RESEARCH ARTICLE (Open Access)

Bioecological characteristics of walnut and the cultivars that are sown in the Dibra Distric

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Abstract:

The walnut is a species that is extensively cultivated in Dibra district of the Albanian Republic. According to the registers hold up to 2008 in the respective localities there are 196 ha with 2670 fruit-trees. This specie is extended along Valley of Black- Drini River, over the bottoms of the slopes, along the creeks and the small deltas of the creeks as Malla and Seta of Lura, Zalli of Okshtun, the creek of Kuben, Erebare etc. It is distinguished for the high quality of its product that is preferred in the native market and abroad. The inhabitants have a tradition to treat this very important specie on the bottoms of cultivated soils.

The history of its cultivation dates back from antiquity and the inhabitants think they are grown together with this fruit-tree during centuries. In a village of Gjurre – Rec 60 % of fruit-growing is covered with this natural specie. It grows in surfaces from 360 in Doda's bridge, up to 1000 m above sea level (in Fushe Lura – Bellova - Ostren etc.). The best development it has in 400 up to 700 m above sea level where is included the phytoclimatical zone of Castanetum and needs aired and loosed soils. Almost in all the district it cannot be found in group, except the village Peladhi where it has been sown during the time of collectivization from the ex-Agricultural Cooperative of Zerqan. In our study, made during some years, we have found some cultivars which have some differ characteristics as "large grain", "oblong",in "cluster form"etc. It needs mainly brown and abandoned forest soils which in Dibra district are very widespread.

Keywords: specie, cultivation, level, valley, fruit

Introduction

Walnut is one of the agroforestry products that prevails European market for many years with its exports from our country. Nowadays we have a great market request of walnut abroud , especially cultivars that are grown in Dibra district. This is one of key factors that make us responsible of a detailed study of cultivars that are grown in this district, its characteristics of evolution in different zones and methods of multiplication in order to increase the a qualitative production. Meanwhile the importance of this fruit force us planning longterm development and spreading politicsin order to build an efficient forestry strategy to accomplish crescent market requests abroad.

Walnut has a special importance because of its great nourishing values as a fruit and as a wood too. In many cases it is treated as a "combinat" wood due to its versatile values. Walnut has a very important use in agroindustry, pharmaceutics, joinery. [8] In Dibra district this plant has a wide use because of its geographic position in Drin valley, interwined with territorial requests in its soil and climatic structure as a result of acceptable line of temperatures in this region (we are talking about minimal and maximal absolute temperature of year).

Walnut is a plant that requires cool soil and SAM aluvional structure and AR with 5-8,5 pH. It requires soils rich in Ca and P. Walnut is sensitive to earth humidity. For this reason, phreatic warters cannot pass over 5-6 m. It is well grown in friable,

flinty and airy soil, near streams, rivers in borders of fields.Dibra district, as it is seen at the graphic below, is extended in III MP group and it grows to 1000 meters heights.

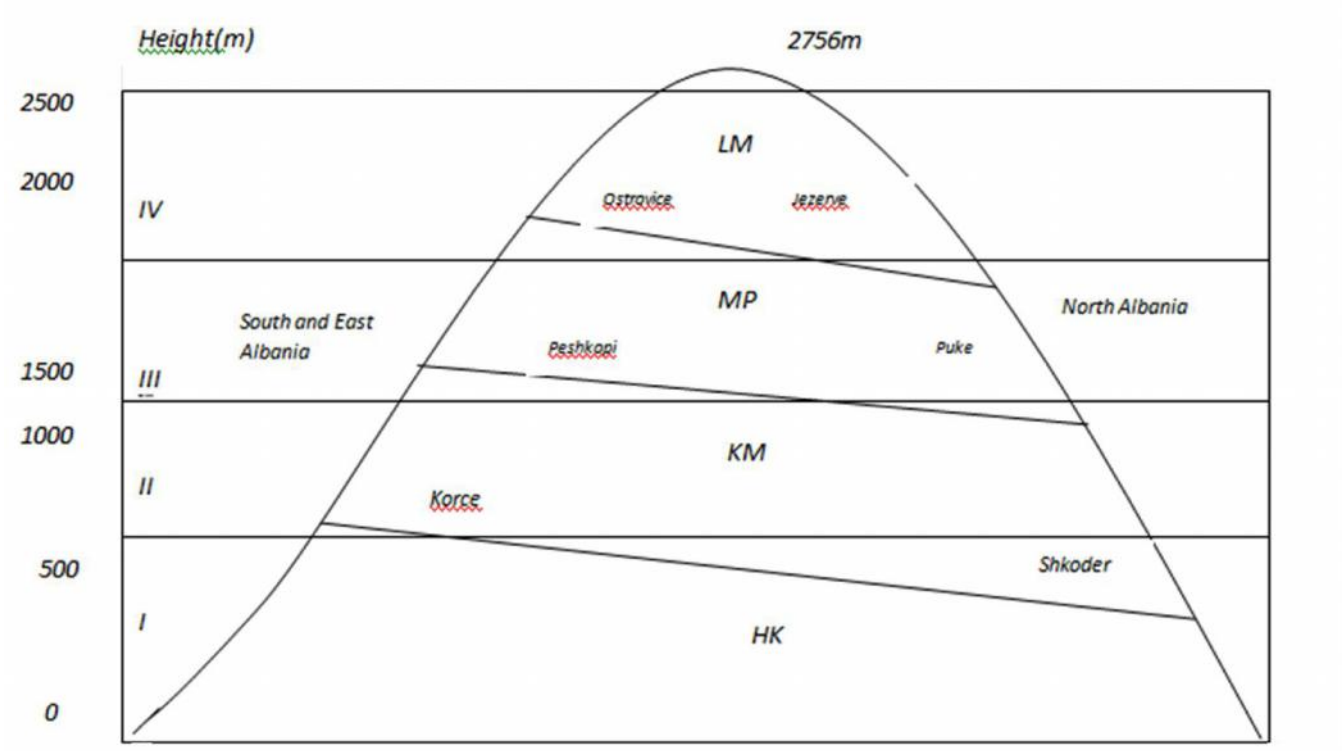

Figure 1. Land Albania.

Land vertical zones in Albania has a major importance in classification and study which is known as soil placement law according to their heights and it is studied a lot by Faik Bajraktari, in 1960. Here we have to do with alternation of land zones with climateric ones, desascending from above- below. This happens because it is interlaced with temperatures' level. The more altitude increases, more temperatures drop; but atmospheric precipitations grow. Dibra district it is clearly visible in general graphic.

In statistic inventory of Agriculture Ministry of 2010, it results that 196 hectare are lied in Dibra district. The same amount that is in Elbasan district, but according to our study, Dibra has a great perspective of walnut growth. There are about 2234 hectare, the second place in our country. This is a very promising result due to many complementary biological factors.

The biology of walnut growth is very interesting in relation to other forest and agro-forest woods because of it takes an intensive growth through the years. At age of 10-12 it is considered completely grown and it is one of the most majestic trees in our country . The most prominent trees are found in Gjurre-Rec, Arras, Zall Dardha and Zerqan. In optimal conditions this tree reaches 3-4 m heights, covered with a smooth, ash colored peel. This peel splits slowly as the years past, creating some vertical channels its length and the peel becomes thicker too. Its branches are smooth, without fluff. The leaves placement system is with 5-9 leaves alternated one after another, with eliptic or oval form, long 7-12 cm, wide 4-8 cm. It has pointy full leaves , without fluff and aromatic all year long [2].

There are two types of walnut stitch, vegetative and fruit- bearing stitches. There are two types of fruit-bearing stitches: simple and comprising. Simple stitch produces only masculine flowers, while comprising one produces female flowers. Masculine flowers are baggy on their sides, female flowers are found at the top of 2 year old cutting. There are

recommended treatments with copper base which are applied before stitch blossom and during the flower blossom. [5]

The masculine flowers are gathered and flaggy, while feminine flowers are formed with four parts placed in cluster form. The blossom is done during april and may. In walnut is noted the problem of heterogamy, blossom time inconsistency of masculine flowers with female ones. Masculin flowers are manifested parallel with vegetation in april or a little bit later. So after 30 days they are ready to do pollination and the pollen spread lasts for two weeks.Feminine pollination is shorter , it lasts 6-7 days and if temperatures arise, it is even shorter. At the end of April, female flowers bloom and after a two weeks period, they are ready to accept the pollen. Walnut is auto- fecundative plant. Nowadays it is recommended crossed fecundation too, because it influenses the product increase. Sometimes the pollination is realized with wind help.

Bio selvic characteristics of walnut

It needs o lot of sun, but it has also be grown under a light shadow. It bares the drought and high temeperatures. It very fragile to the rime and this is the main reason why it requires protected places to grow like valleys, hills exposed to sunlight and even, friable, fresh and thick land plateau. [1] Also it is found in massive forests, where the plant takes the form of an "bunge" oak. It is known for a great branching till it gets very old. [9] Every year it able to give fruits, but not with the same intensity. Planted in her free and natural form, one root of walnut produces 300-400 kg grains of fruit. If it planted in a forest pile, the plant produces ten times less grains. It is a long-lived plant, 300-350 years old, but it can live till 500 years. [7]

Climate

Walnut grows in a warm mountain climate and our country is able to accomplish this condition, in order to develop. Especially Drins' valley that is our key study , is a perfect place that reaches this condition. It has optimal temperatures and atmospheric precipitations. This valley has a great influense in a well development growth of walnut, in quantity and quality. The walnut tree can bear -20 – (-25) °C without demages. It can be seriously demaged, only during early autumn and late spring, due to immediate decrease of temperatures. In this cases we should be aware where we plant it. It should be planted in slopes where the air stream in in balance, by avoiding strong streams that cause frost. Before planting the walnut it is needed a specialist that can define the correct position where to plant it, according to slopes inclination, protective belt, sun hills ect. These elements are part of microclimate in the territory of Drins' valley. This reagion it is calculated during days with 10°C temperature and with natural lighting ≥ 100 hours for periods of months May - September. In this case temperatures higher than 35 °C are very rare, so we are not affected by this fenomenon. If this happens, it can cause the burn of the cuttings and fruits. [2]

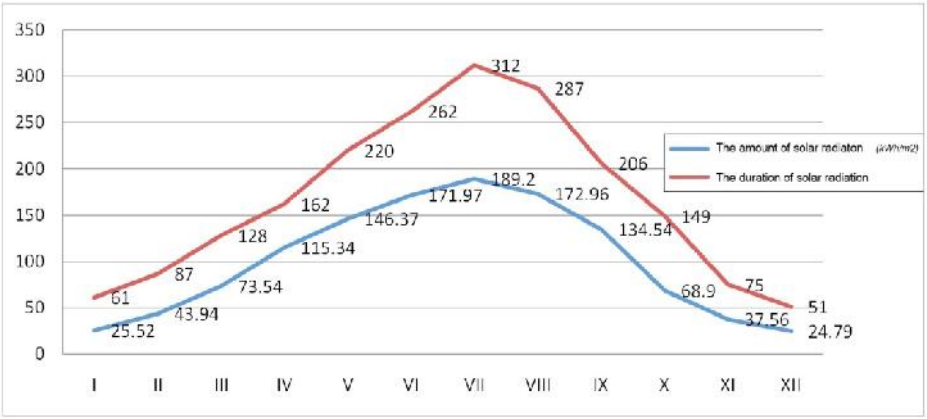

Figure 2. Solar during years 1951-1980

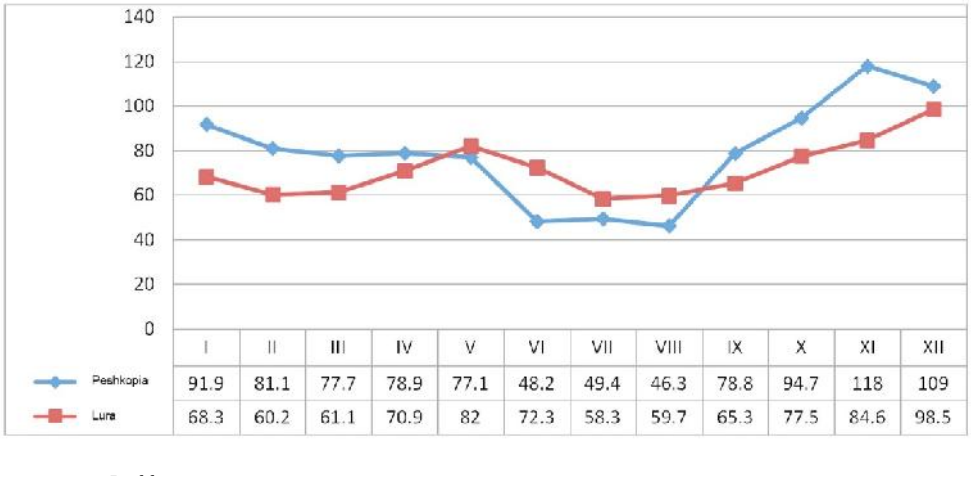

Figure 3. Average amount of atmospheric precipitations in Peshkopia and Lura village.

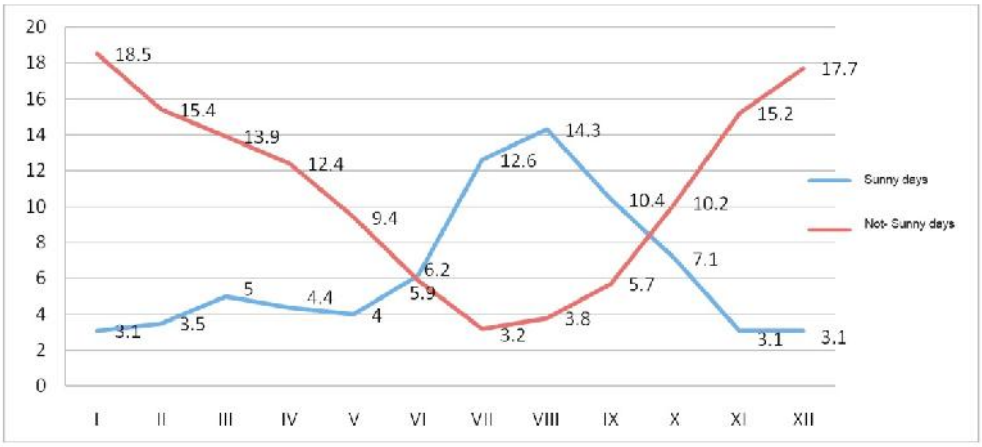

Figure 4. Sunny days, station Peshkopia

In Drins' valley, the average rainfall level goes to 700 mm and optimal humidity varies between 60-70% which is quite favorable, but we should notice that with altitude increase over 700 m, fruit quality begins to decrease as with Klenja case in Fushe –Lura, Radomira etc. It doesn't go well in heavy, impermeable soils. [2]

Walnut tree besides the usual seed multiplication, it multiplicates with sapling and rootstocks. In this case genetic science improvement has reached high levels. This is really noticeable at the combination of different cultivars, rootstocks etc. Priority today is to combine world cultivars by a biotechnological process and marketing these new cultivars that are capable to reproduce very fast. [6]

In the region we are studying we have encountered in several methods of grafting:

*Traditional g*rafting (this is used in wintergreenhouses), the graft *of*"T form" *consists of using grafting knives, slips and* rootstocks. *The same method* for fruit trees in nurseries. *Also* we have *the* usage of grafting and grafting slips under cortex.But, *walnut* creates difficulties for known reasons related to certain phenols which inhibit the formation of callus. Today's artificial techniques have overcome this problem specifically with increasing *of* temp*erature 25*°C and *humidity 75% . This problem nowadays* is solved. *The propagation with seed which* is *imbededand selected through a careful process* for two-three months is treated with a chemical stimulant *which is extensively spreaded.* The European method of grafting, the one with a stamp, it hasn't given satisfactory results in other European countries. [13] *English m*ethod has given result especially the one that uses rootstocks*;* Juglandis hindisi which creates

the possibility *producing quickly and are* resistant to various diseases such as Armillaria etc. [12]

Material and methods

The realization of this study has gone through several stages and extended in time for many years, because we are dealing with that kind of cultivars developed in the region of Dibra.The informations and observations were taken in all administrative units o*f this former communes region. O*ur results are questionable because the analysis has always been subjective. [5]

*Waln*uts have great variability in morphological indicators, shape and size of the fruit, appearance and color, the thickness of the shell, stratification of cloves, shape and size of leaves, shape and size of the crown for the first etj. The first one who has treated the differences between types of nuts *is* De Candolle, *1883*.He distinguishes two forms of walnut*:* J.regia L var vera DC *the present cultivated* and J.regia L var dura hort DC wild *with* strong shell. [5]

The standarts that are use to determine the terrain*:*

1) The plant's phenology (from the beggining of the bl*ooming till the grain formation)*

2) The dendometric characteristics about selective individs and height *of* 1/3.

3) Height

4) The size and shape of the crown *(diameter)*

5) Age

6) The average production annual

7) Fruit's characteristics

The position according to the revelant villages and the height above sea level.Some data are starreed according to the interviewing of the local residents in the wake of harvest. For the fruit, the measurements are made with camions(proves), same about the average weight in 100 grains, weight and fat content of cloves, we refered *to most cases to lab analysis.*

*I*n the end we have reached to the conclusion that in this region there are 5 types based on the above*:*

- Nut coarse-grained

*I*t *mature*s *i*n the middle of September, the leafs are 7 to 9 together, fr*uits are till three together. T*he open grain color, length 40 mmx30 mm width, the grain weight 16-18 gram.The *core* is eas*ily separated from the shells, d*elicious, 50% *fatty*. From all these, following and interviewing residents *it is* worth growth and spread widely.This *is due to* many advantages it presents. [5]

- Nut oblong

It is found in Zdojan, Kastriothill, Gjuras, Trebisht, Ostren Large, Rec, Zall Dardhe, Shumba, Arras, Bllice, Lishan and Arape the Luznise, Dovolan, Kocaj,Smollik. Its characteristics are the *single* fruits, *or* rare*ly are found* 2-3 together, admits side shade. As a result there is no production of big, fruit is sleek, not easy to break. Weight annual average growth rate of 7.5 gr grain, fats around 70%, maturing in the first week of September. It is *the* best to use for hybridization as the production does not exceed the average. It is resistant to late frosts.

- Nuts peel thin

Available in Brezhdani, Luznia, Arras, Arremolla, Gjur-Rec, Zerqan, Maqellara is more widespread in zone.It is treated as an usual Dibra's nut. [13] The fruit is rarely found alone , in groups 2-3 together. The fruit is 11 gr, 70% fat, the normal core gets out of the fruit without damage and it's quite delicious. They are hardwood with a developed crown at the age of 70 years,it goes 18 the diameter's crown and 70 cm diameter of the trunk, there is a big productivity of the high and stable average of 80 kg/year. It's spread throughout the valley and is recommended for broad production. It is recognized by people everywhere. The referral to land requires them alluvial and fresh. The productivity is annual, and it blooms in early May. It is resistant of frost, espacially of late one.

- Nuts thick peel (tuber)

Known as strong peel walnuts, are developed in shallow, rocky and dry soils. These nuts have some features such as: strong fruit that gets broken with difficulty, small grain, empty space within the fruit, lower returns for value. It is not recommended to plant. The positive side is that it has no claim to land, it is adapted easily in difficult ecological condition .The wood's texture has higher features. For production it is worthy only for rootstocks, are found anywhere in these areas, even though in eroded forest land, in the bottom of oaks forest oaks etc.

- Nuts in clusters form

*Are f*ound in *Ostren, Zalli Okshtunit, Ternova, Lura, Zall Dardha, Rec, Zerqan, Dovolan. It*s characteristics *derive by their name, called clusters. They* are found together *in a group of 10-15, bloom* in early May, mature in early September, tree gives an average of 40-50 kg of fruit production. *This production* moves according to such widespread areas, *for example* in Zall Zerqan *it* goes 80 kg of fruit. Fat content is around 61%, the dividing walls between the cloves are dendritic. It is recommended to be used for the graft but it isused for collection too.

Results and disscution

In base of the studyings are considered the nurseries that trade nut sapling type in the region Diber. Currently agricultural aid policies through ARDA has recently tripled and it this shows high interests about this kind of nut. Meanwhile the application ways to benefit funds after the year 2008 onwards is of interest to include the irrigation system that presents great importance. This makes it possible to increase the sustainable production. [2]

Table 1. Applications Debar with state donations

Year	*Nr. Of applicants*	*Sip. ha*	*Nr of gingers*
2007	1	1.35	177
2009	10	10	1800
2011	209	75,135	9860
2012	66	49,198	11540
2013	34	12,849	5321

Based on the study it results that lands in the valley of Drin are separed in two big groups*: the LM and brown, first belt along the estaury*. Along both sides of the flus*hing specific region Zall Dardha*-Kastrioti-Muhuri-Luzni- *Shupenza* result of lands *mostly* SAM *over clay schists. We have* land*s that* have been cultivated continuously until 1990 with other agricultural crops. *They are drained and* because of t*he* slope position, the other group has to do with its LM above the boundaries *of the Drin basin and have soils* which in most cases are bare, particularly after 1990 as a re*sult of the demographic movement*. These lands should reappreciate and the study conducted by the Ministry of Agriculture in 2010 ranked Dibra in second place for prospects to plant new nut Republic report. So they are forecasted for planting 2234 hectares. [11]

Table 2. The land fund for the county

County	***Total area (ha)***	***Agricultural land***	***Woodland fund(non agricultural land)***	***Abandoned land (barren)***
Dibra	258 635	41 056	207 447	2 999.96
The status of the plantings v.2010		198 ha	Forecast 10 years	2 234 ha

According to the table in general we have data taken into consideration and a part of the forest fund of abandoned lands that turns us according to *Forest and Pasture Lands Directory near Ministry of Environment.* These lands which *are known as wastelands in bottom slopes of* the forest economies and to date have not it is necessary to treat revalue for several reasons:

They strech in most of these side streams and rivers and accept nuts and in forestry as defined breeding resulting possibility of cultivation.

They belong to the phyto*climatic*-zones Castanetum or oak zone accepting the growing mass

of the nut and the surface, they are available for selection as are ab*andoned lands. Drini valley is* a considerable area in such. can be easily distinguished the suitable places and through accompaniment of other plant and farmers or Forestry easily distinguish it as such, where they are nettles and elder show that the earth receives and nut. At the same time this group are including former lands deforested in some cases by the state around 1970. [7]

Here it is worth to mention the comparative methods between improved treatment in with the traditional.The first results in higher costs but we are dealing with increase*d fast intake of production.* To concrete we refer to the relevant table.

Seeing the results and compared with the level of wood proliferation to arrest in the region raken, based on the studies we suggest that what matters is that the farmer is highly aware and there is a demand for increasing the surface with this cultivar, efficient scientific way is also the combi*nation between the traditional* and *the* introduction of new methods of planting. The kinds that we see defined as above is necessary advertising walnut, oblong, thin peel as meet the necessary requirements in quality and volume to the consumer.

It's not recommended the thick peel nuts (lumps) because it is refused in the market and doesn't find customers for many reasons such as difficulties in breakage and extraction of clove, its waste, damage etc. This should be replaced with the other cultivars. As it belongs to nuts inclusters form it is recommended because it adapts espacially in higher areas as Klenja, Lura etc. and the dictates of the cold climate.

Conclusions:

Based on the assessments made on the obtained in the study area in connection with the walnut cultivars we have reached some conclusions.

Dibra's region, has a variety of walnut cultivars determined because of separation according to the form and size of the grain and among these we recommend continuatio*n of them. D*ispersion should preferably be mad*e and avoid cam nuts (strong peel*) which sometimesgets out *and as a deviation of the ecotype*. Todayis used throughout the possibility, seedlings are treated with control in local nurseries where the farmer's job isn't wasted.Traditional nuts over the years, especially Dibra's coarse-grained and others at the same time are worth to be in the primary requirements to be cultivated in the future.

In connection with the *pedologic studies we emphasise,* that the Black Drin*'s* Valley is quite appropriate for this cultivar and the results are positive, we recommend a much wider ramifications as there is sufficient surfaces increase the level of interest by the farmers. It's worth emphasizing that territorial reform in forestry sector in the 2014-2015 yea*r will be a boon in this regard.*This is because the abandoned land fund (b*arren land) will be administrated by local residents. E*nough tips skilled in the art and can be treated quite area available so far.[12]

We conclude that the tendency to increase the production of nurseries and tree nut inside area is quite positive.The number of the nursery currently has 10 parcels according to verify the current situation, it makes it possible for seedlings to be adapted to the climate and security and is locale.Warranty is also the certification of the nur*series by specialized entities. W*e emphasize that in som*e cases sapling uncertificated* are *also* accepted.

The assistance which is provided by the Albanian state with subsidies, especially with the new EU policy in particular period (2012-2015) has been very advantageous, simultaneously application package planting and irrigation is more efficient and provides guarantees on production.

Taking into context the climate factor which is very important to accept mitigation of global climate for this reason and we are not at the level of the early indicators of 1980 frosts. *This means we* are favorites for the normal development of walnut and this area is included in this change. We might have advantage in cultivation *of walnut in high levels of altitude. However we should be careful of drought,*

therefore *are* recommended *planting and irrigation schemes as a* package.

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