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Evaluation of the Cluster Components for Apiculture Products and Honey in the Black Sea Region of Turkey[1]

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Karadeniz Bölgesi'nde Arıcılık Ürünleri ve Bal için Küme Bileşenlerinin Değerlendirilmesi

Öz

Türkiye'de bal ve diğer arıcılık ürünleri sektörü son yıllarda gerek üretim düzeyi gerekse meydana getirdikleri katma değer itibariyle önemli gelişmeler kaydetmektedir. Bu çalışmada Karadeniz Bölgesi için bal ve arıcılık ürünleri üretimine yönelik olarak daha etkin işleyen bir piyasa yapısı için bir kümelenme modeli değerlendirilmiştir. Küme, biri merkezi, üçü tamamlayıcı dört kısımdan oluşmaktadır. Stratejinin merkezi bileşenini Karadeniz Bölgesindeki üreticilerin önemli bir kısmını oluşturan küçük aile işletmeleri ile bal ve arıcılık ürünleri için etkin fiyat oluşumunu sağlayacağı düşünülen değişim piyasası oluşturmaktadır. Kümenin ilk kutbu olan arz sağlayıcılar arasında girdi sağlayıcıları ile ürünleri işleyici ve arıcılık yan ürünleri üreten firmalar yer almaktadır. İkinci kutupta finansmana ve pazarlamaya dönük hizmet sağlayıcıları ile turizm sektörü yer alırken, kümenin son kutbunu, kamu ve özel sektörün teknolojik ve finansal desteğiyle oluşacak kurumsal destek mekanizmaları oluşturmaktadır.

Anahtar Kelimeler: Arıcılık, Bal Üretimi, Tarımsal Kümelenme, Bölgesel Kalkınma, Karadeniz Bölgesi, Türkiye

JEL Kodları: Q13, Q17, R11

Evaluation of the Cluster Components for Apiculture Products and Honey in the Black Sea Region of Turkey

Abstract

Honey and other apicultural products have made a considerable progress in both production levels and value added in Turkey. We evaluated a clustering formation for the honey and apicultural products sector in the Black Sea Region of Turkey to develop a more efficient market framework. In our cluster, there is one center and three poles of the cluster: Beekeepers and exchange market in the center, supply providers, service providers and institutional support are in the poles. The central component of the cluster is the small family enterprises, which constitutes a significant part of the producers in the Black Sea Region. The other central part of the cluster; exchange market is expected to promote efficient price formation. The stakeholders of the supply providers are the input providers and food processing and by-product companies. The second pole of the cluster is composed of financial institutions and services, marketing services and tourism sector. Institutional support mechanisms are the last pole of the cluster and composed of public and private support.

Keywords: Apiculture, Honey Production, Agricultural Clustering, Regional Development, Black Sea Region, Turkey

JEL Codes: Q13, Q17, R11

Araştırma ve Yayın Etiği Beyanı	Bu çalışma bilimsel araştırma ve yayın etiği kurallarına uygun olarak hazırlanmıştır.
Yazarların Makaleye Olan Katkıları	Yazarlar makaleye eşit düzeyde katkı sağlamıştır (1. Yazar %50- 2. Yazar %50).
Çıkar Beyanı	Yazarlar açısından ya da üçüncü taraflar açısından çalışmadan kaynaklı çıkar çatışması bulunmamaktadır.

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1. Introduction

In Turkey, following the IMF stand-by agreement in 1999, a new agricultural support policy framework was constituted by letters of intent submitted to the IMF and the World Bank.[4] The new regime basically implied a gradual increase in market relationships for agricultural production and marketing. An increase in the welfare of producers and consumers in the market depends on the economic efficiency of agricultural input and product markets. In recent years, some applications of clustering as a means of regional economic development have been observed in the agricultural sector through the demand for high quality and standardized agricultural raw materials of the food industries. Parallel with general agricultural improvements, honey and apiculture products sector have made considerable progress in both production levels and value added in Turkey. According to FAO data, in 2018, Turkey was second in terms of honey production among countries. Despite this promising trend, the sector had not operated efficiently in terms of production and marketing. Depending on relatively high prices of honey and accordingly, lack of foreign competitiveness can be seen as consequences of the aforementioned lack of efficiency.

In this paper, we evaluate a cluster for the honey and apicultural products sector in the Black Sea region as an alternative model for achieving a more efficient market framework. The study is based on the theoretical foundations of clustering, especially, New Economic Geography (NEG) approach which asserts the role of agglomeration in regional development, and the "diamond model" framework proposed by Porter (1990). In addition to the review of the related literature on agricultural clustering experiences, we use a descriptive analysis to present sector's importance for Turkey and for the Black Sea region, and its current situation to form a basis for our evaluation.

The rest of the paper is organized as follows: the following section evaluates recent transformation trends in agriculture with particular emphasis on its role in regional development and elaborates the general features of NEG approach concerning regional development. The third section discusses economic clusters and Porter's diamond model theoretically to form the basis of the evaluation of the apiculture cluster. The fourth section discusses emergence of agricultural clusters and presents potential economic benefits of them in the light of Porter's model. In the section five we present literature survey on agricultural clusters. The sixth section includes our descriptive analysis regarding apiculture in Turkey and our evaluation for apiculture cluster in the Black Sea region of Turkey. Finally, section seven concludes.

2. Agricultural Transformation in Regional Development: An Evaluation within the Context of the New (Third) Food Regime

If the traditional route to economic development is followed, it can be expected that the share of agriculture in national income and employment decreases in parallel with the increasing importance of manufacturing and services. For developing countries, this standard path is complicated by the dynamics of globalization (Şenses, 2013). Despite the decline in the

[4] For detailed information for the new agricultural policies of Turkey, especially the new agricultural support policy framework constituted by the letters of intent; see Oyan (2013: 111-131).

share of agricultural sector in GDP in such countries, the inadequacy in some socio-economic indicators continues to increase.[5] On the other hand, there are significant and radical transformations in terms of production, marketing and distribution processes in developing countries as neo-liberalism promotes the dominance of market-oriented relations. If such transformations are considered as a process in the context of the role of agriculture and food in capital accumulation, H. Friedmann's concept of a food regime can be used as an explanatory framework for this process (McMichael, 2009). The food regime is a concept that relates international food production and consumption with the historical forms of capital accumulation (Ulukan, 2009: 57), and makes a holistic analysis of the production, consumption and distribution processes of agro-food relations. Thus, all processes that a foodstuff goes through from agricultural raw materials to the final consumer are evaluated through a combination of backward and forward linkages. For example, in the case of wine, pesticides injected into the vineyards, which are backward linkage factors, and marketing factors used in the bottling and labeling, which are forward linkage factors are analyzed together (Büke and Gökdemir, 2010: 188).

Food regimes passed through two historical phases, in each of which the circulation of foodstuffs globally for developing countries has changed along with agricultural forms (monoculture-based plantations, family farms, and capitalist agricultural firms). Following the first two regimes;[6] in the third and current stage, which is called "green capitalism", the distance between the central point of food production and the location where it is sold has increased considerably in the production/supply chain, and contract farming, which focuses on standardized foodstuff production, has gained importance. On the other hand, in terms of typical food consumption, while locally produced products are in question in the traditional food system, this has turned into a combination of basic products and processed food, and the share of processed food under a registered brand has increased steadily in the modern food system (Parfitt et al., 2010).

The market structure emerging as a result of transformation implies a segmented market in terms of consumers. Accordingly, consumers which are included in the upper income bracket have been increasing their demand for products that are "healthy", "fresh" and "ready for use"

[5] Measures such as low protein per capita of consumers, the average income level of people in rural regions, low welfare level due to high food prices in terms of worker can be counted among the indicators.

[6] According to H. Friedmann, the first food regime, starting in 1870 was framed within a general rhetoric of free trade and actual workings of gold standard (Friedmann, 2005). In the period between 1870/1914-1930, under the leadership of Britain, a large scale of migration took place in countries with high agricultural potential such as the United States, Australia and New Zealand. Those who emigrated have maintained a free trade regime based on their dependence on Europe, specialized in wheat and animal husbandry produced for export to Europe. In the first food regime commercial agricultural family farms were organized dependent on the export of mono cultural agricultural products. As a result, thanks to low price agricultural products based on cheap labor in these countries, raw materials needed for industrial production and nutrition of working class in Europe could be produced cheaper. The second food regime ongoing 1947-1972 was even more implicit and reversed the food flow from South to North. As the dominant economic power in the bipolar World after II. World War, the United States adopted a high support and protection applications for the agricultural production. This new approach has revealed the excess of agricultural supply in US and the governments directed the excess supply in the form of subsidized exports under the name of “food aid”. As a result, subsidized products have replaced the more expensive domestic production and led to changes in traditional consumption patterns (Çaşkurlu, 2012: 63-64).

but “much more expensive”, “high quality” and “less durable”, while, some consumers are excluded from the market for regional "niche"[7] new products and standard industrial foods, production of which is subsidized as a result of increased income inequality in developing countries. Supply of such niche products is provided by supply chains based on the acquisition of some product-specific characteristics of environmental standards which includes organic agriculture (Friedmann, 2005: 24-25).

Given the characteristics of the third food regime, the interest in specific agricultural products that can only be produced in certain regions has increased in developing countries. As a matter of fact, in such countries, the increasing application for the patent of specific products through geographical sign is attracting attention.[8] Unlike the earlier development approaches to regional development, the new approach,[9] treated in the context of "New Economic Geography", focuses on small enterprises and concentration/clustering (Kloosterman and Boschma, 2005: 394).

2.1. New Economic Geography

NEG tries to explain the factors that affect the geographical distribution of economic activities and how these effects change over time. According to NEG, agglomeration and clustering are less dependent on natural advantages (Tunalı Çalışkan and Kaya, 2018: 78, 79). In this approach, technology exhibits increasing returns to scale and there is imperfect competition in the product markets. Since factors of production are assumed to be mobile between locations, factor prices and incomes are determined endogenously by location choices. Increasing returns to scale leads companies to concentrate their production in a certain location which is determined by the interaction between agglomeration (centripetal) and dispersion (centrifugal) forces (Combes and Overman, 2004: 2881). The location choice of an agent in the NEG approach is, therefore, based on the love of variety assumption (product differentiation), increasing return to scale and transport costs. Together with factor mobility and/or intermediate inputs these three create cumulative causation and agglomeration (Redding, 2010: 297-298). In essence, the key features of the NEG approach[10] can be explained as follows:

[7] In marketing, “niche” implies the differentiated products that a limited number of consumers demand and thus which are marketed for a limited part of the total market. For the agricultural products, marketing and production of organic agricultural products and products differentiated through grafting are often considered.

[8] According to the Article 34 of the Industrial Property Code, geographical sign is the sign indicating the origin of a product which possesses a specific quality, reputation or other characteristics attributable to that place, area, region or country of origin. In Turkey, geographical sign applications are handled and approved by the Turkish Patent and Trademark Office (Industrial Property Code, 2016). For a study on the importance of geographical sign for rural development in Turkey see Zanbak and Çağatay (2018).

[9] In the regional development, at first, the mass production with Fordist features was in the front line. In this stage, production was concentrated on large-scale enterprises and the product standardized by automation, which was realized by the producers unaware of each other. Beginning from the 1970s, a process began in which firms of different scales produce with different production methods and in conditions different from each other in a cluster. This can be expressed as a form of advanced production is expected to bring economic advantages by strengthening the interaction between the economic factors (Kloosterman and Boschma, 2005: 394; Čiegis et al., 2011: 79).

[10] The NEG models have gone through four phases until today. The first-generation models are the simple core-periphery models, formed by a combination of increasing returns, geography and new trade theories. In the second-generation models, Krugman’s first model was applied to regional development theories, with industrial clusters added to the

1. Increasing returns to scale: Increasing returns to scale provides higher profits to manufacturing firms in the industrial core due to their increased sales than those in the periphery. As a result, this will attract other manufacturing companies to the region, in turn, extending the industrial core.
2. Imperfect competition: Increasing returns to scale and imperfect competition together increases agglomeration.
3. Factor mobility: Factor mobility means mobility of labor. Locations with higher population are have easier access to market and they offer high wages to labor. Higher wages, in turn, attract more labor to that location and increased population leads to more market access.
4. Intra-industry trade: It is defined as a country's simultaneous import and export of goods identified within the same industry. The role of input-output linkages increases under conditions of imperfect competition and increasing returns to scale since these linkages affect both market size via backward linkages and trade costs via forward linkages.
5. Transportation Costs: If transportation costs are high, trade between different locations will be lower. However, when transportation costs are low, firms are able to sell their products in both locations.
6. Love of variety: It means that each consumer demand multiple varieties of a product. In the context of trade, this assumption implies gains from trade, since consumers of each country easily access to products with local and foreign origin (Tunalı Çalışkan and Kaya 2018: 85-88).

As we mentioned above, according to NEG, the spatial distribution of economic activities is determined by the interaction of agglomeration and dispersion forces. Therefore, a brief explanation of these forces can be useful.

Agglomeration Forces (Centripetal Forces):

Market Size Effects (Linkages): A broad local market includes both forward and backward linkages. It involves the reduction of costs for lower-level producers in the supply chain because the settlement areas with access to large markets are preferred due to the economies of scale and large local markets allow the intermediate goods to be produced locally.

Thick labor markets: Industrial concentration brings together an intensive local labor market, especially for the qualified labor, which makes it easier for workers and employers to find each other.

Pure External Economies: Concentration also brings positive externalities such as the spread of knowledge.

model. In the third-generation models, technological advances and externalities of knowledge have been added to the model. The fourth-generation models introduced after the 2008 Financial Crisis covered the World Bank's "spatially blind" regional development approach and OECD and EU's "place-based" regional development approach (Tunalı Çalışkan and Kaya, 2018: 80).

Dispersion Forces (Centrifugal Forces):

Immobile Factors: Constant factors such as land and other natural sources including labor can hamper concentration of production in two ways: From a supply perspective, production should be done where labor is located. From a demand perspective, as disorganized production factors accompany a dispersed market structure, at least a part of production should be close to the consumers.

Land Rents: Concentration of economic activities leads to an increase in rents in the area of concentration, which is an obstacle for further concentration.

Pure External Diseconomies: External diseconomies such as congestion can also be observed as a result of concentration (Krugman, 1999; Fujita, 2007: 5).

As a result of complicated balance between these two opposing forces, a variety of local clustering of economic activities emerges, the spatial structure of the entire economy is self-organized and the net effect of regional development is determined (Fujita, 2007: 5; Gruber and Soci, 2010: 52).

3. Economic Clusters and Michael Porter's "Diamond Model"

We briefly discussed the importance of agglomeration for regional development in the context of NEG in the previous section. In order to take advantage of agglomeration, a region have to possess competitive advantage in a certain sector. As Porter (1998: 78) argued "clusters affect competitiveness within countries as well as across national borders". Hence, we focus on economic clusters and determinants of their competitiveness in this section.

An economic cluster can be defined as the geographical concentration of interconnected companies, specialized suppliers, service providers and affiliates in a country or region while saving their institutional independence (Porter, 1998: 78; Gültekin, 2011: 29). The European Commission (2008: 5) defines clusters as a group of firms, related economic actors, and institutions that are located near each other and have reached a sufficient scale to develop specialized expertise, services, resources, suppliers and skills. The clustering[11] concept was originally developed by Michael Porter primarily for the manufacturing sector. Porter (1990), showed the contributions of clustering on different sectors where some countries have competitive advantage. In these sectors, clustering has two primary common features: the geographical proximity of the companies in the cluster and the interconnectedness/interrelatedness of the firms that are close to each other in a cluster. According to Porter, the outcome is the emergence of positive external economies such as specialized producers in the production of raw materials and components, and the development of specialized supporting technical, managerial and financial services.

Porter (1990) describes functioning of successful clusters with the help of "the diamond model". Accordingly, the four corners of the diamond are composed of factor (input)

[11] As a development policy instrument, clustering was first included in the 9th Development Plan covering the period of 2007-2013 in Turkey. The legislative and institutional framework of the clustering applications is drawn by "Clustering Support Program Regulation" prepared by the Ministry of Science, Industry and Technology and published in the Official Gazette dated 15/09/2012. Official Gazettes (dated 25/03/2014 and numbered 28952, and dated 07/02/2015 and numbered 29260) made amendments to the mentioned regulation.

conditions, demand conditions, the context for firm strategy and rivalry, and supporting industries. Porter differentiates between basic and advanced factors under factor conditions. Basic inputs are used in the traditional/agriculture based sectors where simple technologies are more common. On the other hand, advanced factors include qualified labor, modern infrastructure, universities and research institutions, which are more important in terms of competitive advantage in sectors using advanced technology. With regard to clustering, the competitive advantage from factor conditions depends on how efficiently inputs are used (Porter, 1990). Demand conditions include the size and growth rate of demand, the distribution of demand among different product groups, and the number and characteristics of customers. If local demand in a country can orient local firms and producers about new products and services before other countries, it is expected that the country will have a competitive advantage in that sector. On the other hand, the greater the demand level in a market, the greater the likelihood that firms will benefit from economies of scale. The existence of supplier sectors in relation to relevant and supporting industries affects the related sector in various forms. For example, suppliers with competitive power have an ability of reaching new inputs in an efficient and rapid way. Likewise, the benefits of advanced suppliers are also observed in the innovation process. Suppliers help firms to use know-how and apply new technologies. Suppliers also facilitate the transfer of advanced know-how between companies. The benefit is even greater if the suppliers are spatially close to the client firm. Finally, in terms of market structure, the existence of strong competitors in the market is effective on the progress and invention capability of other companies. Rivalry is also a pressure factor in reducing costs, increasing service quality and designing new products. According to Porter (1990: 85), the presence of strong local rivals is the most important factor for the creation and persistence of competitiveness. Because, domestic rivalry has a powerful stimulating effect on the other corners of the diamond. Moreover, the power of domestic rivalry enhances with geographical concentration. Therefore, as one can notice from the brief explanation above, NEG's approach to regional development, and Porter's assessment on the sources of competitiveness of a nation or region are, in fact, complementary.[12]

The maximization of the benefits expected from the clustering depends on the interaction between aforementioned factors. The superiority that will emerge in one factor has an effect on others, or the weakness in one element restricts the full development potential of the industry. For example, the advantages in factor conditions will not stimulate firms to be innovative unless the level of competition is sufficient. Similarly, demand conditions are transformed into an advantage only if the competitive structure is harmonious.

The necessary conditions for clustering are the division of the production process into various stages, and the transport of products through the value-added chain. On the other hand, the sufficient conditions for clustering are (1) possession of know-how which is different from each other, however complements each other through the coordination of many different

[12] For example, considering the agglomeration effects, NEG's market size effects and thick labor markets correspond almost perfectly to Porter's demand conditions and factor conditions, respectively. Moreover, traces of the remaining two points in the Porter's diamond (firm strategy and rivalry, and related and supporting industries) can be seen in NEG's pure external economies.

items that enable the final product to be obtained throughout the value-added chain, and (2) easily sharing and spreading of innovations through information networks established in the clusters (Gültekin, 2011: 34). Because collaboration, interaction and networking, which are inherent in the cluster approach, require a multi-actor formation, the presence of firms itself is not enough to form a cluster. For this reason, clusters also include public institutions, education and training institutions (technical schools, universities) and financial institutions, which are the main actors that will contribute to increasing the competitive advantage of a region. In addition, other important actors involved in cluster formation are institutions, facilitating cooperation such as professional associations (chambers, associations and cooperatives) (Alsaç, 2010: 32). Therefore, three basic components of a cluster, which interacts with each other, and surrounds a center of exchange (market), can be listed as;

- **Supply Providers:** The input and manufacturer companies which provide input and final products in the value-added chain
- **Service Providers:** The financial institutions and marketing companies which maintain the capital and marketing needs of the cluster
- **Institutional Organization:** Public Institutions, Universities and Research Institutions and Associations and professional associations which provide the know-how need for the cluster in terms of institutional public and private support

When all the conditions mentioned above are evaluated together, stakeholders constituting the cluster has the key role in bringing about the expected benefits and returns. Accordingly, in Section 5, we will base our evaluation of apiculture cluster in the Black Sea Region on these basic components.

4. Agricultural Clustering

According to early development models, the agriculture sector was seen inappropriate for creating and driving clustering forces. As the forces of clustering gather momentum in the urban sector, the rural-urban disparity is predicted to increase against rural sector. This approach was related with the four main characteristics of the agricultural sector which stem from the production structure. First of all, the agricultural sector produces generic products, such as food, using constant returns to scale technology. Secondly, the sector is not obviously distinguished in terms of product differentiation, innovations and knowledge externalities. Thirdly, since the structure of agricultural crop markets is often competitive, it does not offer excess profits to producers. Finally, as traditional agricultural production structure is land intensive, agricultural production is not suitable for spatial concentration (Gangopadhyay, 2014: 47-48).

In the 21st century, the demand for food products changed structurally, with demand shifting to differentiated products as described above in the description of the features of the new (third) food regime. This change in the composition of demand is reflected in agricultural production as increasing product differentiation and higher value-added production. As this change has been supported within the frame of standardized product marketing, of patents and of innovations in packaging, which are relatively new practices for the agricultural sector, it can be argued that the sector had re-invented itself. Consequently, the sector started to be

free from the above-mentioned restrictive situation of being a “clustering-incompatible” sector. In this context, "new agriculture" requires instruments to improve competitiveness and innovation capacity at the macro-level. Clustering applications for various agricultural products at the regional level are considered as instruments to serve this development and it is considered that the benefits obtained from agricultural clustering will ultimately contribute to regional development. Additionally, despite measurement difficulties, some field studies have uncovered important externalities arising from cooperation and input/information among rural households (Gangopadhyay, 2014; Özuğurlu, 2011). This finding supports that clustering has the ability to create positive externalities, even for agricultural structures where family-type agricultural operations are prevalent.

An agricultural cluster can be deemed as an advanced type of agricultural industrialization. The Food and Agriculture Organization of the United Nations (FAO) describes agricultural clusters as a model consisting of agricultural producers, enterprises and institutions related to the same agricultural sub-sector and facing common challenges and pursuing common opportunities (Gálvez-Nogales, 2010: 5).

Depending on the general cluster model of Porter (1990; 1998) described in the Section 3, we can identify four internal and two external factors that determine success of an agricultural cluster. Internal factors are factors of production, demand conditions, performance of related industries and supporting industries. The external factors are affiliated institutions and government. The dynamic integration of these components is expected to bring out different economic benefits and can be explained under five headlines:

1. An agricultural cluster can push forward the development of local economy, and consequently, some expected benefits such as increases in local innovation capacity can be realized. The synergy created in a cluster enhances the local innovation capability and clusters can benefit from regional brand effect. Consequently, the main products produced by the clusters gain competitive strength and higher brand recognition (for example, geographical sign mentioned previously). Especially, new agricultural clusters which include the development of some industries related to agriculture, such as agricultural service, are more influential because of their innovative activities. Therefore, it is easy for them to form a local brand. The local brand will help the region to enhance and consolidate its image in the eyes of investors and consumers.
2. An agricultural cluster is favorable toward promoting competitiveness of cluster enterprises. In agricultural clusters, the companies establish relations and cooperation to organize a network. This network facilitates achieving competitive advantage which is the basis for a sustaining a cluster in the long run.
3. Agricultural clustering gives rise to advances in the degree of specialization. Not only specialization improve the agricultural technology level, but it also contributes to agricultural mechanization. As a result, economies of scale can be achieved in agricultural production. In addition, due to increased cooperation among agricultural producers in the cluster, their market risk resilience can improve, which in turn stabilize the market price and increase producers’ income. Consequently, the tendency of

"exclusion of family type producers from the production process" observed in the third food regime in recent years can be reversed (Liu and Koziol, 2011: 2-4). [13]

4. The geographical concentration via clustering provides more career opportunities for surplus rural laborers. An advanced cluster attracts talented workers from other regions and also provides an efficient way to provide other important inputs. The search and transaction costs for hiring labor will be reduced because the firms in the advanced clusters have access to a pool of qualified and experienced workers.

5. In particular for agricultural clusters, agricultural raw material processing firms will be able to reduce transaction costs using local suppliers instead of providing resources from a remote supplier (Gültekin, 2011: 35).

5. Literature Review on Agricultural Clusters

Studies on agricultural clustering in the literature are concentrated in agro-industrial sectors. Besides, studies on grape-wine clusters are noteworthy for clustering at the level of agricultural products. For instance, Giuliani and Bell (2005) focused on the Chilean wine cluster. The study explored how the clustering model affects companies' innovation ability. In another study, Davidson et al. (2009) examined the South African wine cluster focusing on some problems of the cluster regarding factors of production and demand conditions. Nipe et al. (2010) examined wine production in the McLaren region of South Australia from a microeconomic perspective and found that clustering raises competitiveness of stakeholders in the cluster. As a last example of studies on wine clusters, Centonze (2010) studied the New York agricultural cluster in the United States and questioned the conditions of transition from an agricultural cluster to a wine cluster.

Examples of different agricultural clustering studies involve Chinese tobacco-cigarette cluster, Dutch flower cluster, Chilean salmon cluster and Ukranian meat and milk clusters. Eng (1999) examined the tobacco-cigarette cluster in Yunnan Region of China and focused on the local administration support on the components of the cluster and discusses its prosperity effects. Tavoletti (2008) evaluated the Dutch flower sector in terms of positive and negative effects of the clustering. Zanlungo et al. (2011) analysed the development process of salmon cluster in Chile and points out to the importance of social capital at the beginning of the process. Finally, Vasylieva (2017) examined the meat and milk clusters considering their potential of contribution to food safety in regional basis.

In addition to these studies, Kalaycı (2011) and Yıldız and Alp (2014), Bayramoğlu vd. (2016) and Merdan (2018) are the four studies involving agricultural clusters in Turkey. In the first of

[13] Two examples of agricultural clustering in Turkey where family type of small enterprises can actively raise their income and welfare are the villages of Bursa-Gedelek and İzmir-Bademli. Gedelek pickle cluster was formed as a result of the use of local spring's water which is suitable for the production of pickles in the region, and specialization occurred in the value chain over time. A firm organizes more than 50 peasant families in the region and buys vegetables for making pickles. Pickles obtained from processing in two processing plant in the same region owned by the same firm are exported to Germany, France, Greece, Middle Eastern Countries and Israel. The example of İzmir-Bademli village is based on a cooperative called Bademli Nursery Agricultural Development Cooperative. The 300-member cooperative, whose main function is the marketing of sapling and olive products has established its own brand called Bademli and Potemia, providing permanent information flow between the members through computer and telephone networks. Consultants and partners of Cooperative include universities from Turkey and abroad (Kalaycı, 2011: 124-125).

these studies, Kalaycı (2011) aimed to detect rural and agricultural clusters in Turkey. Findings of the study suggest that there were one potential cluster (Bartın Group of Entrepreneurs Corporation-forestry products), two growing clusters (Gödence-olive oil and olives and Bademli-saplings and olive products) and one mature cluster (Gedelek-pickles). In the second study, Yıldız and Alp (2014) aimed to reveal the competitiveness of Kars kashar cheese cluster in the context of Porter's Diamond Model by interviewing 60 cluster stakeholders. They found that the cluster have some problems regarding input and demand conditions, supporting industries, competitive strategies, and government support. The last two of these studies involve apiculture clusters. Bayramoğlu vd. (2016) studied the existence of an apiculture sector cluster in Bayburt. They collected the necessary data by applying a questionnaire to the beekeepers and used Porter's Diamond Model in evaluating the clustering potential of the sector. Their findings suggest that apiculture activities in Bayburt presents properties of a "potential cluster". In the last study, Merdan (2018) aimed to determine the clustering potential of apiculture in Gümüşhane by collecting questionnaire data from beekepers. Using Porter's Diamond Model, he found that the apiculture sector in Gümüşhane is a potential cluster.

There are some other examples of agricultural clusters in Turkey such as İzmir Organic Food Cluster, Şanlıurfa Organic Agricultural Based Industry Cluster, İzmir-Tire Milk Products Cluster, GAP Organic Food Cluster, Luleburgaz Animal Husbandry Cluster (Bozkurtoğlu, 2013; GAP Organik, 2016; Yonca Hayvancılık, 2014). However, there are no studies examining these clusters in the related literature.

6. Apiculture and Honey Cluster in the Black Sea Region: Relations between the Stakeholders and Possible Economic Benefits

Apiculture is one of the important sources of livelihood especially for people who live in forest and forest-edge villages lacking agricultural land. Having some additional economic advantages such as a requirement for only low primary capital and providing household employment also offers a potential growth opportunity for the Turkish economy in terms of high value-added products such as beeswax, royal jelly, pollen and propolis as well as honey, which is the main product of apiculture. About 82,000 family enterprises in Turkey have been engaged in apiculture as a source of livelihood and it has become a permanently developing industry. In the last ten years, Turkey witnessed a continuous increase in the number of hives and honey production. According to the latest FAOSTAT data, 114,113 tons[14] of honey production was achieved with approximately 8.1 million hives in 2018.[15] In addition, FAOSTAT data reveals that Turkey is ranked second in the world after China in terms of total honey production level as it can be seen from Table 1.

[14] According to TURKSTAT, honey production was 107,920 tons in 2018. However, for the purpose of cross-country comparison, we use FAOSTAT figures here.

[15] 7.9 million of which were new type hives (TURKSTAT data).

Table 1: Top Ten Honey Producing Countries, Country Shares and Output (2018)

Rank	Country	Output (Tons)	Share in the World Production (%)
1	China(mainland)	446,900	24.1
2	Turkey	114,113	6.2
3	Argentina	79,468	4.3
4	Iran	77,567	4,2
5	Ukraine	71,279	3.9
6	United States	69,104	3.7
7	India	67,442	3.6
8	Russian Federation	65,006	3.5
9	Mexico	64,253	3.5
10	Ethiopia	50,000	2.7
	European Union	**258,610**	**14.0**
	World	**1,850,868**	**100**

Source: Authors' own calculations using FAOSTAT data

Despite the recent positive development in levels of honey production, it is not possible to observe the same trend in exports and yield levels. According to UN Comtrade data, Turkey, with 6.41 thousand tons of exports providing a value of $25.7 million in 2018, is not among the top ten countries in honey exports. This can be attributed to the lack of standardized production and uncompetitive prices resulting from high input costs. In terms of yield, although Turkey is a very rich country in terms of bee genetic resources,[16] the average yield in Turkey is well below the world average. According to FAOSTAT data, in 2018 the average yield of honey is about 20.1 kg/colony in the world whereas the yield in Turkey is only 14.4 kg/colony.[17] This can be explained in particular with an inability to produce indigenous breeds and by inadequate knowledge and application of technology,[18] which are the basic determinants of productivity in the beekeeping sector.

6.1. The Importance and Current Situation of Apiculture in the Black Sea Region

Beekeeping is the primary income generating activity in most provinces in the Black Sea region since arable farming fields are relatively limited. The region offers a suitable environment for high quality honey production due to its topographic and climatic conditions bolstering up beekeeping. The increase in elevation at a short distance in the region creates significant differences in vegetation diversity, and flowering times and periods which in turn positively affect beekeeping (Tunçel, 1992: 98). The highly rich plateaus such as Anzer, İkizdere, Karagöl, Ladik and Gerze provide aforementioned positive topographic conditions. The high-quality honey producer provinces can be listed as Artvin, Bayburt, Gümüşhane, Giresun, Ordu, Rize,

[16] Scientific studies have revealed that Turkey is a very rich country in terms of bee genetic resources. According to this, there are five different bee species (A.m. anatoliaca-Anatolia, A.m. meda-Iran, A.m. caucasica-Caucasus, A.m. syriaca-Syria, A.m. carnica-Thrace) and many sub ecotypes in Turkey (Ceyhan and Emir, 2016: 45; Kekeçoğlu et al., 2007: 227).
[17] The relatively low levels of yield point out to the possibility that technical efficiency is inadequate. As a matter of fact, in a study conducted in 2015, 49% of apiculture enterprises in Turkey were found to have a low level of technical efficiency (Ceyhan and Emir, 2016: 29).
[18] A striking indication confirming this inadequacy can be easily understood from a survey-based study conducted in 38 different provinces in Turkey. A significant portion of bee producers (39%) who were asked "Which kind of bee do you keep?" responded "Frankly, I do not know" (Kekeçoğlu et al., 2007: 230-231).

Trabzon and Samsun. Table 2 shows macro indicators related to beekeeping and honey production in Turkey and in the region.

Table 2: Number of Hives, Honey Production (Tonnes) and Honey Yield (Kg/Hive) in Turkey and Black Sea Region

Area	Number of Hives	Honey Production (Tonnes)	Honey Yield (Kg/Hive)
Black Sea Region Total	1,318,876	22,313	
Black Sea Region Average (According to the number of provinces)	73,271	1,240	17
Turkey Total	6,348,009	108,000	
Turkey Average (According to the total number of provinces)	78,370	1,169	15

Source: Güngör and Ayhan (2016: 110).

As can be seen from Table 2, one-fifth of total production in Turkey is carried out in the Black Sea Region and the honey yield level in the region is above the Turkish average. In addition to the above-mentioned positive production conditions, beekeeping activities mainly carried out in modern hives in the region have been supported by several ministries and regional administrations including Ministry of Agriculture and Forestry and former Ministry of Development through various projects which have a variety of main themes including training.[19] While the data obtained from these projects and macro-based ministry data show positive trends in production and yield levels, various problems are identified that indicate inadequate utilization of the potential of the region. These problems, which are also applicable to Turkish apiculture in general, can be discussed under the two headings of production and marketing.

Firstly, in spite of the government support,[20] beekeepers are producing at high cost conditions due to structural problems in apiculture, such as insufficient breeding efforts, lack of training and skilled labor, wrong and untimely use of pesticides, and demand pressures from national market chains for cheaper honey and late payment within these market chains. Such structural problems exist in parallel with apiculture firms operating below their potential for cost efficiency. The economic efficiency coefficient for these firms was calculated as 0.62 by the year 2016 in a study conducted for Turkey overall. An interpretation of this finding suggests that the inefficient apiculture firms have the potential to reduce their costs by 38% and also imply the importance of finding policy solutions to solve structural problems (Ceyhan and Emir, 2016: 29). The presence of high costs leads to higher retail prices of honey companies. In a

[19] For instance, DOKAP (Eastern Black Sea Project) which is one of the recent important and comprehensive regional development projects in Turkey, consists of beekeeping. Republic of Turkey Ministry of Development, Eastern Black Sea Project Regional Development Administration and Anadolu Kalkınma Inc. conducted and completed "Dissemination of Bee and Bee Products Production in Eastern Black Sea Region Project" between 21.05.2014 and 20.05.2015. The project focused on theoretical and practical training activities aimed at maintaining the agriculture and especially production of bee products in appropriate scale and efficiency levels to create economic value in Eastern Black Sea provinces (Artvin, Bayburt, Gümüşhane, Giresun, Ordu, Rize, Trabzon) (DOKAP, 2016: 2-10).

[20] In 2018, designated support amounts for beekeeping were 10 TL/hive for full beehive support, 40 TL/hive for bee gene-pool protection support, 15 TL/bee for queen bee support, 40 TL/bee for breeder queen bee support and 60 TL/colony for Bombus bee support (GTHB, 2018). However, it must be noted that according to our calculations using TURKSTAT data, honey input parity (diesel) decreased annually by 8.2% in 2018. This means that the amount of diesel fuel that 1 kg of honey can purchase declined by 8.2%.

country where the average income level is low, such as Turkey, the high price naturally leads to a low level of demand. Moreover, the beekeepers in the region are faced with additional cost problems specific to the region to improve their production, because strengthening the colonies of existing holdings depends for technical reasons on the displacement of the colonies during the production period. High transportation costs and high accommodation fee are also considered as important cost factors specific to itinerant beekeepers in the region (Yaşar et al., 2002: 20). Another problem is that of "wintering". As the temperature falls and winter begins, bees get together to form winter cluster when they hibernate. In order to prevent the cluster from breaking, it is necessary to take precautions related to the winter conditions from the movement that bees stop flying. These precautions include covering the hives after adjoining them, narrowing the hive entrances without completely cutting the ventilation, positioning the hives so as to be protected from cold and hard winds etc. The problem of wintering is also closely related to the low use of queen bees before wintering. The use of young queen bees before wintering is calculated as only 8.20 % at the regional level (Yaşar et al., 2002: 18-19).[21]

When it comes to marketing problems, according to the data obtained from a field study covering all the provinces in the region, approximately 2/3 (65.57%) of honey was marketed by wholesale traders, and the remaining 34.4% is marketed directly by producers but cooperatives do not play an important role in marketing (Yaşar et al., 2002:19). The same study also indicates that producers are not necessarily able to interact with companies that are marketing complementary products such as beeswax, royal jelly, pollen, etc. In addition, it is stated that beekeepers have difficulties in accessing credit from institutions other than Ziraat Bank (Agriculture Bank)[22] which is a public bank.

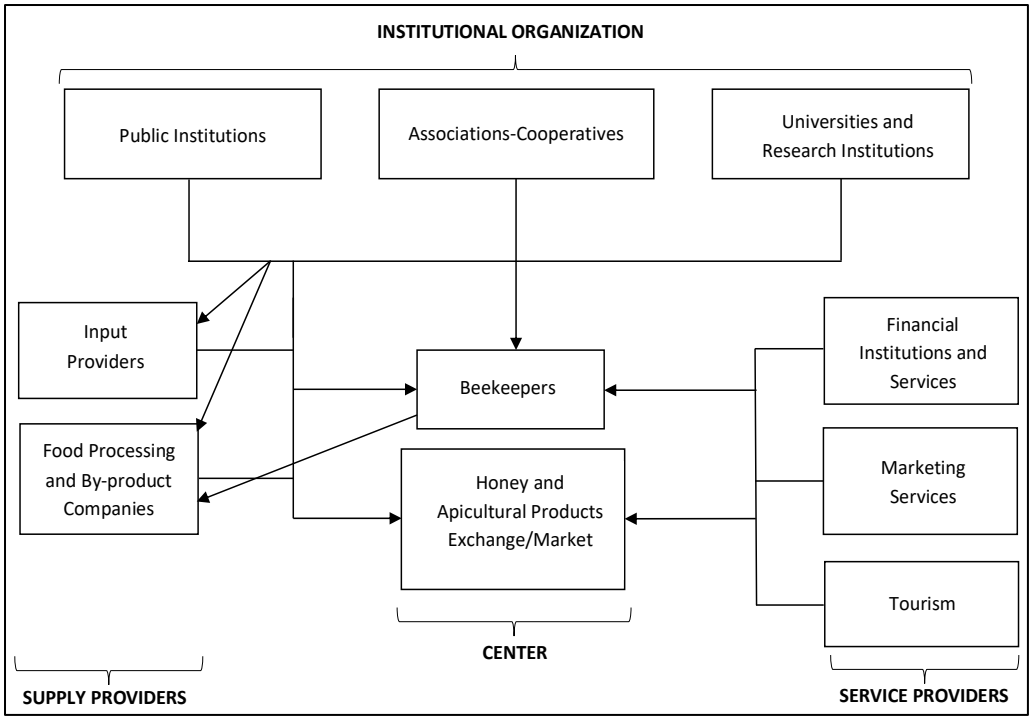
6.2. Evaluation of the Apiculture Cluster Components in the Black Sea Region

In the light of Porter's model and the three basic components of a cluster we have specified in the Section 3, we present an evaluation of the apiculture cluster in the Black Sea Region here. Accepting the FAO's definition of agricultural clustering given above, the stakeholders of the clustering model proposed for apiculture in the Black Sea Region, can be schematically shown as follows:

[21] For detailed information about "wintering" in beekeeping see Tunçel (1992: 116-117).

[22] In recent years, there have been two private banks following the lending policy to the agriculture sector. The share of these two private banks in loans granted to beekeepers is only 15% (Ceyhan and Emir, 2016: 28).

Figure 1: Cluster and its Stakeholders



Source: Adapted from Van Eenennaam and Soesman (2008: 4)

Figure 1 presents the proposed structure of the apiculture cluster and the linkages between cluster components. The cluster has one center and three poles as we mentioned in the theoretical part of the study. Naturally, beekeepers are in the center of the cluster. Those on the left side are the supply providers which consist of input providers and food processing and by-product companies. The right side of the cluster shows the service providers of the cluster. Finally, the stakeholders in the upper side of the cluster represent the institutional organization which consists of public institutions, associations-cooperatives and universities-research institutions. The relationship between the stakeholders and some remarks for the cluster can be sorted as follows:

The small family enterprises constitute the center of the cluster at regional level. For most of these enterprises, beekeeping is not the sufficient income generating activity. The level of capital and technology is low for these enterprises. Considering the positive effects of clustering, the primary aim is to make beekeeping the single or main income generating activity for these enterprises. In order for clustering to reach successful outcomes for producers, it is crucial that producers become organized at the local level. In spite of the existence of honey producer associations in the wholesale trade of honey, these associations are found to be operating inefficiently.[23] If the individual producers or producer groups in regional level (for

[23] In Turkey, there are 80 provincial associations affiliated with Turkish Association of Beekeepers (TAB) and 63 district associations affiliated with the Central Union of Honey Producers of Turkey which are operating at usually sub-provincial level. Some of these associations provide honey filling and packaging services. In a study conducted for Turkey, it

example, on the basis of village) operating outside cooperatives can turn to contract farming[24] with honey processing and marketing companies, it will be possible to increase honey production levels by carrying out standard and specific quality of product which is subject to the production contract. Such a change in production strategy would enable the deactivation of intermediary earnings shown above one of the marketing problems of the honey market. The production strategy change may also contribute to the elimination of market failures which are caused by the lack of quality standards that can be regarded as another important problem in the market (Ceyhan and Emir, 2016: V). In addition, if companies can receive geographical signs for the standard and specific quality of honey, they can increase their domestic market share and position for exporting. Thus, as explained in the theoretical part of the study, conditions that will increase the revenues (both in the form of income and profit) expected from the cluster may arise for both beekeepers and companies. Finally, widespread recognition of geographically signed honey may also contribute to food reliability for consumers by avoiding illegal honey production.

One of the important supply providers in the cluster is the input suppliers. As stated above, in spite of the fact that the Black Sea Region has suitable conditions for honey production, high input costs constitute an important problem. The most important shortcoming in terms of inputs is found to be queen bee production in the region (Yaşar et al., 2002: 19). In this respect, the establishment of competing enterprises that specialize in queen bee production is important. At the same time, the queen bee producing enterprises can also provide additional inputs such as hives and lathes. As the number of suppliers per honey producer increases, the market price might fall since the expansion of the specialized supplier base will lead to decreasing input costs, given the presence of positive externalities mentioned in the theoretical part of the study. It may be considered that the public institutions, which are one of the institutional components of the cluster, should introduce some financial incentives such as tax exemption for these companies.

Considering the demand potential of bee products other than honey, one can easily assert that there is a high domestic and foreign market potential of Turkey. Since apiculture is fueled

was found that 89% of beekeepers associations do not operate efficiently. The problems causing inefficiency were identified as marketing (45%), financing (43%), research (4%) and management and personnel (4%) (Ceyhan and Emir, 2016: V)

[24] Based on the vertical integration between agriculture, industry and marketing, the contract farming model is an instrument for agricultural producers and food companies for usually a "network" and sometimes "clustering" practice and can be defined in the context of the "interaction chain" among these three sectors. Contract farming model in agriculture is a production and marketing model that involves a contract between the industrial and commercial firms, and the agricultural producers, which is done before the production stage of production. The contract means that while the agricultural producer bears the responsibility of providing output, agricultural raw material processing companies guarantee the purchase of the product under certain conditions (Özçelik et al., 1999: 7). The benefits for the agricultural producers can be considered as benefits from in-kind, in-cash, credit and technical assistance provided by the companies offering contracts, and a reduction in the risk of production and marketing (Edleman, 2006: 97; Özçelik et al., 1999: 7). Considering the expectations of these companies, on the one hand contract farming gives the opportunity to reduce total costs by sharing the labor costs and production risks of the capital owners with the producers while providing a competitive advantage in terms of marketing and sales by guaranteeing the supply of standard quality of raw materials on the other. Ceyhan and Emir (2016: 26) determined that only 2% of beekeeping enterprises in Turkey market their products by contract farming.

only by demand for honey because of the single product orientation in Turkey, it is possible to provide additional income for beekeepers if the demand for other apicultural products (e.g, royal jelly, pollen and propolis) could be increased. Such products are demanded globally as raw materials in various industries including cosmetics, pharmaceuticals and woodworking (TKDK, 2016). If companies manufacturing these products are included among the supply providers of the cluster, there will be an additional link to the chain of production and marketing.

The formation of a price that indicates the quality of the product is clearly another important factor for both honey producers and food processing and marketing companies. As theoretically stated before, markets do not operate efficiently on conditions that the buyers and the producers do not directly face. Under the condition where food processors collect honey and other bee products by means of intermediaries, the share of the value added received by producers who are not in the contract farming decreases while the share of actors such as merchants and intermediaries increase (Ceyhan and Emir, 2016: 39). This condition leads to artificial price increases. An established honey market in the region would contribute to the formation of efficient prices in the market as well as increased producers' income. In addition, as in the cases of cotton, figs and raisins in Turkey, providing laboratory analysis services within the market to indicate product quality will contribute to the formation of a reliable equilibrium price.[25]

Institutional support, shown in the upper part of the Figure 1, is another pole of the cluster that will help the cluster to be successful. Institutional support consists of "public support", mainly by local administrations, and "private support", in which universities, cooperatives and associations act in coordination. In terms of public support, both at the national and international level, there are many successful examples that involve decentralized structures as complementary elements of clusters for many commercial products.[26] The support of ministries and affiliates should focus primarily on a project to be carried out by the ministry.[27] Feasibility analysis can be completed by working groups to be formed under a Cluster Initiative Executive Committee which is composed of stakeholders operating at the regional level such as KOSGEB (Small and Medium Business Development and Support Administration), development agencies, universities, cooperatives and associations. Following the completion of the project, public support can focus on training and product development/control. In this regard, it is important to renew DOKAP-like training projects periodically for training the producers. In terms of product improvement, it is necessary to improve breeding, selection and artificial insemination studies based on indigenous races (Kekeçoğlu et al., 2007: 234), and to solve the additives and residue problems in terms of product control. In order to achieve both objectives, the current conditions of laboratory analysis in the provincial organizations of the

[25] As in the case of agricultural insurance, a government support for 50% of the product analysis charge might be considered as an option (Ceyhan and Emir, 2016: 55).

[26] The tobacco-cigarette cluster in China's Yunnan Region (Eng, 1999), the grape-wine cluster in the California Region of the United States (Porter, 1998) and salmon cluster in Chile (Zanlungo et al., 2011) are among the successful examples that the support of local administrations is important and effective.

[27] The project can be based on the scheme of work prescribed for the stakeholders of the Organic Agriculture Cluster of the South Eastern Anatolia region that has been applied previously and has achieved successful results.

Republic of Turkey Ministry of Agriculture and Forestry need to be improved, and if necessary, the number of laboratories should be increased at the regional level.

The third pole of the cluster is the service providers, which is crucial for the capital maintenance for both beekeepers and companies. In recent years, the fact that private banks in Turkey have started to provide loans directly to agricultural producers may increase the opportunities for beekeepers in the region to obtain the necessary loans to increase their fixed capital, especially the number of hives. On the other hand, the enterprises for queen bee breeding and firms of apicultural products could benefit from long-term and low-interest loans of small enterprise incentive packages of public banks. In addition, it is important to decrease the marketing costs of honey and bee products through improving transportation infrastructure. Since environmental conditions are crucial for apiculture, as long as being environmentally sensitive, local-rural roads in the "green road project"[28] should be completed by the central and local public authority. This move may also contribute to agro-tourism which is a supplementary service component of the cluster. In this respect, product promotion and marketing will be possible in environment friendly touristic facilities to be built on these roads.

7. Conclusion

The Black Sea Region makes an increasing contribution to honey production and beekeeping, showing significant progress in Turkey in recent years which has risen to second place in terms of production level in the world. Despite this positive tendency, the region, which is very rich in terms of genetic resources, suffers from production and marketing problems in parallel with the current structural problems of Turkish apiculture and the market for honey and other apicultural products. While economically inefficient markets cause the region to fall below its potential in terms of production and income levels, they affect consumer welfare and export competitiveness negatively due to high prices.

In this study, we have evaluated a clustering strategy for the Black Sea Region of Turkey. Originally designed for the manufacturing sector, clustering strategy has started to be used in the agricultural sector in recent years due to the increased demand in the food industries for higher quality and standardized agricultural raw materials. The coordination between beekeepers, food manufacturers, input suppliers and institutional structure, which are the main stakeholders of the cluster, is considered to contribute to the region's potential in leading to more efficient market functioning. Promoting contract farming, establishing a honey exchange, promoting the establishment of companies specialized in queen bee and apicultural products production, adopting geographically signed products, and institutional support are determined to be crucial within the scope of the evaluated apiculture cluster.

[28] The road project for the opening of a corridor from Samsun to Artvin provinces to promote highland and nature tourism in accordance with The Turkish Tourism Strategy Document-2023. With this project, it is aimed to connect the highland roads and to increase the income level of the people of the region by creating touristic facilities and recreation areas where the road passes (DOKAP, 2020). As of May 2020, 60% of the 2600 km project has been completed.

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