Amaranth Growers Association

A Business Plan

Prepared for Catholic Relief Services, Guatemala

By: The 2014 Notre Dame Business on the Frontlines Team

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I. INTRODUCTION

1.1 Dedication

Representatives from the University of Notre Dame graduate schools of Business, Law, Biology, and Peace Studies respectfully offer this business plan in support of the mission of Catholic Relief Services in Guatemala, for whose friendship and example of servant-leadership we are most grateful.

1.2 Vision Statement

Catholic Relief Services seeks to eradicate malnutrition and poverty in rural Guatemala, by investing in the development of nutrient-dense, economically viable agricultural value chains.

1.3 Mission Statement

The mission of this business plan is to encourage the development of farming associations to support rural farming families in Guatemala, with the twofold goal of improving nutrition, by promoting amaranth consumption, and increasing economic opportunity, by facilitating the sale of surplus amaranth to end consumers.

1.4 Executive Summary

The nutritional and economic challenges of small-scale farming families in San Marcos and other rural areas of Guatemala are significant, with high levels of malnutrition resulting from both low incomes as well as limited access to healthy foods. Meanwhile, demand for niche health foods is growing among consumers in urban markets, driven by health concerns and lifestyle trends. In Guatemala City, there is a rising, unmet demand for gluten-free and vegan products, particularly grain amaranth.

To address rural malnutrition and satisfy urban demand for health food products, an intermediary organization is required to connect amaranth farmers to markets and provide technical training to farmers on production and consumption. Our analysis of the Guatemalan amaranth value-chain included interviews with multiple farmers, growing associations, retailers, consumers, exporters, and experts. Two key findings underscoring the importance of the intermediary role include:

1. Significant value creation & capture happen at the intermediary level of the amaranth value chain.
2. There is currently a gap at the intermediary/organizer level of the value chain, which prevents small-scale amaranth farmers from accessing markets and results in unmet urban demand. We believe this gap is a critical opportunity for CRS intervention.

Our research considered a variety of models which satisfy the intermediary role, including cooperatives, private enterprises, and other options. However, our analysis of several Guatemalan and Mexican amaranth growing associations revealed that the association model aligns strongly with CRS' current approach to rural agricultural development programs, as outlined in the Pathway to Prosperity framework. In addition, the association model mitigates many of the chronic challenges that cause failure in other models. Based on this, we recommend that CRS consider supporting growing associations as a long-term, sustainable model for improving the wellbeing of small-scale farmers.

This business plan synthesizes our analysis and observation of best practices to provide general considerations and guidelines for developing such an association. While we use amaranth as the focus crop for this business plan, the best practices for an association discussed can be applied to most agricultural growing associations. Amaranth-specific aspects of this proposal are limited to agronomic and financial details.

1.5 Assumptions

We make several assumptions in this business plan, informed by our field research.

1. First, it is understood that a significant portion of the association startup costs, detailed in this report, are provided by grant money from an NGO or other sponsoring organization. While purely entrepreneurial models for filling this intermediary organization role do exist, associations typically require some form of external assistance to cover initial costs.
2. Second, all calculations in this report assume that association member-farmers consume about 30-40% of their amaranth production and sell only the remaining 60-70%. This or a similar minimum consumption requirement is necessary to ensure that the tandem goals of improving family nutrition and economic health are both achieved.
3. Finally, this proposal assumes that an organization, such as CRS partnered with Caritas, provides significant technical assistance to the association until it has reached the point of self-sustainability. Subsidization of technical assistance frees up association resources to serve rural farmers directly. For instance, certain agronomical research can be best conducted by a regional NGO and provided to several associations, rather than requiring that each association duplicate that work. Additional technical services that may be subsidized by CRS or a similar organization could include legal services, development of educational or marketing materials, and other technical activities that benefit from economies of scale.

II. ABOUT AMARANTH

2.1 Overview

For thousands of years, amaranth was the primary staple food of the indigenous peoples of Central America. After the Spanish Conquistadors arrived in the Americas, their influence eliminated the use of amaranth. In the 1970s, grain amaranth was reintroduced to the world for food use and it has continued to spread throughout the world until today.[i]

Amaranth can be consumed in three main forms: raw seed, flour, and popped. Since milling and popping the seed takes time and resources, amaranth flour and popped amaranth sells at a premium, compared to raw seed.

Amaranth has two main benefits: First, it is high in nutrition, boasting a very high percentage (14%) of well-balanced protein that is high in lysine. Second, amaranth is relatively easy to grow. It is drought tolerant and can be grown in a variety of soil types.[ii] These dual benefits make amaranth a promising crop to help fight malnutrition.

2.2 Nutritional Information

Both the grain and leaves of the amaranth plant provide important nutrients. Relative to corn, the staple crop of Guatemala, amaranth outperforms in most important aspects of nutritional content, having a higher amount of protein, fiber, fat, calcium, iron, calories, folate, and zinc.

Grain Amaranth Nutrition Facts

Protein: Amaranth has 14.5 g of protein per 100 g of grain, which is higher than most major grains such as wheat (10.7 g), corn (9.4 g), and brown rice (6.5 g). Oats are the only major grain with higher protein content than amaranth (16.9 g) (*Figure 1).* Both amaranth and oats have more protein than an egg (12 g per 100 g).

Lysine: Amaranth also has high lysine content, which is an essential amino acid that the body cannot synthesize and so must be supplied in the diet. Amaranth's lysine content is higher than most grains and comparable to legumes and some animal products (*Figure 3).*

Calcium: Amaranth has 153 mg of calcium in 100 g of grain, which greatly exceeds the calcium of all other major grains (Oats – 54 mg, Wheat – 34 g, Corn- 7 mg, Brown Rice – 3 mg).

Iron and Zinc: 100 grams of amaranth grain also contains 7.6 mg of Iron and 3.2 mg of Zinc. This iron content is higher than all other grains (Wheat – 5.4 mg, Oats – 4.7 mg, Brown Rice – 4.23 mg, Corn – 2.7 mg) and the zinc content is higher than both corn (2.2 mg) and brown rice (1.1 mg).

	Amaranth	Brown Rice	Wheat	Corn	Oats
Protein (g)	14.5	6.5	10.7	9.4	16.9
Fiber (g)	9.3	2.8	12.7	7.3	10.6
Fat (g)	6.5	0.5	2.0	4.7	6.9
Carbohydrates (g)	66.2	79.2	75.4	74.3	66.3
Calcium (mg)	153.0	3.0	34.0	7.0	54.0
Iron (mg)	7.6	4.23	5.4	2.7	4.7
Calories (kcal)	374.0	358.0	340.0	365.0	389.0
Folate (mcg)	49	231	41	19	56
Zinc (mg)	3.2	1.1	3.5	2.2	4.0

Figure 1: Nutrition Content of 100 grams of Amaranth Grain.[iii]

Leaf Amaranth Nutrition Facts

In addition to its grain, the amaranth plant's leaves, commonly referred to as *bledo*, in Guatemala, are also highly nutritious and contain more calcium, phosphorous, and vitamin C than both Swiss Chard and Spinach[iv](*Figure 2)*.

	Amaranth, boiled	Swiss Chard, boiled	Spinach, boiled
Calories (kcal)	21.0	20.0	23.0
Carbohydrates (g)	4.1	4.1	3.8
Protein (g)	2.1	1.9	3.0
Calcium (mg)	209.0	58.0	136.0
Phosphorous (mg)	72.0	33.0	56.0
Iron (mg)	2.3	2.3	3.6
Vitamin C (mg)	41.1	18.0	9.8
Fiber (g)	n/a	2.1	2.4
Folate (mcg)	57.0	9.0	146.0
Zinc (mg)	0.9	0.3	0.8

Figure 2: Nutritional Content of 100g of Amaranth Leaves, cooked with Salt.[v]

Amaranth In Nutrition Programming

Research has demonstrated that amaranth has been effective in addressing malnutrition. A study in Mexico showed that one spoonful (13 g) of amaranth protein concentrate per day reduced mild to moderate child malnutrition by 75%. Prior to the addition of amaranth to the diet, the numerous intervention attempts to reduce malnutrition had not had a success rate over 8%. The researchers project that two spoonfuls (23 g) of amaranth protein concentrate per day could reduce severe malnutrition.[vi]

Amaranth For Nutrition Programming in the Western Highlands Food Desert

The Optifood analysis tool assessed the Western Guatemalan Highlands food basket and concluded that residents of that region had insufficient access to nutrients.[vii] The tool demonstrated that a combination of regionally available foods, including tortillas, potatoes, beans, eggs, green leafy vegetables, and a fortified cereal known as Incaparina, along with breast milk, could almost satisfy children's nutrient needs, except for two key nutrients - iron and zinc, which are especially critical for children ages 6-8 months.[viii] Because amaranth is practical, nutrient-dense, and affordable, it may be able to help fill these nutrition gaps and make a nutritious diet more realistic for many with limited access to a variety of healthy foods.

Plant vs. Animal Protein in Nutrition Programming

There is some debate over whether plant-based protein sources are sufficient, as the foundation of malnutrition interventions. Despite the high nutrition content of grains like amaranth, the World Health Organization (WHO) currently recommends that animal protein be prioritized over plant protein, when fighting malnutrition. This recommendation is based, in large part, on the fact that animal proteins tend to be more easily digestible and higher in biological value than plant proteins[ix] and that plant-based diets tend to be low in iron, zinc, and calcium.[x] Fortunately, amaranth comes very close to animal-based foods proteins in providing a nutrient-dense, balanced protein source.

> *Protein, Digestibility, and Biological Value:* Animal protein sources usually contain all essential amino acids in similar proportions to those needed in human diets. Plant proteins can be substituted for animal proteins but the correct balance is needed to ensure that all essential amino acids are contained in the diet.
>
> Food digestibility refers to how easily a food is broken down and its nutrients absorbed. Biological value measures the proportion of protein that will be incorporated into a person's body by assessing how much of the protein will be used to synthesize other important proteins in cells. The biological value of a food is often limited by the amount of lysine it contains, lending credence to the WHO's preference for animal proteins over grains, which are typically low in lysine.
>
> Fortunately, amaranth is a grain that is extremely high in lysine (*Figure 3*). On average, grains have approximately 200 mg/g N lysine.[xi] By contrast, amaranth has approximately 370 mg/g N lysine.[xii] This level of lysine is much closer to dairy products, such as milk (327-487 mg/g N) or eggs (436 mg/g N), compared to most grains or other non-legume vegetables.[xiii] With these high levels of lysine, the body can utilize the high levels of amaranth protein, just as it would an egg.

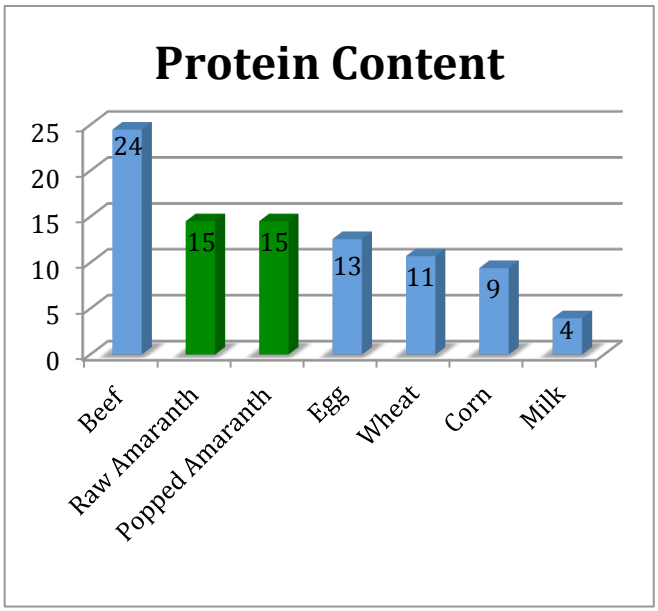
Food	Lysine (mg/g N)
Amaranth[xiv]	372
Maize[xv]	167
Oats[xv]	232
Rice (brown)[xv]	237
Wheat (whole grain)[xv]	179
Legumes (average)[xv]	376
Egg[xv]	436
Chicken[xv]	497
Cow milk[xv]	487
Goat milk[xv]	327

Figure 3: Lysine Content of Common Grain and Animal Protein Sources.

For comparative purposes, an egg has a biological value of 100%. Amaranth has a biological value of 90.4%, when raw, and 85.4%, when popped.[xvi] In comparison, milk has a biological value of 84%, beef 74.3%, wheat 64%, and corn 60%[xvii](*Figure 4*). The biological value of amaranth can actually increase when toasted at temperatures between 170°C - 190°C, but most popped amaranth is made by toasting it at temperatures higher than 190°C, causing its biological value to decrease, as described above.[xviii]

Nutrient Content: Plant-based diets are usually low in iron, zinc and calcium.[xix] But amaranth has higher iron, zinc and calcium content than egg. Per 100 g, amaranth contains 7.6 mg iron, 3.2 mg zinc and 153 mg calcium, while egg contains 1.2 mg iron, 1.1 mg zinc and 50 mg calcium.[xx] Many other grains have comparable zinc and iron levels to amaranth or egg, but amaranth has unusually high calcium content for a grain. This high nutrient content should make a diet that includes amaranth closer to a complete diet than other plant-based diets.

One individual plant will never be able to compare to animal sources of protein, but because of its high biological value, high nutrition content, and high nutrient content, amaranth can be considered a protein source that is almost equal to most animal sources of protein.



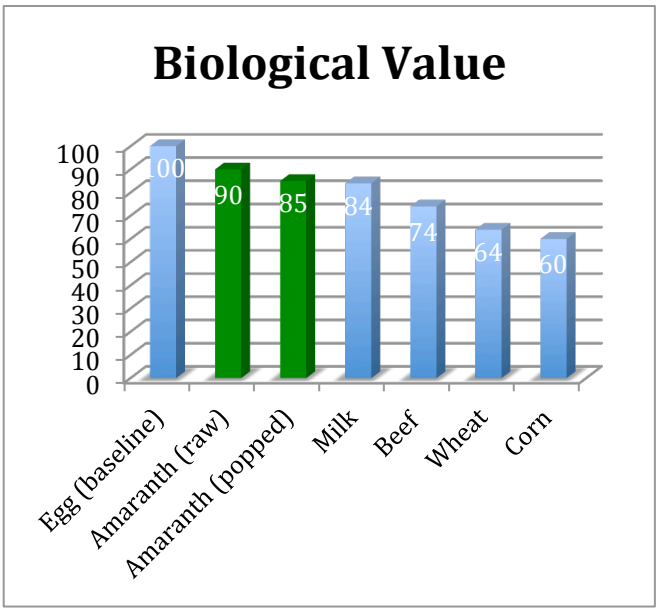


Figure 4. Nutritional information of amaranth and other major grains and animal protein sources. The protein content of amaranth is higher than the content of the comparable weight of an egg. Amaranth has a higher biological value than other major grains and a biological value just below egg, the common food with the highest biological value.

2.3 Cultivation

Amaranth is resilient, easy to grow, and can thrive in many types of environments. As a C_4 plant, amaranth is drought-tolerant and can even be revived after wilting from lack of water. In Guatemala, amaranth can be grown during different months, depending on the region. Amaranth growing seasons vary by region but generally sync with the corn-growing season of each reason. In most areas of Guatemala, the amaranth growing season lasts 3-4 months, from planting to harvest. In other regions, such as the western highlands in and around San Marcos, the season is a more lengthy 8 months. Some farmers plant amaranth together with corn. Others use the same field for amaranth and corn but alternate the two crops, growing one during one season and the other immediately afterward. Optimal timing of planting and harvest can mitigate exposure to seasonal environmental risks, including frost or fungi.

Amaranth Varieties

While there are numerous species of amaranth plants, only three are used for grains – Amaranthus caudatus, Amaranthus cruentus, and Amaranthus hypochondriacus. Another variety of the amaranth plant is Amaranthus retroflexus, a redroot amaranth which is frequently harvested for its leaves and consumed as a vegetable. This leaf is popular because it grows without any cultivation, but this variety does not produce quality seeds for consumption. Unfortunately, seeds from these suboptimal Amaranthus retroflexus plants easily breed with those of higher-quality grain amaranth plants, which can lead to severely reduced yield. The risk of cross-breeding must be considered during any amaranth seed selection or seed saving process.

Note: The term *bledo,* which is commonly used to refer to amaranth leaves, is also used colloquially to refer to Amaranthus retroflexus.

Low-yield Amaranthus retroflexus (left) vs.

Higher quality grain amaranth (right)

The Growing Process

Sowing: Amaranth plants are sown using two different techniques. The first method is to scatter the seed randomly or in pots and then thin or replant once the seedlings have reached a certain height. According to the second technique, seeds are spaced evenly along a raised line.

Field Observations: In some regions, farmers planted amaranth side-by-side with corn. In these cases, some farmers preferred to sow the plants in close proximity, so that the stronger corn stalks would protect the amaranth from wind, while others thought it was better to plant the crops further apart, so plants could grow taller, reaching more sun and helping to prevent fungus.

Watering: Though amaranth is drought-resistant, optimal amaranth cultivation requires more water than corn. For example, amaranth plants will wilt after 4 days without water, while corn can withstand 15-20 days before wilting.

Field Observations: We met with farmers who watered crops by hand, using jugs of well-drawn water as well as two farmers who utilized basic irrigation systems. The irrigation systems we observed included a hose/pump system and the “mariposa” sprinkler system. All of these farms we visited were located relatively near water sources.

Fertilization: Amaranth fertilization practices vary widely in Guatemala. In some regions, we observed that organic fertilizer made from decayed material from the previous harvest was the only fertilizer used. In other areas, store-bought chemical fertilizer was the main fertilizer applied. The amount of fertilizer also varied, depending on the region and the soil.

Field Observations: Members of the Kulb'aalib' Xe'chulub' association used an average of four sacks of fertilizer (400 pounds) per cuerda. Some farmers found using urine and garlic was an effective way to fumigate their amaranth plots. Their yields were usually 30 lbs of amaranth seed per ¼ cuerda, using 1 sack (100lbs) of fertilizer.

Harvesting: The process of harvesting amaranth is slightly more labor-intensive than corn harvesting, requiring an average of five additional harvest days per cuerda. Most farmers harvest amaranth by hand, according to the following process:

1. Grain heads are snapped or cut from the stalk and collected in a pile (using a tarp helps collect any seeds which fall off).
2. Leaves are removed from the stalk (these leaves can then be saved for organic fertilizer/compost or fed to livestock).
3. The grain head is rubbed between hands or against a strainer to separate out the seeds.
4. Debris is captured, using a strainer, and the seeds collect in a basket beneath.
5. Further unwanted debris is separated from seeds using wind or a fan.
6. Seeds are dried in the sun for approximately 8 hours.

Figure 5: Amaranth harvesting process, as demonstrated in Rabinal

Field Observations: Although not a common practice, one farmer we interviewed described a harvesting process in which seeds were removed using a wood chipper-like machine, rather than by hand, before following the steps outlined above. However, it should be noted that this farmer grew grain heads, which were approximately five times larger than the average we saw.

Storage:

- Seed Storage: In general, amaranth seeds can last for quite a long time when properly stored, although seed longevity can depend on the quality of seed. Amaranth grain is usually stored in canvas sacks and can last from 8 months to one year, using this method. The seeds can be stored longer, if storage containers do not allow moisture to enter and are kept in a dark, cool place.

  Pete Noll, Executive Director of the Mexican amaranth promoter, Puente a la Salud Comunitaria, reported that raw amaranth can be stored for 5 to 8 years. At Puente, the farmers store amaranth in 20 kg grain sacks, instead of standard 45 kg sacks, as it allows women and older farmers to move them. These sacks are stored on elevated plastic racks in a dry, relatively cool place, free of rodents or other pests.

  One can assess whether amaranth seeds are in premium condition by whether or not the embryos are still red. Once the red color oxidizes to brown, the germination rate, nutrient content and flavor will diminish.

Seed bank at Asociación Qachuu Aloom, with trap door in the floor

Field Observations: In Nebaj, farmers store the grain in their homes for several months, until they have accumulated enough to sell.

- Processed Amaranth Storage: Toasting amaranth inhibits enzyme activity, which can also extend shelf life. Shelf life for a popped product is quite long, for example, but only lasts about 9 months before the smell from oxidation causes an aromatic head that turns off most consumers, even though it's not necessarily rancid. Processed amaranth flour that is stored in a cool, dry place with mild or low humidity, can be stored for 12-18 months or more.

Seed Selection & Recovery: Careful seed recovery and conservation is vital to the success of any amaranth project. Amaranth seed saving/selection in Guatemala is a sensitive process because of prevalence of wild Amaranthus retroflexus (bledo) plants, which can crossbreed with higher-quality varietals. Due to the technicality of seed selection, as well as differences in regional agronomic conditions, it is best for qualified agronomists to assess optimal amaranth seed selection in detail before investing in an amaranth production project.

Field Observations: In order to determine which seed variety is best suited for the region, most associations have members experiment for 2-3 years with different amaranth varieties. Farmers who tested different strains of amaranth supplied seeds from higher-yield crops to the association, for preservation in a seed bank. These seeds were then sealed and stored for five years, as a germination test. Conserving a variety of strains acts is an important hedge against potential crop diseases, pests, or changes in weather patterns.

Asociación Qachuu Aloom emphasizes the importance of local and native seeds to achieve their goal of food sovereignty. Five hundred families throughout their community have been trained to care for and conserve seeds. The association maintains several community seed banks and underground storage units, preserving seeds from over 50 plant varieties in natural clay jugs, modeled after those used in Mayan temples. This technique creates a colder, low-humidity climate that extends the preservation period.

For more detailed information on amaranth seed selection, refer to Dr. Riccardo Bressani's articles, listed in the Other Useful Resources section below.

2.4 Consumption

Grain Amaranth

Grain amaranth can be prepared in a variety of ways, many of which resemble popular preparation techniques for corn. It can be eaten raw, toasted or popped, cooked like rice, or ground into flour.

Popped Amaranth: Amaranth can be popped in two ways; with a popping machine or toasted over a fire or stove. Popping in a popping machine, as is common in Mexico, but this method produces a less flavorful amaranth than toasting over a fire or stove, which is the most common method used in Guatemala. Popped amaranth, referred to as "poporopo" in Guatemala, is eaten as a snack or used to make granola bars and treats. One popular treat is *alegría*, a sweet, healthy snack common in Mexico, which combines amaranth, nuts, seeds, and sugar or honey. In our field tests, we noted that children and toddlers responded very favorably to plain popped amaranth. Alegría received positive reviews from subjects of all ages.

Popping amaranth over an open stove

Amaranth Flour: Amaranth flour is made by grinding popped amaranth, using a machine or manual grindstone. The flour can be mixed into a number of corn-flour based Guatemalan recipes such as atol, pinol, tortillas, breads, and cakes. Due to differences in taste and texture, amaranth flour cannot completely replace corn flour as a recipe ingredient without altering the end product. However, interviewees reported that an 80/20 mixture of corn/amaranth flour can be used to make tortilla, without affecting the taste or consistency. Amaranth flour is also used in *atol fresco*, a chilled drink mixture of amaranth, water, and sugar, which is popular with children.

Since atol is a staple food for rural farming families with little or no disposable income, we found that it is the easiest point of introduction for incorporating amaranth into the diet, followed by popped amaranth. When introducing grain amaranth into the diet of consumers with more discretionary income, we found that the most frictionless point of introduction was through pre-prepared snack or post-workout foods such as alegría, granola bars, granola, or health food drinks.

Corn atol (left) on a rural stove and amaranth atol (right)

Amaranth Leaf

An additional benefit of grain amaranth that is attractive to subsistence farmers, is its dual use. While the amaranth plant is growing, its leaves can be removed for consumption and prepared in a number of bledo recipes, including caldos, the local dish bosh-bol, and with egg as a type of patty. The amaranth leaf is most commonly consumed by the rural poor.

Bledo patty with egg, tomato, and onion

Amaranth hair conditioner, found in a hotel

2.5 Other Uses for Amaranth

The vast majority of amaranth is consumed as food, but alternative uses have also been proposed. Amaranth oil is used in dyes and is being investigated for its medicinal and cosmetic qualities. It is sometimes included as an ingredient in shampoos and other beauty products. The technology to extract oil is expensive, but could become more affordable as demand increases.

III. ASSOCIATIONS

3.1 Overview

A growing association is a membership-based, not-for-profit entity that exists to connect farmers with markets and provide other social services. An association is first and foremost a community organization: its roots are in one community and all of its activities are ordered toward improving the well-being of the members of that community, specifically focusing on improving both nutrition and livelihoods for member-families.

Growing associations come in many sizes and have diverse demographic composition, depending on the community and families involved. For example, over ten years Asociación Qachuu Aloom grew from five families in five communities to 400 members in 20 communities, with an 80% concentration of women. Centro Kulb'aalib' Xe'chulub' serves 100 members in 17 communities, with a 60-70% female composition.

3.2 The Model

As independent intermediaries, associations buy surplus crops from members and sell them to bulk buyers. Associations generate income from these sales as well as from member fees and grants and reinvest any profits in member services, such as education. The largest variable costs of a growing association are procurement, management salaries, and member training.

3.3 Legal Formation

We researched a variety of commercial entities in Guatemala (see also section 7.3) and concluded that the asociación civil is the most desirable legal formation for a growers association. It is easier and less costly to create than alternatives. As a non-profit organization, the asociación civil is exempt from paying taxes and can subsidize fixed costs and management salaries through grants. Like cooperatives or other for-profit entities, they can still offer goods and services for sale, although they must reinvest any profits.

3.4 Associations and Livelihoods Programming

The association model aligns strongly with Catholic Relief Services' approach to nutrition and livelihoods programs.

First, association mandates are consistent with the first two strategic objectives of Catholic Relief Services' Pathway to Prosperity Framework, assisting farmers in the recover and building stages.

1. Recover: Associations provide group organization, market-based access to seeds, and good production methods.
2. Build: Associations assist with market planning, linking inputs, and maintaining effective seed systems.

Second, a successful association provides the 5 key skills for markets linkage, as defined by CRS: group management, financial management, natural resource management, marketing, and innovation. There is a clear opportunity for CRS to give from its core competencies by supporting skill development for association managers.

Third, we see overlap between the roles of the associations and the ECADI system and encourage the exploration of potential synergies with this program.

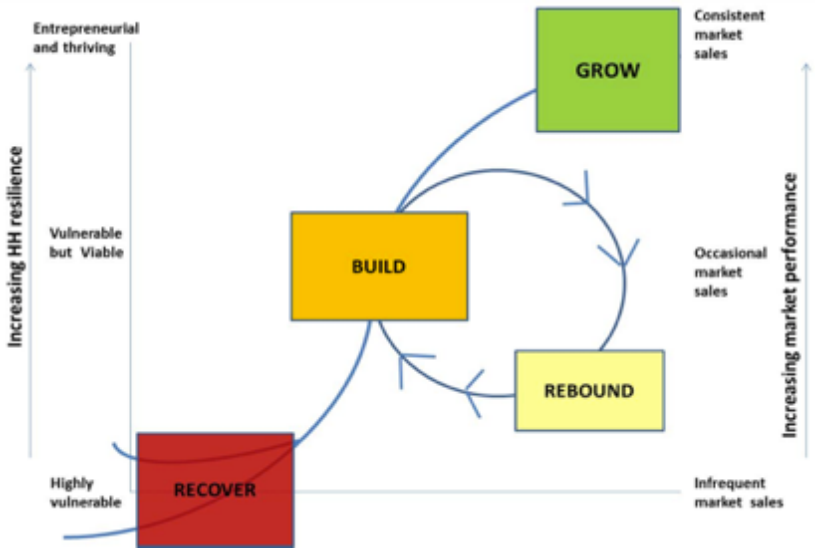


Figure 6: Pathway to Prosperity Agricultural Livelihoods Signature Program Area Implementation Roadmap

3.5 Operations

Agricultural associations have a complex operational mandate. In addition to providing all of the typical business functions of an agricultural intermediary, they have additional responsibilities related to their role as a community development organization. The following is a summary of key functions of successful associations:

Business Development: Associations possess the operational knowledge to connect farmers with markets. This includes sourcing potential customers, managing distribution logistics, negotiating the prices of inputs and finished goods, marketing their products, and developing competitive growth strategy. Association leaders must also develop and maintain relationships with funding sources, by engaging actively with banks or investors, public sector officials, the national and international NGO community, and any other external stakeholders. Finally, leaders must wisely balance commercial imperatives with mission goals, by developing sensitive policies related to internal governance and member services. All associations we visited had established fee structures, quotas, criteria for membership, and minimum consumption quotas to ensure that their member families' nutritional needs are met.

Financial Planning: Association leaders require financial planning skills, including budgeting and cost management, forecasting, financial reporting, and maintaining an optimal capital structure.

Quality Assurance and Seed Selection: The association's commercial success depends on its ability to supply quality products to buyers. Therefore, the association must carefully manage supply through oversight of production inputs and ongoing stewardship of the seed stock. As referenced above, amaranth seed selection is a particularly sensitive process, which requires expert oversight.

It is also worth noting that several amaranth growers associations we visited had strong personal beliefs about seeds, related to the heritage of amaranth cultivation among indigenous people or their desire to be independent from the Central Guatemalan government by maintaining a self-sustainable food supply. For these reason, amaranth associations like Qachuu Aloom maintain robust seed selection processes and storage banks.

Product Processing/Packaging: Associations must manage the processing of amaranth for sale in bulk or directly to consumers. This may include cleaning, storing, certifying, and directing any post-production/packaging activities. As output increases, associations can capture additional value by producing finished goods, such as popped amaranth or amaranth flour, in addition to supplying raw amaranth in bulk. Further value-added processes may also become feasible, over time. For example, were the association to diversify into other crops, such as honey, it could combine ingredients and produce packaged snacks, such as alegría.

Training: The association plays a critical role in promoting best practices of agriculture and family nutrition by providing agronomical evaluation services and training, incentivizing crop diversification, and demonstrating food preparation techniques. According to practitioners, people are willing to grow and eat amaranth but *lasting* dietary change is the real challenge. Some associations address this need by maintaining demonstration and test gardens, facilitating intercambios, or even hosting cooking contests. We noted strong synergies between an association's educational and experimentation functions and the capacities currently being developed under the ECADI system, suggesting the potential for collaboration

Best practices: Asociación Qachuu Aloom has developed a curriculum around amaranth cultivation, seed conservation, and processing, and also created a training team. Their training program is so successful that they receive invitations to train other associations throughout Guatemala and have already completed the training of two partners, in Solola.

Centro Kulb'aalib' Xe'chulub' emphasizes farmer-to-farmer information sharing, believing that it promotes the most relevant information, empowers farmers, and strengthens communities.

Membership Development: As membership grows, economies of scale will lower costs and enable the association to provide more services to the community and its members. Therefore, one of the primary functions of the association is to build trust and cultivate good relationships so that additional farmers are interested in joining. In rural areas, such as San Marcos, knowledge of the association will likely spread by word of mouth, making a strong reputation essential for success. The association also could reach new members by advertising free trainings or community events and/or having a presence in local markets and fairs.

Community Support: As role models and leaders, associations can perform valuable community development activities that strengthen relationships among neighbors and improve representation of the community's interests in government. Associations we visited leveraged their role as community leaders to promote a sense of cultural identity, act as a central hub for community organization, pool capital to create savings and lending groups, and invest in general education for its members.

3.6 Management Team

Strong leadership is the single most important success factor for an agricultural association. As outlined above, association leaders have very diverse mandates requiring expertise in business, agriculture, and community/relationship development. The management team must be able to unite the community, oversee the delivery of technical and educational services, and connect farmers with markets, all while prioritizing family nutrition and economic health as the central goal.

The required number of leaders within an association depends on its age and maturity. Naturally, an association will start with one or two strong leaders and add staff as the association grows and matures.

Some key roles to fill as the association grows include:

***President**:* As the chief administrator, the association president oversees the overall operations of the association. This role is generally that of the founder and therefore the first filled. The president's responsibilities include general management, internal policy, fundraising and communication with granting organizations, strategic planning, membership development, and staff development. The president must also embody and promote the soul of the organization by understanding what resonates with the community and creating a unifying goal around those ideas.

***Agronomist**:* Quality agricultural practices and seed stock are important for ensuring high crop yields. The agronomist oversees all technical aspects of the association including researching and communicating region-specific agricultural best practices, maintaining an experimental and demonstration garden, and overseeing the association seed bank.

***Education Director**:* The Educational Director ensures that member-families have the best possible information about production, nutrition, and other topics important to the health of the community. Drawing on best practices from behavioral change models such as the Hearth Model and Positive Deviance Model, as well as field experience, this individual develops curriculum, coordinates and conducts training sessions with farmers, works with the agronomist or nutrition experts to develop educational materials, and oversees the recruitment and training of promoters.

***Business Operations Manager**:* The Business Operations Manager oversees commercialization efforts including processing and packaging, distribution, marketing, supply chain relationship management, and general financial decision making for the association. This can include participation in local, regional, or national events such as fairs, workshops, or conventions to sell seeds and for overall promotion.

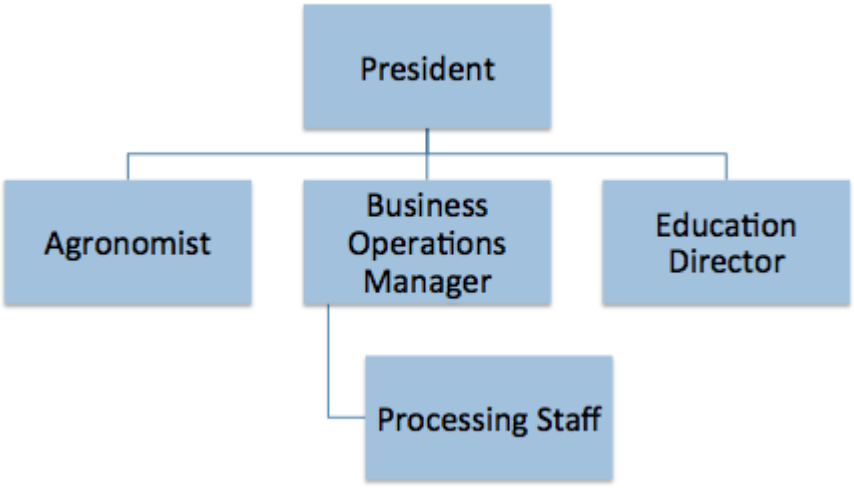


Figure 7: Sample Organizational Chart

The average salary for a mid-level professional in rural Guatemala is 2562Q.[xxi]

Consultant Services

We recommend that any new association developers learn from the experience of established associations. Because of their social orientation, many associations are willing to share their knowledge and best practices. For example, Asociación Qachuu Aloom often accepts consulting contracts to travel outside of the region and train new association leaders.

3.7 Membership

Associations maintain the integrity of their membership by vetting new members and requiring current members to meet ongoing minimum standards.

Youth can also play a role in the production of amaranth. At Asociación Qachuu Aloom, the youth over the age of ten, mainly between the ages 15-20 are trained with the adults to learn about production of seeds and to be promoters to spread knowledge. This family-centered model involved everyone in the process to rescue and care for seeds and provides a way for the association to perpetuate its membership. Associations also emphasize the important role women play in leadership positions, as promoters, and members

Best Practices: Asociación Qachuu Aloom's policies requires that all potential members:

- Share the mission/philosophy of the association
- Equally participate in activities
- Undergo a six month trial
- Be accepted by a vote of the Board of Directors
- Follow all association guidelines of fertilizer, seed storage, minimum consumption, etc.

Association Case Studies

- ***Puente***, in Mexico, uses the methodology of intercambios
- ***Intervida*** was successful with amaranth projects but focused on sales only and lacked long term planning
- ***Asociación Qachuu Aloom*** has seed banks & a test garden, offers training, and holds cooking contests
- ***Kulb'aalib' Xe'chulub'*** trained community promoters to encourage home consumption
- ***Chikach*** promotes amaranth production through vertical integration

IV. MARKET ANALYSIS

4.1 Methodology

As would be expected with a niche product in a small country, deriving an accurate estimate of market potential and growth is difficult, due to the lack of available market research. To arrive at approximate measures, we relied on our primary research as well as reliable market research studies from proxy markets, including the United States and Mexico. Because the target customers for amaranth are of a higher socioeconomic class, trends from the U.S. and Mexico City are likely to influence consumer preferences and behavior. While we acknowledge that several significant demographic and cultural differences make these markets imperfect comparisons, we believe that these are the best estimates available without an in-depth market study.

Fortunately, it is not necessary to have perfect information in order to capitalize on the market opportunity that currently exists for Guatemalan amaranth producers. Therefore, we do not advise commissioning additional research at this time, but instead recommend focusing on meeting current unmet demand, growing the market, and mitigating the risk of over-production by securing forward contracts with buyers.

4.2 Market Overview

We focused our market research on the current suppliers and buyers of Guatemalan amaranth. Through this process, we identified unmet demand for bulk amaranth in Guatemala City, coming from producers of amaranth products and from niche health food stores, which sell raw and pre-packaged amaranth products to consumers. Based on our research, we conclude that market is attractive for Guatemalan amaranth producers.

Two Opportunities

A majority of amaranth sold in Guatemala City is imported from Mexico in popped form. However, even with imports, bulk buyers cannot currently find all desired types and quality of amaranth, particularly raw seed. This indicates a strong market opportunity for Guatemalan amaranth producers to supplement and/or displace Mexican importers.

Compared with more mainstream crops, like corn, amaranth is relatively unknown in Guatemala. Although once a Central American staple, it is now consumed only by the rural farmers who grow it and by urban customers in the niche health food market. However, urban demand for amaranth is increasing

even with little or no advertising, due primarily to changing health concerns and lifestyle trends, including rising incidences of gluten intolerance or celiac disease. Because amaranth is still largely unknown and is not sold in large supermarkets, there is also a large, untapped market opportunity among mainstream consumers. As awareness of amaranth's benefits grows, we anticipate consumer demand will increase, suggesting another strong opportunity for Guatemalan amaranth producers.

4.3 Market Trends & Demand Drivers

Gluten-Intolerance & Celiac Disease

One reason for the increasing amaranth demand is the increase in diagnoses of gluten intolerance and celiac disease, which is triggered by gluten, the protein found in wheat. Recent research in the Journal of the American Medical Association reported that the incidence of celiac disease has increased by a factor of four in the past three decades, yet its causes are unknown.[xxii] Symptoms of gluten intolerance range from severe cramping to chronic fatigue and even organ disorders.

Though celiac disease necessitates a gluten-free lifestyle, the majority of gluten-free buying is a choice not a necessity. According to Diane Walters, a spokeswoman for NuWorld Foods, "there is also a growing crossover market of health-conscious shoppers in search of the most nutritious grains."[xxiii]

Vegetarian/Vegan Lifestyle

Vegetarian and vegan diets require nutrient-dense, plant-based protein sources. As described above, amaranth is a very useful substitute for meat, due in large part to its high lysine content. Vegetarians account for 5% of the population in the United States, and this percentage has remained constant over the past decade.[xxiv] Although we were unable to find the exact number of vegetarians in Guatemala, we found evidence to suggest that a strong vegetarian market exists in Guatemala city and is likewise holding steady. According to the owner of the Guatemalan health food shop, Artesano, about 25% of their customer base identifies as either vegetarian or vegan.

The Organic Movement

U.S. Demand for organic food has been increasing around 10% per year, for the past five years, and surpassed a total market size of $30 billion dollars, in 2012.[xxv] Amaranth, though not always grown organically, tends to benefit from this growth in demand for non-GMO or organic superfoods. We expect these U.S. trends to be a foreshadowing of trends in Guatemala City.

4.4 Market Metrics

Market Size

Given that the urban middle class in Guatemala City constitutes 35.4% of the population and that the core target market is among young adults, we estimate that the number of potential customers in our core target population of Guatemala City is between 175,000 and 225,000 people, with many in the target market still unaware of amaranth.[xxvi]

Our estimate of current annual demand for amaranth in Guatemala is approximately 2,000 to 2,500 quintales. Though exact numbers for Guatemala are not known, we have based these numbers on known figures from more developed North American amaranth markets.

Mexico has been producing around 3,500 metric tonnes (~77,000 quintales) of amaranth, annually.[xxvii] Mexico has had much more time to develop the market for grain amaranth, which is a key ingredient used in the popular snack, alegría. The crop was re-introduced in Mexico much earlier than it was in Guatemala and it has received significant government support. After accounting for differences in size and the cultural differences in consumption, we arrived at the estimates above.

Rate of Growth

We observe U.S. trends in the gluten-free market as a proxy for Guatemalan trends. Though the two markets are different, our Guatemalan target market consists of higher-income, technologically connected people who are very aware of and interested in U.S. consumer trends.

Demand for gluten-free products, in the U.S., has seen tremendous growth, over the past decade. For example, NuWorld Amaranth, a U.S. based company and one of the largest buyers of amaranth, reported a 300% increase in sales from 2003 to 2006.[xxviii] Based on these and other recent trends in the U.S. gluten free market, we expect to see demand for amaranth in Guatemala increase about 25% per year for the next 3 years and then stabilize at around 6% growth per year for the next 3 years.[xxix]

> ***"Gluten-free products will go through a developmental/introductory stage, a rapid growth stage for three to five years, and then level off, and possibly decline, to their long-term level. We are a year or two into the rapid growth stage for gluten-free products. I think that ultimately this category will stabilize to a level consistent with demand associated with about 10 percent of the population."***
> **-Mark Lang, Professor of Food Marketing, Saint Joseph's University 2014[xxx]**

4.5 End-Consumer Segmentation

Currently, amaranth is a niche product with two primary end-consumer segments: rural farmers who grow it for home consumption and sell small quantities to their neighbors, and health food store customers in urban areas.

Rural Consumers: These consumers are also the producers of amaranth, who consume their own crops.

Urban: The core demand for amaranth in Guatemala currently comes from the health food consumers in Guatemala City. Health conscious city-dwellers have higher incomes, have active lifestyles, and are generally younger than the population average. According to representatives from Lula's Oven, a producer of amaranth snack foods, these customers want to eat nutritiously but do not want to compromise on taste. Many are interested in avoiding gluten or providing healthy snack foods for their children. Price is not especially important, as long as it is within the range of other gluten-free products. This customer segment is also interested in convenient, ready-to-eat foods.

Health-conscious urban customers are an important customer segment to understand, from a marketing perspective. Many urban consumers have never heard of amaranth but may decide to purchase an amaranth product simply because it is labeled as gluten-free or as a superfood. A number of customers we interviewed mentioned that they stumbled across amaranth when

looking for gluten-free foods. Many others were vegetarian or vegans looking for alternative protein sources, who were first introduced to amaranth while searching for sources of protein.

4.6 Competitive Landscape

For the purposes of this report, we consider the primary competition for Guatemalan amaranth to be Mexican amaranth, which appears to be dominating market share in Guatemala City. Health food stores, such as Artesano, currently source their popped amaranth from Mexico, as they are unable to obtain sufficient supply domestically. However, while this Mexican amaranth is less expensive than Guatemalan amaranth, it is of relatively low quality and must be transported from the border. Currently, Mexican amaranth has a reputation for arriving unclean, with dirt, harvesting debris, and insects. This necessitates further processing and repackaging, adding to the total cost. Resellers we spoke with indicated willingness to a pay a premium over current Mexican amaranth prices if they could find a reliable local source that provided clean, high-quality amaranth. This suggests an opportunity for farming associations that wish to supplant the current supply chain.

Domestic competition comes primarily from producers in other domestic amaranth associations. There are several associations utilizing amaranth, such as *Asociación Qachuu Aloom,* in Rabinal, and *Kulb'aalib' Xe'chulub',* in Nebaj but the level of unmet demand suggests that there is room for other players. Furthermore, existing associations demonstrate that there is significant room for improvement, including stronger connections with markets and transport networks.

4.7 Export Considerations

With the potential for amaranth to be the next international superfood, the United States, Canada, and Western Europe represent good markets for amaranth export. These markets have populations with higher disposable incomes and have a significant number of health conscious consumers. But due to large quantities of amaranth being grown in India, China, Nepal, and Mexico, international prices are currently depressed, compared to Guatemalan prices. With time, economies of scale may make it more feasible for Guatemalan producers to enter the export market.

However, the risks and benefits of exports should be carefully considered. The story of global quinoa production highlights risks of amaranth export that could jeopardize the nutritional goals of this business plan.

Quinoa: A Cautionary Tale

Quinoa is a gluten-free grain with all nine essential amino acids required for a balanced diet. Though formerly unknown in the U.S., quinoa experienced explosive sales growth over the past decade, as illustrated below. Unfortunately, supply could not keep up with demand and prices for quinoa have risen so high that lower and middle class Bolivians can no longer consume the grain.

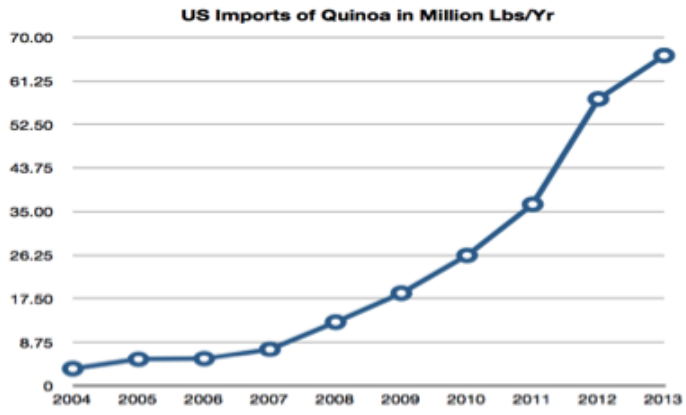


Figure 8: United States Quinoa Imports, 2004-2013.[xxxi]

Organizations such as Puente a la Salud Comunitaria are concerned that a robust export business will drive up the prices of amaranth, making it economically infeasible for farmers to consume their own harvests. But key technical differences between amaranth and quinoa make it difficult to assess the exact risk of amaranth prices following a similar fate. For example, quinoa only grows in a restricted geographical region so production has been unable to expand to meet the growing demand, leading to sharp increases in price.[xxxii] By comparison, amaranth can be grown in a larger variety of regions, meaning that supply can more easily keep up with increasing demand and prices are more likely to remain stable.

On the other hand, the fact that amaranth has a wider growing region can also pose pricing risks. Unlike quinoa, amaranth can easily be produced in the United States. U.S. agriculture typically has considerable cost benefits resulting from access to industrialized technology, more sophisticated markets, and government subsidies. Fortunately, industrial scale U.S. amaranth production in is unlikely, as demand is insufficient to generate large infrastructure investments, and amaranth production techniques are less amenable to industrial production.[xxxiii] Therefore, downward pricing pressure from the U.S. is unlikely. But, in the end, export markets are complicated, and it is very difficult to predict accurate outcomes.

First Things First

Before even considering exports, we recommend that an association first develop a strong national business, given the significant local growth opportunities and the association's local goals. As their brand gains recognition in the local markets and production is able to scale to meet increasing demand, the potential to export can be assessed in by comparing the likely return on investment with the impact of such a project on the program's social goals. At a minimum, the association's minimum consumption policy will help ensure that farmers maintain access to the nutritional benefits of amaranth production.

If international export is pursued, obtaining "organic" certification from the Organic Crop Improvement Association (OCIA) or a similar organization would be advantageous, particularly in the United States and

European markets. Until this point, there is no advantage in obtaining certification by an international body, apart from advertising purposes, nor is there a Guatemalan equivalent certification.

V. MARKETING & SALES

5.1 Marketing to Bulk Buyers (B2B)

Associations' primary marketing target will be commercial entities in Guatemala City (business-to-business marketing or B2B). Associations should cultivate relationships with producers of packaged amaranth food products and with small retailers such as health food stores, yoga studios, and nutritionists. They should also seek to expand distribution by engaging in grocery store and restaurant trade shows. In terms of messaging, the association should emphasize its reliable supply, sustainable practices, and ability to meet quality specifications. Product emphasis should be on amaranth's three core benefits as seen by the consumer: High nutrition (gluten free, vegan, superfood, etc), locally and organically grown in Guatemala, and the perceived mystic power of ancient grains.

5.2 Marketing to End-Users (B2C)

Most association amaranth will be sold in bulk to retailers as raw seed or in larger shipments of finished products. However, associations that sell directly to consumers via a storefront or local market may engage in a small amount of business-to-consumer marketing (B2C). Consumer marketing should be targeted at one of the two primary customer groups: higher income, health-conscious consumers or rural, low-income consumers.

Marketing efforts directed at the health-conscious group should focus on its benefits as a gluten-free food with niche nutritional properties. This focus emphasizes how amaranth meets their unique needs and justifies the premium paid in health food stores.

Marketing efforts directed at rural consumers should focus on the exceptional nutritional properties of amaranth as compared with other options and the ways in which it can help build healthy families. In addition, our research indicates that the cultural connection to amaranth as the "Mayan super-food" is attractive to persons who identify as Mayan.

As is standard practice, any marketing strategy should be targeted and field-tested with consumers before substantial investment is made. Ideally, a comprehensive marketing strategy will be managed by a dedicated sales and marketing staff member at the association and will be intensely focused on the customer segments which exhibit the most opportunity for growth. This individual would develop the unique marketing messages for each customer segment, oversee the development of marketing materials, manage the association's website and other communications, and manage relationships with sales partners.

5.3 Sales

The association should develop a comprehensive sales strategy, which is tailored to its community. Here we provide general guidelines for consideration.

Product diversification is important for the success of the association. After an initial start-up period, associations should begin offering basic processed amaranth such as popped amaranth and amaranth flour, in addition to raw amaranth seed. As indicated in our value chain analysis (See section 6.2), processing provides an opportunity for significant value creation and capture. Among processed options, popped amaranth is in greatest demand and is easy to produce without specialized equipment. This popped amaranth can later be ground into flour or further processed to produce finished snacks such as alegría. Overall, associations should focus on achieving a balanced, diversified product mix.

As an association grows, awareness of the benefits of amaranth will increase in the surrounding community, increasing local market demand. A forward-thinking association should seek to emulate *Asociación Qachuu Aloom*, which has created a local store in Rabinal, where it sells amaranth and other natural foods and artisan products to the surrounding community.

As supply reaches a large scale, the association could also choose to expand further up the value chain by selling directly to consumers. A first step would be to build out its transportation network to urban centers, followed by opening a retail store in Guatemala City. This expansion would allow the association to capture additional value and exact closer control of its sales and distribution channels.

5.4 Growing the Market

Working with other amaranth industry participants to grow the total amaranth market is in the long-term interest of amaranth associations, provided that such investment has a clear return. Here we offer some marketing suggestions aimed at increasing total consumer demand.

The first strategy that amaranth industry partners must employ is to clearly position amaranth in the minds of the Guatemalan consumer through an information campaign that will: (a) promote awareness of the product, (b) strengthen mainstream Guatemalans' perception of the nutritional benefits of amaranth, and (c) create excitement about amaranth's place in Central American heritage and the opportunities it currently creates for rural farming families. This emphasis on heritage and social impact will be attractive to the young, health-conscious consumers, who are both socially-conscious and trendsetters. The association or industry could promote this message through advertising, social media, government partnerships, or celebrity brand ambassadors.

After creating excitement and building knowledge about amaranth, the next step is to spur the widespread adoption of amaranth as part of the Guatemalan diet. Specific marketing activities aimed at persuading new customers to try the new products should be pursued. The promotion for these products should occur at the same time as the aforementioned information campaign, to capitalize on the interest that is generated in the health and social impacts of amaranth. Product sampling is a low-cost and high-impact tactic that could achieve this goal. Incorporating amaranth into school feeding programs and enlisting health care providers to promote amaranth by educating them about its nutritional benefits are also high-impact strategies.

VI. FINANCIAL ANALYSIS

A basic financial analysis provides a guide for projecting association economic performance and making financial decisions. The analysis presented here should be viewed as a framework to be applied to a particular association, rather than a final product. Project-specific considerations including regional growing seasons, market trends, types of funding available, start-up requirements, available infrastructure, and the regionally available talent will determine the particular economics of any given association.

6.1 Pricing Data

Aggregated price data from our March 2014 research is included below. This data includes current prices for the three primary finished amaranth products (popped amaranth, amaranth flour, and alegría) and is divided between association sale prices (assn.) and retail sale prices (end). Raw amaranth, not shown here, is sold by farmers for 8 GTQ/lb - 12 GTQ/lb. All price data is in Guatemalan Quetzales (GTQ).

	POPPED (POPOROPO)				
	Source	Lb	GTQ	GTQ/lb	Averages
End	Artesano Store	0.50	38.00	76.00	75.20
End	Super Verduras	0.50	38.00	76.00	
End	Artesano Store	0.25	20.00	80.00	
End	Super Verduras	0.25	20.00	80.00	
End	Kuchub'al (Atitlan)	0.50	32.00	64.00	
Assn.	Qachuu Aloom	0.50	25.00	50.00	48.50
Assn.	Qachuu Aloom	0.25	15.00	60.00	
Assn.	Chikach	0.50	25.00	50.00	
Assn.	Kulb'aalib' Xe'chulub'	0.50	17.00	34.00	

	FLOUR (HARINA)				
	Source	Lb	GTQ	GTQ/lb	Averages
End	Super Verduras	0.7	31.10	43.38	41.69
End	Kuchub'al (Atitlan)	1.0	40.00	40.00	
Assn.	Chicakh	1.0	32.00	32.00	22.50
Assn.	Qachuu Aloom	1.0	20.00	20.00	
Assn.	Qachuu Aloom	0.5	10.00	20.00	
Assn.	Kulb'aalib' Xe'chulub'	1.0	18.00	18.00	

	ALEGRIA				
	Source	Bars	GTQ	GTQ/lb	Averages
End	Artesano	3	15	75.76	70.71
End	Super Verduras	3	13	65.66	
Assn.	Kulb'aalib' Xe'chulub'	1	2.00	30.30	30.30
Assn.	Kulb'aalib' Xe'chulub'	2	4.00	30.30	

Figure 9: Comparative prices of amaranth products

Note: As shown above, amaranth flour currently sells for less than popped amaranth, despite requiring twice as much processing. Despite this, it still boosts sales volume and offers a product diversification benefit.

6.2 Value Chain

Aggregating the above price data provides a view of the value added by each player in the amaranth value chain. It is readily apparent that the association adds and captures significant economic value by packaging and/or processing the raw amaranth bought from local farmers into flour, popped amaranth, and amaranth bars (alegría) for sale to retailers.

per pound	Farmer	Value added	Aggregator	Value added	Resale
Seeds	GTQ 10.00	120%	GTQ 22.00	–	–
Flour	–	125%	GTQ 22.50	85%	GTQ 41.69
Popped	–	385%	GTQ 48.50	55%	GTQ 75.20
Bars	–	203%	GTQ 30.30	133%	GTQ 70.71

Figure 10: Value chain breakdown for Guatemalan amaranth

6.3 Startup Costs

Start-up costs can be broken into several categories, including infrastructure, processing equipment, incorporation costs, supplies, and other costs.

Infrastructure: Initial infrastructure costs will include the purchase of a small, centrally located plot of land and the construction, renovation, or leasing of buildings. Association facilities we visited often included meeting areas for trainings, administrative offices, an area for cleaning and processing, a restroom (possibly utilizing fertilizer latrines), and two agricultural storage facilities--one for harvested grain and another for a seed bank. Other facilities may be built as needed and could include a full-service kitchen or restaurant, a storefront, or a hostel for overnight visitors, volunteers, or eco-tourists.

Processing Equipment: At a minimum, associations require equipment to clean, package, and store their products. Additional post-processing equipment could enable the association to diversify beyond crude amaranth into higher value products. A stove or popping machine will be necessary to be able to make popped amaranth, which fetches a much higher price than crude amaranth. Making flour requires a stove, as well as grinding equipment, or a mill.

Incorporation Costs: There will also be costs for the legal formation of the association. As discussed above, we recommend registering the association as an “asociación civil,” due to its ease of creation and tax exemption. The fees to register the association are varied and combine to an amount of approximately Q400.00. (However, with a large initial capital investment it could be a little more--there is a fee of Q1.50 for each Q1000.00 of initial capital invested.) If a lawyer must be retained, it adds an additional cost.

Supplies & Other Costs: In addition, the association would require the development of a website, as well as the purchase of furniture, a computer, a printer, a credit-card processing machine, an initial stockpile of packaging supplies such as containers & custom product labeling, and miscellaneous office supplies (pens, paper and other small items, business cards for the leaders, etc).

As outlined below, we estimate the total start-up costs for forming an association to be within the range of 30,000 GTQ to 40,000 GTQ. It is important to consider that actual startup costs may vary widely, depending on regional price differences, the size of the community, availability of preexisting assets, and other factors, and should be evaluated individually for each association. We anticipate that this initial capital investment could be funded through grants or donations of money or physical assets.

	Item	Description	Price (USD)	Price (GTQ)
	Incorporation Legal Services			400.00GTQ
	Incorporation	See Business Plan for more details		550.00GTQ
Office	Office Rental	Price per month, Includes utilities	$ 550.00	4,180.00GTQ
Office	Furniture	4 chairs, 1 desk, 1 table	$ 406.00	3,085.60GTQ
Office	Computer	Laptop	$ 500.00	3,800.00GTQ
Office	Printer	HP All-in-One	$ 99.99	759.92GTQ
Office	Credit Card Machine	Verifone VX510	$ 199.98	1,519.85GTQ
Office	Business Cards	250 Business Cards	$ 20.00	152.00GTQ
Office	Pens	24 Ball Point Black pens	$ 14.98	113.85GTQ
Office	Paper	10 reams	$ 45.99	349.52GTQ
Production	Fan		$ 20.00	152.00GTQ
Production	Storage Containers	6 30 Gallon plastic lidded storage bins	$ 52.62	399.91GTQ
Production	Storage Racks	2 metal/wire shelves	$ 200.00	1,520.00GTQ
Production	Popper			12,500.00GTQ
Production	Website		$ 500.00	3,800.00GTQ
Production	Product Packaging Containers	1000 11oz containers		110.00GTQ
Production	Product Labelling	0.60Q/ 110 Stickers		60.00GTQ
				33,452.66GTQ

Figure 11: Estimate of association start-up costs

6.4 Sample Profit and Loss Forecasts

Based on the pricing data collected, we have provided a profit and loss forecast to give a high-level view of operating revenues and expenses for an association. For modeling simplicity, we describe a single-crop association which sells only amaranth. However, an actual association should seek diversification of crops to protect the association and its member farmers from risk of individual crop failure or price volatility. For example, Qachuu Aloom is an association focused on amaranth, which also encourages crop diversification by providing a market for a variety of crops.

Assumptions

As with any business plan, the output of our financial forecasts depends on the accuracy of our inputs, which vary by region and over time. Readers are cautioned to update these inputs at the time of project development. Our model is based on the following assumptions:

Revenue: The income statement assumes that raw amaranth is purchased from farmers by the association, is processed into flour, popped amaranth, and alegría bars, and is sold to retailers or local community members according to the percentages given. Sale prices are averages from the

list presented in section 6.1. Additional revenue includes farmer membership fees and grants from NGOs or other organizations, if applicable.

Expenses: Expenses are itemized to arrive at the profit generated by the association (a negative number indicates that the association requires external grant support to subsidize operations). We include estimated costs for packing, transportation, training, etc. as estimates that require revision for a particular region or set of circumstances. Actual costs for labor, building maintenance, utilities, and marketing expenses will vary widely between associations, depending on their maturity and assets, and must be accounted for accordingly.

In addition to the example below, an excel template ("Income Statement Templates.xlsx") is provided as a supplement to this document in a framework that can be used to analyze detailed information about a particular farm or association by changing input values.

AMARANTH ASSOCIATION INCOME STATEMENT

This income statement template is a guide for analyzing the economic performance of an amaranth growing association.

Per year	**Worst Case**	**Best Case**
INCOME		
% Popped	50%	50%
% Flour	25%	25%
% Alegria	25%	25%
Popped (poporopo)		
Sale Price (GTQ/lb)	48.50GTQ	48.50GTQ
Amt. Sold (lb)	5000	5000
Flour (harina)		
Sale Price (GTQ/lb)	22.50GTQ	22.50GTQ
Amt. Sold (lb)	2500	2500
Alegria		
Sale Price (GTQ/lb)	30.30GTQ	30.30GTQ
Amt. Sold (lb)	2500	2500
# Members	100	100
Membership fees (GTQ/yr)	25	25
NGO Grants	5000	5000
Total Income	382,000 GTQ	382,000 GTQ
EXPENSES		
Units Sold (assume 1 lb)	10,000	10,000
Purchase Price (GTQ/qq)	1,200.00GTQ	800.00GTQ
Purchase Amt. (qq)	100	100
Purchase Expense	120,000 GTQ	80,000 GTQ
Packaging	1,155 GTQ	1,155 GTQ
Transportation	5,000 GTQ	3,000 GTQ
Training	36,000 GTQ	36,000 GTQ
Association Staff Salaries	40,000 GTQ	20,000 GTQ
Processing Labor	- GTQ	- GTQ
Taxes	64,940 GTQ	64,940 GTQ
Overhead		
License (depreciatd 3 yr.)	2,667 GTQ	2,000 GTQ
Lab Fees	400 GTQ	200 GTQ
Popper (depreciated 3 yr.)	4,167 GTQ	4,167 GTQ
Building Maintenance	50,000 GTQ	25,000 GTQ
Utilities	10,000 GTQ	5,000 GTQ
Marketing	10,000 GTQ	5,000 GTQ
Other	1 GTQ	1 GTQ
Total Expenses	344,329 GTQ	246,463 GTQ
PROFIT	**37,671 GTQ**	**135,537 GTQ**
PROFIT MARGIN	10%	35%

Figure 11: Sample association profit & loss statement

6.5 Growth

Here, we project income, expenses, and profitability over a five year period. This particular model assumes 3% inflation and 5% annual growth in the number of members and volume of amaranth sold, as well as the hiring of additional staff in year 3. These estimates are highly sensitive to assumptions and should be examined using the most accurate data available. Inputs are easily manipulated in the excel template spreadsheet which we provide as a supplement to this business plan.

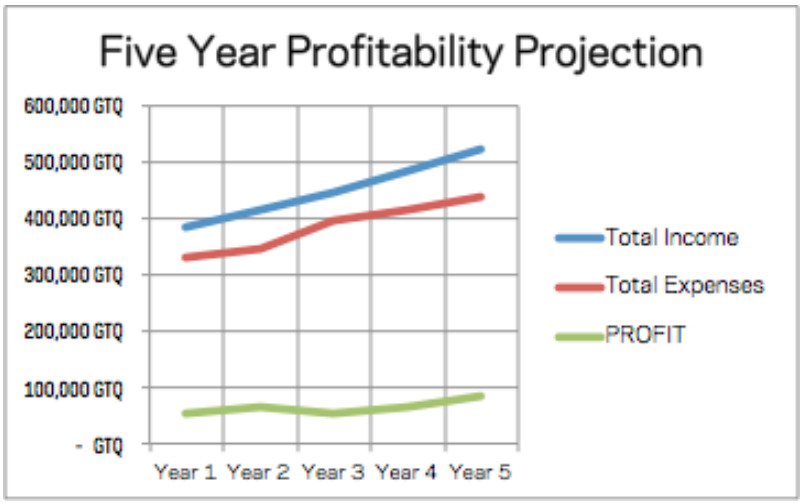


Figure 12: Sample five-year association profitability projection

6.6 Reinvesting for Growth

As a non-profit organization, any profits generated as the result of income exceeding expenses must be reinvested into the association. This reinvestment should be prioritized to maximize both the benefit to member farmers and the return on investment. During the early years, profits should be reinvestment with an additional goal of growth and risk mitigation.

Development of the association seed bank and demonstration/test garden (and any other agronomical capabilities) should be a first investment priority, as they directly contribute to the sustainability of the project and the health of the farmers. Following this, it is important to invest in processing equipment so the association and its members may capture additional value from amaranth production. Expansion of association staff is a third priority for investment, especially since the staff roles we recommend will likely go unfilled in the first few years of the associations existence. Other opportunities for reinvestment include marketing efforts to promote the reach of association sales (including to international export markets) and investment in the transportation network to allow the association to more fully integrate into the urban market and capture even greater value.

VII. ADDITIONAL CONSIDERATIONS

7.1 Metrics

In order to gauge the success of this campaign, we have formulated the following metrics that can be used in its evaluation:

(1) Increase in profits and commensurate increase in worker salary
(2) Increase in awareness in amaranth properties
(3) Increase in retailer penetration across Mexico
(4) Increase in sales of amaranth products
(5) Increase in number of workers employed
(6) Increase in number of amaranth farmers supported

By evaluating these metrics and comparing results to benchmarked data and past performance, the success of the overall mission can be evaluated.

7.2 Risks

Agricultural associations are vulnerable to several supply chain and market risks, as summarized below. However, our preliminary research suggests that some forms of business insurance may be available to help mitigate these risks. Further research is needed to evaluate the availability and costs of these insurance products in rural areas.

Production Risks

- Environmental Risks: As a C4 crop, amaranth is highly resilient to weather and climate variables, such as drought and temperature changes. However, before beginning an amaranth production project, it is important to conduct a region-specific feasibility analysis, which includes appropriate consideration of environmental risks.

- Pests: In the areas with 3 month growing seasons, a fungus can destroy the crop if the seeds are planted too late in the wet season or are grown too close together. Some farmers try to prevent this problem by planting corn, instead of amaranth, during the wet season. Others plant amaranth approximately one month before the wet season begins and replant or thin the crop to have greater spacing between plants. Additional pest risks include the potential for stored grains to be eaten by rodents and for birds to eat the grain as it is growing. Furthermore, one farmer mentioned having issues with the small black worm, *guisano nochero*, which eats the trunk of the plant, if not closely monitored.

- *Producer Risks*: This model assumes that labor is shared among a small set of family and/or community members. As such, production may be disrupted by illnesses, community emergencies, the availability of higher-paying employment opportunities, or any other human variable, which could render one or more producers unable to work.

- Political Risks: Any commercial activity is vulnerable to political conditions including war, redistributive land programs, political instability, changes in industry regulations or tax rates, and other circumstances beyond the community's control.

- Natural Disasters: Any commercial activity is vulnerable to natural disasters, including earthquakes, hurricanes, tsunamis, drought, and others.

Market Risks

New Entrant Risks: Because the amaranth market is so attractive, there is always a threat of entry by a new player (with substantial funding or venture backing) or an existing large-scale agricultural producer.

Demand Risks: A critical assumption underlying this proposal is our expectation that demand for amaranth will continue to grow. However, health food trends come and go and any amaranth-based business is vulnerable to changes in consumer preferences that negatively impact demand.

Price Risks: As with any commodity, the ability to capture market premiums is eroded as supply is increased. Market prices of amaranth are subject to changes in supply and demand levels, both locally and internationally, and any significant increase in relative supply could adversely affect the profitability of this model *and* may make it unreasonable for farmers to consume their own product (see section 4.7).

7.3 Alternatives to the Association Model

As an intermediary, the association we have proposed fulfills a critical role connecting farmers to markets and promoting improved nutrition and livelihoods for rural farmers. That said, there are other organizational models that could fill this role, each with its own set of benefits and challenges. Alternatives that CRS might consider supporting include cooperatives and other for-profit business models.

Cooperative

One popular alternative legal formation is a cooperative ("cooperativa"). Cooperatives function similarly to an association and provide many of the same benefits to farmers, such as enabling economies of scale, increasing bargaining power, sharing the costs of new technology, adding value to agricultural products, gaining access to new markets, and spreading around the risks associated with new enterprises. Like an association, a cooperative is centered around a social goal, but unlike an association, it can make a profit.

The key difference between a cooperative an association comes down to ownership: cooperatives are owned by their members, while associations are non-profit organizations which, by definition, exist without owners. Collective ownership may help strengthen community ties and can empower member-

farmers to have more input in organizational decision-making. However, this same ownership structure is more vulnerable to the free-rider problem than other models and its democratic decision-making process can also decrease operational efficiency.

Registering a cooperative is more complicated than what is required to form an association and involves a 15-step process. However, the cost to create the cooperative is only marginally more expensive than the cost of forming an association. The exact cost varies according to the initial capital investment and associated properties but should not exceed Q500.00.

Social Enterprise

A private business could function in essentially the same market capacity as an association and serve a social goal. The primary differences would be the loss of tax exemption and the ability to make a profit.

In Guatemala, there are a 5 types of legal business entities, called “sociedad mercantiles”, that could be formed: “sociedad colectiva,” “sociedad de comandita simple,” “sociedad de responsabilidad limitada,” “sociedad anónima,” and “sociedad en comandita por acciones.”

We favor one formation in particular, the “sociedad de responsabilidad limitada,” as it has limited liability. Under this formation, creditors would only be able to obtain redress from the capital investment in the organization and, thus, personal assets would not be subject to loss. The cost of registering a business is about Q550 if initial capital is less than Q300,000.00 or approximately Q750 if greater than that amount (plus Q8.50 for each thousand of capital invested, which would be at least Q2,500.00).

Sociedad colectiva	Exists for a a social reason. All partners are jointly and severally liable. (similar to a general partnership in the U.S.)
Sociedad de comandita simple	Has one or more general partners who have liability for obligations, and limited partners with liability up until the amount of their contributions. (Limited Partnership)
Sociedad de responsabilidad limitada	Made of several partners who are only liable for an amount up to their capital contribution. (LLC)
Sociedad Anónima	Capital is divided and represented by shares. The liability of each shareholder is limited to payment for the shares. More geared towards larger projects like banking, general trade, or industry. (Corporation)
Sociedad en comandita por acciones	One or more general partners have unlimited liability for obligations and one or more limited partners have limited liability to the paid for shares as shareholders of a corporation.

Figure 13: Guatemalan business entities

Micro-Investments in Entrepreneurs

Another model that could promote nutrition and connect farmers to markets is investing in entrepreneurs who are motivated to produce and market amaranth at scale. Many in the development community believe that investing in private entrepreneurs is a better way to engender change, because the strategy leverages powerful economic incentives that may accelerate the go-to-market process. Investments in

entrepreneurs may be made by providing scholarships, business training, or direct debt and equity investment.

One important consideration that arises with relying on private enterprise to fill this intermediary role is ensuring that the entrepreneur is incentivized to support the nutritional and economic development set by CRS. Ideal entrepreneurs would have both business acumen as well as a concern for the mission of poverty alleviation in rural areas. The Acumen Fund accomplishes this through a clearly defined investment criteria, which requires that entrepreneurs make a product or deliver a service that addresses a critical need for the poor in their target sectors and geographic focus.

Case Study: Juan Carlos, A Model Entrepreneur

Our research included an interview with Juan Carlos, an entrepreneur in San Marcos, who produces and sells amaranth. Juan Carlos would be an ideal candidate to receive investment from CRS, under an entrepreneurial investment model. He is a qualified agricultural technician who works for Caritas, teaching crop production and commercialization to rural farmers. During his free time, he cultivates and sells niche crops, including amaranth. Juan Carlos began cultivating amaranth in 2003 and has now grown his business to approximately 4 quintals of amaranth sales per year, some of which is sourced from another farmer.

Through trial and error, Juan Carlos has optimized his production techniques. He discovered how to minimize the risk of contracting fungus by separating plants to ensure that leaves are not smothering each other and has streamlined the harvesting process by grinding whole flower blooms mechanically and then using wind to blow away all the debris. These methods have increased his yield and production efficiency.

Juan Carlos has also used his entrepreneurial skills to deliver amaranth in a way that is enticing to potential buyers. He recognized that common methods of packaging amaranth are not conducive for long-term storage; the bags that are often used are not easily resealed and this leads to seed spillage, after the first use. Juan Carlos found that an airtight, re-sealable jar prevents his product from spilling and spoiling. He also found that his clients like to be able to see the amaranth before buying it, so he made sure that his jars were transparent. These customer-centered innovations have allowed him to successfully sell amaranth in San Marcos City.

Juan Carlos dreams of using amaranth to help improve nutrition and incomes throughout the San Marcos area. He believes so strongly in its nutritious quality that he ensures his extended family consumes 20% of his amaranth product. If he had the time and resources, he would increase the amount of amaranth he buys from local farmers, make more finished goods out of amaranth, such as cookies, alegría, granola, and an amaranth nutrition extract, and then sell it in areas beyond San Marcos. Because of his talent and drive, an investment in an entrepreneur like Juan Carlos has the potential to improve the lives of hundreds of farmers and consumers, in Guatemala.

One Acre Fund Model

There are lessons to be learned from the One Acre Fund, which works with smallholder farmers in East Africa. The One Acre Fund works with already existing farming groups, provides training and expertise to these groups in order to improve crop yields, and supplies seed and fertilizer on a credit basis. This program model aims to add value at each step of the value chain. Like numerous other models, the fund helps connect farmers to markets and makes bulk-buying and other economies of scale possible . However, One Acre Fund focuses primarily on increasing revenue by improving crop yield and much less on family nutrition, which is a cornerstone of CRS programming in Guatemala.

Recognizing that the One Acre Fund model supports only one of the two primary aspects of CRS' objectives in Guatemala, namely income generation, the One Acre Fund model serves as an example that can inform an association's thinking, in terms of serving members by providing credit and training. But because a single-minded focus on increasing income will invariably weaken nutrition programming, the One Acre Fund model should be considered as an addition to a more comprehensive program.

Summary

There are several organizational models that could fill this intermediary role in the amaranth value chain. Each model has unique benefits and challenges but the crucial tasks of any middleman are connecting farmers to markets and promoting improved nutrition and livelihoods for rural farmers.

[i] Myers, R. L. (2002). *Grain amaranth: a lost crop of the Americas (Alternative crop guide).* Jefferson Institute.
[ii] Ibid.
[iii] USDA. *Nutritional Database, Standard Ref. 20, version 20088*. http://www.ars.usda.gov/Services/docs.htm?docid=8964
[iv] Ibid.
[v] Ibid.
[vi] Chavez. (1997). *Amaranth in Malnourishment Reduction.* San Luis Potosi Health Services.
[vii] Woldt, M., & Bergeron, G. (2013 йил 11-September). *Optifood: A New Tool to Improve Diets and Prevent Child Malnutrition in Guatemala*. USAID: http://blog.usaid.gov/2013/09/optifood-to-improve-diets-and-prevent-child-malnutrition-in-guatemala/
[viii] Ibid.
[ix] World Health Organization. (2003). *Diet, Nutrition and the Prevention of Chronic Diseases: Report of a Joint WHO/FAO Expert Consultation. WHO Technical Report Series No. 916..* Geneva.
[x] World Health Organization. (2005). *Guiding principles for feeding non-breastfed children 6-24 months of age.* Geneva.
[xi] Food and Agriculture Organization of the United Nations (FAO). (1970). *The Amino Acid Content of Foods and Biological Data on Proteins (Nutritional Study #24)*. Rome.
[xii] Pisarikova, B., Kracmar, S., & Herzig, I. (2005). Amino acid contents and biological value of protein in various amaranth species. *Czech Journal of Animal Science , 50* (4), 169-174.
[xiii] FAO 1970.
[xiv] Pisarikova et al 2005.
[xv] FAO 1970.
[xvi] Pisarikova et al 2005.
[xvii] FAO 1970.
[xviii] Pisarikova et al 2005.
[xix] World Health Organization 2005.
[xx] USDA. (2014). *National Nutrient Database for Standard Reference: Release 26*. From http://ndb.nal.usda.gov/ndb/foods
[xxi] Instituto Nacional de Estadística (INE). (2014 March). *Encuesta Nacional de Empleo e Ingresos: ENEI 2-2013*. Retrieved 2014 May from Instituto Nacional de Estadística Guatemala: http://www.ine.gob.gt/sistema/uploads/2014/03/31/FgOv66TWENVfJi9VjxHWmvnTTTqSzdXr.pdf
[xxii] Jonas F. Ludvigsson, Abraham Reichenberg, Christina M. Hultman, Joseph A. Murray. “A Nationwide Study of the Association Between Celiac Disease and the Risk of Autistic Spectrum Disorders.” JAMA Psychiatry. 2013;70(11):1224-1230
[xxiii] Choi Candice. “Ancient Grains Going Into Modern Diet.” Washington Post. 21 June, 2006. Web.
[xxiv] Newport, Frank “In U.S. 5% Consider Themselves Vegetarians” *Gallup Well-being*. Gallup. 26 July 2012. Web.
[xxv] “Industry Statistics and Projected Growth.” Organic Trade Association, n.p. June 2011. Web.
[xxvi] “The World Facebook: Guatemala.” CIA. n.p., 11 April 2014. Web.
[xxvii] “Resurge la Demandad y Consume de Amaranto en México.” Alimentariaonline. n.p 28 August 2006. Web.
[xxviii] Laux, Marsha and Hoyle, Shannon 2014. “Amaranth” Agricultural Marketing Resouce Center May 2014.
[xxix] Gluten-Free Foods and Beverages in the U.S., 4th Edition.” Packaged Facts. 17 October 2012. Web.
[xxx] Lang, Mark “A Consumer-Driven Trend” nytimes.com. 20 February, 2014. Web.
[xxxi] Depillis, Lydia (2013) "Quina should be taking over the world. This is why it isn't." Washington Post 11 July 2013. Web. 10 May 2014. http://www.washingtonpost.com/blogs/wonkblog/wp/2013/07/11/quinoa-should-be-taking-over-the-world-this-is-why-it-isnt/
[xxxii] Romero, Simon. *Quinoa’s Global Success Creates Quandary at Home*. New York Times, 19 March 2011.
[xxxiii] Personal Conversation, Cathy Bayliss, U. of Illinois

Appendix

Table of Useful Contacts

Contact	Organization	Position	Additional Information	Contact Info	Company Website
Amaranth Experts					
Pete Noll	Puente a la Salud Comunitaria	Executive Director	Puente is a successful organization of small farmers growing amaranth	pete@puentemexico.org	http://www.puentemexico.org
Mary Delano de Alcocer	Mexico Tierra de Amaranto A.C	General Manager	Mexico Tierra de Amaranto is a successful organization of small farmers growing amaranth	marymdelano@yahoo.com.mx	http://www.mexicotierradeamaranto.org/
Jonathan Walters	Nu-World Foods	Director of Sales and Marketing	Nu-World Foods sells ancient grains and gluten-free products	jonw@nuworldfoods.com	http://nuworldfoods.com/
Aubrey Sykes	Calvin College, Grand Rapids, Michigan	Engineering Professor	Professor Sykes has experience designing, developing and building amaranth poppers of all scales, that are made for use in the developing world.	jas28@calvin.edu	
John McMillan	Purdue	PhD in Agronomy	He just finished his PhD research in Amaranth	jmcmilla@purdue.edu	
Mark Holt	Matrix Nutrition, LLC	Founder and General Manager	Matrix Nutrition, LLC is a company that works internationally with crops that can be used for food and animal feed	MHolt@matrix-ind.com	
David Brenner	USDA/Iowa State University	Curator of Amaranth and other crops	Manages the Amaranth Institute Listserv	David.Brenner@ars.usda.gov / dbrenner@iastate.edu	
Jorge Luis Pedroma	Centéotl		Amaranth women's group in Oaxaca, Mexico	jlpedroma@gmail.com	
Programing Resources					
Hal Culbertson	ND Kroc Institute	Executive Director	Experience with dietary behavior change	culbertson.1@nd.edu	
Matt Bloom	ND Mendoza Business School	Associate Management Professor	Design Thinking Expert	mbloom@nd.edu	
Guatemalan Amaranth Contacts					
Harriet	Chikach		Amaranth retailer & promoter of production		chikach.com

Rosalia Asig	Qachuu Aloom	Coordinator	Qachuu Aloom is a successful organization of small farmers growing amaranth		http://www.gardensedge.org/Guatemala/index.html

Other Useful Resources

General Amaranth Information

- Amaranth Institute - amaranthinstitute.org

Nutrition

- USDA, Nutritional Database, Standard Ref. 20, version 20088. - http://www.ars.usda.gov/Services/docs.htm?docid=8964
- Achigan-Dako, E.G., Sogbohossou, O.E.D., Maundu, P, 2014. Current knowledge of *Amaranthus* spp.: research avenues for improved nutritional value and yield in leafy amaranth in sub-Saharan Africa. *Euphytica* 197(3):303-317.
- Howard, B. C. (2013 йил 12-August). *Amaranth: Another Ancient Wonder Food, But Who Will Eat It?* From National Geographic: Daily News: http://news.nationalgeographic.com/news/2013/08/130812-amaranth-oaxaca-mexico-obesity-puente-food/#.UypKTPmwKvc

Amaranth Seed Selection

- Bressani, R., J.M. Gonzales, J. Zuniga, M. Brauner, and L.G. Elias. 1987a. Yield, selected chemical composition and nutritive value of 14 selections of amaranth grain representing four species. J. Sci. Food and Agric. 38:347-356.
- Bressani, R., J.M. Gonzales, L.G. Elias, and M. Melgar. 1987b. Effect of fertilizer application on the yield, protein and fat content, and protein quality of raw and cooked grain of three amaranth species. Qualitas Plantarum 37(I):59-67.

Legal Formation in Guatemala

- Useful for all types
  - http://guatemala.eregulations.org/
- Associations
  - http://contapuntual.wordpress.com/2009/10/05/aspectos-que-deben-cumplir-las-asociaciones-civiles-de-guatemala-en-materia-administrativa-tributaria-laboral-y-fiscal/
  - http://www.slideshare.net/sdellabitta/organizacion-tipos
  - https://ocampoarch.wordpress.com/2006/08/07/asociaciones-y-sociedades-civiles/
- Cooperatives
  - http://www.aciamericas.coop/IMG/pdf/wcms_185442.pdf
  - https://contapuntual.wordpress.com/2011/04/13/caracteristicas-de-las-cooperativas-en-guatemala/
- Businesses
  - http://www.slideshare.net/Faitopedia123/sociedades-mercantiles-en-guatemala