



BUSINESS PLAN

Organic Figs

An ecologically and socially-focused project to save Moroccan fig forests and manage the commercialization of organic Moroccan figs in national and international markets.

HA³ is a social enterprise of the High Atlas Foundation for the benefit of human development driven by green growth.





Organic Figs Business Plan

Executive Summary

Moroccan fig crops are under threat due to a lack of community-managed tree nurseries, adequate water supply, low profitability and untapped potential in value-added processing. Ancient fig plantations are dying out due to negligence,¹ and farmers are limiting new and existing crops to lands otherwise unsuitable for farming, such as mountain slopes, which cannot easily be reached for commercial marketing purposes. On more accessible land, farmers are replacing existing cultivars with more resource- and labor-intensive plant species like wheat, and non-organic apples and pears. Farmers also lack the means to store figs, which spoil quickly without cold storage facilities and gentle handling, and are not given incentive, training and capital to dry enough of the crop to reach more profitable markets. As a result, figs are largely absorbed in fresh form by local, low-value markets. In some places, over half of fig plantations have disappeared, and many figs rot while still on the branch.²

The negligence and, in some cases, destruction of fig forests brought on by missed economic opportunities presents a threat to the wealth of biodiversity found in Moroccan fig crops, and food and living security for rural people, who depend on figs and wood from fig trees to nourish themselves, provide heat in the winter and build shelters.³ The threat to fig crops is also a threat to wider Moroccan forest cover, which is already circumscribed to the Atlas Mountains, represents only ten percent of Morocco's total land area and is significantly threatened by drought.⁴

Though private sector institutions around the world are trying to sustain woodlands -- in 2011, organizations gave \$1.763 million to save Earth's forest -- Morocco is severely neglected in terms of funding, despite its majorly threatened forest diversity. In 2011, 83 percent of 2011's investments went to Latin America, 16 percent went to Asia and Oceania, and the entire continent of Africa received only 1 percent.

Opportunities for raised standards of living are further lost as farming families continue to plant barley and corn, thereby thwarting economic growth as these staples are planted on more than 70 percent of agricultural land, yet account for only 10-15 percent of agricultural revenue.

Some farmers, however, are transitioning to cash crops, commonly fruit trees and plants, to generate greater income. The Ministry of Agriculture suggests billions of trees and plants are needed to make an impact, but the high demand for young trees has made them too expensive for many families, and nurseries and skills to maintain them are not well dispersed. There is also a lack of value-added projects and support networks. Dominant barriers to realizing value-added and market opportunities include a pervasive need for irrigation infrastructure, a broad market, a processing line and vibrant associations and cooperatives to promote reinvestment and human development.

Hope may come from forest investors: those institutions that gave over a million dollars in 2011 were drawn to landholders, primarily of plantations, that were easily able to access markets, had potential for growth, possessed strong physical and institutional infrastructures, boasted a solid business environment and demanded low startup

¹ Potentialités et perspectives de développement de la figue sèche au Maroc." *Actes de la Journée Figuier*. Institut National de la Recherche Agronomique. June 27, 2002.

² Jédi, Lahcen. "Valorisation des figues de Taounate." Direction provinciale d'agriculture de Taounate. 2009.

³ ["State of the World's Forests: Enhancing the socioeconomic benefits from forests." Food and Agricultural Organization of the United Nations. 2014.](#)

⁴ ["Overview of Forest Pests: Morocco." Forestry Department, Food and Agriculture Organization of the United Nations. January 2007.](#)



costs. In light of these factors, the proposed organic figs project is a highly attractive investment opportunity: it opens up a low-cost, unique organic fig market in a stable, economically rising country. If the organic figs project is funded, rural communities - in partnership with the Moroccan-U.S. non-profit organization, the High Atlas Foundation (HAF), and its Moroccan-U.S. corporate subsidiary, the High Atlas Agriculture and Artisanal (HA³) - will eventually be in a strong position to pursue additional funding for future expansion.⁵

Hope is certainly coming from the Moroccan government, in partnership with HAF-HA³. The proposed project specifically addresses barriers, and has, through the HAF-HA³ model, been developing, expanding and solidifying them for the past 10 years. This model provides farmers, with a special emphasis on women and youth workers, with the revenue they need and job opportunities necessary to dismantle systemic rural poverty moderate that is a source of disenfranchisement also experienced in the rest of the Middle East and North Africa.

The Moroccan Ministry of Agriculture and High Commission of Water and Forestry partner with HAF by providing nursery land and technical support for a ten year period. The Ministry and Commission see the organic figs project as a way to pursue goals outlined in the government's Plan Maroc Vert and Environmental Charter, which set reforestation and agroeconomic targets and strategies for the coming decades, and calls specifically for the rejuvenation and creation of organic fruit tree crops and organization of their cultivators. The plan names figs as a special focus.⁶ Both organizations have indicated that fig crops in the Tangier-Tetouan region, which encompasses HAF's planned nursery, suffer from ageing, neglect and a lack of effective marketing. The Ministry and Commission see HAF's planned nursery in Tazroute as strengthening the area's agricultural economy, supporting rural households and honoring the tradition of fig cultivation, to which people in the area are deeply emotionally bound. Support of fig crops will also ensure that figs do not become extinct in the area, a threat that has already eradicated plum and pear varieties there.

As part of the partnership, HAF and the ministries aim to create a fig nursery, distribute saplings for free, create a scientific teaching garden with all regional fig varieties, train farmers in production and value-added processing techniques, and create a fig growers' cooperative to further explore opportunities in cultivation and marketing. Ten varieties of fig will be grown, and saplings will be distributed two and three years after seed planting.

The involved organizations plan to reach 35,000 beneficiaries (50 percent of whom will be rural women in Ouezzane province and the greater Tangier-Tetouan region), extend fig crops by 11,000 hectares and reach a 126 percent increase in fig production by 2020.⁷

While the Moroccan government is contributing land and technical support for the organic figs nursery, HAF is still seeking funding for the significant remainder, without which it cannot pursue the opportunities for rural Moroccans accessed by this project.

The environment, youth, women and rural families and communities are key targeted beneficiaries, and the profit generated through this project and model will allow individuals and their associations to improve their livelihoods and develop their country's economy.

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⁵ [Castren, Tuukka. "What Can Countries Do to Unlock Private Forest Investment?" PROFOR. April 28, 2014.](#)

⁶ ["Les fondements de la Stratégie Plan Maroc Vert." Agence pour le Développement Agricole. 2013.](#)

⁷ Internal talks. December 2014.

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1. Project Summary

1.1 Project description & status

The High Atlas Foundation is a non-profit organization registered in both the US and Morocco that focuses on empowering rural Moroccans and their communities through sustainable agriculture and community-led development projects in health, agriculture and education. HAF's status as a nonprofit organization necessitates the creation and partnership with the High Atlas Agriculture and Artisanal subsidiary to provide support for the commercial aspects of the value chain.

The Project Company of this business plan is the Morocco and US-registered High Atlas Foundation, with the support of HA³ regarding commercial processing and sale of organic product. By engaging in the purchase, processing, and domestic and international sale of organic seeds and fruit, HA³ then returns its net profits to Moroccan farmers and its own internal fund for reinvestment in sustainable development projects in agriculture, health, education, water efficiency, and social enterprises with women and youth.

Moroccan fig varieties - such as Homrana, Mounouacha, Lamdar Labiad, Lamdar Lakhel, Sbaa Ourkoud, Qoti Labiad, Qoti Lakhel, Ghouddane Rond, Ghouddane Oblong and Doukkar (caprifuier, or male fig), which have been identified for planting at the proposed nursery - are under threat due to a lack of adequate water supply, low profitability and untapped potential in value-added processing. Old fig plantations are dying out due to this negligence,⁸ and farmers are limiting new and existing crops to lands otherwise unsuitable for farming such as mountain slopes, which cannot easily be reached for commercial marketing purposes. Farmers also lack the means to store figs, which spoil quickly without cold storage facilities and gentle handling. They do not possess incentives to dry enough of the crop to reach more profitable markets and, as a result, figs are largely absorbed in fresh form by local, low-value markets.

On more accessible land, farmers are replacing existing cultivars with more resource, pesticide and labor intensive plant species like wheat, apples and pears. In some places, over half of fig plantations have disappeared, and many figs rot while still on the branch.⁹

At the same time, 80 percent of Morocco's 14 million rural inhabitants depend on revenue from the agricultural sector. This sector is minimally profitable, however, for farmers: rural Moroccans make up 43 percent of the country's 32 million population, and 75 percent of these households earn less than the national average.¹⁰ Marginalized within this disadvantaged group are women, who provide up to 35 percent of family farm labor, but own less than 5 percent of land and have greater challenges than men in obtaining credit in rural areas to expand their businesses and improve their livelihoods.¹¹

Youth also represent a marginalized group with untapped potential where agriculture is concerned. Nearly half of Moroccan youth are neither studying nor working. As youth comprise 30 percent of the nation's population, their unemployment represents a significant lost opportunity for Morocco's intellectual and economic potential, and a large risk regarding social instability and unrest.¹² Due to a lack of work opportunities in rural areas, youth are moving to cities, thereby increasing strain on rural and urban areas as their labor is lost and they come to rely on urban infrastructures while often still unemployed.¹³

⁸ INRA, *ibid.*

⁹ Jédi, *ibid.*

¹⁰ IFAD, *ibid.*

¹¹ Ghanem, *ibid.*

¹² Hoel, *ibid.*

¹³ FAO 2014, *ibid.*



Opportunities for raised standards of living are further lost as farming families continue traditions of planting barley and corn, thereby thwarting economic growth, as these staples are planted on more than 70 percent of agricultural land yet account for only 10-15 percent of agricultural revenue.

Some farmers, however, are transitioning to cash crops, commonly fruit trees and plants, to generate greater income. The high demand for young trees has made them too expensive for many families, and nurseries and skills to maintain them are not well dispersed. The Ministry of Agriculture suggests billions of trees and plants are needed to make a significant impact on rural families' lives. There is also a lack of value-added projects. Dominant barriers to realizing value-added and market opportunities include a pervasive need for irrigation infrastructure, broad market, a processing line, and federated associations to promote human development.

The proposed HAF-HA³ model specifically addresses these factors, and has been developing, expanding and solidifying them for the past 10 years. This model provides farmers, with a special emphasis on women and youth workers, the revenue and job opportunities necessary to moderate any uprising that could affect Morocco as it has the rest of the Middle East and North African region. Youth and women are key targeted beneficiaries, and the profit generated through this model allows these individuals and their associations to improve their own livelihoods and develop their country's economy.

Morocco is a world leader in fig production: in 2009, the country ranked among the world's top five fig producers (among Egypt, Turkey, Algeria and Iran), and, for dried fig production, climbed to second place globally in 2013, with 22,438 tons produced behind Turkey's 48,000.¹⁴ Figs grow especially well in Morocco due to the country's hot summers and full sun throughout the growing season. This climate ensures one to two bountiful crops a year, as long as fruit trees receive adequate water to ensure fruit does not drop early due to drought stress. Figs are harvested between June and October, depending on the region.¹⁵

Fig crops from Morocco may tap potential markets in the U.S. and E.U. Despite high U.S. production, for example, acreage dedicated to fig production has decreased by at least 5,000 acres in recent decades. This decrease, combined with stress on California's agriculture due to severe drought, presents a strong opportunity for Morocco to fill U.S. fig demand, especially in the U.S.'s large organic market.^{16,17,18}

Figs can be sold fresh, dried or processed into many value-added preventative care, medical, agricultural and household products. Organic fig production, especially, can provide great health advantages to local and international consumers. Figs' calcium content is higher than those of apples and grapes, and their potassium levels exceed those of apples and dates.¹⁹ Figs contain higher levels of phenolic compounds than red wine and tea, high levels of amino acids, and no fat or harmful cholesterol.^{20,21,22}

¹⁴ [FAOStat. "Figs Crops." Food and Agriculture Organization of the United Nations, Statistics Division. 2013.](#)

¹⁵ [Huntrods, Diane. "Fig Profile." Agricultural Marketing Resource Center. November 2013.](#)

¹⁶ [Wallander, Steven, and Jekanowski, Mark. "California Drought: Farm and Food Impacts." United States Department of Agriculture Economic Research Service. August 20, 2015.](#)

¹⁷ Huntrods, *ibid.*

¹⁸ [Greene, Catherine. "Organic Market Overview." United States Department of Agriculture Economic Research Service. April 7, 2014.](#)

¹⁹ [Javanmard, Majid, and Mahmoudi, Hossein. "A SWOT Analysis of Organic Dried Fig Production in Iran." Environmental Sciences, Autumn 2008.](#)

²⁰ Solomon, Anat et al. "Antioxidant Activities and Anthocyanin Content of Fresh Fruits of Common Fig (*Ficus carica* L.)." *Journal of Agricultural and Food Chemistry*. November 2006.

²¹ [Kamiloglu, Senem, and Capanoglu, Esra. "Investigating the in vitro bioaccessibility of polyphenols in fresh and sun-dried figs \(*Ficus carica* L.\)." International Journal of Food Science & Technology. November 2013.](#)



Figs can be used in epidermal, endocrine, reproductive, respiratory, anti-allergenic and anti-epileptic applications, and to counter conditions like hay fever, eczema, asthma and hives.^{23,24} According to Shamkant and colleagues (2014), *Ficus carica* presents “a promising candidate in pharmaceutical biology for the development/ formulation of new drugs and future clinical uses.”²⁵

Fig trees can quickly be propagated through fertilized seeds or hardwood cuttings from female trees, in which one to three-year-old branches are cut, kept in nurseries for three months to two seasons and planted at permanent locations.^{26,27} With enough time, a small number of fig trees can give rise to a large plantation at a minimal cost.

Small-scale Moroccan fig crops are important to the sustainability of fig crops and nutritional systems worldwide. Through growth in small cultivars and breeding between cultivated female and wild male trees, farmers uphold and propagate genetic diversity among figs, thereby providing bulwarks against diseases and effects of climate change that may affect fig cultivars of different sizes and regions.²⁸

HAF and HA³ have built strong and long lasting partnerships with Moroccan farmers through community-based participatory planning meetings and agricultural, health and training projects suggested and planned by rural communities. Furthermore, the “nursery to market” or “farm to fork” agricultural production line enables strategic planning for the steady growth of supply and critical components of the entire development process, including participatory planning, training, irrigation infrastructure, organic certification, value-added activities, etc. - all stages that are critical to overall success. Finally, the public, private and civil partnerships that are in place ensure shared responsibility, investment and risk, as well as commitment to the project - vital elements for long-term sustainability. Thus, the HAF-HA³ Enterprise is especially, and even uniquely, poised to realize these socio-economic and environmental opportunities in rural Morocco.

The Moroccan Ministry of Agriculture and High Commission of Water and Forestry have agreed to partner with HAF: in addition to providing nursery land for ten years of use, they are providing technical training support. In this partnership HAF-HA³ aims to create a fig nursery, distribute saplings for free, create a scientific teaching garden with all regional fig varieties, train farmers in production and value-added processing techniques, and create a fig growers’ association to further explore opportunities in cultivation and marketing. Ten varieties of fig will be grown, and saplings will be distributed three years after seed planting.

Through this nursery, HAF-HA³ plans to reach 35,000 beneficiaries (20 percent of whom will be rural women in Ouezzane province and the greater Tangier-Tetouan region), extend fig crops by 11,000 hectares and reach a 126 percent increase in fig production by 2020.²⁹

²² [Pandey, Kanti Bhooshan, and Rizvi, Syed Ibrahim. “Plant polyphenols as dietary antioxidants in human health and disease.” *Oxidative Medicine and Cellular Longevity*. November-December 2009.](#)

²³ [Basu, Shyamoshree and Bandyopadhyay, Amal Kumar. “Development and Characterization of Mucoadhesive In Situ Nasal Gel of Midazolam Prepared with *Ficus carica* Mucilage.” *AAPS PharmSciTech*. August 4, 2010.](#)

²⁴ Shamkant Bhaskar Badgujar et al. “Traditional uses, phytochemistry and pharmacology of *Ficus carica* : A review.” *Pharmaceutical Biology*. July 2014.

²⁵ Salman Shehzada. “Antimicrobial, Antioxidant and Phytotoxic Screening of *Ficus carica*.” *International Journal of Advances in Pharmaceutical Research*. December 2013.

²⁶ Shamkant, *ibid*.

²⁷ [Achtak, Hafid et al. “Traditional agroecosystems as conservatories and incubators of cultivated plant varietal diversity: the case of fig \(*Ficus carica* L.\) in Morocco.” *BMC Plant Biology*. February 18, 2010.](#)

²⁸ Achtak et al, *ibid*.

²⁹ Internal talks. December 2014.



While the Moroccan government is contributing land and training, HAF is seeking funding for the remainder, without which it cannot pursue the opportunities for rural Moroccans accessed by this project.

Since 2003, HAF has planted over 1,300,000 seeds and trees in eleven provinces of Morocco. We hope to further this success by pursuing fig agriculture with rural communities. By supporting small-scale fig cultivation, Moroccan farmers and HAF can have an impact on local communities, the nation and food security around the world.

Purpose: The purpose of this request for support is to provide the HAF-HA³ social enterprise with the necessary funds to support operations and bring organic Moroccan product to the international market. Fig crops must be planted, and fruits must be organically certified. Support of these measures would allow HA³ and HAF to create Morocco's first domestic organic fig market. Furthermore, this investment facilitates the revolving purchase and sale of the product, allowing the social enterprise to reach its full potential. Budget costs will include, but are not limited to: planting community-managed fig nurseries, securing organic certification, experiential training, cooperative-building, purchasing product from farming families, processing, marketing, shipping, and administrative costs.

Investments: To date, HAF board members, staff and volunteers are supporting HA³ efforts, in addition to the Lucky's Farmers Market, Baked by Melissa, and La Delicias Patisserie enterprises. HAF has received funding from various donors to support part of the actions of the HA³ social enterprise, in particular the US Government's Bureau of Oceans and International Environmental and Scientific Affairs (OES), National Endowment for Democracy, Paperseed Foundation and SEED Initiative. HAF continues to mobilize resources for the farm-end, while HA³ focuses on fork-end resources. The main and key funding challenges include: planting the seeds in nurseries; building water efficiency systems; purchasing the product from farming families; securing adequate and safe storage to house figs fresh, during drying and once packaged; sufficient resources to purchase quality packaging materials for local varieties of product, including training and maintenance for these materials; and funding to conduct an evaluation of operations to capitalize on lessons learnt.

HAF was the recipient of the SEED Initiative, a UN partnership fund to support sustainable development and green economies. This funding aided HA³ in business development and commercialization of organic crops by facilitating initial international market and domestic legal research. The US Government's OES support is helping Morocco to green its production of walnuts and almonds, creating a scalable model to develop green economy in Morocco and support future sustainable projects, including organic fig cultivation. NED enabled HAF to build cooperatives with local communities, and strengthen skills in participatory planning and project management

Partnerships: Public and private partnerships are the core to sustainability for the HAF-HA³ Enterprise for green growth and human development. Key partnerships include:

- **Communes:** Assist in coordinating activities to establish nurseries, coordinate with provincial government agencies, and assist communication and authorizations
- **Province:** Supports the implementation of projects and cooperatives financially through the INDH for new projects, determined by the communities during participatory planning
- **High Commission of Water and Forestry:** Advances human development with communities by lending land for community nurseries; may provides seeds and saplings to supplement project, including its expansion in other provinces; also assists in technical training
- **Ministry of Agriculture:** Supports technical training, could supplement processing facility with equipment and provides authorizations that assist with marketing of product



- **ONSAA:** The project will work closely with ONSAA on the facility design, layout, production process, audit inspections, and authorizations to enable domestic and international sale of products.
- **Ministry of Education and the Ministry of Youth and Sports:** Plant trees and botanical gardens with schools, conduct environmental training, and identify with communities new school construction and programmatic support
- **Current Local and Private Nurseries:** Provide technical support, seeds, and saplings; and share knowledge
- **Women's and Youth Associations and Cooperatives:** Participants in capacity-building workshops, drivers of project design and managers, maintainers of nurseries, supporters of new project development and implementation
- **ECOCERT:** Conducts product organic certification and audits, consults on areas for improvement, provides training on acquiring and maintaining certification
- **INRA (National Institute of Agricultural Research):** Provides technical agricultural support and expertise for project implementation
- **Kahina Giving Beauty:** Facilitates consultations with industry experts, supports the purchase of organic product and partners to increase HAF membership and nursery planting
- A participatory training program was launched as part of a new partnership with Al Akhawayn University in Ifrane. Students and community members gain participatory training. The HAF Training Centre at Hassan II Mohammedia University is a model for developing partnerships between the HAF and post secondary institutions.
- Buyers are identified and secured by Open Hands Marketing, based in New York and California; established buyers of HA³ affiliated products include Lucky's Farmers Market and MTP Investment Group.
- HAF-HA³ continue to build new partnerships to enhance the impact of the project and promote national and international sales.

Context:

Figs are grown mainly in southern oases, the northwest and Rif mountain zones. Fig cultivars are highly diverse and localized, with higher diversity in northern crops (in Ahtak's study, every site studied in the Rif produced around eight unique, localized types of fig). Trees are usually propagated through cuttings (cloning), and ensuing fruits are traditionally fertilized by hanging male fig fruits, often wild, in female trees.³⁰

Moroccan fig varieties – such as Homrana, Mounouacha, Lamdar Labiad, Lamdar Lakhal, Sbaa Ourkoud, Qoti Labiad, Qoti Lakhal, Ghouddane Rond, Ghouddane Oblong and Doukkar (caprifiguiier, or male fig), which have been identified for planting at the proposed nursery -- are under threat due to a lack of adequate water supply, low profitability and untapped potential in value-added processing. Old fig plantations are dying out due to this negligence,³¹ and farmers are limiting new and existing crops to lands otherwise unsuitable for farming, such as mountain slopes, which cannot easily be reached for commercial marketing purposes. Farmers also lack the means to store figs, which spoil quickly without cold storage facilities and gentle handling. They do not possess incentives to dry enough of the crop to reach more profitable markets and, as a result, figs are largely absorbed in fresh form by local, low-value markets.

On more accessible land, farmers are replacing existing cultivars with more resource and labor intensive plant species like wheat, apples and pears. In some places, over half of fig plantations have disappeared, and many figs rot while still on the branch.³²

³⁰ Ahtak et al, *ibid*.

³¹ INRA, *ibid*.

³² Jeddi, *ibid*.



To safeguard its biodiversity and encourage its agroeconomic market, Morocco has created National Frameworks for the community-based participatory planning method to be applied in all municipalities in an effort to advance sustainable development. Examples include the National Initiative for Human Development, the Communal Charter, decentralization, the Green Plan Morocco (Morocco's response to the Convention on Biological Diversity to meet the Aichi Biodiversity Targets by 2020), and frameworks for social justice and people's empowerment, especially for women and youth. Therefore, organic agriculture and value-activities that generate reinvestment in development can engine widespread participatory, democratic planning of development that would end the subsistence agriculture poverty trap for the great majority – 70 percent – of rural families.

1.2 Financial plan and credit support

The Moroccan Ministry of Agriculture and High Commission of Water and Forestry have agreed to partner with HAF by providing nursery land for a ten year period. The ministries see the organic figs project as a way to pursue goals outlined in the government's Plan Maroc Vert, which sets environmental and agroeconomic targets and strategies for the coming decades, and calls specifically for the rejuvenation and creation of fruit tree crops and organization of their cultivators. The plan names figs – specifically Homrana, Mounouacha, Lamdar Labiad, Lamdar Lakhel, Sbaa Ourkoud, Qoti Labiad, Qoti Lakhel, Ghouddane Rond, Ghouddane Oblong and Doukkar (caprifiguier, or male fig) varieties -- as a special focus.³³ The ministries have indicated that fig crops in the Tangier-Tetouan region, which encompasses HAF's planned nursery, suffer from ageing, neglect and a lack of effective marketing. The ministries see HAF's planned nursery in Tazroute as strengthening the area's agricultural economy, supporting rural households and honoring the tradition of fig cultivation, to which people in the area are deeply emotionally bound. Support of fig crops will also ensure that figs do not become extinct in the area, a threat that has already eradicated plum and pear varieties there.

As part of the partnership, HAF, the Ministry of Agriculture and the High Commission of Water and Forestry aim to create a fig nursery and scientific teaching garden with all regional fig varieties, distribute saplings for free, train farmers in production and value-added processing techniques, and create a fig growers' association to further explore opportunities in cultivation and marketing. Ten varieties of fig will be grown, and saplings will be distributed three years after seed planting.

The involved organizations plan to reach 35,000 beneficiaries (20 percent of whom will be rural women in Ouezzane province and the greater Tangier-Tetouan region), extend fig crops by 11,000 hectares and reach a 126 percent increase in fig production by 2020.³⁴ Though the Moroccan government is financing a large part of this project, HAF still seeks funding for a significant portion, without which this project cannot be realized.

Total budget costs include equipment and building of the nursery, which involve an irrigation system and fencing; acquisition of materials for the nursery and workforce; training of and future consultation with farmers; and training costs. Total costs come to \$318,900, with the Moroccan government providing 80 percent (\$255,120) and HAF taking responsibility for 20 percent (\$63,780). The cost breakdown is as follows:

³³ ADA 2013, *ibid.*

³⁴ Internal talks. December 2014.



Global budget	
Nursery: Equipment and building of the nursery: Irrigation system (building concrete reinforcement for basin, well deepening, pipes); 500,000 seeds and grafting; procurement and installation of fencing; tools and equipment	\$120,000
Capacity-building: Training with farmers and cooperative members, emphasizing women and youth: capacity-building in community planning facilitation, project and financial management, association and cooperative registration and procedures, nursery and orchard organic care, organic value-added processing, commercialization, training manuals and materials	\$180,000
Organic certification: audits and fees from NOP certified agency; soil, water and product tests; community, agricultural and environmental data collection; travel costs and logistics, miscellaneous other costs	\$60,000
Value-added processing: facility and storage construction; multi-player belt – feeding and discharge, hot-air dryer with control panel, coal furnace, packaging, installation; shipping, commercialization, sales; labor; ONSAA authorizations and compliance	\$150,000
Management costs: Project manager, training coordinator, nursery caretaker, specialized trainers, administrative support, communications	\$90,000
T o t a l requested	\$600,000
In-kind contribution: The High Commission of Waters and Forests (land for 10 years); Ministry of Agriculture (nursery training support); HAF (training design, office); communities (orchard planting and maintenance, guardian of nursery site)	\$80,000

Fresh and dried product will generate significant revenue and allow dividends to farmers and reinvestment in human development projects determined by the communities. The HAF works with farmers to uphold all organic standards and international requirements. HAF will focus on essential aspects such as community-based participatory planning, cooperative building, improved agricultural techniques, agricultural infrastructure, and organic farming and product marketing training, among others, that will ensure that a quality product is available in order to secure organic certification and conduct sales with the assistance of HA³. Additionally, HA³ hopes to secure funding and investments from private donors, persons and organizations.

2. Project Ownership and Management

2.1 Ownership of the project company

HA³ is an organizing agency, which generates greater income for farming families in disadvantaged areas and investment of profits for further community development. It is the social enterprise and subsidiary of the High Atlas Foundation (HAF). HAF is both a Moroccan organization and a US 501c3 non-profit (registered in New York, US). The nonprofit status of HAF necessitates the creation and partnership with the HA³ subsidiaries to manage the commercial aspects of the HAF-initiated agricultural development enterprises. HA³ US is a legally registered incorporation in New York and is fully (100 percent) owned by the 501c3 non-profit HAF. Congruently, there is the HA³ Morocco social enterprise subsidiary, also fully owned (100 percent) by the 501c3 non-profit HAF. Partnership agreements exist with 16 local Moroccan cooperatives to accumulate their crops to sell in large quantity on



organic markets, facilitated by the HAF-HA³ Enterprise. HAF has worked with these cooperatives for many years, and has helped local communities create the legally registered cooperatives.

2.2 Project Developers

The High Atlas Foundation – HAF and communities, with the social enterprise -- High Atlas Agriculture and Artisanal (HA³), create local initiatives that span the entire agricultural development cycle – from nurseries to market, farm to fork – of certified organic agricultural raw and value-added products. The added value is marketed as organic, fair-trade and environmentally and socially responsible – and it will generate a multiplied return by investing in education, health, water infrastructure, and business development, particularly for women and youth. In this way, coops act as engines of local development.

HAF's vision for Morocco is Morocco's vision for itself: it is the successful implementation of the ideals that form Morocco's own National Initiative for Human Development, Communal Charter, decentralization, binding of democracy-building with sustainable development, and frameworks for social justice and people's empowerment, especially for women and youth. HAF's and Morocco's vision sees public private collaboration at all levels of society to assist communities (villages and neighborhoods) in furthering their self-reliant development. It sees community members across the country coming together to identify and implement the projects they most need and want, which range depending on the opportunities they face. To implement this across Morocco, the nation needs to catalyze participatory planning and implement the project communities determine.

It is now a matter of action, and HAF is dedicated to helping Morocco seize its historic opportunity, and create a model for the region and world. Through the application of participatory development, HAF has had diverse and broadly sustainable achievements since it began operations in Morocco in 2003. HAF is dedicated to projects that local communities identify and implement, and from which they derive sustainable socio-economic and environmental benefits. Since its beginning, HAF has built on the Peace Corps experience of its founders.

Yossef Ben-Meir –Dr. Yossef Ben-Meir has been dedicated to the field of international development since he joined the Peace Corps as a volunteer in the High Atlas Mountains of Morocco in 1993. In 2000, he co-founded the High Atlas Foundation and served as president of the Board of Directors until January 2011, and since has been president of operations. Dr. Ben-Meir was a faculty member at the School of Humanities and Social Sciences of Al Akhawayn University in Ifrane, Morocco (2009-2010). In 2003, he was a research fellow at the American Institute of Maghreb Studies in Morocco. Dr. Ben-Meir was also an Associate Peace Corps Director (1998-99), managing the agriculture and environment program in Morocco. He writes and publishes on the subject of promoting human development in the Middle East and North Africa. Dr. Ben-Meir holds a Ph.D. in sociology from the University of New Mexico (2009), where he also taught, an M.A. in international development from Clark University (1997), and a B.A. in economics from New York University (1991).

2.3 Project Management

HAF President of Operations: Dr. Yossef Ben-Meir, as President of Operations, provides general oversight to HA³ and HAF staff, guides program staff to ensure activities adhere to HAF-HA³ mission and provides synergy to the whole food value chain process. The President of Operations/HAF CEO is the key link between HA³ and HAF, ensuring that product, activities, information, administrative and financial aspects smoothly transfer from one to the other. Dr. Ben-Meir relays developments to the HA³ and HAF Boards of Directors accordingly.

General Manager: Holds an M.B.A. or master's in a field related to management, agriculture, economics, finance or engineering. Reports to the President of Operations and oversees, develops and gathers reports on employees, projects and project sites to ensure conformity to the HAF-HA³ mission.



Technical Director: Holds M.B.A. or master's in similar field, with two years of experience in international trade. Works at domestic and regional levels. Manages the operations of the harvest, processing, certification, storage, packaging, and transportation of product.

Legal/Administrative Coordinator: Is a certified public accountant (Moroccan) with at least some experience in local government. Responsible for registration and local government communications. Works on a Moroccan regional, provincial and community level.

Commercial Director: Responsible for connecting with buyers of the products domestically and internationally, and assisting to create and implement a marketing strategy. Holds an M.P.A. or marketing degree; master's in another field with two years' experience in import/export. Works at national and international level markets.

Procurement and Accounts Manager: Manages distributor contracts, records expenses and revenue from exports, manages product insurance. Degree in management or four or more years with experience in bookkeeping. Works on all levels.

HA³ is further supported by program, development, administrative and finance staff in-kind from HAF.

3. Project Sector / Target Market / Economics

3.1 Sector and industry

Market Environment: Fig crops are in demand in northwestern and central western European countries due to the inability in those regions to grow the crop naturally; worldwide, fig is cultivated mainly in regions stretching from Afghanistan to Portugal.^{35,36} Sweeter figs do well in the Middle Eastern market, while European consumers demand varieties that have relatively lower sugar levels.³⁷ Regarding value-added processing, figs are most often exported dried and as paste by Turkey and the U.S., respectively.³⁸

Morocco is a world leader in fig production: in 2009, the country ranked among the world's top five fig producers (among Egypt, Turkey, Algeria and Iran), and, for dried fig production, climbed to second place globally in 2013, which 22,438 tons produced behind Turkey's 48,000. Morocco produces almost two thirds of North Africa's fig crop.³⁹ Figs grow especially well in Morocco due to the country's hot summers and full sun throughout the growing season. This climate ensures one to two bountiful crops a year, as long as fruit trees receive adequate water to ensure fruit does not drop early due to drought stress. Figs are harvested between June and October, depending on growing region.⁴⁰

The value of the fig market reached \$448 million globally in 2014, with a growth rate of 8 percent from 2007 to 2014. Eighty thousand tons of fruit were produced in 2007, compared to 117 thousand tons in 2014. Demand is spread globally as follows: the U.S. and Canada import small amounts of figs from South American countries. Asian countries -- specifically China, Japan and Taiwan -- are major markets for figs. Japan, for example, consumes more than 20,000 tons of fresh figs per year.

³⁵ [Polat, Aytakin and Caliskan, O. "Fruit characteristics of table fig \(Ficus carica\) cultivars in subtropical climate conditions of the Mediterranean region." New Zealand Journal of Crop and Horticultural Science. February 19, 2010.](#)

³⁶ Shamkant et al, *ibid*.

³⁷ Polat and Caliskan, *ibid*.

³⁸ Javanmard and Mahmoudi, *ibid*.

³⁹ FAOStat 2013, *ibid*.

⁴⁰ Huntrods, *ibid*.



In 2014, India (13 percent), Germany (13 percent), France (12 percent), the U.S. (7 percent) and the United Kingdom (5 percent) were the top destinations for fig imports, together making up 49 percent of total global imports.⁴¹

Moroccan figs can effectively tap in to European Union markets. Morocco is already an important supplier to this region as the top exporter to the EU of vegetables (30 percent of EU-imported vegetables come from Morocco, meaning the country far outpaces the next highest suppliers, Egypt (9 percent of market share) and Peru (4 percent of market share)).

Morocco does not make a list of the top 10 exporting countries when it comes to fruit export to the EU, but may find a niche there soon as EU demand for fresh fruit is consistently growing. In 2013, imports of fresh fruit increased to €12.6 billion, at 13.1 million tons, from €11 billion and 12.4 million tons two years prior. €2.6 billion worth of this fruit came from outside of the EU. This demand is affected by increasing health consciousness among customers and European weather that is, in some years, unfavorable to fruit agriculture. Consumers in Scandinavian countries, especially, are increasingly demanding exotic fruits and berries due to health aspects, and demand in Eastern Europe is growing as exotic fruits become more common there. EU consumers in general are beginning to place a premium on sustainable, socially-focused production and, among older consumers, health certifications like organic. They are especially interested in brand “storytelling” focused on fruits’ regional provenance and fruits marketed as “super foods,” a strategy that can be applied to market figs due to their high fiber content.⁴²

Moroccan figs may also reach markets in the Netherlands, which, with 2.1 million tons of fruit imported annually, is the biggest European importer outside of the EU.⁴³

Morocco is currently in its fifth round of negotiations for free trade status with the EU,⁴⁴ which began in March of 2000 with the Euro-Mediterranean Agreement.⁴⁵

Moroccan fig crops may tap markets in the U.S., with which it has a free trade agreement,⁴⁶ despite high production of figs there. The value of the U.S. fig crop, ranked sixth worldwide in 2009, was almost \$22 million in 2014, with most figs coming from California.⁴⁷ In 2012 alone, the California fig industry harvested 38,700 tons of the fruit, 90 percent of which went through processing. The crop’s value jumped 12 percent from the previous year, with exports traveling mainly to Canada, Mexico, Japan and Hong Kong.

Despite high U.S. production, demand for figs is high: in 2012, the country imported around \$17 million worth of dried and fresh figs, mainly from Turkey and Greece, with whole fig import value increasing by 53 percent from 2011. Meanwhile, acreage dedicated to fig production has decreased by at least 5,000 acres in recent decades. This decrease, combined with high U.S. demand and stress on California’s agriculture due to severe drought,

⁴¹ “World: Figs – Market Report. Analysis and Forecast to 2020.” IndexBox Marketing and Consulting. 2015.

⁴² Solomon, *ibid.*

⁴³ [“What is the demand for fresh fruit and vegetables in Europe?” Centre for the Promotion of Imports from developing countries. 2014.](#)

⁴⁴ [“Countries and regions: Morocco.” European Commission, Trade. June 30, 2015.](#)

⁴⁵ [“Euro-Mediterranean Agreement.” Official Journal of the European Communities. March 18, 2000.](#)

⁴⁶ [“Morocco Free Trade Agreement.” Office of the United States Trade Representative, Executive Office of the President. July 11, 2013.](#)

⁴⁷ [Perez, Agnes, and Plattner, Kristy. “Fruit and Tree Nuts Outlook: March 2015.” United States Department of Agriculture. March 2015.](#)



presents a strong opportunity for Morocco to fill U.S. fig demand, especially in the U.S.'s large organic market.^{48,49,50}

Target Market (Customer Analysis):

Local Growers Marketing in the Moroccan market is in bulk and disregards quality, making it adverse to quality control, organic certification, and export. The fig sector is dominated by local marketing, which is constrained in sectorial development by poor distribution. Thus, the circuit differs from one region to another, with farmers unaware of their product destination or the exact price paid by consumers. Therefore, wholesalers have a high rate of profit margin. Marketing to farmers must address this distrust, but with the right message, HA³ can present farmers with a clear and fixed price through a direct buy of an entire crop.

International Buyers Important sustainable development progress has and will continue to be made by utilizing our strategic partners for commercial planning, business process and implementation, as HAF-HA³ Enterprise partnerships are built with Moroccan and international organic fig buyers.

International consumers Targeting organic consumers, in particular, is expected to bring about higher profit margins: organic consumers are willing and expected to pay a higher price in return for high quality, natural food produced by an environmentally conscious and socially focused company. Furthermore, US consumers are demanding year-round supply at reasonable prices, which the current market supply is unable to provide.

Competitor Analysis:

The private buyers market is a circuit with several actors, including producers, collectors, wholesalers and semi-wholesalers (local and national). The producers are the first actors in the distribution chain; the marketing of their products is an extension of their production activities. They are farmers who own their farms and produce figs often employing seasonal labor. They may also be members of a group with shared economic interests.

Local Collectors are found mainly in the areas of production, and are buyers in the local area who undertake the initial task of assembling nuts. These collectors have close relationships with producers (parents, friends, etc.) in order to retain their supplies and sell them at local souk markets. They use their own capital, equipment and commercialization procedures. They sell their product to semi-wholesalers.

Semi-wholesalers' function is to buy figs from producers or collectors at the local markets and re-sell them to local wholesalers. They can market the product outside the local or provincial souk markets. They differ from the local wholesalers by the smaller amounts that they purchase.

Local wholesalers are traders from the region, and are sometimes themselves producers of figs. They can buy the majority of fig product from collectors, but can also sometimes buy directly from producers. They have sufficient financial resources to collect large amounts of fig product and sell to domestic wholesalers in large Moroccan cities, who, in turn, sell product to wholesalers and distributors of pastries.

National wholesalers are based in large Moroccan cities, often identified as the "great middle". They buy figs from local wholesalers and sell their products in the domestic market to distributors, processors and exporters.

⁴⁸ Wallander and Jekanowski, *ibid.*

⁴⁹ Huntrods, *ibid.*

⁵⁰ Greene, *ibid.*



3.2 Product and Services

HA³ will deliver organic, zero-waste, and high quality wholesale figs to international and domestic markets. The HA³ opportunity lies within the US and the EU, where there is a large demand for organic figs and fig-based products.

In addition, the unique partnership with HAF secures farmer training, nursery capacity-building and organic certification for the HA³ social enterprise. Regular and direct purchase of a municipality's fig yield, as well as the redistribution of net profit, supports family farmers, as well as HAF's agricultural and human development projects. This project covers the entire food value chain, including: 1) cooperative building with farmers and associations, including training to support enterprise administration and management; 2) building community-managed tree and medicinal plant nurseries and irrigation infrastructure (terracing, basins, wells, piping); 3) training local farmers in organic techniques related to nursery and orchard planting and maintenance; 4) securing organic certification for products; 5) marketing and competitive sale of the products to achieve maximum profit; 6) distribution of net profit generated to family farmers for added financial gain and to HAF to provide a revenue stream for community projects and dislocated persons from the HA³ intervention; and 7) reinvesting in agricultural and human development projects, such as in education, health, women and youth empowerment, and experiential training in participatory democratic planning of development and project management.

HAF will retain full control and management of the entire process while conducting all activities, excluding the product purchase from local farmers and sale to national or international markets. The HAF-HA³ collaboration will address structural deficiencies in rural entrepreneurship and contribute more effectively to global markets.

A purchase through HA³ is a zero-waste reinvestment in agricultural and human development projects, such as in education, health, women and youth empowerment, and experiential training in participatory democratic planning of development and project management.

Triple Bottom Line Impact:

Social Dimension:

Number-type of environmental infrastructure incorporated in communities; measured by number of construction products; measured by invoices.

Number of farmers with access to processing and packaging facilities; measured by the number of farmers.

Number of storage facilities serving the communities; measured by the number of storage facilities; measured by construction invoices.

Number of cooperatives receiving capacity building assistance to export; measured by the number of cooperatives; measured by cooperative registration records from the Provincial Department of Agriculture.

Environmental Dimension:

Safeguarding of fig crop diversity, specifically the Homrana, Mounouacha, Lamdar Labiad, Lamdar Lakhal, Sbaa Ourkoud, Qoti Labiad, Qoti Lakhal, Ghouddane Rond, Ghouddane Oblong and Doukkar (caprifiguier, or male fig) varieties; measured by number of fig trees from each variety.

Number of people (disaggregated by sex) receiving training in natural resource; measured by the number of individuals; measured by the participant lists from training rosters.



Number/type of organic nurseries established; measured by the number of nurseries; measured by invoices/grant reports.

Number of trees/medicinal plants cultivated; measured by the number of trees/plants; measured by seed purchase invoices and the number of cuttings purchased.

Rate per Annum of certified organic hectares; measured by hectares certified per province; total hectares of figs per province; measured by agricultural records via Caid.

Economic Dimension:

Value-added agricultural production as a percentage of total agricultural production; measured by organic export revenue; total agricultural export revenue.

Percentage of profits reinvested in agricultural and other projects; measured by monetary reinvestment.

Evidence of expanded organic agricultural enterprise to other provinces of Morocco; measured by number of new initiatives created per province.

Expansion of fig supply through focus on threatened fig varieties; measured by tons of sellable fruit produced by nursery.

Increase in sales; measured by total sales from crop of threatened fig varieties.

Number of cooperatives receiving capacity building assistance to export; measured by the number of new enterprises receiving assistance.

3.3 Project Economic and Technical Specifications

Marketing Strategy:

Preliminary market and distribution strategy research has found that figs can be sold fresh, dried or processed into many value-added preventative care, medical, agricultural, household and cosmetic products.

Organic fig production, especially, can provide great health advantages to local and international consumers. Figs, which constitute a significant part of the heart-healthy and cancer-preventative Mediterranean diet, contain high doses of manganese and fiber, making them effective against colon cancer and in digestive system regulation. Dried figs, especially, have higher levels of crude fiber than other common fruits. They are effective in regulation of blood sugar and cholesterol levels, as well as weight loss.^{51,52} They provide smaller doses of vitamins B6 and K (13 percent of the U.S. recommended daily value), E (10 percent), B1 (9 percent) and A (6 percent), which aid against problems like hypertension, inflammation and cancer.^{53,54} Figs, especially the Mission variety, contain high levels of flavonoids (with flavonoid content increasing according to darkness in color), antioxidants (especially anthocyanins), and polyphenols, which aid against ultraviolet radiation, cancer, endothelial (blood vessel) dysfunction and other threats to health.

⁵¹ Solomon, *ibid.*

⁵² Shehzada, *ibid.*

⁵³ Huntrods, *ibid.*

⁵⁴ Shamkant et al, *ibid.*

Figs contain, per 100 gram serving, high doses of iron (30 percent of the U.S. daily recommended value), calcium (15.8 percent) and potassium (14 percent). Their calcium content is higher than that of apples and grapes, and their potassium levels exceed those of apples and dates.⁵⁵ Figs contain higher levels of phenolic compounds than red wine and tea, high levels of amino acids, and no fat or harmful cholesterol. Antioxidant content in dried purple figs changes little when compared to that of fresh fruits.^{56,57,58}

Due to their health benefits and high natural sugar content (fresh figs contain about 3.7 grams of sugar per 100 gram serving, while dried figs have about 2.8 grams), organic figs can be marketed as a natural, healthy sweet food for children.⁵⁹ Dried figs are high in antioxidants that are not destroyed by human digestion, and can therefore also be marketed as a health food for adults.⁶⁰

Often, figs are sold canned and processed into fig paste. They are also marketed powdered, diced, sliced, and boiled into jam and concentrate, which can serve as a substitute for sucrose and corn syrups. They figure into cookies and snacks.⁶¹ In the U.S., figs have been processed into spreads, preserves, additions to agave syrup and caramels, and sold covered in chocolate.⁶²

Figs, which have not been shown to have toxicity at any levels in animals, can be used in medical applications, as well.⁶³ In India, fig has traditionally been used to treat digestive, endocrine, reproductive and respiratory problems. Fig extracts are applied for hemorrhoids, colic, loss of appetite, sore throats and coughs, as well as against infections in the gastrointestinal- and urinary tracts and hemorrhage.⁶⁴ Practitioners of India's Unani medicine use figs as mild laxatives and to treat inflammation and obstructions in liver and spleen conditions. In India, fig fruits are traditionally used against leprosy, nose bleeds, paralysis and chest pain, while roots are used against ringworm. Leaves treat dermatitis and can be used as animal fodder, and seeds are ground into body lubricant. Latex is traditionally used to curdle milk in cheese making and to counter anemia. In Palestine, figs are recommended to treat kidney stones. Syrup made from figs can relieve constipation.

Fig latex has been shown to contain phytosterols, which block the body's absorption of cholesterol and can treat skin conditions like ulcers, sores and warts, as well as insect bites and stings. In one study, latex application was found to be only slightly less effective against warts than cryotherapy, and induced no side effects.

Phytosterols are used in sunscreen. Figs' quercetin can be isolated and used in anti-allergenic applications, to counter conditions like hay fever, eczema, asthma and hives, and as a chemopreventive product against cancer, to stop proliferation of tumor cells. Fig extracts can be applied as antipyretics (fever reducers), anti-spasmodics and anti-helminthics (used to counter parasites), and to reduce liver damage and increase red blood cell count. Due to their high soluble fiber content, edible fig products can also be marketed as a weight loss aid.⁶⁵

⁵⁵ Javanmard, *ibid.*

⁵⁶ Solomon, *ibid.*

⁵⁷ Kamiloglu and Capanoglu, *ibid.*

⁵⁸ Pandey and Rizvi, *ibid.*

⁵⁹ Polat and Caliskan, *ibid.*

⁶⁰ Shamkant et al, *ibid.*

⁶¹ Huntrods, *ibid.*

⁶² Fabricant, Florence. "Food Stuff; Figs to Spread, Nibble and Even to Drizzle." *New York Times*. June 30, 2004.

⁶³ Shamkant et al, *ibid.*

⁶⁴ [Shukranul, Mawa, et al. "Ficus carica L. \(Moraceae\): Phytochemistry, Traditional Uses and Biological Activities." Evidence-Based Complementary and Alternative Medicine. June 10, 2013.](#)

⁶⁵ Shamkant et al, *ibid.*

Fig mucilage can be used in anti-spasmodic nasal gels, which counter epilepsy more effectively than oral applications and nasal sprays, aid respiration and prevent nasal cavity dryness in people with nasal complaints. In one study, mucilage performed better than the synthetic polymers HPMC and Carbopol 934, which are often used in nasal gels, in terms of rheological (plastic flow), mechanical and mucoadhesive properties, making them a valid and also more bioavailable, and therefore cheaper, alternative to those polymers. Nasal gels made with organic fig extract can be marketed as “natural” and “organic.”⁶⁶

Fig extracts have been found to counter bacteria most commonly found in throat infections (*Streptococcus gordonii*, *Streptococcus anginosus*, *Prevotella intermedia*, *Aggregatibacter actinomycetemcomitans*, and *Porphyromonas gingivalis*), and can therefore be used as antibacterials in medicines. Extracts can also counter *aedes aegypti* (mosquito) larvae, which can spread chikungunya, dengue and yellow fevers, and nematode roundworms (*Meloidogyne incognita*).⁶⁷

According to Shamkant and colleagues (2014), *Ficus carica* presents “a promising candidate in pharmaceutical biology for the development/ formulation of new drugs and future clinical uses.”⁶⁸

Fig extracts are among the only potential organic pesticides available to replace (or use in combination with reduced) copper applications, which are used most often to control disease among tomato and kiwi crops and that present a phytotoxic (plant poison) risk to soil. In one study on tomato crops, fig extracts reduced severity and spread of bacterial speck, spot and canker caused by *pseudomonas syringae*, *xanthomonas vesicatoria* and *clavibacter michiganensis* by 22 percent and 38 percent, respectively, when compared to copper. Fig extract applications may be increasingly in demand for organic agriculture over the next years, as cupric salts are being increasingly restricted by Europe.⁶⁹ Figs can also counter *pseudomonas aeruginosa*, another disease causer in plants and animals, prevent foodborne illness carried by *bacillus cereus* and control the growth of duckweed, an invasive species in some areas.^{70,71,72}

Figs have applications in household and cosmetic areas, as well. Fig latex is used in dishwashing detergent and leaves are used in perfume and candles. Figs are humectant, and can therefore be used as moisturizers in soap and lotions.^{73,74}

HAF is developing social and environmental responsibility benefits to the brand by: 1) the zero waste campaign; 2) exploring the possibility to market the trees as offsetting the emissions of transporting their products to markets; 3) gaining Fair Trade status for the nuts and 4) returning net profits to the farmers.

3.4 Operations

Fresh figs must be marketed quickly after harvest due to their short postharvest lifespan (seven to 10 days) without preservatives, with postharvest decay depending on amount of skin damage at harvest time. Deficit

⁶⁶ Basu and Bandyopadhyay, *ibid.*

⁶⁷ [Dengue Branch, San Juan. “Dengue and the Aedes aegypti mosquito.” Centers for Disease Control and Prevention.](#)

⁶⁸ Shehzada, *ibid.*

⁶⁹ [Balestra, G.M., et al. “Antibacterial effect of Allium sativum and Ficus carica extracts on tomato bacterial pathogens.” Crop Protection. June 9, 2009.](#)

⁷⁰ Shehzada, *ibid.*

⁷¹ [“Lemna minor.” Missouri Botanical Garden.](#)

⁷² Shamkant et al, *ibid.*

⁷³ Shehzada, *ibid.*

⁷⁴ Huntrods, *ibid.*

irrigation can reduce this damage.^{75,76} Preharvest application of methylcyclopropene can somewhat delay ripening of figs postharvest.^{77,78} Farmers can also fog chlorine dioxide over postharvest figs to reduce decay, microorganisms, fungi and bacteria.⁷⁹ Calcium chloride dips (96 percent H₂O and 4 percent calcium chloride) prevent ripening and weight loss in postharvest figs by binding with fruit's pectin and increasing fruit skins' thickness. This, in turn, decreases shriveling, and therefore lengthens storage time to 14 days. Calcium chloride also reduces aerobic bacteria, mold and yeast.⁸⁰ CO₂ is a good preservative, as well.⁸¹ Calcium chloride and chlorine dioxide are approved by the USDA for use on organic crops.⁸²

To further lengthen storage time, fresh figs must be kept between 8 and 1°C (figs do not suffer from chilling injury) and at 90-95 percent humidity. Figs cannot be stored during the off-season.⁸³

Polyethylene film and plastic trays in a CO₂-heavy atmosphere extend fresh figs' postharvest life longer than keeping them stored unwrapped.⁸⁴

Figs can be sundried on grass or tarps.⁸⁵ Dried figs are vulnerable to insects, microbial deterioration and mycotoxins (poisonous fungi). One study found that one gram of magnesium phosphide effectively warded off these effects for two months.⁸⁶

3.5 Facility and Equipment

To most benefit Moroccan and international markets, HAF must have access to a storage facility capable of keeping figs chilled at 8 to 1°C over the harvesting period. It must also have access to calcium chloride salts, chlorine dioxide, CO₂ or methylcyclopropene to preserve the fruit. CO₂ is an especially cost-effective method.^{87,88,89,90,91}

⁷⁵ Kamiloglu and Capanoglu, *ibid.*

⁷⁶ [Kong, M, et al. "Fruit skin side cracking and ostiole-end splitting shorten postharvest life in fresh figs \(*Ficus carica* L.\), but are reduced by deficit irrigation." *Postharvest Biology & Technology*. November 2013.](#)

⁷⁷ [Freiman, Ze, et al. "Preharvest application of 1-methylcyclopropene inhibits ripening and improves keeping quality of 'Brown Turkey' figs \(*Ficus carica* L.\)." *Scientia Horticulturae*. May 2012.](#)

⁷⁸ [Ozkaya, O et al. "Assessment of the Potential of 1-Methylcyclopropene Treatments to Maintain Fruit Quality of the Common Fig \(*Ficus carica* L. cv. 'Bursa Siyahi'\) during Refrigerated Storage." *Notulae Botanicae Horti Agrobotanici Cluj-Napoca*. July 2014.](#)

⁷⁹ [Karabulut, Oa et al. "Evaluation of the use of chlorine dioxide by fogging for decreasing postharvest decay of fig." *Postharvest Biology & Technology*. June 2009.](#)

⁸⁰ [Irfan, P.K., et al. "Calcium chloride extends the keeping quality of fig fruit \(*Ficus carica* L.\) during storage and shelf-life." *Postharvest Biology and Technology*. February 2013.](#)

⁸¹ [Sen, F, et al. "Effects of the post-harvest application of methyl bromide alternatives on storage pests and quality of dried fig." *Turkish Journal of Agriculture & Forestry*. August 2009.](#)

⁸² ["The National List of Allowed and Prohibited Substances." *National Organic Program*. September 24, 2015.](#)

⁸³ Irfan et al, *ibid.*

⁸⁴ Bouzo, Carlos et al. "Effect of Different Packaging Materials on Postharvest Quality of Fresh Fig Fruit." *International Journal of Agriculture & Biology*. 2012.

⁸⁵ Kamiloglu and Capanoglu, *ibid.*

⁸⁶ Sen et al, *ibid.*

⁸⁷ Freiman et al, *ibid.*

⁸⁸ Ozkaya et al, *ibid.*

⁸⁹ Karabulut et al, *ibid.*

⁹⁰ Irfan et al, *ibid.*

⁹¹ Sen et al, *ibid.*



It must also have tree-to-facility transport and market packaging materials. Polyethylene film and plastic trays in a CO₂-heavy atmosphere extend fresh figs' postharvest life longer than keeping them stored unwrapped.⁹²

Seeds and cuttings can easily and quickly (propagation can take as little as four to five months) be obtained from wild fig cultivars.⁹³

3.6 Supply and Distribution

HA³ will work with 1,000 rural Moroccans to support the cultivation of 20,000 fig trees a year in Arbaoua, Tazroute, due to the strong needs of the communities and environment there, as well as the wealth of local knowledge among fig farmers.

In rural parts of the North, which produces 85 percent of Morocco's fig crop, the fig market provides many jobs and an important source of income.⁹⁴ Increased fig production is a profitable and low-maintenance way to inject poverty-stricken communities in the North with enough economic success to improve standards of living.

In addition to providing economic safety to rural populations in Tazroute, fig crops can also contribute to nutritional security worldwide, as the genetic diversity created by traditional Moroccan fig farming, in which female domestic figs are selectively bred with wild male varieties improves fig caliber and taste, raises sugar levels and increases efficiency of adaptation to surrounding environments. In the North, farmers have well adapted fig trees to poor soil and little water. Figs are bred to contain as little water as possible, thereby making them more readily suitable for drying.⁹⁵ This diversity makes fig trees less susceptible to shocks that may wipe out more homogenous crops.⁹⁶

Despite this wealth and their ability to survive without much moisture, Moroccan fig crops are under threat due to a lack of adequate water supply, low profitability and untapped potential in value-added processing. Old fig plantations are dying out due to this negligence,⁹⁷ and farmers are limiting new and existing crops to lands otherwise unsuitable for farming, such as mountain slopes, which cannot easily be reached for commercial marketing purposes. Farmers also lack the means to store figs, which spoil quickly without cold storage facilities and gentle handling. They do not possess incentives to dry enough of the crop to reach more profitable markets and, as a result, figs are largely absorbed in fresh form by local, lower-value markets.

On more accessible land, farmers are replacing existing cultivars with more resource- and labor-intensive plant species like wheat, apples and pears. In some places, over half of fig plantations have disappeared, and many figs rot while still on the branch.⁹⁸

To ensure that fig crops are protected and that they reach their full economic potential in aiding rural communities, HA³ aims to encourage farmers to cultivate figs through a nursery in partnership with the Moroccan Ministry of Agriculture and the High Commission of Water and Forestry. The Ministry and Commission see the organic figs project as a way to pursue goals outlined in the government's Plan Maroc Vert, which sets environmental and agroeconomic targets and strategies for the coming decades, and calls specifically for the rejuvenation and creation of fruit tree crops and organization of their cultivators. The plan names figs as a special

⁹² Bouzo et al, *ibid.*

⁹³ Shukranul et al, *ibid.*

⁹⁴ Jeddi, *ibid.*

⁹⁵ INRA, *ibid.*

⁹⁶ Ahtak et al, *ibid.*

⁹⁷ INRA, *ibid.*

⁹⁸ Jeddi, *ibid.*



focus.⁹⁹ The Ministry and Commission have indicated that fig crops in the Tangier-Tetouan region, which encompasses HAF's planned nursery, suffer from ageing, neglect and a lack of effective marketing. They see HAF's planned nursery in Tazroute as strengthening the area's agricultural economy, supporting rural households and honoring the tradition of fig cultivation, to which people in the area are deeply emotionally bound. Support of fig crops will also ensure that figs do not become extinct in the area, a threat that has already eradicated plum and pear varieties there.

As part of the partnership, HAF, the Ministry and Commission aim to create a fig nursery, distribute saplings for free, create a scientific teaching garden with all regional fig varieties, train farmers in production and value-added processing techniques, and create a fig growers' association to further explore opportunities in cultivation and marketing. Ten varieties of fig will be grown, and saplings will be distributed three years after seed planting.

The involved organizations plan to reach 35,000 beneficiaries (20 percent of whom will be rural women in Ouezzane province and the greater Tangier-Tetouan region), extend fig crops by 11,000 hectares and reach a 126 percent increase in fig production by 2020.¹⁰⁰

Eighty percent of figs will be dried, and both fresh and dried products will be destined for export. The nursery will hopefully serve as a place to begin medium and long term supply expansion of Moroccan figs, thereby tapping into a vast and as yet unrealized opportunity in creating a domestic organic figs market in Morocco.

4. Legal, Economic and Political Environment and Government Participation

4.1 Licenses, Permits and Legal Regime

The United States Federal Drug Administration (FDA) requires a "Prior Notice of Imported Foods" electronic form filled out per the following: "The Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (the Bioterrorism Act) directs the Food and Drug Administration (FDA), as the food regulatory agency of the Department of Health and Human Services, to take additional steps to protect the public from a threatened or actual terrorist attack on the US food supply and other food-related emergencies."

The U.S. Customs and Border Patrol requires entry documents within 15 days of the product's arrival in the U.S. These documents include a "Carrier's Certificate" (found in the footnote link); Entry Manifest or Application and Special Permit for Immediate Delivery; evidence of the right to make entry; a commercial or pro forma invoice for every single or assembled shipment(s); list of packaging; and documents on duty assessments and statistics (these last are automated processes). A bond must also be posted to pay for any costs incurred during the import process, and evidence of this bond must be shown to CBP officials.

Entry packages are returned to HAF, which will then submit an entry summary.¹⁰¹

HA³ has created the Prior Notice of Imported food account, and follow-up work requires inputting specific vendor and port of entry information as it becomes available.¹⁰²

⁹⁹ ["Les fondements de la Stratégie Plan Maroc Vert." Agence pour le Développement Agricole. 2013.](#)

¹⁰⁰ Internal talks. December 2014.

¹⁰¹ ["Importing into the United States: A Guide for Commercial Importers." U.S. Customs and Border Patrol. 2006.](#)



The European Union requires a Single Administrative Document to be given to customs authorities. Food business operators must register themselves as importers, monitor their food's safety and observe good hygiene during production.¹⁰³

According to USDA records, no fresh Moroccan figs have been exported to the U.S.¹⁰⁴

Fresh and dried figs will be exported to the US and EU. If figs do not meet requirements, they will be disposed of on-site or given to charities.

Organic Certification Criteria:

The rules and practices for organic farming are codified into Moroccan law No. 39-12 and USDA Organic Regulations, Code of Federal Regulations, Title 7 Section 205.^{105,106} Mentioned under these laws are the organic standards, including prohibited practices, requirements, and the National List of Allowed and Prohibited Materials. Ecocert, present in Morocco, is partnering with HA³ to provide the added value of organic certification for local farmers. Each year, HAF will assist and guide farmers to obtain organic certification.

Ultimately, the responsibility is for the farmers, with training, to ensure and reinforce best practices of organic farming methods. By building upon lessons learnt, the farmers will be able to preserve the certification each year. Farmers are required to sign commitment letters to practice organic agricultural techniques. These techniques, laid out in a HAF prepared manual, include techniques to preserve soil and water, protect trees from pests, properly harvest crop, store harvest and avoid contamination. The manual detailing this information is 23 2015-01, which is provided in hard copy to each and every farmer, completely revised periodically (including providing hard copies) and diffused by HAF-trained trainers (local community members) through training and hands-on assistance. Land and book records will be supervised by Ecocert to validate these organic practices and the product quality. Warehouses and storage units, processing factories and shipment methods all have specific means in which they must be conducted to ensure certification. HA³ has hired staff to specifically address these regulations in close collaboration with Ecocert.

4.2 Economic/Political Climate

According to Morocco's Agency for Agricultural Development, 80 percent of the country's 14 million rural inhabitants depend on revenue from the agricultural sector. Rural Moroccans make up 43 percent of the country's 32 million population, and 75 percent of these households earn less than the national average.¹⁰⁷ Women provide up to 35 percent of family farm labor, but own less than 5 percent of land and have greater challenges than men in obtaining credit in rural areas to expand their businesses and improve their livelihoods.¹⁰⁸

Youth also represent a marginalized group with untapped potential where agriculture is concerned. Nearly half of Moroccan youth are neither studying nor working. As youth comprise 30 percent of the nation's population, their unemployment represents a significant lost opportunity for Morocco's intellectual and economic potential, and a large risk regarding social instability and unrest.¹⁰⁹ Due to a lack of work opportunities in rural areas, youth move

¹⁰² ["Prior Notice of Imported Foods." U.S. Food and Drug Administration. January 8, 2015.](#)

¹⁰³ ["EU Requirements for fresh Fruit and Vegetables." European Mediterranean Institute. April 27, 2007.](#)

¹⁰⁴ ["Fruits and Vegetables Import Requirements - Morocco." United States Department of Agricultural Animal and Plant Health Inspection Service. September 30, 2015.](#)

¹⁰⁵ [Boussaid, Mohammed. "Bulletin Officiel." Chef du Gouvernement, Maroc. March 10, 2014.](#)

¹⁰⁶ ["Electronic Code of Federal Government Regulations." U.S. Government Publishing Office. September 29, 2015.](#)

¹⁰⁷ IFAD, *ibid.*

¹⁰⁸ Hafez, *ibid.*

¹⁰⁹ Hoel, *ibid.*



to cities, thereby increasing strain on rural and city areas as their labor is lost and they come to rely on urban infrastructures while still unemployed.¹¹⁰

Farming families traditionally plant barley and corn, thwarting economic growth as these staples are planted on more than 70 percent of agricultural land, yet account for only 10-15 percent of agricultural revenue.

Farmers are transitioning to cash crops, commonly fruit trees and plants, to generate greater income. The high demand for young trees has made them too expensive for many families, and nurseries and skills to maintain them are not well dispersed. The Ministry of Agriculture suggests billions of trees and plants are needed to improve rural families' lives. There is also a lack of value-added projects. Dominant barriers to realizing value-added and market opportunities include a pervasive need for irrigation infrastructure, broad market, a processing line, and federated associations to promote human development.

The proposed HAF-HA³ model specifically addresses these factors, and has been developing, expanding and solidifying solutions for the past 10 years. This model provides farmers, with a special emphasis on women and youth workers, the revenue they need and job opportunities necessary to moderate any uprising that could affect Morocco as it has the rest of the Middle East and North African region. Youth and women are key targeted beneficiaries, and the profit generated through this model allows their associations (and themselves) to improve their own livelihoods and develop their country's economy.

4.3 Government/Multilateral Participation

The goals and mission of the HAF-HA³ Social Enterprise are perfectly aligned to those of the Government of Morocco. The Kingdom has set forth a Green Plan, which develops the Moroccan agro-food industry through sustainable techniques, ensuring conservation efforts and promoting workforce development. By aspiring to develop this model, HAF-HA³ are increasing organic trade and improving environmental policies that support the Free Trade Agreement's environmental provisions and the policies set forth by Morocco's Environmental Charter, which are instituted in Morocco's Green Plan. This model strengthens relationships between US and Moroccan authorities, non-governmental actors, the private sector, and local communities by advancing the organic output for export to the US and increasing the gross domestic product, a goal stressed by Morocco's Green Plan. HAF's participatory approach fulfills the provisions of Morocco's Constitution, Municipal Charter 24 2015-03-01, the National Initiative for Human Development, Environmental and Trade Frameworks, and gender and youth empowerment objectives.¹¹¹

Morocco-US free trade abolishes customs on US imports from Morocco for certain products. The HA³ goal in this regard is to foster Moroccan economic growth and improve quality of life by advancing bilateral US-Moroccan trade relations through an agricultural development model, which inextricably bounds organic processes to proactive rural eco-management systems. This model promotes US Government efforts in Arab Spring countries to provide jobs, economic growth and stability. The HAF-HA³ model is a successful example of what can be developed in other Arab countries. Furthermore, it can be used as a model for successful social entrepreneurship to raise rural farmers out of poverty. Current HAF efforts extend to Burkina Faso with the Organization of Islamic Cooperation and Jordan with the Al Baqua Technical University to implement this Green Economy model, proposals pending. The Moroccan Ministry of Agriculture and High Commission of Water and Forestry have given HAF-HA³ full use of land in Tazroute that will be used for the organic fig nursery for a five to ten year period, and has done so as a way to pursue goals stated in the government's agricultural and environmentally-focused Plan Maroc Vert. The Ministry and High Commission see HAF's planned nursery in Tazroute as strengthening the area's agricultural economy,

¹¹⁰ FAO 2014, *ibid.*

¹¹¹ ["Sustainable Development in Morocco." Kingdom of Morocco. June 2012.](#)



supporting rural households and honoring the tradition of fig cultivation, to which people in the area are deeply emotionally bound. Support of fig crops will also ensure that figs do not become extinct in the area, a threat that has already eradicated plum and pear varieties there.

4.4 Current or Pending Litigation

As of the creation of this document, neither HAF nor HA³ are involved in any current or pending disputes or litigation.

5. Project Strengths, Risk and Risk Mitigation

5.1 Competitive Advantage

The HAF-HA³ comparative advantage is the trust of the local High Atlas population, built over many years through many community-based participatory planning meetings and locally determined and implemented agricultural, health and training projects. Trust is the key factor for local buy-in. Since 2006, HAF has planted over 190,000 walnut seeds and secured funding to plant over 380,000 more in the 2014-2015 planting season. Furthermore, a total of 111,650 saplings were available from nurseries HAF supported two years ago; these saplings have been prioritized for all the 2014-2015 planting season. As these and the many other trees mature, supply is projected to significantly increase over the next 20 years (walnut trees can live several centuries, and almond more than 100 years). Since 2003, HAF planted over 1,000,000 seeds and trees in nine provinces of Morocco.

Improving Moroccan livelihoods requires a commitment to integrating sustainable agricultural methods and environmental conservation. The communal, agricultural and processing techniques in this action ensure the most efficient and effective use of resources. The current available product and market potential (both internationally and nationally) requires capitalization on such existing income generating prospects. When including organic and Fair Trade certification, the profit margin increases to where rural farmers will have the means to lift themselves out of poverty. It is therefore that the food value chain proposed is enriched with added-value elements that must be capitalized upon.

5.2 Risk Analysis and Mitigation Measures

Measures of risk analysis and mitigation are as follows, in order of urgency.

1. Risk of Moroccan fig varieties dying out.
 - a. Prioritize the creation of this nursery, which will provide a place for these varieties to grow and multiply.
 - b. Promote the expansion of the fig industry through threatened fig variety saplings that will be planted throughout the North, thereby increasing numbers of individual varieties while strengthening Morocco's fig industry.
2. Risk of not having sufficient funds to purchase available harvest.
 - a. Apply for loan opportunities.
 - b. Pitch HAF-HA³ model to private social investment entrepreneurs and companies, including Moroccan and US investors.
3. Risk of unforeseen export and import barriers that impede 2015 revenue.
 - a. Prioritize approaching board members with import/export experience with wholesale foodstuffs and experience with US-Moroccan Free-Trade Agreement.
 - b. The two brokers at Open Hands Marketing with whom HAF partners have a combined 40 years experience in the nut industry in North America and assist in addressing challenges to shipment of product and overall marketing.
4. Risk of not making organic certification requirements following harvest.
 - a. HA³ General Manager hired to create organic certification plan based on Ecocert conditions. Organic certification is secured, however, product must be finished packaging and shipped. These steps must continue to uphold certification requirements.



5. Risk of inefficient decision-making or legal registrations outside of current HAF institutional knowledge
 - a. Further identify potential board members, beyond the current three confirmed.
 - b. With support of the graphic designer and Charity Advantage sponsorship, launch the preliminary website with board requirements and business outline.

Conclusion

Expansion of Morocco's fig cultivation represents significant ecological and economic opportunities. Through encouragement of rural farmers and engagement, especially, of women and youth, HA³ can help communities in northern Morocco preserve their wealth of fig biodiversity and significantly increase their standards of living. This effect will spread to the EU and US as figs are exported to health-conscious consumers and used in diverse medical and cosmetic applications.

With support, northern Morocco can become a global hub of fig production, and its rural communities, as well as the threatened fig species they cultivate and propagate, will reap benefits for generations.