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EVALUATION OF THE AGRICULTURAL INFRASTRUCTURE OF THE PROVINCE RIZE REGARDING ITS PLANT PRODUCTION POTENTIAL

SUMMARY

The province Rize is located at the East of the Black Sea coast between the 40°-22' and 41°-28' meridians, 40°-20' and 41°-20' North parallels. With a rainfall of 2.300 mm/year it is the rainiest province in Turkey. Rize displaying low sunshine has a temperature mean of 14 °C. This province has a climate displaying fresh summer, moderate winter and rainfall in every season. Reasons for narrow plant production design in Rize are; low pH and high sulphur in present production fields, limited I. and II. degree agricultural fields, not any development regarding agricultural mechanization because of rough terrain.

Rize is displaying all tones of green and the amount of plant production area in Rize is 54.513 ha; corresponding to 15,2 % of the total area of Rize. Nearly most of the agricultural area (98,5 %). Tea (*Camellia sinensis* L.) O. Kuntze) is the predominantly planted crop plant in this area and not any plant protection product is used in this area. 67,6 % of the total tea production of Turkey is provided by Rize and is followed by kiwi, hazelnut and other plants. The aim of this paper is to give brief information about the plant production potential of the Rize province.

Keywords: Rize, Climate, Soil, Plant Production.

INTRODUCTION

Rize is located in North-East Anatolia : at the eastern part of the Black Sea coastline, between the 40°-22' and 41°-28' East meridians and the 40°-20' ve 41°-20' North latitudes. Rize, surrounded at the west from the of district of Trabzon, at the South part from the İspir district of Erzurum, at the East from the Yusufeli and Arhavi districts of Artvin and at the North from the Black Sea has a surface area of 3.922 km² dir. The Rize province consists of 11 districts: Guneysu, Cayeli, Pazar, Ardesen, Hemsin, Camlihemsin, Findikli, Derepazari, Iyidere, Kalkandere and İkizdere (Anon, 2013a).

The soils of Rize are placed on the northern shoulders of the East Black Sea costal mountain chain and are generally stated hill and broken terrain. But this general topographical situation is varying differently at the vertical direction.

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Rize is a province with abundant rainfall and a balanced temperature regime. Therefore, It has a strong natural vegetation cover. Forested areas start from the coast and continue up at an altitude up to 2.200 m. Beginning from this altitude, subalpine and alpine meadows start and continues up to 3.200 m (Guner et al., 1987). These subalpine and alpine zones generally form the habitat of endemic taxa some of which has medicinal and aromatic value.

The parts of Rize over ranging 3.000 m constitute the steepest parts of Rize. The highest points which are largely bare and completely rocky and the slopes of the sharp ridges between them are too steep for walking. The peaks among these ridges constitute the highest points of Rize. Mount Kackar (3.937 m) has still the glacier on and forming the highest point of Rize land, Mount Vercenik (three tops) (3.709 m), Mount Vacakar (3.458 m), Mount Caymakcur (3.420 m), Mount Marsis (3.334 m) and Lower Asagi Karatas (3.322 m) are some of these peaks (Anon, 2013a). The major rivers of the province Rize are Firtina, Iyidere, Taslidere, Buyukdere, Yesildere, Caglayan and Ortakoy. Plateaus of Camlihemsin-Ayder, Ikizdere-Anzer and Upper Kavron which all have been declared as a tourism center by the Tourism Ministry, and apart from these Elevit, Palovit Tirevit, Hazindag, Samistal, Tue, Pokut, Kito, Cagrankaya, Cimili, Varda, Kaman, Bermuda and Karas are the other major plateaus of Rize. The highlands have been used only for livestock earlier; but nowadays, besides this purpose, people are benefiting from the plateau for relaxation (Anon, 2013b).

The people in Rize, intertwined with highland and farming culture, are living in one of the rare cities which is integrated with the city center, its counties and settlements. The tea plant is seen as the indispensable single product in Rize and is the first of the plants which is adapted to the climate and soil conditions of Rize and farmers are profiting economically from this plant, and today, it has already coated nearly all of agricultural soils of the province. The tea plant grown in Rize – defined as "Capital of Tea" in Turkey – has been the mainstay of farmers over many years. However this could not prevent the migration to other provinces. Because, increase in the population of families led to more additional revenue. The aim of this paper is to give brief information about the plant production potential of the Rize province.

MATERIAL AND METHODS

In this review, the climatic characteristics, general state of lands, soil structure and agricultural products of the Rize province will be examined and also focussed on crop production potential and recommendations will be declared for production strategies.

RESULTS AND DISCUSSION

Climatic Characteristics of the Province Rize

Summers are cool and winters are temperate in Rize. In addition, a climate rainy in every season is seen in Rize. The biggest reason of this is that the mountains are located parallel to the sea. Although humidity varies according to

the seasons in Rize, it is always above 70-75%.150 days of the year are overcasting. That the number of fair days is low minimized also opportunity to benefit from solar energy. The annual average temperature is 14.3 °C in Rize of which insolation is less. According to 50-years meteorological data in the province, to this day, the lowest recorded temperature is -7 °C and the highest temperature is 38 °C. According to 10-years average (2003-2012), February is the coldest month, August is the hottest. The average temperature in February is 6,6 oC, while the average temperature in August is 24.6 °C. The differences between monthly min. and max. temperatures is not much. Therefore, it can be said that Rize has a steady temperature. However, considering the last 20 years, there is an very little increase in the average temperature of Rize as parallel to global warming (Anon, 2013c).

Rize is the most rainy province in Turkey with 2.300 mm of annual rainfall. The least rainfall generally is in spring while the most rainfall observes in autumn, and rainfall is distributed balanced over all seasons. Dry seasons are not available. When we analyze meteorological data, in recent years, some monthly rainfall in the province has shifted to the previous or next month. Torrential rains sometimes caused landslide in agricultural land and may even lead to loss of life due to flooding. In addition, this may lead to washing of a significant proportion of nitrogen in agricultural soil, so leading to the contamination of streams.

Land Status and Soil Properties of Rize Province

The Rize province can be divided into three separate sections in terms of landforms. A large part of the province territory (like 78%) is covered with the mountains. There is no lowland areas apart from small plains in the parts that streams flow into the Black Sea. These small plains define a portion of Rize's area as low as 1%. The slope is very high in the province. A provincial land rises towards the south suddenly. Elevation reached 400-500 meters after 10-15 km to the south from the coast. If we go further to the south, the mountains exceeds the elevations of 2.500-3.000 meters. There are highlands economically important among these high mountains. The share of these plateaus in total area is 21% (Genc, 1998). Rize and the surrounding of these high mountains have a high rate of endemism and there are 115 endemic taxa. Some of them is important in terms of medicinal and aromatic plants. These plants constitute an important genetic resource in Rize (Savsatli and Seyis, 2014).

Agricultural areas of Rize constitute 15.2% (54.513 ha) of the total land area. Of the rest of the land, 45.322 ha (12.58%) are meadow and pasture land, 158.411 hectares (44%) are forest and scrub and 101.573 ha (28.21%) are the non-farm and residential area. Most of the farm land is located in the center settlement, following by the districts Cayeli, Findikli, Ardesen, Pazar and the other districts (Anon, 2014a).

The contribution of rangeland and meadows to the development of livestock is very important in every country. These areas are located in Rize in

high altitudes and the soil depth is inadequate. Because of drainage problems as well as uncontrolled intensive grazing these grazing areas come face to face with erosion problems. On the other hand only a small part of grass and pasture area (about 1 %) is classified as wetland (Anon, 2012).

The soils of Rize are poor regarding productability. Only 13,5 % of the farm area in Rize are ranked in the first four land use capability classes. Therefore, the big part of “farmland” in Rize consists of for roping non adequate soils.

48,5 % of the farmland in Rize is classified as 5th class, 38 % as VII. Class. Further, more than 70 % of the present farmland is face to face with problems caused by water erosion, unadquate soil depth and unadquate drainage (Anon, 2012).

The soils of Rize are gathered due to different climatic, topographical and geological (bedrock material) in 6 main groups: alluvial soils, colluvial soils, red-yellow podzolic soils, red-yellow podzolic soils, grey-brown podzolic soils, limeless brown forest soils and high mountain pasture soils. These soil types are common at the North Black Sea region. Intensive cultured soils beginning from the coastline up to 600 m are belonging to this group. The surplus of rainfall and temperature at this region and the presence of non-evergreen forests are playing role in the formation of such soils (Anon, 2012).

Red-yellow podzolic soils, common at the East Black Sea region, were investigated regarding their some main physico-chemical characteristics and their productivity levels and it was stated that whole of the soils of Rize nearly limeless. Further, 93.4 % of the soil samples of Rize showed strong acidic up to slight acidic characters (Ozyazici et al., 2013a). Another study stated that a big part of the soils in Rize showed pH values under 4,5 (Ozyazici et al., 2013b). Some study reported that ammonium sulphate fertilizer (21 N%) was used commonly in Rize beginning from 1974 in tea plantations (Yukse et al., 2013). The reasons why the soil pH values are so low can be notified as the prolonging use of this fertilizer and the easy washing of lime from the soil. At later times ammonium sulphate was replaced by NPK (25-5-10) fertilizer. This fertilizer was the most used fertilizer between the years 1991-2010 in tea plantations (Anon., 2014e). Still this composite fertilizer is used mainly in tea plantations.

Product Design in Rize

Agricultural used area (54.513 ha) corresponds to 15,2 % of the whole area of Rize. The soils of Rize are mountainous, forested and very rough. Therefore these soils are not suitable for ploughing and usable agricultural soils are rare at this city. High rations of relative humidity, the deficiency of sunshine has limited the plant pattern at high slopes in this area (Anon, 2014a) and perennial plants increased more in their value Nearly on whole of the present planted area (%98,5) perennial fruits are present (Anon., 2014d). Tea (*Camellia sinensis* (L.) O. Kuntze) is corresponding for the mainstay of the district and no plant protection

product is used on this area. Rize covers 67,6 % of the tea production in Turkey (798.201 tonnes fresh tea), followed by kiwi and hazelnut. The ratio of field crops (corn, bean, potato, barley) sowing area in the production design in Rize is 0,8 %, the share of horticultural crops is 0,7 % (Anon, 2014d).

The world famous smoking tobacco was planted in former time in the Pazar district of Rize. Smoking tobacco was a specific industrial plant in this district and they were used in the production of Pazar smoking tobacco (Sahin and Tasligil, 2014). Similarly upland rice was present between the earlier times planted crops. In broad areas maize were sown. But because of the increase in tea planted area and applicated governmental politics tobacco and rice sowing get limited, maize sowing decreased and relate livestock lost its importance compared with former times. The fact that present soils are so rough and small that mechanisation is inadequate, leads to the point that farmers only produced the amount what they needed.

75.910 ha area is planted with tea in total 5 provinces in Turkey and totally 207.660 farmers are producing tea. Rize is the first ranking province with totally 66 % (49.803 ha) tea plantation area. Most of the tea producers are also in this province (129.042 producers) (Anon, 2014b). Tea is produced in more than 30 countries on the world; Turkey is ranking o the 5th place with 6 % after China, India, Kenia and Sri Lanka regarding tea production and at the 7th place regarding planted area. A big part of consumed tea is covered by local production. Import and export values are very low. Consumption per person reached 3 kg annually in the last years (Anon, 2008).

Factors mostly effecting tea production are soil and climate characteristics. Conditions for the normal development of a tea plant are annual mean temperature above 14 °C, a total annual rainfall not under 2000 mm and adauate distribution over months, relative humidity values not lower than 70 %.

The tea plant can be easily grown on all soils displaying textures from sandy to clay with acidic reaction (Anon, 2014c). Rize is in a position which is fulfilling all these requirements at a broad range. Kiwi, ranked at the second palce regarding production after tea is planted on 350,8 ha and 6.273 tonnes kiwi were produced in 2013. The 3th most produced fruit is hazelnut with a planted area of 3.609,7 ha and a production of 1.377 tonnes (Anon, 2014d).

Inadequate fertilization and production techniques and old hazelnut plantations can be mentioned as reasons for low production amounts. Other fruit plants in Rize are Japanese persimmon, pomegranate, mulberry, plum, cherry, peach, sour cherry, apple, pear, medlar, chestnut, lemon, orange and mandarins. Because of the high rainfall of more than 2.000 mm annually reveals that these plants can be easily grown general stated without irrigation. Also partly effective low temperatures can be a problem in some districts. Therefore, in the districts Camlihemsin and Ikizdere, which are not located at the coast, the numbers of planted fruit species are lower compared with the other districts.

The east Black Sea region is one of the regions where agricultural inputs and industrial developments affecting the environment are very low. However,

the different geographical structure, the maintained rich fauna and flora and biodiversity in crop plants makes this region to a region with a high organic agriculture potential. This region is the most important candidate regarding to be the organic plateau of Turkey due to its plant and animal production potential (Yildirim et al., 2013).

Besides tea producers there are also farmers performing organic agriculture. If there is a sufficient support due to the yield losses, Rize has a enormous potential regarding organic tea production. Because, no synthetic chemical is used and it has not an serious diseases. Only with the use of organic manure instead of the chemical one, organic production in tea could be fulfilled.

Suggestions for Production Strategies

The tea plant is in the Rize province an important agricultural product in case of development and any replacement with any alternative product is not possible. But, besides tea production sometimes different activities providing additional income are necessary. Therefore kiwi is the first plant remembered when talked about additive income, because it is raining on 3th place regarding an agricultural product. Different from the other kiwi production areas, farmers in Rize prefer mixed production because they have the opinion that mixed production led to higher income. There is no need to develop an alternative product in state of tea, but the request from side of farmers for additive income providing plants stated kiwi to an important income providing plant. With overcoming problems in the infrastructure, establishment and marketing in kiwi, important developments will be reached regarding quality and income (Akbulut et al., 2013a).

Another additive income providing plant is blueberry. Wild *Vaccinium* forms are native in this province and cultivars of blueberry were introduced and some gardens were established there. Because tea production is periodical, this leads to uneffective use of manpower at some periods. In this manner, blueberry is different due to the use of its fruits, leaves etc. and its production. Blueberry production is recommended in areas above 300 m altitude where problems are arising regarding yield and on this areas plantations of this plant and its production additive to tea is recommended. The fruit as well as the leaves of blueberry has a potential as an additive income providing plant in the province Rize. With the solution of sapling costs and marketing problems, a sustainable and competitive production model can be developed for blueberry. In the last years blueberry production is arising with the support of the local directorship of Agriculture, Food and Livestock (Akbulut et al., 2013b).

Approximately 14 days snow can be seen on the ground in Rize and frosty days are approximately 10. Because of the few frosty days and that minimum temperature does not exceeds -7 °C, Rize is suitable for the production of citrus trees and other few subtropics plant species. Okman et al. (2006), stated in his report that based on obtained climatic values pineapple, avocado, carambola, blueberry, kiwi, mango, papaya pepino, banana, olive tree etc. plants could be

cultured in this province and they suggested to conduct adaptation trials on the mentioned plants

CONCLUSIONS

There is no another ecology where tea could be grown in Turkey. The tea plant is integrated with Rize, because its climate, soil conditions, and topographical suitability and also with the local industry and therefore this plant is very convenient product for this region. Therefore, tea is an abandon plant for the farmers in Rize. The farmers in Rize are looking every time for additive agricultural income, but they never what to replace their tea production. This may be an advantage for sustainable production efforts in this region.

Turkey is one of the rare countries producing tea without chemical protection. Only chemical fertilizers are used in tea plantations. Therefore, the switch to organic tea production in Rize will make all other plants familiar with organic agriculture. With the switch to organic farming the pollution of drink water, rivers and seas via the washing of fertilizers from agricultural areas will be also prevented.

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