



Integrated environmental impact and risk assessment in rural women entrepreneurs

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Received: 11 September 2019 / Accepted: 3 April 2020 / Published online: 16 April 2020
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Abstract

This study set out to reveal to what extent women entrepreneurs operating in rural areas have been affected by environmental pollution and climate change. Besides, it emphasises how much they will be affected over the next 5 years throughout Turkey. The study covered rural areas of all seven regions in Turkey. Findings were analysed by using SPSS 23 programme. Women entrepreneurs were younger in less developed regions of the country, such as the Central, Eastern, and South-Eastern Anatolia, and were older in the more economically developed coastal areas. One-third of the respondents were microentrepreneurs; 12% employ five or more workers. The problems of rural women entrepreneurs are further complicated by environmental pollution and climate change. Among the significant environmental issues, women entrepreneurs endure a loss of income, loss of trade stock/goods, and loss of livestock, property damage and potable water supply. Women entrepreneurs agreed that, in the next 5 years, environmental problems would adversely affect customer demand, the quality of raw materials they use and the products they offer; therefore, customer demand would reduce. On the other hand, they were divided in their opinion about whether environmental problems will be affecting their business location and the need to invest in technology and equipment. The study showed that none of the participants obtained disaster insurance, and none of them was members of an environmental organisation.

Keywords Rural women · Women entrepreneurs · Environmental pollution · Climate change

Introduction

Entrepreneurship exists from the beginning of capitalism, yet its importance has risen, especially after the 1980s. Countries have prepared policies and programs to support entrepreneurship and attempted to increase their number of entrepreneurs (Henderson 2002; Kurt et al. 2006). Entrepreneurial culture, in particular, women entrepreneurship, has received increasing attention in Turkey as well as with the rest of the world (Soysal 2010).

Tourism is an attractive field in terms of business development, employment income generation and the revitalisation of

the local economy. The tourism sector in Turkey accounts for 21.9% of exports and 4.5% of total employment and covers 49% of foreign trade deficit (TUSIAD 2017).

Rural tourism is supported globally by its role in creating entrepreneurial opportunities for women who are usually unpaid family workers and economically dependent on their families. Women are almost twice as likely to be an employer in rural tourism compared with other sectors (UNWTO and UN Women 2011). Public and local stakeholders see rural tourism as a viable strategy for easily integrating women into the local economy, to achieve the conservation goals of natural resources and to revitalise and reconstruction of economically impoverished areas at the same time.

According to Demirezen (2018), rural tourism in Turkey is a small-scale tourism facility related to boarding in rural areas, cafes, restaurants, selling homemade foodstuff, selling handicrafts, outdoor activities, folk arts, workshops, ecotourism, cultural tours and recreation activities. Women involved in rural tourism in Turkey are not solely farmers but permanent residents of rural areas.

Responsible Editor: Philippe Garrigues

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Rural entrepreneurship and women

Rural entrepreneurship has been studied under numerous headings such as entrepreneurship process, its role in the economy and the characteristics of its entrepreneurs (Pato and Teixeira 2018). Hoy (1983) defines a rural entrepreneur as a person who makes independent decisions and takes action; takes risks; is goal-oriented, confident, optimistic, hardworking, and innovative; and creates new employment opportunities with entrepreneurship activities in the rural environment. Rural entrepreneurship is fundamentally based on society and strong family ties and has a relatively more significant impact on rural society (Elena et al. 2015).

The most important and known contributions of rural entrepreneurship are realised in three areas. These are rural development with the advancement of the area where the enterprise is located: urban development by preventing migration to cities, providing intermediate and contract manufacturing to the industry and supporting the needs of the people and social and national development as a whole by increasing national income, production volume, export rate, education and specialisation, employment and per capita income (Saxena 2012).

The employment of women in rural areas, working as registered workers, thus ensuring their job and social security, and developing women's entrepreneurship are realised through rural entrepreneurship (Harrison et al. 2020). The main problems faced by women entrepreneurs in rural areas are low levels of education, lack of knowledge about the business they set up and difficulties in balancing work and family. The study by Lashgarara et al. (2011) showed that women starting a new business in rural areas are quite a novice in getting information about work and supportive systems. At the same time, women in new ventures do not have the training and knowledge of investment and savings, nor the knowledge and experience of sales, marketing and management. Rural lifestyle being patriarchal is another problem. In patriarchal societies, men often perceive the financing of women's ventures as a significant risk. Women often have a low risk-taking attitude. Instead of applying to banks or other credit institutions, they finance by using their savings or by borrowing from close family, relatives and friends. Furthermore, low literacy and education levels result in them being unaware or incompetent about the use of new technologies.

In recent years, significant changes have been observed in the European Union's rural policy. The European Union also contributes indirectly to the development of rural entrepreneurship by providing substantial funds to SMEs. Similarly, many strategies and programs have been developed in the USA to support entrepreneurship and small businesses. In rural areas, these strategies and programs are focused on rural entrepreneurship (Stathopoulou et al. 2004).

Rural tourism and the environment

Nature and climate determine numerous factors such as biodiversity, coastal areas, natural habitats, quantity and quality of food and water, forest areas, and snowfall that provide input to rural tourism (UNWTO 2007). Environmental problems, for instance, urban sprawl, population growth, rising consumption rates, excessive use of pesticides, insecticides and chemical fertilisers, add up to environmental degradation. Adverse outcome of environmental issues has become a threat to our world. Climate change will remain a significant global environmental issue resulting in increased dependence on fossil fuels and deforestation (Malik et al. 2016).

Environment destruction, air, water and soil pollution will continue to affect biodiversity, human health, historical and natural environment. Therefore, attraction centres will likely to be affected, even change. It will also affect the spatial distribution of tourism, the timing of travels and the duration of accommodation (Shaheen et al. 2019). Destinations directly dependent on environmental conditions such as agricultural tourism, rural tourism, sea and ski tourism will ultimately fail to satisfy tourist expectations. The sectors and destinations will become more susceptible to the type of touristic activity, duration of visit, quality of service and even the cost of the service. The number of expenditures tourists make will be affected either. Economic and social benefits of the sector may be reduced as unexpected extreme weather events will lead to uncertainties for tourists and service providers.

The tourism sector has a direct impact on 54 sub-sectors, particularly food, transportation, energy, textile and construction (AKTOB 2014). The decrease in agricultural production, the species and quantities of sea products and game animals, will negatively affect the food and beverage sector operating in the touristic regions. Environmental degradation will directly affect the necessary raw materials of the sector and will reduce the efficiency of these goods. Each regional location is affected in different ways and degrees. Adaptation policies need to be established to eliminate those negative impacts on the sector.

Possible effects of climate change

Turkey is located in the Mediterranean basin, where it will be primarily affected (temperature rise in the hottest seasons, decrease in humidity and rainfall) by global warming. UNWTO has declared this basin as one of the centres where the tourist flow will change (UNWTO 2009).

The summer tourism climate index (TCI) scores of Turkey's southern coast will decline. Turkey will have climate conditions "acceptable" and "marginal" (TCI value between 40 and 50) instead of "perfect" or "very good" climate conditions (TCI > 80) in the TCI evaluation currently owned. TCI points belonging

to the Black Sea will be less affected than the Mediterranean and Aegean regions (Aydemir and Senerol 2014).

Climate change will have both positive and negative effects on tourism. The elongation of the tourism season will be a positive effect. On the contrary, the rising air temperature will divide and reduce the time that can be spent outdoors during the day. The decrease in water resources, especially during the hot summer months, will cause potable and running water shortage. The increase in the use of electricity for cooling will also despairingly affect tourism costs (TBMM 2008). Extreme weather events and excessive rainfall have begun to cause significant losses, especially in a rural settlement with inadequate infrastructure. Forest fires, which occur and will continue to occur, cause the loss of natural beauties (Yildiz 2009).

Changes in settlements that may arise as a result of increasing temperatures will increase human pressure on the sensitive mountain and valley-canyon ecosystems. This pressure, especially in the summer months, may emerge as temporary migration. It will bring about the infrastructure shortages in the new temporary settlement areas (Yildiz 2009).

Micro and small- and medium-sized enterprises (SMEs) are highly vulnerable to environmental pollution and climate change challenges in both developed and developing countries (Crick et al. 2018).

Reasoning focus of the paper

Studies on women entrepreneurship in Turkey started in the 1990s. Although the literature on women entrepreneurship has increased comparatively since the 2000s, these are mostly contextual and empirical studies are rare. These studies mainly discussed the current state of women entrepreneurship and focused on the socio-demographic differences between male and female entrepreneurs. Current research mostly outlines women entrepreneur profile and, repeatedly, highlights the challenges they face and emphasise the importance of women entrepreneurs in regional development.

Almost all studies that touched the issues of women entrepreneurs covered a particular province or region. Two national studies were carried out on female entrepreneurs (Ozturk and Arslan 2016; Gulcubuk et al. 2011) who are members of the Union of Chambers and Commodity Exchanges (TOBB) of Turkey.

Similarly, literature about rural development and rural entrepreneurship increased rapidly, especially in developing countries (Dogan et al. 2019) However, when rural entrepreneurship is narrowed down as rural women entrepreneurship, the researches on the matter are surprisingly scarce and limited to only a single province (Ballesterio et al. 2014; Koutsou et al. 2009; Mishra and Kiran 2014; Panta and Brijesh Thapa 2018).

Numerous studies have been conducted to draw attention to the negative impacts of environmental pollution and climate change on SMEs (Lo et al. 2019; Montmasson-Clair et al.

2019; Shrestha 2014). Sizeable research focused on SMEs and its impact on the environment, which investigated SMEs' intentions to employ environmental management systems (Aragon-Correa et al. 2008; Graafland and Smid 2016; Redmond 2008; Revell et al. 2008), offered them guidelines for reducing these impacts (Struwig and Lillah 2017).

In summary, the literature on women entrepreneurship, rural entrepreneurial women, rural tourism and environmental problems affecting SMEs has increased steadily but separately.

Present studies are mainly focused on specific provinces or regions. However, we found no research in the literature about how rural women-run enterprises are affected by environmental problems.

Research aim

This study set out to reveal the extent to which women entrepreneurs operating in rural areas have been affected by environmental pollution and climate change, and how much they will be affected over the next 5 years throughout Turkey.

Research objectives

The purpose of this research is to reveal:

1. The extent to which rural women entrepreneurs are affected by environmental pollution and climate change
2. Whether they suffered any loss as a result of these effects, what are the losses of those who suffered the loss,
3. To what extent they will be affected by these problems in the future.

The impact of the research

We wanted to go beyond the studies that focus on the socio-economic problems of women entrepreneurs or compare women and men entrepreneurs from various perspectives.

We wanted to explore for the first time how rural women perceive and respond to environmental problems and climate-related matters that are affecting their businesses. In doing so, we wanted to take the matter from SME perspective. Current literature lacks research that comprehends the entire country and but at the same time emphasises regional differences. This study is essential in terms of fulfilling this gap.

The findings of this study cover women entrepreneurs that were operating in rural Turkey, but we believe that the results will yield beneficial results for researchers in other parts of the world, especially in developing countries. This research will lead to an increase in similar studies.

Methodology

Data collection

We used a survey questionnaire to collect primary data. It consisted of 27 questions in two parts: the first part included items to measure the socio-demographic characteristics of the participants. The second section included 20 items measuring how climate change affects small enterprises run by women entrepreneurs. First, the participants indicated their degree of participation in 18 expressions using the 5-point Likert-type scale (1 = Strongly Agree; 2 = Accepted; 3 = Unstable, 4 = Disagree, 5 = Strongly Disagree). Besides, in the two statements, participants were able to select multiple options. Finally, they had to answer two “yes” and “no” questions.

The survey covered the seven geographical regions of Turkey. Each region has its distinct characteristics.

The closed-ended questions were used, and they were piloted on eight female postgraduates from the Agricultural Faculty of Uludag University. Additionally, the questionnaire was reviewed by two senior academics to ensure clarity in expressions and accuracy of communication.

The sample size was determined by estimating a proportion formula used by Thompson (2012). The computation was as follows:

$$n = \frac{t^2 2[1 + (0.02)(b-1)] pq}{E^2} \quad (1)$$

where n is the sample size, t is the significance level (assumed to be 95%), p is the probability of the situation being searched (assumed to be 50%), q is the probability of the situation not being searched ($1 - p$), and E is the accepted error (assumed to be 5%). When the finite-population correction can be ignored, Eq. 1 is transformed into the following equation:

$$n = \frac{t^2 pq}{E^2} \quad (2)$$

Using the formula;

$$n = \frac{t^2 pq}{E^2} = \frac{(1.96)^2 [(0.50 * 0.50)]}{(0.05)^2} = 384 \quad (3)$$

Hence, the minimum sample size is 384. The questionnaires were distributed to 400 participants to reflect the full sample size calculated above. The population densities of the regions were taken into consideration: Marmara Region (27.5%: 110:113), Aegean Region (13%: 52:65), Mediterranean Region (12.5%: 50:53), Central Anatolia Region (16%: 64:72), Black Sea Region (12%: 48:34), Eastern Anatolia Region (9.2%: 37:32), Southeast Anatolia Region (9.8%: 39:31). The returned questionnaires largely represent this tendency and reflect the distribution rates.

Data analysis

Data analysis is performed by using the SPSS 23.00 package. Independent sample T test and one-way ANOVA were used to reveal the relationships between the variables. The Cronbach alpha reliability coefficient of the survey was found to be $\alpha = 0.761$. A Shapiro-Wilk test was used to test for normality assumption. The analysis showed that ($D(400) p = 0.010$, $p > 0.05$) the data does not show normal distribution. Therefore, the skewness and kurtosis values are further used and skewness of -0.88 ($SE = 0.122$) and kurtosis of -0.543 ($SE = 0.243$) were found. Tabachnick and Fidell (2013) confirm that $+1.5$ and -1.5 skew and kurtosis values meet the normality assumption.

Findings and discussion

The demographic profile of the participants

Rural female entrepreneurs' age that responded to the survey was almost equally distributed between 31–44 and 41–50 years (32.3% and 32.5%). The ratio of entrepreneurs between the ages of 51–60 was 14.5%, while those between the ages of 20–30 were 12.3%.

GEM (Global Entrepreneurship Monitor) (2015) indicates that entrepreneurs in Turkey clustered in the 25–44 age range. The research which was undertaken by Istanbul Chamber of Commerce (Ozturk and Arslan 2016) on women entrepreneurs who registered to TOBB reveals similar findings: 34.1% of women entrepreneurs in Turkey were in the age range of 40–49, 30.1% in 30–39 and 26% in 50–59. A vast majority of the participants (89.5%) were married. The highest educational attainment of the participants was high school (45.8%) followed by primary school (22.5%) and vocational school (16.8%). Other studies in Turkey reported a similar result that 52% of women entrepreneurs were high school graduate (Ecevit 2006). Research also reveals that almost half (44%) of the rural women entrepreneurs earned \$5000 to \$10,000 annual income. Twenty-one percent earned less than \$5000. In short, 66% of rural women entrepreneurs belonged to the middle class and had a very modest income.

Of the female entrepreneurs involved in the study, 30% were micro-entrepreneurs and 58% were small businesses employing 2 to 4 people. Only 12% of women entrepreneurs employed five or more people.

Environmental pollution and climate change at regional level

Turkey portrays rich geographical and climatic characteristics due to being in the conjunction of the three continents. Each

region possesses unique physical (climate characteristics, landforms, soil characteristics) and human factors (industrialisation, agriculture, underground resources, tourism, transportation). For this reason, nationwide results may not always yield meaningful results for every region; each region needs to be evaluated within its dynamics to perform meaningful analyses.

Marmara is one of the smallest regions but constitutes 30.7% of Turkey’s population. It has the highest urban population. It is the most economically developed region with the largest working population in the industrial sector.

The Aegean region comes second in industry and tourism development. As the climatic conditions are favourable, the variety of commercial agricultural products is wide. The Mediterranean Region has limited agrarian areas. Despite the limitation, the region’s most important economic activity on the coast is agriculture. The region ranks third in terms of tourism revenues. The Black Sea population density is below the country average. Continuous rainfall prevents growing products that demand summer drought. Livestock breeding is an important commercial activity. Natural beauties are the essential tourism potential of the Black Sea region. Plateauing activities are one of the developing tourism activities in recent years in Central Anatolia. The industry has not developed sufficiently in territorial regions where natural conditions have adverse effects. As the industrial organisations are insufficient, the residents of the Eastern and South-Eastern Anatolia regions make a living mostly on agriculture and animal husbandry.

The Ministry of Environment and Urbanisation (MEU) prepared a report on “Turkey’s environmental problems and priorities” in 2018 and assessed environmental problems in terms of geographical regions. According to the report, water pollution is the primary environmental problem in the Marmara, Aegean and Mediterranean regions, each of which is a coastal region. In all three regions, waste was second and air pollution was the third major environmental problem. In the Mediterranean region, another coastal region, air pollution was the first urgent environmental problem followed by water and noise pollution and waste.

Water pollution is one of Turkey’s pressing environmental issues (MEU 2018). Approximately 79% of the surface waters in the country are polluted and 43.3% of the surface water is highly polluted water, qualifying as “Grade 4”. Only 21.3% of surface water qualifies as “Grade 1” high-quality water. Some of the common causes of surface water pollution are domestic wastewater, pesticide and fertiliser use, solid wastes, industrial wastewater, seawater mixing with rivers, and maritime activities. The same report states that air pollution is the primary environmental problem in the territorial regions of Eastern and South-Eastern Anatolia, followed by water pollution and waste. In the Central Anatolia region, water pollution is the leading environmental problem, while air and noise pollution,

waste and erosion are noted as other critical environmental problems.

According to the World Health Organization (WHO) data, all provinces except 1–2 of them are above the limit values in terms of air pollution. The WHO says that particulate matter in the air (PM10) should be below 20 micrograms a year. The border value adopted by Turkey is 44.1 (Nasuhbeyoglu 2019). These rates were 74.2 for Bursa, 62.25 for Istanbul, 58.74 for Balikesir and 45.82 for Tekirdag (Data recorded on 20.06.2019).

Household wastes in Turkey constitute 42.8% of total waste followed by the energy sector. Municipalities recycle 6% of the waste, 64% is landfilled, and 30% of are uncontrolled disposal (unsanitary, dump). Uncontrolled disposal of household wastes and hazardous wastes throughout Turkey is a major problem (Unal 2018).

We asked participants to select three among the various environmental problems at first to find out which environmental problems they consider important for themselves and their small businesses. The result partially overlapped with the Ministry’s research and partially dissociated. Table 1 summarises the regional distribution of the top three major environmental problems perceived by rural female entrepreneurs. Water and air pollution in the Aegean and Mediterranean regions are seen as the most critical environmental problems, in the Marmara region air, and noise pollution were prevalent problems.

It is not surprising that flooding, deforestation and desertification, loss of biodiversity were among the most critical environmental problems in the Black Sea region. The Black Sea region has become an important centre of attraction for local tourists in recent years because mainstream coastal

Table 1 Regional distribution of the three major problems perceived by women entrepreneurs

Regions	%								
	A	B	C	D	E	F	G	H	I
Marmara	85	58							67
Aegean	68		76						72
Mediterranean	64		74						62
Black Sea						54		64	78
Central Anatolia			71	63					58
Eastern Anatolia			84	64					69
South-Eastern Anatolia			92	65					72
Turkey	73		79						65
Total									

(A) air pollution; (B) noise pollution; (C) water shortage/contamination; (D) pollution of rivers and seas; (E) soil contamination; (F) flooding; (G) waste; (H) climate change; (I) deforestation, desertification, loss of biodiversity

tourism has focused mostly on foreign tourists. In contemplation of meeting this demand, rapid construction causes loss of natural beauties.

Soil and water contamination, water shortage, pollution of rivers and seas, deforestation, desertification and loss of biodiversity were revealed most prior environmental problems in the Eastern and South-Eastern regions in the survey. There were 24,000 “sensitive fields” reported about soil pollution in only the Southeastern Region in the MEU report (2018). In particular, soil pollution caused by oil wells in the Batman province threatens agricultural areas, pastures and livestock, and pollutes underground water (UCTEA 2018).

The current research shows that women entrepreneurs are familiar with climate change and see climate change as among the most critical environmental issues in five out of seven regions. These finding also confirms the findings of the “Are we aware of climate change?” a survey conducted by the MEU (2012) in cooperation with the United Nations Development Programme (UNDP). The research represented the 17 provinces of Turkey, living in urban and rural areas, and was conducted with 3166 people between the ages of 15–69. The research represents 3166 people between the ages of 15–69 who live in urban and rural areas in 17 provinces of Turkey. 64.3% of the interviews were conducted in urban areas and 35.7% in rural areas. 39.5% defined climate change as seasonal change, 13.5% identified as drought/water shortage and 9.3% defined as weather conditions. The rate of those who associate climate change with global warming was 6%. The 97% of the natural disasters that took place in Turkey in 2016 was due to climate change such as precipitation and floods, storms, hail, snow, high temperatures and drought. In 2017, a total of 598 natural disasters with meteorological characteristics were reported. The Marmara region, the coastal parts of the Aegean and the Mediterranean and the inner and northern parts of the country were most affected (MFWA 2018).

Environmental pollution and climate change: impacts on rural SMEs

After revealing the environmental issues that participants perceived as a priority, further questions were asked to find out whether their workplaces or businesses were affected by these issues, or to what extent if they were affected.

All businesses, small or large, undoubtedly have adverse effects on the environment. There is a mutual interaction between the environment and businesses. Although the environment is affected by the activities of small and large enterprises, it also affects the activities of these enterprises. Especially after increasing environmental pollution and climate-related issues, the impact of the environment on businesses has appeared to be more on the national and international agenda.

Of the respondents, 71.6% of them ($\bar{X} = 2.0955$, $SD = 1.02656$) agreed that environmental problems climate change and extreme weather events are urgent problems that can disrupt the economy and harm small businesses. Nevertheless, 36.7% ($\bar{X} = 2.8719$, $SD = 1.03157$) was indecisive whether their businesses or work activities have any negative impact on the environment. Furthermore, about one-third disagreed with the statement ($\bar{X} = 2.8719$, $SD = 1.03157$) (Table 2).

In the minds of the public, there is the misconception that large-scale enterprises and factories cause environmental pollution. However, given that small enterprises make up more than 90% of all enterprises, their negative impact on the environment is high. Since small businesses have to survive with their means, one may think that they can manage their resources more carefully, create less waste and appear to be less damaging to the environment than large-scale businesses. However, SMEs and micro-businesses have limited managerial skills and financial resources. They do not have adequate knowledge and technologies and lack resources and capacities to undertake energy-saving measures, waste management policies and prevent losses through the supply chain, sales and after-sales (Biggs et al. 2012; Hall 2006; Reynolds 2013). Consequently, SMEs are highly vulnerable to environmental problems and climate change (Runyan 2006; Yoshida and Deyle 2005; Wedawatta et al. 2010) and they have to face the reduced profitability at higher risk (Aragon-Correa et al. 2008).

Approximately two-thirds of the women entrepreneurs participated in the research stated that either their businesses or the businesses around them had encountered environmental problems ($\bar{X} = 2.1734$, $SD = 1.17814$). The rate of those who stated that “they believe they will be affected by environmental problems in the next five years” rose up to 84% ($\bar{X} = 1.94$, $SD = 1.098$). Despite this alarming response, only 4% of respondents indicated “they knew how to make their small businesses environmentally friendly”.

In the next stage, we asked women who were exposed to environmental problems to see if their workplace or their work suffered a loss of these problems. The response to the survey shows that almost all women exposed to environmental problems are adversely affected by these environmental problems ($\bar{X} = 2.32$, $SD = 1.374$).

Environmental problems and the ways SMEs are affected by them

Rural tourism enterprises are mostly micro or SMEs; therefore, they are and will be highly susceptible to environmental problems.

The cost of natural disasters caused by climate change worldwide in 2018 was over \$225 billion (AON 2019). Climate change caused a loss of 1.9 billion dollars in 2017

Table 2 Participants opinion on environmental problems and its effects on the environment (*n* = 400)

	1	2	3	4	5	Mean	SD
My business and what I do in it has an impact on the environment.	7.0	17.1	36.7	31.4	7.8	2.87	1.032
I know what I can do to make my small business more environmentally friendly.	4.0	18.1	30.9	32.9	14.1	2.65	1.056
Environmental problems, climate change and extreme weather events are urgent problems that can disrupt the economy and harm small businesses.	32.2	39.4	17.8	7.8	2.8	2.10	1.027
My business or those around me have encountered environmental problems.	34.9	35.9	10.1	15.1	4.0	2.17	1.178
I believe that my business, or those around me, will be affected by an environmental problem(s) in the next 5 years.	39.2	44.7	6.0	3.0	7.0	1.94	1.098
Environmental problems and climate change negatively affected my premise/operations.	35.9	30.9	10.1	11.1	12.1	2.32	1.374
Environmental problems will affect the quality of raw materials I access or products that I can produce	19.1	28.1	17.1	20.6	15.1	2.84	1.354
Environmental problems will affect the location of my business.	10.1	27.4	33.2	11.6	17.8	2.99	1.228
Environmental problems will affect consumer demand for my product(s)/service(s).	48.7	31.2	10.1	6.3	3.8	1.85	1.077
Environmental problems will affect my investment in technology and equipment	18.1	35.2	13.1	23.6	10.1	2.72	1.281
Environmental problems will affect my business resource use.	32.2	25.9	6.0	26.1	9.8	2.56	1.416
I have been told by someone in authority what to do if any environmental problems occur.	11.8	7.5	8.0	36.7	35.9	3.77	1.326
The local authority is doing things to help us to adapt to environmental problems locally	10.8	14.3	5.3	20.1	49.5	3.83	1.439

(1) Strongly Agree; (2) Agree; (3) Undecided; (4) Disagree; (5) Strongly Disagree

in Turkey (Eckstein et al. 2018). Professional actuaries (experts calculating insurance risks and premiums based on available data) identified climate change as the most significant risk for 2019 in a sector survey. They emphasised climate change more than cyber damage, financial instability and terrorism. The survey found that 22% of the 267 actuaries identified climate change as the most significant risk emerging. In 2018, only 7% of respondents identified climate change as the highest risk that could harm people and property (Rudolph 2019).

In this section, we aimed to examine in detail what impact those environmental problems made on the women entrepreneurs’ businesses. The results are given according to the region in Table 3.

The small business literature states that female business owners have been challenged by environment-related problems more than men-owned businesses. Lo et al. (2019) argue that socioeconomic disadvantages such as being a female in a traditional community could make certain aspects of small business operation susceptible to the impacts of climate change and extreme weather. Women achieve higher failure rates and lower levels of profitability than male-owned companies. For example, female owners had increased probability of closing their businesses after the hurricane Katrina compared with male counterparts (Marshall et al. 2015).

However, others have pointed out that small businesses run by women will be more environmentally active than those led by men (Gurbuz and Yildiz 2019). Crick et al. (2018) found that male entrepreneurs are more active on adaptation and coping strategies overall, but not significantly so, but less likely than women to accomplish sustainable adaptation. Sanchez-Medina et al. (2014) state that the attitude toward environment is

influenced by the gender of the business owner and argues that when the business owner is a woman, the company has a more favourable attitude toward the environment. Lewis et al. (2014) further claim that female owner-managers were more likely to prefer New Zealand to become a global leader in responding to climate change. Schaper (2002) reported that businesses with female owner-managers more likely to display a positive environmental performance compared with males.

Women entrepreneurs in rural areas often sell products they produce at home or produced from their immediate surroundings in their ateliers or local markets (Gurbuz and Ozkan 2019). Unexpected changes in weather, such as drought or excessive precipitation, may result in stock shortage. When a natural disaster (such as storm, rain, hail, extreme heat) occurs at the time or place where products or services are offered, a significant loss occurs in the quality and quantity of the products and services provided. As Marshall et al. (2015) confirmed, women entrepreneurs will suffer more losses in such situations because of their small investment capital and their limited array of product and services.

A total of 598 meteorological disasters were reported in Turkey in 2017. Storm (36%), heavy rainfall/flooding (31%) and hail disaster (16%) were in the top ranks. There were 217 storms, and hurricanes have been reported. Flooding and inundation have increased in recent years, and a total of 187 incidents reported. Ninety-four hail disasters occurred in the same year. Heavy snow was seen 43 times. In the very same year, the most catastrophic events occurred in the Marmara region, the coastal regions of the Aegean region and the Mediterranean region, as well as in the inner and northern parts of the country (MFWA 2018).

Table 3 Effects of environmental pollution and climate change on your business (All regions)

	MR <i>n</i>	AR	MdR	BR	CAR	EAR	SAR	TR (%)
Damage to property	17	16	22	35	9	8	7	14.5
Loss in livestock	-	-	-	5	10	12	8	4.5
Loss in trade stock/goods	42	39	44	43	35	33	38	34.8
Loss in income	34	39	36	38	41	43	45	35.0
Health hazards	12	15	18	14	6	7	8	10.2
Lack of potable water	2	5	8	6	18	17	28	10.1
Other	5	2	2	1	-	-	-	1.2

TR Turkey, MR Marmara Region, AR, Aegean Region, MdR Mediterranean Region, CAR Central Anatolia Region, BR Black Sea Region, EAR Eastern Anatolia Region, SAR Southeast Anatolia Region

In our research, female entrepreneurs in all geographical regions stated that they suffered economic losses as a result of natural disasters caused by environmental pollution and climate change. Those losses were higher in deprived terrestrial regions (Table 3).

Among the losses, the loss of the product or service subject to sale and consequent loss of income were primary ones. In Marmara, Mediterranean and Black Sea regions, the loss of products/services subject to sale was higher in terms of volume; the negative impact of these losses on income was higher in the less developed terrestrial regions of the country.

We noted that women entrepreneurs in coastal regions, where the settlement is denser and engaged in resident-based businesses such as running pensions, café restaurants or small shops selling crafts, suffer higher losses compared with other terrestrial regions.

Unplanned urbanisation and unlicensed buildings on river basins have a significant impact on increasing environmental disasters. Especially the Black Sea region is the region most affected by such disasters in recent years and the most damaged area for both male and female business owners. General Directorate of State Hydraulic Works of the Ministry of Forestry and Water Affairs confirmed in the 4th National Flood Symposium that the rate of buildings damaged caused by disaster events in the Black Sea region was 17% (Kaynak 2016).

Turkey is already a water-scarce country and has problems in terms of the quality and quantity of water it has. Moreover, women entrepreneurs who exposed to droughts and floods cannot access potable water.

The survey results show that women entrepreneurs, especially in the Central, Eastern and South-Eastern Anatolia regions, are the most vulnerable. These terrestrial regions are predominantly making their living with agriculture and animal husbandry due to the lack of industrial development. The services sector is also primitive in these regions. Given the economic constraints of these regions, farmers cannot use effective agricultural and animal husbandry methods, and agricultural products and animals are wasted in any natural disaster.

We found no empirical research on the direct effects of environmental pollution on employee health in Turkey. However, according to The Lancet Pollution and Health Commission's report on 189 countries, environmental pollution in Turkey causes the premature death of approximately 42 thousand people each year. About 13 out of every 100 people in Turkey die as a result of environmental pollution. This rate is 8.3% in the UK and 5.7% in the USA. According to the findings of the report, air pollution is responsible for the premature death of approximately 30 thousand people in Turkey every year (Landrigan et al. 2018).

Even though disasters become more frequent and destructive, local governments cannot act fast enough in planning and implementing the necessary measures due to infrastructural deficiencies. They also fail to obtain the must-have equipment to combat such events. For this reason, rescue efforts during and after every disaster are usually carried out by the business owners and employees themselves. Such efforts often cause health problems and sometimes led to life losses.

The future implications of environmental problems on rural SMEs

In the third part of the study, we aimed to find out how women entrepreneurs think that they will be affected by environmental pollution and climate disasters in the near future.

There are 79.9% of responses that agreed that environmental problems and climate change would adversely affect their products ($\bar{X} = 1.8518$, $SD = 1.07672$), and 80% of them agreed their premises and operations would be affected in the next 5 years ($\bar{X} = 1.94$, $SD = 1.098$) (Table 1).

People in the big urban cities prefer rural tourism to escape from the problems of bigger cities, particularly for fresh and cool air, quietness and unspoiled nature that urban life cannot provide. Tourists prefer products produced in the countryside because they believe they are healthier and environmentally

friendly. People who buy these products may opt out purchasing these products if they are convinced that the countryside is also adversely affected by environmental pollution.

In the previous section, 40% of the participants reported losing trade stock/goods and livestock due to environmental problems in the past. Likewise, 58.1% of the respondents agreed with the statement that environmental problems would affect their resources in the next 5 years. However, more than one-third of the participants did not agree with this statement.

A similar dilemma was whether or not the quality of materials used by entrepreneurs will be affected in the next 5 years. While 19.1% believed that they would “definitely” be affected, 17.1% remained undecided and 15.1% said they would not be affected. We can regard these responses as an indication that rural entrepreneurs were primarily attentive to immediate consequences. They do not yet have an in-depth understanding of the domains of environmental problems.

Participants were divided in their opinion whether environmental issues will affect the location of their businesses. A third of respondents were undecided, while 29.4% believe such problems can affect their workplace and 37.5% disagree with this possibility ($\bar{X} = 2.9975$, $SD = 1.22834$). Those who run stationary businesses such as running pensions, cafes, restaurants and workshops remain indecisive. On the contrary, entrepreneurs who sell their products in places like markets and fairs and who are more dependent on open spaces may believe they will be more affected by future environmental problems.

Rural entrepreneurs, in particular, women entrepreneurs, are not able to engage in jobs that require high investment and technology in the view that they are primarily micro and small businesses. However, small businesses now ought to invest in technology and equipment, such as installing energy-saving devices and bulbs. They need to improve their premises by adding central heating/cooling, replacing windows and adding/changing insulation. Small businesses need to reduce electricity, water and gas use, reduce waste, increase recycling, and start composting to cope with climate change and to reduce the negative impacts of their businesses on the environment. Only half of the participants agree that such a necessity has occurred. A third of them have not yet accepted such a requirement. Of course, in the meantime, it should be remembered that under this research, micro-sized enterprises had a high proportion and their capital structures were weak ($\bar{X} = 2.72$, $SD = 1.281$).

Despite the frequent occurrence of environmental problems and disasters caused by climate change and their increasing damage, 72.6% of respondents stated that they did not know how to be prepared for any disasters. The competent authorities have not informed them of what to do at the time and place where a problem arises. The proportion of respondents who felt that local governments were not doing their part to help public and small businesses deal with environmental issues

was as high as 69.6%. This result parallels the findings of previous studies.

The results of the study showed that none of the women entrepreneurs working in rural areas was members of any environmental organisation. However, based on this information, it would not be right to conclude that rural women are insensitive to environmental issues. They may not be aware of the existence of such organisations. They may have concerns that environmental organisations time to participate in their activities, may think that such organisations require high membership fees, or may be ambivalent about how these organisations can help them.

Finally, despite the increased climate insurance options and simplified compensation processes, no women entrepreneur in this research has taken out insurance to protect their workplaces in the event of natural disasters. They did not even consider obtaining such insurance. Insurance premiums, which are still high, are thought to be effective in this outcome. Worse, none of the women surveyed has contingency plans in case of a possible disaster.

Conclusions and recommendations

This study aims to reveal the extent which women entrepreneurs operating in rural areas are aware of environmental pollution and climate issues. It also explores to what extent their regions and businesses have been affected by these issues to date and will be affected in the next 5 years. Their views on how rural women entrepreneurs should take measures in the future to protect themselves from these risks have also been examined.

The literature argues that many small businesses are unaware or uninterested in environmental issues affecting their businesses and habitats. For example, research from northwest England stated that SMEs still see environmental issues lower in their list of business priorities (Bichard 2000). However, in this research, we found that women entrepreneurs were widely aware of environmental issues and climate change. Women entrepreneurs, within the scope of the research, agree that environmental problems will adversely affect the quality of the products they offer to their customers in the next 5 years; thus, customer demand will decrease. On the other hand, they were divided in their opinion that environmental problems could also affect their businesses, and they should invest in technology and equipment to adapt to new environmental conditions. Among the significant environmental problems women entrepreneurs endure were loss of income and loss of trade stock/goods. Micro-entrepreneurs often cannot store their goods in a safe place, such as a warehouse. They buy and sell commercial stock/goods in cash. Therefore, the loss of goods leads to significant revenue losses. Entrepreneurs report widespread property damage disasters in Western and coastal

areas in recent years, and difficulties have been encountered in the supply of drinking water in terrestrial areas.

The main objective of this study is to integrate the previous local and regional studies by taking the entire country in the scope of the research. Although the findings of this research are specific to rural women entrepreneurs in Turkey, the results may offer insights for further research. Efforts have been made to reach divergent geographical regions, to unveil unique developmental characteristics. Nevertheless, it is possible to mention some limitations of the research.

Rural tourism is spread across a broad spectrum. Those who sell their home-made products in markets, those who run shops and cafes and accommodate people, those who are also engaged in agriculture and animal husbandry, and those who are part of the services sector are also part of the rural tourism. Due to time and resource constraints, we were unable to differentiate the sub-sector within rural tourism. Therefore, the unique features that each sector may have and the issues they may be exposed to were not addressed. The adverse effects of each sector on the environment are different. The ways each sector is affected by climate-related issues are different too. Therefore, the measures to be taken will need to be different. For this reason, further research needed to be carried out to focusing on specific sectors. Such research will guide both women entrepreneurs and sectors to understand what they need when fighting against climate change, and the measures that businesses need to take in this fight.

Women entrepreneurs are already exposed to cultural and economic constraints around the world. While their problems in economically developed or underdeveloped countries are similar, the dimensions and urgency of those problems are different. In order to emphasise this difference, we included regions with contrasting economic and cultural development levels. Therefore, the findings of the research are important in terms of comparing the problems faced by rural women entrepreneurs in regions with different levels of economic development. However, further studies comparing countries with different economic development will be useful to make a more comprehensive interpretation. The same can be said of cultural structures. Although the problems of women entrepreneurs in countries with similar cultures are similar, their solution approaches may differ. Solutions found by entrepreneurs operating in different cultures can guide others. Cross-country comparison will show how rural women entrepreneurs cope with the same problems in different settings and guide policymakers.

This research only revealed existing problems and approaches to environmental problems. The underlying causes of these problems, women entrepreneurs' behaviours and factors affecting that behaviour should also be studied more deeply through various psychological and sociological theories.

Local and national governments try to support women entrepreneurs. A small number of international funds are also available. However, these benefits are usually available to a small number of women living in cities with higher education levels. Women entrepreneurs' associations work often limited to women in the industrial world.

The successes of the women entrepreneurs depend not only on their efforts but also depend on the institutional actors like government and non-governments, NGOs and different sectors. Local governments, state and legislators need to develop policies that will extend to women entrepreneurs in rural tourism and implement practices that will ensure their effectiveness.

Women entrepreneurship in rural areas varies by regions. The problems and priorities of women in each region vary; thus, research confirms this. Therefore, regional differences should be taken into account when developing programmes and policies for rural women. In order to mitigate the effects of environmental disasters, information on financial support, technological and equipment support and training programs should be provided to women before disasters occur.

Preventive and corrective actions seem to far from being put into action by local governments. Currently, only agricultural insurance is offered in Turkey. This insurance is not yet commonly taken up due to high premium payments. There is a need for disaster insurance that covers not only those engaged in agriculture but also all small-scale entrepreneurs and facilitates the purchase with affordable premium payments. Women entrepreneurs should be provided with insurance policies that they can afford. The scope of disaster insurance, especially for small businesses, should be expanded, entrepreneurs should be made aware of the importance of obtaining these insurance and women entrepreneurs should be provided with incentives.

Government policies should be implemented to provide affordable credit to women affected by environmental disasters to mitigate these negative impacts. The government should also encourage access to regulations to facilitate the process of women entrepreneurs.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflicts of interest.

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