POTENTIAL FEASIBILITY STUDY OF CREATING A SMALL COMPANY THAT PRODUCES TOMATO PASTE IN AMBATONDRAZAKA DISTRICT

A THESIS

Submitted to the Postgraduate Program of Sebelas Maret University in partial fulfillment of the requirements for the degree of Magister in the Department of Agribusiness

By
Hasina Rasolofoharitschena
S641308010

DEPARTMENT OF AGRIBUSINESS
POSTGRADUATE PROGRAM
SEBELAS MARET UNIVERSITY
SURAKARTA
2015
POTENTIAL FEASIBILITY STUDY OF CREATING A SMALL COMPANY THAT PRODUCES TOMATO PASTE IN AMBATONDRAZAKA DISTRICT

A THESIS

Submitted By

Hasina Rasolofharitscheno
S641308010

Supervisor

Name

Signature

Date

Supervisor 1
Dr. Ir. Kusnardar, MSi.
NIP: 19670703 199203 1 004

Supervisor 2
Dr. Ir. Minar Perichani, MP.
NIP: 19670331 199303 2 001

Approved by

Dr. Ir. Kusnardar, MSi.

Head of the Agribusiness Postgraduate Program

NIP: 19670703 199203 1 004

commit to user
POTENTIAL FEASIBILITY STUDY OF CREATING A SMALL COMPANY THAT PRODUCES TOMATO PASTE IN AMBATONDRAZAKA DISTRICT

A THESIS

Submitted By
Hasina Rasolofoharitscheno
S641308010

Thesis examiner Board

Position
Name
Signature
Date
Head
Dr. Ir. Joko Sutrisno, M.P.
NIP: 196708241992031003
.07. May, 2015
Examiner 1
Prof. Dr. Ir. Endang Siti Rahayu, MSi
NIP: 193701041980032001
.07. May, 2015
Examiner 2
Dr. Ir. Kusnandar, MSi.
NIP: 196707031992031004
.05. May, 2015
Examiner 3
Dr. Ir. Minar Ferichani, MP.
NIP: 196703311993032001
.03. May, 2015

Approved by

UNS Postgraduate Director
Agribusiness Postgraduate Program Head

Prof. Dr. Ir. Ahmad Yunus, MS
NIP. 19610717 198601 1 001
Dr. Ir. Kusnandar, MSi.
NIP : 19670703 199203 1 004
ACKNOWLEDGMENTS

Completing this work has been a wonderful thing, yet challenging experience that could not have been accomplished without the grace of God. First of all, I would like to acknowledge him for giving me such opportunity and courage required for the achievement of this research.

Second, I would like to express my deepest gratitude to my supervisors both Dr. Kusnandar and Dr. Minar Ferichani for their encouragement, patient guidance, correction and proofreading. It has been an honor to be your student at Sebelas Maret University. I would also like to thank Pr. Endang Siti Rahayu and Dr. Joko Sutrisno for being my examiners.

Third, I would like to express sincere thanks to the region of Alaotra-Mangoro for the facilitations that they provided and for allowing me to conduct this research in the district of Ambatondrazaka. I acknowledge particularly Mr. Richard Ramandiamanana and Mr. Marius Andriamanina, Head and DDR of Alaotra-Mangoro region, respectively. I also acknowledge Mr. Benoit Rakotondrasata, Mr. Lanto Ravalitera and those who helped me for the collection of the data. The data collection should not be achieved without your involvements.

Fourth, I also would like to acknowledge my family, my Dad and my Mom for helping me to collect the data, my big brother Toky for providing me a motorbike, my younger brothers Tahiana, Tojo, Tiana and Herizo for their accompaniments, my cousin Nahary for his ATM card, and particularly Patricia Raharilalao for her love and her supports.

Lastly, I would like to thank my fellow postgraduate students in the Department of Agribusiness of Sebelas Maret University and all my friends such as Tommy, Kombate, Arlindo, Hailou, Abdullah, Jean Jacques and Victor for their supports, assistances and kindnesses.

Surakarta, April 2015

Hasina Rasolofoharitseheno
TABLE OF CONTENTS

TABLE OF CONTENTS ..................................................................................... v
LIST OF TABLES .......................................................................................... viii
LIST OF FIGURES ....................................................................................... ix
LIST OF ACRONYMES ................................................................................ x
ABSTRACT .................................................................................................. xi
ABSTRAK ................................................................................................ xii

I. INTRODUCTION ........................................................................................ 1
   A. Background ....................................................................................... 1
   B. Statement of the problem .................................................................. 2
   C. Research objectives ......................................................................... 2
   D. Research significance ..................................................................... 2
   E. Research scope ............................................................................... 3

II. THEORETICAL BASIS ............................................................................. 4
   A. Literature Review ........................................................................... 4
      1. Tomato Origin and Taxonomy ...................................................... 4
      2. Tomato Varieties ....................................................................... 5
      3. Tomato Cultivation .................................................................... 5
         a. Climate .................................................................................. 5
         b. Soil ...................................................................................... 6
         c. Cultivation method ............................................................... 6
      4. Tomato World Production ............................................................ 9
      5. Tomato Nutritional value ............................................................ 10
      6. Tomato paste processing ............................................................. 10
      7. Project Definition ....................................................................... 11
      8. Project life cycle ........................................................................ 12
      9. Project Advantages ................................................................... 13
     10. Project aspect and Analysis ......................................................... 14
         a. Market and Marketing aspect ................................................ 14
         b. Technical and Technological aspect ...................................... 14
         c. Financial aspect .................................................................. 15
d. Socio-Economic aspect ................................................................. 16

e. Institutional Aspect ..................................................................... 17

f. Managerial aspect ........................................................................ 17

g. Environmental aspect ................................................................. 18

B. Related studies ............................................................................. 18

1. Study related to the commodity, tomato ........................................ 18

2. Studies related to the project feasibility analysis .............................. 19

C. Idea flowchart ............................................................................... 22

III. RESEARCH METHODS ................................................................... 23

A. Research period and research location ............................................. 23

B. Data source .................................................................................... 23

C. Data collection method .................................................................... 23

D. Situation analysis ............................................................................. 23

E. Project feasibility analysis ................................................................. 25

1. Variables .......................................................................................... 25

   a. Technical and Technological analysis variables ............................ 25

   b. Market and Marketing analysis variables ..................................... 25

   c. Managerial analysis variables ....................................................... 25

   d. Financial analysis variables .......................................................... 25

   e. Socio-economic analysis variables ................................................ 26

   f. Environmental analysis variables .................................................. 26

2. Data analysis methods ................................................................. 26

   a. Descriptive analysis method ........................................................... 26

   b. Technical and Technological analysis method ............................... 26

   c. Financial analysis method .............................................................. 27

IV. RESULTS AND DISCUSSION .......................................................... 29

A. Profile of Ambatondrazaka district .................................................. 29

1. Geographic location ......................................................................... 29

2. Climate ............................................................................................ 29

3. Agricultural activities ........................................................................ 30

4. Administration and population ...................................................... 32

vi
B. Situation analysis ................................................................. 34
C. Project feasibility analysis .................................................... 38
   1. Technical and Technological analysis ............................... 38
      a. Project location and project duration analysis ............. 38
      b. Production Capacity and Raw materials analysis ......... 39
      c. Building and Infrastructure analysis ......................... 41
      d. Machines, Technologies, and equipments analysis ....... 43
      e. Human resources skills required analysis ................. 46
   2. Market and marketing analysis .......................................... 47
   3. Managerial analysis ......................................................... 53
   4. Financial analysis ............................................................ 56
      a. Feasibility analysis ................................................... 56
      b. Sensitivity analysis .................................................. 61
   5. Socio-Economic analysis ................................................. 62
   6. Environmental analysis .................................................. 66
V. CONCLUSION ........................................................................... 71
REFERENCES .................................................................................. 73
APPENDIXES

commit to user
LIST OF TABLES

Table 1. Total arable surfaces in Ambandrika, ...................................................... 32
Table 2. Total population of Ambatondrazaka district .......................................... 33
Table 3. Ambatondrazaka district population from 2008 to 2013 .......................... 34
Table 4. Profiles of the experts .............................................................................. 34
Table 5. Initial Investment ..................................................................................... 57
Table 6. Company’s operating variable cost .......................................................... 58
Table 7. Company’s operating fixed cost ................................................................. 58
Table 8. Company’s revenue in USS ....................................................................... 59
Table 9. Loan reimbursement planning .................................................................. 59
Table 10. Company’s cash flow projection ............................................................... 60
Table 11. Financial indicators’ values ...................................................................... 60
Table 12. Project sensitivity analysis ...................................................................... 62
Table 13. Existing transformation Units in Ambatondrazaka district, 2012 .......... 64
LIST OF FIGURES

Figure 1. Major tomato producing countries in the World ............................................... 9
Figure 2. Project life cycle .......................................................................................... 12
Figure 3. Idea flowchart ......................................................................................... 22
Figure 4. SWOT matrix analysis ............................................................................ 24
Figure 5. Map of Alaotra-Mangoro Region ................................................................. 29
Figure 6. SWOT matrix analysis ............................................................................ 38
Figure 7. Tomato crates .......................................................................................... 41
Figure 8. Tomato washing tube ............................................................................ 43
Figure 9. Tomato paste making machine ................................................................. 44
Figure 10. Tomato paste pasteurizer ..................................................................... 45
Figure 11. Tomato paste packaging machine ............................................................ 46
Figure 12. The existing tomato paste in the local market ........................................... 48
Figure 13. Tomato paste packing ........................................................................... 51
Figure 14. Project implementation planning ............................................................ 54
Figure 15. Company’s organization chart ................................................................. 56
LIST OF ACRONYMES

BEP: Break Even Point
BNI: Banque National de l'Indutrie
BOA: Bank Of Africa
CALA: Regional Research Center of Middle East
CECAM: Réseau Caisse d'Epargne de Crédit Mutuel Agricole
EAT: Earning After Tax
EBT: Earning Before Tax
GDP: Gross Domestic Product
GTDR: Rural Development Working Group
HACCP: Hazard Analysis and Critical Control Point System
INSTAT: Institut National de Statistique
IRR: Internal Rate of Return
JIRAMA: Jiro sy Rano Malagasy
Net B/C: Net Benefit Cost Ratio
NICF: Net Income Cash Flow
NOE: National Office of Environment
NPV: Net Present Value
OTIV: Ombona Tahiry Ifampisamborana Vola
PAMF: Première Agence de Microfinance
SIPEM: Société d'Investissement pour la Promotion des Entreprises à Madagascar
SWOT: Strength, Weakness, Opportunity, and Threat
ABSTRACT Hasina Rasolofoharitséheno, S641308010. 2015. “Potential Feasibility Study of Creating a Small Company that Produces Tomato Paste in Ambatondrazaka District”. THESIS. Supervisor I: Dr. Ir. Kusnandar, MSi., II: Dr. Ir. Minar Ferichani, MP. Department of Agribusiness, Postgraduate Program, Sebelas Maret University, Surakarta.

ABSTRACT

This research is aimed at analyzing the situation and studying the feasibility of the project, creation of a small company that produces tomato paste in the district of Ambatondrazaka-Madagascar. The tool used to analyze the situation is SWOT matrix and the aspects taken into consideration in the project feasibility analysis are technical and technological, market and marketing, managerial, financial, socio-economic, and environmental aspects. The situation analysis highlighted that there are six opportunities and two strengths that lead into the creation of the company. However, some alternatives such as working closely with farmers, through the establishment of contracts, building good relationship with regional and central governments, training the company’s manager and personnel, and finding places for tomato cultivation during the raining season should be applied by the company to overcome the situation’s weaknesses and threats. Based on the technical and technological, managerial, financial, socio-economic, and environmental analysis, the creation of the company is feasible. The sensitivity analysis highlighted that the project cannot resist to the increase by 10% of the fresh tomato price, decrease by 10% of the company’s total production, and both increase by 10% of the fresh tomato price and decrease by 10% of the company’s total production, simultaneously. The socio-economic analysis pointed out that the existence of the company will increase the local and regional economy. The environmental analysis highlighted that the pollution caused by the company can be avoided or reduced. However, the market and marketing analysis pointed out that the capacity of the local and regional markets is low. Hence, The Company should apply correctly the proposed marketing strategy that is expected to increase its local and regional sales.

Keywords: Ambatondrazaka, potential feasibility study, project, tomato paste, small company.
ABSTRAK

Penelitian ini bertujuan untuk menganalisis situasi dan mempelajari kelayakan proyek, pendirian sebuah perusahaan kecil yang memproduksi pasta tomat di distrik Ambatondrazaka-Madagaskar. Alat yang digunakan untuk menganalisa situasi adalah SWOT matriks dan aspek-aspek yang diteliti dalam analisis kelayakan proyeknya adalah aspek teknis dan teknologi, pasar dan pemasaran, manajerial, keuangan, sosial-ekonomi, dan lingkungan. Hasil analisis situasi menyatakan bahwa ada enam peluang dan dua kekuatan yang mengarah ke pendirian perusahaan ini. Namun, ada beberapa alternatif seperti bekerja sama dengan petani melalui pemakaian kontrak, membangun hubungan baik dengan pemerintah daerah dan pusat, pelatihan manajer dan personil perusahaan, dan menemukan tempat untuk membudidayakan tomat pada musim hujan harus diterapkan oleh perusahaan untuk mengatasi kelemahan dan ancaman situasi. Berdasarkan analisis teknis dan teknologi, manajerial, keuangan, sosial-ekonomi, dan lingkungan, proyek ini layak. Hasil analisis sensitivitas menekankan bahwa proyek ini tidak bisa menahan kenaikan sebesar 10% dari harga tomat (fresh tomat), penurunan sebesar 10% dari total produksi, dan peningkatan sebesar 10% dari harga tomat yang diikuti penurunan sebesar 10% dari total produksi. Analisis sosial-ekonomi menunjukkan bahwa keberadaan perusahaan ini di distrik Ambatondrazaka akan meningkatkan ekonomi lokal dan regional. Analisis lingkungan menyatakan bahwa polusi yang disebabkan oleh perusahaan dapat dihindari atau dikurangi. Namun, analisis pasar dan pemasaran menunjukkan bahwa kapasitas pasar lokal dan regional adalah rendah. Oleh karena itu, Perusahaan harus menerapkan strategi pemasaran yang sudah diusulkan untuk meningkatkan penjualan lokal dan regional.

Kata Kunci: Ambatondrazaka, studi potensi kelayakan, proyek, pasta tomat, perusahaan kecil.
I. INTRODUCTION

A. Background

Tomato is one of the most consumed vegetables in Madagascar. The production of tomato in the national scale is dominated by two regions, namely, Itasy and Alaotra-Mangoro regions (INSTAT database, 2003). According to Bodosoa (1995), tomato cultivation has started long time ago in Alaotra-Mangoro region, particularly Ambatondrazaka district is known as the main producer. There are two species that dominate the cultivation of tomato in this district such as Marglobe or Lycopersicon Lycopersicum (round fruit) and Roma VF or Lycopersicon esculentum (elongated fruits). Over the past few years, a general upward in tomato consumption has been seen not only in Ambatondrazaka district, but also in whole Madagascar. In 2010, the average annual per capita consumption of tomato, including tomato paste, in Madagascar was about 11 kg (INSTAT database, 2010).

The total surface of Ambatondrazaka district is about 6,492 km² and the total population in 2012 was about 439,570 (Ambatondrazaka district database, 2013). This district is well known for the biggest Lake of Madagascar called Alaotra. The existence of this Lake made the district capable to produce various types of crops, including tomato. The survey conducted in 2014 highlighted that the yield per hectare of tomato during the hot season in Ambatondrazaka district varied between forty eight and fifty four tons. This yield allowed the district to produce an average production of forty to fifty tons per day. The maximum production of about 200 tons per day is attained in July to November. This is an enormous production which exceeds the demands of the local and regional markets. However, farmers do not have technology for preserving and stocking fresh tomatoes. In addition, due to the inadequate transportation system and the bad road conditions, their access to the provincial and national markets is very difficult. Hence, a considerable quantity of fresh tomatoes cannot leave the district and is deteriorated at the place. Thus, the existence of a company that transforms fresh tomato into paste in this district is very important not only to lighten this problem, but also to ameliorate its economy.
The famous brand name of tomato paste made in Madagascar was Madco. This product was manufactured by a Malagasy company located in the province of Majunga, more precisely in the district of Ambato Boeny. But nowadays, this company is no longer operational. That is why many imported tomato pastes such as FANA, Heven, Bravo Salsa, and Evita dominate the Malagasy markets. Three of them are made in Italy and the fourth, Evita, is made in China.

B. **Statement of the problem**

The creation of the company will be important first, for improving the situation of tomato sector in the district of Ambatondrazaka and second, for increasing the local and regional economy. However, the two principal questions that occur are:

1. Is the current situation favorable for the creation of the company? and
2. What about the feasibility of the project regarding technical and technological, market and marketing, managerial, financial, socio-economic, and environmental aspects?

C. **Research objective**

The objectives of this research are to:

1. Analyze the current situation, based on its internal and external key factors; and
2. Study the feasibility of the project regarding technical and technological, market and marketing, managerial, financial, socio-economic, and environmental aspects.

D. **Research significance**

Only little researchers mainly from Antananarivo and Tamatave Universities carried out researches related to tomato sector in the district of Ambatondrazaka. On the other hand, the latest research on tomato conducted in this district was published twenty years ago. The current research is thus very
important regarding the information and data that it provides. This research enables:

1. The researcher to put into practice the theories that he has learned and to acquire new information and new knowledge;
2. The investors to assess whether the creation of the company that produces tomato paste in the district of Ambatondrazaka is feasible; and
3. The local and regional authorities to develop an effective rural development policy related to tomato sector.

E. Research scope

The research includes six aspects of project feasibility analysis, namely, technical and technological, market and marketing, managerial, financial, socio-economic, and environmental aspects.
II. THEORETICAL BASIS

A. Literature review

1. Tomato origin and taxonomy

Tomato is indigenous to the Peru and Equador region in South America. It was domesticated and first cultivated in Central America by early Indian civilization of Mexico. The Spanish explorers introduced tomato into Spain and it was later taken to Morocco, Turkey and Italy. Its use as food crop started in the eighteenth century. Currently, tomato is one of the most popular and widely grown vegetables around the world.

Ever since the cultivated tomato was introduced to Europe in the sixteenth century, botanists have recognized the close relationship of tomatoes with the genus Solanum and commonly referred to them as S. pomiferum during the seventeenth century. In 2002, Iris, et al reported that Tournefort (1694) was the first to consider cultivated tomatoes as a distinct genus, Lycopersicon. He placed species with large multilocular fruits in the genus Lycopersicon and the bilocular species in the genus Solanum. However, it is currently known that some species have two to many locules. In 1753, Linnaeus classified tomatoes in the genus Solanum, and described S. lycopersicum and S. peruvianum in his book entitled Species Plantarum. In 1789, Jussieu also included tomatoes in Solanum. However, in 1754, Miller followed Tournefort and formally described the genus Lycopersicon. In 1768, he published diagnoses for L. esculentum (the type species), L. peruvianum, and L. pimpinellifolium. Miller's circumscription of the genus also included the potato, S. tuberosum, and two other species of Solanum under Lycopersicon, but he ultimately merged Lycopersicon and Solanum. Following Tournefort and Miller's works, a number of classical and modern authors recognized Lycopersicon. That is why currently researchers agree that tomato belongs to Solanaceae family and to solanum genus, and the scientific name of tomato is Solanum lycopersicum (Jose, et al. 2012).
2. Tomato varieties

Many varieties of tomato are dispersed around the world; however the most important varieties can be classified in five groups, based on the fruit external aspect (Lynn and Clint 2009). The first variety is the variety with big and round fruit. This variety produces a big and round fruits fairly flattened and ranges in the weigh from 150 to 300 grams. The second variety is the variety with medium and flat fruit. This variety produces fruits that are flat and fairly ribbed and their weigh ranges from 90 to 150 grams. The third variety is the variety with small and round fruit. This variety produces fruits which are small and smooth and their weigh ranges from thirty to ninety grams. The fourth variety is the variety with elongated fruit. This variety produces elongated and smooth fruits, which includes tomatoes such as San Marzano and Roma. The fruits weigh ranges from forty five to sixty grams. The last variety is the tomadose. This variety produces fruits that have several forms and several colors; however all of them are with a small size.

3. Tomato cultivation

According to Shankara, et al. (2005), tomato cultivation requires specific climate and specific soil.

a. Climate

**Temperature and light:** Tomato requires a relatively cool, dry climate for high yield and premium quality (Janina, et al. 2013). However, it is adapted to a wide range of climatic conditions from temperate to hot and humid tropical. The optimum temperature for most varieties lies between 21 and 24 °C. The plants can survive a range of temperatures, but the plant tissues are damaged below 10 °C and above 38 °C. Tomato plants react to temperature variation during the growth cycle, for seed germination, seedling growth, flower and fruit set and fruit quality. If cool or hot weather spells persist during flowering, pollen production will be low and this will influence the formation of the fruits. Frost will kill the plants. To avoid frost damage, it is best to wait until the winter is
definitely over before sowing. It is possible to sow indoors earlier (in pots or trays). Light intensity affects the colour of the leaves, fruit set and fruit colour.

**Water and humidity:** A simple rule of thumb can be used to determine whether local water supplies are sufficient for growing tomato. If there are herbaceous plants (plants with many thin leaves) growing in the natural environment, it will be possible to grow tomato. The plant needs at least three months of rain. Water stress and long dry periods will cause buds and flowers to drop off, and the fruits to split. However, if rains are too heavy and humidity is too high, the growth of mould will increase and the fruit will rot. Cloudy skies will slow down the ripening of tomatoes. However, adapted cultivars are available. Seed companies have special tomato varieties for hot-humid climates.

**b. Soil**

Tomato grows well on most mineral soils that have proper water holding capacity and aeration, and are free of salt. It prefers deep, well drained, sandy loam soils. The upper layer needs to be permeable. Soil depth of 15 to 20 cm is needed to grow a healthy crop. In heavy clay soils, deep ploughing allows better root penetration. Tomato is moderately tolerant to a wide range of pH (level of acidity), but grows well in soils with a pH of 5.5 to 6.8 with adequate nutrient supply and availability. Addition of organic matter is, in general, favourable for good growth. Soils with very high organic matter content, like peat soils, are less suitable due to their high water holding capacity and nutrient deficiencies.

**c. Cultivation method**

**Land preparation:** According to Shanakara, *et al.* (2005), loughing is necessary to prepare the land for a new crop of tomato. It improves the land structure and water holding capacity. The same author says that in areas where water is a limiting factor, ploughing enhances water
conservation as well. It also helps to reduce soil borne pests and diseases by exposing the soil to the hot sun. But to break an impermeable hard subsoil layer, removing the weeds and bringing the land to fine tilth is necessary. Then, to level the land, it is also often necessary to harrow two times, breaking the clods and removing crop residues.

**Manures and fertilisers:** To get high yields, tomatoes need to be fertilised. For this, there are two groups of crop nutrients, namely, organic manures and chemical fertilisers (Shanakara, *et al*. 2005). The most common kinds of farmyard manures (organic manures) are horse, cow and pig manures. Of these three kinds, horse manure has the best balance of nutrients. Cow manure has relatively little phosphate. Pig manure is usually rich in mineral salts but has relatively little potassium. Manures from goat and sheep are also good organic manures. But it should be highlighted that using farmyard manure on sandy soils is much better than using farmyard manure on clayey soils, because clayey soils is quite sticky. Sandy soils will not fall apart as easily if manure is added, and will therefore be able to hold more water. If only farmyard manure is used, 12.5 to 25 tons per hectare per year is a reasonable amount to apply. However, smaller applications of manure can be enough if growing conditions are not so good or if chemical fertiliser is also applied.

Concerning the Chemical fertiliser (except for calcium), it does not improve the soil structure but enriches the soil by adding nutrients. Usually, chemical fertiliser is relatively expensive, but in some areas, in terms of nutrients provided, it is less expensive than manure. It does not pay to use a lot of chemical fertiliser in small scale cultivation, or where prices are fluctuating and yields are low.

**Watering:** Tomato is not resistant to drought. Yields decrease considerably after short periods of water deficiency. It is important to water the plants regularly, especially during flowering and fruit formation. The amount of water needed depends on the type of soil and on the weather (amount of rain, humidity and temperature). It is
especially important to water regularly (three times a week) on sandy soils. But under good circumstances, once a week should be enough: about 20 mm under cool conditions and about 70 mm during hot and dry periods (Shanakara, et al. 2005).

**Seedlings:** Tomatoes are normally transplanted because much better results are gained when seedlings are raised in a nursery. Raising seedling in nursery can be done by using seedbed. The seedbed should be 60 to 120 cm wide, 20 to 25 cm high and its length depends on the number of seedlings wanted. Thus, to raise a sufficient amount of plants for one hectare, 150 to 200 g of seeds should be sown on 250 m$^2$ of seedbed (Shanakara, et al. 2005).

**Transplanting:** The seedlings transplantation can be done three to six weeks after sowing. A week before transplanting, seedlings should be hardened by reducing the application of water, but twelve to fourteen hours before they are taken out of the seedbed, they should be thoroughly watered again to avoid excessive damage to the roots. Generally, seedlings of 15 to 25 cm tall with 3 to 5 true leaves are most suitable for transplanting. Transplanting should be done in the afternoon or on a cloudy day to reduce the transplanting shock. Once they have been transplanted, the plants should be watered immediately and when removing the seedlings, a large clump of soil attached to the roots should be kept to prevent them from being damaged. The Space between plants and rows depends on the cultivar growth habit, soil type, cropping system and also whether the plants are to be supported by stakes or left on the ground. However, the common spacing is 50 cm between plants and 75 to 100 cm between rows. If the tomatoes are to be supported by sticks, the distances between rows can be decreased to 20 to 40 cm (Shanakara, et al. 2005).

**Harvesting:** The harvesting should be done at the correct stage. The correct stage depends on the purpose for which the fruits are to be used. The fruits ripening stages are green, mature green, turning pink, red pink and over-ripe. For supermarkets, for example, the fruits should be picked
when the bottom tip of the tomatoes have an orange-pink tint. Then, they will turn light red within two to three days. But soon after picking, the fruits should be cooled rapidly to 13 °C to increase the shelf life of the fruit by reducing the rate of respiration and other physiological processes which influence ripening (Mashego, 2001).

4. Tomato world production

Tomato is one of the most important protective foods both because of its special nutritive value and also because of its widespread production. It is thus one of the world’s most important vegetables, with an estimated total production of about 141.40 million tons in 2009 (Nikolaos, 2013). According to the same author, tomato is the second most widely consumed vegetable after potato, with an average annual per capita consumption of 12 kg. In 2011, the Indian Horticulture data base stated that the world produces around 117 million tons of tomatoes from an area of 43 lakh hectares (Average of 2001 to 2005).

In world scale, few countries dominate the production of tomato (Figure 1). China is the largest producing country; almost contributing for 25%. During 2005 China stood first with annual production of 31.64 million tons followed by USA with 12.76 million tons, Turkey 9.7 million tons, Italy 7.81 million tons and India and Egypt each with 7.6 million tons. These six countries contributed for around 60% of world’s tomatoes production (Indian Horticulture database, 2011).

![Figure 1. Major tomato producing countries in the World](source: Indian Horticulture Database, 2011)
5. **Tomato nutritional value**

Apart from its macronutrient composition (water, carbohydrate, total dietary fiber, protein and total lipid), tomato is an important source of micronutrients, notably lycopene, β-carotene, α-tocopherol, phenolic compounds, certain minerals (notably potassium) and carboxylic acids, including ascorbic, citric, malic, fumaric and oxalic acids (Victor and Ronald, 2008). The benefits of tomatoes and tomato products have been attributed mostly to the significant amount of lycopene contained, which constitutes 80 to 90% of the total carotenoid content in tomatoes (Erba, *et al.* 2013).

Tomatoes are widely consumed either raw or after processing and can provide a significant proportion of the total antioxidants in the diet. In many countries, especially in the Countries that produce tomatoes such as China, Turkey, Egypt etc, tomatoes constitute the predominant source of lycopene and phenols (Elsayed and Amany, 2011).

6. **Tomato paste processing**

The demand for tomato processing usually arises from a need to preserve the product for cooking purposes out of season or to add value for extra income. Traditionally, the most important methods used are concentration (to a paste or purée) and drying either fruit pieces or to a powder.

In many Countries, especially developed Countries, tomato paste processing constitutes a common method used to ensure the availability of tomato out of season. In U.S. for example, a big part of tomato processing industry is occupied by Companies which produce tomato pastes (Hayley and Henrich, 2005).

Tomato paste is made from whole processing tomatoes generally containing between 4.5 to 6.0 percent tomato solid. With regard to solid content, the industry normally refers to TSS (Total Soluble Solids), a measure which excludes all insoluble solids. In accordance with generally accepted market standards, tomato paste must contain at least 14 percent TSS. On average, 6kg of fresh tomatoes are required to make 1 kg of tomato
Paste 26-28 Brix. Most common tomato paste is in Concentrate 2 or double concentrate with 26-28 Brix, but Concentrate 3 or triple concentrate with 36-38 Brix is also present in the market. Triple concentrate is especially popular in China where it is exported to the markets where it is diluted and resold. High density paste can save freight, and this is a major reason why TSS 36-38 dominates China’s export oriented production (Louis, 2009).

7. Project definition

According to Price (1982), a project can be defined as all activities that use resources in order to make profits. The same author defined and specified agricultural and agribusiness project as an investment activity in which financial resources are expended to create capital assets that produce benefits over an extended period of time.

Jason (2003) defined project as a unique endeavor to produce a set of deliverables within clearly specified time, cost and quality constraints. According to him, projects are different from standard business operational activities as:

- They are unique in nature. They do not involve in repetitive process. Every project undertaken is different from the last, whereas operational activities often involve undertaking repetitive process.
- They have a defined timescale. Projects have a clearly specified start and end date within which the deliverables must be produced.
- They have an approved budget. Projects are allocated a level of financial expenditure within which the deliverables must be produced to meet a specified customer requirement.
- They have limit resources. At the start of the project an agreed amount of labor, equipment and materials is allocated to the project.
- They involve an element of risk. Projects entail a level of uncertainty and therefore carry business risk.
- They require a set of skill. Specialist knowledge, skills and experience are required to reduce the level of risk within a project and thereby enhance its likelihood of success.
They require a suite of tools. Various types of tools are used by the project managers to improve their chance of success.

They require a series of processes. Various management techniques and processes to monitor and control time management, cost management, quality management, change management, risk management and issue management.

8. Project life cycle

Project consists of a number of different phases that form its life cycle. In the early years of the development of modern project management practices, it was common to see each phase of a project being planned, scheduled, and managed as a separate project from start to finish of each phase (George, 2003). These phases comprise project initiation, project planning, project execution and project closure (Figure 2).

![Figure 2. Project life cycle](image)

Source: George, 2003

**Project initiation:** During this phase, managers develop the draft of the project scope, project objectives, project reference and the draft of project schedule.

**Project planning:** This is the phase during which the project scope is determined, team members are selected and deliverables are planned.
**Project execution:** This is the most important phase during which key deliverables are produced, monitoring and control are executed and operations are managed.

**Project closure:** Project closure is characterized by the end of the activities. The project contract is ended and the team stops working.

9. **Project advantages**

The main purposes of projects are to solve the existing problems and/or to make profits. Obviously, all projects have good impacts towards the society. These advantages vary through the type of the project but generally each project has both social and economic advantages. Whatever the size of the projects, they always create job opportunity. Projects give a chance to people to get a job, whether it is a direct or indirect job.

Concerning the economic advantages, various measures can be used to assess them (Glen and Burton, 1997), such as:

- **Total employment:** Total employment reflects the number of additional jobs created by economic growth. This is the most popular measure of economic impact because it is easier to be understood.

- **Aggregate personal income:** Aggregate personal income rises as pay levels rise and/or additional workers are hired. Either or both of these conditions can occur as a result of business revenue growth. As long as nearly all of the affected workers live in the study area, this is a reasonable measure of the personal income benefit of a project or program.

- **Value Added:** Value added is normally equivalent to Gross Domestic Product (GDP) or Gross Regional Product (GRP). It is a broader measure of the full income effect. This measure essentially reflects the sum of wage income and corporate profit generated in the study area.

- **Business Output:** Business Output is the broadest measure of economic activity, as it generates the largest numbers. It includes the full level of business revenue, which pays for costs of materials and costs of labor, as well as generating net business income.
10. Project aspect and analysis

To carry out any project, some aspects and analysis have to be taken into account (Peni, et al. 2011). These aspects may cover Market and Marketing, Technical and Technological, Financial, Socio-Economic, Managerial and Organizational and Environmental aspects (Ibrahim, 2003).

a. Market and Marketing aspect

The market and marketing aspect of a project includes the arrangements for marketing the output produced by the project and the arrangements for the supply of inputs needed to build and operate the project (Price, 1982). This aspect has to contain at least the market space, the market evolution, the market share and other aspects that are related directly to the business (Ibrahim, 2003).

To analyze the market space, variables such as market supply and market demand are needed to be assessed either in present time or for the future (Peni, et al. 2011). This assessment depends on the size of the market. For example, if the product will be sold in the national market, the study of the market demand and market supply has to cover the national scale.

Also, the market and marketing aspect has to assess the obstacles to which the product will be faced, particularly the substitution products coming from competitors. This aspect needs to highlight the power of the rival products. Are they very competitive? What will be the share that the product will occupy?

According to Peni et al. (2011) this aspect also has to define the customers and develop first, the marketing strategy that will be applied second, the distribution of the product third, the selling places and fourth, the product price.

b. Technical and Technological aspect

The technical analysis covers both the project’s inputs and the project’s outputs of real good or service. It is extremely important, and
the project framework must be defined clearly enough to permit the technical analysis to be through and precise.

Whatever the type of the project, the main factor needed to be determined is its location. The other factors that should be assessed are the source of the raw materials, labor, tools and machines, transportation to distribution, communication, environment and infrastructure that support the production process.

Also, the type of the technologies, its total and its size must be highlighted. And the last requirement is about the production technique aspect. The production has to be programmed by taking into account the duration of the project. Therefore, the capacity of the production should be planned.

c. Financial aspect

According to many authors, the financial aspect constitutes the key aspect of the project. This aspect analyzes the amount of the initial investment required and its source, the total costs (operating and maintenance cost, labor cost etc) and the total benefits. It also allows evaluating the financial feasibility through indicators such as Net Present Value, Internal Rate of Return, Payback Period and so on (Ashish, et al. 2012).

The initial investment is the amount of money required to start up the project or the Business. It comprises the cost of the capital and the amount of the initial operating cost.

Concerning the Investment source, it has to be clear from the beginning. It may be from banks, investors (self financing) and/or shareholders.

The operating and maintenance cost comprises both variable and fixed costs. Managers should pay special attention on these costs because they will affect the financial feasibility indicators (Ibrahim, 2003). Fixed cost consists of workers’ wages, bank interest rate, loans, depreciation, insurance etc. However, variable cost comprises the cost of production
process that depends on the production capacity. Production process cost consists of raw material cost, direct labor cost, energy cost, building rent and so on.

The benefit that the project will generate has to be clarified as well as possible because the decision that managers will make depends largely upon it. The feasibility of the project can be known through indicators such as Payback Period, Net Benefit Cost Ratio (Net B/C), Net Present Value (NPV), Internal Rate of Return (IRR), Break Even Point (BEP) etc.

Payback Period is the length of time from the beginning of the project until the net value of the incremental production stream reaches the total amount of the capital investment. If the duration of the Payback Period is shorter than the duration of the project, the investment is feasible (Ibrahim, 2003).

Net Benefit Cost Ratio (Net B/C) is the amount of net benefit that is profitable, produced from project financial lost unit. Net benefit is the value of net present income, while cost is the value of negative net present income. The judgment of project feasibility result on net Net B/C: if Net B/C ≤ 1 the project is not feasible and if Net B/C > 1, the project is feasible (Agus, 2011).

Net Present Value is the difference of the present value from the benefit and cost flow, which is measured based on certain level of discount. If NPV > 0, the project is financially feasible, otherwise the project is not feasible (Agus, 2011).

Internal Rate of Return (IRR) is the discount level that makes NPV for a project equal to zero. If IRR is greater than the current interest level, the project is feasible, otherwise the project is not feasible not (Agus, 2011).

d. Socio-Economic aspect

Each project/investment has not only positive impacts, but also negative ones. These impacts affect both the project/investment itself and
the surrounding community. The Socio-Economic aspect rule stipulates that the project/investment can be implemented only if it provides more benefits/advantages rather than disadvantages (Kasmir and Jakfar, 2003). Among these benefits/advantages, we can mention the job opportunities provided by the project/investment that decreases the jobless rate, the increase of both governments and households’ incomes, and the increase of the local and regional economy.

e. Institutional aspect

The institutional policy either national or regional affects directly the implementation of the project (Price, 1982). So to have a chance of being carried out, a project must relate properly to the institutional structure. This aspect take into account some question such as: What size of company will be encouraged? Does the project incorporate local institutions and use them to further the project? How will the administrative organization of the project relate to existing agencies? Is there to be a separate project authority? What will be its links to the relevant operating ministries? Will the staff be able to work with existing agencies or will there be institutional jealousies? Etc.

f. Managerial aspect

According to Husein Umar (2003), managerial aspect comprises four activities such as Planning, Organizing, Actuating and Controlling. These activities remain the same either it is for project development or for ongoing Business.

Project planning comprises time planning, management level planning, work program planning and investment planning. After developing these parameters, the managers assess the project whether it is realizable or not.

The second activity which is project organizing consists of work distribution, departments separation, organization structure realization and so on.
Actuating is more art than science. This is the way how to make workers better at their work and more satisfied.

The last activity, controlling, aims at evaluating all activities in order to know how far the project objectives are accomplished.

g. Environmental aspect

Currently, many researches take into account the environmental dimension such as that of Burhanuddin of the year 2006. The environmental aspect assesses the possibility of the project implementation based on the surrounding environment. The Project environment comprises people who live surrounding the project area, roads that ensure the transportations and places where the wastes can be thrown or processed. Thus, managers need to evaluate first, how far the project will be accepted by the local people and second, the roads availability required for the project implementation. The managers and technicians also have to find out places where the wastes released by the project activities can be thrown or processed.

B. Related studies

1. Study related to the commodity, tomato

In 1995, Bodosoa has conducted a study that aimed at analyzing the situation of tomato sector in Madagascar. She has highlighted that tomato can be cultivated in all regions of this big island, especially where Lake and/or River are available and climate is appropriate such as in Mampikony, Port Berge, Ambato Boeny, Itasy, and Ambatondrazaka districts.

According to her, four varieties of tomato are available in Madagascar, namely, Marglobe and Casque rouge (round fruits), and Roma VF and Japonica (elaborated fruits). Japonica represents a good seed during dry season, whereas Roma VF is the appropriate seed during the rainfall season. The cultivation of Marglobe and Casque rouge (round fruits) seems difficult because they need more treatments, yet they are more appreciated by
consumers. Concerning the duration of the cultivation, it takes about two or two and half months.

Bodosoa’s study has also highlighted that usually, Malagasy farmers cultivate tomato after paddy harvesting season. The industrial cultivation already started but it concerns only few regions.

2. Studies related to the project feasibility analysis

Presently, there is no data supporting project feasibility studies done by researchers in Madagascar. However, limited amount of studies have been carried out by Indonesian researchers. In 2004, Purwoko and Arkeman have investigated the feasibility of creating mushroom chips company in Bogor regency. Their study included both primary and secondary data and the data were analyzed based on technical and technological, market and marketing, operational management, and juridical and financial aspects.

The Market and Marketing analysis took into consideration the market demand and its projection in the future, market supply, whether it is from the local or the international market, existing competitors and marketing strategy applied.

The Technical and Technological analysis covered the choice of the technologies used, the capacity of the production, the choice of the location of the company and the determination of the machines and buildings required.

The Operational Management analysis consisted of the organization structure planning, job description of each position, and labor requirements and its specifications.

To evaluate the financial feasibility of the project, the indicators utilized were Net Present Value (NPV), Internal Rate of Return (IRR), Net Benefit Cost Ration (Net B/C), Break Even Point (BEP) and Pay Back Period (PBP).

In 2009, Burhanuddin has conducted a study that aimed at assessing the possibility of constructing a livestock slaughter house in east Kutai-Indonesia. This study included three approaches such as economic,
environmental and social approaches. The economic approach was used to evaluate the feasibility of the project based on financial, market and marketing, and managerial aspects. The environmental approach was used first, to assess the impacts of the project towards the surrounding environment and second, to minimize them. The last approach, social approach, was used to analyze how far the project affects the society.

The research included both primary and secondary data and these data were collected through two methods, namely, desk research method and in-depth interview. The primary data were collected first, from the local and central Governments, industrials and farmers, machines and equipments sellers and second, from the sample of the people living in the surrounding area.

The sampling method used was random sampling method and the analyses taken into consideration were:

- Market feasibility analysis: with variables such as market supply and market demand;
- Technical feasibility analysis: with variables such as project location, raw materials sources, technologies used, company’s production capacity, need of labor, and water and energy sources;
- Financial feasibility analysis: with variables such as total investment required for the land, buildings, machines and equipments purchases; investment sources; and total cost that comprises installations cost, operating fixed cost, and operating variable cost; and
- Environmental feasibility analysis: that took into consideration the location of the project; availability of roads for transportations; and availability of wastes disposal/treatment sites.

In 2011, Peni et al. conducted a research that aimed at analyzing the feasibility of modifying tile press machine in a small enterprise located in central Java-Indonesia. This study covers four aspects such as market and marketing, financial, technical and socio-economic aspects. These four aspects have been observed and investigated as follows:
Market and Marketing aspect that examined the market demand, the buyers and the competitors.

Financial aspect that determined the prospects of the investment through the calculation of the expected costs and benefits to compare the revenue and expenditure such as the availability of funds, cost of capital and ability to refinance the project funds within the allocated time so that the project is relevant to be carried out.

Technical aspect of production and operations that considered the location of the production, sources of raw materials, labor, tools and machines required, transportations for distributions, and infrastructures that support the production process.

Socio-economic aspect that is expected to provide positive impacts to the community: opening job opportunities, increasing households and governments’ incomes and increasing the local and regional GDP.

The research included only primary data and the data collection method used was questionnaire survey. From the totality of the population, a sample has been established. To establish this sample, a criterion that is having home industry of the more than three years has been adopted. The sampling technique utilized was purposive sampling.

To highlight the methods used in these related studies, a table has been drawn in Annex 1. This table states the aspects taken into consideration for the project feasibility analysis, the variables for each aspect, the type of data and their sources, and the data collection methods used.
C. Idea Flowchart

![Idea Flowchart Diagram]

**Figure 3.** Idea flowchart
III. RESEARCH METHODS

A. Research period and research location

Thirteen months was required to carry out this research. It started in April 2014 and has been accomplished in May 2015. The research was conducted in the district of Ambatondrazaka-Madagascar, which included eleven Communes, namely, Ambatondrazaka Urban, Ambatondrazaka Sub-Urban, Feramanga Avaratra, Ambandrika, Ambohitsilaozana, Ambatosoratra, Imerimandroso, Manakambahiny Anderefana, Ampitatsimo, Ilafy, and Didy.

B. Data source

This research included both primary and secondary data. Primary data came from observations, tomato farmers, tomato paste sellers and importers, local and regional government workers, and experts. However, secondary data came from offices, libraries and internet materials. The choice of the experts was based on their knowledge and their experiences and they were involved particularly in the analysis of the situation.

C. Data collection method

Secondary data were collected through desk research method, however primary data were collected through interview and questionnaires. The collection of the primary data intended to deepen and actualize the information provided by the secondary data. The data collection locations were chosen purposely, however the respondents were selected randomly.

D. Situation analysis

According to Demetris and Alxis (2006), Strength, Weakness, Opportunity, and Threat matrix, known as SWOT matrix can be used to analyze the situation. It is built, based on the analysis of the situation’s internal and external key factors. The analysis of the internal key factors aims at identifying the situation strengths and weaknesses, however the analysis of the external key factors aims at identifying the situation’s opportunities and threats (Syed, et al. 2013). These key factors are related to the project feasibility study aspects such
as Technical and Technological, Market and Marketing, Managerial, Financial, and Environmental aspects. After their identification, the key factors are matched in order to get strategies such as Strength-Opportunity (SO), Weakness-Opportunity (WO), Strength-Threat (ST), and Weakness-Threat (WT). SO strategy uses the situation’s internal strengths to take advantages of external opportunities, WO strategy aims at improving the situation internal weaknesses by taking advantages of external opportunities, ST strategy uses the situation strengths to avoid or reduce the impact of external threats, and WT strategy aims at reducing the situation’s internal weakness and avoiding the situation’s external threats (Fred, 2011). The SWOT matrix is illustrated in the following figure:

<table>
<thead>
<tr>
<th>Internal Factors</th>
<th>Strengths (S)</th>
<th>Weaknesses (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opportunities (O)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Threats (T)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 4. SWOT matrix analysis*
E. Project Feasibility analysis

1. Variables

The variables used in this research are grouped based on the aspects of the project feasibility analysis as follows:

a. Technical and Technological analysis

According to Hasan, et al. (2012), the technical and technological analysis variables comprise:

- Project location and project duration;
- Project production capacity;
- Raw materials, by taking into account their source, their distribution, and their supply capacity (The analysis includes both primary and secondary data and the collection methods used for the primary data are interviews and questionnaires);
- Buildings and infrastructures required;
- Machines and technologies required; and
- Human resources skills required;

b. Market and Marketing analysis

According to Diane, et al. (2006), the Market and Marketing analysis includes variables, but not limited to, such as:

- Market demand and market supply, and the gap between them;
- Existing competitors, by taking into account their product prices, product qualities, and production scales (The data are collected from tomato paste sellers, tomato paste importers and government workers, through interviews and questionnaires); and
- The marketing strategy applied.

c. Managerial analysis

According to Peni, et al. (2011), the managerial analysis has variables such as:

- Project planning: project implementation planning, management level planning, work program planning, and
- Project organizing: department separation, and work distribution.
d. Financial analysis
According to Xiao and Pieter (2010), the financial analysis comprises variables such as:
- Funds source;
- Project’s operating cost;
- Project’s operating revenue; and
- Project’s operating profit.

e. Socio-Economic analysis
The Socio-Economic aspect analyzes the positive impacts of the project towards communities (Glen and Burton, 1997). Therefore, this aspect takes into consideration variables such as job opportunities, increase of the local and regional communities’ incomes, increase of the local and regional governments’ incomes, and increase of the local and regional GDP.

f. Environmental analysis
According to Burhanuddin (2006), the environmental analysis should take into consideration main variables such as:
- Water and Air/Wind availability;
- Wastes disposal or treatment sites availability; and
- Environmental impacts of the project;

2. Data analysis methods
a. Descriptive analysis method
This method is used to analyze the market demand and market supply, income per capita, demographic growth, and socio-economic and environmental impacts of the project.

b. Technical and Technological analysis method
Technical and Technological analysis method takes into account the raw material analysis, human resources skills analysis, infrastructure analysis, and machines and technologies analysis.
c. Financial analysis method

To analyze the financial feasibility of the project, the indicators used were Net Benefit Cost Ratio, Payback period, Net Present Value, and Internal Rate of Return.

**Net Benefit Cost Ratio:** Net Benefit Cost Ratio is used to compare the positive net present income with the negative net present income. If Net B/C is greater than 1, the project is feasible; but if Net B/C is smaller than 1, the project is not feasible. Net B/C formula is as follows (Salam, et al. 2006):

\[
\text{Net B/C} = \frac{\sum_{t=1}^{n} \frac{B_t}{(1+r)^t}}{\sum_{t=1}^{n} \frac{C_t}{(1+r)^t}}
\]

Where:
- \( B_t \) denotes the benefits received in a year (t);
- \( C_t \) refers to the costs incurred in a year (t);
- \( r \) is the rate of discount; and
- \( n \) refers to the number of the year.

**Payback period:** Payback period is used to indicate the period during which the cost of the investment will be earned back. If payback period is less than the duration of the project, the project is feasible. Otherwise, the project is not feasible (Suzan and Aboul-Nasr, 2013).

In case the annual cash flows of the company are uniform, the payback period can be calculated by using the following formula:

\[
T = \frac{I}{Â}
\]

Where:
- \( T \) represents the Payback period;
- \( I \) represents the Investment; and
- \( Â \) is the uniform cash flow per year.

But if the company’s cash flows are not uniform, cumulative cash flows method can be used to determine how long the cost of the investment will be amortized.
**Net Present Value:** Net Present Value (NPV) is a good method to assess the feasibility of the project by calculating the value of the income in the present and in the future. If NPV is positive, the project is feasible, but if NPV is negative, the project is not feasible (Carlo, 2010). NPV formula is as follows (Huang, 2014):

\[
NPV = \sum_{t=1}^{n} \frac{B_t - C_t}{(1 + r)^t}
\]

Where:
- \(B_t\) denotes the benefits received in a year \(t\);
- \(C_t\) refers to the costs incurred in a year \(t\);
- \(r\) is the rate of discount; and
- \(n\) refers to the number of the year.

**Internal Rate of Return:** Internal Rate of Return (IRR) is the discount level that makes NPV for a given project equal to zero (Chiang, et al., 2010). If IRR is greater than the current interest level, the project is feasible. Otherwise, the project is not feasible. IRR formula is as follows (Ibrahim, 2003):

\[
IRR = r_1 + \frac{NPV_1}{NPV_1 - NPV_2} (r_2 - r_1)
\]

Where:
- \(r_1\) is the NPV\(_1\) discount rate; and
- \(r_2\) is the NPV\(_2\) discount rate

**Calculation method:**
If NPV\(_1\) is positive, NPV\(_2\) must be negative. To make NPV\(_2\) negative, the value of the discount rate \((r_2)\) must be increased.
IV. RESULTS AND DISCUSSION

A. Profile of Ambatondrazaka District

1. Geographic location

Ambatondrazaka district is located in the province of Tamatave, more precisely in the region of Alaotra-Mangoro. The appellation *Alaotra-Mangoro* comes from the combination of the names of the largest lake of Madagascar, called Alaotra and the longest river of the region, called Mangoro. Alaotra Lac is located between the district of Ambatondrazaka and the district of Amparafaravola, yet Mangoro River is located in the district of Moramanga. Alaotra-Mangoro region has five districts, namely, Ambatondrazaka, Moramanga, Amparafaravola, Andilamena and Anosibe An’Ala (Fig. 5). The district of Ambatondrazaka has the highest number in term of population. This fact has particularly pushed the authorities to choose this district as a Capital City of the Region. Ambatondrazaka district is located 150 km in northeast of the Capital City of Madagascar, between the latitudes 17° and 18° in the South and the longitudes 48° and 50° in the East.

![Figure 5. Alaotra-Mangoro Region map](image)

*Source: Alaotra-Mangoro Region*

2. Climate

The district of Ambatondrazaka has two remarkable seasons: a hot, rainy season that starts from October and ends in March and a cooler, dry season that
starts from April and ends in September. The minimal temperature in Ambatondrazaka district is about 20°C, whereas the maximal temperature is about 34°C. The average temperature lies between 24°C to 26°C. Due to the climate change effects, the district of Ambatondrazaka is experiencing serious problems. These recent years, the district has only 100 days of raining a year and the average pluviometry varies between 1 092 to 1 200 mm (Ambatondrazaka district database, 2013). The supply of water for irrigations is therefore not satisfying. Obviously, this influences the cultivation conditions and may decrease crops productions, including tomato production.

3. Agricultural activities

The total surface of the district of Ambatondrazaka is about 6 492 Km². From this total, 417.47 Km² or 41 747 Ha is arable and the cultivated surface is about 355.60 Km² or 35 560 Ha (INSTAT database, 2013). This proportion shows that almost 85% of the arable surface is already cultivated. The main part of the used land is generally occupied by paddy farming. This is justified by the fact that 75% of the people living in Ambatondrazaka district are paddy farmers. The local and regional economy is thus largely dependent on paddy farming. Generally, the local farmers produce paddy once a year. This is because of the irrigation system which is still underdeveloped. However, there are some zones well irrigated where farmers can produce paddy two times a year. The cultivation of paddy is generally conducted in December, January, and February and the harvesting season is in May, June, and July. When the fields are free from paddy, July to December, farmers cultivate some fruits and vegetables, including tomato.

The cultivation of fruits and vegetables is mostly conducted in the eastern part of Alaotra Lake, particularly in four Communes, namely, Ambohitsilaozana, Ambandrika, Feramanga Avaratra, and Ambatondrazaka Sub-Urbane. This type of cultivation is ranked in the second position after paddy farming, which is called Voly Avotra in Malagasy language. The Voly Avotra is presently promoted by the ministry of agriculture in order to keep the soil more fertile and more productive. Thereby, many of the local farmers alternate paddy
cultivation with *Voly Avotra* throughout the year. The farmers operating in the *Voly Avotra* are grouped in a cooperative called *Avotra*. This cooperative covers the four mentioned Communes that practice fruits and vegetable cultivations. The cooperative has been established on June 27, 2008 and already has about seventy members. According to its members, the *Voly Avotra* is conducted at least by 85% of the local paddy farmers and is dominated by tomato cultivation. The average production of tomato during the hot season in each of these four Communes varies between seven and eight tons per day. This allows thus the eastern part of Alaotra Lake to produce an average production of about 40 to 50 tons per day.

The total surface used for agricultural activities in these four Communes is illustrated in the table 1. According to this table, these four Communes have arable and cultivated surfaces of about 3 296 and 1 891 Hectares, respectively. This means that a vast non-used surface of about 1 445 Hectares is still exploitable for tomato cultivation.
Table 1. Total arable and cultivated surfaces in the four Communes considered as main producers of tomato in Ambatondrazaka district in 2013.

<table>
<thead>
<tr>
<th>Commune</th>
<th>Perimeter</th>
<th>Used surface (Ha)</th>
<th>Non-used surface (Ha)</th>
<th>Arable surface (Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambandrika</td>
<td>Manamontana RG</td>
<td>300</td>
<td>711</td>
<td>1011</td>
</tr>
<tr>
<td></td>
<td>Andingadingana</td>
<td>221</td>
<td>290</td>
<td>511</td>
</tr>
<tr>
<td>Ambatondrazaka</td>
<td>Sub-Urbane</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambodikininina</td>
<td>20</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Lohafasika II</td>
<td>246</td>
<td>0</td>
<td>246</td>
</tr>
<tr>
<td></td>
<td>Mahalavada</td>
<td>286</td>
<td>0</td>
<td>286</td>
</tr>
<tr>
<td>Ambohitsilaozana</td>
<td>Manamontana RD</td>
<td>600</td>
<td>444</td>
<td>1044</td>
</tr>
<tr>
<td></td>
<td>Ambodivoara</td>
<td>40</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td>Feramanga Nord</td>
<td>Mangalaza</td>
<td>178</td>
<td>0</td>
<td>178</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td><strong>1 891</strong></td>
<td><strong>1 445</strong></td>
<td><strong>3 296</strong></td>
</tr>
</tbody>
</table>

Source: INSTAT database, 2013

4. Administration and Population

Ambatondrazaka district is divided into twenty Communes, namely, Ambatondrazaka Urbane, Ambatondrazaka Sub-Urbane, Feramanga Avaratra, Ampitatsimo, Ambohitsilaozana, Ambandrika, Ilafy, Didy, Manakambahiny Ouest, Antsangasanga, Bejofo, Andilanatoby, Soalazaina, Tanambao Besakay, Ambatosoratra, Amparihitsokatra, Manakambahiny Est, Imerimandroso, Andromba, and Antanandava. The distribution of the populations in these Communes is not uniform. Ambatondrazaka Urbane is recognized as the most populated Commune, followed by Ambatosoratra, and Ambandrika. The population of Ambatondrazaka Urbane Commune represents the quarter of that of Ambatondrazaka district, which attained 10 6 937 in 2013 (Table 2). The
three less populated Communes of the district are Andromba, Antsangasanga, and Feramanga Avaratra. In 2013, their total populations are 6,024, 9,337, and 9,575, respectively. Thereby, the total population of Ambatondrazaka district in 2013 was estimated at 439,570.

**Table 2. Total Population of Ambatondrazaka District in 2013**

<table>
<thead>
<tr>
<th>District</th>
<th>Commune</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambatondrazaka</td>
<td>Ambatondrazaka</td>
<td>106,937</td>
</tr>
<tr>
<td></td>
<td>Urbaine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ambohitatsimo</td>
<td>26,895</td>
</tr>
<tr>
<td></td>
<td>Ambohitsilaozana</td>
<td>19,074</td>
</tr>
<tr>
<td></td>
<td>Ambandrika</td>
<td>29,770</td>
</tr>
<tr>
<td></td>
<td>Ilafy</td>
<td>15,712</td>
</tr>
<tr>
<td></td>
<td>Didy</td>
<td>21,974</td>
</tr>
<tr>
<td></td>
<td>Manakambahiny ouest</td>
<td>26,972</td>
</tr>
<tr>
<td></td>
<td>Antsangasanga</td>
<td>9,337</td>
</tr>
<tr>
<td></td>
<td>Bejofo</td>
<td>21,004</td>
</tr>
<tr>
<td></td>
<td>Andilanatoby</td>
<td>23,662</td>
</tr>
<tr>
<td></td>
<td>Soalazaina</td>
<td>11,435</td>
</tr>
<tr>
<td></td>
<td>Tanambao besakay</td>
<td>12,629</td>
</tr>
<tr>
<td></td>
<td>Ambatosoratra</td>
<td>31,879</td>
</tr>
<tr>
<td></td>
<td>Amparihitsokatra</td>
<td>12,485</td>
</tr>
<tr>
<td></td>
<td>Manakambahiny est</td>
<td>9,897</td>
</tr>
<tr>
<td></td>
<td>Imerimandroso</td>
<td>19,943</td>
</tr>
<tr>
<td></td>
<td>Andromba</td>
<td>6,024</td>
</tr>
<tr>
<td></td>
<td>Antanandava</td>
<td>13,326</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>439,570</strong></td>
</tr>
</tbody>
</table>

Source: Ambatondrazaka District database, 2013
The population of Ambatondrazaka district increases from one year to another. If it was estimated about 364,286 in 2008, it climbed up to 439,570 in 2013. The total population of Ambatondrazaka district from 2008 to 2013 is shown in the table 3. This table highlights that the annual average growth rate of Ambatondrazaka district population is about 5%.

**Table 3. Ambatondrazaka district population from 2008 to 2013**

<table>
<thead>
<tr>
<th>District</th>
<th>Ambatondrazaka</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>364,286</td>
</tr>
<tr>
<td>2009</td>
<td>390,247</td>
</tr>
<tr>
<td>2010</td>
<td>416,208</td>
</tr>
<tr>
<td>2011</td>
<td>434,044</td>
</tr>
<tr>
<td>2012</td>
<td>359,070</td>
</tr>
<tr>
<td>2013</td>
<td>439,570</td>
</tr>
</tbody>
</table>

Source: Ambatondrazaka district database, 2013

**B. Situation analysis**

The tool used for analyzing the situation is SWOT matrix. The determination of the internal key factors such as Strengths, and Weaknesses and the external key factors such as Opportunities, and Threats were mainly based on experts’ analyses. Three experts are involved in the situation analysis, namely, Benoit Rakotondrasata, expert in tomato production; Lanto Ravalitera, expert in fruits and vegetables conservation/transformation; and Marius Andriamainty, expert in rural development policy. Their profiles are shown in the following table.

**Table 4. Profiles of the experts**

<table>
<thead>
<tr>
<th>Nº</th>
<th>Name</th>
<th>Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Benoit Rakotondrasata</td>
<td>Vice President of Avotra Cooperative and President of the Rural Development Working Group (GTDR). Ex-researcher in the Regional Research Center of Middle East (CALA), sector of fruit and vegetable and Responsible of seed control in the Regional Department of Agriculture.</td>
</tr>
<tr>
<td></td>
<td>Lanto Ravalitera</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Marius Andriamainty</td>
<td>Ex-researcher in CALA, sector of fruit and vegetable and Regional director of rural development.</td>
</tr>
</tbody>
</table>

Source: Author
The situation analysis highlighted that there are six opportunities and two strengths that lead into the creation of the company (Figure 6). According to the result of the research survey, the cultivation of tomato in Ambatondrazaka district is mostly conducted in four communes, namely, Ambohitsilaozana, Ambandirka, Aferamanga Avaratra, and Ambatondrazaka Sub-urbane. Through these Communes, the district is capable to produce up to about 200 tons of fresh tomato per day during the hot season. This is an enormous production which exceeds the needs of the local and regional markets. This case offers a potential opportunity to transform fresh tomato into paste. On the other hand, the price of fresh tomato is very interesting. Tomato paste can be preserved for long time and its transportation to the provincial and national markets doesn’t require a specific care.

Presently, there is no company that transforms fresh tomato into paste in Madagascar. However, the machines and technologies required for tomato paste processing are available. According to the online survey, a country such as China currently proposes various types of machines and technologies that can be used for this operation. Their prices are reasonable and their transportation to Madagascar needs only about 15 to 30 days.

Madagascar is divided into six provinces, namely, Antananarivo, Fianarantsoa, Toamasina, Mahajanga, Antsiranana, and Toliary and has a total population of 21 842 167 in 2013 (INSTAT database, 2013). These provinces constitute potential markets that need a large quantity of foods, including tomato pastes. However, as Madagascar does not produce tomato pastes, the markets are supplied by industrialized countries such as Italy and China. This importation affects Malagasy trade balance and represents a considerable loss of the national currency value. Therefore, the creation of a company that produces tomato paste in the Malagasy territory will not only satisfy the markets, but also contribute to the economic growth.

Ambatondrazaka district already has an adequate financial support system required for such investment. There are two big banks such as Bank of Africa (BOA) and Banque Nationale de l’Industrie (BNI), and many micro-credits such as Première Agence de Microfinance (PAMF), Réseau Caisse...
Starting from 2014, the Malagasy government is promoting Small and Medium Enterprises (SMEs). The economy of Madagascar is largely dependent on agriculture and Small and Medium Enterprises (SMEs). However, the political and economic crisis of 2009 and 2010 had leaded these sectors into difficulties. To remedy this problem, the current government decided to facilitate the creation of SMEs and promotes Malagasy brands. This is considered as the greatest opportunity because political factors have always been seen as the main blockade in project developments in Madagascar.

However, as it is shown in the Figure 6, there are some weaknesses and threats to which the project should address. Firstly, the district of Ambatondrazaka doesn’t yet have skilled workers. Yet, the creation of the company will need high-skill in both management and tomato paste processing. This may affect the quality of the service and product introduced by the company. Consequently, the company’s product may be rejected by the markets. Secondly, the supply of tomato during the period of December until February is low. During this period, the average supply of fresh tomato in the whole district is only about 10 tons per days. Thirdly, the political interventions in businesses represent a serious menace for the company. The government may increase significantly the taxes in short time and may also increase the food importations.

According to Kalpande et al. 2010, the situation’s threats and weaknesses can be overcome by applying WO, ST, and WT strategies. Therefore, to improve workers’ skills, the company will need to train workers as better as possible. The training can be done by machine suppliers or by national/international experts. To guarantee its stability, the company should...
build a good relationship with the local and central governments. The company should therefore pay taxes regularly and on time and provide some activities that will be beneficial for both the local and regional communities. To ensure the availability of tomato during the raining season, December to February, the company together with farmers should find places where tomato cultivation can be conducted. Based on the research findings, the cultivation of tomato during this period is possible by using uplands.

<table>
<thead>
<tr>
<th>Internal Factors</th>
<th>Strength (S)</th>
<th>Weakness (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Availability of the required fund, 55% covered by the future shareholders of the company.</td>
<td>1. Low competence in management and organization</td>
</tr>
<tr>
<td></td>
<td>2. The future shareholders of the company are very motivated for investing.</td>
<td>2. Low competence in tomato paste processing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>External Factors</th>
<th>Opportunities (O)</th>
<th>Strength Opportunity (SO)</th>
<th>Weakness Opportunity (WO)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Availability of fresh tomato to be transformed into paste.</td>
<td>1. Completing the required fund by borrowing from Bank Of Africa (BOA).</td>
<td>1. The company’s manager should be trained to be good at management and organization.</td>
</tr>
<tr>
<td></td>
<td>2. The company’s personnel should be trained to dominate the machines and technologies used for tomato paste processing.</td>
<td>2. Creation of a company that produces tomato paste in the district of Ambatondrazaka.</td>
<td>2. The company’s personnel should be trained to dominate the machines and technologies used for tomato paste processing.</td>
</tr>
<tr>
<td></td>
<td>3. Availability of machines and technologies required for tomato paste processing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Existence of potential markets for tomato paste such as provincial and National markets.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Existence of financial support system required for such investment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. The current Malagasy government is supporting the creation of SMEs and is also promoting the Malagasy brands.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Threats (T)
1. The low supply of fresh tomato during December until February may reduce the company’s production.
2. The markets may reject the company’s product if it is low quality.
3. The political interventions may affect negatively the company’s businesses.

Strengths

Strengths Threats (ST)
1. The company should work closely with tomato farmers, through the establishment of contracts.

Weaknesses

Weaknesses Threats (WT)
1. The company’s workers should be trained to produce quality product.
2. The company together with tomato farmers should find places where tomato can be cultivated during December until February.

C. Project feasibility analysis

1. Technical and Technological analysis

   a. Project location and project duration analysis

   The company has two shareholders and its entity is limited partnership. This is a small company that has two departments, namely, production and commercial departments. The location of the production department will be chosen based on resource base approach. It will therefore be located in a place where potential suppliers of fresh tomato are available. Four Communes are seen as potential suppliers of fresh tomato in Ambatondrazaka district, namely, Ambatondrazaka Sub-Urban, Feramanga Nord, Ambandrika, and Ambohitsilaozana. The one which is located in the center and should be chosen as a site of production is Ambandrika. However, this Commune does not have sufficient resource of water which is required for ensuring the company’s activities. That is why the Commune of Ambohitsilaozana has been selected as a site of production. The Commercial department will be located in Ambatondrazaka City. This choice has been made based on market base approach. This will thus allow the company first, to get close to the potential consumers and second, to facilitate the market and
marketing activities, which are very important for the company’s business life.

The duration of the project has been set at five years, based on both the company’s objectives and the company’s equipments useful life. The company will invest only once during the five years but at the sixth year, it will extend its business and, if possible, move to the next scale that is a medium scale.

b. Production capacity and raw materials analysis

Every country has its own criteria to classify the Companies. These criteria are mostly dependent on the economy and the culture of the Country in question. However, the total number of the employees is still the main criterion used to classify the companies. In Africa, including Madagascar, the total employees of the small company vary between 10 and 50. Thus, the company proposed by this research will be classified among the small ones.

The total production of the company will be about 500 Kg per day. Based on the product formula, the company’s daily production requires 3 tons of fresh tomato, 7 150 pouches and 140 boxes for packaging, 100 Kg of salt, 50 Kg of sugar, 15 Kg of garlic and 25 liters of oil. All of these raw materials are available in the local and national markets, except the pouches that will be imported from China.

As it has been stated, the main producer of fresh tomato in Ambatondrazaka district is its eastern part. This starts from the Commune of Ilafy and ends in the Commune of Ambatosoratra, located in the southern and northern parts of Ambatondrazaka district, respectively. However, the most potential producers comprise four Communes, namely, Ambatondrazaka Sub-Urbane, Aferamanga Avaratra, Ambandrika, and Ambohitsilaozana. These Communes produce permanently tomatoes but the production capacity varies regarding the season and the needs of the markets. The two main varieties of tomato cultivated by farmers are Marglobe (round fruits) and
Roma VF (elongated fruits). Therefore, the market is largely dominated by Roma VF, which is more resistant and less perishable. The research finding highlighted that the yield of tomato in these four Communes varies between forty eight and fifty four tons per hectare, which allows each of them to produce an average production of about eight to ten tons per day. The maximum production of 48 tons per day is attained in August, September, October, and November, during which the fields are free from paddy so that farmers can practice the cultivation of *Voly Avotra*. However, the production in December, January, and February is very low that is about 1.5 to 3 tons per day. This low production is first due to the occupation of the fields by paddy and second, due to the abundance of the rainfall. The cultivation of tomato during this period is thus conducted in uplands, called *Baiboho* in Malagasy language. The surface of the existing uplands in Ambatondrazaka district is still very large. But as the majority of the local farmers practice paddy cultivation during this period, the production of tomato decreases. However, farmers affirmed that the cultivation during this period is more profitable; the yield is much better and the cost of production decreases. This is because of two facts first, farmers do not need to irrigate tomato fields during this period and second, tomato diseases are not as harmful as usual.

The production capacities highlighted that whatever the season, the company can ensure its supply of fresh tomato, which is about three tons per day. However, the company will need to cooperate and work closely with tomato farmers. This can be done through the establishment of contracts between them. In the four Communes subject of this research, tomato farmers are grouped in a cooperative called *Avotra*. This cooperative was established in order to protect farmers and to search for new markets. The conducted survey pointed out that the farmers grouped in this cooperative are very interested for the implementation of the project and are willing to work together with the company.

Currently, farmers sell tomatoes in crates that weight about 20 to 40 Kg, regarding the capacity of the transportation used (Fig. 7). Usually,
the crates are not provided by farmers so buyers should come with when they want to purchase tomatoes. In 2014, a tomato crate price was about US$ 10 during the rainfall season. However, the price during the cool season was about US$ 1.6. The company also plans to use crates for buying and transporting tomatoes up to the production Unit. Therefore, it will buy a tomato crate of about 30 Kg at US$ 4. This price has been approved by farmers and already includes the transportation costs.

![Tomato crates](image)

Figure 7. Tomato crates
Source: Author

c. Building and infrastructure analysis

The buildings and infrastructures required for a given company depends mostly on its activities. But the local and national regulations may also force the company to own specific infrastructures in order to protect workers and preserve the surrounding environment. That is why the authorities of Ambohitsilaozana Commune announced that the company’s location and the dimension of its building should comply with the local and national environment regulations. This requirement concerns particularly the building used for the production. Thus, the production Unit will be located beside the village and probably in the western part.

Based on the company’s activities, two buildings will be required and each of them must have at least two rooms. The dimension of the
building used by the production department should be at least 50 m². Half of this space will be used for its activities and the rest will be used for the storage of fresh tomatoes. As the building does not yet exist, the company should construct it. The building required for the commercial department is expected smaller than that of the production department. The commercial department will need two rooms that size about 40 m². 16 m² will be used as office and the rest will be used as warehouse. This building will be rented and will of course be located in Ambatondrazaka City Center.

All of the infrastructures required for the commercial department are already available. However, the production department will require some constructions such as road and building constructions. The main road required for the transportation of the raw material and finished product is already available. But as the production department is located beside the village, the company has to construct a short road of 5 to 10 meters. The company also will need to construct a site and channel for treating and evacuating the released wastewater.

The energy used by both departments will be from JIRAMA (Jiro sy Rano Malagasy). JIRAMA is a state company that provides electricity in Madagascar. According to its regional department, this company still has sufficient capacity for supplying such project.

The communication of the company will be based on cell phone and internet. Cell phone will be used for both internal and external communications. Three mobile operators are available in the district, namely, Telma, Orange, and Airtel. As each of them has specific offers, the company will choose the one that can best meet its needs. However, the internet will be used especially for external communications. A big part of the company’s advertisements such as e-mail and social network advertisings will be conducted through internet. The company’s source of internet connection will be Blueline Madagascar that has high-speed and affordable price.
d. Machines, Technologies and equipments analysis

The production of pouched tomato paste requires specific techniques and advance technologies. These techniques and technologies obviously differ from those used for canned tomato pastes. Tomato paste processing starts with tomato washing and tomato sorting. Tomato washing aims to render fresh tomatoes free from undesirable matters and organisms, yet tomato sorting aims to eliminate undesirable tomatoes such as spoiled and unripe tomatoes. These operations will be entirely manual that need two persons. The tomato washing will therefore be conducted in plastic tube such as follows (Fig 8):

![Tomato washing tube](source:_supplier)

Figure 8. Tomato washing tube

Source: Supplier

The second step of tomato paste processing is tomato paste making. This operation will be entirely ensured by machine, called tomato paste making machine. The tomato paste making machine used by the company is illustrated in the figure 9. This machine can produce 100 to 500 Kg of tomato paste per hour. It can thus ensure the expected total production of the company, which is about 500 Kg per day. The particles of tomato paste produced by this machine vary between 2 and 50 microns. These particles are classified among ultrafine particles, which are required for producing high tomato paste quality.
The third step of tomato paste processing is tomato paste pasteurization. The pasteurization aims at eliminating pathogenic microbes and lowering microbial numbers in order to preserve the quality of tomato paste. This objective can be attained when the tomato paste is heated over 70 °C for 15 to 20 seconds. This treatment will be combined with tomato paste cooking, during which all of the ingredients will be added. These ingredients comprise salt, sugar, oil and garlic. The machine used for this operation is stated in the figure 10. This machine allows operators to set automatically both the temperature and time necessary for the pasteurization and cooking. Therefore, it can achieve both tomato paste pasteurization and tomato paste cooking within a well-defined time.
The last step of tomato paste processing is tomato paste packaging. This step is also performed entirely by machine called packaging machine. The packaging machine used by the company is stated in the figure 11. This is an automated machine that has two parallel lines and can produce up to seventy pouches of tomato paste within one minute. This machine will be run by one operator and one agent of production.
Machine Technical data
- Material: Stainless steel
- Packaging Speed: 30-70 pouches/min
- Packaging range: 30-300ml

The company will need equipments such as office and quality control equipments. The office equipments comprise computers, printers, chairs, tables, calculators and so on. However the quality control equipments comprise pH-meter, and refractometer. pH-meter is important for controlling the acidity of the product that directly affects not only its organoleptic quality, but also its expiration date. Therefore, the company should control this parameter and set its value at around 4, where the product can be preserved for long time. Refractometer also constitutes an important tool in tomato paste control. This allows the company’s technicians to know whether the double concentration is already attained.

e. **Human resources skills required analysis**

The Human resources skills required for the two departments are obviously different. The skills required for the production department are more technical and technological, yet those required for the commercial
department are more strategic. Therefore, the responsible of the production department should have first, knowledge related to human resources management and second, knowledge related to tomato paste processing. According to the analyses of the experts, these required skills may not be available in Ambatondrazaka district. In this case, the company should hire someone who comes from Antananarivo or Toamasina provinces. However, hiring someone in the district is not unimaginable but the company has to train him or her as better as possible.

The responsible of the commercial department should be a strategist. He or She has to know how to implement marketing strategies and how to inter the product onto the markets. These required skills may be available in Ambatondrazaka district because of the existence of many Universities that propose marketing as specialization. However, the hired person has to be trained as better as possible in order to accomplish his or her job properly.

2. Market and Marketing analysis

Market and marketing analysis is considered as one of the most important analyses in project feasibility study. The parameters and variables taken into consideration in this analysis vary regarding the project being analyzed. However, it has to include main variables such as existing competitors, market demand, market supply and marketing strategy applied.

In October 2014, a market research has been conducted in Ambatondrazaka district. This research included 5 Wholesalers, 10 Supermarkets, 67 Regular Shops, 65 Restaurants, and 67 Households that are dispersed in eleven Communes, namely, Ambatondrazaka Urban and Ambatondrazaka Sub-Urban (in the Center); Feramanga Avaratra, Ambandrika, Ambohitsilaozana, Ambatosoratra and Imerimandroso (in the North); Manakambahiny Andrefana (in the South); Ampitatsimo (in the West); and Ilafy and Didy (in the East).
The findings highlighted that four tomato paste brand names such as Fana, Heven, Evita, and Bravo Salsa are available in the local and regional markets (Figure 12). Fana, Heven and Bravo Salsa are produced in Italy, however Evita is produced in China. These products are imported by companies such as Societé E.N that imports Fana; UCODIS that imports Hevene; SKL that imports Evita; and RMB that imports Bravo Salsa. All of these companies are located in the Capital City of Madagascar.

![Figure 12. The existing tomato paste in the local market. Source: Author](image)

The net weight per unit of these products is 70g. The selling price of Heven, Evita, and Bravo Salsa in Ambatondrazaka City is US$ 0.24. However, selling price of Fana is US$ 0.28. These prices increase along with the distance from Ambatondrazaka City. In spite of its price, Fana is still the most purchased product and is continuing to dominate the local and regional markets. According to the consumers, this product has better quality as compared to others.

Almost 60% of the supermarkets and regular shops located in the district of Ambatondrazaka are supplied by four wholesalers, namely, Wai Albert, Bernadette, Bernard and Raherivelo, which are located in Ambatondrazaka City. Wai Albert ensures the highest supply that is about 1 500 cans or about 100 Kg of tomato paste per month. The total supply per month of these four wholesales is about 300 Kg. The rest of the market, 40%, is directly supplied by tomato pastes importers that are located in Antananarivo City. It means that the total supply of tomato pastes in Ambatondrazaka district is about
420 Kg per month. However, during the raining season, where fresh tomatoes are very scarce, this supply increases by 30 to 50%. The annual growth rate of tomato paste supply in Ambatondrazaka district is about 5%. This rate depends mostly on the population growth.

All of the supermarkets located in Ambatondrazaka district and almost 90% of the regular shops located in Ambatondrazaka Urban and Ambatondrazaka Sub-Urban Communes sell tomato pastes. However, only about 25% of the regular shops located in Feramanga Avaratra, Ambandrika, Ambolitsilaozana, Ambatosoratra, Imerimandroso, Manakambahiny Andrefana, and Ampitatsimo Communes sell them. There is no tomato pastes seller in Ilafy and Didy Communes, yet the Commune of Didy represents an interesting market that should be exploited.

The average supply of each supermarket is about 70 cans or about 5 Kg per month and the average supply of each regular shop is about 50 cans or about 3.5 Kg per month. The difference between these two supplies is not significant due to the fact that people living in Ambatondrazaka district are still used to buy something from the nearest regular shops.

According to the 35% of the supermarkets and regular shops interviewed, the current total supply of tomato pastes in the district of Ambatondrazaka does not satisfy the market demands. Hence, its average demands is estimated about 450 Kg per month. This quantity covers both the restaurants and households’ needs (ultimate customers). Almost 70% of the restaurants located in Ambatondrazaka district use tomato pastes and most of them purchase it from the nearest selling places. The big restaurant can consume up to five cans per day, however the small one consumes only about one to two cans per day. According to them, tomato pastes provide specific advantages to their cooking. It makes food tastes and food textures more desirable. The consumption of households is very low. Only about 13% of them regularly consume tomato pastes. The rest consume only whenever fresh tomato is not available.

Based on these data, the current demand of Ambatondrazaka district is estimated about 3 to 5% of the total production of the company. But it may
increase up to 9 to 15% whether the company develops an effective marketing strategy. The company will need thus to look for other markets. According to its chamber of commerce, Alaotra-Mangoro region has seven potential markets, excluding that of Ambatondrazaka City. These markets comprise six Cities, namely, Andilamena, Amparafaravola, Atanambe, Morarano Chrome, Moramanga and Nosibe An’Ala and one international company called Sherritt. The consumption of each of them is not far from that of Ambatondrazaka City. So approximately, the regional market can consume at least 50% of the company’s total production. The remaining quantity of about 250 Kg will thus inter to the provincial and national markets.

The two main suppliers of fresh tomato in the national scale are Alaotra-Mangoro and Itasy regions. Alaotra-Mangoro region through the district of Ambatondrazaka supplies permanently tree provinces such as Toamasina, Antananarivo and Majunga. This supply is about seventy ton per day during the hot season. This means that the demand of the provincial and national markets is very high so that entering 250 Kg of tomato paste in these markets should not be difficult.

As the gap between the markets’ demands and markets’ supplies is narrow, the company should apply an effective strategy for conquering the markets. The marketing strategy applied by the company will be Product, Price, Promotion, and Place strategy, known as 4Ps strategy. The company’s product will be conceived as better as possible, based on both differentiation and innovation. The market research highlighted that people are willing to pay the new product whether it is a good quality. This quality refers first, to the organoleptic quality and second, to the packaging quality. Hence, the company will pay a special attention upon them. On the other hand, the company also plans to guarantee its product quality and safety by implementing Hazard Analysis and Critical Control Point System (HACCP System). HACCP is a production control system for the food industry that identifies where potential contamination can occur (the critical control points or CCPs) and strictly manages and monitors these points as a way of
ensuring the process is in control and that the safest product possible is being produced (Piotr and Tadeusz, 2011).

The new product introduced by the company will weight 70 g, which includes new ingredients such as sugar, oil and garlic. The packaging used by the company will be made of plastic but its internal surface will be in aluminum (Figure 13). To facilitate the transportation of the finished product, the company also will use boxes. Each box will contain 50 pouches of tomato paste. The utilization of these packagings and the inclusion of the new ingredients will make the product very different as compared to those of the competitors. It will thus allow the company to apply product differentiation strategy.

To conquer the market, the company will apply low pricing strategy. The product’s formula and its packaging type will enable the company to offer an original product with a low price. The company’s product basic and selling prices will be set based on the company’s operating unit cost and the competitors’ product selling prices. The company’s operating unit cost (UC) is calculated as follows:

\[ UC = \frac{FC + VC}{Q} \]

Where:

UC: Operating unit cost;
FP: Operating fixed cost;
VP: Operating variable cost; and
Q: Total quantity of the production

Thereby, the company’s operating unit cost will be US$ 0.171. Based on this cost and the competitors’ product selling prices, the company’s product basic price will be set at US$ 0.18. By taking into account a tax on value added of 18% (based on Malagasy tax) and a profit taken by traders, the company’s product selling price will be US$ 0.22. This selling price is of course lower than those of the competitors.

The company’s warehouse will be located in Ambatondrazaka City in order to facilitate the supply of the wholesalers, supermarkets and regular shops. According to the market research, these customers are willing to purchase the product as long as the quality is good. The company will deliver its product to the local and regional customers by using its own transportation. However, the transportation to the provincial and national markets will be ensured by transportation Companies and/or trains.

As it is a new product, the company will need to boost its sales through promotions. Many types of promotion such as advertisement, sales promotion, direct e-mail to subscribers, internet marketing and sponsorship will be applied by the company. The advertisements will be conducted through local radio stations, televisions and brochures. This action aims first, at letting people know that the new product exists and second, convincing them to purchase it. The advertisements will also be completed by seminars and exhibitions. The sales promotions will be used to obtain an increase in sales for a short term, which may be done through special offers and discounts. The direct e-mail will allow the company to use its resources more effectively by sending advertisement materials to subscribers within the company’s target segment. By personalising its advertisement, the company may increase the chance of improving sales. Various forms of online marketing techniques such as banner advertisement, videos or social network will be applied by the company to promot and sell its product. For sponsorship, the company will use organizations such as football teams or singers groups. The chosen organizations must be well known and have a
high profile in order to make sure that the company’s brand name and logo will be seen by many people.

3. Managerial analysis

The managerial aspect takes into consideration first, the project planning that includes time planning, management level planning and work program planning and second, the project organizing that includes department separation and work distribution.

According to Alam (2014), Gantt chart can be used for scheduling an entire or a part of a given project. Here, this tool is used for planning the implementation of the project (Figure 14). The chart states that the project implementation will start with the land purchase, which may take about one week. Once the land is purchased, some activities such as road and building constructions will be conducted. As it is a short road, its construction will take only about five or six days. However, the construction of the building will take long time, which is estimated about eight months. The installation of the machinery and equipments will start two days after the completions of the road and building constructions. As the machines will be imported from China, their purchases should be carried out two months before the installations. The machinery and equipments installations will need only about one week.

To run the company’s activities, human resources are also required. The personnel of the company will be recruited two weeks before the machinery and equipments installations. But it is noted that the recruitment process will start at least two months before it. When the personals are recruited, they are directly invited to be trained. The head of the department training will take about twenty days but that of the agents will take only about ten days. It is also noted that the trainings include the production test that will takes about three days. Based on these durations, eight months and 20 days will be required for the implementation of this project. So if the terrain purchase is effectuated on Augustus 3, 2015, the company will be operational on April 4, 2016.
<table>
<thead>
<tr>
<th>Project implementation planning</th>
<th>Start</th>
<th>End</th>
<th>Duration</th>
<th>Q4</th>
<th>Q1</th>
<th>Q2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation Duration</td>
<td>03/08/15</td>
<td>27/04/16</td>
<td>231</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchases</td>
<td>03/08/15</td>
<td>18/04/16</td>
<td>223</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land</td>
<td>03/08/15</td>
<td>03/08/15</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machines</td>
<td>15/02/16</td>
<td>15/02/16</td>
<td>55</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipments</td>
<td>11/04/15</td>
<td>11/04/15</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constructions</td>
<td>10/04/15</td>
<td>16/04/16</td>
<td>218</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>10/04/15</td>
<td>16/04/16</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Building</td>
<td>18/08/15</td>
<td>16/04/16</td>
<td>211</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Installations</td>
<td>18/04/16</td>
<td>23/04/16</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipments</td>
<td>18/04/16</td>
<td>20/04/16</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machines</td>
<td>18/04/16</td>
<td>25/04/16</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recruitments</td>
<td>04/01/16</td>
<td>11/04/16</td>
<td>85</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responsables</td>
<td>04/01/16</td>
<td>04/04/16</td>
<td>79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agents</td>
<td>07/03/16</td>
<td>11/04/16</td>
<td>31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trainings</td>
<td>04/04/16</td>
<td>25/04/16</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responsables</td>
<td>04/04/16</td>
<td>25/04/16</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agents</td>
<td>11/04/16</td>
<td>25/04/16</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production test</td>
<td>25/04/16</td>
<td>27/04/16</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 14.** Project implementation planning

Source: Author
The company will have two levels of management. The top level, manager level, will be responsible of the company’s strategies formulation. The manager will need thus to find out what strategies should be applied to conquer the markets and how to produce tomato paste efficiently. The second level, head of department level, will apply what the manager has formulated. However, in order to improve its ability, the company will apply employee empowerment strategy. This strategy will make the personnel more autonomous so that the decision making process and the job execution in any level will be fluent. On the other hand, this also will promote the personnel to be more creative and more visionary. Their creativities and their visions will obviously be helpful first, for improving the performance of the company and second, for discovering more opportunities.

The personnel of the company will work six days a week. This means that Saturday will be included among the working days. Concerning the work schedule, the company will start working at 7 o’clock in the morning and ends its activities at 17 o’clock in the evening. However, a rest for one hour and thirty minutes will be given to the personnel at midday. This schedule corresponds to the Malagasy work law, which stipulates that workers shouldn’t work more than eight hours a day. In case the company works overtime, the personnel must be informed before and receive their additional salaries at the end of the month.

The company’s organization chart is illustrated in the figure 15. This figure shows the two departments of the company, namely, production and commercial departments that are under the responsibility of the manager. The company’s manager will be assisted by both heads of departments. The production department will employ ten persons, namely, its head, the responsible of quality control, three machine operators, and four production agents. The responsible of quality control will not only test the quality of the product, but also give some technical assistance to the workers, particularly to the machine operators. The operator of the tomato paste making machine will be assisted by two agents. These agents will ensure first, the fresh tomato washing and sorting and second, the fresh tomato transportsations.
However the responsible of the pasteurizer and packaging machines will be assisted only by one agent, respectively.

The total number of the personnel working in the commercial department will be four. It comprises the department head, two commercial agents and one driver. The commercial department head will apply the company’s marketing strategy through the assistance of his two agents. However, the driver will ensure all transportations, particularly the delivery of the finished products. But it is noted that the head of the commercial department also will act as warehouse responsible.

![Figure 15. Company’s organization chart](Source: Author)

4. Financial analysis
   a. Feasibility analysis

   According to many authors, the financial aspect is the most important aspect in project feasibility analysis. The financial aspect analyzes the fund required for the project and its source and particularly the company’s cash flows. In order to project the company’s cash flows, the company’s operating cost, operating revenue and operating profit must first be analyzed. Through this projection, financial indicators such as Net Benefit Cost ration, Net Present Value, Internal Rate of Return and Payback period can be calculated.
The fund required to start the project includes both the initial investment (Io) and the budget required to run and secure the company’s activities during the first month. As shown in the table 5, the initial investment required to start this project is US$ 17,812. This amount already takes into account the purchases of the land, machines and equipments and the costs of the constructions such as road and building constructions.

<table>
<thead>
<tr>
<th>Component</th>
<th>Unit</th>
<th>Total</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land</td>
<td>m²</td>
<td>80</td>
<td>800</td>
</tr>
<tr>
<td>Road/Channel/Wastes’ sites</td>
<td>m</td>
<td></td>
<td>400</td>
</tr>
<tr>
<td>Building</td>
<td>m²</td>
<td>50</td>
<td>7000</td>
</tr>
<tr>
<td>Transportation</td>
<td></td>
<td>1</td>
<td>1500</td>
</tr>
<tr>
<td>Machines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tomato paste making machine</td>
<td></td>
<td>1</td>
<td>1700</td>
</tr>
<tr>
<td>Packaging machine</td>
<td></td>
<td>1</td>
<td>3700</td>
</tr>
<tr>
<td>Pasteurizer</td>
<td></td>
<td></td>
<td>1200</td>
</tr>
<tr>
<td>Office Equipments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computers</td>
<td></td>
<td>2</td>
<td>560</td>
</tr>
<tr>
<td>Printers</td>
<td></td>
<td>2</td>
<td>96</td>
</tr>
<tr>
<td>Tables</td>
<td></td>
<td>4</td>
<td>150</td>
</tr>
<tr>
<td>chairs</td>
<td></td>
<td>8</td>
<td>160</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
<td>300</td>
</tr>
<tr>
<td>Quality control equipments</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pH-meter</td>
<td></td>
<td>1</td>
<td>177</td>
</tr>
<tr>
<td>Refractometer</td>
<td></td>
<td>1</td>
<td>69</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>17,812</strong></td>
</tr>
</tbody>
</table>

Source: Author

The budget required to run and secure the company’s activities during the first month covers both the company’s operating variable cost and the company’s operating fixed cost. The company’s operating variable cost comprises the cost of the raw materials, packagings, and utilities (Table 6). However the company’s operating fixed cost comprises the workers’ salaries, materials depreciations and materials maintenances (Table 7). Therefore, the total amount of the operating cost required for the first month is US$ 36,644. By taking into account the initial investment (Io), the total amount of the fund required to launch this project is thus US$ 54,456.
Table 6. Company’s operating variable cost in US$

<table>
<thead>
<tr>
<th>Component</th>
<th>Unit</th>
<th>Q/Day</th>
<th>Q/Month</th>
<th>Cost/Unit</th>
<th>Cost/Month</th>
<th>Cost/Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw materiels</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tomato</td>
<td>Kg</td>
<td>3000</td>
<td>90000</td>
<td>0.13</td>
<td>11700</td>
<td>140400</td>
</tr>
<tr>
<td>Salt</td>
<td>Kg</td>
<td>100</td>
<td>3000</td>
<td>0.5</td>
<td>1500</td>
<td>18000</td>
</tr>
<tr>
<td>Sugar</td>
<td>Kg</td>
<td>50</td>
<td>1500</td>
<td>0.8</td>
<td>1200</td>
<td>14400</td>
</tr>
<tr>
<td>Garlic</td>
<td>Kg</td>
<td>15</td>
<td>450</td>
<td>0.8</td>
<td>360</td>
<td>4320</td>
</tr>
<tr>
<td>Oil</td>
<td>L</td>
<td>25</td>
<td>750</td>
<td>1.3</td>
<td>975</td>
<td>11700</td>
</tr>
<tr>
<td>Sodium</td>
<td>kg</td>
<td>2.5</td>
<td>75</td>
<td>1.6</td>
<td>120</td>
<td>1440</td>
</tr>
<tr>
<td>Packings</td>
<td></td>
<td>7150</td>
<td>214500</td>
<td>0.08</td>
<td>17160</td>
<td>205920</td>
</tr>
<tr>
<td>Energy</td>
<td>Kwh</td>
<td>140</td>
<td>4200</td>
<td>0.4</td>
<td>1680</td>
<td>20160</td>
</tr>
<tr>
<td>Water</td>
<td>m</td>
<td></td>
<td></td>
<td></td>
<td>35</td>
<td>420</td>
</tr>
<tr>
<td>Petrol</td>
<td>L</td>
<td>120</td>
<td>120</td>
<td>1.2</td>
<td>144</td>
<td>1728</td>
</tr>
<tr>
<td>Phone &amp; Internet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Advertisement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>550</td>
<td>6600</td>
</tr>
<tr>
<td>House rent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50</td>
<td>600</td>
</tr>
<tr>
<td>Waste treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50</td>
<td>600</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>35</td>
<td>624</td>
<td></td>
<td><strong>427 538</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: Author

Table 7. Company’s operating fixed cost in US$

<table>
<thead>
<tr>
<th>Component</th>
<th>Total</th>
<th>Cost/Month</th>
<th>Cost/Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manager</td>
<td>1</td>
<td>400</td>
<td>4800</td>
</tr>
<tr>
<td>Department Responsible</td>
<td>2</td>
<td>200</td>
<td>2400</td>
</tr>
<tr>
<td>QC responsible</td>
<td>1</td>
<td>150</td>
<td>1800</td>
</tr>
<tr>
<td>Machinists</td>
<td>3</td>
<td>120</td>
<td>1440</td>
</tr>
<tr>
<td>Agent</td>
<td>6</td>
<td>75</td>
<td>900</td>
</tr>
<tr>
<td>Driver</td>
<td>1</td>
<td>75</td>
<td>900</td>
</tr>
<tr>
<td>Depreciation</td>
<td></td>
<td>1303.42</td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
<td>690</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1 020</strong></td>
<td><strong>14 233.42</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: Author

As shown in the table 8, the company’s revenue is obtained by multiplying the company’s total production with the company’s product basic price.

*commit to user*
The ready fund from the two shareholders is US$ 30 000. As this amount covers only 55% of the total required fund, the company must borrow an amount of US$ 24 456 from a Bank, probably from Bank Of Africa (BOA) that has an interest rate of 15% per year. The loan reimbursement is planned to be effectuated during the first three years and is calculated based on flat balance calculation method (Table 9). This method has been chosen because it represents a common method used by several banks across the world.

To analyze the financial feasibility of the project, the company’s cash flows were first projected (Table 10). This projection takes into account the initial investment, company’s operating cost, company’s operating revenue, loan reimbursement, company’s materials depreciations and company’s Net Income Cash Flows. The company’s operating cost and operating revenue during the five years of production are assumed constant. In other word, the company’s operating variable cost and the company’s product price do not change during these five years. The company’s materials depreciations are calculated by supposing that the building, machines, and equipments loss 5%, 10%, and 20% of their initial values per year, respectively.
Table 10. Company’s cash flow projection in US$

<table>
<thead>
<tr>
<th>Components</th>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment (Io)</td>
<td>17812</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable cost</td>
<td>427538</td>
<td>427538</td>
<td>427538</td>
<td>427538</td>
<td>427538</td>
<td></td>
</tr>
<tr>
<td>Fixed cost</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td></td>
</tr>
<tr>
<td>Total Production</td>
<td>2570400</td>
<td>2570400</td>
<td>2570400</td>
<td>2570400</td>
<td>2570400</td>
<td></td>
</tr>
<tr>
<td>Product Price</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
</tr>
<tr>
<td>Operating Revenue</td>
<td>462672</td>
<td>462672</td>
<td>462672</td>
<td>462672</td>
<td>462672</td>
<td></td>
</tr>
<tr>
<td>Operating Profit</td>
<td>20900.58</td>
<td>20900.58</td>
<td>20900.58</td>
<td>20900.58</td>
<td>20900.58</td>
<td></td>
</tr>
<tr>
<td>Loan</td>
<td>10711.16</td>
<td>10711.16</td>
<td>10711.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBT</td>
<td>10189.42</td>
<td>10189.42</td>
<td>10189.42</td>
<td>20900.58</td>
<td>20900.58</td>
<td></td>
</tr>
<tr>
<td>Taxe (35%)</td>
<td>7315.203</td>
<td>7315.203</td>
<td>7315.203</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EAT</td>
<td>13585.38</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depreciation</td>
<td>1303.42</td>
<td>1303.42</td>
<td>1303.42</td>
<td>1303.42</td>
<td>1303.42</td>
<td></td>
</tr>
<tr>
<td>NICF</td>
<td>-17812</td>
<td>7.926.54</td>
<td>7.926.54</td>
<td>7.926.54</td>
<td>14 888.8</td>
<td>14 888.8</td>
</tr>
</tbody>
</table>

Source: Author

EBT: Earning Before Tax, EAT: Earning After Tax, NICF: Net Income Cash Flow

The values of the financial indicators such as that of Net Benefit Cost Ratio, Net Present Value, Internal Rate of Return and Payback period are stated in the Table 11.

Table 11. Financial indicators’ values

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Net B/C</th>
<th>NPV</th>
<th>IRR %</th>
<th>PBP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>1.909</td>
<td>US$ 16 201.16</td>
<td>44 %</td>
<td>2.247 Years</td>
</tr>
</tbody>
</table>

Source: Author

The Net Benefit Cost ratio rule states that a given project is feasible if Net Benefit Cost ratio is greater than one. And the higher this value the better the investment. As shown in the table 11, the Net Benefit Cost ration of the company will be 1.909. This means that the project is feasible and is able to generate about more than twice the value of the initial investment within five years.

The second indicator used for assessing the feasibility of the project is Net Present Value. Net Present Value represents the difference between the sum of the net benefits and the sum of the net costs of the project. Based on the Net Present Value rule, a project is feasible whether Net Present Value is
positive. As the NPV is equal to US$ 16 201.16, the project is feasible. This means that the company will be able to provide a net amount of US$ 16 201.16 within five years of production. The project is thus feasible and can be implemented.

The third indicator used in the financial analysis is Internal Rate of Return (IRR). The Internal Rate of Return rule stipulates that a given investment is feasible if IRR value exceeds that of the current interest rate and it should be rejected otherwise. As the IRR is equal to 44%, which is greater than the current interest rate of 15% per year, the project is feasible. But it is noted that the higher this value the better the project.

The last indicator used in the financial analysis is Payback period. This indicator indicates the period during which the cost of investment will be earned back. As shown in the table 11, the initial investment will be earned back within 2.247 years or two years and 90 days. This period is obviously shorter than the project duration, which is 5 years. This means that the project is feasible and the company may attain one of its objectives that is extending its business after five years of production and moving, if possible, to the next scale that is the medium scale.

b. Sensitivity analysis

Sensitivity Analysis is the calculating procedure used for prediction of effect of changes of input data on output results of a given model. This procedure is often used in investment decision making related with the investment project evaluation under conditions of uncertainty. Applying this analysis, it is possible to find the maximum or minimum points which one value may take while, however, still allowing an investment project to be justified and acceptable for realization (Shenila, Abdul and Safeeullah, 2010). By creating a given set of scenarios, the researcher can determine how changes in input data will impact the output results. Here, three scenarios are taken into consideration. Scenario I: the price of fresh tomato increases by 10%, Scenario II: the company’s total production decreases by 10%, and Scenario III: the increase in price of fresh tomato by 10% is
accompanied by the decrease in total production of the company by 10%. The table 12 states that whatever the scenario that happens, NPV is always negative. The project is thus sensitive to the increase in price of fresh tomato and the decrease in total sales. However, it is noted that the project can support an increase in price of fresh tomato up to 5%, where Net B/C equals 1.050, NPV equals 905.27, IRR equals 17 % and PBP equals 3.74 years and a decrease in total production up to 2%, where Net B/C equals 1.004, NPV equals 71.29, IRR equals 15.2 % and PBP equals 3.8 years.

Table 12. Project sensitivity analysis

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Scenario I</th>
<th>Scenario II</th>
<th>Scenario III</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPV</td>
<td>- 14390.6</td>
<td>- 84610.5</td>
<td>- 115202</td>
</tr>
</tbody>
</table>

Source: Author

5. Socio-Economic analysis

The economy of a given area depends exclusively upon people activities. Each activity requires specific knowledge and skills that should come from educations and/or experiences. The education level of people living in Ambatondrazaka district is higher than the national average level. If the percentage of the uneducated people in the national scale is about 33.3%, that of Ambatondrazaka district is only about 23.5% (Ambatondrazaka district database, 2013). This means that Ambatondrazaka district has many qualified human resources who are seen as a pillar of its economy. These people perform not only in the primary sector, but also in secondary and tertiary sectors. However, the local and regional economy is still largely dependent on the primary sector. This sector employs more than 80% of the local people and most of them are farmers. The regional database states that about 70% of women and 73.5% of men living in the district of Ambatondrazaka are engaged in paddy farming and at least 75% of them practice tomato cultivation.

The jobless rate of the district of Ambatondrazaka is not high, which is about 3% in 2013 (INSTAT database, 2013). However, this low rate does not directly affect the level and the dynamism of the economy because most
of the people perform business with low income, particularly the traditional farming. The regional database also points out that about 6.5% and 18.3% of the people living in Ambatondrazaka district are classified among the very poor and very rich, respectively. About 16% are classified among the poor but still have a minimum purchase power required. Almost 60% of the people living in Ambatondrazaka district are classified as a middle class; but it is noted that only about 32% of them have a high income and high purchasing power. These people spend at least about US$ 190 per capita per year to ensure their aggregate consumptions (INSTAT database, 2013).

As the economy of the district is largely based on the primary sector, the regional industrialization is still underdeveloped. In the whole district, there are only two big companies, namely, JIRAMA and Rice Fanampy. JIRAMA is a state company that supplies the regional electricity, whereas Rice Fanampy is a big rice mill located in the Commune of Manakambahiny Andrefana that exports rice to developed countries such as France, German, and US. Apart from these two big companies, there are only 109 transformation Units dispersed in twenty Communes (Table 13). None of these Units processes tomato paste and only few of them are able to offer more than ten direct jobs.
Table 13. Existing transformation Units in Ambatondrazaka district, 2012

<table>
<thead>
<tr>
<th>N°</th>
<th>Communes</th>
<th>Transformation Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Urban Commune of Ambatondrazaka</td>
<td>24</td>
</tr>
<tr>
<td>02</td>
<td>Sub-Urban Commune of Ambatondrazaka</td>
<td>5</td>
</tr>
<tr>
<td>03</td>
<td>Rurale Commune of Ambandrika</td>
<td>4</td>
</tr>
<tr>
<td>04</td>
<td>Rurale Commune of Ambatosoratra</td>
<td>4</td>
</tr>
<tr>
<td>05</td>
<td>Rurale Commune of Amparihitsokatra</td>
<td>1</td>
</tr>
<tr>
<td>06</td>
<td>Rurale Commune of Ampitatsimo</td>
<td>8</td>
</tr>
<tr>
<td>07</td>
<td>Rurale Commune of Manakambahiny Est</td>
<td>1</td>
</tr>
<tr>
<td>08</td>
<td>Rurale Commune of Antanadava</td>
<td>1</td>
</tr>
<tr>
<td>09</td>
<td>Rurale Commune of Andromba</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Rurale Commune of Iafy</td>
<td>5</td>
</tr>
<tr>
<td>11</td>
<td>Rurale Commune of Didy</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>Rurale Commune of Antsangasanga</td>
<td>4</td>
</tr>
<tr>
<td>13</td>
<td>Rurale Commune of Bejotra</td>
<td>8</td>
</tr>
<tr>
<td>14</td>
<td>Rurale Commune of Panambao Besakay</td>
<td>4</td>
</tr>
<tr>
<td>15</td>
<td>Rurale Commune of Andilanatoby</td>
<td>7</td>
</tr>
<tr>
<td>16</td>
<td>Rurale Commune of Manakambahiny Ouest</td>
<td>10</td>
</tr>
<tr>
<td>17</td>
<td>Rurale Commune of Feramanga Nord</td>
<td>2</td>
</tr>
<tr>
<td>18</td>
<td>Rurale Commune of Ambohitsilaozana</td>
<td>6</td>
</tr>
<tr>
<td>19</td>
<td>Rurale Commune of Imerimandroso</td>
<td>6</td>
</tr>
<tr>
<td>20</td>
<td>Rurale Commune of Soalazaina</td>
<td>4</td>
</tr>
</tbody>
</table>

Ambatondrazaka District 109

Source: Ambatondrazaka district database, 2013

Thereby, the implementation of this project in the district of Ambatondrazaka will be very beneficial not only for the local and regional communities, but also for the local and regional governments. The existence of the company will offer many job opportunities and increase the local and regional incomes. The increase of these incomes will rise up thereafter the local and regional Gross Domestic Product (GDP).

Fourteen direct jobs will be offered by this project. These jobs can be classified in three levels. The top level, that needs someone who knows more about managements and businesses. This level will be run by someone who may not be from the district. The second level will be occupied by two persons who have specific knowledge and skills required by the production and commercial departments. These two persons can be from the district/region. The third level does not require advanced knowledge and skills. Of course, it is better if they are skillful but their jobs require more physical efforts than intellectual efforts. Therefore, this level will recruit
people living in the surrounding areas. They will be eleven: ten agents and one driver. This means that the company will offer about thirteen direct jobs to the district or to the region. This is an interesting proportion as compared to those of the existing companies.

Apart from these direct jobs, the company also will offer many indirect jobs related to the supply of the fresh tomato and the commercialization of the finished product. The company will need to work at least with thirty farmers, continuously and in a professional manner, to guarantee the supply of fresh tomato. These farmers will be dispersed across four Communes, namely, Ambatondrazaka Sub-Urban, Feramanga Avaratra, Ambandrika and Ambohitsilaozana Communes.

The transportation of fresh tomato is usually not performed by tomato farmers. Thus, the company will need at least five persons per day to perform it, based on the transportation used. The commercialization of finished product also will need transporters and advertisers. These persons are of course not among the company’s staff but their jobs are directly dependent on the company’s activities. Thereby, the company will need at least five persons per day to conduct its advertisements and its finished product transportations. In short, the company will offer about fifties stable jobs to the district of Ambatondrazaka, including the direct jobs. This number will decrease the current regional jobless rate, which is about 3%. In addition, these people will be well paid so that their income will clearly ameliorate the local and regional economy.

Actually, the first beneficiary of the existence of the company will be the people living close to the production Unit, particularly farmers who supply the fresh tomato. If farmers currently sell a tomato crate at US$ 1.6 during the hot season, the company will buy it at a price twice as expensive. This will obviously double their incomes and encourage them to produce more. On the other hand, the price at which the company buys tomato also will affect the whole regional tomato prices. This phenomenon will be beneficial for the local and regional economy, especially for the people living in the four mentioned Communes.
The existence of the company also will increase the income of the local and regional governments. Currently, there are 111 companies in the district of Ambatondrazaka and only two of them are considered as a big company. These companies constitute the main source of revenues for the local and regional governments. Therefore, the arrival of this new company will strengthen it. During the first year of production, the company will pay a tax of US$ 3,566 to the local and regional governments. This amount increases from one year to another so that in the fifth year, it will be US$ 7,315.

The economic rule stipulates that the economy of a given area increases when people’s incomes increase. This increase can be known through the evaluation of the Gross Domestic Product (GDP). GDP is recognized as a good metric system for measuring the performance of a given economy. It takes into consideration variable such as household’s consumptions, people’s investments and savings, and government’s expenditures. As it was stated, the company will increase not only farmers’ incomes, but also governments’ incomes. While the increase of the farmers and governments’ incomes will rise up the local and regional expenditures. The rise of these expenditures will promote a partial growth of the local and regional economy. On the other hand, the company by itself will generate an average value added of about US$ 10,711 per year. This amount will be used as expenses/investments or savings that will immediately increase the local and regional GDP. The increase of the GDP in question will strengthen the local and regional economy.

6. Environmental analysis

Over the past ten years, environmental aspect became an important aspect in the development of projects. This is the result of people's awareness vis-a-vis the bad effects of projects. This aspect includes, but not limited to, the analysis of vital resources availability such as air/wind and water availability, the analysis of wastes disposal or treatment sites, and particularly the analysis of the environmental impacts of the project.
The availability of resource such as air/wind is very important in the environmental analysis. This will allow the authorities to predict whether workers can perform in a good working condition as the working laws require. Lots of chemical agents and raw material residues should be released in the transformation room during the company’s activities. The availability of air/wind will be thus crucial. On the other hand, the presence of air/wind will also be very useful for preventing the local people’s health.

In Ambohitsilaozana Commune, where the transformation Unit will be located, the wind generally comes from the east and discharges in the west. This wind is always available but its intensity differs from one day to another. Therefore, the evacuation of the residues released during the company’s activities should not worry both the workers and the people who live close to the transformation Unit. Also, as the Unit will be located in the western part of the village, the evacuation of the residues will not affect the local people.

The availability of water also represents an important parameter in the environmental analysis. Water is required not only for running the company’s activities, but also for facilitating the evacuation of the released residues and wastes, particularly water waste. As it was stated, the choice of Ambohitsilaozana Commune as a production site was mainly based on the availability of the water. The Commune has a potential source of water called Andoharano. This is a big river that passes through the eastern part of the village and has been used since long time ago by the local people as a source of drinking and washing water. The water supply is currently managed by the local authorities and according to them, the water source is still able to cover the needs of such project.

The activities of the company will release wastes such as water and tomato wastes. These wastes may obviously affect the surrounding environment and cause serious problems if they are not well managed. Hence, the company will need to look for places where the wastewater and tomato waste can be managed and treated. The conception of the company’s wastewater treatment site will require technicians who have advanced
knowledge on it. However, the daily treatment of this waste will be ensured by the company’s workers. As the production Unit is surrounded by a vast arable land, it is desirable if the wastewater is treated as quickly as possible. Therefore, the company’s wastewater treatment site will be located just behind the production Unit. This will be a kind of hole where the wastewater released during the Unit operations will be immediately evacuated and then treated. This treatment will minimize the risk of the environmental impacts caused by the company and make safe the activities of the local farmers.

The company is expected to produce 100 to 150 Kg of tomato waste per day. These quantities come from two operations, namely, tomato sorting and tomato grinding. Tomato sorting releases undesirable tomatoes such as unripe and spoiled tomatoes, which is about 10 Kg per day. However, tomatoes grinding releases tomato waste, which is estimated about 90 to 140 Kg per day. Therefore, the company will need to find a site where this waste can be managed and/or treated. According to the Regional Department of Environment, the selection of the tomato waste management/treatment site needs the approval of the local authorities. And on the other hand, as the company plans to transform the tomato waste into compost, the involvement of the local farmers is desirable. Composting the tomato waste will be good not only for preserving the environment, but also for promoting sustainable agriculture. According to Nonglak, et al. (2009), all organic wastes, including tomato waste can be transformed into compost. However, for speeding up the composting process, some parameters such as pH, temperature and moisture must be set at strict values. Keith and Jackie (2009) pointed out that a composting process may last one to six months, depending on the organic matter being composted. As the company does not speed up the composting process, it will take about three to six months.

The company will need skilled technicians for conceiving the composting site. However, the daily or weekly composting monitoring will be conducted by the company’s personnel or by farmers who work together with company. It is noted that the compost produced by the company will be used by these farmers for free. Actually, the composting site must be
accessible by route and its environment must be able to furnish the resources
needed for running the composting process. Therefore, the non-used land
located in the North-East of the village has been seen as a most potential
choice for it.

The Malagasy environmental charter, through the environmental law n°
99-021/August 19, 1999 on the control of industrial pollution, stipulates that
the environmental impacts of a project that aims to produce in industrial
scale must first be assessed before its implementation. These impacts refer
particularly to industrial pollutions such as air, soil and water pollutions.
According to this low, there is industrial pollution when the environment is
altered in its composition (quantitative and qualitative) by the presence of
polluting agents that come from the industrial activities. The organ that
handles the pollution issue in Madagascar is called NOE or National Office
of Environment. This organ analyzes and evaluates the documents of
industrial pollution assessment provided by the project manager and then
decides whether the project can be implemented.

As the company uses clean energy, electricity, the risk of air pollution
will be very low. The company is not also expected to produce any smoke
and the particles released during its operations are not supposed to be
volatile. Thus, the company should not be concerned about the possibility of
air pollution caused by its activities.

Yet, the possibility of water and soil pollutions should not be ignored in
the assessment of the environmental impact of this project. As it has been
stated, the company will produce both chemical and organic wastes. The
chemical waste will be conveyed by the wastewater and the organic waste
will be the tomato waste itself. In fact, both of them may cause water
pollution but the contribution of the wastewater is seen more serious first,
because of its chemical polluting agents and second, because of its condition
that can easily discharge in any site of water. The tomato waste may also
pollute water sites even if its dispersion is not as fast as that of the
wastewater. Thereby, the company should take strict measures to reduce the
risk of water pollution caused by its activities. This can be done first, by
neutralizing the released wastewater (using alkaline matter such as lime) second, by finding a right direction through which the treated water will be discharged and third, by finding out a place where tomato waste can be stocked and treated.

As an organic matter, tomato waste is not supposed to cause soil pollution. However, its degradation is desirable in order to ameliorate the texture of the soil. All the company has to do is thus to find an appropriate disposal site where the degradation of the tomato waste can be conducted in normal condition. Contrary to this, the wastewater released during the company’s activities may cause soil pollution. The chemical polluting agents present in this waste is considered very harmful not only for the soil, but also for the agricultural activities. The company should thus pay a particular attention on the wastewater treatment and its evacuation because it may cause both water and soil pollutions.
IV. CONCLUSION

The situation analysis highlighted that there are six opportunities such as availability of raw material, fresh tomato, availability of machines and technologies, existence of potential markets, existence of financial support system, and presence of an adequate SMEs government’s policy and two strengths such as availability of the required fund, and high motivation of investors that lead into the creation of the company. However, some alternatives such as working closely with farmers, through the establishment of contracts, building good relationship with regional and central governments, training the company’s manager and personnel, and finding places for tomato cultivation during the raining season should be applied by the company to overcome the situation’s weaknesses and threats.

Based on the technical and technological, managerial, financial, socio-economic, and environmental analysis, the project is feasible. The technical and technological analysis stated that the machines, technologies, and raw materials required for the implementation of the project can be met. The Managerial analysis showed that through the two departments and by adopting the two levels of management, the company can carry out its all activities. All of the indicators used in the financial analysis highlighted that the creation of the company is feasible. Net Benefit Cost Ratio is greater than 1, which equals 1.909; Internal Rate of Return is greater than the current interest rate, which is equal to 44%; Net Present Value is positive, which equals US$ 16,201.16; and Payback period is equal to two years and 90 days, which is shorter than five years. The sensitivity analysis highlighted that the company cannot resist to the increase by 10% of the fresh tomato price, decrease by 10% of the company’s total production and both increase by 10% of the fresh tomato price and decrease by 10% of the company’s total production, simultaneously. This means that the company is sensitive to the increase in price of fresh tomato and decrease in total sales. The socio-economic analysis pointed out that the existence of the company will increase the local and regional economy. The environmental analysis highlighted that the pollution caused by the company can be avoided or reduced by treating the wastewater and finding an appropriate site where tomato waste can be managed and treated. However, the market and marketing analysis pointed out that the capacity of the local and regional markets is low. They consume only about 15 and 50% of the company’s total production, respectively. Hence, The
Company should apply the proposed marketing strategy that is expected to increase its local and regional sales.

The methods and resources used for this research enabled to attain the objectives. However, it is recommended to combine the technical and technological analysis with laboratory experiments and extend the market research into regional and national scale.
REFERENCES


### APPENDIX 1. Summary of the related studies

<table>
<thead>
<tr>
<th>Research</th>
<th>Aspect</th>
<th>Variable</th>
<th>Data Type and Source</th>
<th>Data Collection Method</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Technical and Technological</td>
<td>Choice of the technology, Capacity of the production, Company location, and Machines and Building determination</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Operational Management</td>
<td>Planning of the Organization structure, Job description, Labor requirements and its specifications</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Financial</td>
<td>NPV, IRR, Net B/C, BEP, PBP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burhanuddin (2009)</td>
<td>Market</td>
<td>Demand and Supply</td>
<td>Primary: From the local and central Government, Industrials and Farmers, machines and equipments sellers and from the sample of the Population</td>
<td>Random Sampling Method</td>
</tr>
<tr>
<td></td>
<td>Technical</td>
<td>Company location, Source of raw Material, Technology, Production capacity, Labor, and Energy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Financial</td>
<td>Total investment, Working cost, Fixed and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td>Variable costs and Source of investment</td>
<td>Secondary</td>
<td>Desk research</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------</td>
<td>-----------</td>
<td>---------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Closeness with residential areas, Roads for transportation and Waste disposal sites</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Peni et al. (2011)</th>
<th>Markets and Marketing</th>
<th>Buyer, Demand, and Competition</th>
<th>Questionnaire survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial</td>
<td></td>
<td>Costs and Benefits</td>
<td>Primary: from the industry employers</td>
</tr>
<tr>
<td>Technical</td>
<td></td>
<td>Company location, Source of raw materials, Labor, Tools, Machines and Transportation</td>
<td></td>
</tr>
<tr>
<td>Economic and social aspects</td>
<td>Project positive impacts</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Author
APPENDIX 2. Questionnaire for tomato farmers

I. Profile of the Farmer

Name/Nom : ..........................................................

Gender/Genre : ..........................................................

Age : ..........................................................

Length of career/Dureé de carrière : ..........................................................

Schooling/Niveau d’etude : ..........................................................

Location/Village : ..........................................................

II. Questionnaire

1. When did you start to cultivate tomato/Quand avez-vous commencé à cultiver de tomate?

   This Year/Cette Année ( ) ; .............. Year(s) Ago/An(s) Passé

2. What type of tomato do you produce/Vous produisez quelle type de tomate?

   Round/ Rond ( ) ;  elongated/allongé ( )

3. How many times do you produce tomato a year and in what season(s)/Combien de fois par an vous produisez de tomate et en quelle saison?

   .............Times/Fois  Summer/été ( ) Autumn ( ) Winter/Hiver ( ) Spring/Printemps ( )

4. How many Hectare of tomato field do you have and what about its yield/Vous reservez combien d’Hectar pour la culture de tomate et qu’en est il de son rendement?
5. Is this production regular or sometimes you swift to another product (commodity)?

Est-ce que cette production est régulière ou parfois vous basculer à un autre produit?

Yes ( ) ; No ( ), Swift to/Basculer à ..................

6. Where and how do you sell your product and what about its price?

Ou et comment vendez-vous votre produit et qu’en est-il de son prix?

In/A ......................................................

By unit of Kg/Par unité de Kg ( )

In case/En caisse ( )

Summer/été : .................... Ar/Kg
Autumn : .................... Ar/Kg
Winter/Hiver : .................... Ar/Kg
Spring/Printemps : .................... Ar/Kg

7. Did you sign a contract with any Company or other organization?

Est-ce que vous avez signé de contrat avec des Entreprises ou Autres?

Yes, with ....................... ; No ( )

8. If there is a Company that wants to establish a contract with you, are you willing to sign it?

Esct-ce que vous êtes prêt à signer un contrat avec une Entreprise?

Yes ( ) ; No ( )

commit to user
9. If you are invited to increase your production, are you willing to do it/Si vous êtes
invité à augmenter votre production, esct-ce que vous êtes prêt a le faire?

Yes ( ) ; No ( )

10. What problem you face in tomato cultivation/Quel problem vous rencontrer dans la
culture de tomate?

…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………
…………………………………………………………………………………………………

commit to user
APPENDIX 3. Questionnaire for tomato paste suppliers

I. Profile of the Supplier

Type : _____________________________________________
Name/Nom : _________________________________________
Location/City/Village : _________________________________

I. Questionnaire

1. What brand of tomato paste do you sell and where are they come from/Quelle marques de concentrés de tomate vendez-vous et d’où viennent-elles?

Brands/Merques: ............................................................................................................................

Sources: ...........................................................................................................................................

2. Can the Supply cover the Demand/Est-ce que le ravitaillement arrive à satisfaire le demande?

Yes ( ) ; No ( )

3. How much quantity do you need monthly for the supply and how much quantity can you sell/Combien de quantité vous avez besoin par mois et combien de quantité vous pouvez vendre?

Supply/Ravitaillement……………………..Kg or Unit
Sold/Vendue…………………………………Kg or Unit


commit to user
Yes stable ( ) ; No, Not stable ( )

Brands: ……………..; Price/Prix ………. Ar/unit
……………..;  ;  …….
……………. ;  ;  ………...

5. In what period the demand becomes higher/En quelle periode la demande devient-elle plus elevée?

Period……………… ; Kg or Unit/Month………………….

6. Does the price increase during this period/Est-ce que le prix augmente pendant cette periode?

Yes ( ), by/de………. Ar; No ( )

7. Did you experience an out of stock during this period/Est-ce que vous avez déjà connu une rupture de stock pendant cette periode?

Yes ( ) ; No ( )

8. Your Supply increase by how many percent per year/Votre ravitaillement augmente de combien de pourcent par an?

……… % ; No it is stable/Non c’est stable ( )

9. Who are your Costumers/Qui sont votre clients?

…………………………………………………………………………………………
…………………………………………………………………………………………
…………………………………………………………………………………………

commit to user
APPENDIX 4. Questionnaire for experts

I. Profile of the Expert
Name/Nom : ........................................
Gender/Genre : ........................................
Age : ........................................
Profession/Qualification : ........................................
Working place/Lieu de travail : ........................................
Length of career/Dureé de carrière : ........................................
Schooling/Niveau d’étude : ........................................

II. Questionnaire
By taking into account some aspects such as Market and Marketing, Technical and Technological, Managerial, Financial, and Environmental aspects; what are the project:

a. Strengths/Forces
   ........................................................................................................
   ........................................................................................................
   ........................................................................................................
   ........................................................................................................
   ........................................................................................................
   ........................................................................................................
   ........................................................................................................
   ........................................................................................................
   ........................................................................................................
   ........................................................................................................

b. Weaknesses/Faiblesses
   ........................................................................................................
   ........................................................................................................
   ........................................................................................................
   ........................................................................................................
   ........................................................................................................
   ........................................................................................................

   commit to user
c. **Opportunities/Opportunités**

d. **Threats/Menaces**
APPENDIX 5. Questionnaire for tomato paste consumers

I. Profile of the Consumer

Type : Household ( ) Other ..............
Name/Nom : ......................................................
Gender/Genre : ......................................................
Age : ......................................................
Location/City/Village : ......................................................

I. Questionnaire

1. Do you know tomato paste/Est-ce que vous connaissez les conctrés de tomate en boite ou sous autre emballage?
   Yes ( ) No ( )

2. Have you used it/L’avez-vous utilisé?
   Yes ( ) No ( )

3. What tomato paste brand name have you used and which one do you like the most/Quelle marque de conctré de tomate avez-vous utulisé et preferez-vous laquelle?

   List..................................................................................................................
   ..........................................................
   Prefer/Preferer................................., because/parce que..........................
   ..........................................................

4. Where do you usually buy them/Où est-ce que vous avez l’habitude de les acheter?

   In Supermarket ( ) Retailer/Detaillant ( ) Regular shop/Epicerie ( )
5. Do you buy them regularly or seasonally? Est-ce que vous les achetez régulièrement ou saisonnnermment?

Daily/Journalière ( ) weekly/Hebdomadaire ( ) Monthly/Mensuel ( ) Seasonally/Saisonniere ( )

6. How much quantity do you need for this frequency and what about its price per unit? Vous avez besoin combien de quantité pour cette fréquence et combien coûte l’unité?

…………Kg/……………………………..Ar/Unit

7. Is this price stable? Est-ce que ce prix est stable?

Yes ( ) No ( )

Summer/été : ………..Ar/Unit
Autumn : ………..Ar/Unit
Winter/Hiver : ………..Ar/Unit
Spring/Printemps : ………..Ar/Unit

8. Does your need in tomato paste increase annually? By how much? Est-ce que votre besoin en concentré de tomate augmente annuellement? De combien?

Yes ( ) by/de…………. ; No ( )

9. Do you think that tomato paste supply is enough? Pensez-vous que le ravitaillement en concentré de tomate est suffisant?

Yes ( ) ; No ( )

10. Have you experienced a shortage in tomato paste? Avez-vous vecu une pénurie en concentré de tomate?

Yes ( ) ; commit to user No ( )
11. Do you buy tomato paste if fresh tomato is available/Est-ce que vous achetez de concentré de tomate même s’il y en a des tomates fraîches?

Yes ( ) ; No ( )

12. If both domestic and imported tomato pastes are available in the market, which one do you purchase and why/ Si les deux concentrés de tomates, nationaux et importés, sont disponibles sur le marché; achetez-vous laquelle et pourquoi?

Domestic Product/Produit National ( ) Imported Product/Importé ( )
Because/Parce que ………………………………………………………………………..
…………………………………………………………………………………………

13. In your opinion, the ideal product should weight how much grams? And what about its price/Selon vous, le produit idéal peserait combien de grammes? Et qu’en est-il de son prix?

…………. Grams ; Price: Ar………….

14. If a Company introduces pouched tomato paste in the market, with the affordable price, are you willing to purchase it/Si une entreprise livre des concentrés de tomate en sachet, avec de prix intéressant, êtes vous prêt pour les acheter ?

Yes ( ) ; No ( )
APPENDIX 6. Calculation of the financial indicators

Table 1. Net Present Value (NPV) and Net Benefit Cost Ratio (Net B/C) calculation

<table>
<thead>
<tr>
<th>Year</th>
<th>Y 0</th>
<th>Y 1</th>
<th>Y 2</th>
<th>Y 3</th>
<th>Y 4</th>
<th>Y 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>NICF</td>
<td>-17812</td>
<td>7926.54</td>
<td>7926.54</td>
<td>7926.54</td>
<td>14888.8</td>
<td>14888.8</td>
</tr>
<tr>
<td>PV</td>
<td>17812</td>
<td>6892.643</td>
<td>5993.603</td>
<td>5211.829</td>
<td>8512.718</td>
<td>7402.363</td>
</tr>
<tr>
<td>NPV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net B/C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source Author

With Present Value (PV) = NICF/(1+r)^n

Where,

- r is the rate of discount; and
- n refers to the number of the year.

Table 2. Payback Period (PBP) calculation

<table>
<thead>
<tr>
<th>Components</th>
<th>NICF</th>
<th>Cumulative Flow</th>
<th>Period (Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Io</td>
<td></td>
<td>17812</td>
<td>0</td>
</tr>
<tr>
<td>Y 1</td>
<td>7926.54</td>
<td>- 9885.46</td>
<td>1</td>
</tr>
<tr>
<td>Y 2</td>
<td>7926.54</td>
<td>- 1958.92</td>
<td>1</td>
</tr>
<tr>
<td>Y 3</td>
<td>7926.54</td>
<td>5967.62</td>
<td>-0.247</td>
</tr>
<tr>
<td>PBP</td>
<td></td>
<td></td>
<td>2.247</td>
</tr>
</tbody>
</table>

Source Author

Table 3. Internal Rate of Return calculation

<table>
<thead>
<tr>
<th>NPV_1</th>
<th>NPV_2</th>
<th>NPV_1 - NPV_2</th>
<th>r_1</th>
<th>r_2</th>
<th>r_2 - r_1</th>
<th>IRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>16201.16</td>
<td>-284.366</td>
<td>16485.53</td>
<td>0.15</td>
<td>0.45</td>
<td>0.3</td>
<td>44%</td>
</tr>
</tbody>
</table>

Source Author

With \( IRR = r_1 + \frac{NPV_1}{NPV_1 - NPV_2} (r_2 - r_1) \)

Where:

- \( r_1 \) is the discount rate of NPV_1 discount rate; and
- \( r_2 \) is the discount rate of NPV_2 where NPV_2 is negative

commit to user
APPENDIX 7. Cash flow projection for the different scenarios of the sensitivity analysis

Table 1. Scenario I: The fresh tomato price increases by 10%

<table>
<thead>
<tr>
<th>Components</th>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment (Io)</td>
<td>17812</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable cost</td>
<td>441578</td>
<td>441578</td>
<td>441578</td>
<td>441578</td>
<td>441578</td>
<td></td>
</tr>
<tr>
<td>Fixed cost</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td></td>
</tr>
<tr>
<td>Total Production</td>
<td>2570400</td>
<td>2570400</td>
<td>2570400</td>
<td>2570400</td>
<td>2570400</td>
<td></td>
</tr>
<tr>
<td>Product Price</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
</tr>
<tr>
<td>Operating Profit</td>
<td>462672</td>
<td>462672</td>
<td>462672</td>
<td>462672</td>
<td>462672</td>
<td></td>
</tr>
<tr>
<td>Revenue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Profit</td>
<td>6860.58</td>
<td>6860.58</td>
<td>6860.58</td>
<td>6860.58</td>
<td>6860.58</td>
<td></td>
</tr>
<tr>
<td>Loan</td>
<td>10711.16</td>
<td>10711.16</td>
<td>10711.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBT</td>
<td>3850.58</td>
<td>-3850.58</td>
<td>-3850.58</td>
<td>-3850.58</td>
<td>6860.58</td>
<td>6860.58</td>
</tr>
<tr>
<td>Taxe (35%)</td>
<td>-1347.7</td>
<td>-1347.7</td>
<td>-1347.7</td>
<td>2401.203</td>
<td>2401.203</td>
<td></td>
</tr>
<tr>
<td>EAT</td>
<td>2502.88</td>
<td>-2502.88</td>
<td>-2502.88</td>
<td>4459.377</td>
<td>4459.377</td>
<td></td>
</tr>
<tr>
<td>NICF</td>
<td>-17812</td>
<td>-1199.46</td>
<td>-1199.46</td>
<td>-1199.46</td>
<td>5762.797</td>
<td>5762.797</td>
</tr>
</tbody>
</table>

Source Author

NPV = -14390.6

Table 2. Tolerated limit of the increase in fresh tomato price (5%)

<table>
<thead>
<tr>
<th>Components</th>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment (Io)</td>
<td>17812</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable cost</td>
<td>434558</td>
<td>434558</td>
<td>434558</td>
<td>434558</td>
<td>434558</td>
<td></td>
</tr>
<tr>
<td>Fixed cost</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td></td>
</tr>
<tr>
<td>Total Production</td>
<td>2570400</td>
<td>2570400</td>
<td>2570400</td>
<td>2570400</td>
<td>2570400</td>
<td></td>
</tr>
<tr>
<td>Product Price</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
</tr>
<tr>
<td>Operating Profit</td>
<td>462672</td>
<td>462672</td>
<td>462672</td>
<td>462672</td>
<td>462672</td>
<td></td>
</tr>
<tr>
<td>Revenue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Profit</td>
<td>13880.58</td>
<td>13880.58</td>
<td>13880.58</td>
<td>13880.58</td>
<td>13880.58</td>
<td></td>
</tr>
<tr>
<td>Loan</td>
<td>10711.16</td>
<td>10711.16</td>
<td>10711.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBT</td>
<td>3169.415</td>
<td>3169.415</td>
<td>3169.415</td>
<td>13880.58</td>
<td>13880.58</td>
<td></td>
</tr>
<tr>
<td>Taxe (35%)</td>
<td>1109.295</td>
<td>1109.295</td>
<td>1109.295</td>
<td>4858.203</td>
<td>4858.203</td>
<td></td>
</tr>
<tr>
<td>EAT</td>
<td>2060.12</td>
<td>2060.12</td>
<td>2060.12</td>
<td>9022.377</td>
<td>9022.377</td>
<td></td>
</tr>
<tr>
<td>NICF</td>
<td>-17812</td>
<td>3363.54</td>
<td>3363.54</td>
<td>3363.54</td>
<td>10325.8</td>
<td>10325.8</td>
</tr>
</tbody>
</table>

Source Author

NPV = 905.2731
Table 3. Scenario II: The Company’s total production decreases by 10%

<table>
<thead>
<tr>
<th>Components</th>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment (Io)</td>
<td>17812</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable cost</td>
<td>427538</td>
<td>427538</td>
<td>427538</td>
<td>427538</td>
<td>427538</td>
<td></td>
</tr>
<tr>
<td>Fixed cost</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td></td>
</tr>
<tr>
<td>Total Production</td>
<td>2313360</td>
<td>2313360</td>
<td>2313360</td>
<td>2313360</td>
<td>2313360</td>
<td></td>
</tr>
<tr>
<td>Product Price</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
</tr>
<tr>
<td>Operating Revenue</td>
<td>416404.8</td>
<td>416404.8</td>
<td>416404.8</td>
<td>416404.8</td>
<td>416404.8</td>
<td></td>
</tr>
<tr>
<td>Operating Profit</td>
<td>-25366.6</td>
<td>-25366.6</td>
<td>-25366.6</td>
<td>-25366.6</td>
<td>-25366.6</td>
<td></td>
</tr>
<tr>
<td>Loan</td>
<td>10711.16</td>
<td>10711.16</td>
<td>10711.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBT</td>
<td>-36077.8</td>
<td>-36077.8</td>
<td>-36077.8</td>
<td>-25366.6</td>
<td>-25366.6</td>
<td></td>
</tr>
<tr>
<td>Taxe (35%)</td>
<td>-12627.2</td>
<td>-12627.2</td>
<td>-12627.2</td>
<td>-8878.32</td>
<td>-8878.32</td>
<td></td>
</tr>
<tr>
<td>EAT</td>
<td>-23450.6</td>
<td>-23450.6</td>
<td>-23450.6</td>
<td>-16488.3</td>
<td>-16488.3</td>
<td></td>
</tr>
<tr>
<td>Depreciation</td>
<td>1303.42</td>
<td>1303.42</td>
<td>1303.42</td>
<td>1303.42</td>
<td>1303.42</td>
<td></td>
</tr>
<tr>
<td>NICF</td>
<td>-17812</td>
<td>-22147.1</td>
<td>-22147.1</td>
<td>-15184.9</td>
<td>-15184.9</td>
<td></td>
</tr>
</tbody>
</table>

Source Author

NPV = - 84 610.5

Table 4. Tolerated limit of the decrease in Company’s total production (2%)

<table>
<thead>
<tr>
<th>Components</th>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment (Io)</td>
<td>17812</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable cost</td>
<td>427538</td>
<td>427538</td>
<td>427538</td>
<td>427538</td>
<td>427538</td>
<td></td>
</tr>
<tr>
<td>Fixed cost</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td></td>
</tr>
<tr>
<td>Total Production</td>
<td>2529274</td>
<td>2529274</td>
<td>2529274</td>
<td>2529274</td>
<td>2529274</td>
<td></td>
</tr>
<tr>
<td>Product Price</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
</tr>
<tr>
<td>Operating Revenue</td>
<td>455269.2</td>
<td>455269.2</td>
<td>455269.2</td>
<td>455269.2</td>
<td>455269.2</td>
<td></td>
</tr>
<tr>
<td>Operating Profit</td>
<td>13497.83</td>
<td>13497.83</td>
<td>13497.83</td>
<td>13497.83</td>
<td>13497.83</td>
<td></td>
</tr>
<tr>
<td>Loan</td>
<td>10711.16</td>
<td>10711.16</td>
<td>10711.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EBT</td>
<td>2786.663</td>
<td>2786.663</td>
<td>2786.663</td>
<td>13497.83</td>
<td>13497.83</td>
<td></td>
</tr>
<tr>
<td>Taxe (35%)</td>
<td>975.3322</td>
<td>975.3322</td>
<td>975.3322</td>
<td>4724.24</td>
<td>4724.24</td>
<td></td>
</tr>
<tr>
<td>EAT</td>
<td>1811.331</td>
<td>1811.331</td>
<td>1811.331</td>
<td>8773.588</td>
<td>8773.588</td>
<td></td>
</tr>
<tr>
<td>Depreciation</td>
<td>1303.42</td>
<td>1303.42</td>
<td>1303.42</td>
<td>1303.42</td>
<td>1303.42</td>
<td></td>
</tr>
<tr>
<td>NICF</td>
<td>-17812</td>
<td>3114.751</td>
<td>3114.751</td>
<td>3114.751</td>
<td>10077.01</td>
<td>10077.01</td>
</tr>
</tbody>
</table>

Source Author

NPV = 71.294
<table>
<thead>
<tr>
<th>Components</th>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment (Io)</td>
<td>17812</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable cost</td>
<td>441578</td>
<td>441578</td>
<td>441578</td>
<td>441578</td>
<td>441578</td>
<td></td>
</tr>
<tr>
<td>Fixed cost</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td>14233.42</td>
<td></td>
</tr>
<tr>
<td>Total Production</td>
<td>2313360</td>
<td>2313360</td>
<td>2313360</td>
<td>2313360</td>
<td>2313360</td>
<td></td>
</tr>
<tr>
<td>Product Price</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
<td>0.18</td>
</tr>
<tr>
<td>Operating Revenue</td>
<td>416404.8</td>
<td>416404.8</td>
<td>416404.8</td>
<td>416404.8</td>
<td>416404.8</td>
<td></td>
</tr>
<tr>
<td>Operating Profit</td>
<td>-39406.6</td>
<td>-39406.6</td>
<td>-39406.6</td>
<td>-39406.6</td>
<td>-39406.6</td>
<td></td>
</tr>
<tr>
<td>Loan</td>
<td>10711.16</td>
<td>10711.16</td>
<td>10711.16</td>
<td>10711.16</td>
<td>10711.16</td>
<td></td>
</tr>
<tr>
<td>EBT</td>
<td>-50117.8</td>
<td>-50117.8</td>
<td>-50117.8</td>
<td>-39406.6</td>
<td>-39406.6</td>
<td></td>
</tr>
<tr>
<td>Taxe (35%)</td>
<td>-17541.2</td>
<td>-17541.2</td>
<td>-17541.2</td>
<td>-13792.3</td>
<td>-13792.3</td>
<td></td>
</tr>
<tr>
<td>EAT</td>
<td>-32576.6</td>
<td>-32576.6</td>
<td>-32576.6</td>
<td>-25614.3</td>
<td>-25614.3</td>
<td></td>
</tr>
<tr>
<td>NICF</td>
<td>-17812</td>
<td>-31273.1</td>
<td>-31273.1</td>
<td>-31273.1</td>
<td>-24310.9</td>
<td>-24310.9</td>
</tr>
</tbody>
</table>

Source Author

\[ NPV = -115202 \]
APPENDIX 8. Company’s balance Sheet

Rule: Asset = Equity + Liability

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash</th>
<th>Fixed Asset</th>
<th>Cumulated Depreciation</th>
<th>Net Fixed Asset</th>
<th>Total</th>
<th>Loan and Interest Rate</th>
<th>Tax</th>
<th>Retained Earnings</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>22204</td>
<td>17812</td>
<td>130342</td>
<td>16508.58</td>
<td>38712.58</td>
<td>10711.16</td>
<td>3566.295</td>
<td>24435.12</td>
<td>38712.58</td>
</tr>
<tr>
<td>2</td>
<td>22204</td>
<td>17812</td>
<td>260684</td>
<td>15205.16</td>
<td>37409.16</td>
<td>10711.16</td>
<td>3566.295</td>
<td>23131.7</td>
<td>37409.16</td>
</tr>
<tr>
<td>3</td>
<td>22204</td>
<td>17812</td>
<td>391026</td>
<td>13901.74</td>
<td>36105.74</td>
<td>10711.16</td>
<td>3566.295</td>
<td>21828.28</td>
<td>36105.74</td>
</tr>
<tr>
<td>4</td>
<td>22204</td>
<td>17812</td>
<td>5213.68</td>
<td>12598.82</td>
<td>34802.32</td>
<td>7315.203</td>
<td>27487.12</td>
<td>34802.32</td>
<td>33498.9</td>
</tr>
<tr>
<td>5</td>
<td>22204</td>
<td>17812</td>
<td>6517.1</td>
<td>11294.9</td>
<td>33498.9</td>
<td>7315.203</td>
<td>26183.7</td>
<td></td>
<td>33498.9</td>
</tr>
</tbody>
</table>

Source: Author