on February 6, 2023
Kahramanmaraş Earthquake / Türkiye

Shaken to the Core:

Assessing the Impact of the Earthquake on ESSN and C-ESSN Recipients

SITUATION
OVERVIEW

On February 6, 2023, a 7.7. magnitude (Mw) earthquake (EQ) with the epicenter of Pazarcık, Kahramanmaraş happened in Türkiye's South-East Anatolia Region. Less than 12 hours, a second EQ with 7.6. magnitude, which centered in Elbistan, Kahramanmaraş followed the first one[1].

As of February 16, 4323 aftershocks happened in the area[2]. Almost more than 32,670 buildings have collapsed, 35,418 people died[3] and 105,500 people were injured[4]. In the region, there are a total of 29,444 search and rescue teams, including 11,488 foreign teams from 80 different countries and 44 NGOs. Furthermore, 168 NGOs, consisting of 87 national and 37 international organizations, are involved in search and rescue operations. The response efforts have also been supported by a total of 253,016 personnel[5]. Aggravated winter conditions exacerbated the negative impact of the shock. On February 7, a three-month state of emergency covering the provinces hit by EQs (Adana, Adıyaman, Diyarbakır, Gaziantep, Hatay, Kahramanmaraş, Kilis, Malatya, Osmaniye, and Şanlıurfa) was decleared[6].

SOUTH EAST TURKIYE EARTHQUAKE - ESSN RECIPIENTS IMPACT | FEB 10
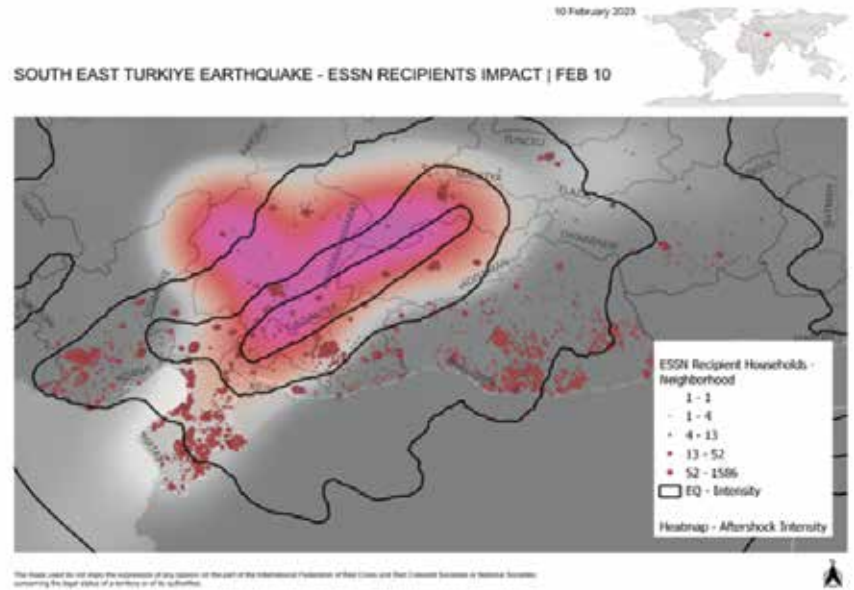
As of January 2023, 47 per cent of the total assistance recipients live in this area (50 per cent of C-ESSN, 45 per cent of ESSN)[7], in total, 1.8 million refugees were affected by the disaster.

Considering C-ESSN recipients are the most vulnerable group, due to disaster and its aftermath their vulnerability would extend to an even more atrocious situation. Thirty-seven percent of the C-ESSN recipients in the affected area have one or more disabled individual in the household (HH), and these disabilities put them in a rapidly deteriorating health situation. Additionally, most of the C-ESSN applicants are female, and their shelter and security needs are vital. For people who survived the disaster, issues like loss of identification documents, money and bank cards including KIZILAYKART add another layer to the difficulties they experience.

Fifty-five per cent of the C-ESSN recipient HHs have at least one member between 0 to 17 years of age. On the other hand, ESSN recipient HHs tend to be more crowded than C-ESSN recipient HHs[8]. Due to the larger size and the HH compositions (76 per cent have at least a member aged between 0 to 5; and 78 per cent have at least a member aged between 6 to 17), the needs of the dependent members, such as children's access to food in the disaster zone, become prominent.

Considering the emergency and vitality of the current circumstances, this report aims to analyse available data to assess vulnerabilities of the HHs living in the affected area as a first step to understand needs and the potential areas of support aftermath of the EQs.

[1]AFAD. (2023). 06 Şubat 2023 Pazarcık (Kahramanmaraş) Mw 7.7 Elbistan (Kahramanmaraş) Mw 7.6 Depremleri Ne İlişkin Ön Değerlendirme Raporu. https://deprem.afad.gov.tr/assets/pdf/Kahramanmaras%20Depremleri_%20On%20Degerlendirme%20Raporu.pdf
[2]AFAD. (2023). Latests Eartquakes. https://deprem.afad.gov.tr/map
[3]https://www.afad.gov.tr/kahramanmarasta-meydana-gelen-depremler-hk-basin-bulteni-30
[4]https://www.afad.gov.tr/kahramanmarasta-meydana-gelen-depremler-hk-basin-bulteni-31
[5]https://www.afad.gov.tr/kahramanmarasta-meydana-gelen-depremler-hk-basin-bulteni-30
[6]Resmî Gazete. (2023). 32098 Sayılı Resmî Gazete İlanı. https://www.resmigazete.gov.tr/eskiler/20230208/02/2023.pdf
[7]Türk Kızılay KIZILAYKART Cash Based Assistance Programmes, verification data (access date: 31.10.2023). Thirty-eight per cent of the non-recipients also live in the affected area.
[8]ESSN recipient HHs have an average size of 6 member; while the figure is 4 for the C-ESSN recipient HHs.

PROJECTIONS REGARDING THE IMPACT OF THE EQ IN DIFFERENT SECTORS

Socio-economic Indicators

Analysis of the available data on socio-economic indicators show that HHs living in the affected area were already economically vulnerable. The new shock is expected to aggravate the fragile economic situation of the affected refugees and make achieving financial stability even harder. Livelihood sources can easily be affected by disasters and this interaction causes to decrease in the incomes of HHs. Some studies illustrate income loss, for instance, the effect of Typhoon Ketsana in Vietnam was 10 per cent income loss for people living in the affected area within months following the typhoon[9]. In the US, hurricanes caused personal income growth to fall by 45 per centage points in the same year in the impacted coastal counties[10]. The size of the HH also affects how much is the loss. Natural disasters have a greater effect on the wealth of larger HHs compared to smaller HHs according to a study in China[11].

According to Post Distribution Monitoring Survey (PDM) 16 data[12], HHs living in the South-East region have the lowest median income as TRY 4,500 and expenditure as TRY 8,571, as well as HH debt is TRY 4,000. According to IVS-II, there is a significant difference between HH income for those living in the affected area and non-affected area; the median income excluding assistance is TRY 2,700 for the former and TRY 4,000 for the latter. This is valid for expenditure (TRY 3,710 vs TRY 4,278). According to PDM 16, 55 per cent of C-ESSN and 71 per cent of ESSN HHs are above of MEB value[12]. This is valid for expenditure (TRY 3,710 vs TRY 4,278). According to PDM 16, 55 per cent of C-ESSN and 71 per cent of ESSN HHs are above of MEB value[13]. This rate is 66 per cent in the HHs affected by the disaster according to merged C-ESSN and ESSN datasets[14] .

Pre-shock studies show that HHs do not have the financial safety net to cope with the negative financial impact of the shock. Overall, savings is not a source of income for 96 per cent of the HHs participated in the Intersectoral Vulnerability Study (IVS-II). This figure is 95 per cent for the HHs in the affected area and 97 per cent in for those in the non-affected area. According to the IVS-II, while 72 per cent of the HHs living in the affected area has debt, this is 72 per cent for the HHs living rest of the country. The median debt is the same, TRY 3,000 for both groups.

Before the EQ, 84 per cent of those impacted had at least one working member in their HH, with an average of 6 individuals per HH (IVS-II). Among the employed individuals, 45 per cent were daily workers and 46 per cent received a salary. Unfortunately, 90 per cent of the employed individuals did not have social security coverage. A substantial number of the working people in the affected region were also engaged in seasonal labour, which could be tied to the extensive agricultural activity in the southeast area. In addition, while refugee's income from earnings decreases because of the irregularity and informality of the jobs available for the refugee population, as a general trend, the price of goods and utilities increase during winter months which put them in a difficult financial position (FGDs, IVS-II).

Economic indicators also reflect into overall severity calculations. The figure below shows that the percentage of HHs with no vulnerability is lower while of those with severe vulnerability is higher among those affected by the EQ (IVS-II) which indicates well-being on of the those who live in the affected is slightly poorer than those who live in the rest of the country. In addition, among those who live in the affected area, ESSN and C-ESSN recipient HHs have higher severity scores, meaning in more vulnerable situation than the non-recipient HHs.

Figure 1. Vulnerability disaggregation by whether or not people live in the affected area
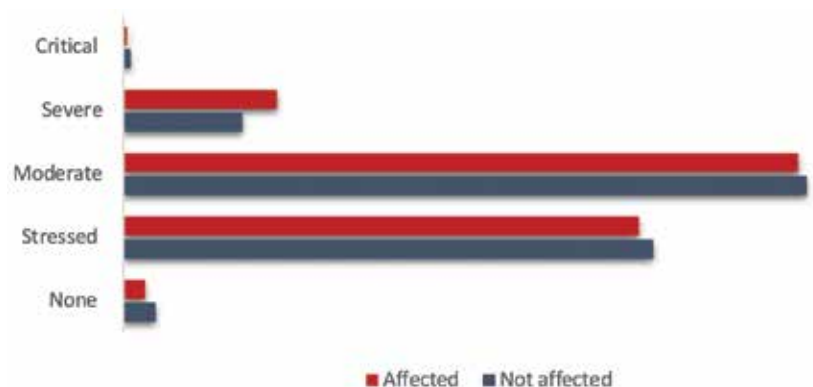
Note: IVS-II severity index, observed max, not normalized

[9]Gröger, A., & Zylberberg, Y. (2016). Internal Labor Migration as a Shock Coping Strategy: Evidence from a Typhoon. American Economic Journal: Applied Economics, 8 (2),123–153. http://www.jstor.org/stable/24739104

[10]Strobl, E. (2011). The Economic Growth Impact of Hurricanes: Evidence from U.S. Coastal Counties. The Review of Economics and Statistics, 93(2)575–589 . http://www.jstor.org/stable/23015955

[11]Wu, S., Zhang, R., Wang, C., & Feng, D. (2022). The impact of natural disasters on rural household wealth: Micro evidence from China. Frontiers in Environmental Science, 1738. https://doi.org/10.3389/fenvs.2022.993722

[12]PDM 16 Data Collection conducted between November 2022 and January 2023.

[13]If the total expenditures of any HH are above the calculated MEB value, this HH is more likely to meet its basic needs.

[14]PDM 16 and PDM 3 datasets were used for ESSN and C-ESSN applicants, respectively.

A comprehensive study was performed to evaluate the effect of the loss of income on the HHs that receive ESSN and C-ESSN in terms of their ability to fulfil their basic needs, measured via comparison of their expenditures and the minimum expenditure basket (MEB) amount. The study explored different scenarios by gradually increasing the loss of income from 20 per cent to 100 per cent of those households living in the affected area. For instance, if the total income decreases by 20 per cent, the proportion of HHs that are above the MEB value decreases by 7 per cent. In case of 60 per cent decrease in total income, the percentage of HHs whom cannot meet basic needs goes to 67 per cent, which is a likely scenario to happen after the earthquake. In the worst-case scenario, where HHs lose all of their total income, none of the HHs would be able to fulfil their basic needs.

> To summarize, the loss of livelihood opportunities is inevitable for HHs in the affected area, leading to a rapid decrease in the number of HHs that can meet their basic needs.
>
> Given that these HHs already struggled with financial difficulties, the impact of the disaster will likely be severe on the living conditions of the C-ESSN and ESSN target groups.

Figure 2. Percentages of Affected HHs above MEB Value by Income Loss
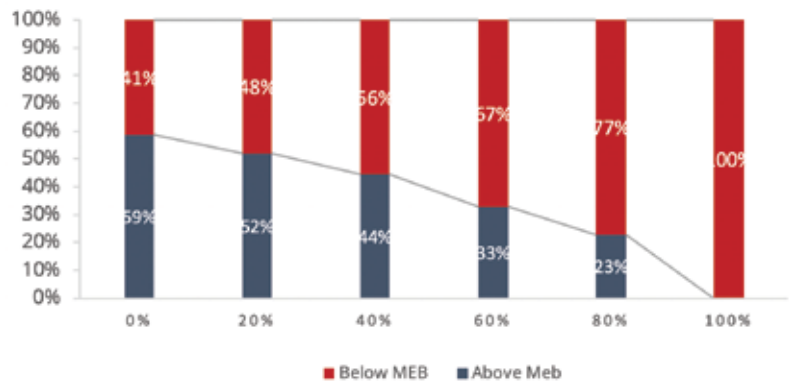
Finance

The estimated damage of The Marmara EQ that struck on August 17, 1999 on the national economy was about 30 billion dollars[15]. In the aftermath of the EQ, Türkiye faced significant economic crises in 2001, which was followed by another economic downturn in 2008-2009. Recently, there have been multiple crises which impacted the country's economic condition negatively, such as the COVID-19 pandemic and wildfires in summer of 2021 and 2022. A bigger shock can be expected to the economy as EQs centered in Kahramanmaraş damaged over 16 million people and 10 provinces[16]. The banks are already taking protective measures for those who have businesses and have debts living in the affected area[17].

The annual average affected GDP is estimated as 10 billion $ while this estimate is 2 billion $ for capital losses, like buildings, as a result of earthquakes in Türkiye[18]. This economic impact would be expected to be felt much more acutely by low-income and affected communities as they have fewer resources to fall back on, their consumption is limited to only what is necessary for survival, and they do not have the means to smooth over the impacts.

Inflation rates has been increasing in the country since late 2021. In January 2023, the annual inflation rate was 58 per cent, while it was 71 per cent in food and non-alcoholic beverages, 56 per cent in shelter and 77 per cent in health expenditures[19]. Recent updates from some affected areas show that there is a scarcity of goods and services (clean water, transportation etc.), prices of the goods and services in high demand has been increased by the opportunist sellers[20,21]. In addition to apartments, shops have also been destroyed and bank branches cannot provide services[22], which makes hard to access and use cash for purchases. Since disaster relief will be costly, the fragile economy of the country is expected to be adversely affected and inflation increase even further. Hence, even if in-kind assistance is provided to the affected population, an increase in the level of indebtedness and amount of debt (both cash and in-kind) can be expected.

[15]Worldbank Group and GFDRR. (2017). Europe and Central Asia Country Risk Profiles for Floods and Earthquakes, p.113. https://www.gfdrr.org/en/publication/europe-and-central-asia-country-risk-profiles-floods-and-earthquakes.

[16]https://www.tbb.org.tr/Content/Upload/Dokuman/8894/TBB_KD_060223.pdf

[17]Dünya. (2023). Deprem bölgesinde banka borçları 6 ay erteleniyor. https://www.dunya.com/gundem/deprem-bolgesinde-banka-borclari-6-ay-erteleniyor-haberi-685149

[18]Worldbank Group and GFDRR. (2017). Europe and Central Asia Country Risk Profiles for Floods and Earthquakes, p.vii, p.113. https://www.gfdrr.org/en/publication/europe-and-central-asia-country-risk-profiles-floods-and-earthquakes

[19]TURKSTAT. (2023). Tüketici Fiyat Endeksi, Ocak 2023. https://data.tuik.gov.tr/Bulten/Index?p=Tuketici-Fiyat-Endeksi-Ocak-49655-2023

[20]Pazarlamasyon. (2023). E-ticaret platformlarından fırsatçı satıcılara önlem. https://www.pazarlamasyon.com/e-ticaret-platformlarindan-firsatci-saticilara-onlem

[21]CNN Türk. (2023). SON DAKİKA: Türkiye'nin yarısı depremi hissetti!. https://www.cnnturk.com/turkiye/son-dakika-turkiyenin-yarisi-depremi-hissetti-iste-deprem-bolgesinden-ilk-kareler

[22]ParaMedya (2023). Deprem bölgesinde bankalar ortak ATM'den ücret almayacak! https://www.paramedya.com.tr/devami/85638/deprem-bolgesinde-bankalar-ortak-atmden-ucret-almayacak/

Impact on Health and Education

Both education and health sectors are severely impacted by the EQs. Approximately 15 hospitals in 10 different provinces have been damaged while reported number of injured people increase on a daily basis, which may create obstacles to access to necessary medical care in the affected area.

All schools across the country will remain closed until February 20th, and in 10 provinces, schools will remain closed until March 1st[23] . There are steps taken such as increasing capacity for affected students in high schools located in unaffected provinces[24]. To add further, it should be noted that universities will be conducting online classes during the upcoming spring semester, which could potentially result in challenges for students to access necessary equipment such as computers and reliable internet connection in their respective regions.

Considering health and education expenditures of the refugee population is already limited and people tend to cut back these expenses to cope even before the EQs (PDMs, FGDs), we would expect some protection risks occurring in near future for those who were affected. To illustrate, 7 per cent of the working individuals were children (IVS-II), with schools being closed, people relocating and income opportunities being scarcer than ever, there is a risk of an increase in the percentage of HHs who withdraw children from school and child labour.

In addition, an increase in the mental health problems is likely to be observed. People who had lost a job and income because of the EQs were more likely to experience psychological problems. According to a study by Fan et al. (2015), two socio-economic factors - unemployment and lower annual HH income - are linked to depression and frequent mental distress[25]. Additionally, the destructive and unpredictable nature of EQs leaves the affected population vulnerable to negative thoughts and feelings. Individuals might feel overwhelmed, numb, detached, anxious, stressed, and might show irritability and sudden mood changes[26]. Due to social and economic loses, they might experience high levels of depression, and feelings of hopelessness[27]. In times of crisis, rampant rumors on social media can exacerbate the fear of discrimination among affected populations, hindering their ability to ask for assistance. This can lead to social isolation, loneliness, and hinder social integration. Based on the field observations, these impressions hold true, and the lack of effective communication channels can cause those affected to feel disconnected from their communities. In addition, individuals experiencing a natural disaster first-hand might show Post-Traumatic Stress Disorder (PTSD) symptoms[28]. They may undergo sleep and eating problems, physical symptoms such as chest pain, nausea, headache, and have intrusive memories of the event, along with an ongoing fear that the event will happen again[29]. Hence, psychological support will be essential for both host and refugee communities for recovery[30].

Impact on Wash

The unavailability of clean water and poor hygiene conditions in the affected areas could potentially trigger an outbreak of epidemic diseases. While drinking water is available on the roadside, the lack of adequate supply for cleaning purposes such as dishwashing and showering is a pressing issue. The provinces facing these challenges also report widespread problems with toilets, water access, and sanitation, with many areas lacking adequate, hygienic toilet facilities. Additionally, most districts lack closed water reservoirs, causing long lines at fountains and sinks to obtain water.

[23]Republic of Türkiye, Ministy of Education. (2023). Bakan Özer: 10 İldeki Lise Öğrencileri İçin 71 İlde, 1 Milyon 279 Bin Öğrenci Kapasitesi Oluşturduk. https://www.meb.gov.tr/bakan-ozer-10-ildeki-lise-ogrencileri-icin-71-ilde-1-milyon-279-bin-ogrenci-kapasitesi-olusturduk/haber/29056/tr

[24]Republic of Türkiye, Ministy of Education. (2023). Bakan Özer: 10 İldeki Lise Öğrencileri İçin 71 İlde, 1 Milyon 279 Bin Öğrenci Kapasitesi Oluşturduk. https://www.meb.gov.tr/bakan-ozer-10-ildeki-lise-ogrencileri-icin-71-ilde-1-milyon-279-bin-ogrenci-kapasitesi-olusturduk/haber/29056/tr

[25]Fan, A. Z., Prescott, M. R., Zhao, G., Gotway, C. A., & Galea, S. (2015). Individual and community-level determinants of mental and physical health after the Deepwater Horizon oil spill: Findings from the Gulf States Population Survey. Journal of Behavioral Health Services & Research, 42 (1), 23-41. https://doi.org/10.1007/s7-9418-014-11414

[26]Makwana N. (2019). Disaster and its impact on mental health: A narrative review. Journal of Family Medicine and Primary Care, 8 (10), 3090-3095 https://doi.org/10.4103/jfmpc.jfmpc_19_893

[27]American Psychiatric Association, DSM-5 Task Force. (2013). Diagnostic and statistical manual of mental disorders: DSM-5™ (5th ed.). American Psychiatric Publishing, Inc. https://doi.org/10.1176/appi.books.9780890425596

[28]Golitaleb, M., Mazaheri, E., Bonyadi, M., & Sahebi, A. (2022). Prevalence of post-traumatic stress disorder after flood: A systematic review and meta-analysis. Frontiers in Psychiatry, 13,890671. https://doi.org/10.3389/fpsyt.2022.890671

[29]Lee, J. Y., Kim, S. W., & Kim, J. M. (2020). The Impact of Community Disaster Trauma: A Focus on Emerging Research of PTSD and Other Mental Health Outcomes. Chonnam Medical Journal, 56 (2), 99-107. https://doi.org/10.4068/cmj.2020.56.2.99

[30]Notes of Ad Hoc National Protection Working Group Meeting on Southeast Earthquake, Feb 13 ,2023.

Impact on Shelter

Individuals living in bad socio-economic conditions, both in Türkiye and globally, tend to live in homes that are more susceptible to the effects of disasters compared to those of higher socio-economic individuals. Consequently, they often suffer from greater material losses, reduced protection from disasters, and greater damage or destruction to their homes during a disaster event. Studies by Fothergill and Peek[31] have shown that low socio-economic individuals are at a higher risk of hazards and damage to their homes because of their living conditions. This is often due to their homes being constructed with lower quality materials[32] or being older homes[33]. According to a World Bank report[34], the poorest 20 per cent of people globally are 1.8 times more likely to reside in vulnerable homes during disasters[35]. Fothergill and Peek also highlight that disasters can sometimes lead to homelessness for low-income individuals.

The IVS-II study revealed that the housing quality of individuals residing in the EQ-impacted region is poor, only 33 per cent of the population in the affected area are living in good or better-quality houses. Rest of the HHs live in apartments categorized as bad quality. Four per cent of affected population was living in an unfinished house at the time of the study. Focus Group Discussions also indicate that houses refuges live in are old enough to require immediate renovation and humid, hence prone to cause health issues for the people living in it. In addition, people report in these discussions that the houses do not have enough capacity to accommodate the number of people live in it. They could not move out because of the financial difficulties. Even if they could relocate, since they tend to move in with other refugee households, residing in overcrowded houses would create some protection risks, especially for women and children[36]. Moreover, even if individuals relocate to different regions, it remains uncertain whether they will be eligible for existing programs as the application process for such programs is temporary. Presently, individuals can take a 60-day leave from their current location to move to a new region, but they are required to return to their original location after the 60-day period.

[31]Fothergill, A., Peek, L.A. (2004). Poverty and Disasters in the United States: A Review of Recent Sociological Findings. Natural Hazards 32,89-110 . https://doi.org/10.1023/B:NHAZ.0000026792.76181.d9 .

[32]Greene, M. (1992). Housing recovery and reconstruction: Lessons from recent urban EQs. In Proceedings of the 3rd U.S./Japan Workshop on Urban EQs, Oakland, CA: EQ Engineering Research Institute (EERI) Publication No. 93-B.

[33]Comerio, M. C., Landis, J. D., & Rofe, Y. (1994). Post-Disaster Residential Rebuilding, Working Paper 608, Institute of Urban and Regional Development, University of California, Berkeley, CA.

[34]The World Bank. (2016). Breaking the link between extreme weather and extreme poverty. www.worldbank.org/en/news/feature/14/11/2016/breaking-the-link-between-extreme-weather-and-extremepoverty

[35]Hallegatte, S., Vogt-Schilb, A., Bangalore, M., & Rozenberg, J. (2017). Climate Change and Development Series: Unbreakable; Building the resilience of the poor in the face of natural disasters. Washington, DC: World Bank.

[36]Notes of Ad Hoc National Protection Working Group Meeting on Southeast Earthquake, Feb 13 ,2023.

Food Security

Disasters can have devastating effects on food security and food insecurity can make individuals and communities more vulnerable. In times of disaster, people who lack access to food may resort to extreme measures to meet their basic needs, which can harm their livelihoods and make them even more vulnerable[37]. Before the EQ, refugees were already adopting negative coping strategies regarding food consumption, which ranges from cutting food expenses and sacrificing adults' food consumption to compensate for children (IVS-II, FGDs). The EQ disrupted markets in the affected areas, making it difficult for people to access food. There have been reports of people waiting in line for hours just to get bread and clean water in some parts of the affected regions. Problems of preservation of food is another obstacle to overcome. Thus, food is sector which require close attention by the humanitarians.

Communication and Transportation

After the EQ, many of the affected individuals have likely lost their phones and other communication devices, and lack the financial means to purchase new ones. This situation presents an additional risk in that, despite having working electricity and internet infrastructure, these individuals may be unable to access important information regarding the programs they benefit from, as well as current updates. Damaged base stations and electricity outage makes it hard to establish a healthy communication structure in the affected areas[38]. That's why, although 98 per cent of the people in the affected area has basic mobile phones (IVS-II), it would be hard to communicate with not only their friends and relatives but also authorities and call centres via phone. Due to the intense snowfall, road closures and transportation difficulties, in the first days of EQ it became challenging for rescue teams to access the areas affected by the EQ. The EQ has caused damage at some stations and disrupted some power lines, making it hard for people to get fuel. Additionally, the presence of traffic jam and road closures cause confusion. For refugees, Hence, with lack of public transportation, even if the individuals have personal means of transportation, which 7 per cent of the refugee people living in the affected area has (IVS-II), means of transportation is scarce. Both relief workers and affected population experience difficulties to be in and out of the affected areas, and it would be even harder for refugees with economic hardships to evacuate the disaster zone.

[37] Garschagen, M., Hagenlocher, M., Kloos, J., Pardoe, J., Lanzendörfer, M., Mucke, P, Radtke, K., Rhyner, J., Walter, B., Welle, T. & Birkmann, J. (2015). World Risk Report 2015. https://collections.unu.edu/eserv/UNU:3303/WRR_2015_engl_online.pdf

[38] Milliyet. (2023). Deprem bölgesinde telefon ve internet sorunu sürüyor. https://www.milliyet.com.tr/ekonomi/deprem-bolgesinde-telefon-ve-internet-sorunu-suruyor-6901360

HUMANITARIAN
RESPONSE

All humanitarian organizations, including AFAD and the Türk Kızılay, have activated their search and rescue teams and emergency response units. Türk Kızılay is working to alleviate food consumption problems by providing hot meals in the affected areas. Simultaneously, four mobile social service centers were dispatched to the affected area along with daily 1,077 staff members and 648 vehicles to provide support. Türk Kızılay and NGOs are delivering soup, hot meals, rations, snacks and food packages to the citizens in the earthquake-stricken regions. Between February 6 and February 16, the distribution materials include 9,624,753 food packages, 5,329,316 soups, 1,148,119 treats, 59,235 blankets, 17,530,757 units of water, and 2,207,001 beverages. The Türk Kızılay has a recorded vehicle capacity of 390 units, consisting of 65 catering vehicles, 10 mobile kitchens, 1 mobile oven, 3 soup kitchens, 11 field kitchens, 112 delivery vehicles, and 188 other vehicles. Additionally, 160 volunteer vehicles are deployed daily. The Nutrition Platform's hot meal distribution constitutes 15.97% of the total distribution, which amounts to 4,608,097 meals.

5,329,316 Soup	**1,148,119** Treats	**390** Vehicle Capacity of Units
17,530,757 Units of Water	**2,207,001** Beverages	**1** Mobile Oven / **65** Mobile Oven
9,624,753 Food Packages	**59,235** Blankets	**10** Mobile Kittchen / **11** Field Kitchens
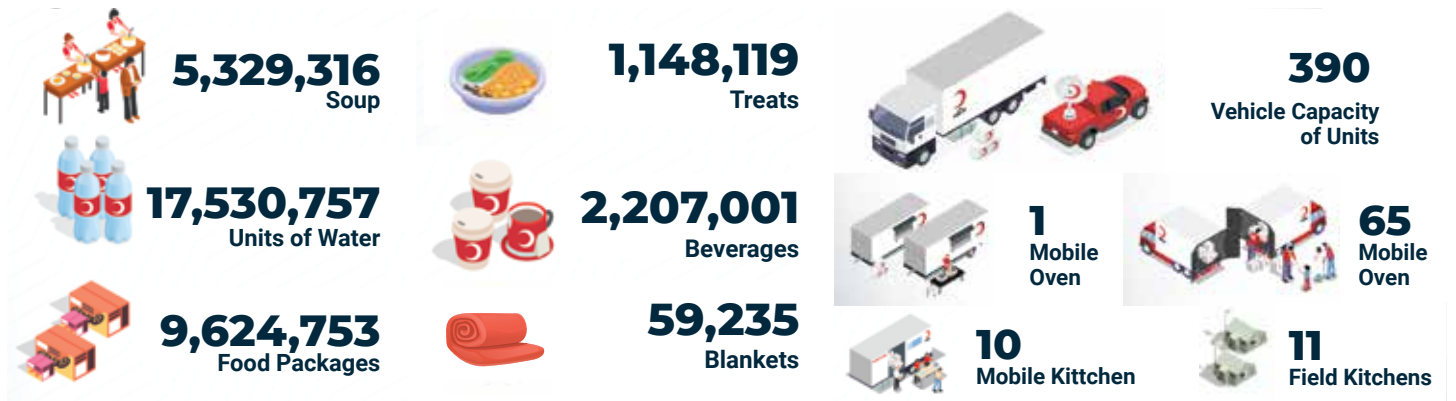
The World Health Organization (WHO) has taken swift action in response to the disaster. The organization has mobilized its resources at all levels and is working closely with United Nations agencies and partners to provide assistance. To aid in the ongoing response efforts, WHO has delivered 72 metric tons of supplies for trauma and emergency surgery, including vital treatments. The first charter flight, which carried 37 metric tons of crucial supplies, departed for Türkiye on February 9th[39].

Several countries, including Azerbaijan, Turkish Republic of Northern Cyprus, Qatar, the EU Commission, and the USA, provided aid to Türkiye after an earthquake. Azerbaijan sent the first search and rescue team, while TRNC and Qatar also provided aid. The EU sent 30 search and rescue teams and medical teams, with 79 search and rescue dogs and personnel from 19 EU member states and 21 European countries. The non-governmental organization (NGO) Global Empowerment Mission (GEM) in Florida, USA, raised $10 million in aid. Additionally, Albania, Montenegro, Serbia, Slovakia, Slovenia, Greece, Italy, Spain, Sweden, Poland, Romania, Moldovia, Netherland, Germany and France and etc. also sent search and rescue teams to assist with the efforts in various cities[40]. Finland has offered emergency housing i.e., heated tents and stoves, support to around 3,000 individuals in Türkiye. The aftermath of the EQ has created a pressing demand for assistance in the recovery and debris removal efforts[41].

[39] https://cdn.who.int/media/docs/default-source/documents/emergencies/2023/who_flashappeal_EQresponse_11-feb-2023.pdf?sfvrsn=94d4de2a_1

[40] The data were collected from main media channels.

[41] Finish Government. (2023). Finland sent emergency accommodation to Türkiye – material assistance to Syria is also under preparation.

https://valtioneuvosto.fi/en/-/1410869/finland-sent-emergency-accommodation-to-turkiye-material-assistance-to-syria-is-also-under-preparation

CONCLUSION

Assistance is imperative in the provinces affected by the EQ to satisfy fundamental needs. Despite the evacuation of thousands of people and the best efforts of local stakeholders to assist everyone, the gap in support and coordination remains, particularly for the most vulnerable populations. While transportation and infrastructure are slowly improving day by day, there are still difficulties in traveling from city to city and accessing remote rural areas. The program's target audience is impacted by travel challenges. The spread of conflicting information and rumors about travel permissions from various sources causes difficulties, particularly for those in affected regions. Furthermore, false rumors about foreigner's fuel social tensions and instill fear in those residing in the area. This scenario poses a significant protection risk, especially for vulnerable individuals. Therefore, it is crucial for both the host community and foreign individuals/households to receive frequent and accurate updates. Water and sanitation are especially crucial, as the shortage of running water puts the public health at great risk. Businesses like gas stations, schools, and sports halls have been requested to open their restrooms to those in need. Although access to dignity kits[42] is limited. Türk Kızılay teams on the ground have reported a pressing need for interventions in shelter, non-food items, food, and psychological support to address the widespread loss and trauma. The majority of temporary shelters and accommodations pose safety hazards for women, children, the elderly, and people with disabilities. The conditions for those staying near damaged buildings are particularly perilous for children and people with disabilities. The Ministry of Family and Social Services has reported that numerous unaccompanied children rescued from the rubble are still undergoing treatment in hospitals, with many children under protection.

Bank branches are affected severely in most of the regions especially in Hatay/rural areas that have been affected by the disaster, leading to a significant challenge for individuals to access their funds. This shortage of financial resources is further compounded by a dire prediction of a severe decline in livelihoods and income in the next 6 to 12 months. This decline in financial stability is likely to hinder the mobility of humanitarian programs, making it even more challenging to provide aid and support to those in need. In this critical humanitarian situation, it is essential to provide practical in-kind aid to alleviate the burden on those affected. Furthermore, an increase in inflation is expected in the coming year, adding to the already precarious financial situation for many individuals and families. However, in the coming days/period, the bank branches in the region it's expected that will become functional again with the progress made in the infrastructure works of the bank branches. The current state of affairs highlights the need for immediate and sustained action to address the challenges facing the affected communities. Markets are among the places that suffered the most damage in earthquake zones. Especially when local markets were in a more troubled situation, chain markets took faster action during the emergency. Therefore, further assessments are a must.

Considering the damage in different sectors and characteristics of the regions, humanitarian aspect raised below might[43] be useful as a roadmap both for actors and donors;

- **Short Term** *(areas where markets are not functional, a market assessment study is at hand)*
    - o   Rural: In-kind
    - o   Urban: In-kind
- **Medium Term**
    - o   Rural: In-kind + Cash ~ Alternatively vouchers as a second option
    - o   Urban: Cash
- **Long Term**
    - o   Rural: Resilience Projects + Cash
        - ▪ Livelihood projects
        - ▪ Animal husbandry (small cattle like chicken, goat, sheep distribution and items related to that activity)
        - ▪ Agriculture projects (seeds, soil and items related to that activity)
    - o   Urban: Cash + Livelihood projects

ANNEX

The analysis was conducted in order to estimate loss of income for next six months by using PDM 16 and PDM 3[45] datasets which is conducted for ESSN and C-ESSN respectively.

Methodology

In this study, the main purpose is to observe how it will affect the poverty level of the HHs when their income starts to decrease. The steps followed in this study are given below as an algorithm.

Algrithm 1. Steps followed in the study

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1. Define the scenarios
2. Create the model to be used in the study and determine which will use model
3. Evaluate the success of the model
4. Make predictions on scenarios using the model obtained in Step 2
5. Report the results

Since steps 4 and 5 are included in the report, the first three steps will be discussed in detail in this appendix.

Step 1 – Define the Scenarios

Predicting the impact of natural disasters on HH income is challenging, which is why various scenarios have been created for this study. These scenarios have five phases. In the first scenario, it is assumed that HHs will lose 20 per cent of their total income. In the second scenario, the loss increases to 40 per cent and continues to rise by 20 per cent in each subsequent stage. Finally, in the last stage, it is assumed that the HHs will experience a complete loss of 100 per cent of their total income, resulting in a total income of zero for each HH. The formula used in each scenario can be summarized as follows.

i.Scenario= Total Income - (Loss Percentile × Total Income)

To illustrate, the third scenario projects that 60 per cent of the overall revenue will be lost. This implies that 60 per cent of the HH's income will be subtracted from their total income. The objective of this scenario is to determine the proportion of HHs that have sufficient income to cover their basic necessities using the calculated income values.

Step 2 – Model Creation and Gradient Boosting Models

Explanatory variables of the model were the HH income, their location, the additional amount they need to cover their needs, the size of the HH and their assistance status (C-ESSN or ESSN). These variables were included as they play a crucial role in determining a HH's ability to meet their basic needs. The variables utilized in the study are listed below.

Variable Name	Description	Variable Type
Total income	Amount of the total income for a HH	Numeric
Region	The area where the HHs live	Categorical
Total HH	HH size	Numeric
Recipient Status	The type of program that HHs benefit from	Categorical
Coverage Needs	In addition to the ESSN assistance, how much additional resources (in TL) do you need on a monthly basis to meet your basic needs?	Numeric

[45]PDM3 data collection conducted between November 2022 and January 2023.

The PDM-16 and PDM-3 datasets were utilized to create the model, missing and outlier observations were identified and were excluded from the data set in order not to increase the error of the model. The algorithm used in this analysis, gradient boosting algorithm, is one of the most powerful machine learning techniques, developed by Jerome H. Friedman[46] for solving regression or classification problems. It involves three elements:

I. A loss function to be optimized
II. A weak learner to make predictions
III. An additive model to add weak learners to minimize the loss function

The basic concept of this method involves defining and minimizing a loss function, which can be adjusted depending on the type of problem being solved. This method creates a model, typically composed of decision trees, by combining weak predictive models. The best possible next model is combined with previous models to minimize the overall prediction error.

Step 3 - Model Success Evaluation

A confusion matrix is a tool that can be used to assess classification success. It is a performance evaluation tool for classification problems and displays a 2x2 table of predicted and actual values. The confusion matrix below represents the classification success of the model that was created.

Table 1. Confusion Matrix

		Predicted Household Counts	
		Above	Below
Observed Household Counts	Above	888	898
	Below	327	3416

The combination of PDM-3 and PDM-16 datasets used to train the model consists of 5,529 observations in total. According to the confusion matrix, the model correctly predicts **78 per cent** of HHs spending above or below the MEB value. It is seen that our model correctly predicts **91 per cent** of the HHs that cannot meet their basic needs, while it correctly predicts **49.72 per cent** of the HHs that can meet their needs. Briefly, it can be said that the model has a good performance for the prediction of MEB levels.

[46]Friedman, J.H. (2001). Greedy Function Approximation: A Gradient Boosting Machine. The Annals of Statistics, Vol. 29, No. 5 (Oct., 2001), pp. 1189-1232

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