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Feasibility Studies on Grape Production and Business Plan Development in Axum, Ethiopia

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Abstract

Ecological and socio economic feasibility studies were conducted for establishment of a vineyard in Aksum Maykerah by Aksum University. Sustainable vineyard proper management is a paramount important in decision making ecologically and many socio economically over the long productive seasons of the vine grapes. Determining the vineyard design, including the location, land slope, water accessibility, the type of irrigation system, soil and nutrient status and the type agronomic management practices should be made prior to farm establishment. There would be a requirement of regular assessments of production costs and advantages of major agronomic practices such as soil tests and amendments, fertilizer recommendations, vine-training, pruning, pest and disease management, land cultivation, gardening, seasonal management and irrigation scheduling.

Satisfactory analysis of farm determining factors favorable for economic operation would indicate profitably of a farm. Farms economic feasibility analysis essentially entails identifying major factors that directly impacts the enterprise's market potential, resource constraints, and the production processes. However, the ultimate profit-determining factor is the whole farm management practice. Feasibility studies help to avoid costs associated with a wrong decision. Hence they will designate whether or not a projected business plan could succeed. Feasibility studies on a farm can be carried out any time as managers consider any alteration to the farms current operation. There is a considerable initial capital investment requirement for the establishment of this vineyard as a communal development project and it takes five to six years to recover the costs associated with the establishment and get a first profit. The vineyard would be operated as a communal business enterprise *via* crucial considerations on details in both the production and financial management for a successful and sustainable production and profitability.

Keywords

Feasibility study; Costs; Business plan; Profitability; Production grape

Introduction

Feasibility studies are usually important to sustainably produce and supply to the consumers. As it was initiated by the Kidus Yared Church development committees to establish a grape farm, a research team from Aksum University made a preliminary survey to the farm and grape farms established at Adwa and Mekelle. Based on the interest of the Kidus Yared farm owners' the research team conducted investigations to major growth requirements, environmental adaptations and socio-economic factors of grape.

Cropping history and archeological findings of the area revealed that there was grape cultivation in the area. There is archeologically found well established wine press that is anticipated as a property of the kings and succeeding land lords of Aksumite civilization. There is also legend from elders that grape crop was cultivated in ancient Aksumit civilizations in this area. The church people are interested in producing table grape which will be used for religious purpose as communion services to all local churches around Tigray so as to earn income to the church. Currently, people are in confusion weather this crop will grow and produce economic yield after a long period of time. They are uncertain whether there would be economic feasibility to produce grape as an enterprise in the area. The governmental agriculture development policies also demand them to present sound business plan to allow them the venture to continue.

Therefore, feasibility study has been conducted inclusively for all growth conditions such as land suitability, soil and nutritional requirements, climatic suitability and metrological parameters assessment, irrigation water quality and supply, social and economic factors. Various Stake holders such as church people, farming communities, funding organizations, Axum University and Research Centers in the area will contribute their share to the establishment of grape farm in Axum, taking actions to inaugurate the finding to the real ground.

Knowing all possible about major growth factors of a potential vineyard site will allow for better management decisions prior to planting. Soil testing is important to provide evidence on physical, biological and chemical nature of the soil. A pH of 5.5 to 6.5 is suggested for grape production. The soil of the area is believed to be good for vineyard establishment through major amendments in land clearing since there are so many stones, excavation for slope leveling and organic matter addition since it has been cultivated for so long and lost its organic content. Water is accessible from the tope side of the farm from a spring owned by the people. The climatic condition of the terrain (indicated in the appendixes) is also nearly favorable for grape production [1-3].

Grape production in the region is negligibly practiced, while the high demand still exists among the people. There are more than 14 local Orthodox churches in Axum city in which each of them demands at least 0.5 kg grape fruit for communion services per day, 15 Kg a month and 180 Kg a year. They have been spending up to 120 ETB for a Kg to import the fruits of grape from abroad to prepare it for the communion service after being dried using a processing machine [4]. The above mentioned demand and expense assessed are only for a single city so as demands of other churches both in cities and country-side should be considered. Communion service of all the churches is impossible without the table or juice grape in daily bases. For this reason the church people were spending much money and effort to find grape fruits. Considering the insignificant supply of grape produces and their high demand, the church people request Aksum University for a feasibility study and business plan development to establish grape farm [5].

Aksum University research team conducting preliminary surveys comes to an agreement to study all the growth requirements of grape and the suitability of the farm land to grape production. Based on

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literatures the research team had identified feasibility study areas to suit conditions and to design agronomic measures to amend environmental factors according to the crop requirement [6,7]. To help the community in addressing production constraints and socio economic feasibility of farm establishments is one of the mandate areas to Aksum University and hence the team is in the command of the will of the service.

Axum May-Kerah is gaining recognition for high quality juice grapes for communion services and table grape for fresh consumption. Axum as one of major tourist destinations, there is an increased demand for fresh grape fruits in almost all hotels and restaurants. Moreover, there are many denominations of the local churches which depend upon grape juices on daily bases for communion services. The investigations of Axum as a potential vineyard site and market area, fosters high demand and interest in the production of grapes particularly by the Kidus Yared Church development committee. To be successful at establishing a vineyard in Axum May-Kerah, it is important to develop a sound business plan to be presented to the government and funding institutions. It should be made from the initial planning through the overall management practices, harvest and post-harvest handling, marketing chains and sale prices [8-10].

Objectives

The Objectives of this paper is to investigate the ecological and socio economic feasibility of vineyard establishment in Aksum, May-Kerah as a communal enterprise

To provide a business development plan and evidences of establishment and operation costs of a vineyard for any interested in the investment of vineyards, willing sponsors, and financing organizations in Axum area.

This paper took models of the management practices of vineyards in Adewa private farm and Mekelle Pom Gold Fruits PLC, in Tigray regional state at the present time and the current financial requirements that can influence the establishment and operating costs. All the expenses in this paper stand for average values and there will be variation depending on the growers' scenario and the site conditions [13,14].

Methods and Procedures

Research was conducted to investigate socio ecological and economic feasibility of grape from 2014to 2015 in Aksum. The research is initiated for grape farm establishment at May-Kerah for the Kidus Yared communal vineyard farm. Kidus Yared Church department of development and community service is initiating to establish grape farm to bring internal financial capacity building so as other community services could be possibly done by the internal funds.

The vineyard site studied is located in North -Central Tigray Ethiopia 4 km from Axum city to a narrow north- valley elevated 2119 m above sea level and placed at 14.12507°N and 038.75135°E. The area is surrounded by Mountains on the West, East, South and South East with a river crossing in middle to the East direction. The major farming and semi urban settlements in the study area includes; Axsum 4 km, Adwa 25 km to the south, 30-60 km to the West Selekleka and Shire, Rama 55 km to the North. The farm has experienced crop cultivation for long period of time by the local farmers. Annual average temperature ranges in between 11.23 and 27.45°C which is favorable for almost all crops production in different growing seasons so does for various grape varieties.

The project was started in April 26, 2014 with planned completion date of July 23, 2015. A project extension to continue data collection, grape farms assessment, consultancy and training was approved at March, 2015 by Akusum University Research and post graduate office in consultation with the researchers and Kidus Yared farm community leaders.

Evidences and data presented in this document were collected *via* economic reports from other vineyard farms in Adewa and Mekelle, interviews of grape growers, retailers and consumers and personal communications. Data were collected through interviews, field surveys, online and printed resources, discussion with farmers, Kidus Yared grape farm development committee, experts and agribusinesses. In the study data relating to grape phenology, viticulture, production, and fruit quality were measured, compiled and compared *via* modelling commercial grape planting established in Adewa and Mekelle. In addition climate data were compiled and interpreted through a weather station in Aksum weather station. Aksum weather station has provided us two decades weather data (Tables 1-3) which significantly helped the research team to make analysis of favorable environmental factors for various grape vine varieties.

Overview of Vineyard Establishment Costs

In the vineyard business, returns are a function of Capital and Operating expenses and revenue is a function of grape fruit yield, sale price and fruit quality." Vineyard establishment and operating expenses may vary from site to site and from producer to producer because of the considerable costs of land, labor, machineries and operating materials. On the other way, those variations in the establishment and operating costs are affected by management practices such as grape cultivar, vine spacing, vine training systems, soil amendments, pest management and the setting of the site.

The capital costs such as the land purchase, land preparation, grapevines, labor, trellis materials, pest management materials and interest on debt if any are the main costs during the initial years of vineyard establishment. There is significant variation in the cost of land preparation depending on the need for land clearing, excavation for leveling, terracing against a steep slope, and land drainage. In this project there is requirement for an investment for the above mentioned practices, in irrigation, and fencing including wind break. Studies indicated that, generally costs for improvement in land led in an earlier and more reliable performance of a crop hence bearing an earlier and desirable return on the capital investment of a project [15-18].

Table 1: Vineyard Establishment Costs– Pre-Planting Year(s).

S. No.	Items of Variable Costs	Cost Per Item (ETB)
	Land clearing and Excavation	5,145.00
	Land Preparation	11,657.00
	Fencing and Wind Break	9,870.00
	Tile Drainage	5,086.00
	Soil Amendments and Testing	5,615.00
	Manure and fertilizer applications	2,456.00
	Drip installation	3,435.00
	Cover Crop	789.00
	Total variable costs	44,053.00
	Fixed Costs	
	Motor pump	85,000.00
	Drip Equipments	120,000.00
Total Cost		249,053.00

Table 2: Establishment Costs per farm– Year 2: Planting Year.

S.No.	Items for Variable Costs	Cost per farm (ETB)
	Gardeners (hired labor)	14,000.00
	Vine seedlings	23,085.00
	Trellis Supplies	5,000.00
	Equipments for cultivation	3,548.00
	Wires	2,376.00
	Grow Tubes	6,785.00
	Anchors	2,345.00
	Tying Material	384.00
	Steel Stalk for supporting vines	7,347.00
	Pesticides	520.00
	Soil Testing and Amendments	5,615.00
	Cover Crop	621.00
	Motor pump Expenses (maintenance and fuel)	2,167.00
	Total variable costs	73,793.00
	Fixed Costs	
	Taxes	
	Total Cost	**73,793.00**

Table 3: Establishment Costs per farm – Year 3: Growth Year.

S.No.	Activities (Variable Costs)	Cost per Item per Year (ETB)
	Labor (gardeners)	14,000.00
	Viticulture	4,467.00
	Specialists for Consultancy and trainings	10,000.00
	Vines (2%) replacement	462.00
	Trellis (support materials) Supplies	1,870.00
	Wires	1,300.00
	Tying Materials	145.00
	Pesticides	560.00
	Plant leaf analysis, Soil Testing and Amendments	12,475.00
	Taxes and Land rent	
	Total Expenses	45,279.00

Operating costs that can be referred as production expenses too may also vary along with variations in vineyard sites, screened cultivars, viticulture practices, training system, grape fruit yield and fruit quality. Producers intending to enter into a vineyard business should carefully regard site selection and cultivar screening as these have an important effect on the profitability of the vineyard.

Vineyard producers will be required to give attentions to the potentials for sustainable and maximum profitability which is a direct function of fruit yield and sale price. Fruit yield is associated with the site, soil status, cultivar and management practices. The by current market and fruit quality determine the sale price that the producers can achieve for the crop. Thus it is possibly true that the sale price is could be determined by the ability to produce and provide markets a quality fruit. Most grape demanding churches and consumers in the region are looking a way to produce a premium quality grape juice for daily base demands of communion services and hence are highly desired in producing quality juice grape fruits.

Site selection for a vineyard

Time has been devoted for the vine yard site selection for determining the suitability of ecological and socioeconomic feasibilities in the settlement areas. The climate, topography, soil properties and growers perceptions were considered during the vine yard site selection. Seasonal considerations were also made as grapes are very susceptible to extreme temperatures in the winter. The length of the growing period and the total heat unit accumulation are determinants of grape cultivars for the ripening of fruits. Findings also indicated that timing heat units and duration of sunlight are also significantly affect ripening in grape fruits [19-20].

Grape cultivars from the West preferably suggested effective growing seasons for grapes to be the time between the last spring frost (-2°C) and the first frost in the fall below -2°C. Generally, the commonly grown grape cultivars require nearly 150 frost free days. Grape cultivars perform variedly tolerance to coldest temperatures which will go down up to -23°C. Tolerance to minimum temperatures is fostered due to the health of the vines.

South facing slope is a pertinent consideration of a vineyard for growing grape which is believed to be paramount for air drainage and maximum solar radiation interception. It will also allow shelter from strong winds. Unfortunately this particular site is located with a steep slope facing to the North-West but possibly arrangement of rows east to west can alternatively use to gain such benefits. The soil of the site is suitable for a well-drained land preparation. It is an ideal and well drained naturally. However, there will be requirements of installation of tile drainage for optimal soil moisture utilization and other favorable site factors.

Grape vine cultivars for communion services in axum

The grafted rootstock and own root types of vines are essentially known for planting in small or large vineyards in the world's grape growing areas. Grafted vines are preferably cultivated widely in Ethiopia. Many of the rootstocks and/or grafted seedlings are used to be imported from Israel and South Africa. The use of rootstocks is important to ensure gaining vines form healthy sources, early vine establishment and it is economical.

Assessment on grape varieties cultivated in Tigray with the same agro-ecology to Aksum area showed dramatic performance in a vineyard establishment ecologically attractive, socially acceptable, and economically promising. There are five varieties planted before five years in Mekelle at Pom Gold Fruits PLC. The company had another fruit farm in South Addis Ababa called Guna fruits PLC and grape plantations are also there. According to Ato Gebreziabher, general manager of Pom Gold Fruits PLC and the former investment officer of Tigray region, these varieties were imported from South Africa and are performing well in the growing years. These varieties are: Chenin blanca, Tannat, Alicante bouschet, Pinotage and Shiraz [21].

Grape varieties surveyed at a private farm in Adewa with three varieties have been matured starting from the third growing year. The farm owner told that at every harvest season more than 10 Mt per hectare is harvested in average. According to the farm manager Ato Wolu, grape fruits are harvested once in a year from April to May. One of these varieties called Black Hamburg appeared in a good performance with biggest berries and dark red color which is suggested by the church people for communion services. The church people's development committee leader Like Mekuas Kiros explained past experience of Orthodox churches in preparing and using grape fruits with seeds which is recommended as a trend. The church never used the wine for communion services rather it is better either to prepare or import the ready juice for the service as usual.

Grape Planting material suppliers and nurseries in Ethiopia are very limited in number and potential to address the uplifting demand

of grape growers. Growers in Adewa brought grape seedlings from Debrezeit Research center and Mekelle grape producing farm found from South Africa. Hence trusted and economical way of finding grape seedlings will be possible from Debrezeit Agricultural Center for small scale farm enterprises. Both improved and local grape varieties are available in Ethiopia and in Tigay regional state to wineries for beverages, table grapes for fresh consumption and juice grape majorly for communion services [22,23].

Grape fruits can be produced for different purposes such as wineries, table grapes and grapes juices. This report can be used for any type of grape productions. However, the particular farm May-Kerah is majorly intended to be devoted for grape juice that is being used for communion services in all the churches in Axum area. Axum May-Kerah will establish its vineyard farm using some local and improved varieties. Nonetheless, it is better to be labored to research and made a sound decision to an apt combination of cultivars that work great for this site [24].

Assumptions of vineyard establishment and production costs

The business development plan is devised for a 0.6 hectare of vineyard. There will be purchase of vineyard related equipments such as shovels, spades, drip pipes, hedger, sprayer and harrows and motor pump or dynamo for irrigation at an investment of ETB 250,000. Other expenses might be required such as expenses for personal, grape processing machine, store house, sale houses, vehicles for transport, and buildings for offices, office furniture and stationeries.

Farm land tax will be calculated as per the tax regulation of the government of Ethiopia for rent land taxes to investments in Agriculture

- The farm design will consist 40 rows 50 meters long each with 1.3 meters spacing of vines and spacing of 2.5 meters of a row. There will be approximately 1,539 vines/farm land.
- Vertical shoot positioning system is being used as a trellis (supporting) system.
- Prices on trellis supplies will be obtained from Adewa textile factory Plc.
- Expenses for land preparation are based on cultivated land that need some amendments and land clearing.
- Farm land rent and/or compensation costs are not dealt in this study due to dynamic governmental land policies and variations in land prices and values in the community. For this reason, it is important to consider for the land expense if any interested want to use this document in planning of any vineyard.

Grape production costs and returns

Variable costs: Costs that change directly with an increase or decrease in the farm land are called variable costs. These include costs for grapevines, trellis materials, pesticides, fertilizers, labor and expenses for machinery rents.

Fixed costs: Fixed costs do not or slightly change because of an increase or decrease in any expansion in the vineyard. Expenses for motor pump, drip irrigation equipments, and taxes are examples of fixed costs.

Year 1: Pre-Planting - Costs

The selected vineyard site usually requires land preparation for planting of the vine seedlings and gardening prior to establishment years in the first year. There will be costs associated for operations including tile drainage installation, tillage practices, application of lime, fertilizers and organic manure in proper magnitude based on the soil test results. Plantations of a cover crop to prevent soil erosion and tress as a wind break should be made for optimization of the vineyard farm establishment [25].

Year 2: Planting Year – Costs

There is a significant capital investment requirement for the vineyard in the year of planting. The cost of vine seedlings accounts much of the costs in the planting year, followed by labor and the cost of supplies for the trellis system for this particular farm.

The labor expense will vary depending on the amount of labor needed to hire, the availability of the labor, and the wage expected by the labor pool available at the time of planting. For this particular farm, money will be saved by using the volunteering church people and neighbor farmers as laborers which is valued even if not using cash to pay for it directly.

Year 3: Growth Year

Vines are planted to grow and established well in the third year. There will be a need to incur costs in areas of labor, fertilizer, pesticides, stalks and tying materials. Consultants and trainers will be invited from Axum university college of Agriculture and research centers in occasions whenever assistance is needed. In the growing year there is no expectation for economic yield and so as any revenue. The vineyard farm will require 1,539 vines. This is calculated based on the supposition that the vines are planted at 1.3 m spacing in 40 rows 50 meters in length spaced at 2.5 m apart the. The costs of vines will vary depending on seasonality and the cultivars. The estimated cost for this farm is ETB 15/vine.

Production Years: Fourth Year and Beyond

Economic yield will begin to emerge in the fourth year of the establishment in most vineyard farms. Starting from the fourth year a grower can expect return in the expense of his costs. There might be extensions of the first harvest years due varieties and whether conditions. Particularly local grape juice cultivars will give yield 4 to 6 years. It is not expected to receive the yield of satisfactory grape fruits in the first year of harvest. A vineyard rarely may bear grape fruits even in year three however for a feasible achievement let revenue be considered in year four and beyond for this report.

Production years of a vine yard will have almost similar trends of expenses and economic yield at least up to twenty years. However, there should be expectations of some production constraints, risks, catastrophes and changing costs which will demand additional expenses. The general expectation of revenue trends in most vineyard farms revealed that, there is an increase throughout the production years. Particularly in our country there is a linear increase in demand of fruits so as the market price will influence positively the revenue of such enterprises that are very limited in number.

A matured vineyard generally is expected to have a yield between 5 and 10 tons/ha. Vineyard yield is highly determined by grape cultivars, the viticulture, fertility and pruning practices. Sugar content of grape fruit is associated with the yield and sugar, generally, it is believed to be: the higher the yield the lower the sugar. There are possibilities of harvesting high sugar content fruits in a simple practice which is reducing fruiting flowers through pruning and topping. The

same might be possible to increase yield rather than sugar by leaving many bunches of flowers and fruiting branches to bear fruits.

Vineyard Establishment Costs

Vineyard owners are required to manage three consecutive years of establishment costs prior to any revenue being received it is often necessary to accumulate the establishment costs until such time as a crop is harvested and revenue is received during evaluation of a vineyard enterprise. The establishment costs in each of the three years along with their respective interest charges should be accumulated to the fourth year using an interest rate of 5% compounded annually. The total compounded amount represents the cost of establishment of the vineyard that is assumed to be repaid over a period of years of harvesting for financial analysis purpose [26].

Economic analysis on production costs can be made using assumptions of interest rates based on the countries investment incentives in which it is stated with free or a minimum interest rate debt. However, for the sake of economics of the farm let interest rate be considered 5%. Hence, it is possible to calculate how much to pay to finish credits in certain years (Table 4).

To devise an approach to production costs, it is necessary to consider constant costs and returns for each of the succeeding harvesting years. The total cost of establishment should be amortized and the repayment of these costs must be divided equally over the harvest years. Realizing that the establishment of the vineyard increases the asset value of the land, the grower is able to depreciate the costs annually over a defined number of years of actual harvesting periods (Table 5 and 6).

By making assumptions of the interest rate at 5% the total initial investment will amount to 386,531.25 ETB. In amortizing this initial investment the grower can pay all in a certain term. For example for this farm it is assumed that the payback will be done in 15 years with 25,768.75 ETB annually. Comparisons of returns and costs revealed that there is a significant profit earned after growing years over the investment costs. Significantly increased revenue from 129,000 at growth year 4 to 270,000 ETB is recorded throughout production years (Table 7).

The report finally got very courageous recommendations to all interested to enter in to the very profitable business and invites all responsible donors to finance such fast growing, ecologically sound, socially acceptable, beneficial to many in the community and sustainable enterprise.

Revenue

Revenues or any return do not fully begin until the production year (fourth year) in any investments of a vineyard. However, it is not beyond the production that a vineyard owner should expect matured grapes to harvest a satisfactory yield for commerce. In general, grape growers should expect an average yield to be about 7.5 ton/Ha in optimal growth resourced farm with good managers. There are some cultivars that could produce yields of 8.5 to 10 ton/Ha.

Produce quantity and quality are major determinants of a sale price for grape growers. Quality is represented by the sugar content in the grapes in which it will be measured by brix refracto meter. It is common for there to be a base sale price for a minimum acceptable quality. There is a general trend in which the price increases as the sugar content increased and the price decreases in a reduced sugar content.

Potential grape growers should understand that there is a high association in between yield and sugar. Usually a grower is required to sacrifice yield during the viticulture *via* pruning to increase sugar content of the grapes. Hence, grape growers need to prepare sequences of activities considering the effect of cultivar, grape yield and sugar content on price as they prepare a plan.

The base price offered for wine grapes in all over the world varies from winery to winery. The price assessed at markets for grapes in Tigray for this document, is often set merely without knowing the brix content of grape fruits at a base price. The price increases or decreases from the base majorly seasonally with a randomly determined taste (sugar content). However, there is an increased price record due to poor grape supply to the region. The market is very seasonal in which retailers occasionally brought edible grape fruits to the market with prices ranging ETB 80 to 120 per a Kg. The phenomenon exerts difficulties to access grape fruits easily even for different services that cannot be happened without the fruit such as communion services of Christian churches in the area.

Contribution margin

The contribution margin is the difference between the revenue generated and the expenses used to generate the revenue. It should provide funds to cover other expenses including loan payments, fixed costs and capital expenses. May-Kerah, Axum vineyard of varieties yielding 7.5 ton/ha with good sugar quality will be grown. The sale

Table 4: Costs of a Farm to Operate a Mature Vineyard.

S. No.	Activities and Items of Variable Costs	Cost Per Item Per Year (ETB)
	Hired Labor (Guards and gardeners)	14,500.00
	Consultancy and training	10,000.00
	Viticulture / Pruning	5,300.00
	Trellis Supplies and Tying Material	654.00
	Pesticides	560.00
	Soil Amendments and Testing	5,615.00
	Motor pump Expenses (maintenance and fuel)	3,500.00
	Harvesting cost	3,300.00
	Bird Control	1,906.00
	Harvest materials and Transportation	1,378.00
	Storage materials	1,476.00
Fixed Costs		
	Taxes and land rent	
	Total Expenses	**48,189.00**

Table 5: Summary of Establishment Costs of the Farm Assuming Financial Requirements in 5% Interest Rate.

Year	Cost of Establishment	Interest (5%)	Total Amount
Pre-planting	**249,053.00**	**12,452.65**	**261,505.65**
Planting	**73,793.00**	**3,689.65**	**77482.65**
Year 3	**45,279.00**	**2,263.95**	**47,542.95**
Total	**368,125.00**		**386,531.25**

Table 6: The amortization of the total three year establishment costs of the farm over a 15 year period at an interest rate of 5%. Amortization of Establishment Costs of the farm.

Total Amount	**368,125.00**	**386,531.25**
Interest rate	**No interest**	**5%**
Term	**15 years**	**15 years**
Yearly Payment	**24,541.67**	**25,768.75**

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Table 7: Forecasted Economic Analysis of the farm for twenty growing years.

Year of cultivation	Yield ton/.6Ha	Revenue(ETB)	Variable Costs (ETB)	Fixed Costs	Total Costs (ETB)	Net Cash Flow (ETB)	Accumulated Profit (ETB)
Pre-planting	0	0	44,053	205,00	293,053	-293,053	-293,053
Planting	0	0	**73,793**		73,793	-73,793	-366,848
3.	0	0	45,279		45,279	-45279	-412,143
	2.15	129,000	48,189		48,189	80,811	-331,332
	3.5	210,000	48,189		48,189	161,811	-169,521
	4.5	270,000	48,189		48,189	221,811	52,290
	4.5	270,000	48,189		48,189	221,811	274,101
	4.5	270,000	48,189		48,189	221,811	495,912
	4.5	270,000	48,189		48,189	221,811	717,723
	4.5	270,000	48,189		48,189	221,811	939,534
	4.5	270,000	48,189		48,189	221,811	1,161,345
	4.5	270,000	48,189		48,189	221,811	1,383,156
	4.5	270,000	48,189		48,189	221,811	1,604,967
	4.5	270,000	48,189		48,189	221,811	1,826,778
	4.5	270,000	48,189		48,189	221,811	2,048,589
	4.5	270,000	48,189		48,189	221,811	2,270,400
	4.5	270,000	48,189		48,189	221,811	2,492,211
	4.5	270,000	48,189		48,189	221,811	2,714,022
	4.5	270,000	48,189		48,189	221,811	2,935,833
	4.5	270,000	48,189		48,189	221,811	3,157,644

price that is assumed to determine the revenue is a minimum base price of ETB 60/Kg for good quality grape. The price formula is set using the current market price in Mekelle and Axum retailers, eat-fruits and tourist hotels. It could not reflect existing sale prices of any specific grape enterprise. Growers, retailers and consumers need to expect that, sale price offered for grapes will vary depending on the grape varieties and qualities. Both yield and quality of the crop has an impact on the revenue generated.

Small scale grape growers in Axum can gain a drastic increased return with a positive net cash flow at the fourth production year and an in-pocket accumulated profit at the sixth production year (Table 7). Significant revenue recorded might be because of easily availability of facilities and growth resources with less production cost. Cheap labor costs, availability of land, water and suitable climates will favor the business to succeed and grow fast. The presence of Axum research center

center provided for socio economic and ecological feasibility studies. The University established a research team on the s, Aksum University, Axum Agriculture Office and Shire soil laboratory center helps such enterprises greatly in giving researching, giving consultancy and trainings, providing skilled man power, producing production guide and creating market opportunities through bridging producer-industry linkages.

Funding Requirements

Funding and support from the Aksum university research and community service subject and made business development plans based on the research findings to take its share of contributions for free. Funding to produce vines of each cultivar's seedling will be required from donating organizations. This funding also is needed to purchase of motor pump and to install drip irrigation lines. Funding to continue and expand the project will be possible because of a successful application for funds by different donating development organizations, Grape growers' Associations research centers to find grape certified seedlings, private farms and government organizations to Investment in Agriculture. Besides there will be the support of funds and in-kind contributions from any interested institutions, groups and individuals. Land owners and the church people are immense assets as volunteers to invest their time, labor and absorb many costs significant to the vineyard establishment and continuous maintenance for sustainability. These people are participants and direct beneficiaries from this communal project as since they are the project owners [27].

Conclusion and Recommendation

Aksum, May-Kerah is identified as one of potential grape growing areas in North Tigray, Ethiopia. Ecological and socioeconomic studies were conducted by Aksum University for establishment of a communal vineyard in Aksum. This document is initiated to provide a guide to devise a business plan for vineyard establishment. Establishment and production costs are indicated for the farm. There is a significant capital investment required for the establishment of a vineyard in prior to grape production May-Kerah, Axum and there is also a long payback on the capital investment.

Vineyard business requires a great deal of concerns to every details of production management in order to ensure an adequate quality and high volume to satisfy the revenues required. For a business venture with no requirements for borrowed money, a pressure on the finances will be significantly less and the breakeven on the investment will occur much sooner. As it is indicated in the economic analysis table of this farm there is huge return that can shorten the payback of the initial investment. The major important reasons for the fast increased economic return is realized due to an increased demand, limited supply and a high market price for grape fruits that took double portion over most countries' market price. Some of other factors include; cheap labor accessibility, availability of local inputs, low risk production, land and water sources availability.

Sound plan prior to the establishment and management practices to optimize combinations of resources during production of grapes are essential for a vineyard. There are numbers of useful resources

available to individuals interested to establish a vineyard in Axum Tigray, including favorable climate, large arable land, good ground water table and surface water sources, labor availability, accessible consulting institutes, huge market access and government policy priority and incentives to attract investments in Agriculture.

Comparisons of returns and costs revealed that there is a significant profit earned over the investment costs. The report finally came to conclude that there is a paramount demand, an opened gate and high profitability in a vine yard business and invited all responsible donors to finance this communal project which is potentially fast growing, ecologically sound, socially acceptable, beneficial to multitudes of unemployed in the community and sustainable enterprise.

References

1. Alley L (2002) ATF Adds Tannat to List of Approved Grape Varieties Wine Spectator.
2. Clarke OZ (2001) Encyclopedia of Grapes. Harcourt Books.
3. Ferreira JHS (1985)"Effect of Rootstock on the Incidence of Dying Arm of Chenin blanc vines". Viticultural and Oenological Research Institute, Stellenbosch, Republic of South Africa.
4. Green J (2012) Wine SA "Pinotage wine in other countries".
5. Hugh Johnson (2004) The Story of Wine: Washington State's Winemaking. 58: 131.
6. Irvine R, Clore WJ (1997) The Wine Project: Washington State's Winemaking. Sketch Publications. USA.
7. John, Platter (2003) South African Wines, The John Platter SA Wine Guide (Pty) Ltd, South Africa.
8. Lichine A (1967) Alexis Lichine's Encyclopedia of Wines and Spirits. London: Cassell & Company Ltd. 495.
9. Lori Kittilsen (2008) Business Development Specialist Nova Scotia Department of Agriculture Business Development and Economics.
10. Maul E, Eibach R (1999) "Vitis International Variety Catalogue". Information and Coordination Centre for Biological Diversity (IBV) of the Federal Agency for Agriculture and Food (BLE), Deichmanns. Bonn, Germany.
11. McDonald, Fiona (2003) Fairbairn Capital Trophy Wine Show. WINE Magazine, South Africa.
12. Molesworth J (2003) Leaving Pinotage Behind. Wine Spectator, South Africa.
13. Robinson J (1986) Vines, Grapes & Wines.
14. Robinson J (2006) The Oxford companion to wine. (3rd edtn), Oxford University Press, United Kingdom.
15. Robinson J (1986) Vines, Grapes & Wine. Octopus Publishing Group. 188.
16. Robinson J, Harding J, Vouillamoz J (2012) Wine Grapes - A complete guide to 1,368 vine varieties, including their origins and flavours.
17. Scotian Gold (2008) Grape Growers Association of Nova Scotia.
18. Stevenson, Tom (2005) The Sotheby's Wine Encyclopedia. Dorling Kindersley.
19. USDA National Agricultural Statistics Service (2008) Red Wine Type Grapes Acreage Report.
20. Establishment and Production Costs for Grapes in Ontario (2009) Economic Report
21. http://www.omafra.gov.on.ca/english/busdev/download/grpecon.htm
22. Planning for Profit – Vinifera Wine Grapes.
23. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/berry/bv19.pdf
24. Winery Association of Nova Scotia.
25. http://www.winesofnovascotia.ca/index.php
26. Agra Point.
27. http://www.agrapoint.ca/index.php?option=comcontent&task=view&id=100&Itemid

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