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Option : **Plant Protection**

Crop management and identification of tobacco pests in the region of Zribet el oued

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Defended on 06/28/2022, before the jury composed of :

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Dedication

I dedicate this work…

*To my dear mother **FATMA***

No dedication can adequately describe my admiration, eternal love, and gratitude for the sacrifices you have made for my education and well-being.

Thank you for all of your love and support throughout my youth, and I hope your blessing continues to accompany me. May God, the Almighty, grant you health, happiness, and a long and happy life…

*To my precious father **SAID***

No dedication can ever describe my love, admiration, devotion, and respect for you. Nothing in the world is worth the efforts made day and night for my education and my well-being. This work is the fruit of your sacrifices that you made for my education and training.

TO

*After God Almighty, my shelter, strength, and support, and my soul mates with whom I shared the most exquisite experiences **SIF EDDINE** & **YOUSRA**, my cherished siblings*

TO

*My dear friends, homies and colleagues who supported me throughout all of this journey, special gratitude to all of the **TRAP LORDS** out there with no exceptions*

List of abbreviations

List of abbreviations

PPE: Personal protective equipment

UAA: Utilized agricultural area

PSP: Phytosanitary products

USD$: United states dollars

DA: Algerian dinars

DAS: Directorate of Agricultural Services

General introduction

Tobacco comes from plants native to the Americas around Peru and Ecuador, where it has been found since prehistoric times. It was brought back to Europe by early explorers where it was adopted by society and re-exported to the rest of the world as European colonization progressed. Smoking tobacco in pipes of one kind or another gave way to handmade and then manufactured cigarettes, especially during World War I. Smoking rates increased dramatically during the 20th century in developed countries until recently and rates continue to rise in underdeveloped countries. (Musk & De Klerk, 2003)

Apart from smoking, tobacco had a number of uses as medicine. As a pain killer it was used for earache and toothache and occasionally as a poultice. Smoking was said by the desert Indians to be a cure for colds, especially if the tobacco was mixed with the leaves of the small desert Sage, *Salvia dorrii*, or the root of Indian balsam or cough root, *Leptotaenia multifida*, the addition of which was thought to be particularly good for asthma and tuberculosis. (Balls & Edward, 1962).

Tobacco, like other plants, is susceptible to diseases induced by its own natural enemies, diminishing both yield potential and output quality as well as causing major losses throughout production.

A disease is defined as any deviance from the norm. The farmer has instinctively formed a standard of the appearance of a healthy tobacco plant in his head after living with his crop through all phases of growth and seasons of the year. This is the norm. He notices any changes or strange behavior in its development or look right away. In a wide sense, deviation from his established idea is disease. (Anderson, 2017)

From the perspective of the agents that cause tobacco diseases, the following categories are recognized: Diseases caused by fungus, bacteria, viruses, malnutrition, unfavorable weather, and unknown or poorly understood causes.

The productivity of traditional agriculture is based on the almost ubiquitous use of chemical inputs (fertilizers and pesticides).

Pesticides are commonly used in chemical control to keep plant pests away from crops, seeds, and stored commodities. Chemical management decreases agricultural losses by protecting plants from harmful organisms, reducing insect infestations, minimizing weed competition, and ensuring the preservation of stored grains (Ndao, 2008).

A pesticide is also a substance that is sprayed on a crop to reduce harmful organisms. It's a concept that includes insecticides, fungicides, and herbicides. In that sequence, they deal with insect pests, fungus, and weeds (Ndao, 2008)

This current study is basically related to the protection of plants against bio-aggressors and the agricultural procedures used by farmers to assure a higher quality of agricultural produce.

The Biskra region has seen a considerable agricultural development, and because the Ziban region is regarded one of Algeria's most fertile and distinct places, its agricultural diversification like arboriculture, phœniciculture, market gardening, cereal producing, industrial crops and sheep farming, allows it to maintain a dominant position on the national agricultural market. (DAS, 2016)

Among the Algerian local products, we have the case of tobacco (*Nicotiana tabacum*), which is grown in the Ziban and especially that of Zribet El Oued which is also locally known as "tibgh".

As long as tobacco farming is deemed profitable when we lack sufficient information on its cultivation requirements, therefore we insist on focusing primarily on tobacco cultivation in the region of Zribet el oued with the goal of expanding our knowledge of the various cultural actions performed on the fields cultivated by this plant as well as identifying the various bio aggressors that threaten and prevent tobacco production in this region.

This makes us question about tobacco growers' agricultural know-how and the farming procedures they use to ensure a decent output as well as the identification of the major tobacco pests in the area.

To reinforce our worry about this issue, we suggested the following hypothesis:

- Farmers concern about the quality of their goods and their capacity to spend a significant amount of money on PSP.
- Their ability to not only detect and classify diseases, but also to find an immediate treatment
- Their bond with their farms, which allows them to build their own crop management techniques in order to identify bio aggressors and control them.

Our research corpus will focus on a field survey with farmers in the Zribet el oued region of Biskra using a set of questions serving our research objectives.

This work will be split into two parts; theoretical and practical:

The first section includes a theoretical chapter that presents all of the fundamental knowledge on which we will base our work and test our hypotheses. This section consists of identifying the plant, detailing its history and origin, and discussing its characteristics.

The second section, which is concerned with the practical aspect of the work, consists of two chapters in which we will first present the region of Zribet el oued, which is our object of study, and then propose a detailed questionnaire to the farmers, followed by a complete and detailed analysis of the results in order to have more information on the cultural management but also the identification of the bio aggressors of the tobacco plant in this zone.

PART I

Fundamental knowledge

CHAPTER I

Presentation of tobacco growing

I. GENERAL INFORMATION ON TOBACCO *Nicotiana tabacum L.* & *Nicotiana rustica L.*

I.1. History of the plants

I.1.1 Pre-Columbian America

Tobacco was found by Mesoamerican and South American natives and eventually bro ught to Europe and the rest of the world.

Archeological discoveries show that people in the Americas first used tobacco 12,300 years ago, thousands of years earlier than previously thought. (Nuwer, 2021)

I.1.2 Europe

Christopher Columbus took comprehensive notes of the local terrain, people, and customs during his 1492 voyage to the New World. Columbus reports of a cannabis twisted and smoked by Native Americans. This dried material has previously been noticed by Europeans during interactions with the area's indigenous tribes. Despite the fact that Columbus and his crew were unsure of the plant's name, these are the first recorded European references to tobacco. The significance of Europe's introduction to this crucial commodity is evident now, as it became an important New World cash crop.

Nicotiana is the genus that contains all of the known tobacco varietals. Domesticated tobacco, on the other hand, is divided into two species. The first is Nicotiana rustica, which historians believe originated in South America and arrived in the eastern portion of North America around AD 160. The second Nicotiana tabacum is thought to be the tobacco Columbus met in the Caribbean. (Cosner, 2015)

I.1.3 Asia

Tobacco originally arrived in the Ottoman Empire in the late 16th century, In 1633, Sultan Murad IV outlawed smoking in the Ottoman Empire. When his successor, Ibrahim the Mad, repealed the prohibition, it was instead taxed. Damascene jurist Abd al-Ghani al-Nabulsi remarked in 1682: "Tobacco has now become extremely famous in all the countries of Islam ... People of all kinds have used it and devoted themselves to it ... I have even seen young children of about five years applying themselves to it." In 1750, a Damascene townsmen observed "a number of women greater than the men, sitting along the bank of the Barada River.

They were eating and drinking, and drinking coffee and smoking tobacco just as the men were doing."(Japan Tobacco Inc., 1994).

I.1.4 Australia

Although *Nicotiana suaveolens* is endemic to Australia, tobacco smoking was introduced to northern-dwelling Indigenous people in the early 18th century by visiting Indonesian fisherman. British smoking habits were brought to Australia with the new immigrants in 1788, and in the years that followed, Indigenous Australians quickly acquired British smoking habits as well. Tobacco was an essential item by the early nineteenth century, commonly provided to slaves, criminals, and ticket-of-leave men (conditionally released convicts) as an encouragement to labor, or withheld as a form of punishment. (A Brief History of Tobacco Smoking in Australia, n.d.)

I.1.5 Africa

Tobacco was introduced to Africa from the Americas in the late 1500s. Plant was traded across the continent beginning in the 1600s, and probably earlier. Tobacco helped sustain mercantilist and slave-trade economies, became a focus of colonial and postcolonial economic development efforts, and remains economically important. (Goodman, 2005).

According to (Ehret 2002), "we can follow this dissemination through the spread of a single word, taba, meaning tobacco all the way throughout Africa".

It is clearly evident that African peoples across the continent had taken up the smoking of tobacco by the mid- to late 1600s. as noted in Berthod Laufer's "The Introduction of Tobacco into Africa" (1930).

In the mid-seventeenth century. It appears to have extended into the interior of North Africa's Saharan area, notably Biskra in the district of Zribet el oued, which will be the focus of our investigation. In the second chapter, we'll go over it in greater detail.

I.2. Origins of the genus

Majority opinion among botanists holds that the genus originated in the Andean region, from which it spread throughout most of the American continent and adjacent islands before European colonizers settled the New World. Through the colonizers, it spread to the rest of the world, becoming established in wide areas of Europe, Asia, Africa, and Oceania. Of all the species of *Nicotiana*, two—N. *tabacum L.* and N. *rustica L.*— predominate in the world. Most

other species have remained wild or have returned to the wild along the borders of agricultural regions. (Goodman, 2005).

Linnaeus picked one of the denominations that had circulated among European botanists in the roughly two centuries since the Spanish conquerors' first interaction with tobacco. The Latinization of the surname of Jean Nicot, French ambassador to the court of Lisbon, where he had been acquainted with the plant around 1559 and sent it to France, was a necessary procedure for the science of that age when internationalizing any proposition of this sort.

The proposal to dedicate the plant's Latin name to Nicot first arose in a French manual of agricultural techniques published by Jean Liébault in 1567, but for nearly two hundred years it had to compete with other proposals that appeared in numerous works by European botanists, including "herba sancta" and "herba di Santa Croce" (both used in several Italian treatises), "picietl" (from the nahuatl name of the Mexican Indians, reported by Francisco Hernández after his expedition in 1570–1577), and "herba petum" (from the name of the Brasilian Indians, reported by Portuguese navigators and made well known in Europe thanks to Clusius' work).

Linnaeus' study also established scientific names for the two most common species, *N. tabacum L.* and *N. rustica L.*, which have remained definitive ever since, as well as proposed names for five more species: *N. fruticosa, N. glutinosa, N. paniculata, N. pusilla,* and *N. urens*. This first classification has been the subject of several disputes over the next two centuries, ending in the suggestion of Thomas H. (Goodspeed, 1954) for the whole genus, which is the system most frequently accepted by taxonomists today.

II. DESCRIPTION OF THE PLANT

Tobacco, *Nicotiana tabacum*, is an herbaceous annual or perennial plant in the family *Solanaceae* grown for its leaves. The tobacco plant has a thick, hairy stem and large, simple leaves which are oval in shape. The tobacco plant produces white, cream, pink or red flowers which grow in large clusters, are tubular in appearance and can reach 3.5-5.5 cm in length. Tobacco may reach 1.2-1.8 m in height and as is usually grown as an annual, surviving only one growing season.

II.1. Cultivation

Tobacco grows very well in a wide range of climates and will grow optimally at temperatures between 20 and 30°C in areas where there is a dry period to facilitate harvest of

the leaves. The type of soil depends on the variety of tobacco being grown but the best yields are usually obtained in loam to sandy loam soils. The soil should have a pH between 5.0 and 6-6. Tobacco plants are easily damaged by water logged soils and quality can be affected by high salinity. Plants should therefore be grown in a well-draining and well aerated soil. (Tobacco | Diseases and Pests, Description, Uses, Propagation, n.d.)

Figure 01: Tobacco field (original)

II.2. Propagation

Tobacco is propagated from seed on protected (covered) seed beds or in the glasshouse and transplanted to the final growing site. Seeds grown outdoors are protected for the first few weeks to prevent weather damage to the emerging young plants. seedlings are transplanted after 30–60 days when they are approximately 15 cm in height. The young plants should be spaced 46–61 cm apart. (Tobacco Seed To Harvest, n.d.)

II.3. General care and maintenance

The best quality tobacco leaves are produced when the flowerheads of the plants are removed, a process known as topping. Topping plants promotes the development of suckers which should also be removed. Suckers are removed through the use of chemicals in commercial tobacco production with some hand removal also necessary. Fertilizer and irrigation requirements of tobacco vary with the variety being grown but generally, tobacco has a requirement of 40-80 kg per hectare of nitrogen, 80-90 kg per hectare of phosphorous and 50-110 kg per hectare of potassium. (Tobacco | Diseases and Pests, Description, Uses, Propagation, n.d.)

II.4. Harvesting

Tobacco is harvested by hand in most parts of the world by picking 2–3 leaves from each plant per harvest. In the USA and Canada, tobacco plants are mechanically harvested by cutting the stalks of the plants. Only fully mature leaves should be harvested when hand picking is practices and harvests should be carried out at weekly intervals. After harvest, leaves are usually tied in pairs to cure. To produce flue-cured tobacco, the leaves are mixed with tobacco sticks and put in a barn kiln, which heat cures the tobacco without exposing it to smoke. Sun curing tobacco involves drying the leaves in the sun. (Tobacco Seed To Harvest, n.d.)

II.5. Tobacco types

According to (Tobacco Farming and Curing | PMI - Philip Morris International, n.d.) The three tobacco types are Virginia, burley and oriental. These tobaccos are grown in over 30 countries including Argentina, Brazil, China, Greece, Italy, Malawi, Mozambique, Spain, Tanzania, Turkey, Africa and the United States:

II.5.1 Virginia, or flue-cured tobacco

Is also known as 'bright tobacco' because of the golden-yellow to deep-orange color it takes on during curing. Typically cured for a week in heated barns, it has a light, bright aroma and taste. Virginia tobacco is mainly grown in Argentina, Brazil, China, India, Tanzania, and the United States.

II.5.2 Burley tobacco

Is light to dark brown in color. Air-cured in barns for up to two months, burley loses most of its natural sugars and develops a strong, almost cigar-like taste. It is mainly grown in Argentina, Brazil, Italy, Malawi, and the United States.

II.5.3 Oriental tobacco

Is highly aromatic. Its small leaves are harvested individually and sun-cured in the open air. It is mainly grown in Bulgaria, Greece, Macedonia, and Turkey.

II.6. Botanical classification

Twenty-first-century botanical classifications include more than 240 denominations for the various species, subspecies, and varieties of the genus *Nicotiana*, which belongs to the family *Solanaceae*, subclass *Asteridae*, class *Magnoliopsida* (*Dicotyledoneae*). In spite of

divergences in the formal nomenclature (system of naming) and in the eponyms (name of person, often abbreviated, linked to scientific name of species) used to identify its various species, botanists generally consider the genus *Nicotiana* to include more than 60 distinct species.

- Kingdom: *Plantae*
- Subkingdom: *Viridiplantae*
- Infrakingdom: *Streptophyta*
- Super division: *Embryophyta*
- Division: *Tracheophyta*
- Subdivision: *Spermatophytina*
- Class: *Magnoliopsida*
- Superorder: *Asteranae*
- Order: *Solanales*
- Family: *Solanaceae*
- Genus: *Nicotiana L.*
- Species: *Nicotiana tabacum L.* and *Nicotiana rustica L.*

III. GEOGRAPHIC DISTRIBUTION OF TOBACCO PRODUCTION

Tobacco production is primarily concentrated in regions with a mild and sunny climate, which is suitable for the cultivation of tobacco plants. China, India and Brazil were rated among the leading producers worldwide, followed by the United States. In the U.S., states residing in the Virginia-Carolina tobacco belts are mainly known for their extensive tobacco cultivation.

World production of tobacco leaf has continued to grow since 2003, up 25% from 6.03 million tons in 2003 to 7.5 million tons in 2012. African countries produced 650,000 tons, or 8.7% of the world production of tobacco leaf in 2012, compared to 440,000 tons or 7.3% in 2003. Total area harvested for tobacco in African countries increased by 66%. and output increased by 48%. In this same period, area harvested for tobacco in the United States decreased by 18% while production decreased by 5%. For Europe, the decrease is 40.4% in the area harvested and 43% in production. The source drift from high income to low-income countries is evident. (Hu & Lee, 2014)

According to statistics from the Philip Morris International's website (June 12, 2022), the Global production of green tobacco is on average 6.3 million tons, of which over 60% is produced in Asia. Over the last decade, the top three producers of tobacco leaf were China, India and Brazil.

More than 15 million people are involved in tobacco growing on approximately 3 million farms, at a total output value of more than USD 16.7 billion.

Figure 02: Percentage of growing area per region (www.pmi.com/who-we-are/tobacco-economics)

PART II

Practical section and results analysis

CHAPTER II

Material & methods

I. INTRODUCTION

This chapter summarizes our essay's methodological approach and provides an overview of the research region.

The questionnaire survey was our primary method of observation and information collection in this essay. It enabled us to create a database on the phenomena under investigation, in this case, crop management and identification of tobacco pests in the region of Zribet el oued.

The questionnaire survey is a methodological technique in working methodology that has advantages and disadvantages. According to Claude (2019), there are three key advantages to this form of data collecting. According to them, it is one of the most efficient strategies for producing new information on the subject of the researched matter. Furthermore, a questionnaire allows for data standardization and comparison. Finally, a questionnaire survey ensures that the data sources remain anonymous. On the other hand, one of its drawbacks is that it is susceptible to "declarative bias." It is hard to tell whether or not the information provided in the questionnaire is correct. We are obliged to rely on those who answered.

II. STUDY AREA

The province of Biskra is located in the south-east of Algeria. Its territorial limits are summarized as follows (Sedrati, 2011):

- In the North : The province of Batna
- In the North West : The province of M'Sila
- In the South West : The province of Djelfa
- In the South : The province of El-Oued
- In the North East : The province of Khenchela

The province lies 400 kilometers southeast of Algiers, the capital.

It has a total size of 21,671 km2 and its altitude is 128 meters/sea level (Megueni-Tani,2013)

Biskra’s overall population is predicted to be 775,797 (2010), with a population density of 36 people per km2 (A.n.i.r.f., 2010).

According to the same author A.n.i.r.f. (2010), the agricultural industry employs around 40.6 percent of the entire population.

Agriculture is practiced on 175335 acres, with a diverse range of crops.

II.1. Agricultural vocation of Biskra

According to the DAS 2018, the most important in terms of surface area (it accounts for 88 % of agricultural land) is an intensive Oasis profession based on the exploitation of subsurface water resources. It is characterized by the cultivation of date palms, grains, and market gardening, as well as all forms of livestock rearing. There are basically four types of agricultural production systems.

The intercropping system, the open field system, the mounted system, and breeding are all examples of farming systems.

The following are the most common practical cropping systems:

- Arboriculture
- Phoeniciculture, market gardening, cereal producing, industrial crops
- Sheep farming (Sedrati, 2011).

II.2. Climate

The climate of Biskra is characterized by aridity due to the combined influence of a lack of precipitation, a very contrasting thermal regime, excessive solar radiation and a very high evaporating power of the air.

The Ziban agro-ecological complex is located in the Saharan bioclimatic stage, which is distinguished by a moderate winter with minimal rainfall and a dry and hot summer (Le Houérou, 1995 in Belhadi et al, 2015). Rainfall hardly surpasses 250 mm per year, and the dry season lasts nearly the whole year (Belhadi et al, 2015).

III. OBJECTIVE

This study was conducted during the 2021/2022 agricultural campaign; it aims to survey tobacco cultivation management and to identify the bio-agressors of this cultivation in region of Zribet el oued.

IV. MATERIAL

IV.1. Survey questionnaire on tobacco growing

Visits to tobacco fields took place during different stages of cultivation. We worked on a questionnaire that is divided into 5 modules. The objectives of each module can be summarized by the following points:

- **Module 01:** Inquiries about the farmer; Age group, school level and agricultural training of respondents…
- **Module 02:** Exploitation analysis questions …
- **Module 03:** Farm-related queries; Questions on crop conduct, which is separated into sub-sections from soil preparation and the nursery stage, crop management; fertilization, irrigation, phytosanitary treatment…
- **Module 04:** Weather change.
- **Module 05:** Product warehousing and marketing. (Annex 01)

V. SAMPLING

The realization of this survey began during the 2021/2022 campaign, for this a number of sixteen (16) tobacco growers were questioned.

V.1. Farmer selection

It should be highlighted that conducting this study was challenging owing to a lack of information at the DAS levels on the real number of farmers practicing this crop, particularly in the villages of the province of Zribet el oued.

As a result, the sampling of tobacco growers has affected even people who have abandoned the business but still know how to cultivate tobacco.

V.2. Farmer selection strategies

Three basic strategies are used to choose farmers:

- A decision made through a previous tobacco farmer who will lead us to these colleagues from the same or an adjacent town.
- A decision made through a local man or woman who will lead us to the citizens who cultivate tobacco.
- A decision reached by immediate communication with tobacco farm owners.

The total number of farmers interviewed was sixteen (16).

V.3. Information Gathering Strategy

To obtain as much information as possible, we employed a variety of methods to fill out the questionnaires, including chats, question/answer interviews between the interviewer and the farmer visited, and so on. This took roughly 30 minutes on average. Including voice recordings and field observations, this will take 45 minutes to an hour.

CHAPTER III

Results & discussion

The purpose of this chapter is to describe the findings of a farmer survey conducted in the commune of Zribet El Oued.

I. RESULTS

I.1. Personal traits of farmers questioned

I.1.1 Age of the individuals questioned

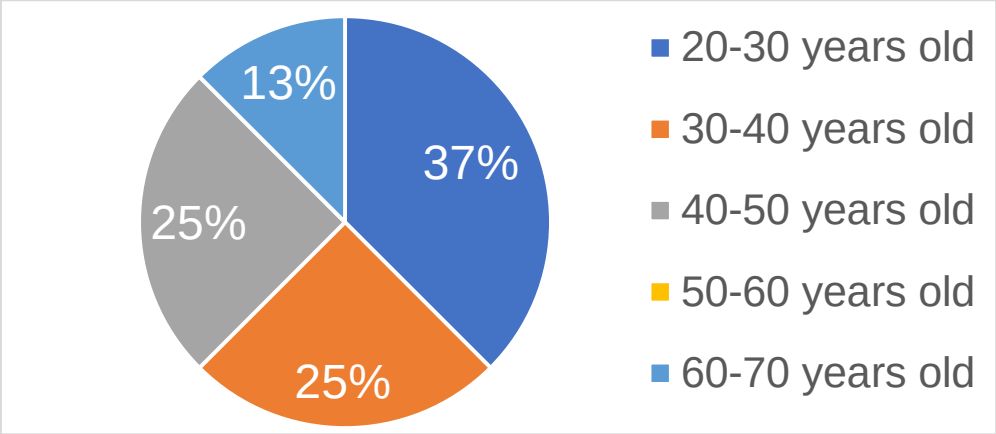

Figure 03: Age group of tobacco farmers

The age group that characterizes our sample is predominantly between 20 and 30 years old, accounting for 37% of our sample, while the age groups between 30 and 40 years old and 40 to 50 years old each account for 25%, and the low rate of 13% is obtained with the age group of over 60 years old and at last we see a 0% for the age group between 50 to 60 years old. This age group distribution indicates that tobacco culture's tradition is being preserved (until other factors, such as new regulations or future generations' lifestyles, change it).

I.1.2 Years of experience

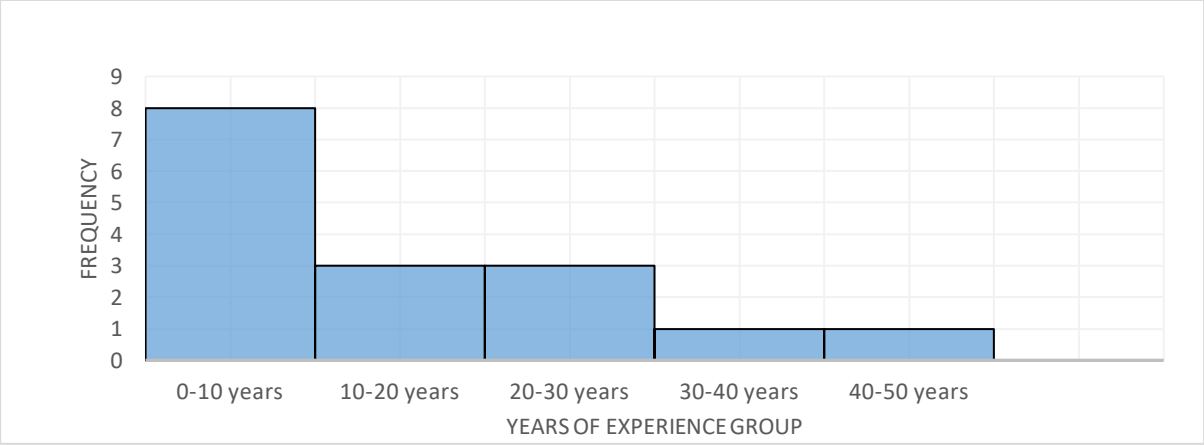

Figure 04: Years of experience

The majority of participants have up to ten years of tobacco growing experience 50 % (8 individuals), while the second largest group based on years of work experience consists of participants with 10 to 20 and 20 to 30 years of experience 18.75% (3 individuals) each, and the minority of participants with 30 to 40 and 40 to 50 years take 6.25% each from the population.

I.1.3 Agriculture training

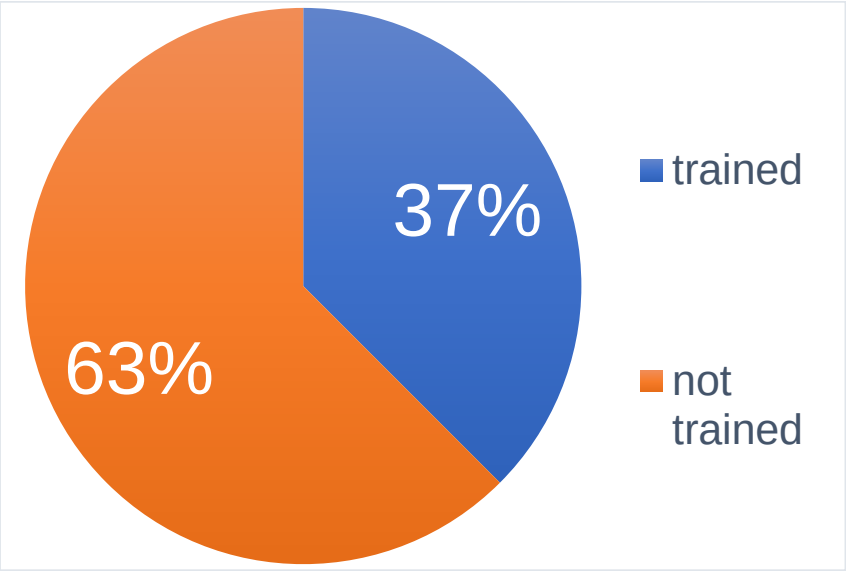

Figure 05: Percentage of individuals training

The pie chart (figure 05) above depicts the percentages of questioned individuals who trained at institutions, universities, or traineeships, as well as those who did not train at all.

With a huge proportion of 63%, the untrained sector captured the majority of the population. While the trained sector took only a percentage of 37% of the total number of the individuals.

This explains why a large majority of farmers responded with inheritance when we asked them why they picked this career.

I.2. Farm

I.2.1 Tobacco planted surface area

Planted tobacco area frequencies in %:

(0-2) acres are 37.5%, 2-4 acres is 43.75%, 4-6 acres is 12.5% and 6-8 acres is 6.25%

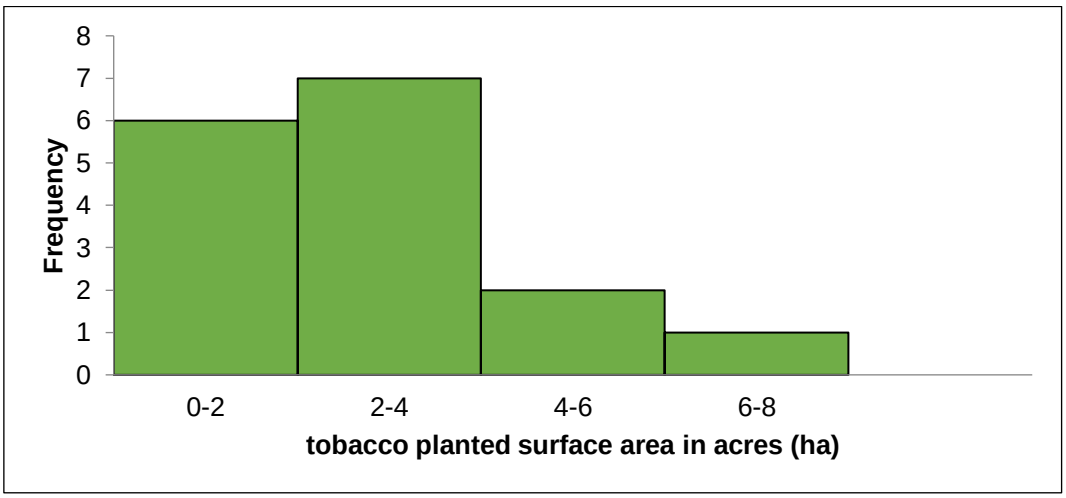

Figure 06: Tobacco planted surface area

In terms of farm size, the most commonly identified tobacco UAA ranges from 2 to 4 acres (Ha) which represents 43.75% of the population, the next most important UAA ranges from 0 to 2 acres (Ha) with a percentage of 37.5%, Following that is a significantly smaller 12.5% of UAAs of around 4 to 6 acres (Ha) Finally, the lowest of them all, 6.25%, represents the class of 6 to 8 acres (Ha).

I.2.2 Total land surface

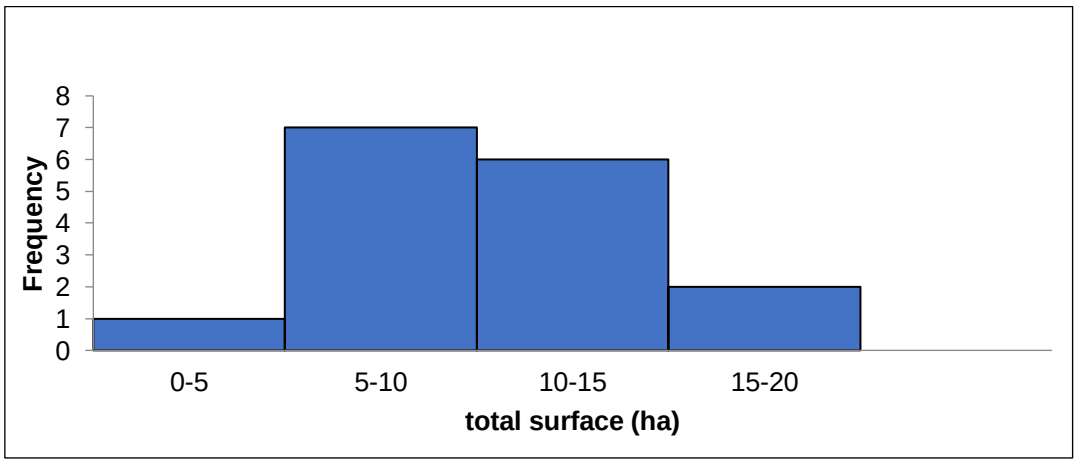

Figure 07: Total land surface

In comparison to the total land surface, the much more frequently described surface ranges from 5 to 10 acres (Ha), representing 43.75% of the population, however the next most relevant surface varies from 10 to 15 acres (Ha), representing 37.5%, and a significantly smaller 12.5% of soils ranging from 15 to 20 acres (Ha) However, the lowest of all, 6.25%, represents the 0 to 5 acre class (Ha).

I.2.3 Surface of other cultures

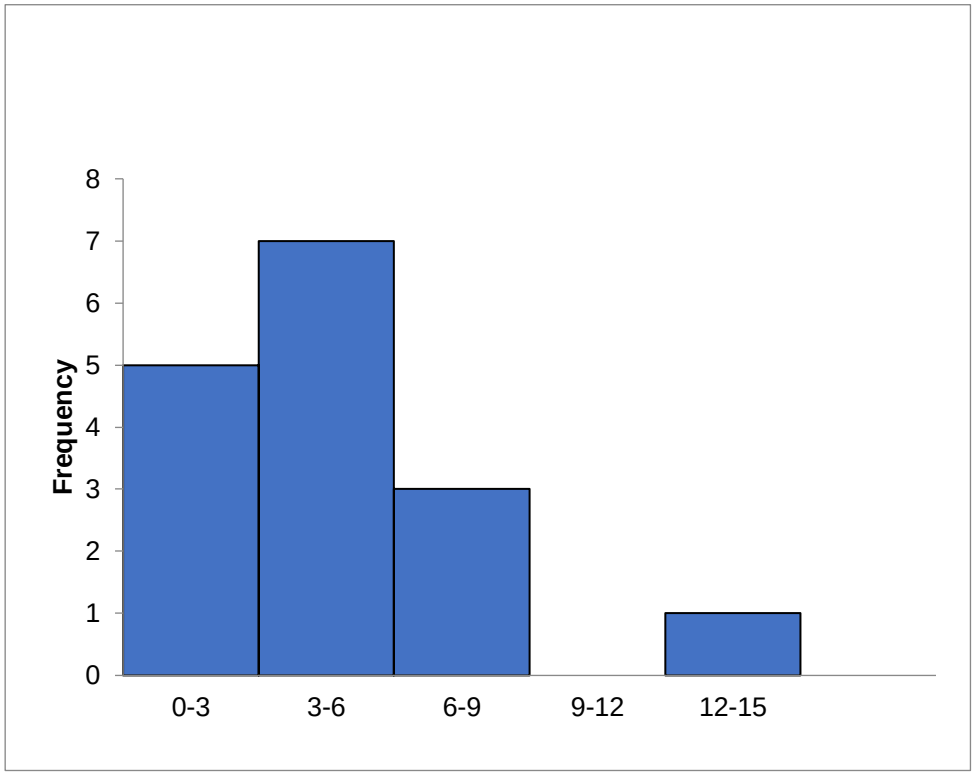

Figure 08: Surface of other crop areas

The rest of the farmers' UAA is reported to be cultivated mainly with wheat, beans, pea, Green Bean, lentils, freekeh, tomato, and radish. The histogram below (figure 08) depicts the surface of various cultures.

Starting with the most frequent class, which has a total vote of 7 farmers and a 43.75 % of the population and represents 3 to 6 acres (Ha) of cultures apart from tobacco, the 0 to 3 acres (Ha) class has a frequency of 5 farmers and a percentage of 31.25 %, and the 6 to 9 acres (Ha) class has a percentage of 18.75 % and a frequency of 3 votes, in addition to a modest amount of 6.25 % for the 12 to 15 acres (Ha) at last.

I.2.4 Tobacco surface in relation to total farm surface

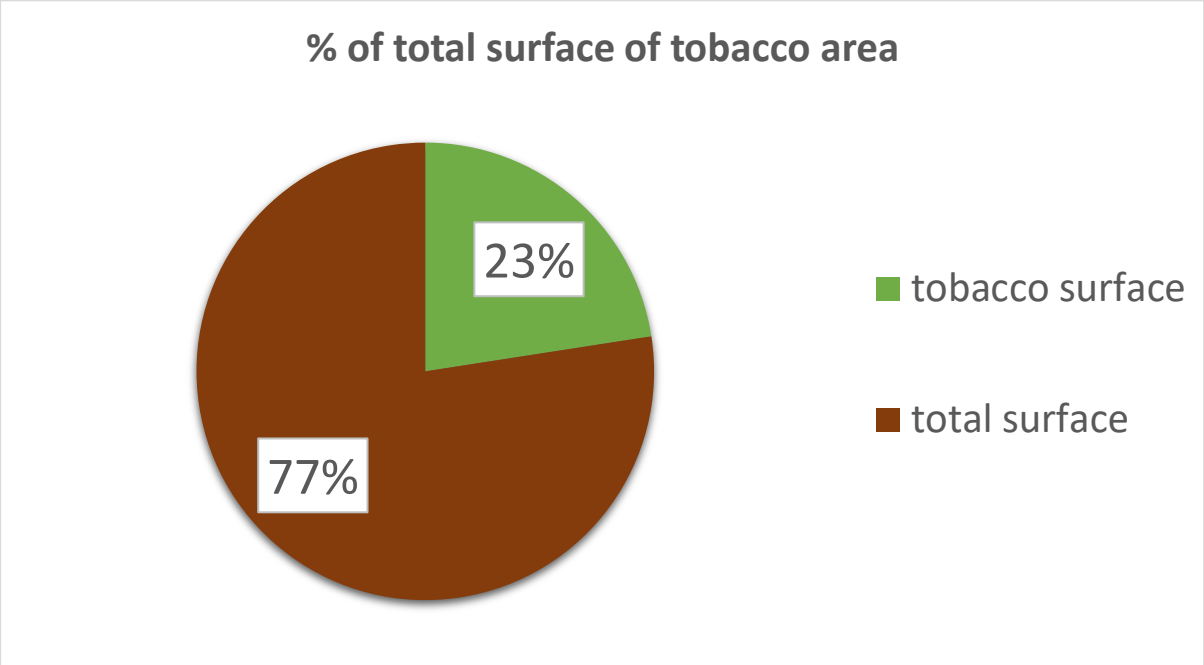

Figure 09: Percentage of total tobacco surface compared to the total surface of farms

Farmers are not entirely reliant on tobacco production, while it is an important component of their overall output. According to the farmers questioned, they cultivate tobacco every year because it is easily manageable and yields quick returns.

I.2.5 Tobacco variety

Despite the fact that the world is familiar with three tobacco varieties: Virginia, burley, and oriental. Argentina, Brazil, China, Greece, Italy, Malawi, Mozambique, Spain, Tanzania, Turkey, and the United States are among the nations that cultivate these tobaccos. (Tobacco farming and curing | PMI - Philip Morris International. 2022, June,12)

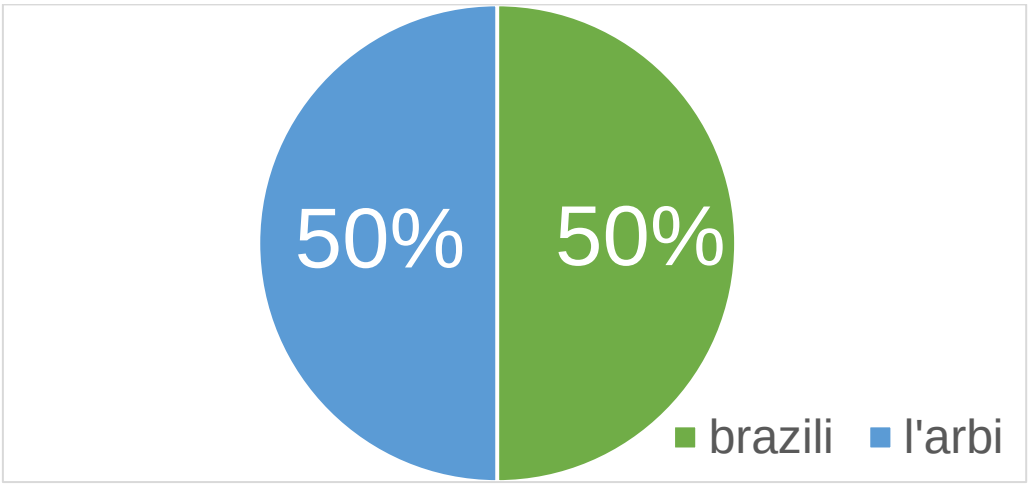

Figure 10: Local varieties

Farmers commonly refer to the local varieties in production as (Berzili and L'arbi). They claim that these final two have been the only variety cultivated since their grandparents.

The pie chart (figure 10) implies that Farmers suggest that they grew both because they are evenly distributed throughout the people and the seeds are widely available simple to obtain.

I.2.6 Planting season

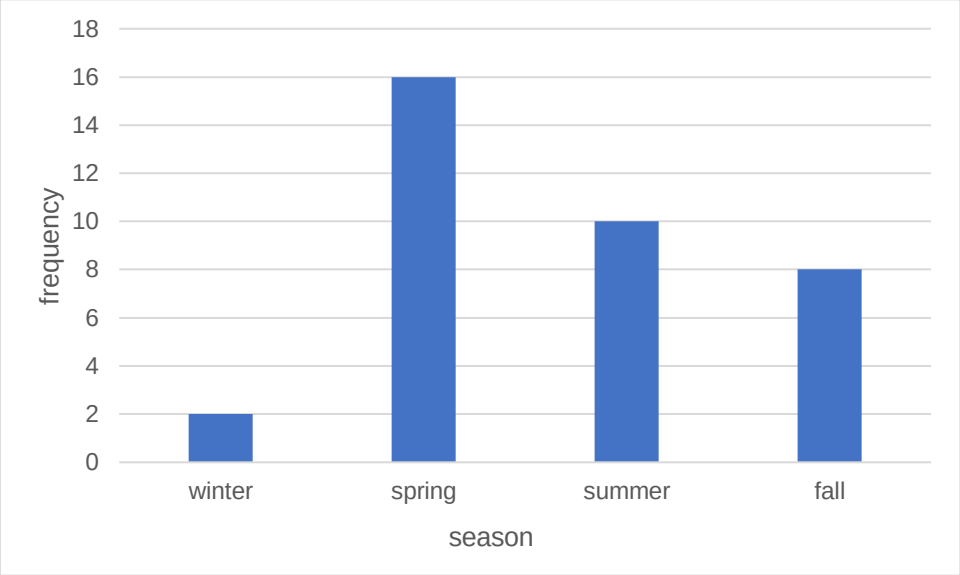

Figure 11: Season of tobacco cultivation

According to the entirety of growers, the best season for tobacco cultivation is spring, allowing it to have the optimal conditions such as temperature, sun exposure, and the ideal humidity level in order to maximize growth potential. Then comes summer, then fall, and finally winter, which has the worst factors such as low temperatures, wind, and excessive humidity, which produces fungus illnesses such as blue mildew (Figure 11).

Tobacco is native to the subtropical region. For economic reasons, it is currently produced commercially in virtually every corner of the planet, between latitudes 55°N and 40°S, but the finest areas are frequently in a far narrower range. The most important essential requirements for field development are at least 120 frost-free days (preferably 140), suitable water for the kind, sufficiently high temperatures, and sunshine for fundamental biochemical and physiological activities. Furthermore, humidity and temperature have a significant influence on the frequency of some tobacco ailments, such as blue mold. Although many tobacco types can endure brief periods of extreme heat, prolonged exposure causes significant stress and, in some cases, permanent plant damage. In general, cold temperatures limit root

development after transplantation in the early stages (1 to 4 weeks), harming immature plant establishment. The following four weeks (5–8) are critical for leaf growth and expansion. For flue-cured tobacco, minimum and maximum temperatures of 18° to 22° C, as well as day temperatures of 28° to 32° C, are considered best. Most locations, however, are not as favorable yet nevertheless produce significant numbers of high-quality leaves.

Temperatures below 13°C are typically unfavorable for all tobacco varieties, especially when combined with rain and limited sunshine. Temperatures about 27°C in a warm climate with ample of sunlight provide good growth conditions, allowing crops to mature in 80 to 90 days after transplantation. In colder climates, it may take 100 to 120 days. Inadequate sunlight causes poor growth and prevents leaves from reaching full maturity, resulting in low-quality tobacco. Throughout the growth phase, sunlight and moderately high temperatures are essential for dry-matter creation and accumulation, as well as related metabolic activities. Even after harvest, a low temperature hampers the natural biochemical process for proper ripening and subsequent curing, especially in air-cured varieties. (Davis, 1999).

I.3. Farm related queries

I.3.1 The use of phytosanitary products

Conventional agriculture's productivity is dependent on the practically universal use of chemical inputs (fertilizers and pesticides).

Pesticides are widely employed in chemical control to protect crops, seeds, and stored goods from plant pests. Chemical management reduces agricultural losses by protecting plants from dangerous organisms, minimizing insect assaults, restricting weed competition, and assuring the preservation of stored meals (Ndao, 2008).

According to the findings, all of the farmers polled use phytosanitary agents such as pesticides, herbicides, and fungicides.

Before utilizing a product, all of the farmers polled say they check with the venders to see if it is acceptable for the crops they are cultivating.

II.3.2 Common diseases

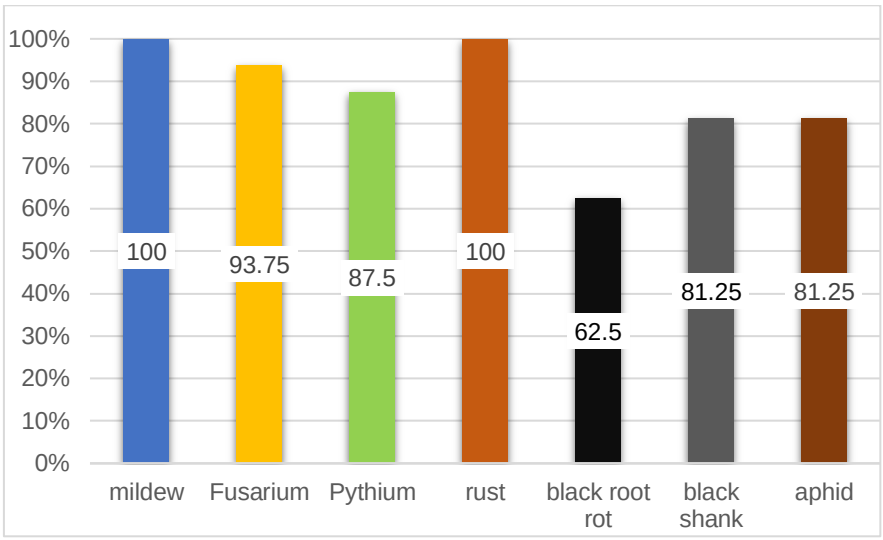

Figure 12: The most common tobacco diseases

The figure (figure 12) demonstrates the diseases that farmers most commonly encounter in their farms, beginning with the most common two (mildew and rust) with a 100% occurrence, followed by fusarium

with a 93.75%, pythium with an 87.5%, black shank and aphid with an even percentage of 81.25%, and finally black root rot with only a 62.5%.

Several tobacco-related diseases are caused by fungus and bacteria. Less than a fifth of these are classified as significant disorders, and will be discussed more below. Some fungal and bacterial infections develop on the leaf, having a direct influence on production and quality (for example, blue mold, brown spot, powdery mildew, target spot, wildfire, and angular leaf spot). Some fungal infections create root rots, which cause stunting and, as a result, indirectly reduce yield and quality (e.g., black shank and black root rot). Other fungal and bacterial diseases can infect the plant stalk or vascular system, causing plant death and loss prior to harvest (e.g., black shank, sore shin, Granville wilt, collar rot, Fusarium wilt and hollow stalk). (Davis, 1999).

II.3.3 Irrigation water salinity

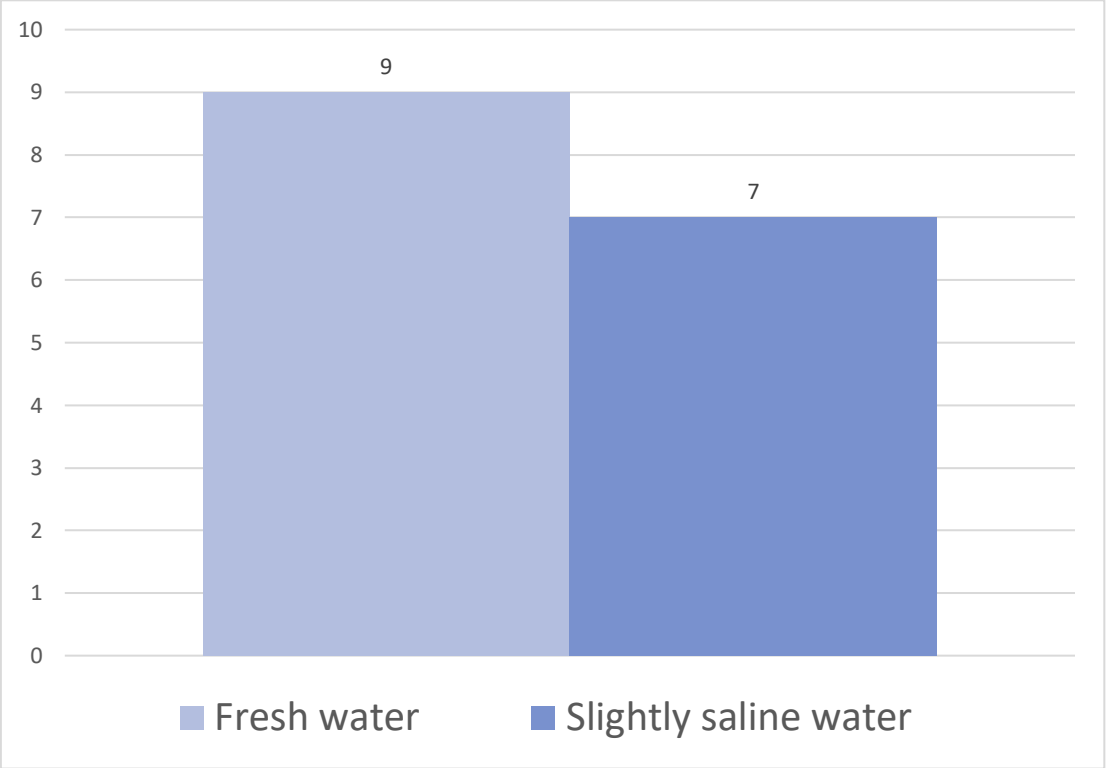

Figure 13: Irrigation water salinity degree for each individual

The questioned individuals are separated into two groups. The first group has a slightly higher number of people who replied with (fresh water) by a total of 9 people, which is 56.25%, while the other group has 7 people who answered with (slightly saline water), which is 43.75%.

II.3.4 Pesticides dosage

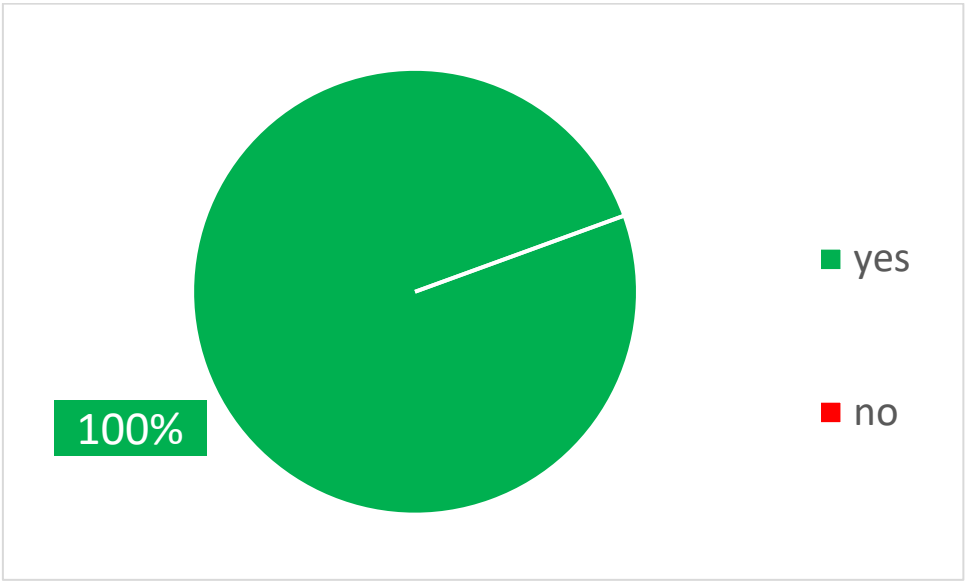

Figure 14: Compliance with phytosanitary product dosages.

We wish to know the farmer's ability to adhere to pesticide dosages throughout treatment. The findings revealed that 100% of respondents adhere to the specified dosages of usage, while 0% disregard the doses.

II.3.5 Source from which farmers obtain and respect the dose from

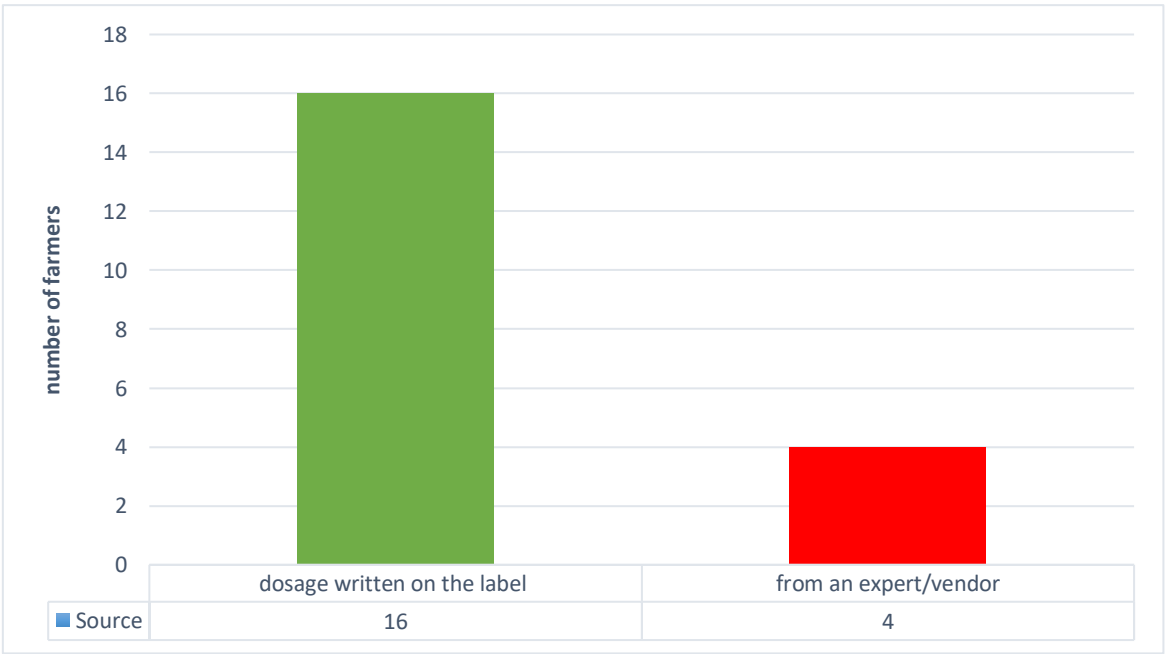

Figure 15: Distribution of the source from which farmers acquire and adhere to the dose.

The results show that all of the farmers (16) carefully follow the dosages listed on the label, and (4) of them will also still obey the doses they acquire from experts/vendors, and none of them determine the doses independently.

II.3.6 Phytosanitary product selection

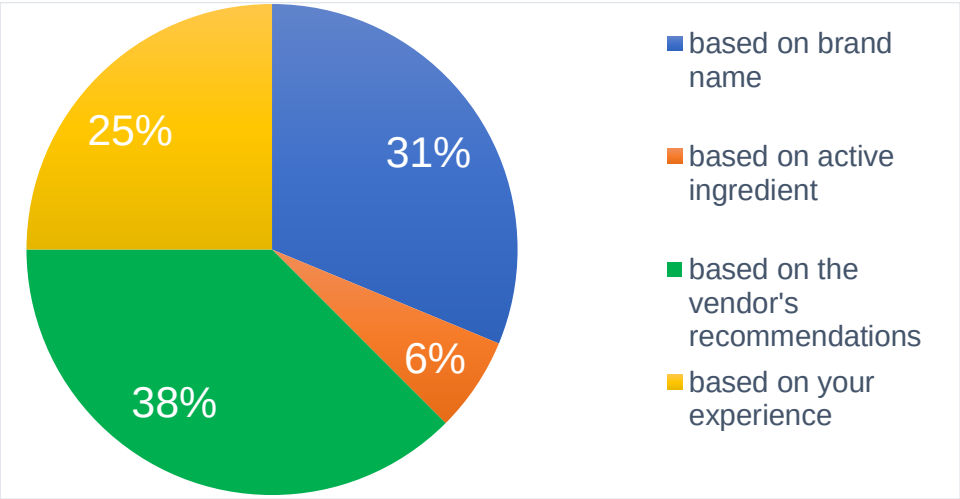

Figure 16: Distribution of farmers according to the criteria for choosing PSP.

According to the findings, 38% of respondents chose their products based on vendor recommendations, while 31% choose well-known brand names, Others chose their goods based on their agronomic experience 25%. The last option is to select items based on the active ingredient with a percentage of 2%.

II.3.7 Cost of pesticides for each acre of tobacco

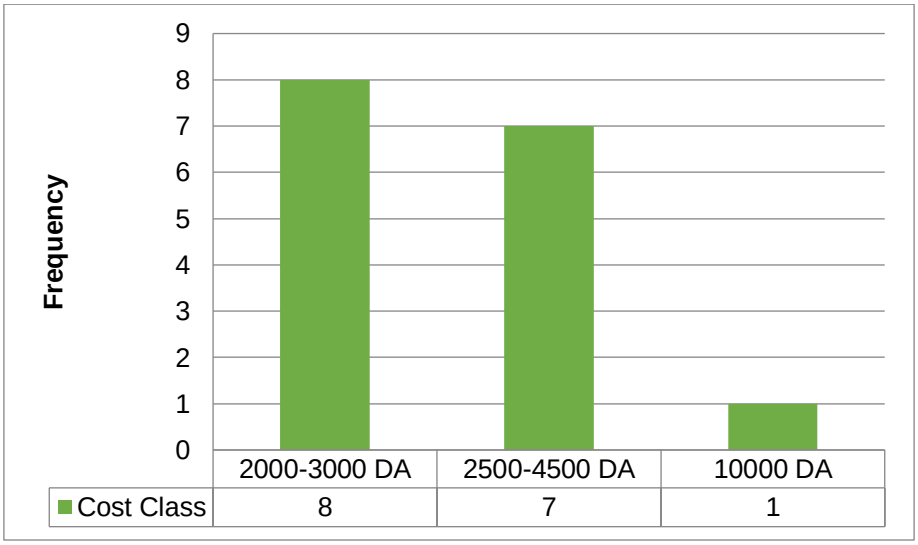

Figure 17: Distribution of cost of pesticides for every acre

According to the data, 8 farmers spend between 2000 and 3000 DA per acre, while the other set of 7 farmers spend between 2500 and 4500 DA per acre of tobacco, but the last farmer spends as much as 10000 DA.

As stated by Lencucha et al., (2016) the average cost of pesticides per acre in Malawi is 5.7$ for independent farmers and 15.4$ for contracted farmers.

At the point of making this study the price of 1USD$ is approximately 190.00DA.

II.3.8 Fertilization

Fertilization may be the most important human controlled aspect in growing excellent tobacco. Tobacco producers have control over the form, rate, timing, and technique of fertilizer application, and each variable is critical.

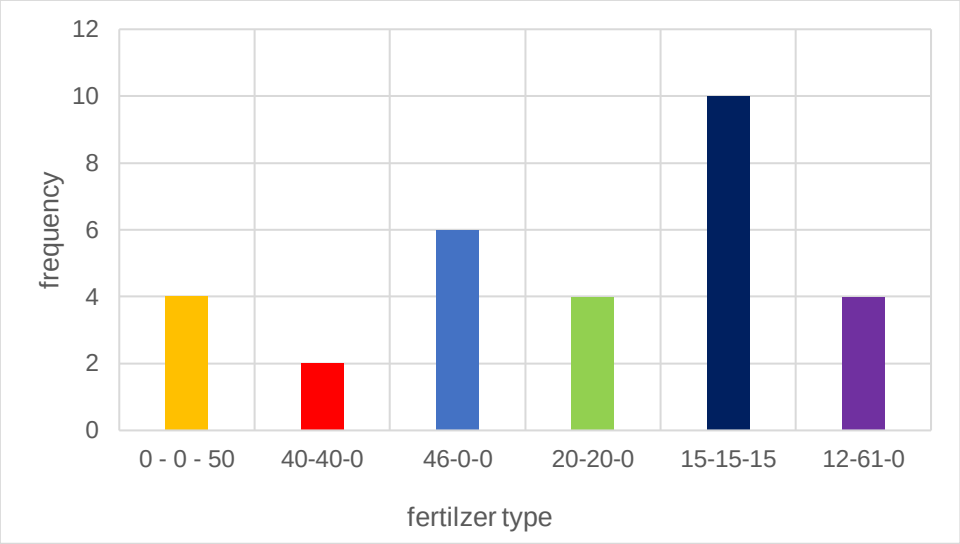

Figure 18: Bar graph illustrating the several types of fertilizers used for tobacco

According to the poll findings, 10 farmers use the 15-15-15 formula, 6 farmers use the 46-0-0 formula, each of the 0-0-50, 20-20-0, and 12-61-0 received 4 votes., and two farmers vote for 40-40-0. Overall, the majority of farmers choose the safer option of 15-15-15 since it contains all of the NPK nutrients required by the plant.

II.3.9 Identification of tobacco diseases

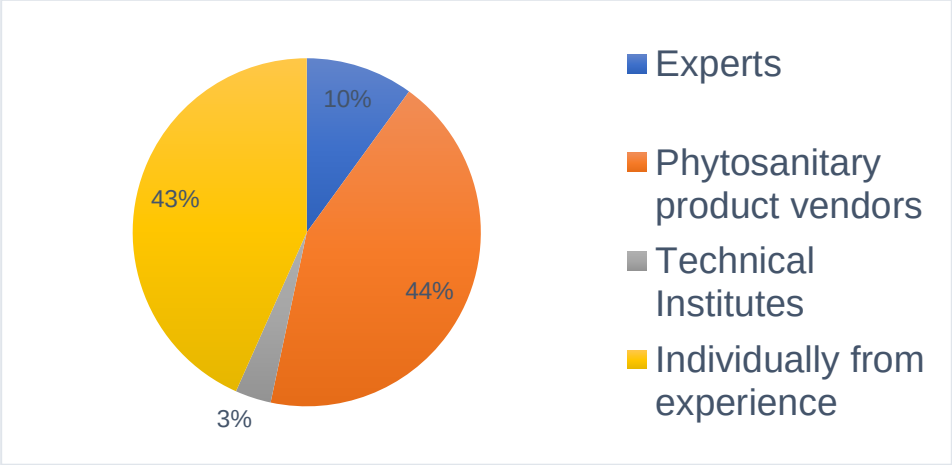

Figure 19: Basis of tobacco disease identification

As per data of the pie chart, 44% of respondents diagnose diseases based on vendor opinions, while a nearly equal 43% depend on individual experience for identification. 10% rely on expert opinions. The last approach is to pick technical institutes with the lowest proportion of 3%.

II.3.10 Status of the mildew spread

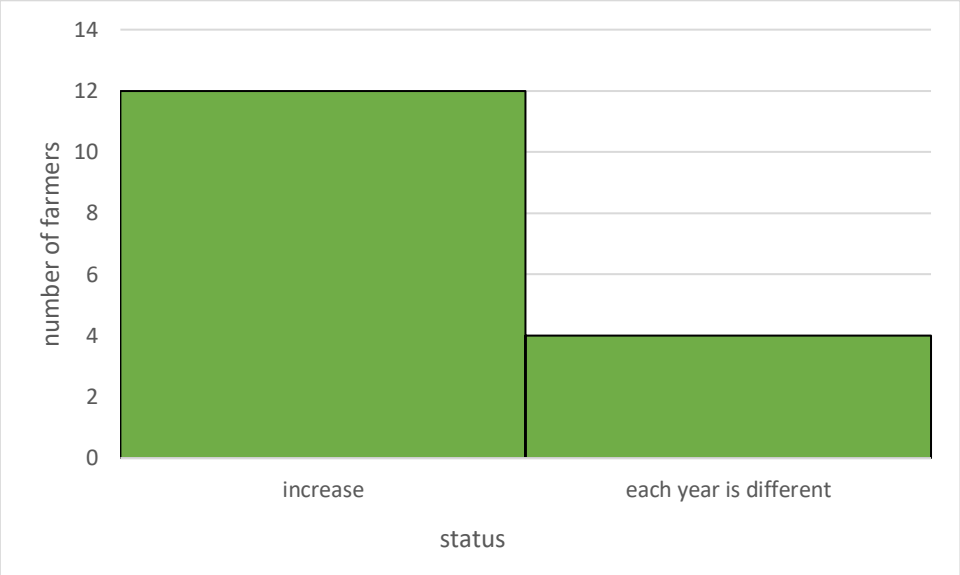

Figure 20: Status of mildew outbreak

Searching for the farmers opinion on the status of mildew outbreak the results show that 12 farmers said that mildew is increasing, which is the majority, and 4 farmers said that each year is different, while no one said that mildew is declining.

One of the most serious tobacco illnesses is blue mold. It is most harmful after lengthy periods of humid and wet weather during which the fungus has had time to grow numerous spore cycles. Depending on the weather, stage of growth, and other factors, blue mold losses in a field might range from moderate to complete crop devastation. The virus that causes blue mold may be found in tobacco growing regions all over the world, including the Americas, Europe, and Australia. However, the sickness has not been observed south of the equator in Africa or east Asian countries such as China and Japan. (Davis, 1999).

II.3.11 Source of mildew spread

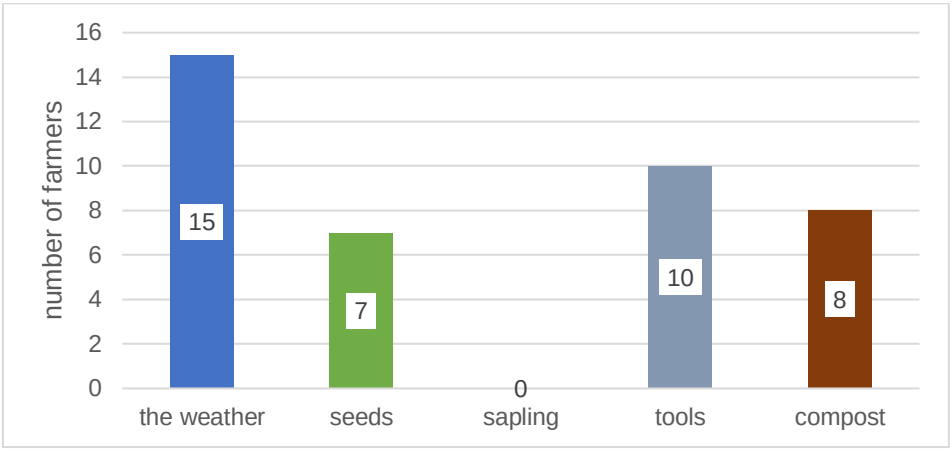

Figure 21: Distribution of respondents according to their opinion on the source of mildew spread

According to the graphic, 15 respondents chose weather as the most likely source, followed by 10 votes for tools, 8 votes for compost, 7 votes for seeds, and 0 votes for sapling.

II.3.12 Symptoms

The symptoms vary depending on the maturity of the plant at the time of infection. Within 2 to 3 weeks of germination, infected seedlings will turn yellow, shrivel, and die. Older seedlings may show signs of systemic and leaf infection. When seedlings get systemically infected, the leaves become twisted and puckered, and the terminal bud ceases to grow. Suckers may develop in the leaf axils, causing the seedling to die. Leaf spots, which can form on seedlings or leaves of any age after transplantation, are the most visible indicators of blue mold. The disease is named after blue mold leaf spots, which are spherical in form and appear yellow on the upper leaf surface while being bluish and moldy on the lower leaf surface. Typically, the yellow leaf spot appears the day before the bluish mold. The yellow leaf spot with the bluish mold will remain for a week, until the leaf tissue in the region becomes necrotic and tan, and the mold becomes brown. The tissue in the leaf spot may eventually fall out of the leaf, leaving a 2 to 4 cm diameter hole. If there is a lot of leaf spot infection within the first 6 to 8 weeks of transplanting, the infected leaves will look ragged, blight, and fall off the plant. If the infection occurs later in the growing season, the leaves will most likely remain on the plant, and the leaf spots will be quite obvious after harvesting and curing. Infection in leaf veins is another sign of blue mold, which is characterized as a locally systemic infection. These induce a minor discoloration and deformation of the infected site and are hardly followed by fungal sporulation. Plants that survive early systemic infection may appear to develop normally, but in the late season, they are typically stunted and prone to lodging. Cutting across the stem of

systemically infected plants reveals a reddish-brown discoloration in the vascular tissue. (Davis, 1999).

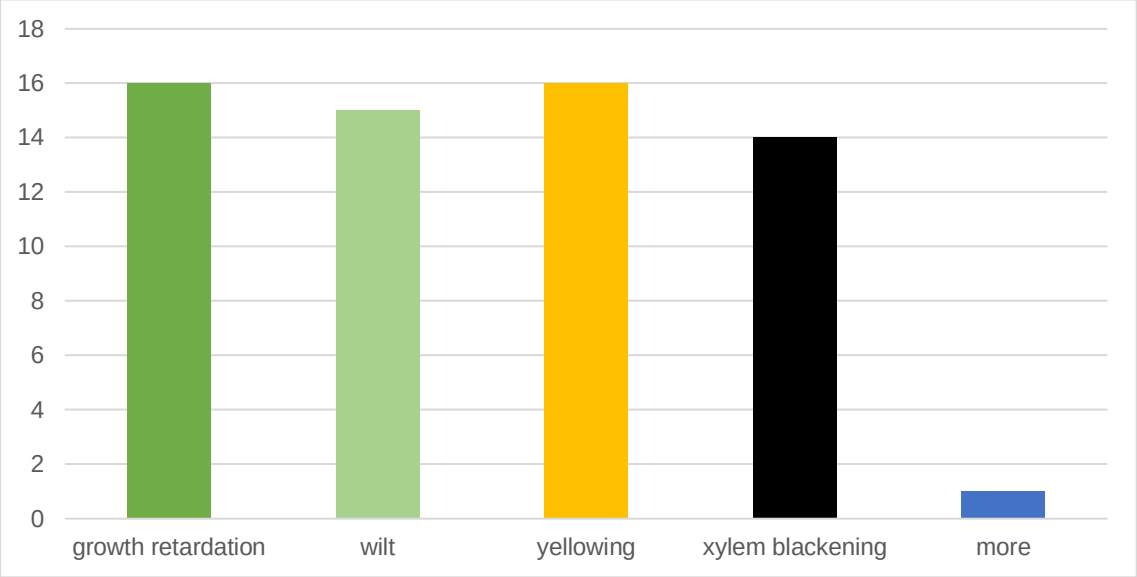

Figure 22: Distribution of known Mildew symptoms

As per the findings, every mildew sign appeared to be present. With 16 votes for both growth retardation and yellowing, 15 for wilt and 14 for xylem blackening, respectively, and 1 for whom noticed even more symptoms.

II.3.13 Mildew treatment

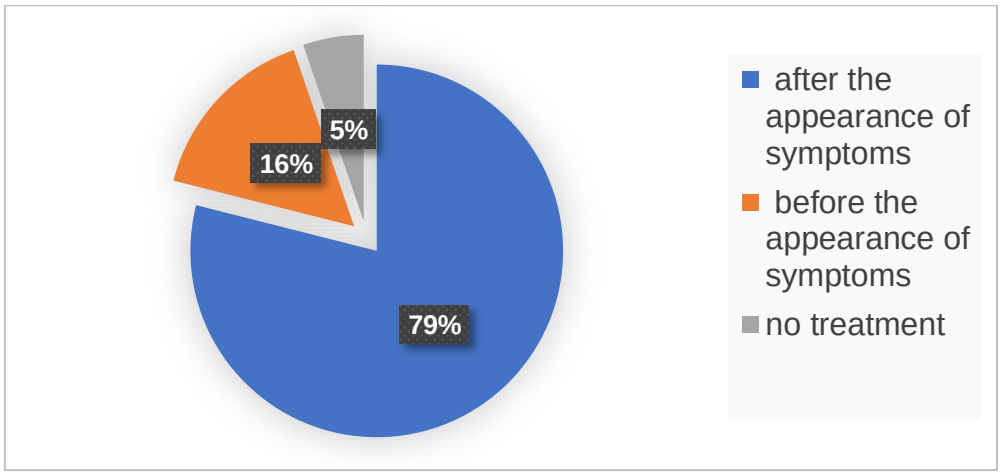

Figure 23: Distribution of treatment time

The majority of growers (79%) prefer to wait until symptoms occur before applying curative therapy since it saves them effort and resources. On the other hand, the minority (16%) chooses prophylactic treatment, while the remaining 5% disregard signs and do not cure their plants.

II.3.14 Treatment results

When we questioned the growers, "did you see successful outcomes based on the therapy method?" they all answered with a 100% treatment success rate.

II.3.15 Pesticide swap

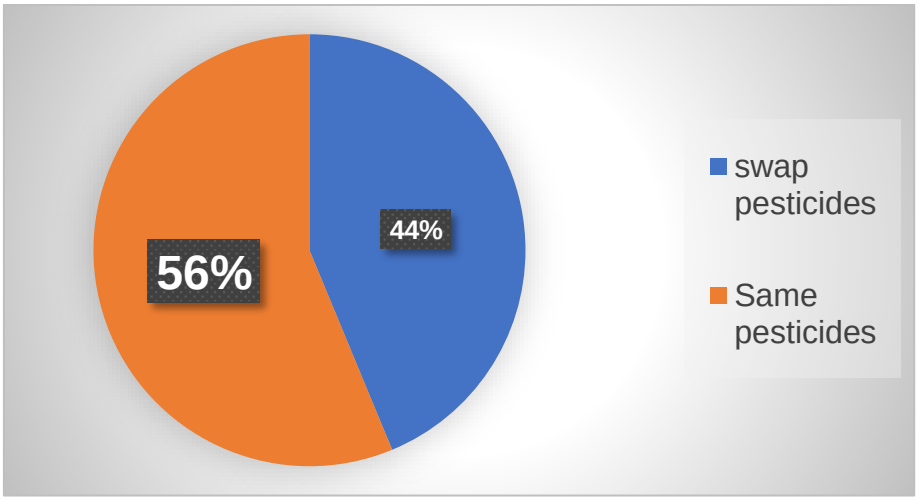

Figure 24: Pesticide rotation

According to the statistics, 56% of those surveyed use the same pesticides because they believe on the idea "Why replace something which works?''; the remaining 44% switch pesticides to prevent developing resistance.

II.3.16 Farmers knowledge of side effects

Farmers recognize that PSP are toxins that induce a variety of negative consequences to the human health when used excessively and without regard for the proper doses.

II.3.17 Safety measure during treatment

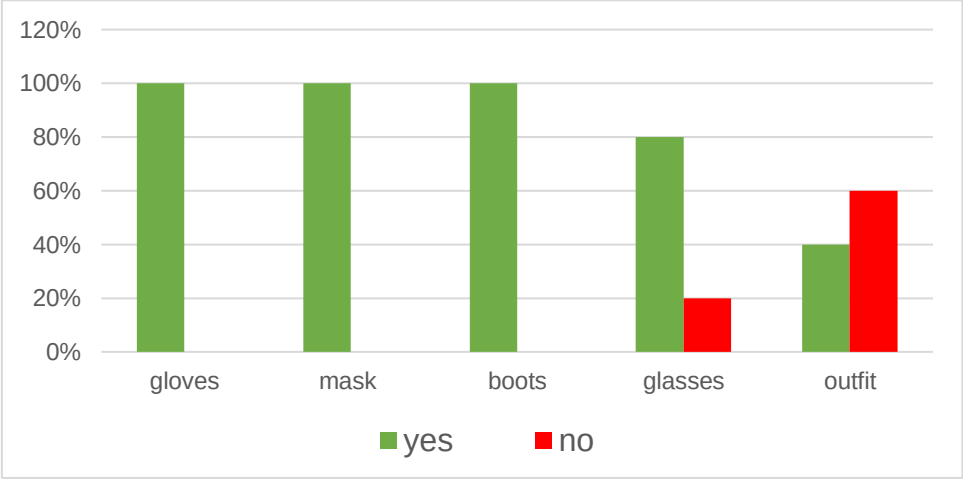

Figure 25: Distribution of wearing of PPE by respondents during treatment

During the treatment, Protective clothing is necessary for personal protection, the statistics show that 100% of the respondents do in fact wear gloves, masks and boots.

But regarding the wearing of glasses 80% wear them, while the rest (20%) do not, as for the full outfit the majority that is 60% doesn't wear it and the other 40% wears it.

II.3.18 Weed control

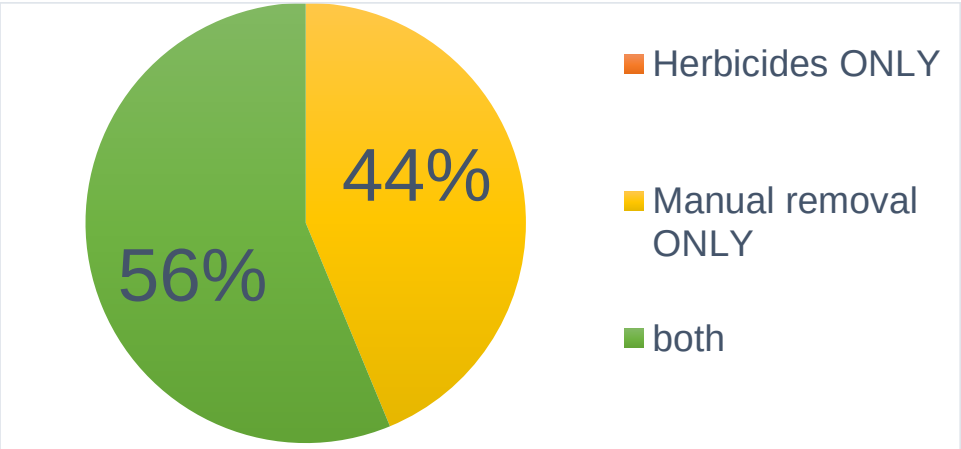

Figure 26: Weed control method distribution

The analysis of the statistics shows that 56% of the population uses both manual removal and herbicide application methods, while 44% solely uses manual removal.

None of the farmers depends only on herbicides.

II.3.19 Weed control period

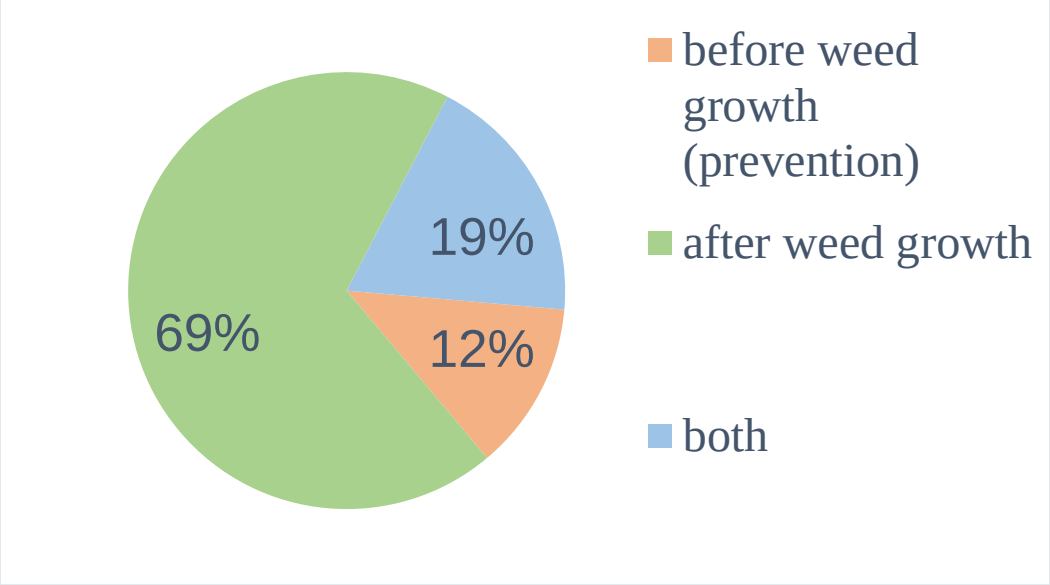

Figure 27: Weed control period distribution

The majority of those responded to the survey (69%) tend to cure and treat noxious weeds once they develop and emerge.

19% use prophylactic weed control, while the remaining 12% mix the two.

II.3.20 Tobacco technical supervision

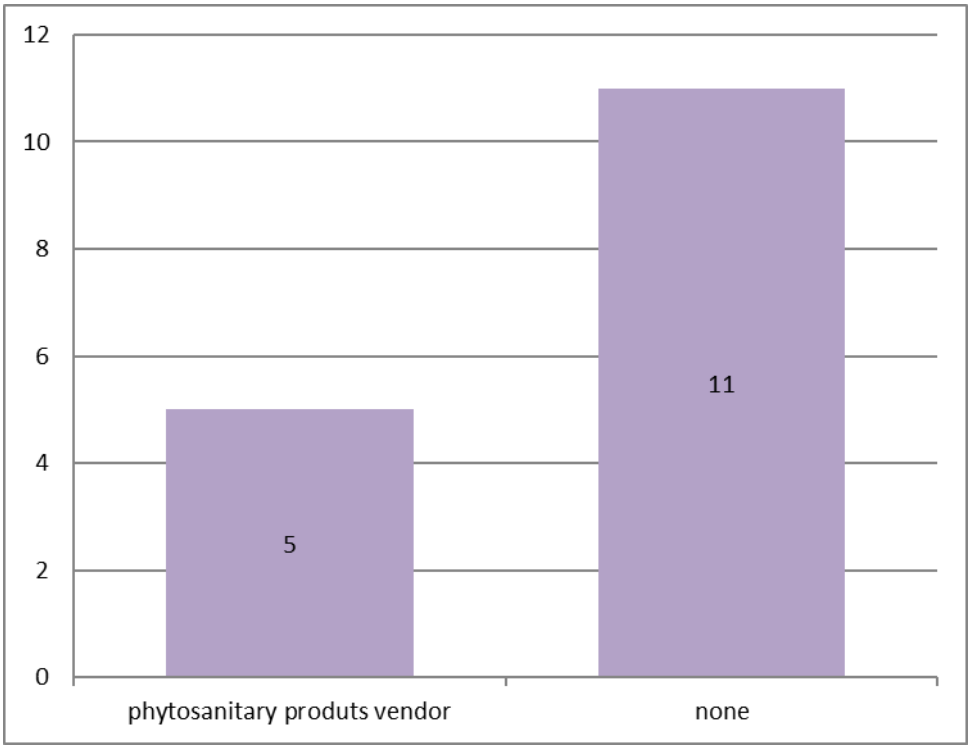

Figure 28: Distribution of tobacco technical supervision

We noticed from the analysis of the results that 11 farmers deny the existence of any technical supervision while the other group of 5 farmers say that they get supervision from their PSP vendors.

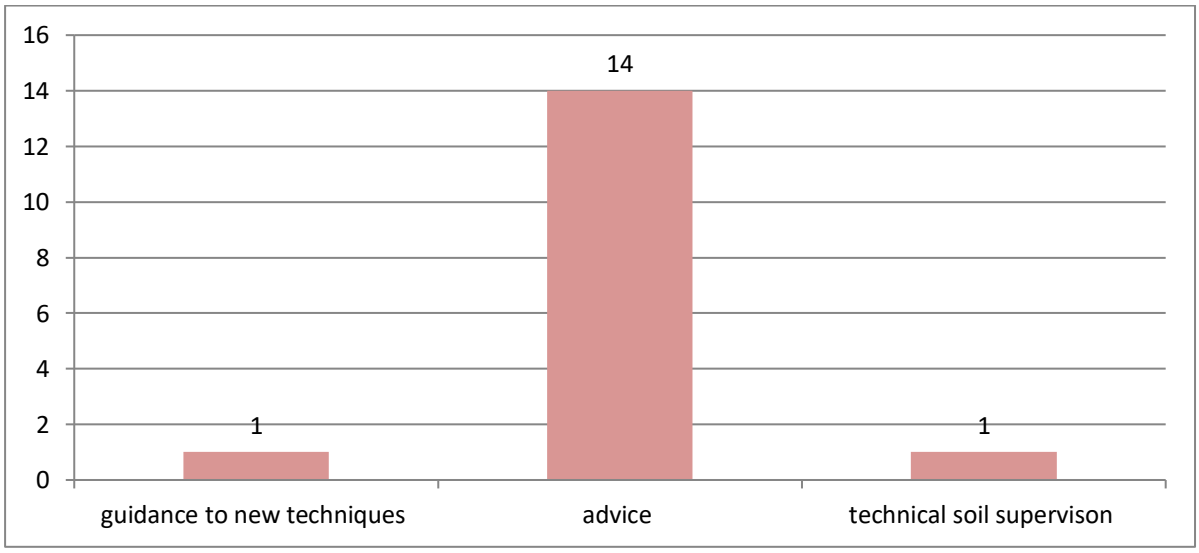

Figure 29: Distribution of the type of help that farmers get from the PSP vendors

According to the data, the majority of 14 farmers get advice from their vendors while the rest 2 goes to guidance to new technics and technical soil supervision.

II.4. Weather change

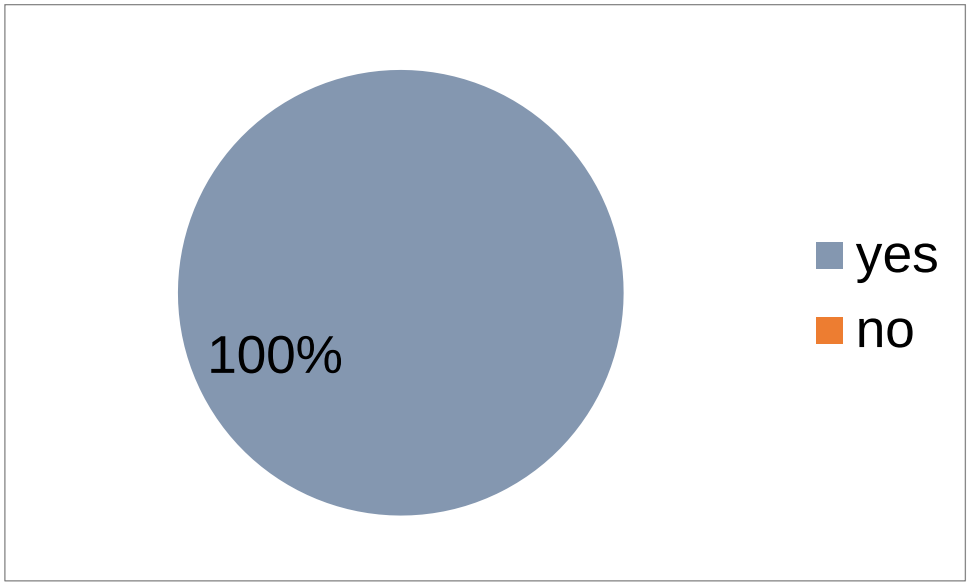

Figure 30: Distribution of weather changes according to farmers

According to all the population of the farmers questioned, the weather indeed is changing.

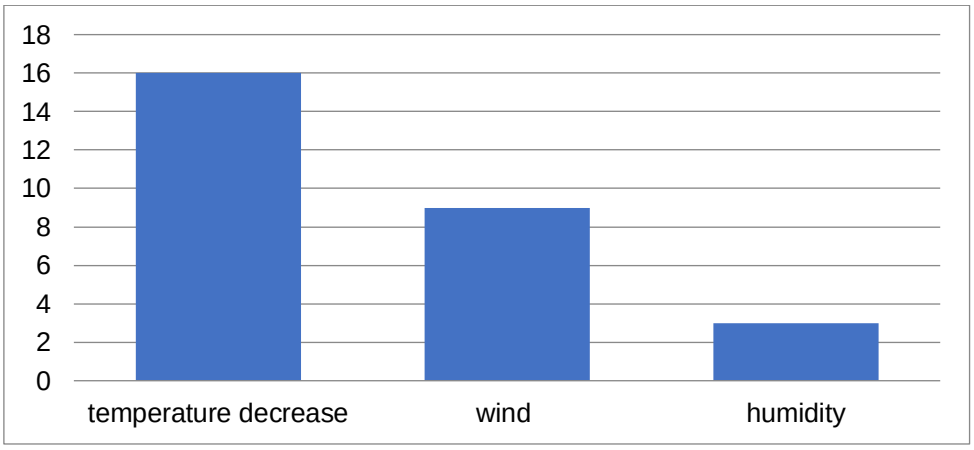

Figure 31: Distribution of the weather changes those farmers noticed

The entirety of tobacco growers noticed that the temperature is decreasing, while 9 of them noticed wind increase and another 3 noticed humidity increase due to the recent increase of raining.

Farmers appear to agree on the same approach to dealing with the aforementioned weather shift, which is to reduce irrigation water to avoid moist soils.

II.5. Product warehousing and marketing

II.5.1 Investment capital

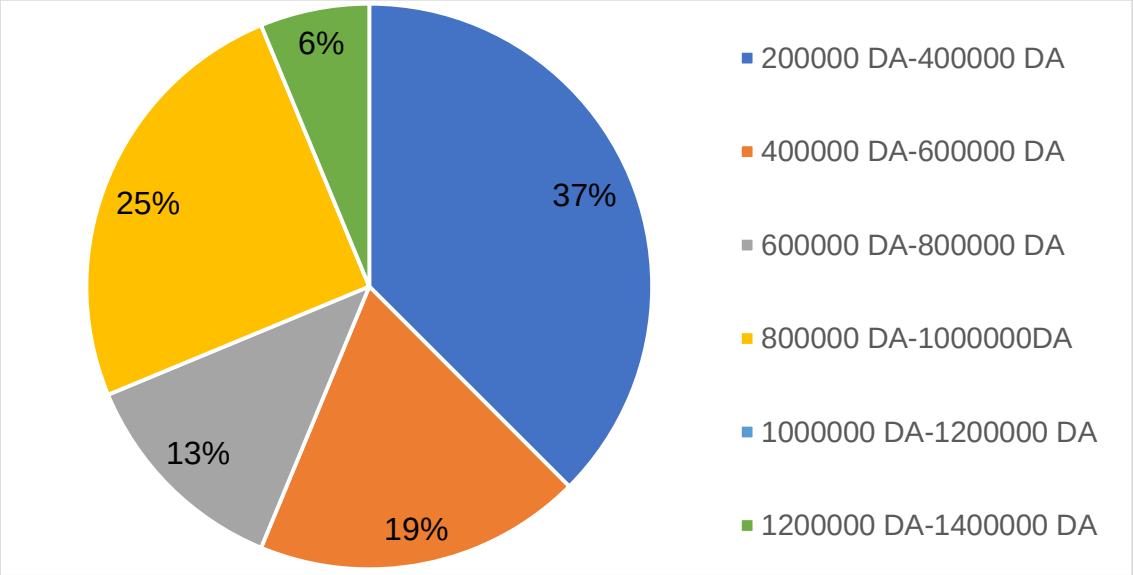

Figure 32: Distribution of investment capital per class

From the farmers questioned we get that 37% of them spend from 200000DA to 400000 DA following that a 25% spends from 800000 DA to 1000000 DA, a 19% spends over 400000 DA to 600000 DA, a 13 % spends 600000 DA to 800000 DA and the last 6% spends between 1200000 DA and 1400000 DA on their agricultural investment.

II.5.2 Place to sell the product

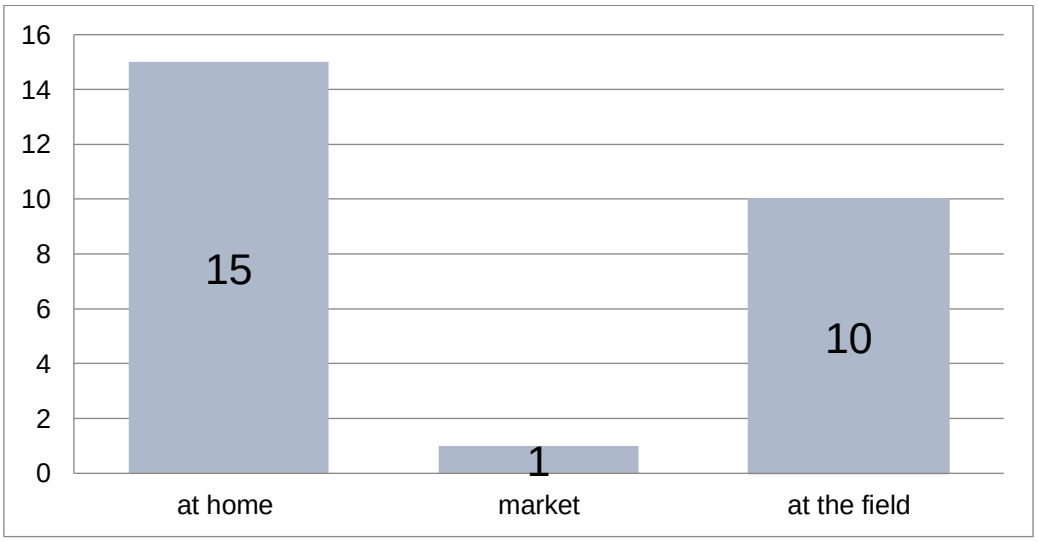

Figure 33: Place where farmers sell their product

The majority of the farmers sell their products at home (15) a part of them also sells at the field (10) while the very minority sells in the market.

II.5.3 Targeted market

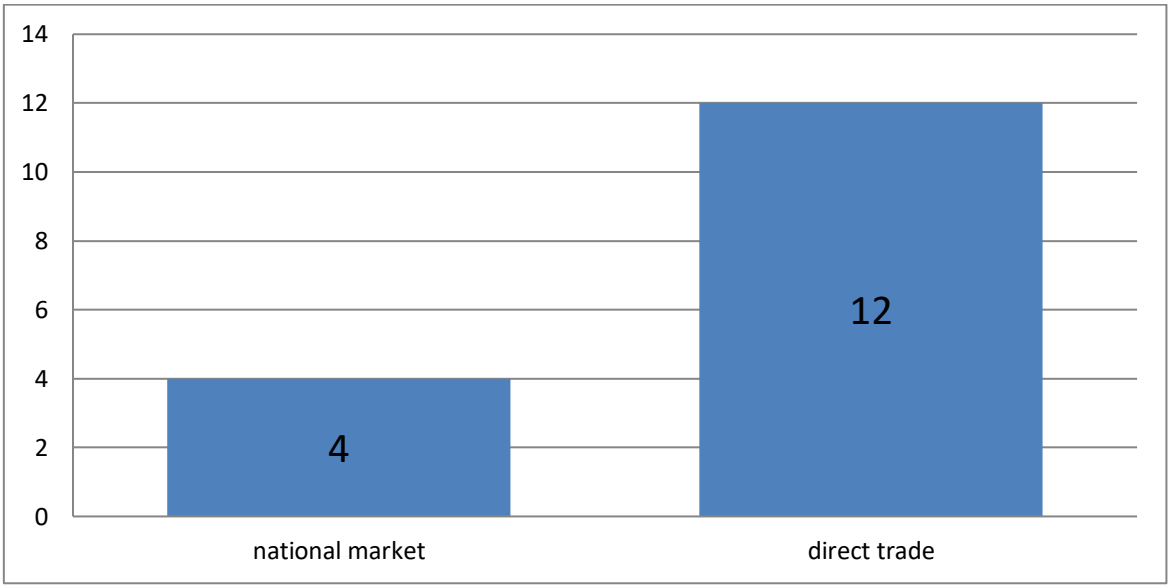

Figure 34: Distribution of targeted market by tobacco producers

Data shows that 12 farmers sell their produce directly to wholesalers/companies...etc.

The other 4 targets the national market.

The absence of any local or international market targeting.

II.5.4 Method for removing the remnants of the plant

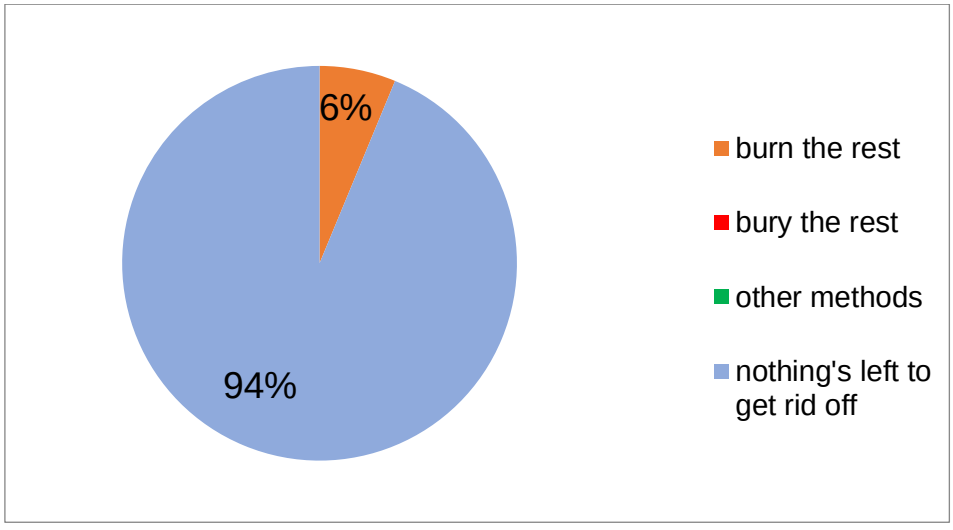

Figure 35: Distribution of method of removing tobacco remnants

After the harvest 94% of the population agrees on the fact that every component of the plant like the stem, the leaves and the flower which has the seeds can be exploited and there will be nothing left to get rid of.

However, just 6% choose to burn the remainder and profit only from the sale of the leaves.

II.5.5 Significant issues confronting tobacco producers

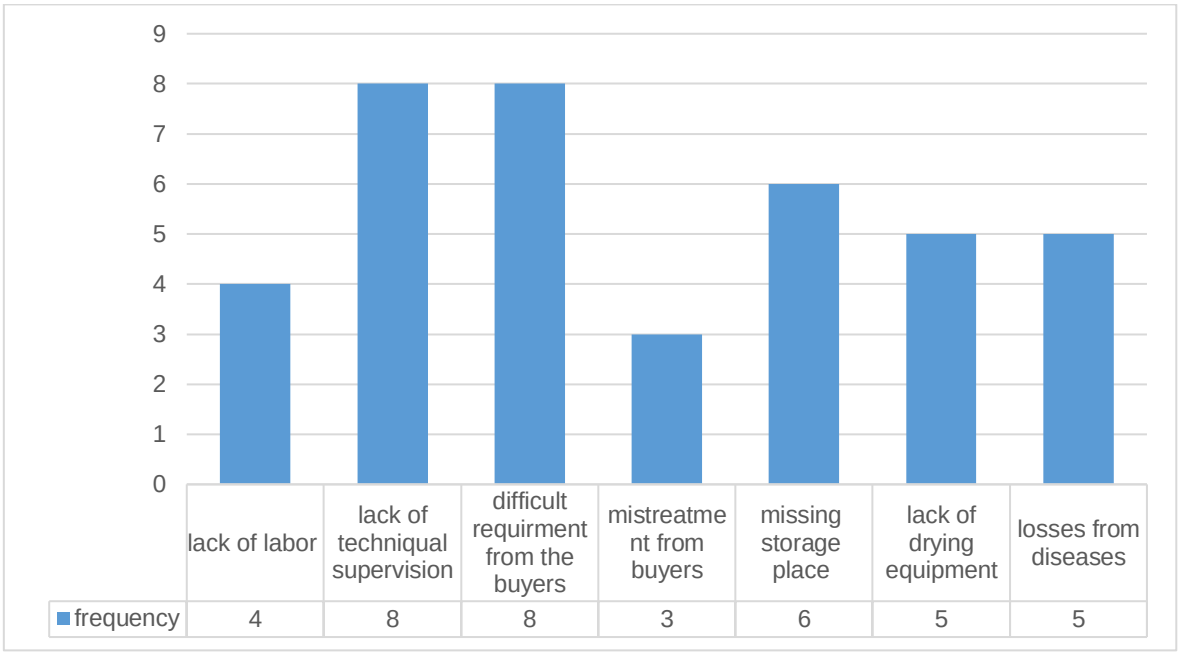

Figure 36: Distribution of the major problems facing tobacco growers

The two most frequently mentioned issues are a lack of technical supervision and the buyer's demanding criteria, such as the moisture of the leaves and the level of dryness and color with 8 mentions each.

Absence of storage space is also a major concern; some farmers resort to storing cured tobacco in their own houses, this issue has been cited 6 times.

Following that is a lack of drying equipment to create flue-cured tobacco and losses due to plant diseases such as blue mold; these latter two difficulties have been mentioned 5 times each.

Finally, there was a labor shortage, as evidenced by 4 reports, in addition to 3 claims of buyer mistreatment.

General conclusion

The realization of this work relied mainly on the agricultural know-how of tobacco growers and the cultivation procedures they use to ensure a decent yield as well as the identification of the main tobacco pests in the Zribet El Oued area. The study of the results collected allowed us to confirm our hypotheses that were suggested at the start of our study concerning:

- The attention that farmers bring to the quality of their products and also their willingness to allocate a considerable budget on PSP.
- Their ability not only to detect and classify diseases, but also to find immediate treatment
- Their link with their farms, which allows them to build their own crop management techniques in order to identify pests and control them.

The whole population consists of men, in which 62% of respondents are under or equal to 40 years old. Between 20 and 30 years is the most common age with 37%, this indicates the young age of farmers in this region.

Half of the participants have up to ten years of tobacco growing experience 50 % and the remainder are separated into small groups of 10 years and above. Along with that a huge proportion of 63% of the population is untrained which explains the reason a large majority of farmers responded with inheritance when we asked them why they picked this career.

In terms of tobacco farm size, 4 acres or less is the most usually identified tobacco UAA 81.25%. The same percentage for the lands total surface which ranges between 5 to 15 acres.

The rest of the farmers' UAA is reported to be cultivated mainly with wheat, beans, pea, Green Bean, lentils, freekeh, tomato, and radish. In whom 75% of the population utilize 6 acres or under for different crops apart from tobacco.

From the total surface of the farmers lands combined only a 23% goes to tobacco cultivation means that farmers are not entirely reliant on tobacco production, while it is an important component of their overall output. According to the farmers questioned, they cultivate tobacco every year because it is easily manageable and yields quick returns as a side production.

Farmers often refer to the local cultivars in production as (Berzili and L'arbi). They claim that these previous two varieties have been the only ones grown since their grandparents' time.

The optimum season for tobacco growing, according to growers, is spring, which allows it to have the appropriate parameters such as temperature, sun exposure, and the ideal humidity level in order to optimize development potential.

All of the farmers surveyed employ phytosanitary chemicals such as insecticides, herbicides, and fungicides, according to the data. Before using a product, every farmer polled said they check with the vendor to verify if it is suitable for the crops they are growing. The studies also indicated that 100% of respondents adhere to the doses of usage mentioned on the label.

93 % spend no more than 4500 DA on pesticides per acre, while the rest spend more than 10000 DA, but also 38 % chose their products based on vendor recommendations, while 31 % chose well-known brand names, and the remaining 25 % chose their goods based on their agronomic experience. The final option is to choose things based on the active component with a proportion of 2%.

Fertilization is possibly the most significant human-controlled part of creating high-quality tobacco. In our situation, ten farmers choose to mix a balanced 15-15-15 formula with other high nitrogen or potassium formulas, while the remainder prefer to combine nitrogen and potassium rich fertilizers.

Because tobacco plants grow quickly and generate a lot of leaves, their fertilizer requirements are high. Basic NPK is a good starting point for tobacco crops. Despite the fact that a 1:1:3 ratio is usual, nitrogen has the greatest impact on tobacco production among the 13 important elements. Too little, and yield suffers; too much, and production improves; yet, Tobacco plants require sufficient of potassium to drive root growth; however, it must be administered with caution, since too much potassium can restrict magnesium uptake.

The diseases that farmers most commonly encounter in their farms, begins with the most common two (mildew and rust) with a 100% occurrence, followed by fusarium with a 93.75%, pythium with an 87.5%, black shank and aphid with an even percentage of 81.25%, and finally black root rot with only a 62.5%.

44% of respondents diagnose diseases based on vendor opinions, while a nearly equal 43% depend on individual experience for identification. 10% rely on expert opinions. The last approach is to pick technical institutes with the lowest proportion of 3%.

In terms of mildew spread, 12 farmers said that it is increasing, which is the majority, and 4 farmers said that each year is different because of the presence of every mildew infection sign based on farmers' observations. The source of the spread, according to the questioned farmers, is primarily the weather.

The majority of 79% prefer to apply the curative therapy since it saves them effort and resources in case of the absence of mildew symptoms while the minority 16% chooses prophylactic treatment, while the remaining 5% disregard signs and do not cure their plants. Resulting in a 100% treatment success rate.

56% prefer to stick to the same pesticides as long as it provides the expected results, the other 44% swap every year to avoid the development of resistance.

Farmers comprehend that PSP are poisons that have a range of detrimental effects on human health when used excessively and without consideration for suitable dosages.

Protective apparel is required for personal safety during treatment, and data reveal that 100% of responders do wear gloves, masks, and boots. However, when it comes to glasses, 80% wear them while the remaining 20% do not. but when it comes to entire suits, 60% do not wear them while the remaining 40% do.

56% of the population employs both manual removal and herbicide application methods, whereas 44% only uses manual removal.

The majority of people who answered to the poll (69 %) cure and treat noxious weeds as they appear. Prophylactic weed management is used by 19%, while the remaining 12% combine the two.

The majority of tobacco producers deny the presence of technical supervision, whereas the minority claims to get it from their PSP vendors. In the other hand 14 farmers get advice and the other two get technical soil supervision and guidance to new techniques from their PSP vendors.

The weather is changing, according to the whole population of farmers polled. predicated on their observing a drop in temperature accompanied by some wind assaults.

Farmers appear to be using the same strategy to cope with the aforementioned weather shift: limit irrigation water to avoid wet soils.

37% of the tobacco growers spend from 200000DA to 400000 DA following that a 25% spends from 800000 DA to 1000000 DA, a 19% spends over 400000 DA to 600000 DA, a 13 % spends 600000 DA to 800000 DA and the last 6% spends between 1200000 DA and 1400000 DA on their agricultural investment.

The majority of the farmers sell their products at home (15) a part of them also sells at the field (10) while the very minority sells in the market. With the target mark of direct trade according to 12 farmers and the other 4 targets the national market.

After the harvest, the majority of the population agrees on the fact that every component of the plant like the stem, the leaves and the flower which has the seeds can be exploited and there will be nothing left to get rid of. However, just 6% choose to burn the remainder and profit only from the sale of the leaves.

With eight mentions each, the two most commonly reported difficulties are a lack of technical monitoring and the buyer's exacting standards, such as the hydration of the leaves and the level of dryness and color.

Lack of storage space is also a serious issue; some farmers resort to keeping cured tobacco in their own homes; this issue has been mentioned six times. Following that is a shortage of drying equipment to produce flue-cured tobacco, as well as losses due to plant diseases such as blue mold; the latter two issues have been reported five times apiece.

Finally, there was a labor scarcity, as demonstrated by four complaints and three buyer abuse accusations.

According to our study, we have noted certain nuances at the financial and managerial level for this, proposing the following solutions:

- Create a special sector to organize commercial activities in order to protect farmers' rights.
- Farmers receive state agricultural assistance in the form of improved drying technology and storage facilities.
- Educate farmers on the proper use of PSP but also pay close attention to the alarming increase of blue mold.
- Accredit agricultural specialists to train farmers in tobacco growing, as well as guide them towards adopting safe solutions to the problems they face.

Finally, we hope that our study will serve as a gateway for additional in-depth research in this subject.

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ANNEX

الاستبيان

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19 اذا نعم تقدر تسميلي اسم الجمعيات؟
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21 على واش مركز اكثر في الفلاحة تاعك؟
22 شحال عندك خدمة في الفلاحة ؟
23 شحال راك مخصص للدخان ؟
24 شحال عندك خدمة في الدخان ؟
25 عندك مساحة للرعي اذا نعم شحال مساحته ؟
26 راك محوط الفلاحة للحماية ؟ اذا نعم ماهي نوعية الي محوط بيها ستور
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32 كفاش توجد الأرض نتاعك للغراسة

33 تخلي جزء من الأرض متغرسهاش ؟ اذا نعم ماهي الفوائد اذا لا ماهي الأسباب ؟

34 كي تخير صنف لي راح تغرسو تشوف الى يتحمل الامراض الفطرية او لا ؟

النوع	الاسم التجاري	وقت الغرس في الموسم متاخرة مبكرة على طول العام	واش كنت غارس قبل هذا الصنف	تغرس كل عام عام بعام او كيف	طريقة الغرس نقلة زريعة	زريعة مهجنة غير مهجنة	نقلة مطعم غير مطعم
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- عند مشتلة خاصة
- نتا لي ديرها

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لا

نعم بعد نقلهم قبل النقل

36 واش الامراض لي يقيسو في مرحلة التشتيل

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مقلد

اصلي

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40 درجة المولوحة التراب ؟

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- مش مالح ؟
- مالح شوي ؟
- مالح بزاف ؟

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-أسعار السوق ؟

مردود الصنف و شحال تربه فيه ؟

-حسب طلب ناس اللى تبيعلهم ؟ ولا حسب نوعية تربة ؟

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46 وش هو البرنامج لي تبعو في معالجة الامراض ؟

47 هل تبع في برنامج للتسميد ولا كل مرة كفاه ؟

48 دير تبادل غبار؟

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-غبار

– قرط ؟

49 واش هوما أنواع السماد لى تستعمله ؟

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- غنمي
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- انقري

50 حسب طريقة مكافحة لاحضت نتيجة اجابية ؟

نعم

لا

51 كفاش تخير الادوية الي داوي بيها ؟

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-معاهد ؟

-تعرف وحدك ؟

-الانترنت؟

52 على أي أساس تخير القرانوتي الي تخدم معاه ؟

-موافق في السعر

-عندو واش تحتاج ؟

-بالكريدي ؟

مليح في الاستقبال و نصيحة ؟

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55 داوي بدوا واحد ضد العفن الأزرق (الميليديو (ولا تستخدم عدة ادوية في نفس الوقت ؟

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- اختيار الأصناف المقاومة
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58 وقتاش داوي ضد العفن الأزرق

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مكش مجربها

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67 عمق البير ولا فوراج ؟

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-مش مالح ؟

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74 أنواع الامراض الأكثر انتشار في الدخان

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- دفن بقايا النباتات
- أخرى

-

Annex 02: Transplantation of the seedlings of tobacco (original)

Annex 03: Surface irrigation with partial flooding (original)

Annex 04: Irrigation system (original)

Annex 05: Surface for preparation of seedlings (original)

ANNEX 06: Tobacco plants showing symptoms of disease (original)

Annex 07: Herbicides at a local PSP retailer

Abstract

Based on our survey of tobacco growers' agricultural know-how and the cultivation procedures they use to ensure a decent yield, as well as the identification of the main tobacco pests in the Zribet El Oued region.

we discovered that farmers face certain nuances at the financial and managerial levels due to a lack of technical supervision and up-to-date equipment that helps farmers produce a higher quality yield given that the majority of farmers in the region are independent and have a very limited financial resources, as well as a lack of experts specializing in tobacco.

Key words: Investigation, Tobacco, Crop management, Tobacco plant pests, Zribet El Oued, *Nicotiana tabacum* L, *Nicotiana rustica* L.

الملخص

بناءً على المسح الذي أجريناه للمعرفة الزراعية لفلاحين التبغ وإجراءات الزراعة التي يستخدمونها لضمان عائد لائق ، فضلاً عن تحديد آفات التبغ الرئيسية في منطقة زريبة الواد.

اكتشفنا أن المزارعين يواجهون بعض الفروق الدقيقة على المستويين المالي والإداري بسبب الافتقار إلى الإشراف الفني والمعدات الحديثة التي تساعد المزارعين على إنتاج محصول عالي الجودة نظرًا لأن غالبية المزارعين في المنطقة مستقلون ولديهم محدودية الموارد المالية ، فضلاً عن نقص الخبراء المتخصصين في التبغ.

الكلمات المفتاحية: بحث ميداني ، التبغ ، إدارة المحاصيل، آفات نبات التبغ، زريبة الواد، نيكوتيانا تاباكوم إل، نيكوتيانا روستيكا إل.

Résumé

Sur la base de notre enquête sur le savoir-faire agricole des tabaculteurs et les procédures de culture qu'ils utilisent pour assurer un rendement décent, ainsi que l'identification des principaux ravageurs du tabac dans la région de Zribet El Oued.

Nous avons découvert que les agriculteurs sont confrontés à certaines nuances aux niveaux financier et de gestion en raison d'un manque de supervision technique et d'équipements à jour qui aident les agriculteurs à produire un rendement de meilleure qualité étant donné que la majorité des agriculteurs de la région sont indépendants et ont un très des ressources financières limitées, ainsi qu'un manque d'experts spécialisés dans le tabac.

Mots clés: Enquête, Tabac, Gestion des cultures, Bioagresseurs du tabac, Zribet El Oued, Nicotiana tabacum L, Nicotiana rustica L.