management steps described above were meant for another volunteer or intern who would be taking over the project when I left, because as mentioned, I did not have sufficient time in the community to complete the project. However, as nobody was sent to continue on the project, these become irrelevant. It can be assumed that the garden was essentially left uncared for and that nobody will be taking responsibility of the harvest. Again, had the community truly been the owners of the project, then there would be no need for direct management by a volunteer or intern. In any case, it would be much more logical to have teams of people working on a project rather than just one person, so that the project has continuity and is able to achieve real results, thus again, truly benefiting the community.

The Spanish part of the booklet was written, but because I fell ill during my final part in the community, it was never edited, and so the booklet was never able to really be provided to the community. The composting and pesticides information sheets are provided below. If any there is any effort in the future in continuing this project, its related aspects or any other relating projects, perhaps these can be translated, or used for workshops or information sessions.

# COMPOST

- Compost is a type of organic fertilizer resulting from the decomposition of plant and animal matter
- Using compost is one way to begin participating in agricultural and environmental sustainability
- By using compost you can maintain the health and nutrients of you soil, while eliminating the dependence on costly synthetic fertilizers
- In this way, you are both saving money and helping to reduce environmental contamination
- Additionally, preparing compost allows you to productively use kitchen and other wastes that would otherwise accumulate and cause further contamination

## The composter

- You need a large container, structure or place to prepare the compost
- The container can be as large or small as you like but a good size for small scale use is usually between 1-1.5m wide x 2-10m long x 1-1.5 m high
- It's a good idea to build the composter on a slope so that any excess water can drain freely and not accumulate in the compost. Its also a good idea to divide the composter into two sides to have two continuous cycles of compost
- Materials you can use to build the compost include wood, canvas, old plastic, tin, chicken wire, or any other materials you already have or that are easy to acquire.
- When the composter is ready, put 1-2 hollow tubes of some sort (wood, metal etc) in each side of the compost for stirring and to allow air to enter.
- In the bottom of the composter, put a layer of thick, bulky material such as corn stalks, straw, branches, etc to help with water drainage and air circulation.

## Collecting Organic Wastes

Start a system of collecting all the organic wastes from your home and farm or yard, for example:

- a) A bucket in the kitchen to collect food and kitchen wastes such as cooking scraps and leftovers from meals, etc
- b) An area outside where you can collect all of your yard wastes such as branches, leaves, grass etc
- c) A spot or container where you can collect all of your animal manure
- d) a bucket or container to collect excess ash from you fire

## Preparing the Compost

- To prepare the compost it is best to add the four different types of waste described above in layers into the composter. Yard waste is added in the highest amount followed by the kitchen wastes and animal manure and finally a little bit of ash. You can also add a little bit of soil or earth with the ash.
- If you are not able to add the wastes in specific layers, that's fine too, simply add the wastes when you are able or is most convenient, but try to at least have some mixture of yard waste with either kitchen scraps or manure or both.
- After adding wastes, cover the compost with some sort of lid (plastic, wood) or material such as straw or hay

## Maintaining Compost

- Always keep the compost hot and humid to activate the decomposition of the wastes by keeping it covered
- you can check the temperature of the compost by inserting a machete or another object in the center of the pile to take out a leaf or piece of material. If after 2-3 minutes you can't keep your hand on the leaf, the compost is too hot and you need to stir it to introduce more air
- generally speaking, the compost heap needs to be turned or stirred about once a month. Try to mix it evenly so that the wastes decompose evenly
- If the compost has a strong foul odor, try adding more yard waste, ash or earth and stir the pile
- If the pile is too cold, try adding water or diluted sugarcane water to activate the process of decomposition

## Using compost

- It should take 3-4 months for the compost to fully form
- When the compost is ready, you can use it as a fertilizer for all types of crops or plants, anything you want to grow. Just mix it into the soil and reapply as necessary.

# PESTICIDES AND AGROCHEMICALS

PESTICIDE is a broad term which usually refers to a group of agricultural chemicals or “agrochemicals” such as insecticides, herbicides and fungicides

Pesticides are functionally toxic and poisonous. Most pesticides are products of world war two experimentations with chemical warfare and deadly gases. They are manufactured to kill, and can kill people in large doses, but kill only “pests” in small doses. As such they pose very serious human health and environmental risks.

The frequent or continuous use of pesticides are not only dangerous and unsustainable for the environment and human health, but also in terms of agriculture and economics as well. They inhibit the long term health and productivity of the soil, creating a costly continuous cycle of dependence on their use.

## ECONOMICS

Pesticides and agrochemicals are BIG BUSINESS. The industry has grown from \$0 in the 1940's to over 30 billion dollars by the year 2000....BUT how does the farmer benefit from this.....

- Using pesticides actually reduces the biodiversity (by destroying all plant and animal matter) and thus the quality of the soil, its resistance to erosion and ability to retain water
- The use of pesticides creates pest resistance to the pesticides and thus insect populations that are not affected by the chemicals. At the same time, the pesticides also kill off the beneficial insects that are predators for the pests
- Killing beneficial predator insect populations can also result in the outbreak of other harmful insects that were never causing a problem in the first place due to the elimination of the natural controlling factors. Often the predator population are the most susceptible to the deadly chemicals
- All of these factors listed above, soil depletion, pest resistance, and new pests, creates a severe costly economic dependence on the use of increasingly greater quantities and more varieties of pesticides, therefore enriching the corporations which create this dependence in the first place.

## ENVIRONMENT

- Over 95% of sprayed pesticides reach destinations other than their intended targets. In other words they end up in the the earth, the air we breath, the the water we drink, and the food that we eat
- The pesticides enter the environment by drifting through the air when sprayed, running off from fields, leaching through the soil, when applied directly into the natural environment and when

accidentally spilled.

- Many pesticides are extremely persistent and difficult to break down, remaining in the environment for decades, with the ability to travel far distances in the air and water and become deposited in remote regions
- Many pesticides are also able to bioaccumulate, becoming more concentrated and toxic as they travel up the food chain. For example a bird that has eaten a worm which is contaminated with pesticides will build up an even higher toxicity of pesticides. This is especially harmful for those animals highest on the food chain, which we also consume. These chemicals often also have the ability to biomagnify, becoming up to 70 000x more concentrated in the environment than when first applied..
- These chemicals are extremely harmful to the environment, directly reducing biodiversity by killing animals, wildlife and their habitats, and directly disturbing the delicate ecological cycles and balances. For example, some pesticides sprayed to kill a particular insect also kill bees, which in turn severely affect the crucial pollination process and thus the reproduction of plants. Pesticides that run off of fields into streams, rivers and lakes for example may directly kill fish or kill the smaller plants and animals that the fish eat, thus depleting fish populations.
- Pollution from pesticides have been detected in all natural waterways and over 90% of wells in the united States. They have also been detected in ground and rain water.
- Pesticides are directly responsible for the death of millions of birds every year and linked to the endangerment or extinction of hundreds of species of birds and amphibians
- The ingredients in pesticides are often able to bond to and combine with other elements in the environment, forming new potentially dangerous molecules. Additionally there is little known about the cumulative effects of all the different pesticides accumulating and combining in the environment, forming what is being called a “toxic soup.”
- The “inactive” ingredients in pesticides are not tested, regulated or often even listed on the container, and are sometimes more toxic than the “active ingredients”

## HEALTH

- Just as pesticides are toxic to the environment, they are also toxic to our health. We are part of the environment and pesticides are present in the air we breathe, the food we eat and the water we drink.
- Those most at risk from pesticides are those who have direct exposure, such as agriculture workers and those who apply the chemicals.
- Up to 25 million agricultural workers are poisoned every year, and more than 200 000 of those die.
- In Latin America 10-30% of agricultural workers show signs of organophosphate poisoning

- Exposure to pesticides produces acute health problems such as dizziness, headaches, abdominal pain, nausea, vomiting, skin disorders and eye problems and long term health problems such as various types of cancer, respiratory problems, neurological disorders, and reproductive disorders
- Children and pregnant women are more sensitive to the chemicals and thus are at higher risk. Many pesticides also contain molecules that are chemically similar too and thus mimick female hormones, causing greater health risks for women such as breast cancer
- “Tolerable” levels of exposure that have been tested and regulated to be “safe” have been shown by various studies to cause the same acute and long term health affects as those listed above
- It is estimated that between 4000 - 20 000 cases of cancer in the United States alone are caused by the ingestion of “tolerable” amounts of pesticides in foods
- Tests done by the US department of agriculture have shown that 70% of tests done on 60 different types of common foods show pesticide residues and 40% show more than 1 pesticides

## ALTERNATIVES

Integrated pest management is the use of multiple methods to control pests. The following are some alternative pest controls:

- **Polyculture-** growing multiple types of plants to avoid attracting and causing infestations of insects that feed and grow off of a monoculture crop
- **Crop rotation** – rotating crops regularly to move them away from feeding populations and confuse the insects. Crop rotation is also essential in maintaining soil fertility and health, eliminating the dependence on synthetic fertilizers as well.
- **Trap Crops/Beneficial crops** - the use of crops that either attract the pests away from the real crop or deter the pests altogether. Beneficial crops can also be used that attract predator populations
- **Physical traps-** the use of physical traps to capture the pests
- **Organic/Biological pesticides** – the use of organic pesticides which usually do not actually kill the pests but prevent them or deter them from causing damage. These pesticides are not synthetic and do not have any harmful environmental or health effects
- **Physical elimination of pests** – This may include the hand picking or killing of insects. It may be a demanding or tedious method, but is practiced by many organic farmers, who prefer the work over the risks of pesticide use.
- **Hand weeding and mulching** – Again, it might be more work to weed by hand, but the benefits far outweigh the risks of pesticides. Mulching is another method of covering the soil with a dry material such as straw, which helps to keep weeds down and retains water too.

