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Climate Landscape Analysis for Children in Kazakhstan

(Final Report 2018)

Climate Landscape Analysis

For Children in Kazakhstan

Final Report (2018)

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1 Acronyms

ADB	Asian Development Bank
ARI	Acute Respiratory Infections
CAREC	Regional Environmental Centre for Central Asia
CBD	Convention on Biological Diversity
CCA	Climate Change Adaptation
CCM	Climate Change Mitigation
CEE	Climate, environment and energy
CES MIA RK	The Committee for Emergency Situations of the Ministry of Internal Affairs of the Republic of Kazakhstan ().
CLAC	Climate Landscape Analysis for Children
COP	Convention of Parties
CP	UNICEF Country Programme
CFCI	Child Friendly Cities Initiative
DRR	Disaster Risk Reduction
EBRD	European Bank for Reconstruction and Development
EC IFAS	Executive Committee of the International Fund for Saving the Aral Sea
ECD	Early Childhood Development
ECHO	European Commission's Humanitarian Aid Department
EE	Energy Efficiency
GCF	Green Climate Fund
GEF	Global Environment Facility
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HHMP	Hazardous hydro-meteorological phenomenon
IAP	Indoor Air Pollution
IFAD	International Fund for Agricultural Development
ISS	Integrated Social Services
JISP	Joint Economic Research Programme
KCO	UNICEF Kazakhstan Country Office
MAC	Maximum Allowable Concentrations
MICS	Multiple Indicator Cluster Survey
MINT	Ministry of Industry and New Technologies (MINT)
MoES	Ministry of Education and Science
MoE	Ministry of Energy
MoH	Ministry of Health
NAP	National Adaptation Plan
OSCE	Organization for Security and Co-operation in Europe
RE	Renewable Energy
SDG	Sustainable Development Goals
SP	Social Protection
SSSIP	School Seismic Safety Improvement Program
TNC	Third National Communication to the UNFCCC
UNIDO	United Nations Industrial development Organisation
UNFCCC	United Nations Framework Convention on Climate Change
UNDP	United Nations Development Programme
USAID	United States Agency for International Development

WASH	Water, Sanitation and Hygiene
WB	World Bank
WFP	World Food Programme
WHO	World Health Organisation

2 Pretext

Climate change and environmental degradation undermine children's rights around the world. In UNICEF's mid-term review of the strategic plan in 2015, climate change emerged as one area to step up in the lead-up to the next strategic plan (2018-2021). Therefore, the UNICEF Executive Director issued an Executive Directive "Addressing the Impact of Climate Change on Children" in March 2016, instructing all UNICEF Country Offices (COs) to incorporate climate change and related issues in their Country Programmes (CPs) by 2020. Climate and environment issues have also been integrated in one of the five main outcome areas of the draft of the new Strategic Plan. This decision has been solidified by the Executive Board members in February 2017 by their adoption of the roadmap for the new Strategy Plan which uses the SDGs as a long-term framework.

In response to these developments and the Executive Directive, UNICEF Kazakhstan Country Office (CO) together with UNICEF Headquarters (Division for Data Research and Policy) have prepared this "Climate Landscape Analysis for Children (CLAC)" report. It provides the essential baseline information on climate, environment and energy (CEE) issues affecting children and provides recommendations to the CO on stepping up their work on the most important issues and opportunities in this area. Below follows a brief overview of the main findings (key messages) and recommendations.

3 Executive Summary and Key findings

An annual mean temperature increase of 2°C has been observed in Kazakhstan between 1936-2005. Although national rainfall averages have not change significantly, some southern arid areas have become drier. Overall, the extremely dry climate across most of country, coupled with warming temperatures and a high inter-annual rainfall variability is already affecting water availability in many locations, including Astana.

Climate change is expected to exacerbate these trends. By 2050, average temperatures are predicted to increase by between 2.1°C and 2.6°C above the 1990 baseline, meaning an almost 5°C total increase since records began. While precipitation projections are less conclusive, increasing variability and more violent rain and snow storms, flooding and landslides are predicted. In addition, accelerated melting of the vast glacial water stores in the Tien Shan mountains is likely to increase water volumes, flooding and mudslides in the short to medium term, and later (post-2050) drastically and rapidly reduce water volumes in many of Kazakhstan's major rivers.

Water availability in the medium and long term is therefore likely to be the most strongly impacted climate threat, with important repercussions for both domestic and industrial needs. Agriculture, still the economic mainstay of many rural communities is expected to be especially impacted, with wheat crop productivity predicted to be the most significantly reduced. Access to safe drinking water, already a substantial and costly challenge for the Government and development partners, is very likely to

become more difficult across the vast water-insecure regions of the country, and post-2050 to become a problem in new, previously unaffected areas.

On top of climate change, environmental degradation in Kazakhstan has for a long time threatened both human and environmental health across the country. Intensive farming and an historically laissez-faire attitude towards environmental protection in the name of rapid economic development has led to unsustainable natural resource extraction, poor enforcement of air pollution regulations and the uncontrolled dumping of toxic and radioactive waste.

From the energy perspective, Kazakhstan is enormously wealthy and boasts near-universal access to electricity across its territory. However, high prices of electricity and spatial disparity in access to cleaner energy sources, coupled with the relative abundance and ease of access to coal means many households continue to choose it as their primary heating fuel. Additionally, the vast majority of electricity is produced in coal, oil and gas fired power stations, meaning that burning of highly polluting fossil fuels dominates the energy landscape. Renewable energy, almost exclusively from hydropower plants, makes up just 13% of national energy production.

Impacts on Children

Impaired access to continuous clean water; threats to agricultural productivity; reduced household income and food security and increased energy poverty, together with more frequent and intense natural disasters and environmental degradation are already impacting children's rights in Kazakhstan.

Urban air pollution, perhaps the country's most visually noticeable but under-studied environmental issue, presenting a serious and growing threat to children's health. High population densities, solid fuel burning in homes and industries, and a growing numbers of vehicles consuming low quality fuels are all contributing to a situation where emission concentrations in populated areas are often many times higher than both WHO and the Government determined safe levels.

While it is not yet possible to quantify the direct impacts of air pollution on child morbidity and mortality in Kazakhstan, the growing body of global evidence as well as a growing bank of in-country data points towards a very high likelihood that children's health is being severely affected by air pollution, and that as a uniquely vulnerable group children are at highest risk of both short and long term health consequences.

Additionally, energy poverty in homes and schools may be affecting children's health and education. A lack of appropriate insulation in schools and homes, and high costs or unavailability of clean energy and technologies lead to unhealthy living and learning environments during Kazakhstan's long, extremely cold winters, and may be resulting in poorer learning outcomes for children.

Supporting action on air pollution, both UNICEF's own Strategic Plan 2018-2021 and the Sustainable Development Goals include specific reference to reducing emissions and their impacts:

- **UNICEF SP Goal 4:** Every child lives in a safe and clean environment, Every child has a right to live in an environment that is conducive to his or her growth and safety, including being protected from pollutants and other hazards.
- **SDG 3.9:** By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.

- **SDG 11.6:** By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management
- **SDG 12.4:** By 2020, achieve the environmentally sound management of chemicals and all wastes[…]and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.

From the energy perspective UNICEF, in line with the Executive Directive on Children and Climate Change and its focus on sustainable energy solutions, has recently begun engaging closely on **SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all**, providing momentum and opportunities for support to country offices looking to tackle related issues for children.

Other important threats include:

Impacts to household income: rural, agriculturally dependent households will bare the brunt of the economic impacts of climate change. Drought, land degradation, desertification and harsh winters already severely impact agricultural productivity; due to climate change wheat crop and pasture (livestock) productivity is expected to reduce by up to a third by 2030. Although declining in importance, agriculture still employs almost a fifth of the population, and far more in the rural and informal economies. Worryingly, social protection systems that already struggle to provide an adequate financial safety net for many at-risk households are not well designed to capture the climate vulnerable, those living in remote areas or those working in the informal sector, all of which can be expected to increase in number as the climate and environment become less agriculturally favorable.

Adolescent mental health: addressing mental health concerns and suicide amongst adolescents represents one of the most pressing child issues in Kazakhstan, and is a strong focus of UNICEF KCO's programming. Growing global evidence points towards important linkages between environmental health and mental health, both as a negative trigger for worsening an individual's situation, and as an important tool for reducing feelings of depression and anxiety. Understanding the spatial distribution of mental health issues in children, and supporting the Child Friendly Schools Initiative are two relevant actions already being taken by UNICEF and partners; combining these results with new development partners' actions looking to better map the environmental health situation in Kazakhstan may be important for achieving long-term improvements in children's mental health issues.

Access to safe drinking water, and WASH in Schools: Kazakhstan has made huge progress in ensuring all of its citizens have household access to water, however access to improved water supply remains an equity issue, with 1 in 10 households in the lowest wealth quintile, and 1 in 5 households in some regions still relying on unimproved water sources. Further, due to the numerous ways of measuring water availability and access, additional concerns remain as to whether households and schools have continuous, reliable access to water, especially during extreme weather events and dry periods that are predicted to become longer and more severe with climate change. Aggravating the issue in schools is an endemic shortfall in total funding for education, and consequently its low allocation for repairs and maintenance of WASH facilities; a situation exacerbated in rural areas where old, run-down schools prevail and low student numbers result in very low budgets. UNICEF KCO is already supporting the Government to improve schools' resilience to disaster threats, providing an important entry point for further, stronger, climate change resilience focus.

Water quality is a further issue of debate, with the strongest concerns relating to groundwater contamination with heavy metals and agricultural pollutants, but also of water-borne diseases. While water quality issues have commonly been associated with the Aral Sea Basin the perceived public threat is now country wide; and with considerable numbers of children being hospitalised for diseases associated with water contamination, and the increased risks of utilisation of unimproved water sources due to climate change, a closer investigation into the health risks associated with all domestic water utilisation in Kazakhstan is warranted.

3.1 Recommendations (see General Recommendations for full description)

As a first step in building its own capacity to fully understand the CEE-child nexus, and subsequently influence government and CEE partners, UNICEF Kazakhstan is advised to make a number of in-house commitments to: solidifying its engagement with CEE; strengthening internal mechanisms for CEE learning and sharing, and; using its existing experience and comparative advantage as a child-rights focused organisation to raise the profile of children as an important stakeholder in the CEE-sphere.

1) **Establishment of a CEE Focal Point Triangle** responsible for engaging in adaptation and mitigation dialogue, and communicating and coordinating UNICEF's CEE work and messages both within and outside of the organization (i.e. with Government, donors and implementing partners and the wider public).

2) **Development of a stakeholder engagement strategy** including producing information and advocacy materials to build improved understanding and demand for the inclusion of child-sensitive planning and policy within CEE activities. This should be complemented with the production and provision of a menu of child-sensitive, CEE indicators

3) **Establish a Children and CEE Roundtable,** building on the child-CEE nexus momentum achieved during the CLAC mission, KCO should consider formalizing a roundtable to bringing together government agencies, donors, NGOs and other potential partners in both the child and CEE spheres.

4) **Allocate time to continued learning** about CEE within each CO section/ division, coupled with developing a **formal internal mechanism** for improved coordination between sectors to identify joint actions for CEE – sharing of experience and lessons learned in different activities, across the organization.

5) **Raising children's voices** in the climate sphere, and advocacy for greater inclusion of inputs from children into the design process and participation of children in the implementation of CEE initiatives (advocacy with donors and implementing agencies).

Further sector specific recommendations are provided in Section 10, Annex 1 Sectoral/ Activity Recommendations **and** Annex 2 Advocacy targets **of this report.**

4 The climate, environment and energy situation in the country

Kazakhstan's climate is continental and harsh, with hot summers, cold winters, strong winds and little precipitation across much of the territory. The large size of the country, along with its high spatial diversity means the climate conditions are best understood when split between four zones: forest-steppe; steppe; semi-desert and desert.

Throughout these climate zones, diverse topographical features, including three mountain ranges (up to 7000m), expansive grassy plains (at between 200-300m), one of the lowest points on earth (132m below sea-level) and sprawling lake and river systems provide for a wide range of ecological-zones holding specific vulnerabilities to climate change, and presenting varied challenges to climate change adaptation and mitigation actions

The Harshness of the Kazakhstani Climate

"Strong winds are characteristic for the entire territory, while in a number of regions hurricanes (over 40 m/sec), and dry and frigid winds prevail. In summer, dry periods can last 40-60 days, with air humidity decreasing to just 5-12%, causing evaporation of water bodies, burning of vegetation (surface drought) and extinction of wildlife. In winter, alternation of severe frosts (down to -40) and thaws, instability and blowing away of snow cover result in the freezing of trees, grass roots, formation of multilayer ice crust on the snow cover and complete freezing of water bodies causing constant lack of food, death of animals and mass deaths of fish in lakes."

UNDP Kazakhstan, 2004

As well as, and often in tandem with its harsh environment and climate-related vulnerabilities, a broad range of environmental degradation issues exist, including desertification and erosion; industrial and agricultural pollution of water, soil and air; diminishing glaciers; and the radioactive remnants of uranium mining and nuclear and biological weapons testing. Together these hazards threaten the sustainable use of ecosystems, undermine livelihoods, and place human and ecosystem health at risk.

Additionally to enviro-climatic factors, the vast size of the country presents energy access challenges for the large rural population. Despite having a massive energy resource base and a well-developed energy extraction industry, distribution of useable energy in the form of electricity is often difficult and expensive, leading to varying degrees of energy poverty across much of the territory.

The current climate, including variability

Baseline (1986 -2005 average) climate data from across the country shows[1]:

Summer temperature: (warmest month national mean)	24.6°C
Winter temperature: (coldest month national mean)	-10.01°C
Precipitation high elevation: (foothills/mountains annual)	500 - 1600mm
Precipitation mid elevation: (steppes annual)	200 - 500mm
Precipitation low elevation: (desert plains annual)	100 - 200mm .

Average temperatures in the warmest month (July) vary from 18°C in the north to 29°C in the south while average temperatures in the coldest month (January) vary from -20°C in the north to -5°C in the extreme south. Between 1936 and 2005, temperatures in Kazakhstan rose by approximately 2° C, - or more than double the global average[2].

With a national average of 250mm/y, precipitation is marginal across most of the country[3], with significant rain and snowfall occurring only in mountainous areas and their foothills[4]; the mountains in the south and southeast receive the country's highest precipitation volumes, while the cold desert and semi-arid central and west regions (about 45% of land area) have hot summers, cold winters and high aridity. Although precipitation totals vary from year to year and place to place, the national average annual trend has not increased or decreased significantly in most areas over the last 70 years. However, while national rainfall has not changed significantly, the southern desert region of Moinkum, and Lake Zaisan in the east, have seen pronounced decreases in total annual rainfall[5].

4.1 Climate related threats and disasters

Kazakhstan is already experiencing climate-driven natural disasters that cause infrastructure damage, disrupt agricultural livelihoods, hurt the economy, and occasionally cause loss of life[6]. The most common disasters, or extreme events, include droughts, heat waves, floods, mudflows and landslides, which in turn can also lead to a longer term worsening land degradation situation and reductions in the capacities of ecosystems to provide essential services for human prosperity. Agriculture production is considered the most vulnerable economic activity to adverse climate threats, and already suffers losses as high as a 70% due to drought, hot winds, and unseasonal thaws and frosts[7].

Drought: Drought is already common in Kazakhstan, occurring in 2 out of every 5 years and seriously affecting agriculture activities, especially grain (wheat) production; northern-steppe and forest-steppe, non-irrigated zones tend to be the most vulnerable[8].

Drought frequency and duration has increased in the steppe zone of West Kazakhstan[9].

Temperature increases: Temperature increases have the capacity to damage crops through both increasing the amount of water crops require to be productive, and reducing the availability of water (due to higher evaporation rates from surface water stores) in already water-scarce, dry conditions.

Increasing temperatures are also likely responsible for the observed ~18% and ~27% reduction in glacial area and volume in the Tien Shan mountain range between 1961 and 2012[10]. For example The Tsentralniy Tuyuksuyskiy glacier above Almaty city retreated by over 1.2km between 1908 and 2015, or approximately 11m per year[11]. This presents a significant threat due to melt water being important for access to both food and water, especially in southern regions.

Heat waves: According to the III-VI National Communication on Climate Change, between 1941 and 2011 the number of hot days each year increased by 1-3 days/decade across southern and western locations, while the World Health Organisation also identified South Kaz, Kyzylorda, and Mangystau, in the South-West of the country, as the most prone oblasts to health impacts from heat waves. In addition to impacting human health, heat waves also kill livestock and affect arable farming productivity[12].

Flooding, GLOFs and mudslides: Flooding events are commonly associated with high melt-water flow due to the thawing of snow and ice in spring,

and heavy rainfall events swelling rivers. Recent examples include the 2018 flooding in Eastern Kazakhstan in which 150 homes, and about 70 other buildings were damaged by high waters in the regional capital and surrounding district, with hundreds of homes being evacuated in Ayagoz district[13]; and the spring melts in 2017 and 2015, affecting >7000 and >15,000 people respectively[14,15]. Damage to road infrastructure, power lines and buildings is common.

Flood-risk areas can be broadly separated in to two categories[16]:

- Flat lowland areas affected by rapid spring melting that increases surface run-off by up to 50 times the annual average. Regions include: West Kazakhstan, Atyrau, Aktobe, Kostanay, North Kazakhstan, Akmola and Karaganda regions, fed by rivers such as the Urals, Ilek, Yesil, Tobol, Nura, Sarysu rivers. The rivers receive the vast majority of their water volume from melting snow, and generally receive little rainfall.

- Mountain-fed river areas, including South Kazakhstan, Zhambyl, Almaty, East Kazakhstan regions. These areas are prone to flash flooding due to spring thaws, heavy rains and frozen rivers, and can result in broken dams and massive damage to infrastructure.

Specific glacial-related flooding called glacial lake outburst flows (GLOFs), caused by breakages in glacial ice dams, result in acute rapid water flow, flooding and mudflows, serious infrastructure damage and threaten human life in locations downstream of glaciers. Recent events include the 2015 GLOF-derived mudflow destroying property and infrastructure in residential areas near Almaty[17].

According to UNISDR's PreventionWeb, flooding in its various forms accounted for 59% of disaster events, 49% of disaster related deaths and 99% of disaster-related economic issues between 1990 and 2015[18].

Landslides: Landslides risk is considered to be high in the foothills and upland areas of the Tien Shan mountains in the south-east of the country, but low or non-existent across much of the steppe and desert areas of the interior and north[19].

4.2 Environmental Situation

Kazakhstan faces several serious environmental challenges resulting from both anthropogenic and natural causes.

Natural challenges, including low rainfall, high winds and extreme temperatures leave much of the country susceptible to drought, desertification and related biodiversity loss[20], placing the fragile landscape vulnerable to a negative cycle of worsening environmental quality as vegetation fails to thrive and land remains barren.

In terms of purely human-induced degradations, poor land management practices; inadequate household waste disposal systems; pollution from dumping of heavy industry and radioactive waste; and over extraction of water have resulted in worsening land and water resource quality and biodiversity loss, hindering economic and social development in many areas of the country[21].

Land degradation, desertification and salinization

The drying up and related pollution of the Aral Sea/ Desert in particular, as well as the disposal of nuclear, chemical and biological waste from uranium mining and weapon testing programs continue to be among the most pressing, serious environmental degradation issues, and represent

an ongoing threat to water and food resources throughout the country[22,23,24].

Land degradation however is not at all confined to the Aral Sea Basin. Salinized, eroded and, low organic content soils occur in more than 90 % of the arable lands of the country, while the total area covered with sand and alkaline and saline soils makes up about half, or 123 million of the country's 272 million hectares[25]. In Northern and Central Kazakhstan 5.6 million hectares of arable lands have been affected by water erosion and crop yields have decreased by 20-30%[26].

According to data for 2013, 15% of agricultural lands are not used efficiently, about 125 million hectares of pastures are not watered and abandoned, and more than 20 million hectares of pastures adjacent to settlements are degraded[27]. In total approximately three quarters of the country's land area is thought to be subject to high-risk ecological destabilization[28].

Desertification alone has an economic impact estimated in the hundreds of millions USD. The socio-economic impacts of the depletion of water resources and associated soil health in Kazakhstan causes a decline in productivity and jobs and a worsening of the standard of living of the population, and ultimately leads to migration[29].

The Aral Sea and Lake Balkhash regions, where ~1/3rd of the population live, are the most exposed areas to desertification, salinization, and general worsening soil health. Decades of resource mismanagement through redirecting of rivers to irrigate crops and an overly liberal use of agricultural inputs has resulted in the well-documented lowering of the Aral Sea Basin water table, recession and pollution of the Aral Sea itself, and the creation of the highly toxic, heavy-metal encrusted Aral Desert.

Due to unsustainable water extraction compounded by the trans-boundary nature of its tributaries and associated resource management challenges, areas around Lake Balkhash, though less well known are nevertheless suffering the same fate.

Air pollution: Due to its economic reliance on extractive and metallurgy industries, fossil fuel burning for energy (in power stations and in homes), and a rapid increase in the numbers of cars burning low-grade fuels in its highly populated cities, air pollution in Kazakhstan is considered a serious, though still under-studied issue.

Outdoor air pollution is believed to be most pronounced in highly populated cities, especially Almaty, and in heavily industrialized cities such as Temirtau and Pavlodar[30]. In January 2018, for example, KazHydroMet (the Government agency responsible for monitoring air pollution) reported levels of sulphur dioxide and hydrogen sulphide in Temirtau city exceeding the government-defined maximum limit by more than 6.6 and 4.5 times respectively, and in total breached the maximum permissible concentrations on over 600 occasions[31]. In 2011 ADB estimated the number of people affected by urban air pollution in Kazakhstan to be ~1.4m[32], while in 2013 the cost to the economy was calculated at 1.4biliion USD annually, or ~1% of the GDP[33] - figures that have likely grown in line with the increases in both vehicle numbers and emission increases from industries such as steel, iron and cement production[34].

While air pollution is widely recognized as a potential threat to public health in Kazakhstan, a current lack of reliable, long term, spatially disaggregated data for both air quality and associated human health trends inhibits a full understanding of the severity of the issue.

Despite Kazhydromet operating 146 air quality

monitors across the country and publishing their recordings online, neither the World Bank, nor many of the environmental experts and observers interviewed as part of this CLAC process are confident that the full extent of Kazakhstan's air pollution situation is understood. This is largely because many air quality monitors are known to be non-functional or do not record particulate matter pollution (PM2.5 and PM10)[35,36]; additionally, air quality data that is publically available at times presents static, artificially low readings that are not representative of the locations they cover, and sometimes are clearly at odds with both independent research and observable daily and seasonal pollution variations[37].

In response, a number of independent air quality measurement initiatives have recently been conducted in Almaty city. The independent research has identified an unofficial air pollution situation far worse than previously recorded in almost all parts of the city, and as such many times higher than WHO's safe guideline values and many times higher than those used in the WHO, ADB and World Bank estimates.

While not representative of the country as a whole, *if* this new data does more accurately represent the air pollution situation in Almaty, it may indicate the presence of a systematic under-representation of pollution levels across the country, and as such point towards a higher environmental burden of disease and higher costs to the economy, and justify increased investments in improved data collection and revised health impact calculations based on improved, more accurate information.

Even without revised air quality data, in 2013 the then Ministry for the Environment, together with the World Bank initiated a call-to-action over air pollution. The Joint Economic Research Programme (JESP) published its report- Towards Cleaner Industry and Improved Air Quality Monitoring in Kazakhstan, highlighting many issues with poor air quality, their origins, locations and potential solutions, and summarizing that sufficient evidence already exists to determine that exposure to air pollution in Kazakhstan is causing serious human health and environmental problems. It also deduced that air pollution is predominantly affecting urban and highly industrialized areas, and that implementing and adhering to EU standards on emissions, as detailed in the Green Economy Concept, is the best regulatory option to address the issue.

Indoor air pollution (IAP) is also a relatively understudied area in Kazakhstan. IAP is assumed to impose a low risk to human health nationally, largely due to the almost universal use of natural gas or electricity for indoor cooking, and in 2008 the WHO attributed just 100 deaths per year to IAP[38]. However, these assumptions are likely based on cooking fuels emissions alone and do not capture the potential risk presented by the endemic coal burning for heating in rural homes (~70%). They were also compiled prior to a more recent, better understanding of the human health risks associated with IAP.

4.3 Aquatic resources

Due to a naturally low rainfall regime across of much of the country, coupled with the trans-boundary nature of approximately half of the nation's available water volume, water insecurity in Kazakhstan is considered to be high[39] and an important driver behind many of the socio-environmental and economic challenges facing the country.

Water availability: Kazakhstan's water balance at the national level provides approximately four times as much water as the population requires, however as half of this is subject to trans-boundary water sharing agreements, the sovereign water balance is just double the water

scarcity threshold[40,41].

Across the country water management difficulties are complicated by extremely uneven distribution of surface water and strongly seasonal fluctuations (with as much as 90% of river run-off taking place in spring[42]). As a result competition for available water between economic, social and environmental water requirements is often great, and while drinking and domestic needs are given highest priority by the Government, infrastructure, management and natural (seasonal and spatial) deficiencies can result in substandard delivery of drinking water and shortages for industrial needs, while environmental requirements are commonly ignored[43].

According to the latest (2017) National Communication to the UNFCCC on climate change, central and northern regions are most prone to worsening water availability, due to their heavy reliance on surface water for household drinking, and the absence of significant ground water with which to mitigate any shortfalls. Astana, due to being situated within this area of high water vulnerability, having a large rapidly growing population, and a high potential for increased mining and agricultural development, is at particularly high risk of severe water scarcity within the next 15 years[44].

Water bodies: Despite its largely arid climate, vast deserts and steppe-based landscapes, Kazakhstan has a number of hugely important water resources, including three major lakes and five large rivers over 1000km long. In total (apart from the Aral and Caspian Seas) there are more than 48.462 lakes and ponds with a total area of about 45.000 km^2, the largest of which are Balkhash, Zaisan, Sileteniz, and Teniz.

Large lakes/seas

The Caspian Sea, the largest water mass in Central Asia provides important water and food resources to an number of populations in the otherwise extremely dry and food scarce far west of the country. However despite its importance as a provider of essential services, the ecosystems of the Kazakh area of the Caspian Sea are threatened by agricultural and industrial pollutants, especially oil spills and high nitrite concentrations, and illegal overfishing, with knock-on impacts to locally important fishing livelihoods, food security, and potentially to human health[45].

Kazakhstan's second largest water body is the well documented Aral Sea. Due to massive and unsustainable river water extraction for agricultural irrigation, the Aral Sea has been shrinking since the 1960s; during this time its salinity increased by 75%, the number of plant species declined by 92% and the number of native and commercial fish species and stock sizes to almost zero[46]. In addition, as a recipient of irrigation waste waters loaded with high concentrations of agricultural chemical inputs for over half a century, a number of far-reaching environmental and human health issues have arisen; for example, drinking water sourced from the surrounding ground water has been shown to be highly polluted, mineralized and unfit for human consumption. Making matters worse, the massive new expanses of now dried-out seabed expose the once-dissolved toxic chemicals to wind erosion, with likely health implications for both local and downwind populations across the region. Health impacts from Aral Sea toxins including lower life expectancy, and higher mother and child morbidity and mortality (discussed further in the Health Section)[4748].

On a positive note, since 2004 the Kalaral Dam Initiative has been successful in increasing the depth of the Kazakhstan part of the Aral Sea by 4m, with associated improvements in surface area, lower salinity and increased fish stocks[49].

Similarly to the Aral Sea, Lake Balkash continues to suffer from industrial pollution and unsustainable water usage for irrigation.

Across the country the situation of low rainfall and poor water availability is exacerbated by the trans-boundary nature of major rivers. Extraction of water for irrigation in neighboring countries can limit volumes entering Kazakhstan, raising concerns on the long-term sustainability of irrigated agricultural productivity, and potentially for food security and water access.

Radioactive and biological waste: Following country wide Soviet-era uranium mining, and nuclear weapons testing at the Semipalatinsk test site in Eastern Kazakhstan, as much as 240 million tons of radioactive waste is known to have accumulated across the Kazakh territory[50], leading to some isolated environmental-health and wide ranging human-health impacts being recorded[51,52]. Biological waste due to Soviet-era biological weapon testing on the former Vozrozhdeniya Island in the Aral Sea may also continue to be a cause for concern to local populations. Biological agents including anthrax, smallpox and plague pathogens are known to have been buried on or near the island and may remain viable; in addition the lowering of the Aral Sea water level[53] has resulted in the island becoming a peninsular, increasing ease of human and animal access. At the same time members of local communities are known to have undertaken metal scavenging activities within the location of the ex-research facility, potentially exposing them to infection, though to-date there is no evidence of adverse environmental or human health impacts.

Forests: As of 2010, the national forest area had declined to just 3.3 million hectares; forest cover is currently estimated at 4.61% of the total area of Kazakhstan. The observed long-term decline in forest area can largely be attributed to unsustainable soviet-era land use change policies, contemporary unregulated deforestation and desertification, as well as the likely affect of average temperature increases. Despite the long term trend in forest area reduction, recent government led initiatives have seen the total area of the State Forest increase by 1 mln hectares or 3.5%[54].

4.4 Projected changes in climate

- Mean temperatures are projected to be warmer, especially during December-February and June-August. Average increase by 1.4°C by 2030[55] and between 2.1 and 2.6°C by 2050[56]
- During December through May precipitation is projected to be decrease by 2% - 5% by 2050.
- Precipitation for the months of June to November may increase by 1% and 4%

Summer: **+2.3°C** (27°C)

Winter: **+2.98°C** (-7.03°C)

Precipitation: little total change at all elevations, but higher rainfall variability and more violent events

The above conditions are expected to exacerbate the current climate threats described above, resulting in:

- Increased drought and longer heatwaves
- Increased incidence of heavy rainfall events, leading to worsening flooding, landslides and mudflows. Increased temperature-induced vegetation loss, combined with more violent rainfall events and greater glacial melt water volumes have been predicted to increase mudflow occurrences tenfold[57]
- Increased variability of agricultural production - Southern areas are

especially reliant on glacial and snow pack melt water, while northern areas are more rainfall reliant, and as such highly vulnerable to fluctuating annual precipitation levels. Due to reductions in surface water availability, and increases in rainfall variability the agricultural sector as a whole is expected to suffer under future climate conditions[58] with a national reduction of wheat crop by up to 48% predicted by 2050[59].

- Reductions in river water volume: It is estimated that the annual cross-border flow of the Irtysh, Ili, Chu, Talas, Ural and Syr Darya rivers could decrease ~30% by 2030[60]. From an economic, water budget perspective, by 2030 Kazakhstan is forecast to have an unsustainable annual water deficit of 13 to 14 billion cubic meters[61].
- Reductions in hydropower production potential[62]
- Further drying up of internal water bodies, including the Aral Sea, and associated environmental health risks
- Glaciers - Higher temperatures due to climate change are very likely to increase the rate of glacial melting (with near term increases in water availability, and possibly flooding), and reduce the rate of ice recharge on glaciers in the Tien Shan mountain range, meaning glacial volumes are expected to decrease to just 50% of their 1961 size by 2050[63].

4.5 Greenhouse Gas Emissions

Kazakhstan's total GHG emissions in 2011 amounted to 274,46 tCO2 eq, or 76.7 % of its 1990 total[64]. While considerably lower than 1990 levels, at 16.7t per capita still remain high when compared to the OECD average of 12.82[65].

The vast majority of energy produced in Kazakhstan is from fossil fuels (coal, oil and natural gas); renewables such as solar, hydro and wind based electrical energy production remain low at ~13% (predominantly from large hydro), while nuclear energy generation is non-existent[66].

In line with its obligations to the UNFCCC COP21 (2015 Paris Agreement on curbing GHG emissions) Kazakhstan has delivered its Intended Nationally Determined Contributions submission to the UNFCCC Secretariat, identifying its ambition to achieve an economy-wide target of 15%-25% reduction in greenhouse gas emissions by 2030 compared to 1990[67].

4.6 Energy situation and access

Kazakhstan has abundant mineral and fuel resources and with its proven oil, coal and uranium reserves ranks among the most energy-abundant and energy–intensive economies in the world. Oil and natural gas output amounts to nearly a quarter of GDP and accounts for over two-thirds of exports.

Coal-fired plants account for ~72% of the total national 22,055 MW electrical generation capacity, with hydro-power plants (12%) and gas-fired plants (10%) providing the remainder[68]; as of 2011 total heat production was around 391,000 TJ, with 100% produced from coal[69].

Industry consumes approximately three-quarters of Kazakhstan's electrical production, households 11%, and transportation 2%[70]; in recent years increases in energy and electricity consumption has mirrored Kazakhstan's rapid economic growth, resulting in energy surpluses being eroded and causing occasional spot shortages during winter peak loads, especially in the south. Energy demand projections by the International Energy Agency (IEA) see Kazakhstan's energy demand increasing by at least 50% to 2035[71].

Energy Access: At ~100% (up from 97.7% in 1990), access to electricity in Kazakhstan is universal,[72]. Despite all households being connected to electrical power, the average annual household consumption of electricity is 3.5 times lower than the OECD average[73], while per capita consumption of coal (traditionally the cheapest energy source) ranks amongst the highest in the world and has increased by 44% between 2002 and 2012[74]; currently 32% of all households use coal as a primary source for heating, rising to 72% in rural areas[75].

Just over half of all urban and just under one quarter of rural households have access to piped gas supply. While planned extensions to pipelines will increase access to this cleaner fuel, concomitant higher prices along with the exclusion of many remote areas from the improvement[76], may restrict benefits away from the most vulnerable and heighten energy poverty disparities, especially in locations away from gasification centers. Where piped gas is unavailable Liquid Petroleum Gas (LPG) usage increases, often as a cooking fuel in combination with coal as a heating fuel. LPG is used by 54% of all IAEE surveyed households. Wood fuel is also widely used in rural areas, predominantly where neither piped gas nor municipal heating systems are available.

Broadly speaking, almost all households have access to electricity but almost none use it for heating and just 20% urban and 2% rural households use it for cooking[77]. Combinations of cooking and heating fuels, varying across locations, with urban households most likely to use gas plus central heating (municipal heat supply) and coal, while rural households will most commonly use a combination of wood, coal and LPG. Regional differences are important, with western areas (where the gasification industry is situated) far more likely to utilize gas with virtually zero coal consumption, while all other areas (north, central and east) are highly dependent on coal (up to 91% in rural areas)[78].

Regional differences are also important for end-user affordability of electricity. Due to a policy of deregulation and privatization, regional consumer tariffs reflect the varying costs of production (which depending on type of- and distance from- fuel source), resulting in higher end-user costs per Kwh in those regions where energy production or distribution is more expensive.

Despite coal once being the cheapest source of heating fuel, policy changes in 2012 have led to coal now being the most expensive, meaning rural households, with few alternatives (i.e. no access to piped gas or municipal central heating) have a higher burden of heating costs compared to those who can use municipal central heating or piped natural gas, i.e. primarily urban residents[79].

Renewable Energy: Non-fossil fuel sources make up approximately 13% of electricity production in Kazakhstan, with almost all deriving from hydro-power installations[80]. Just 0.9% of total generated energy in Kazakhstan is derived from what is considered to be RES (renewable energy sources)[81].

However as of October 2017 the Government, with support from the European Bank for Reconstruction and Development and the Green Climate Fund is embarking on a $110m USD initiative for solar, wind, small hydropower and biogas energy development, as well as the modernisation and strengthening of the electricity grid in order to enhance the integration of renewable energy sources[82]. The initiative ties in with Kazakhstan's commitment's to the Paris Accord and associated commitments to curtail its CO2 emissions to 15% below 1990 levels by 2030.

From a climate threat perspective, reductions in glacial and snowpack melt water under warmer

climate conditions may undermine hydroelectricity production potential and increase water use competition, raising concern for the long-term economic viability of the hydro energy sector.

Energy Efficiency: Kazakhstan's has the World's 4th most *carbon intense* economy as well as ranking amongst the top-ten most *energy intense* economies in the world. Driving these intensities is a high reliance on energy-hungry extractive industries, cheap energy costs, an ageing and inefficient energy distribution network, and poorly constructed, energy inefficient infrastructure and housing. Until recently, a lack of a progressive institutional and economic enabling environment supported by energy efficient policies, has meant that incentives for public and private enterprises have been insufficient to drive improvements[83].

The public and residential sectors, i.e. government buildings, schools, housing and social facilities account for 55% of the country's heat consumption and 20% of electricity consumption. It is estimated that 70% of public and residential buildings require retrofitting in order to comply with new national thermal efficiency standards[84] described in the 2012 Energy Efficiency Law and its associated Comprehensive Program for Energy Efficiency (CPEE – see Annex X)

In response, improving energy efficiency in public and social facilities, and strengthening the enabling environment for sustainable energy financing has become a target for government and donor investment, with the World Bank currently investing $23m USD in EE improvements (See Annex 4 CEE-focused projects with potential entry points for UNICEF engagement).

5 Government responses to/priorities on CEE

Following independence in 1991, the Government of Kazakhstan has taken a number of legislative steps and developed important policy and strategic plans in order to safeguard and restore the country's natural resources and environment, as well as improve its efficient, green and clean use of available energy resources. In doing so Kazakhstan has begun to establish the legal framework necessary to address many of the issues identified in Section 2.

The protection of the environment is enshrined in Article 31 of the Constitution of the Republic of Kazakhstan, which states that "The State aims to protect the environment, for human life and health". On top of this, individual sector codes and law's include:

- The Environmental Code of the Republic of Kazakhstan, adopted in 2007 and based on more than 200 national laws, as well as international conventions, recommendations and regulations
  - Includes Articles 13 and 14 on the rights of individuals and public organizations to access environmental information and participate in the adoption of public decisions on matters relating to the environment.
  - Includes requirements for environmental self-monitoring for industry (important from an air and water pollution perspective)

- **The Law on Support of Renewable Energy Sources 2009-** This piece of legislation aims to eliminate previous legal and financial barriers to the development of renewable energy projects, thus facilitating new projects and access to regional energy grids, as well as regulating energy pricing to ensure that energy from renewable sources is cost-comparable to fossil fuels[85].

- **The Law on Energy Saving and Energy Use Efficiency Improvement 2012** - This law establishes the legal framework to regulate markets as they relate to the consumption of energy. It explains that the Government has the authority to regulate markets according to the principles of energy saving and energy efficiency. Such principles shall be disseminated to the public through national mass media. It authorizes and requires local and regional executive authorities to develop and approve of energy saving programmes as well as scientific research into energy efficiency. Funds to finance such programmes and research are allocated by the national budget.[86]

- **Law on the Transition to Green Economy 2016** -The purpose of the law (full name: "On introducing amendments and addenda to some legislative acts of Kazakhstan on the transition to green economy") is to improve legislation related to ecology and renewable energy. Changes are made to the Land, Water, Environment, Tax, and Enterprise Codes to introduce or strengthen sustainable practices (e.g. updated environmental and natural resources protections, extended producer responsibility, improved standards for water consumption, sustainable waste management).[87]

Supporting these laws, as well as citizens' rights towards ensuring they are upheld, in 2015 the Government passed the "Law on Access to Information". This law provides important legislative support necessary to aid civil society's involvement in environmental monitoring and oversight of the country's progress towards improved environmental health and associated human health.

5.1 CEE-related policies and strategies

In terms of implementing legislative direction and providing a coordinated national response to CEE issues, Kazakhstan has developed a number of national action plans and strategies that identify short, medium and long-term CEE goals and guide the design and implementation of activities and investments towards achieving them.

In addition to- and in conjunction with national strategies, the Government recently hosted the Expo 2017 on Future Energy, highlighting key concepts such as: promoting renewable energy and other energy alternatives; energy efficiency and responsible consumption; electrification of transport; and universal access to clean energy; potentially indicating increased government support towards meeting targets identified in the Green Economy Concept.

The most important CEE focused policies and strategic plans are:

Kazakhstan 2050 Strategy (2012), Kazakhstan's overarching long-term national economic development strategy, outlining amongst other national ambitions, the Government's decision to transition to a green economy.

While the Strategy 2050 **does** recognize the importance of environmental protection, clean energy and the need for sustainable management of natural resources in order to achieve its goals, it **does not** take into consideration the likely impact of **climate change** on natural resources and ecosystem services essential for sustainable economic and social development.

Green Economy Concept and Action Plan (2013), The Concept and Action Plan describe the Government's ambition and vision for the country's transition to a Green Economy. It presents the business case, objectives and expected outcomes, specifies priority sectors based on green growth potential, and details relevant financial mechanisms for financing green projects.

The Concept is based on six pillars: Effective Water Resources Use, High-Yield Agriculture, Energy Efficiency, Electric Power Industry, Air Pollution Reduction, and Waste Management.

The GEC details green development targets, such as 50% share of energy production from renewables, 50% reduction of energy intensity of GDP, and 50% waste recycled, by 2050, as well as improved air pollution and water delivery standards.

Almaty-2020 Development Programme. While predominantly focused on maintaining Almaty's position as the dominant national and regional economic hub, the Almaty 2020 Development Programme includes important environmental health and green energy elements. Specifically the Programme aims to improve the ecological situation of the city, and move towards a city designed to be convenient for pedestrians rather than vehicles.

A number of **sector-specific strategies**, relevant to and impacted by CEE issues have also been developed, including:

- The **Comprehensive Program for Energy Efficiency (CPEE) a**nd its supporting Energy Efficiency Law (2012). Recognizing the huge inefficiencies throughout the economy (industry and residential/municipal) and associated opportunities for reducing costs and CO2 emissions, the CPEE details 47 policies aimed at increasing energy efficiency throughout the public and private sectors, including establishing an

enabling environment for increased investments.

- Kazakhstan's **National Biodiversity Strategy and Action Plan (NBSAP)** developed in 1999 (and therefore outdated) sets out proposed measures for improving the management and legislative structure and legal basis for conservation and sustainable use of biological diversity. However the main 'current' biodiversity policy document is the "Zhasyl Damu" Program 2010. ("Green Development", that despite "playing an important role" cannot substitute for "the lack of the national strategy and the action plan for the conservation of biodiversity"[88].

- **National Environmental Action Plan 2004-2016,** is unavailable, and according to environmental actors in Astana, was never operationalized[89], nor superseded by a 2017 strategy, or similar.

- In terms of focused climate change adaptation and mitigation policy instruments, a **National Concept on Adaptation to Climate Change was drafted in 2010** though it was never adopted.. The Government has already produced and submitted a number of climate change mitigation focused reports to the United Nations Framework Convention on Climate Change (UNFCCC), they are: the Initial National Communication (1998), Second National Communication (2009) and III–VI National Communication (2013). Together these reports identify the national circumstances related to GHG emissions; provide an inventory of emissions by sector; describe impacts and adaptation requirements; and assess the capacity and actions being undertaken to improve the country's response to international obligations and national climate change threats. The 7th National Communication and Biennial report to the UNFCCC has recently been completed, with assistance from UNDP. In July 2016, the Government of Kazakhstan requested UNDP's support to develop a National Adaptation Plan

A full list of CEE-focused policy instruments can be found in Annex 3 CEE-relevant Policies and Strategies

5.2 Ratification of international laws and treaties

In conjunction with promulgating CEE relevant national laws and developing associated policies and strategies, the Government of Kazakhstan has become a signatory to a number of international climate and environmental agreements including: the UNFCCC Kyoto Protocol and Paris Agreement on greenhouse gases and global warming; the Convention on Biological Diversity; the Convention to Combat Desertification; the Aarhus Convention on access to information, public participation in decision-making and access to justice in environmental issues; the Vienna Convention and Montreal Protocol on Ozone-Depleting Substances; the Ramsar Convention on Wetlands; and Agenda 21 under the Commission on Sustainable Development; as described in 3.1, Kazakhstan has submitted its National Communications on Climate Change 1-6 to the UNFCCC and the National Biodiversity Strategic Action Plan to the CBD, and as of February 2018, has completed the Seventh National Communication and Biennial Report.

5.3 Main CEE actors

Government

The key government institutions responsible for developing and implementing CEE-related strategies and projects are:

The Ministry of Energy
Following the breakup of the Ministry of Environment and Water Resources, the Ministry of Energy now host's the Committee of Environmental Regulation and Control, Kazakhstan's main governmental body responsible for environmental monitoring, regulation development, and conservation.

Committee of Environmental Regulation and Control
Main objectives of the Committee include:
- improving the environment quality, environmental safety, natural resources conservation;
- improving the system of state regulation for environment protection and control;
- organization and execution of the state environmental expertise in accordance with relevant laws;
- organization, coordination and regulation of emissions and the issue of environmental permits.

The Ministry of Energy also hosts both the Global Environment Facility and the Green Climate Fund national Focal Points.

Republican State Enterprise – Kazhydromet
RSE Kazhydromet provides environmental monitoring, forecasting and warning on hydrometeorology events, and collection and dissemination of hydrometeorology and environmental pollution data. Kazhydromet operate 146 air quality monitoring stations across the country and monitor surface water quality, disseminate metrological, water and air quality data via their webpage and apps, as well as producing a newsletter on environmental issues,

Ministry of Industry and New Technologies (MINT) Responsible for energy policy setting, including energy efficiency and renewable energy activities.

Ministry of Health
Undertakes drinking water quality monitoring activities across the country, including in non-piped water locations (wells and boreholes). Responsible for recording and making publically available statistics on children's health, including recently taking over sole responsibility for recording respiratory and diarrhoeal diseases in children (replacing MICS reporting)

Committee for Emergency Situations
The Committee for Emergency Situations of the Ministry of Internal Affairs of the Republic of Kazakhstan (CES MIA RK). The CES MIA RK is responsible for the general management of the State system regarding disaster prevention and mitigation. It coordinates prevention measures, controls industrial technical safety, supervises the national fire service and serves as the coordinating body for civil defense in Kazakhstan.

The Committee of Emergency Situations (together with MoES) as been responsible for the implementation of the UNICEF supported Disaster Risk Reduction in Education programme, aimed at enhancing national policies and capacities to better integrate elements of risk reduction within schools structural safety, national education curricula, teacher training and day-to-day management of schools.

CES MIA RK is also responsible for assessing the severity of the impacts of disasters, response to disasters, and distribution of emergency benefits to impacted households.

Ministry of National Economy – Committee on Statistics. The Committee on Statistics produced the Children of Kazakhstan Yearbook in 2017. While not CEE focused, the work of The Committee on Statistics provides baseline statistics important for measuring impacts of CEE hazards on children's health, wellbeing and rights.

Ministry of Education and Science

The Ministry of Education and Science, in its role as the developer of the national curriculum and as the provider of teachers and training for all teachers throughout Kazakhstan is responsible for the inclusion of environmental learning within children's education, and to ensure that teachers are capable of effectively delivering environmental-focused learning. The Ministry has been closely involved with the Disaster Risk Reduction in Education programme, as well as partnering with UNDP's Small Grant Programme on improving climate and environment learning in a number of individual schools across the country.

5.4 Coordination Mechanisms

Under the Green Economy Concept, a Governmental Climate Change Working Group (one of eight sectoral working groups under the Concept) chaired by the Department of Climate Change, under the Ministry of Energy, provides the main inter-ministerial coordination mechanism for climate related activities, though it is not clear how orientated it is towards overseeing CEE project development or strategic planning with partners.

While the GEF and GCF (the largest climate and environment-focused funding mechanisms) Focal Points sit within the Ministry of Energy, the Ministry of National Economy plays an important role in deciding whether and how climate orientated and climate funded projects are developed.

In summary, a number of government actors are involved in coordinating CEE-focused investments, however without an active coordination hub, coordination capacity within and between government ministries can be considered to be low. There is also currently no functioning climate partner/ donor roundtable meaning decisions and actions made by implementing agents (UNDP etc) are unlikely to be properly communicated to other partners, and opportunities for collaboration and synergy are likely being missed.

5.5 CEE-focused activities and development partners

The Government of Kazakhstan, together with international partners has developed and adopted a number of projects focused on: climate change adaptation and mitigation; renewable energy and energy efficiency; and environmental protection and restoration measures, that may be important to UNICEF as it embarks on greater inclusion of CEE-focused issues within its programing.

Partners, and their recent and ongoing CEE activities include:

UNDP –highly active in the climate change adaptation and mitigation, environmental sustainability and renewable energy spheres. As an implementing agency for the Global Environment Facility and the Green Climate Fund (two of the largest CEE-oriented financing mechanisms) UNDP has extensive experience in identifying CEE related activities and programming associated large budgets in partnership with the Government. UNDP is

currently implementing 4 GEF funded activities, and has recently concluded the development of the 7th National Communication and Biennial Report to the UNFCCC.

The De-risking Renewable Energy Investment project (approved for implementation in September 2017) is on of the largest and most high profile projects currently being implemented – it focuses on investments in renewable energy technologies and installations, and is funded through the Global Environment Fund (GEF) (4.6m USD)

Through its Global Environment Facility (GEF)-funded Small Grant Program (SGP), UNDP has implemented a multitude of smaller environment, climate change, and renewable energy focused projects across Kazakhstan, many of which have focused on and included children within their designs and implementation.

UNDP has also produced an environment and climate change learning pack for children, to be distributed to schools nationwide.

World Bank - The World Bank has been one of the largest source of lending to Kazakhstan for activities related to environmental management. Its environmental program includes the Syr Darya Control and Northern Aral Sea Phase-I Project and associated Pilot Water Supply Project.

Currently the World Bank is investing $23m USD in the Energy Efficiency Project, mainly focused on reducing energy use in public buildings.

EBRD - EBRD's mandate in Kazakhstan is to support the country's transition to a green economy. EBRD assisted the Government's development of its 2013 Renewable energy legislation and as of 2016 approved 200m Euro for up to 9 renewable energy projects within the Renewable Energy Framework, three of which have already been financed. Separately EBRD also financed a 50 megawatt wind farm in Yerementau, Akmola region.

In 2017, both the European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD) signed an Accreditation Master Agreement with the Green Climate Fund (GCF) to be able to receive and redistribute GCF funds worth USD 106 million - EBRD aims to develop the renewable energy sector in Kazakhstan by investing a total of 550 million USD in 8-11 intermediate and small subprojects in the renewables sector for the next five years. Subprojects are planned to include renewables such as solar, wind, small hydropower and biogas[90].

USAID

In addition to development of its Kazakhstan climate change country profile USAID is working with the Government of Kazakhstan and the private sector to strengthen the climate resiliency of the wheat sector, as well as partnering with the Executive Committee for the International Fund for Saving the Aral Sea on developing an economic model to evaluate trade-offs between competing water uses across the Aral Sea Basin[91].

ADB

The Asian Development Bank (ADB) has collaborated with the Global Environment Fund (GEF) and the Global Mechanism under the Central Asian Countries Initiative for Land Management, to help Kazakhstan reduce the rate of desertification and land degradation.

UNIDO - In 2009, the UNIDO and Eurasian Economic Community signed a memorandum of cooperation in the fields of energy, climate change and environmental protection, focusing on water management, the agricultural sector and strengthening commercial potential and private sector development. Between 2014- 2016 UNIDO implemented the "Regional Capacity Building for Developing Programmes for the

Mitigation of Global Environmental Problems", in six countries including Kazakhstan. The project provided training to experts on effectively developing project proposals that contribute to mitigating environmental challenges in their respective countries and in the region as a whole. This resulted in the development of 21 national and 6 regional concept proposals[92].

GIZ GmbH

GIZ GmbH is currently (2016-2019) supporting the Government through two environment-focused projects.

- "Ecosystem-based Adaptation to Climate Change in High Mountainous Regions of Central Asia", - GIZ has provided capacity building measures focusing on ecosystem-based approaches and the green economy in Kazakhstan
- "Sustainable and climate sensitive land use for economic development in Central Asia" – supporting the Committee of Forestry and Fauna in the Ministry of Agriculture in developing mechanisms to support private forestation initiatives

GIZ has also been highly involved with two major regional programs in the Aral Sea Basin: "Transboundary water resources management in Central Asia" and "Enhancing Economic and Environmental Welfare in the Aral Sea Region (EEWA)".

The Regional Environmental Centre for Central Asia (CAREC)

CAREC is an independent international organisation assisting Central Asian governments, regional and international stakeholders in addressing environmental and sustainability challenges through promoting dialogue and collaboration among all environmental stakeholders.

CAREC was founded by the governments of the five Central Asian republics, namely Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, as well as the European Union and UNDP, following the resolution of the IV Pan-European Conference held in 1998, Aarhus (Denmark)

Both regionally and within Kazakhstan, CAREC is working on a number of important activities including:

- **The Education for Sustainable Development Programme** – mainstreaming SDG 4 "Quality Education" into education systems, including integrating "green" knowledge skills, competencies and principles into trainings for teachers, youth, and public officials and CSOs .

- **Environment and Health Programme**- recognizing public health as a key factor in socio-economic development and the strong role environmental conditions play in disease prevalence and prevention, the programme seeks to identify the interrelationships between human and environmental health with a view to reducing the environmental burden of disease.

- **Climate Change and Sustainable Energy Programme-** provision of support to national policy development for climate change mitigation and sustainable energy development through promoting low-carbon development, carbon sequestration, energy efficiency and renewable energy technologies.

Executive Committee of the International Fund for Saving the Aral Sea

The mission of EC IFAS is to coordinate cooperation at national and international levels in order to use existing water resources more

effectively, and to improve the environmental and socio-economic situation in the Aral Sea Basin. EC IFAS serves as a platform for a dialogue among the countries of Central Asia, identifies priorities, and selects project proposals for funding, in line with the set priorities. EC IFAS is currently responsible for the Third Aral Sea Basin Program, which includes environmental protection as one of its four "directions"[93]. IFAS partners closely with many international actors, including: UNECE, GIZ, World Bank and USAID.

Aarhus Centre Kazakhstan (supported by OSCE) - Aarhus Centres work on the three pillars of the Aarhus Convention; promoting public participation in decision making processes; access to information, public participation in environmental decision-making, and access to justice in environmental matters

There are fifteen Aarhus Centres In Kazakhstan. The first being established in 2001 in the city of Pavlodar. The other Aarhus Centres are located in Aktobe, Almaty, Astana, Atyrau, Karaganda, Kokshetau, Kyzylorda, Mangistau, Petropavlovsk, Burabay, Ust-Kamenogorsk, and Western Kazakhstan. In addition, the Union of Aarhus Centres and Innovative Development Entities is located in Astana. The Aarhus Centres of Kazakhstan act as a bridge between NGOs, local administration and the private sector and support environmental assessment and participatory decision-making. They also work to facilitate access to information in environmental matters for the public and to raise awareness of environmental and health-related risks.

Climate Change Coordination Centre (C4)
Historically very active in the climate change space, C4 has been involved in promoting Kazakhstan towards becoming a signatory to the Kyoto Protocol as well as partnering with the United Nations Environment Programme (UNEP) to implement activities relating to the Vienna Convention and Montreal Protocol on Ozone-Depleting Substances.

Akbota NGO
Based in Arshaly District in the Akmola Region, Akbota has assisted six rural schools and two medical clinics through the provision of technical and financial assistance to deliver clean drinking water, heating systems for buildings, water supply systems and energy efficient greenhouses with low-cost drip irrigation.

Vyacheslavka Village school for example has been supported to advance green technologies to address social/ health/ environment issues, particularly in terms of energy efficiency, renewable energy, and water use practices.

Akbota has channeled funding from Every Drop Matters (EDM) Global Programme, the Coca-Cola Company, the GEF Small Grants (GEF-SGP) Programme, and UNDP
For a full list of activities please see Annex 4 CEE-focused projects with potential entry points for UNICEF

6 Are children benefiting from CEE investments and programs?

Despite the clear linkages between CEE and children's health, education, nutrition, and wellbeing, to-date very little investment has been ear-marked for addressing CEE-threats to children in Kazakhstan. Similarly, while large amounts of funding has been allocated to improving the CEE situation, little effort has made to measure any improvements to child beneficiaries of CEE investments.

Without considering children as a unique group (with specific vulnerability and adaptation needs) or looking at project designs through a "child

rights lens", projects and strategies don't internalise the need for child-sensitive indicators, and therefore cannot measure whether or not, or by how much children are benefiting from the millions of USD invested nationally in CEE each year.

This trend is not unique to Kazakhstan. Globally the vast majority of investments in CEE programmes and projects are not viewed through a child rights-lens. Generally this means that addressing children's specific vulnerabilities and needs is not incorporated within programme goals, and consequently projects don't consider benefits to children's (or their participation) within their design, activities, indicators, outputs or outcomes.

The dominant CEE funding and current policy direction In Kazakhstan points strongly towards improving energy efficiencies and investing in renewable energies, with a view to reducing greenhouse gas emissions and strengthening the country's sustainable economy base; both of these goals are directly in line with UNICEF's Executive Directive on Climate Change, a number of SDGs, the Kazakhstan Strategy 2050 and the Green Economy Concept. These policy and investment directions therefore become important CEE themes to consider through the child-rights lens, as it is these areas that will be receiving the most support from Government and, therefore, from international donors and investment banks in the next few years.

However, while schools are partially included within these energy focused investments, the strongest and most substantive inclusion of child-sensitive design within CEE-related development work in Kazakhstan is within the 'disaster risk reduction' sector, and through building school-based disaster preparedness and resilience programmes. As such building on on-going DRR work also provides an important focus and entry point for strengthening child-related CEE actions.

7 The impact of climate, environment and energy issues on children

From Section 2 we can see that the *current climate*, together with observed climate change has already, and will continue to threaten both rural and urban livelihoods and assets, as well as occasionally placing lives at risk. We also see that the *projected* changes in climate, including increases in extreme events such as flooding, drought, heatwaves and cold spells; greater variability of annual rainfall; and changes in seasonal timings will likely exacerbate the already harsh living conditions (especially in rural areas), and worsen the already vulnerable water security situation across much of the country.

In turn, these manifestations of climate change are set to threaten availability of sufficient clean water for adequate drinking, sanitation and hygiene, and disrupt agricultural productivity- with the potential to reduce household income and food security in some areas.

Environmental degradation (i.e. water, land and air pollution; desertification, salinization and erosion; and destruction of ecosystems and biodiversity) threatens to both exacerbate the decline in water availability, food productivity, and rural livelihood viability, as well as bringing unique threats to children's rights, for example due to air pollution from fossil fuel burning, as well as the release of greenhouse gas emissions that contribute to global warming.

Lastly, the energy situation in Kazakhstan presents further threats to children's rights, and is again closely associated with both climate change and environmental degradation. Despite high overall national energy consumption and almost universal access to clean energy in Kazakhstan, low energy efficiency of residential and public buildings and the unaffordability of clean energies for heating, combined with both high and low seasonal temperature extremes means children throughout the country are vulnerable to energy poverty that can strongly undermine their rights to health, education and a clean environment. Extreme cold conditions for example, and being exposed to polluted air (due to the need to burn coal and other air-polluting solid fuels for household and municipal heat energy requirements) mean that children's health and educational may be being undermined by insufficient availability of affordable clean energy.

7.1 Health

Globally, impacts to health due to CEE threats are most strongly associated with: extreme temperatures; air pollution; water contamination and water-borne diseases; reduction of water supplies; injuries associated with extreme weather events; and changes in proliferation of vector–borne diseases[94].

In Kazakhstan, calculations of the environmental burden of disease measured by the World Health Organization (WHO) show medium-high rates of disease impacts associated with pollution such as some cancers and cardiovascular diseases, but a relatively low national burden of respiratory diseases such as pneumonia; vector-borne diseases such as malaria; and waterborne diseases such as diarrhoea, compared to global averages[95]. Approximately five climate/ disaster-related deaths are recorded each year, predominantly due to flooding, storms and landslides[96] (numbers of Injuries were unavailable).

Despite the low rates of diarrhoea and pneumonia in Kazakhstan, they remain the key causes of death among children aged one to four years old[97], and in 2016 40.8% of all hospitalised children (aged 0-14) were being treated for respiratory diseases. At 13% "infections and parasitic diseases" were second[98].

While the underlying causes of these health burdens remain unknown and difficult to discern (due to the low availability of data and limited investigation into the relationships between environmental and human health), it is accurate to state that in Kazakhstan the main causes of under-5 mortality and chid hospitalisation are known globally to be linked with environmental conditions (i.e. poor water and air quality, cold and hot conditions), and are also preventable using proven, affordable, low-technology interventions[99,100].

The region with the highest burden of disease (by a significant margin) for both under-1s and under-5s is Pavlodar Oblast, (with over a third more cases of morbidity per 1000 children than the next highest oblast, for both age groups)[101]; the published regional disaggregation data does not however identify the types or causes of diseases contributing to the high overall morbidity rates.

Air pollution

Addressing air pollution in Kazakhstan is directly in line with SDG 3.91 on decreasing the mortality rate attributed to household and ambient air pollution, SGD 11.6 on reducing the adverse environmental impact of cities (especially air pollution), and SDG 7 on ensuring access to clean, affordable energy. Reducing air pollution and its impact on health It is also a key ambition within the Almaty City 2020 Development Programme and a target within the national Green Economy Concept to 2050.

According to WHO estimates (calculated using air quality concentrations published by the Government) outdoor air pollution was responsible for 2,400 premature deaths per year in 2009[102], while in 2012 the World Bank revised the figure to 2,800[103]. While alarming, these estimates of the burden of respiratory diseases may still underestimate the magnitude of the problem (due to the air pollution monitoring issues described in Section 2). One more recent study looking at the impact of PM2.5 on health indicates that mortality and morbidity implications of air pollution may be far worse than previously thought, concluding that air pollution constitutes a significant contribution to the environmental burden of disease, and mortality risk attributable to air pollution is ~16,000 cases per year, a figure higher per capita than in Ukraine and Russia[104].

Children as a single, separate demographic are especially vulnerable to air pollution[105]. Physiological traits that make children more susceptible to air pollution include: smaller, more sensitive lungs still in the development phase, more prone to infection and more susceptible to long-term damage; an under-developed immune system, exacerbating the vulnerabilities of underdeveloped lungs to infection; faster breathing rates, and higher volume intake per unit body weight. Children's brains are also in the development phase, making them more susceptible to the toxic effects of fine particulate matter and chemicals such as carbon monoxide and nitrogen dioxide[106]. Pneumonia, worldwide the single largest infectious cause of death in children under-5, and asthma -one of the most common chronic health conditions in children- are both linked to exposure to air pollution[107108]

In Kazakhstan, just over half of all 0-1 year old disease incidence (including illnesses originating in the perinatal period and trauma) is related to respiratory disease, while for under-5s the figure rises to ~63%[109].

Global evidence suggests that urban children tend to be more at-risk from outdoor air pollution than their rural counterparts[110], and is also likely the case in Kazakhstan. While comparatively little is known about either the urban or the rural air pollution situation (due to a lack of monitoring stations), available in-country data has identified that it is the highly industrialized and heavily populated cities that likely endure the worst air

quality[111].

With reference to Strategy 2050's ambition of urbanizing 70% of the population by 2050, addressing *urban* air pollution warrants particularly close attention; substantial *rural* air pollution risk from toxic dust storms (i.e. in the Aral Sea regions) and forest fires should not however be ignored[112,113].

Indoor air pollution presents an addition threat to children, particularly in rural areas where exposure risk to solid fuel burning is higher. The use of solid fuels for cooking, while low nationally, is predominantly undertaken within those household where the head of household has no- or only primary-level education (5.9%), and those that sit within the poorest wealth quintile (5.6%), making addressing indoor air pollution an equity issue. In addition to cooking, burning solid fuels for household and school heating is popular throughout the country, but especially away from planned urban settlements and city centers, where access to municipal, centralized heating and alternative forms of energy are lower.

Water-related threats to health

Addressing water-related health threats is directly in line with SDG 3.92 on reducing the mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene, and is explicitly identified as an issue within the country's climate change and environmental reporting to the UNFCC and UNCBD, as well as in the CRC Committee's 4th periodic report Concluding Remarks.

Water-vector related disease estimates -such as those for diarrhoea, are low in Kazakhstan. These estimates are calculated based on an almost universal improved household sanitation (98%), with 99% of homes having both soap and water and a specific place for hand washing. Nationally, household access to an *improved* water supply is also very high at 97.3%[114].

However, positive national averages for household-level indicators contrast strongly with disaggregated rates based on income and location, with the poorest quintile and some oblasts for example West Kazakhstan, showing comparatively high rates (9.9% and 19.9% respectively) of household populations with unimproved drinking water.

While the official statistics present a generally positive situation in terms of access to *improved* water, statistics for access to "potable" and "safe" water present additional causes for concern. According to the National Statistics Agency (2017) access to *potable* water in Kazakhstan disproportionately favours urban locations, with just 47% of rural dwellers having access to potable water, compared to 86% in urban areas[115], and according to JMP (WHO/UNICEF 2017) estimates, in 2015 26% of rural households did not have accessible water on the premises, and only 55% were connected to piped water supplies[116]. Further, independent studies have identified potentially important discrepancies between official and actual (surveyed) water and sanitation situations, with access to "safe water supplies" dropping by 15 percentage points compared to official data in some rural areas [117].

In terms of institutional capacity to manage water delivery and related infrastructure the lack of a single agency responsible for countrywide water supply results in limited regional/local-government administration and implementation capacity, and restricted access to investment. Additionally, deterioration of water infrastructure outside of the main cities, as well as low (50%) access to sanitation in 5 out of 14 regions present important barriers to providing quality services[118,119]. In terms of WASH in Schools, old buildings and insufficiently low budgets for school maintenance and repair[120] are likely exacerbating the impact of water supply issues in many rural schools.

From the climate change perspective, reductions in available surface water is projected to arise due to both long-term changes in high mountain snow pack volumes and glacial melt water availability[121], as well as short term increased variability of rainfall and more extreme drought and flooding events. While most of the country relies on surface and ground water in equal measures for their drinking water supplies, some areas are almost wholly dependent on surface water, and as such are most vulnerable to changes in water quantities due to seasonal variation and long term climate change. The most vulnerable areas are in the Yessil and Tobol-Torgay water basins, placing populations of Akmola and Kostanay oblast at highest risk from water shortages[122].

In addition to concerns over water access, the quality of water provided to households presents additional, important management challenges for the Government and the private companies it relies on for water delivery. Although water quality monitoring is undertaken regularly, and according to the Government agency responsible (Ministry of Health), water is delivered at a standard in line with the national "Sanitarian Epidemiological requirements to water sources, drinking water supply, cultural water usage places, and safety of water objects", concerns remain throughout the country as to the safety of municipal piped water[123]. The main issues are thought to relate to heavy metal pollutants, as well as biological contamination at concentrations that may threaten human health, with many environmental actors as well as Government representatives, and the public at large[124], expressing concern that contaminants within water supplies are placing the population's health at risk.

As a result, at-home water treatment of piped water is common throughout the country, though worryingly less than half of households *without* improved water employ the correct treatment methods to make the available water safe to drink[125].

Evidence to identify the quality of the improved water across the country, and its likely impact on pubic health, are scattered and largely inconclusive, however a number of indicators are available which may provide clues on the extent to which the national burden of disease is associated with known water contamination illnesses:

1) According to the Ministry of Health the total registered number of hospitalizations of children under-5 years due to gastroenteritis in 2009 was 13,357, corresponding to 1 in every 26 children in Kazakhstan being hospitalised due to gastroenteritis by the age of 5[126].

2) 13.4% of sick Children aged 0-14 years in hospitals were suffering from infectious and parasitic diseases (2017)[127]

3) 2900 deaths due to diarrhoea per year in 2009[128]

Further qualitative and quantitative evidence within documents produced by scholars, development partners and the Government provides insight into the likely water quality-health situation:

"Helminthiasis and intestinal protozoa infections are of considerable public health importance in Central Asia. Agricultural and industrial pollution is especially **affecting downstream areas of Amu Darya** and Syr Darya rivers. In large areas copper, zinc, and chromium concentrations in water exceed maximum permissible concentration."*[129]*

"**In Kazakhstan,** the morbidity and mortality associated with gastrointestinal diseases are high and gastric cancer is the second largest cause of cancer death. Results by Nurgalieva et al. suggest that transmission of H. pylori can be water borne, related to poor sanitary practices, or both H. pylori infection is linked with gastritis and

associated diseases such as peptic ulcer, gastric adenocarcinoma, and primary gastric lymphoma."[130]

With regard to toxic chemicals within groundwater-surface water systems in Kazakhstan, concentrations of copper, arsenic, nitrite, and dichlorodiphenyltrichloroethane (DDT) have been found at high levels[131], though the exact health impact of these high concentrations in Kazakhstan is not well known.

In terms of barriers to a better understanding of the water quality - human health situation, recent research suggests much more needs to be done by the Government in terms of data collection and dissemination to enable it to address health issues and achieve its SDG goals:

"Good water service delivery requires reliable data that seem **currently to be lacking for rural Kazakhstan.** Data and statistics that may exist have not been sufficiently analyzed or shared. Achieving SDGs will require investment in data collection as well as more selective and innovative ways to understand, share, and audit the data." [132]

From the climate and environment perspective, the likely decreases in surface water flow may push water users towards an increased reliance on groundwater, which is often artisanal and unregulated and may be unsafe. Evidence suggests that the usage of non-state supplied/regulated groundwater in some areas of the country is far higher than officially recognised[133], and that groundwater (in the Aral Sea Drainage Basin) may contain higher concentrations of toxins than surface waters:

"Overall, groundwaters were associated with much higher health risks than surface waters. Health risks can therefore increase considerably, if the downstream population must switch to groundwater-based drinking water supplies during surface water shortage. Arid regions are generally vulnerable to this problem due to on-going irrigation expansion and climate changes."[134]

Radiation related diseases:

Increased incidences of genetic mutations and linkages to higher rates of various types of cancers and cardiovascular diseases have been found to be associated with population proximity to known nuclear testing sites[135][136], however while direct relationships between exposure to radiation and human health have been identified, further research is required to pinpoint the extent of the correlation[137]. Additionally, as much as 240 million tons of radioactive waste from historical uranium mining is known to have accumulated at >22 locations across the country, placing local populations at low-level danger, particularly where dumped mining waste is reused for construction purposes[138].

Vector borne diseases

While incidence of vector borne infections such as malaria are low in Kazakhstan (WHO acknowledged Kazakhstan as being malaria-free in 2012), changes in the distribution of infection carrying insects (such as mosquitoes and mites) have been observed. Kazakhstan faced an outbreak of Crimean Congo haemorrhagic fever (CCHF) in 2009, resulting in 30 deaths. CCHF is a tickborne disease, and being highly climate sensitive, highlights what could happen in the future under a changing climate[139].

Aral Sea Basin-specific health risks

Wide spread environmental pollution from agriculture inputs and irresponsible disposal of industrial waste is known to have occurred across much of the country, with the Aral Sea-Syr Darya Drainage Basin (that includes Aktobe, Kyzylorda, and South Kazakhstan Oblasts) known to have been particularly highly exposed. While the direct human health impacts of known environmental degradation remain largely unquantified in

Kazakhstan, a number of studies have identified relationships between exposure to toxins and increased incidence of disease, including:

"Raised concentrations of organochlorine pesticides and toxic metals such as arsenic have been found in human blood, milk, hair, and urine of the exposed population living in the Aral Sea Drainage Basin. The exposed population is experiencing increasing maternal and infant mortality, delay in growth and puberty of children, liver and digestive problems, allergies, and diseases related to occurring bacteria in water[140]."[141]

Clinical studies conducted on children from the Aral Sea area in the late 1990's also identified a number of health issues that may be related to chronic heavy metal exposure and polluted drinking water, including: skin lesions, heart and kidney disease; growth retardation and late sexual maturation; anaemia; and impaired renal tubular function[142]

According to the 5th National Report on biodiversity, about 40% of mothers in the Aral and Kazaly districts suffer a visible loss of body weight, every second woman is vitamin C deficient, and almost all pregnant women have iron deficiency anaemia as a result of protein and vitamin starvation. According to the report 77-85% of infants are deficit in vitamins B and E, while the prevalence of rickets among children is 2-2.5 times higher than in other regions (implying a lack of vitamin D, calcium and/ or phosphate in their diets). The report goes on to state that "The major environmental factors that determine the quality of people's health in the Aral Sea region are dry and harsh continental climate, high salinity, pollution and shortage of drinking water, as well as desertification of the areas. This brings difficulties for agriculture, lack of quality food and drinking water. Hence, it results in low immune state of the population, beriberi disease etc. Against this, background risks of cancer, tuberculosis, diabetes, intestinal infections, and hepatitis A are high."[143]

Access to health services

Insufficient access to health services is already acknowledged as an important issue in rural Kazakhstan. Poor public and private transport is known to inhibit travel between widely dispersed villages and district towns, limiting access to medical centres and creating barriers to- and limiting the efficacy of home visits by patronage nurses and social workers, most of whom walk or rely on public transport for their work[144]. If extreme conditions in rural areas worsen or become more frequent with climate change, difficulties in accessing health services in rural areas may worsen accordingly.

Poverty as driver of poor health, and a barrier to accessing health services also needs to be considered from the climate perspective. Poorer families in Kazakhstan are less likely to either recognise the signs of illness (pneumonia) or take their children straight to a health facility when faced with danger signs. Additionally, despite the State's guarantees of free public health provision for the entire population, significant out-of-pocket payments are required for many health services that were once free[145] - a situation that may worsen with climate change for two reasons: firstly, where rural livelihoods are negatively impacted by climate change, household incomes can be expected to drop with a concomitant decrease in household expendable income, and; secondly, being publically funded through taxation, Kazahstan's health care system is vulnerable to funding cuts and therefore to reductions in agricultural production and fluctuations in oil-based GDP, both of which may be affected by climate change and climate and agriculture–associated regional and global politics.

Health summary

Taking into account: the current child disease profile of Kazakhstan; the known global burden of childhood diseases related to climate and environmental threats; and the likely trajectory of the climate, environment and energy situation in Kazakhstan, the impacts of CEE-related threats on children's health in Kazakhstan will most likely manifest as increased incidences of respiratory and infectious diarrhoeal diseases. precipitated by a declining availability of piped safe water and worsening air and water quality.

In addition, children's access to quality health care may be interrupted where more frequent extreme climate events such as flooding cut off remote communities from accessing clinics, or where increasingly harsh conditions prevent healthcare workers from making home visits, or where household and state budgets are affected by climate conditions, making healthcare less affordable and accessible.

Lastly, the very likely negative ramifications of climate change on rural agricultural, and therefore on agriculture-dependent household incomes will also likely result in falling wealth and worsening child deprivations, both of which present increased risks for children's health as conditions conducive to a healthy living environment deteriorate (including the ability to afford food, fuel, and clean water).

7.2 Education, Early Childhood Development and CEE

Globally, children's ability to learn is recognized as a product of a number of inter-related issues, all of which may be affected by CEE-threats. They include: children's health and nutrition status; ability to physically go to school, and having time to go to school; the school environment including the electricity/ heating/ cooling situation and the availability of clean water and improved sanitation; the quality of teaching; and the continuity of school during or shortly after disasters.

Based on the known CEE–related barriers to learning, nationally available education indicators and the current CEE situation in Kazakhstan, the following provides an overview of the main CEE-threats likely to impact learning in Kazakhstan.

CEE and Optional Pre-schooling (0-59 months)

Just over half of children aged 1-5 years old in Kazakhstan attend an organized early childhood education programme (ECEP), rising to 4/5ths for 3-5 year olds[146]. Attendance is highly variable across regions, dropping to just 38.6% in Almaty Oblast, and is as high as 82% in West Kazakhstan[147]. Attendance correlates well with increasing wealth, rising linearly from 45% in the poorest households to 70% in the wealthiest; children in urban areas are 25% more likely to attend than those in rural areas[148].

Considering that two of the key determinates of attendance of ECEP are wealth and location related[149], it follows that main CEE-related barriers to accessing ECEP are likely to be those that exacerbate those conditions, including: worsening rural household poverty; and reduced access to services in remote areas (where extreme weather events such as flooding or snowstorms temporarily impact access, or damage buildings or road infrastructure).

Climate-related impacts to essential services within education centers, such as difficulties in ensuring adequate WASH standards, or a lack of electricity and heating may also impact parents decision making, and result in children being withheld from optional ECEP under drought or extreme cold conditions, or after a storm or flood.

In addition to ECEP, quality of parental care in preparing children for school may also be impacted by CEE factors. Engagement in home-

based activities that promote learning and school readiness, and availability of children's books in homes have both been shown to be inversely correlated with wealth in Kazakhstan, as well as being less common in rural areas[150]. As such, preparedness of children for school may also suffer due to lower incomes and decreased wealth in agriculturally dependent households.

Mandatory Schooling (5-16 years)

MICS 2015 indicators show very high rates of urban children enrolled in primary schools (99.4%), though the 'Children of Kazakhstan Yearbook 2017' shows this figure drops significantly to 88.9% in rural areas; there is however very little gender discrepancy in either situation. Gross enrolment in secondary education is above 100% for both boys and girls across all regions.

Education, poverty and CEE - As schooling is obligatory, free and wealth does not appear to be a strong determinate of school attendance, CEE and poverty linkages are unlikely to decrease attendance or increase dropout rates significantly, though they may still impact children's ability to learn. Linkages between climate change and wealth, health, nutrition status, and a conducive home environment for learning, could place children in agricultural-dependent households at an educational disadvantage in the long-term, compared to children who's household incomes are not CEE vulnerable.

Education and nutrition- all schools provide free breakfast for grades 1-4, and free school meals to disadvantaged children[1], and in doing so have the potential to eliminate much of the CEE related threat to children's nutritionally-determined educational outcomes. However the food provided in schools is reportedly often of poor nutritional quality[151], meaning that where food and nutrition insecurity prevails at home, access to food at school may not fully alleviate the risks of lower attention rates and poorer educational outcomes due to inadequate nutrition[152]. Furthermore, schools with higher numbers of disadvantaged children (above 5%) do not receive additional resources to provide extra school meals, meaning they may not be able to fully cope with increasing numbers of disadvantaged children overtime, or in emergency situations.

In addition -as discussed with UNICEF the Social Policy Officer - where CEE vulnerable families are <u>not</u> eligible for social assistance or emergency benefits, but are affected by transient poverty (due to both seasonal variability and the more insidious, slow-onset impacts of a changing climate) children may occasionally have neither access to adequate food at home, nor be eligible to receive free food at school.

Rural schools

<u>Teaching quality-</u> In general the quality of education in rural schools is considered to be lower than in urban schools[153]. Despite the "Diploma to the Village" scheme for incentivising teachers and other civil servants to work in rural locations, and the Ministry of Education providing salary top-ups to teachers that attend advanced training courses[154][155], teachers in rural areas tend to be less qualified and more likely to leave[156], less likely to attend improvement training[157], are

[1] Children from families eligible to receive national targeted social assistance; children from families that have average income below the minimum subsistence level; orphans and children without parental care; and children from families that need urgent assistance due to emergency situations

therefore also less likely to be able to provide the most up-to-date scholastic experience for students. Low salaries, difficulties in returning to regional capitals for training, and an insufficiently strong culture of continuous pedagogical improvement may be contributing to this situation[158].

From the CEE perspective, where environmental, social and economic health of rural areas continue to suffer, retainment rates and incentives for teachers in rural areas may decline accordingly, potentially resulting in fewer highly qualified teachers in rural areas, a lower overall standard of teaching, and concomitantly lower learning outcomes for rural children.

School Infrastructure, WASH and energy – Many schools in Kazakhstan were constructed during the Soviet era and 15% are over 70 years old[159]. Rural schools tend to be in a more dilapidated condition, poorly insulated and less well funded for infrastructure repair compared to schools in urban situations; WASH and heating facilities are especially prone to being in substandard conditions[160][161].

WASH in schools is an understudied area, presenting a potentially high threat to children's health. According to the 2015 UNICEF Advancing WASH in Schools Monitoring report, 15% of schools did not have water and sanitation "coverage" in 2013[162].

> Old buildings that fail to heat properly in the winter, or are too expensive to heat, threaten students' health and ability to learn in one of the world's coldest climates. Schools that lack basic equipment, instructional materials or without indoor toilets are alarmingly common **in rural areas**. OECD 2015. Reviews of School Resources Kazakhstan
>
> Most schools and Primary Health Care Centres in **rural areas** are equipped with pit latrines without any hand washing facilities adjacent to the toilets. This is obviously a major constraint for any effort to promote good hand washing practices. UNICEF WASH Consultant 2012.

One reason for disparities between rural and urban schools likely relates to the use of 'small-class schools' throughout low population regions of Kazakhstan (half of all schools nationwide are small-class schools - a feature of the Government's policy to ensure universal access to compulsory schooling), resulting in budgeting inefficiencies in rural areas and therefore limited funding being spread across many schools in a region. As a coping mechanism, schools, especially in rural areas are forced to prioritise between adequate heating or books, internet access and pedagogical equipment.[163]

A recent (2018) announcement from the Government that from 2020 all schools will receive per capita budgets[164] also raises concern from the CEE-impact perspective, as where falling student numbers due to CEE-driven rural-urban migration prevail, continuous reductions in budgets to schools will follow.

[Kazakhstan] is populated with a large number of small-class schools, which might not be the most cost-effective option to deliver education services in rural and remote areas. In addition, students in small-class schools tend to suffer from poorer learning environments. OECD 2015. Reviews of School Resources Kazakhstan

Where inadequate learning environments are already translating to lower learning outcomes, the situation can expect to be exacerbated by climate threats. Water shortages, storm damage and extreme weather conditions -all of which are known to inhibit learning and be costly to address- are already affecting rural schools across the country[165,166]. Additionally, out-migration from rural areas (due to declining rural livelihood prospects) will likely further reduce student numbers in rural schools, further strain school budgets and increase inefficiencies, and where children are sent to boarding schools as a coping mechanism, may impact children's right to live in a family environment.

Children with Disabilities (CWD) and access to WASH in School and pre-schools

Inaccessible or inadequate WASH facilities in schools create additional barriers for children with disabilities to attend school, and lead to a denial of a school education[167]. In Kazakhstan just one third of CWD aged 3-6 are enrolled in preschools. Adolescent girls in particular, who have to manage menstrual hygiene as well as a disability, are especially vulnerable to conditions that may undermine their dignity, health, and school attendance [168].

While increasing attention has been placed on accommodating children with disabilities in mainstream schools[169], the underlying low standard of WASH facilities in many schools likely presents a significant deterrent to CWD attendance. In rural areas, for example, two thirds of schools have only outdoor toilets, while nationwide just ~85% have water and sanitation "coverage" (2013)170, with rural areas very likely suffering most of the deficit.

In locations where a lack of continuous piped water into schools is already undermining WASH standards, climate change is likely to worsen the situation; in other locations, climate change may begin to present water access problems where previously they were absent, with the potential for associated reductions in CWD enrolment/attendance. In addition, where rural populations reduce due to climate change forced migration, school budgets for providing and maintaining disability-appropriate WASH facilities are likely to be affected.

CEE Education in schools

Both the UN Framework Convention on Climate Change (Article 6) and the Paris Agreement on Climate Change (Article 12) encourage governments and their development partners to promote, and cooperate in enhancing climate change education in schools and awareness across the general population.

In Kazakhstan, climate change as a topic is not explicitly included within the national curriculum, though aspects related to climate change and pollution are reportedly included within the syllabus of a number of subjects for children in grades 9-12, and are discussed in relation to the biosphere, stratosphere and lithosphere. Video-media is also utilised to carry environmental messages to students[171].

The topic of environment is included within the primary school curriculum within the 'World Discovery' subject, and is allocated approximately 1 hour per week. It focuses on topics related to plants, animals, and nature conservation. Additionally, the non-curriculum based 'Classroom Hour' provides an extra opportunity each week to address a range of topics for one

hour, of which 'sustainability' is one of four suggested themes. 'Classroom Hour' thereby potentially provides an additional ~8 hours per school year to address issues related to CEE. However, the session is neither mandatory nor assessed, and is not supported by associated teaching materials or structure, commonly resulting in teachers using the time for catch up with curriculum-based study or for marking papers[172].

Despite some opportunities and encouragement for increased CEE-related learning for school children, incentives for teachers, nationwide to up-take environmental and sustainability-focused teaching activities, and also attend pedagogical trainings and implement more progressive teaching methodologies in general is considered to be low[173][174].

Overall, availability of teaching materials and equipment for science/environment/climate change/ energy –type subjects can be considered to be low, and in ECEPs non existent.

7.3 CEE and Disaster Risk Reduction for Children's Resilience

Children are more vulnerable to disaster, are disproportionately impacted, and globally represent approximately 50% of all people affected them, making addressing children' specific vulnerabilities crucial to effective national prevention and response strategies.

In Kazakhstan, where the 4.8m children under-14 represent ~25% of the population, DRR has been a focus of UNICEF's support to the Government since 2009. Strengthening UNICEF's capacity to support the Government in addressing child-specific vulnerabilities to climate-driven disasters is crucial as climate change continues to influence the disaster risk profile of the country and in doing so worsen the threat of disasters, both in scale and frequency.

According to UNICEF's recent report "Assessment and documentation of good practices on DRR for children's resilience in Kazakhstan" 75% of the territory of Kazakhstan is vulnerable to natural disasters. Flooding presents the dominant disaster threat, followed by extreme temperature events, earthquakes, landslides, storms and wild fires. In terms of losses associated with disasters, each year between 3,000-5,000 injuries, several dozen fatalities and approximately 50 million USD are attributed to the 3000-4000 emergency situations.

Recognising this, UNICEF Kazakhstan's DRR programme has been active in two main areas of work:

1. **1) The Disaster Risk Reduction in Education Programme:**
    - Safe construction of schools
    - Disaster risk reduction/resilient education
    - Disaster risk management at school level

(See Box 1)

2. **2) Disaster Risk and Child Vulnerability Analyses:**
3.
    - Developing the methodology for disaster risk analysis at the local level with special attention on the needs and vulnerabilities of children
    - Piloting the disaster risk and child vulnerability analysis in East Kazakhstan region, Kyzylorda and Mangistau regions

BOX 1.

1) Disaster Risk Reduction in Education Programme

Since 2009 UNICEF Kazakhstan has supported the Ministry of Education and Science and the Committee of Emergency Situations under the Ministry of Interior in the implementation of the "Disaster Risk Reduction in Education Programme" aimed at enhancing national policies and institutional capacities to better integrate elements of risk reduction within national education curricula, provide teacher training to strengthen the delivery of DRR education, and strengthen the day-to-day management of schools for disaster resilience.

Among the results set is enhancement of the national school safety assessment system in line with the Global Framework for School Safety, including:

- Safe construction of schools
- Disaster risk reduction education
- Disaster risk management at school level.

Safe Construction of Schools (DIPECHO U-11 'Providing Assistance in Reducing Disaster Risk to Organisations and Vulnerable Communities in Kazakhstan from 2012-2013', UNICEF)

In 2013 UNICEF Kazakhstan piloted a rapid visual screening of eight schools using the UNICEF regional methodology to determine the structural school safety through **School Safety Assessments**, expanded to more carefully consider school facility vulnerability to fire and seismic hazard using local standards.

To scale up this methodology to a national school safety assessment and school prioritization strategy, recommendations were made including greater focus on building fragility and a focus on areas of high hazard exposure; in 2015 the 'National Inter-sectoral action plan on ensuring safety of children in schools for 2015-2016' was approved by the Government of Kazakhstan. The Plan included a target on enhancement of the structural school safety.

To date, 38 schools in 5 regions (Astana, Almaty, Kyzylorda, Mangistau, Eastern Kazakhstan) have been assessed for physical safety by UNICEF international expert and national expert of the National Construction Institute under the Ministry of National Economy.

Disaster Risk Reduction Education (DIPECHO U-11 'Providing Assistance in Reducing Disaster Risk to Organisations and Vulnerable Communities in Kazakhstan from 2012-2013', UNICEF)

Promotion of DRR into the National curricula with the National Education Academy under the Ministry of Education and Science. UNICEF contributed to the education standards and curricula revision, adding a competency that students should be taught to assess the situation, and adequately react to disasters, as well as helping friends and younger children. UNICEF also developed materials, including learning DRR booklets for primary and secondary school children and DRR guides for school and pre-school teachers. DRR has been integrated into the syllabus of lessons, including Geography, Physical Education lessons, and World Discovery. Moreover, in partnership with the Teachers' In-service Training Institute it has been mainstreamed to the school and pre-school teachers' in-service training system.

Disaster risk management at school and pre-school level. (DIPECHO V project - Supporting disaster risk reduction among vulnerable communities in Kazakhstan (UNICEF), 2009)

Starting from 2009 UNICEF has been working on DRR in the disaster prone regions of Kazakhstan (Almaty, Southern Kazakhstan, Eastern Kazakhstan, Kyzylorda, Mangistau). 3,700 teachers and around 70,000 students of pilot and resource schools increased their knowledge and skills on DRR. Methodical and instruction letter on how to integrate DRR to the school subjects, how to organize the work with teachers and parents, how to conduct disaster simulation exercises and drills was developed by UNICEF for schools. Pilot and resource schools have received DRR equipment and teaching and learning materials and drills were supported jointly by local Emergency Departments and school management and staff.

Source: UNICEF. Improving The Methodology Of School Safety Assessment In The Republic Of Kazakhstan. 2016

With reference to Box 1 (above), based on information provided in the UNICEF 2016 report "Improving The Methodology Of School Safety Assessment In The Republic Of Kazakhstan" many of the wider non-structural strength implications of earthquake and CEE-related disaster damage are not fully considered within the assessments. For example, assessing impacts to services such as water supply (quantity and quality), sanitation, and electricity, that can interrupt education after disaster events, is not mentioned.

2) Disaster Risk and Child Vulnerability Analyses (DRCVA) - in 2015-2017 a pilot child-centered disaster risk and vulnerability analysis was conducted under the "Increasing the competitiveness of the region through the introduction of innovative approaches to regional planning and the provision of social services, (UNICEF, 2015/2016)" in the Zyryanovsk district of East Kazakhstan Oblast, Syrdarya district of Kyzylorda Oblast, and in Mangistau district of Mangistau Oblast.

The comprehensive assessments looked at climate variability, climate change, and geophysical-based risks, and resulted in integrated assessment of risks of emergencies, natural disasters and hazardous weather phenomena for settlements in Zyryanovsk, Syrdarya and Mangistau districts. Particular attention was paid to understanding children's vulnerability, which is known to increase in the event of natural disasters.

From the perspective of UNICEF moving forward with CEE programing it is crucial to understand the results of these assessments from a multi-disciplinary perspective, particularly as they highlight the multi-hazard, spatially diverse and cross-sectoral nature of the threats impacting communities in different part of the country. In Zyryanovsk, for example, the main threats identified by participants were all CEE related: abnormal snowfall, snow storms, abnormal frosts, and flooding. Furthermore, using criteria to ascertain the likely impacts of the identified threats, the analysts found flooding (a highly climate-influenced threat) was determined to pose the highest overall risk to communities in Zyryanovsk region, followed by avalanches, and snowstorms.

However, from the intervention perspective, it is important to note that while flooding overall presented the greatest risk regionally, it was not the greatest risk in any of the individual villages. Instead, the greatest risk in each individual village differed widely, and included avalanches, snow storms, earthquakes, and ice drifts, underscoring the importance of undertaking vulnerability assessments at the local level and the need for tailored resilience planning.

The methodology, which has been adapted to be specific for the context of Kazakhstan is currently being promoted for scale-up to the national level by UNICEF. The availability of comprehensive, localised disaster risk and child vulnerability assessments such as these will be extremely valuable for UNICEF within and outside of the DRR sector, and crucial as UNICEF expands its programming for addressing CEE threats to children.

In summary, while some of UNICEF's DRR programming works towards better understanding and building resilience to many of the CEE threats identified in section 2, the Disaster Risk Reduction in Education Programme and particularly the **Structural School Safety** component focuses almost exclusively on seismic threats (non-CEE), and therefore misses out on evaluating many potential CEE threats to children's education.

Reasons for this may be that these CEE events often do not directly threaten school structural safety, but instead result in damage to

infrastructure or services off the school grounds (for example where a flood or drought impacts water supply, or a storm knocks down electricity distribution lines). However, as children's education is in part determined by their ability to attend school shortly after disasters, and requires that minimum service standards are upheld, these issues will likely deserve greater consideration as the programme expands nationally, into areas more vulnerable to flooding and drought.

In terms of opportunities to improve this oversight, one immediate benefit of an expanded DRCVA program could be in helping to determine the localised CEE-based disaster risks to schools and school children as the Government rolls out further school structural assessments into areas that are likely to be less seismically vulnerable and more climate vulnerable than those already covered.

7.4 Child nutrition

Addressing child nutrition is in line with SDG2 on ending hunger, and particularly SDG 2.2 as it relates to ending all forms of malnutrition, including achieving targets on stunting and wasting in children under five years of age, and addressing the nutritional needs of adolescent girls, and pregnant and lactating women.

Climate and environmental degradation can impact children's nutritional status through a number of avenues. Globally the most common CEE implications for nutrition are where CEE hazards reduce or disrupt agricultural productivity, affecting household availability and access to food (i.e. impeding households' ability to produce or purchase food) resulting in reduced household food security. CEE-related Interruptions to and/ or contamination of drinking water supply that increase disease rates can also seriously impact the nutrition status of children through reducing their ability to utilise food.

The CEE-relevant child nutrition situation in Kazakhstan

A number of nutrition trends that prevail in Kazakhstan may be in-part attributable to current CEE conditions, and may be worsened by predicted changes to the climate. Of particular concern are: a) the impact of increasing temperatures and water variability on food productivity; and b) a reduction to the availability of clean water for drinking and sanitation. Both present specific threats to children's nutrition, especially in rural areas where consumption of home produced food is more common, and where barriers to accessing sufficient water for adequate hygiene and sanitation and safe drinking water are greater.

Infant feeding - According to the MICS 2015, only 38% of babies under the age of 6 months are exclusively breastfed, and 26.8% are predominantly fed with non-breastmilk liquids; infant formula is widely used as a complimentary food source for children under 6 months. In addition to increasing the potential for insufficient micro-nutrient provision, globally where formula is prepared in unhygienic conditions or safe drinking water is not used, non-exclusive breastfeeding increases the risk of infection in infants[175], and is linked with higher rates of diarrhoeal diseases[176] and associated increases in malnutrition[177].

While over 97% of households are reported to have access to improved drinking water, the quality of improved water -especially in rural areas- remains a contentious issue (see water discussion in Health Section). Additionally, for those households without access to improved water, less than half use an appropriate treatment method to clean it, indicating that in some areas non-exclusive breastfeeding is highly risky.

Babies are also susceptible to the effects of under-nourishment in the womb, which may be caused by under-nutrition and anaemia in mothers during pregnancy, and result in low birth weights (nationally 30% of women of reproductive age[178] -and almost half in some regions[179] suffer from anaemia). Approximately 5.7% of children are born underweight, with regional disparities varying more than two-fold. North Kazakhstan Oblast for example has the highest incidence at 9%, compared to 4% in South Kazakhstan Oblast.

Under-5s - Under-5 child stunting rates have halved from 17.5% to 8% in Kazakhstan since 2005, however ~200,000 children still suffer from malnutrition[180]. Under-nutrition in under-5s is also highly variable across regions. Stunting for example, sitting at 8% nationally, is highest in Atyrau Oblast (11.8%), and perhaps surprisingly (due to the high low-birth-weight incidence), lowest in North Kazakhstan Oblast (2.3%). Stunting is 20% higher in rural areas, while wasting in 60% higher, compared to urban areas[181].

Under-nutrition is also well predicted by household wealth, with children from the poorest quintile 66% more likely to be stunted than those from the wealthiest.

Overall, the causes of child under-nutrition are complex and multi-dimensional, and in Kazakhstan are likely to be predominantly "use" based (i.e. dependent on care-giver knowledge of age-appropriate, nutritious diets, including breastfeeding practices). However from the CEE perspective, as noted earlier barriers to access, availability and use of nutritious foods are most likely to be determined by households' ability to produce food for self-consumption, disruption to households income, and decreases in access to safe water.

Household food security - Despite the high level of national food security (a direct result of strong Government agricultural policies promoting intensive cereal farming by agricultural enterprises[182]) household food security remains an issue in Kazakhstan, with ~200,000 people severely food insecure[183]. Reasons for household food insecurity commonly include households being unable to afford food, unable to grow enough food, or when the available food is of insufficient dietary quality.

As the vast majority of arable produce is grown by large agricultural enterprises and sold at scale (much of it is exported) rather than by farming households, household food security in Kazakhstan in most cases is likely to be determined by wealth and access to- and efficacy of food safety-net programmes and social benefits, rather than household's capacities to produce their own food.

However approximately 3 million farming households still do produce food for their own consumption on small personal subsistence plots, and in doing so produce 50% of the country's poultry and 85% of its cattle[184].

From the CEE perspective, by 2030 climate change is expected to reduce overall agricultural productivity by between ~24-33% in important wheat producing regions, and by up to 31% in pastures important for livestock rearing[185]. While the direct implications for household food security remain unknown, reductions in productivity are likely to undermine food security in households that consume produce directly, as well as reducing national food security and agriculture-determined GDP (currently at 8%), with potential knock-on impacts on the Government's capacity to meet food-safety net and social protection needs. In addition, as almost 1/5th of the population are employed in the agriculture sector, affordability of food may also be impacted by both reduced incomes and higher prices for a significant proportion of households, especially in rural areas. Further, an additional 60% of all informal workers are

employed in the agriculture sector, which accounts for an additional 1/3rd of all employment[186] meaning that where agriculture productivity declines, a significant, additional number of informally employed households will be threatened with little or no access to compensation or automatic state support.

7.5 Social Protection

Social protection benefits have the potential to play an important role in protecting households at-risk of increasing hardships due to increasing climate shocks and downward trends in agricultural productivity. Through providing ex-ante assistance to vulnerable households or ex-post assistance to affected households (for example in the form of increased or temporary access to TSA) well designed social protection systems can become valuable tools in helping to offset losses in income or assets due to climate change.

The CEE and Social Protection situation in Kazakhstan

Poverty rates in Kazakhstan have decreased drastically in recent years, dropping from 46.7% in 2001 to just 2.7% in 2015[187], largely as a result of pro-poor economic growth and wealth redistribution strategies[188]. Numbers of households receiving poverty-targeted social assistance benefits (households living on <40% subsistence minimum) have also seen congruent reductions, down from 1.2m in 2001 to just 20,100 in 2015[189].

However, while poverty rates have decreased generally, they remain twice as high in rural compared to urban areas[190], and coverage of low-income and vulnerable families by targeted social assistance and special social services remains fragmented[191]. In addition to the 20,100 people benefiting from poverty-targeted social assistance, ~500,000 children receive state child assistance (reserved for households living on <60% of the subsistence minimum). Children represent a large share of the poor (34.5%) and have a higher poverty risk than other age groups[192].

Extreme weather shocks and long-term CEE trends are likely to negatively impact livelihoods and increase hardships, especially in farming and pastoralist communities[193], and with poverty rates already higher in rural areas, It is likely that as the CEE situation worsens, increasing numbers of already poor households (as well as those that current sit just above the poverty line) will begin to require (or depend more heavily on) social protection programs.

Currently 1/5th of the population is employed in agriculture, and >3 million people grow food or raise livestock on small plots. Being heavily dependent on both the climate and environmental for their livelihoods, it is these households are the most threatened by changes in climate and environmental degradation, and the children living within these households that are most at risk of CEE-driven deprivations.

Coping with CEE in SP - There is currently no emergency or shock-related social protection mechanism in place to assist households affected by climate or other shocks in Kazakhstan. Furthermore, a recent UNICEF study on barriers to accessing social assistance in Kazakhstan[194] identified a number of issues within the current SP system that are impacting its efficacy, and will likely further undermine its capacity to protect CEE-vulnerable households from worsening poverty. (See Box 2).

BOX 2. Barriers to accessing social services in Kazakhstan (as identified by UNICEF's 2017 report)	CEE relevance:
Only ¼ of the households (in surveyed regions) are aware of Targeted Social Assistance (TSA). Awareness of social assistance programs appears to be poorly promoted by the Government. Word-of-mouth is a major vector for information dissemination, especially in remote locations, with current recipients providing the primary channel through which others become aware of assistance options. Low income households were found to be the least likely to be aware of TSA in 1 of 3 regions surveyed.	The remote, rural poor who are often the least aware of their right to social protection are the group most likely to require it more as climate change impacts livelihoods
Genuinely poor households are already being excluded from social assistance. Generally, the eligibility threshold for poverty targeted benefits is extremely low (i.e. you have to be extremely poor to qualify). Applicants for poverty targeted social assistance feel that eligibility assessments are too strict. 2/3 of TSA applicants are currently denied based on their current wealth status being over-represented. The current cut-off is a household income of 40% of the subsistence minimum.	With agriculture being the lowest paid sector in Kazakhstan[195], and much of the home-based farming occurring in the informal economy[196], high numbers of agriculture-dependent households may be excluded from assistance, and therefore sitting just above (the very low) social assistance cut-off line. Those that are may quickly drop in to poverty due to extreme weather events.
Eligibility tests do not accurately capture the real wealth situation of households. The benefits of ownership of livestock or participation in part-time work for example, are over valued, do not reflect local conditions, and given their dynamic nature are difficult to calculate, resulting in them frequently being incorrectly considered in eligibility assessments,. This results in applicants being denied social assistance based on ownership of assets or work opportunities that do not sufficiently raise their wealth to a reasonable standard.	Similarly to the previous barrier, benefits from assets such as livestock, land, and temporary farm-work are highly vulnerable to CEE-threats meaning a family's wealth status can diminish rapidly and repeatedly due to drought, flooding, extreme cold, disease etc. Where the inclusion of these assets/income in eligibility testing does not also capture their fragilities, and is preventing households from receiving social assistance, the overall household situation becomes extremely climate vulnerable. Agricultural productivity estimates in Kazakhstan are also based on information that is over ten years old, meaning that changing land, climate and market conditions -that may have adjusted agricultural productivity and associated household income potential overtime- are not being taken into account.
Receipt of other forms of social assistance prevents restricts access to poverty targeted assistance. Households that benefit from disability, educational stipends and child benefit payments for example, are unreasonably penalised by additional 'income' being included in wealth calculations.	Inclusion of additional 'income' from non-poverty related social benefits may be disguising a very low wealth and food security situation in agriculturally dependent households. Food and income insecure households' wealth may be further reduced in the event of even a mild CEE event occurring, again pushing them in to severe poverty that isn't captured by the system due to its inclusion of other forms of SA.

Complicated and lengthy application processes. Approximately 1 in 8 people who believe they are eligible for social assistance were put off applying because they could not collect the necessary documentation (including unemployment certificates), and a further 12% who did apply were rejected for having submitted incorrect documents. Information on assets, including the presence of a "personal part-time farm" must be included, but it is often not clear what details are necessary, and what assets will exclude applicants from being eligible for assistance

On average respondents required four days to gather the documents needed for application and an additional 14 hours of total travel and submission time to register their first claim (more for remote households). Eligibility assessments are taken quarterly.

Reductions in household wealth status due to extreme weather events can occur rapidly, and repeatedly. In order to prevent affected households repeatedly entering into transient- and eventually permanent- poverty, sufficient social protection benefits must be quick and easy to access.

Of particular concern, in terms of delaying the process, is the requirement of an unemployment certificate or proof of low income status from an employer. For many small scale, rural farming households (that often operate in the informal sector) this likely presents a myriad of problems, for example: the transition from employed to unemployed (or from wealth to poverty) is not clear for self-employed farmers or people engaged in part-time or informal work; and, unemployment certificates can only be acquired at employment centers in district capitals, making them difficult to obtain for rural households.

In addition employment centers may provide applicants with work rather than presenting them with an unemployment certificate. This option may be unachievable for rural famers as it often means having to travel long distances to urban areas, therefore creating a barrier to climate vulnerable households being protected from worsening poverty.

Overall, there appears to be an imbalance between the TSA criteria that rightly prevents non-poor agriculturally-dependant households from accessing assistance, and those that should ensure that extremely poor agriculturally-dependant households who need it, receive it.

The main issues are:

- Ownership of agricultural assets immediately places households ineligible for assistance, regardless of how minimally this bolsters their real wealth or how rapidly these assets can be lost;
- Lack of knowledge of both the existence of social assistance and the eligibility criteria to apply is greatly affecting the number of households applying for assistance, especially in remote rural (climate vulnerable) areas;
- Even when people are knowledgeable of their rights and how to access them, the practicalities of applying for them are convoluted, expensive and time consuming, especially for people living away from district centers and who were not previously employed
- Despite being self-employed, this status does not grant small-hold farmers the license to certify themselves as receiving income below the threshold or as unemployed. Instead their low income or unemployment status must be proven within the constraints of a system not designed to process their claim quickly or efficiently (a requisite of effective shock-responsive SP).

While these barriers are not unique to Kazakhstan, the very real and grave threat of repeated loss of agricultural assets, especially in central and north areas (particularly vulnerable to drought and extreme cold), combined with a social protection system not designed to efficiently address their situation places many farming households and their children extremely vulnerability to worsening poverty, and may result in increasing child deprivations at the household level.

In light of the SP reform taking place in 2018 that will:

- abolish the State Child Allowance and instead use a single, increased TSA allowance, and
- raise the cut-off level for eligibility (though likely still leave many poor households uncovered and ineligible for assistance[197])

UNICEF's on-going support to the Ministry of Labour and Social Protection may provide a timely opportunity to influence the design of the TSA system towards ensuring vulnerable children living in CEE-affected households are adequately protected from extreme poverty.

CWDs, Special Social Services and CEE - In terms of children with disabilities' access to Special Social Services: long distances from services; a lack of transportation; difficulties in paying for transport; and difficulties in using public transport with disabled children have been identified as important barriers to accessing SSS[198]. In UNICEF's 2017 study, 30% of respondents who were eligible for SSS but did not apply identified 'distance-related' factors among their reasons. It follows that where climate related extreme events, particularly snow storms and flooding inhibit ease of travel; where solutions such as the InvaTaxi scheme remain insufficient; and where paying for transport becomes less affordable, barriers to services may become more common.

7.6 Child Protection

Globally, the links between climate change and child protection tend to focus on impacts of disasters and worsening rural poverty leading to: higher numbers of working children, children entering the worst forms of child labour, lower school attendance, and drop-outs; disaster-driven migration, separated children, exploitation, trafficking and abuse; economic migration, higher rates of single parent-families and female headed households, and increasingly, issues such as radicalisation and children in conflict with the law[199,200;201].

Child protection issues that have been highlighted in Kazakhstan by the Committee on the Rights of the Child 2015, and could *potentially* benefit from analysis from the CEE perspective include:

- Child labor in cotton and vegetable production[2] (re: employers demanding cheaper, child labor to compensate for falling productivity)
- Urban child labor in places of entertainment and trade[3] (re: concerns

[2,3] Concerns highlighted in the CRC COB Kazakhstan 2015

related to rural-to-urban economic migration)

- High rates of mental health problems in children[4], leading to depression and some of the highest rates of adolescent suicide in OECD countries[202] (re: links to environmental and poverty drivers of mental illness)
- Separated, institutionalized and fostered children[5] (re: links to increased migration and poverty)
- Sexual violence towards, abuse and exploitation of children (re: poverty as a driver of child exploitation)

Of particular importance to UNICEF's on going work, exploring the connection between environmental degradation on the underlying causes of poor mental health and high suicide rates in adolescents may be justified. Additionally, suicide and mental health are recognised as an "emerging issue" within UNICEF's Strategic Plan 2018-2021

Rationale for strengthening UNICEF KCO's investigation in to linkages between the environment and children's mental health include:

New scientific evidence has shown that exposure to $PM_{2.5}$ is positively associated with increased psychological distress.[203]

There is growing evidence relating to the impacts of activities in natural environments on children's mental health and their cognitive, emotional and behavioural functioning[204].

In children, a greater quantity or proximity of natural spaces around the home or school is significantly related to improved cognitive performance[205] and reduced incidence of behavioral issues[206]

Mental health of individuals is in part a product of nature and is negatively impacted by land degradation processes[207] - a considerable issue in many areas of Kazakhstan.

In relation to Child Friendly Cities, and according to information already produced by the CFC initiative in Kazakhstan, data on suicide deaths, as well as suicidal behaviour and attempts can be used to develop comprehensive prevention programmes aimed at young people, families, communities, policy makers, and health and education specialists[208].

UNICEF is currently investigating the spatial distribution of mental health warning signs in children through digital, online questionnaires undertaken in schools, designed to identify high risk individuals. The tool asks school-children to self-identify their mental state through answering a number of questions, designed to identify early mental health warning signs.

By combining the spatial data that results from this activity with environmental health data (highlighting hotspots of poor environmental health across the country), it may be possible to further understand whether, or how environmental risk factors contribute to children's mental health status in Kazakhstan.

[4] Identified by the General Prosecutor's Office, 2015, and highlighted in the UNICEF CPD 2016-2020

[5] Concern highlighted as requiring more data in the CRC's List of issues in relation to the fourth periodic report of Kazakhstan 2015.

8 Potential CEE threats to the UNICEF Kazakhstan Country Programme outcome areas,

Indicative Country Programme Outputs	Indicators and potential impacts of CEE
Outcome area: Families with children, adolescents, and young people living close to or below the national subsistence minimum are more resilient (to economic and social deprivation, and stress) and they benefit more from equitable access to quality and inclusive social services and transfers **Related UNICEF Strategic Plan outcomes:** Health, Child Protection and Social Inclusion	
1.1 The effectiveness of social assistance in reducing the vulnerability of children and their families is strengthened; the revised national subsistence minimum is equity-based and child-friendly; and the social model of disability is incorporated into relevant legislation. 1.2 Improved legislation facilitates the better cohesion of the health, education and social protection services. 1.3 The patronage nursing system provides a comprehensive range social and health home visiting services to children and their families, which meet international standards. 1.4 A quality assurance system over social work, including case management, gate-keeping and referral is functioning	Indicator: Share of households in lowest income quintile receiving means-tested social assistance transfers CEE Impact: • Remote, rural, agricultural-focused households living close to or below the national subsistence minimum become more vulnerable to adverse weather/ long-term changes in climate, and more reliant on social protection • Higher number of climate-affected households in lowest quintile • The revised national social protection system does no take in to consideration the specific situation of self-employed farming households' loss of earnings due to adverse climate conditions – children within these households remain outside of social protection system (despite being below the raised NSM) • Risk of increased transient poverty increasing child deprivations in households remains invisible to social protection services Indicator: Percentage of CWD benefitting from individual rehabilitation programmes (national, urban, rural) CEE Impact: • Children requiring special assistance living in remote areas experience worsening service provision as flooding and harsh weather continue to impact access to special social services • Increased poverty in climate vulnerable households limits ability to pay for transportation and other costs associated with accessing SSS Indicator: Percentage of families with children under-five satisfied with the quality of home visiting services CEE Impact: • Increasing numbers of children living in deprived circumstances in climate vulnerable locations • The patronage nursing system does not adequately plan or budget for the growing needs of the rural, climate vulnerable poor (no spatial budgeting/ planning based projected decreases in household wealth in some locations) Indicator: Number of children under 3 years of age in residential care institutions CEE Impact: • Loss of livelihood opportunities in rural areas due to climate change results in migration and family separation leading to increasing institutionalization • Children at higher risk of deprivation, institutionalization, exclusion, and discrimination due to decreases in household income with climate change Indicator: Rate of suicide per 100,000 adolescents aged (15-19 years)

and aligns with international standards. 1.5 District-level authorities resource innovative approaches and policies to reduce the incidence of adolescent suicides; Youth Resource Centres provide outreach and awareness to vulnerable adolescents on the signs of depression, and promote help-seeking behavior.	• Mental health problems are increasingly being linked with deteriorating environmental health, potentially undermining UNICEF's actions on reducing suicide rates in adolescents Indicator: Proportion of mothers (or caregivers caretakers, aged 15-49 years) of children under-five who recognize the two danger signs of pneumonia (top and bottom wealth quintiles) CEE Impact: • Continuing increases in air pollution place more children at risk of respiratory diseases. Increasing proportions of mothers/ caregivers may not be sufficient to keep up with growing numbers of children at risk, i.e. numbers of respiratory infections continue to increase, despite greater recognition of danger signs • Rural to urban migration places increasing numbers of children in pollution hotspots – caregivers originating in rural areas may have lower awareness of air pollution threats to children's and pregnant women's health, and less knowledge of danger signs of pneumonia. Indicator: Proportion of CWD in mainstream primary and secondary education • Low standards of WASH facilities in schools already present significant barriers to CWD education. Reductions in student numbers and school budgets in rural areas, and shortages of water as a consequence of climate change are likely to exacerbate problems with maintaining WASH standards and increase barriers for CWD, in rural schools especially.
Outcome area: Children, especially those in difficult life circumstances, suffer, witness and practice less psychological and physical maltreatment, including all forms of harm, abuse, neglect, and exploitation at home, in school, in care, in custody and in public spaces. Related UNICEF Strategic Plan outcome(s): Child Protection	
Greater awareness of the risks and long-term social and economic costs of VAC results in increased public demand for 'zero tolerance' policies, reporting of cases and enforcement of legislation protecting children from violence. Legislation, policies and protocols (including respective accountabilities) related to VAC are aligned across health, education and justice systems, legally enforced and regularly monitored. A system for data collection, monitoring reporting and analysis on the quality of care in closed institutions and schools is functioning; the Children's Ombudsperson and civil	**Indicator:** Percentage of children (aged 2-14) who experience any violent discipline at home CEE impact: • Violent discipline is more common in the poorest quintile households than any other quintile. Household wealth is likely to decrease in climate vulnerable locations, potentially leading to increases in violence in affected areas **Indicator:** Number of children left without parental care entering residential institutions CEE Impact: • Loss of livelihood opportunities in rural areas due to climate change results in external migration and family separation. Institutionalization of children is Climate driven competition for central funding may reduce state allocations for child-focused investments, undermining state institutions capacities to implement laws.

society independently monitor VAC in closed institutions and schools.	○ Climate change results in overall reduction in economic production and foreign exchange through exports (agriculture) ○ Climate change results in more spending on adaptation and disaster response, reducing focus on social care
Outcome area: The Government of Kazakhstan fosters opportunities for State institutions, civil society, private sector, academia, the media and the international community to mobilize support, capacity and resources to advance the rights of vulnerable children and adolescents, within and beyond the borders of Kazakhstan. **Related UNICEF Strategic Plan outcomes:** Health, HIV/AIDS, Nutrition and Social Inclusion	
Innovative partnerships, initiated by Parliament, civil society, the corporate sector and the media engage the public in discourse on priority issues affecting children.	**Indicator:** Proportion of ODA that is 'child-friendly' CEE impact: • Growing proportion of development budgets allocated to CEE activities that are not yet child-sensitive or include child participation in design, planning or monitoring

9 Country-Specific Barriers to Improved Protection of Children from CEE Threats

A number of issues specific to Kazakhstan are preventing a clear picture of the threats to children from being formed, as well as the known issues from being addressed, they include:

An incomplete baseline of environmental and health related data (especially spatial and age disaggregated data)

- Insufficient air quality monitoring apparatus. Low availability and quality of data
- Data that is made available publically is not presented in a useful way and is not easily accessible
- "Protection of Personal Information" legislation is preventing high resolution health-related information being made available, unnecessarily limiting researchers ability to identify localized relationships between pollution and health.

Weak enforcement of environmental protection legislation

- Allegations of corruption
- Strong short-term economic focus of central government strategies, at the expense of environmental protection

- Lack of a separate agency or ministry responsible for climate and environment issues due to the dissolution of the Ministry of Environmental Protection (subsumed into the Ministry of Energy)

From: Bulletin of the Ecological Society Green Salvation Herald (2017)

"The country's unsatisfactory compliance with international obligations, adopted in accordance with the Aarhus and other environmental conventions, is regrettable. Public access to objective environmental information, decision-making and justice has deteriorated noticeably. This is largely due to an ineffective monitoring system and intentional hiding of information by governmental agencies and commercial entities. Information about sickness rate caused by pollution is either absent or hidden."

From: Bulletin of the Ecological Society Green Salvation Herald (2017)

" The main factor determining the socio-ecological situation in the country remains the state's policy of economic growth at all costs in the absence of environmental policy. […].

Under the plausible pretext of reducing costs and improving the investment climate, extracting companies work tirelessly to "soften" the environmental legislation and alleviate the tax "burden." As a result, numerous amendments to laws do not contribute to environmental protection, but only increase legal chaos."

While comprehensive legislation and some CEE policies and strategic plans are in place, a recent restructuring of ministerial responsibilities has also taken place, potentially indicating a regression of the Government's overall stance on climate and environmental protection issues.

Perhaps the most important action in this respect has been the dissolution of the Ministry of Environmental Protection, firstly into the what became the Ministry of Environment and Water Resources (2013), followed by an institutional downgrading, into a department within the Ministry of Energy and Ministry of Agriculture. While these readjustments do not in themselves prevent progressive CEE actions being developed or implemented effectively, the possibility of a conflict of interest -where the implementation of potentially strongly competing policies are the responsibility of a single institution- can not be ignored.

In addition, high levels of corruption within state power[6], low levels of enforcement of environmental legislation[209], and recorded

[6] According to Transparency International, with a score of just 31/100 Kazakhstan ranks as number 122 out of 180 countries on the Corruption Perception Index. https://www.transparency.org/country/KAZ

reductions in environmental communication between the Government and NGOs[210], indicate that the degree to which the Government takes environmental protection seriously may be undermining the long term sustainability of the country's natural resources and environmental health.

Lack of inclusion of children within the CEE sphere

- No child-focused activities in CEE sectors – i.e. no inclusion of children in designs, no child participation and no child-sensitive-indicators

Significant barriers to CEE learning in schools, undermining the general environmental/green awareness of the population:

- Weak inclusion of environmental issues within subjects
- Low engagement of teachers with modern teaching methods
- Weak extra-curricular inclusion of environmental issues (field trips etc)

From: UN Special Rapporteur On Human Rights & Toxics, End of Visit Statement – Kazakhstan 2015
"In my view, in Kazakhstan there appears to be a systematic and wide-spread deficiency in: (1) generating information on pollution in the environment that threatens human rights, in particular the right to health; and (2) enabling public access to information in a manner that allows people to defend their rights […
…] although a generally adequate legal framework is in place, there is consensus that the environmental legislation in Kazakhstan is not being properly implemented, complied with, or enforced. This raises the question of the political will of the Government to protect human rights from hazardous substances and wastes."
Baskut Tunchak, UN Special Rapporteur on Human Rights and Toxics, 2015.

10 Entry points and recommendation,

UNICEF Kazakhstan has been, and remains, engaged in a number of activities containing components, activities, outcomes or goals that are influenced or undermined by CEE. On top of these, some of UNICEF's traditional partners' activities, as well as potential new partners' activities contain entry points through which UNICEF can begin to better influence the CEE space, better address CEE threats to children, and improve children's overall CEE resilience.

The following provides a list of the recommendations and entry points available to UNICEF to begin to address the issues highlighted in this report, better integrate CEE issues within its programming, capitalise on existing partnerships and strengthen its engagement with CEE actors

10.1 General Recommendations

In order to strengthen programming capacity to address CEE challenges internally, as well as to begin influencing partners towards greater inclusion of children within CEE-financed development activities, a number of baseline actions are recommended:

1) **Appointment of a CEE Focal Point** responsible for engaging in adaptation and mitigation dialogue and communicating and coordinating UNICEF's KCO's CEE work and messages both within and outside of the

organization with the Government, UN agencies, NGOs and donors.

In order to manage workloads and capitalise on specialist staff skills, it is recommended that the CEE Focal Points are designed as a Focal Point Triangle, where the base of the triangle is formed by DRR staff providing substantive technical inputs, while the Communication section develops advocacy and communication materials. These specialisms will then feed up to the UNICEF Representative or Deputy Representative at the top of the Triangle, responsible for delivering messages to external government and development partners, and the public.

2) **Development of a stakeholder engagement strategy** including producing multi-media information and advocacy materials to influence decision makers in Government to view CEE proposals through a child-rights lens prior to project approval, as well as to build a greater understanding and demand for the inclusion of child-sensitive planning and policy within up-coming CEE-focused strategies and activities and child-sensitive design, budgeting, implementation and evaluation in climate finance investments.

Specific advocacy and awareness targets for raising the profile of children within CEE planning should include;

1. The Ministry of Energy - Committee Of Environmental Regulation And Control, and Focal Points for the Global Environment Facility and the Green Climate Fund
2. UNDP, World Bank, EBRD, GIZ – an specifically the development of National Adaptation Plan (UNDP)
3. UNDP/ GEF Small Grant Programme
4. Digitize Kazakhstan (GoK), Ministry of Health, UNDP and CAREC - Environment and Health programming
5. Astana and Almaty City Councils

Please see Annex 2 Advocacy targets

3) **Establish a Children-and-CEE Roundtable,** building on the momentum achieved during the CLAC mission, KCO should consider formalizing a roundtable to bring together government agencies, donors, NGOs and other potential partners working within the climate and child spheres. Invitees should include:

- Ministry of Energy
- Ministry of Health
- Ministry of National Economy – Committee on Statistics.
- Ministry of Labor and Social Protection
- Committee for Emergency Situations
- Ministry of Education
- World Bank
- EBRD
- GIZ
- UNDP
- UNDP – SGP (Almaty)
- CAREC (Almaty and Astana)
- Akbota NGO
- CISC ECO FUND
- EcoShkoli- Green Flag initiative

Chaired by the UNICEF CEE Focal Point, the CCEER roundtable will at once bring together all relevant actors to allow greater visibility of activities, exchange of information, and highlight opportunities related to children and CEE, as well as raising UNICEF's profile as an active and important partner across the CEE landscape.

An additional, smaller side-table should be organized to look specifically at the issues associated with air pollution and human health,

and the timely opportunities for UNICEF to engage in the design of related activities currently being initiated by UNDP and CAREC.

1) **Allocate time to continued learning** about CEE within each CO section/ division, coupled with developing a **formal internal mechanism** for improved coordination between sectors to identify joint actions for CEE – sharing of experience and lessons learned in different activities, across the organization. Consider attending and contributing to national and regional environmental and public health focused events, such as CAREC's June 2018 Central Asian International Environmental Forum

2) **Raising children's voices** in the climate sphere, and advocacy for greater inclusion of inputs from children into the design process and participation from children in the implementation of CC initiatives (advocacy with donors and implementing agencies).

Children in Kazakhstan have not yet been adequately included within the design and implementation processes of CEE investment delivery. Helping children to be heard and increasing their participation in all phases of projects can have beneficial impact on both projects' outcomes and sustainability, and foster a much needed culture of CEE awareness in the next generation of resource users and decision makers.

3) Greening external operations.

UNICEF may want to consider directing greater focus toward ensuring procurement of products and services for its activities with Government and other implementing partners is undertaken in an environmentally and climate responsible way.

10.2 Sector-specific recommendations See Annex 1 Sectoral/ Activity Recommendations

Child Protection/ Youth and Adolescent

- Explore the linkages between mental health and environmental degradation/ air pollution/ access to open spaces, with a view to identifying targeted environmental solutions to support the reduction of suicide rates.

Education in rural areas

- Address CEE-related barriers to education in rural areas, with a focus on declining rural populations, falling student numbers, insufficient budgets, and poor learning conditions (including WASH in Schools). Supporting the Government in identifying workable, clean and sustainable solutions to energy poverty in homes and schools across the country should also be prioritized

Environmental Education

- Collaborate with new environmental-education-focused development partners to identify ways to improve teachers' access to more modern and environment-specific learning tools and lesson plans

Education and Nutrition

- Address climate-driven threats to children's nutrition through supporting improved nutritional awareness, availability and quality of school meals via school-garden vegetable production, combined with environmental learning programs

Health and Innovation Lab

- Support the Innovation lab to include air pollution as a priority theme in its next Hackathon.

Health and impacts of CEE

- Engage with the GoK and partners to support greater capture, availability and analysis on information relating to the linkages between environmental and human health with a strong focus on air pollution, and ensure child morbidity and mortality rates data are specifically included and disaggregated.

Health and WASH

- Support the development of WASH programmes aimed at improvement of Government's baseline capacity to legislate, budget, plan, design and deliver sustainable, coordinated WASH services.

- Investigate opportunities to undertake assessments of WASH standards in schools across the country. Consider piggy-backing on on-going, established national school assessment mechanisms, such as School Structural Safety Assessments for DRR, to quickly capture WASH conditions, and identify most vulnerable schools.

- Investigate the potential for technical support on climate resilient WASH from regional COs who have already included WASH in Schools assessments within DRR-based school assessment activities, and from UNICEF-GWP.

- Ensure MICS activities capture all water and air pollution related indicators. Consider ensuring "diarrhoea incidence" returns as a MICS survey question, or alternatively engage with Government to ensure Government-collected data (in lieu of MICS data) is made readily available. Ensure including water quality testing is included within MICS 2020 activities (already identified by CO). Ensure knowledge od first signs of pneumonia, and questions on cooking and heating fuels and methods is included

Social Protection

Engage with the Government to highlight the importance of adapting social protection services to meet the growing needs of climate vulnerable households

- Ensure climate vulnerable households are specifically targeted in TSA revisions.
- Assess the SP system's capacity to respond to the poverty impacts of extreme weather events and long term climate change
- Include a question related to "barriers to accessing Special Social Services" within the child-centered disaster risk and vulnerability analysis (DRR) to enable barriers to accessing special services to be evaluated within the CEE/Disaster context

Disaster Risk Reduction

- Strengthen existing DRR activities to better integrate broader, more CEE-focused threats to school infrastructure and service delivery (specifically WASH and energy access (heating) related)

See Annex 1 Sectoral/ Activity Recommendations for more details

10.3 Priority actions/ urgent partnership opportunities

Partners for better understanding of the Health-Environment nexus

With respect to the likely impacts on children's health from water and air pollution, the low availability of data and lack of consensus on causal relationships, UNICEF should consider:

1) Establishing a health and environment focused partnership with UNDP and CAREC.

UNICEF, In partnership with CAREC should consider supporting the Government to investigate the relationships between children's health, climate change and environmental degradation.

UNDP is currently in the process of requesting spatially disaggregated data from the Ministry of Health in order to assist in the identification of potential relationships between the country's climate change and environmental degradation situation, and human health impacts. CAREC meanwhile have established a regional programme aiming to establish causal relationships between environmental and human health. However, neither initiatives have yet considered the opportunity to utilize age disaggregated data in order to highlight specific threats to children's health, or locations where children are being impacted disproportionately by CEE threats.

As dissemination of data remains a sensitive issue in Kazakhstan, it is recommended that UNICEF engage in dialogue with the Ministry of Health in order to sensitize their decision makers and encourage collaboration towards collecting and disseminating child related data, disaggregated by location and age parameters important for child-risk analysis (for example by Under-5s, and 5-17 year olds at health facility level resolution across the country)

2) Support the Innovations Lab and air pollution focused NGO partners to tackle air pollution information and awareness issues

Unicef's Innovation Lab in Almaty has been carrying-out Hackathon activities in Kazakhstan for the last 2 years. Hackathons provide rewards and support to young software developers to design and develop-to-pilot innovations in mobile phone application technologies, based around themes identified by UNICEF KCO.

Building on the 2017 Hackathon, which included environmental and child learning elements, and other activities the Innovation Lab has been working with /supporting on air pollution monitoring, and their experience in data analysis, there is strong rationale for targeted UNICEF support to include CLAC related issues within their upcoming 2018 work (Hackathon Round 2).

Of particular importance is support to the development of innovative, child-friendly apps that bring together the growing number of NGO-led air pollution monitoring systems (that are now being calibrated to Government standards, and are therefore becoming accepted) and mobile applications, to support air pollution learning, improve children's awareness of pollutant levels, and to recommend exposure-reduction actions to be taken on high air pollution days.

Potential Hackathon barriers than will need to be overcome include:

- Hackathons are becoming very popular in Kazakhstan, with phone companies for example offering jobs and substantial rewards for winners. As such competition is high and UNICEF may not be attracting the best young minds due to its lower rewards.
- Prize money for winning does not reflect the cost of getting the app to market, meaning previous winners that developed useful apps in the last round

have not yet been able to get their apps to market. Post-hackathon continuation is dependent on the goodwill and on-going enthusiasm of the developer, rather than on a costed business plan and obligation to continue post-win. While there is the option for winning apps to apply for UNICEF Innovation Fund grants, the scale of the Innovation Fund's grants are not appropriate for app-based developments.

Solution: for apps to make a substantive difference to the air pollution response and exposure-reduction situation, UNICEF may need to consider offering higher prize monies plus on-going financial support and technical assistance to the winners. Hackathon contestants, as part of their application obligations should also be required to develop a indicative budget to get their app to market that will be submitted and be included in the evaluation process. This will ensure useful apps that are likely to be achievable within a budget are fully costed, and if they win, can be supported to completion.

3) CEE-focused engagement with Kazakhstan's Social Protection reforms

In order for social protection systems to be able to adequately protect against the additional economic vulnerabilities that come with increasing CEE-threats, they first need to be strengthened in delivering their core responsibilities[211]. As such, UNICEF's continued support to ensuring the Kazakhstan SP system addresses the needs of the most vulnerable, is in effect pushing it towards being better able to cope with CEE threats. However, more can be done to a) better understand the specific vulnerabilities and circumstances of children from rural, agriculturally-dependent families, and b) strengthen the SP system to better assisted climate vulnerable households with children to cope with climate shocks and disasters.

Recent "shock-responsive social protection" work in Armenia investigating the 'readiness' of the country's social protection system to implement preparedness and mitigation strategies in emergency situations (via social cash transfer programmes), may provide interesting regionally-relevant findings.

4) Strengthen Disaster Risk Reduction actions for CEE threats

School Structural Safety (SSS) Assessments - although multi-hazards are included within the 2014 recommendations for improving assessment methodologies (for up-scaling the programme nationally), more needs to be done to ensure CEE-type disaster risks (i.e. water availability and quality impacts, electricity cuts after disaster events, storm damage to buildings), are adequately captured in the SSS methodology.

Rationale: as the programme expands nationally, seismic risks will decrease in some areas, and other more CEE-relevant risks will increase. Vulnerability Analyses (as supported by UNICEF – DRVCA), conducted at the local level can sensitize and inform SSS assessors as to the localized threats, and should be carried out before School Safety Assessments are conducted.

Once captured by the DRCVA, these spatially variable vulnerabilities ought to be understood and considered (i.e. via trainings) on a rayon-by-rayon basis, by those undertaking the School Safety Assessments. In this way experts conducting assessments will be able to tailor their methodology to the location and place appropriate weighting of their risk criteria according to the main disaster threats identified for each location.

11 Greening UNICEF

In line with the 2016 Executive Directive on Addressing the Impact of Climate Change on Children's fourth pillar on "*Greening UNICEF*": and the UNICEF Strategic Framework on Environmental Sustainability for Children 2016 – 2017's Priority 5 on "*Incorporating environmental sustainability management (ESM) in the organization*, UNICEF KCO has already taken a number of important steps toward reducing its Environmental Footprint

Based on the results of an Environmental Footprint Assessment of the KCO office in 2015 and 2016, UNICEF KCO was advised to conduct a power consumption audit, funded by global project funds. A certified energy audit company "KazEnergy" was engaged to conduct the assessment. The results of the audit and recommendations were presented to the office in February 2018.

They include:

- Increasing energy efficiency throughout the office through installation of heat-reflecting screens behind heating devices.
- Installation of energy-saving film on windows and sealing rubber around the perimeter of windows
- Improving insulation in the building's walls
- Fitting energy monitoring devices

Energy saving from the implementation of energy-saving measures from the calculated indicators will amount to 129.7 thousand kW / year.

These actions are in line with UNICEF's new Strategic Plan 2018 – 2022, which makes addressing environmental and energy efficiency issues an organizational priority.

However, there is still room for improvement, most importantly with regard to making environmental sustainability an integral part of programme design and operations, outside of the office.

Annex 1 Sectoral/ Activity Recommendations

UNICEF Section activity and output area	Entry Points and CEE relevance	Justification	Partners/ Projects
Child Protection/ Youth and Adolescent **Output 1.5: District-level authorities resource innovative approaches and policies to reduce the incidence of adolescent suicides** **Suicide prevention activities utilizing school-based, online mental health self-assessments.** **Child Friendly City Initiative, with reference to the upholding of the rights of children to:**	Exploring the linkages between mental health and child wellbeing, and environmental degradation/ air pollution **Opportunity:** Utilise spatially disaggregated mental health data **(**being gathered in schools) to identify locations where: a) rates of poor mental health in children are high, and, b) environmental degradation and air pollution may be affecting children's wellbeing, c) UNICEF can support urban greening initiatives/ strengthen integration of air pollution issues into CFCi activities CEE relevance: - to better understand whether environmental conditions are contributing to poor mental health problems in children and help to predict areas of high mental health risk. - Identify opportunities / actions to improve children's mental wellbeing, i.e. access to a clean natural environment, open/ green spaces, improved urban design etc In conjunction with UNICEF's on-going Child Friendly Cities work, the identification of locations/	Mental Health issues are a growing concern in Kazakhstan. Suicide and mental health are recognised as an "emerging issue" within UNICEF's Strategic Plan 2018-2021 New scientific evidence has shown that exposure to $PM_{2.5}$ is positively associated with increased psychological distress.[212] There is growing evidence relating to the impacts of activities in natural environments on children's mental health and their cognitive, emotional and behavioural functioning[213]. In children, a greater quantity or proximity of natural spaces around the home or school is significantly related to improved cognitive performance[214] and reduced incidence of behavioral issues[215] Mental health of individuals is in part a product of nature and is negatively impacted by land degradation processes[216]. In relation to Child Friendly Cities - Data on suicide deaths, as well as suicidal behaviour	**Zhastar/ BlimBox –** school-based online mental health self assessments **Child Friendly Cities Initiative CFCI**- with Committee for Child Rights Protection of Ministry of Education and Science of the Republic of Kazakhstan UNICEF HQ have recently launched two new products developed by **UNICEF's Child Friendly Cities Initiative (CFCI)**: the **UNICEF Child Friendly Cities and Communities Handbook** and **new CFCI website.** CISC ECO FUND 'Making City Healthier". project through Almaty City Municiplity -Division of Nature Use (focus on urban green spaces) **Green Belt of Astana Initiative** – Astana Akimat's development and management of green spaces around the city of Astana - photos

• **Have green spaces for plants and animals;** • **Live in an unpolluted environment**	communities most in need of improved access to green spaces (based on rates of poor mental health in children) may be possible.	and attempts, can be used to develop comprehensive prevention programmes aimed at young people, families, communities, policy makers, and health and education specialists[217].	
Children with Disabilities, Access to Education and WASH in Schools	In order to better understand the additional barriers to CWDs education in mainstream schools, UNICEF KCO should consider the following: 1. Supporting the Government of Kazakhstan in undertaking an assessment of WASH in Schools standards across the country, including CWD criteria 2. Consider supporting the integration of WASH in Schools assessments within DRR-focused School Structural Safety activities, with additional assessment of their compatibility with CWD requirements. 3. Better understand the WASH situation in institutions providing education for CWDs i,e. in boarding schools and similar, Is there at least one bathing area that is accessible for females with limited mobility and a separate one for males with limited mobility? (from WHO/UNICEF 2016 WinS indicators document[218].) The current climate in Kazakhstan already impinges on the capacity of schools to provide a continuous	CRC 2015 identifies concern for discrimination against children with disabilities, especially with regard to their access to education. By 2020, UNICEF has targeted supporting increasing the proportion of CWD in mainstream primary and secondary education by ~50%. Poor standards of WASH in mainstream schools may present barriers to achieving this goal. WASH standards in many rural schools are recognised as being sub-standard, and are very likely to be incompatible with the needs of CWDs, outdoor toilets, for example are the norm in the majority of rural schools, and are likely incompatible with the needs of CWDs. According to WHO/UNICEF WinS standards[219], indicators for “Advanced Service” facilities (appropriate for Kazakhstan’s level of income and development) include WASH services that are: accessible to all (including CWDs), of sufficient quantity, inspected for cleanliness &	

	supply of water in some schools, while climate change projections are likely to disrupt water supply further. Without a better understanding of the current conditions and climate vulnerabilities of WASH facilities in schools, addressing WASH-based barriers to CWD education will not be possible.	appropriate facilities for menstrual hygiene management are provided. SDG also provide support to inclusion of CWD needs into WASH in schools actions: SDG 4.a: Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, nonviolent, inclusive and effective learning environments for all 4.a.1 Proportion of schools with access to: (d) adapted infrastructure and materials for students with disabilities; (e) basic drinking water; (f) single-sex basic sanitation facilities; and (g) basic handwashing facilities (as per the Water, Sanitation and Hygiene for All indicator definitions)	
Education in rural areas **Small School Design for low population/ remote areas** **Supporting rural teachers to become more engaged with CEE-type learning**	Addressing CEE-related barriers to education in rural areas Opportunity: 1) Consider investigating the appropriateness of small school designs to address the situation of normal schools in remote/ low population areas no longer suitable/ economical for small numbers of students 2) Explore opportunities for schools to access climate finance (i.e. UNDP, SGP, World Bank) with which to increase energy efficiencies and reduce costs (freeing up budgets for other needs) 3) Explore options for increasing rural teachers access to environmental education awareness, materials	1) Declining population numbers in rural areas, coupled with Government policy for maintaining school access throughout remote locations has resulted in schools being unfit for the small number of students, with high costs and declining budgets with which to pay for maintenance and heating, and purchasing of energy efficient technologies. UNICEF Armenia has been working with a similar situation and is currently investigating the appropriateness of small school designs for improved learning condition and cost efficiency. 2) A number of CEE-financed activities provide opportunities to increase schools' resilience to adverse climate conditions, and finance	UNICEF Armenia – the Small Secondary School Design pilot project is highly relevant to the Kazakhstan situation: The UNICEF Armenia example is related to secondary schools serving small numbers of children in remote areas. It is based on the following principles and approaches: • Development of a model of education institutions with enrolment of a small number of children, • Organization of education in small size schools and development of effective teaching and learning methodologies,

	and lesson plans, and incentives to attend trainings in regional centres. **CEE relevance:** Conditions in rural areas are likely to become harsher and less productive, and with lower student numbers (and consequently lower school budgets) as migration to urban areas (due to both urbanization policies and climate change-driven reduced agricultural productivity) increases. Availability of materials and budgets for improved environmental education are essential for increasing children's learning on environmental issues. Rural, small schools suffer from low budgets, which is reflected in low availability of materials, and an overall low engagement with new concepts and new teaching methods.	"green" and energy efficient technologies in schools. UNICEF partnerships could assist them in identifying the most important targets for their interventions, from the child right's perspective. 3) Rural schools are suffering from poorer teaching and lower teacher retainment rates. Teachers in remote areas are less likely to become engaged in modern teaching methods, and have reduced access to appropriate materials important for CEE-type learning.	• Community involvement in the children's education and community development, • Saving of financial resources and their effective utilization in education and community development. "The school sketch project should be based on the construction principles of Universal Design and Child Friendly School and should consider the requirements of energy efficiency and use of alternative energy sources" GEF Small Grants Programme(grants for CEE- type technologies and activities, including solar heating and electricity) Energy Efficiency Law and Comprehensive Program for Energy Efficiency (CPEE), (Energy efficient retro-fitting of municipal buildings, including schools) **UNDP** De-risking Renewable Energy Investment (Eurasian Development Bank component providing investments for EE retrofitting of nurseries, schools and clinics)
Environmental Education	**Opportunity:** UNICEF to work together with new development partners (already tackling environmental education in Kazakhstan) to identify	Environmental awareness and knowledge is low in Kazakhstan.	UNDP -Climate Box for schools Ministry of Education

	ways to improve teachers' access to more modern and environment-specific learning tools and lesson plans UNDP, though its Climate Box and The SGP programme has been actively engaged with schools in Kazakhstan, providing material and financial support for purchasing materials and tools to help schools provide environmental teaching and move towards a more green status (waste recycling, water saving, renewable energy, energy saving) and reduce costs, in conjunction with educating students in the need for sustainable resource use and reductions in GHG emissions. The EcoShkoli (Eco Schools) and Green Flag programme in Kazakhstan (active globally) should be investigated for closer collaboration and support (See UNICEF Macedonia CLAC) CEE relevance: supporting environmental education towards improving children's understanding and interest in the environment, sustainable development/ natural resource use is an important step in building awareness throughout societies in general. The SEARCH II initiative has produced The Air Pack educational toolkit – it provides resources for teaching children about indoor air quality in schools. It focuses on indoor and outdoor sources of pollution, and on perceptions of comfort in the classroom.	Although lesson plans and some materials are becoming more widely available to teachers, and trainings in more modern, interactive pedagogical delivery are being delivered, the historical underlying learn-by-rote, didactic approach to teaching remains, making learning about environmental issues difficult for students. Teachers are not sufficiently incentivized to include environmental learning within their annual work plans. Low budgets for education result in low pay and limited incentives to include extra work loads/ new material. Availability of tools, instruments (measuring devices, chemicals), teaching materials and opportunities to engage children with touch-and-feel type learning is low, and more difficult in locations suffering from insufficient local administration budgets. Although 50,000 teachers have been trained in improved pedagogical approaches, the impact of the trainings is unknown, and likely hindered by a number of barriers including: logistics, time required (1 month) to complete trainings, corruption (paying for certificates), and disincentives from senior teachers and school administration staff[220]	CAREC - The Education for Sustainable Development Programme - The Education for Sustainable Development Programme GEF Small Grants Programme– specific reference to the Akbota NGO's work with SGP in providing funding to schools to increase children's exposure to "green" concepts and technologies, and improve energy efficiency/ access to clean energy in schools. Current SGP Phase 6 is "youth oriented" providing an excellent opportunity for UNICEF to engage with the SGP itself to integrate child-focused criteria within its project selection mechanism, and with selected/funded projects to support their child focused activities. UN CC:Learn The One UN Climate Change Learning Partnership (including UNICEF) supports countries to design and implement systematic, recurrent and results-oriented climate change learning. Eco-Schools/ EcoShkoli - a global program of ecological management and certification for the sustainable development of schools- inspires and

			supports teaching and administration staff to integrate sustainable "green" activities into school design, lesson planning and delivery, energy and WASH infrastructure and general school management. SEARCH II - assessments of children's comfort and exposure to indoor air pollution in schools
Education and Nutrition **Support to Ministry of Education**	Support improved nutritional awareness, availability and quality of school meals via school-led vegetable production, combined with environmental learning programs Identify locations (through UNDP's NAP process) in which long-term and seasonal household food insecurity will require schools to be better funded and more flexible in providing nutritious meals to children from climate vulnerable households. Investigate opportunities to work with green schools, SGP and other eco-related actors to bolster that availability of nutritious foods in school meals through school-garden vegetable/ livestock production	Malnutrition remains a cause for concern in Kazakhstan. Low quality meals at home and in schools may be contributing to poor learning outcomes for least wealthy and rural children especially. Rural, agriculturally dependent communities/households are likely to become poorer and more food insecure. Currently schools provide meals to children from households receiving social protection benefits, though the nutritious quality of meals is reportedly unregulated[221] and may be low. The number of children requiring meals is likely to increase during periods of drought or other livelihood-impacting events. Schools do not have the surge capacity to expand their coverage when necessary, and use only the SP mechanism to identify eligible children (meaning children from affected non-registered houses will not be covered).	UNDP – NAP activities will be (in 2018) identifying high climate change risk areas. UNICEF's collaboration with UNDP to identify specific risks to children's nutrition should be considered. GEF Small Grants Programme– specific reference to the Akbota NGO's work in providing funding to schools to increase children's exposure to "green" concepts and technologies, including growing vegetables that contribute nutritious elements to school meals

		Current SGP Phase 6 is "youth oriented" providing an excellent opportunity for UNICEF to engage with the SGP itself to promote expansion of proven horticulture-type activities in school across the country, in conjunction with exposing children to environmental concepts/ augmenting classroom-based learning	
Health and Innovation Lab **Hackathon - Hackathons encourage young software developers to design and develop apps to address themes related to child rights, identified by UNICEF KCO**	Support the Innovation lab to include air pollution as a priority theme in its next Hackathon. Air pollution is a hot topic, especially amongst youth. Developing apps targeting children, adolescents and youth may help in air pollution awareness, prevention and exposure reduction. The Common Sense Civic Foundation is leading the way in civil air quality monitoring, and is increasing its visibility and acceptance by the Government and the public.	Hackathons allow participation of youth and children in the air pollution issue, via digital technologies, and within the established Innovation Lab modality. This opportunity represents a valuable entry point for UNICEF to engage with CEE. The Innovation Lab has excellent experience in developing air pollution-focused digital tools and platforms, as well as managing the previous 2017 Hackathon. This institutional knowledge and capacity should be capitalized on through UNICEF prioritizing air pollution as a main theme within its up-coming Hackathon 2. In addition, funding should be provided to support developers in getting winning apps to market, in addition to prize money	Innovation Lab University of Technology, Almaty Common Sense Civic Foundation (Air quality Monitoring expertise) – consider engaging with CSCF in order to build awareness/ response utility within the system (i.e. integrate/ improve/ endorse pollution reduction/ avoidance advice messages to users – capitalise on youth acceptance of this and similar initiatives.
Health and impacts of CEE	Engage with the GoK and partners to support greater availability and analysis on information relating to the linkages between environmental and human health, and ensure threats to children's health are specifically included.	Environmental pollution, particularly air and water quality are believed to be strongly impacting children's health across the country, though insufficient evidence is available to identify strong causal relationships. A lack of data, or unavailability of spatially and age	UNDP – Climate Change Division GoK, State programme – Digital Kazakhstan CAREC - Environment and Health Programme- regional initiative

	There is currently a lack of spatial and age disaggregated data, restricting the evaluation of the impacts of environmental pollution on children's health. UNDP, CAREC and the GoK are independently working towards addressing the situation in various ways, though there is currently no focus on the specific risks to children's health presented by, for example, air pollution.	disaggregated data is one of the main barriers to improved understanding of the linkages. UNDP is currently in the process of requesting spatially disaggregated data from the ministry of health in order to understand the relationships between CEE circumstances and human health impacts for an initiative called "How climate change affects populations health" The Government of Kazakhstan's Ministry of Information is in the process of preparing the Digital Kazakhstan programme - a new initiative aiming to increase the digitization of a number of currently analogue data sets, including information on population health. CAREC are implementing a regional initiative to identify causal relationships between environmental pollution and population health.	investigating linkages between human environmental impact and human health
Health and WASH, inc WASH in Schools	Support the development of WASH programmes aimed at improvement of Government's baseline capacity to legislate, budget, plan, design and deliver sustainable, coordinated WASH services. Include water quality testing within MICS 2020 activities. Consider ensuring diarrhoea incidence remains, or engage with Government to ensure Government collected data (in lieu of MICS data) is made available.	The current WASH situation in Kazakhstan already places children, particularly in remote areas, at increased risk of water-borne disease, and of exposure to potentially harmful toxins, including heavy metals. Climate change and on-going environmental degradation threaten to further reduce water availability and quality, potentially placing more children at risk of health-related impacts.	UNICEF – Global Water Partnership (GWP) GWP's mission is to advance governance and management of water resources for sustainable and equitable development. Kazakhstan is already an accredited partner of the GWP. GWP and UNICEF have recently developed and launched a Strategic

	Consider requesting support from COs with experience of integrating WASH-focused assessments into DRR school assessment methodologies. Investigate the potential for technical support from UNICEF (GWP) to state and private partners. Investigate opportunities to undertake assessments of WASH standards in schools across the country. Consider utilising on-going, established school assessment mechanisms, such as School Structural Safety Assessments for DRR.	Improving baseline water delivery standards across rural areas especially, is critical for building resilience to likely future reductions in water availability. WASH in schools is believed to present a serious threat to children's health and learning, again, predominantly in rural and remote areas, and especially where school budgets are insufficient to maintain minimum WASH standards. However, very little is known about the WASH situation in schools. A better understanding of the impacts of limited access to safe drinking water on children's health is needed. Barriers to delivery of continuous, universal, safe water already exist in Kazakhstan, and will likely worsen with climate change. Support is needed for improved budgeting, planning and administrating of water management programs, at both national and subnational levels.	Framework to provide WASH service delivery that is resilient to climate change. SSS-DRR - integrate WASH focus into current School Structural Safety assessments Kyrgyzstan and Armenia COs, for example have experience in school WASH assessment under their school DRR-focused activities. Supporting sustainable water management is strongly in line with both the Green Economy Concept and Action Plan (2013):, and the Kazakhstan 2050 Strategy
Social Protection **"Barriers to access social assistance and special social services in Kazakhstan" report**	Engage with the Government to highlight the importance of adapting social protection services to meet the growing needs of climate vulnerable households **1) Ensure climate vulnerable households are specifically targeted in TSA revisions.** UNICEF, within its engagement with the new TSA design process,	1) Extreme events (shocks), such as flooding and drought (See section 2) are already impacting rural livelihoods. Extreme events are likely to become more frequent and intense, with resulting worsening impacts on agriculture and increase damage to households and services. In addition climate change is also predicted to result in long-term reductions in	UNICEF Armenia- has recently commissioned an emergency preparedness, cash-based response evaluation, investigating the preparedness/ capacity of the Armenian social protection system in providing sufficient support to beneficiaries during and after crises. Reproducing this work in

Regional Office – Social Protection **Cash Preparedness Assessment (Armenia example)**	should consider including advocacy for changes for improved, specific support to rural, climate-vulnerable families with children. In line with recommendations made in the "Barriers to accessing social services in Kazakhstan 2017" report, the Government should be supported to more accurately capture the group's poverty situation in-terms of: ownership of assets and their real value; availability of appropriate alternative employment and ability to engage in employment; as well as their specific situation with regard to being able to prove their unemployment or low-income status, and their status of existing within the informal sector. **2) Assess the SP system's capacity to respond to the poverty impacts of extreme weather events and long term climate change** (Armenia example), including whether there is sufficient surge capacity within the SP and emergency benefits system to cope with CEE shocks impacting poverty. From the Special Social Services perspective: 3) Include a question related to "barriers to accessing Special Social Services" within the child-centered disaster risk and vulnerability analysis, to identify areas where an increased focus on resolving transportation is most needed.	productivity, which will slowly erode rural livelihoods viability, meaning social protection services will need to become more responsive to rural households' needs. 2) A number of barriers to accessing social assistance and services in Kazakhstan have been identified in the recent UNICEF report. Many of the barriers identified are most disruptive for would-be beneficiaries in rural areas, those who are reliant on climate and environmentally dependent/vulnerable livelihoods, and operate within the informal work sector. Protecting vulnerable communities from the projected poverty-related impacts of climate and environment will require improved social protection systems that adequately capture and include rural agricultural-dependent households' particular situations (see UNICEF Armenia shock responsive social protection work). This should be evaluated in terms of timely access to benefits in the event of *both* more frequent extreme weather events (shocks/disasters) *and* year-on-year reductions in productivity (creeping poverty due to slow-onset climate change). 3) 30% of respondents to UNICEF's 2017 study who were eligible for Special Social Services but did not apply identified distance-related factors among their reasons. A lack of transport, difficulties in paying for transport,	the Kazakhstan context, with a stronger view towards long-term reductions in agricultural productivity, and ensuring inclusion of communities in remote areas, may be valuable. DFID-funded study on shock responsive social protection systems (Overseas Development Institute (ODI), the Cash Learning Partnership (CaLP) and INASP) Southeast Europe and Central Asia Catastrophe Risk Insurance Facility – potential for learning partnership with World Bank's catastrophe insurance and early warning project. Use of Early warning system's can prepare beneficiaries for shocks, and allow service delivery agents (i.e. social protection services) to provide timely assistance.

		and difficulties in using public transport with disabled children compound the issue. It follows that where rural poverty increases, and climate related extreme events, (particularly snow storms and flooding) inhibit ease of travel, these concerns may become more common. Evaluation of access to public services is already included within the "Methodology for risk analysis of disasters at the local level with special attention to the needs and vulnerability of children" (UNICEF/ GoK/ZUBR), which looks at time and distance criteria in order to access services. However the evaluation does not consider special social services, or the impact of disasters and extreme weather events on accessing them.	
Disaster Risk Reduction –WASH in Schools and maintaiing conditions conducive to learning (energy/heating) **Output 2.6: National authorities resource inter-sectoral initiatives**	Strengthen existing DRR activities to better integrate broader, more CEE-focused threats to school infrastructure and service delivery All of the DRR activities focus strongly on earthquake-based disaster risk reduction, largely through strengthening school building design and construction standards and practices, and improving awareness, knowledge and behaviour of students and teachers. **Opportunity:** Support the inclusion of greater CEE-focused resilience in School Structural Safety Assessments roll-out (currently seismic risk focused),	Schools throughout the country are known to have low WASH standards and poor access to clean energy for heating, potentially undermining learning and placing children at risk of disease and hardship. According to the UNICEF Country Programme Strategy, by end 2017, the national school safety assessment system is aligned with the *Global Framework for Comprehensive School Safety* (which includes WASH and energy requirements)	Disaster Risk Child Vulnerability Analyses (DRCVA)/ Zubr Integrate regional lessons learned from UNICEF Turkmenistan and UNICEF Armenia's DIPECHO-based school safety assessment work to identify WASH and energy issues within Kazakhstan's SSS activities. Promote CEE adaptation, i.e. through improved WASH and energy security (solar and clean energy)

to advance child safety and reduce mortality and disability from injuries in children **School Structural Safety (SSS) Assessments** **DRCVA activities** **In 2013 UNICEF KCO piloted a rapid visual screening of eight schools on Disaster Risk Reduction Education and in 2014 identifying methodology improvements for up-scaling the pilot programme nationally.** **Implemented the expanded Structural School Safety programme in 38 Schools in 4 regions with the Ministry of**	with particular focus on maintaining minimum standards for learning conditions, i.e. WASH and water access, and heating/affordable access to clean energy in schools. **CEE relevance:** Utilizing local CC vulnerability assessments (DRCVAs) already being supported by UNICEF, School structural safety assessment teams should consider factors inc. continuous access to water and electricity during and after extreme weather events (floods, storms, drought). Where schools are identified as vulnerable, opportunities for investments such as PV panels, solar water heaters, water storage tanks and water saving technologies should be explored and recommended. Locations likely to benefit the most from these types of assessments are: • South Kazakhstan, East Kazakhstan, Kyzylorda, and Zhambyl – due to the "emergency" conditions of the schools (OECD) • Kyzylorda – due to poor water quality conditions and climate projections of decreasing water availability • Northern and central steppe regions – due to water scarcity and extreme cold conditions	To-date the focus of school Structural Safety Assessments has been strongly skewed towards measuring their resilience to seismic activity. However, schools in many locations, especially in more remote areas, are vulnerable to various threats in addition to earthquakes. As the pilot SSS assessments roll-out nationally, regions more vulnerable to drought, flooding and storms will be assessed. Local vulnerability assessments (DRCVAs) have been carried out that could assist SSS assessment teams in better understanding localized CEE risks and reporting on related school infrastructure-related threats to children's education. Also consider investigating the Making Schools Healthy –SEARCH II initiative that looked at school heating and indoor air pollution conditions, and their impact on children's health. Integrating the SEARCH methodologies into the SSS may allow for identification of schools at risk of indoor air pollution/ placing children in health-impacting situations.	UNDP – SGP - support schools identified (through the SSS/ DRCVA mechanism) as highly vulnerable to water and energy poverty towards accessing SGP funding SEARCH II – supported by the Italian Ministry for the Environment, Land and Sea (IMELS) Working with DRR initiatives for climate adaptation is in line with Change Strategy 1 - Programming At-Scale Results For Children, through "Enhance coherence and connectedness between humanitarian action and longer-term programming – including analyses of risks related to disaster, conflict, climate change and other shocks" Global Framework for Comprehensive School Safety, includes key responsibilities to: - Adapt water and sanitation facilities to potential risks (for example, rain-fed and lined latrines). - Implement climate-smart interventions to enhance water, energy and food security (for example,

National Economy and the National Construction Institute **Assisting the Government in inclusion of Disaster risk reduction issues in the school curriculum, and developed supporting materials including booklets and guides for teachers.**		rainwater harvesting, solar panels, - renewable energy, school gardens).

12 Annex 2 Advocacy targets

Partner/ Coordination/ Advocacy Target	Opportunity	Rationale
Ministry of Energy - Committee Of Environmental Regulation And Control, and Focal Points for the Global Environment Facility and the Green Climate Fund	**Influence decision makers within The Ministry of Energy** (responsible for overseeing CEE proposal development and signing off on submissions to climate finance providers) to encourage a stronger child-focus in project designs	To- date there is no recognition of the specific vulnerabilities of children to CEE threats within the national CEE sphere, and consequently the preparation of CEE financed projects are not viewed through a child-rights lens at any point in their design. This results in submissions from development partners having no inclusion of child-focused activities, no child participation in the planning or implementation phases, and no child sensitive indicators developed for monitoring and evaluating the impact of the projects on children's wellbeing.
UNDP –SGP programme **The Small Grants Programme has been working with a number of schools, via grants to NGOs, to improve schools' inclusion of environment, clean energy and climate change issues within their learning activities and school infrastructure. Actions**	Influence UNDP-SGP towards stronger engagement with child-focused projects/ increasing their focus towards funding NGO-school partnerships. Building on the exemplary "Akbota" NGOs work with assisting schools in accessing sustainable, CEE-appropriate technologies (including clean energy) and inclusion of CEE learning. Utilizing the SGP's established mechanism for training recipients of grants, UNICEF has an opportunity to identify and access hundreds of school principals and teachers who have shown	Improving environmental education and school environmental status is largely dependent on individual teacher/principal enthusiasm, and availability of budgets with which to implement activities. The SGP funding mechanism has carved out a key role in addressing both of these issues, and presents an opportunity for expanding to a wider number of schools and school children Operation Period 6 of the SGP is currently being developed, and is specifically youth focused. Through supporting the SGP funding mechanism to better include child-sensitive indicators, child-focused design and child participation within its Phase 6 "Youth Oriented"

have included investments in solar water heaters, water filters, materials to improve **NGO Akbota Association– established UNICEF partner and SGP recipient partner working with environmental issues**	interest in improving their school's situation and environmental education performance. Many school-oriented NGOs already exist that are eligible to apply for SGP finance	selection criteria, and working with school-focused NGOs to assist them in designing child-centered proposals, UNICEF can contribute to improving environmental education and strengthening schools' capacity to secure funding for environmental education and energy efficiency/ clean energy activities. Working with UNDP-SGP is in line with Change Strategy 6 of the UNICEF Strategic Plan 2018-2021
UNDP - NAP	**UNDP is currently preparing the National Adaptation Plan** for Climate Change - UNICEF should work with UNDP to ensure children are properly and fully considered within the plan	NAPs are a means of identifying medium- and long-term adaptation needs and developing and implementing strategies and programmes to address those needs. Inclusion of children's specific vulnerabilities to climate change and their particular needs (to improve their resilience) within this document will be crucial for ensuring children are properly represented within climate policies and projects in to the future. Partnering with UNDP is in line with Change Strategy 6 of the UNICEF Strategic Plan 2018-2021
UNDP CO - Health and Environment work	UNDP are currently developing an initiative to better understand the linkages between environmental and human health.	Age disaggregation of information and findings has not been considered in the development of the initiative so far. However, following the CLAC process' engagement with UNDP, there is agreement and enthusiasm within UNDP to better capture child-specific environmental-human health impacts.

		UNDP will require assistance in identifying the most important issues for children, and in creating methodologies and indicators to ensure these are captured in its activities. This coordination between UNICEF and UNDP should aim to influence wider inclusion of child-sensitive indicators within UNDP's broader implementation of climate and environment finance Partnering with UNDP is in line with Change Strategy 6 of the UNICEF Strategic Plan 2018-2021 United Nations Working Together through "addressing climate change; and improving; and ensuring greater availability and use of disaggregated data to address inequity".
CAREC - Environmental and health (EHP)	CAREC are working with human health and environmental degradation throughout the Central Asia region. Influencing CAREC to adopt child-sensitive indicators within their climate and environment focused work will	CAREC's regional EHP programme is working closely with WHO and the European Centre for Environment and Health. It's focus on water, sanitation and hygiene; climate change; and air pollution make it an ideal candidate for partnership with UNICEF. Encouraging CAREC to include the specific vulnerabilities of children and develop their design to take into account the need to disaggregate based on age should be strongly considered.
Astana and Almaty City Councils (Akimats) Municipal Energy Efficiency Plan for the City of Astana	In conjunction with UNICEF's ongoing work with the Child Friendly Cities Initiative, UNICEF has an opportunity to engage with Akimats to strengthen support for addressing CEE-relevant child related issues such as increasing awareness, prevention and improved response to air pollution threats, and ensuring issues such as children's mental health is fully considered within emerging city strategies and designs, that	A number of urban space activities are being planned, in line with city-level energy efficiency strategies and urban greening plans. i.e.in Astana - Green spaces in the city/ 'Making City Healthier" activities under the Division of Nature Use (changing to Division on Environmental Protection). UNICEF is already engaged with the CFCi, providing a clear entry point for increasing Akimat's awareness of the threats

Municipal Energy Efficiency Plan for the City of Almaty	promote green spaces and limit polluting industries and activities within the vicinity of populated and high child-density areas (i.e. schools)	that urban-specific CEE issues place on children health and wellbeing. In addition, new projects and strategies, such as the World Bank funded EE

13 Annex 3 CEE-relevant Policies and Strategies

Table 1 Policies and Strategies related to CEE

CEE Strategy/Policy	Climate change	Environmental degradation	Energy (renewables, efficiency and access)	Are CEE-child linkages included?
Kazakhstan 2050 Strategy Kazakhstan Strategy 2050 is a long-term plan consisting of 100 concrete steps that should implement an institutional reform to place the country among top 30 advanced nations in the world by 2050,	Climate Change is not included within the100 Concrete Steps	Environmental issues are not included within the 100 Concrete Steps	Step 59 refers to energy savings	No – there is no specific mention of children in terms of CEE issues.
	Policy areas included?			
CEE Strategy/Policy	Climate change	Environmental degradation	Energy (renewables, efficiency and access)	Are CEE-child linkages included?

Green Economy Concept and Action Plan (2013): In 2012 the Government, through its Kazakhstan 2050 Strategy, outlined its decision to transition to a green economy. in 2013 Kazakhstan developed and approved the Green Economy Concept, which contains a business case for the transition, objectives and expected outcomes, specific priority sectors which have largest green growth potential and relevant financial mechanisms for financing green projects based on best practice and taking into account specifics of Kazakhstan's economy.	To reduce current CO2 emissions in electricity production by 40% by 2050;	SOX, NOX emissions into environment at EU levels Municipal solid waste (MSW) coverage -100% Sanitary utilization of waste -95% Share of recycled waste - 40%	The Concept set the following targets: -To decrease energy intensity of GDP by 50% by 2050 from the 2008 level; -To increase the share of non-conventional energy sources in the electricity production to 50% by 2050.	No child-focused elements. The Concept is highly sensitized to the health impacts of the current water situation, but not specifically on children. The Green Economy Concept proposes a set of sustainable-development initiatives across six key areas: water, agriculture, energy-using sectors, energy production, air pollution and waste, many or all of which will have important impacts on children's welbeing.
CEE Policy	Policy areas included Climate change	Environmental degradation	Energy (renewables and access)	Are CEE-child linkages included?

Development of Kazakhstan's National communication to the UNFCCC and Biennial Report UNDP/ GEF. Ministry of Environment and Water Resources To assist Kazakhstan in the preparation of its Biennial Report (BR) and National Communication (NC) for the implementation of the obligations under the UNFCCC	Greenhouse gas inventories, Collect, analyze, and update information related to national circumstances; geography, climate, natural resources and socio-economic conditions related to the GHG emissions and absorption; GHG emissions projections for the period 2017-2040; A GHG emission abatement action plan until 2040 developed;	Not ED focused. The project will assit to implement the Green Economy Concept in a more effective and transparent manner in synergy with other environmental conventions	SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all Promote private-sector investment in renewable energy in Kazakhstan in order to achieve Kazakhstan's 2030 target for renewable energy	No explicit inclusion of children or their rights.
CEE Strategy/Policy	Policy areas included? Climate change	Environmental degradation	Energy (renewables, efficiency and access)	Are CEE-child linkages included?
Energy Efficiency Law and Comprehensive Program for Energy Efficiency (CPEE),	Reductions in CO2 emissions are included in the rationale for the Program	General environmental benefits due to reductions of emissions (pollution/ air quality)	The CPEE calls for mandatory energy audit of all public buildings and the application of EE performance criteria for	Addressing EE in school buildings and residential homes is included in the energy efficiency improvement targets

As part of the World Bank's Kazakhstan Energy Efficiency Project, the CPEE focuses on the most energy inefficient sectors of the economy, including industry and the municipal/residential sector. The aim is to tap the country's vast energy saving potential, which is estimated at US$1.3 billion per year or 12 TWh of electricity, 2.5 million Gcal of heat and 7 million tons of coal. Mechanisms in the CPEE include fiscal incentives, standards and codes, awareness raising, state budget allocations with private sector leverage, and the creation of a National Energy Savings Fund. Two new urban focused Plans have been developed in 2017			major building renovations. Focus is on public and residential sectors - two sectors that account for 55% of the country's heat consumption and 20% of electricity consumption. School energy efficiencies are strongly considered within the City plans	Where UNICEF supports better identification of energy poverty (through the recommended expansion of the School Structural Safety Assessments), the CPEE can be used to support calls for increased energy efficiency investments in schools
CEE Strategy/Policy	Climate change	Environmental degradation	Energy (renewables, efficiency and access)	Are CEE-child linkages included?

Municipal Energy Efficiency Plan for the City of Astana **Municipal Energy Efficiency Plan for the City of Almaty**				
CEE Strategy/Policy	Climate change	Environmental degradation	Energy (renewables, efficiency and access)	Are CEE-child linkages included?
EBRD Kazakhstan Renewables Framework **GCF - 110m USD** The Green Climate Fund (GCF) has approved an allocation of up to US$ 110 million to the EBRD's Kazakhstan Renewables Framework, an innovative plan to finance the construction and operation of renewable energy projects in the Central Asian country.	Yes - CO2 emission redutions	No	Yes, macro-scale interventions The framework was approved by the EBRD Board of Directors in December 2016 for a total volume of € 200 million. It will support investments in solar, wind, small hydropower and biogas energy sources and the modernisation and strengthening of the electricity grid in order	**UNICEF entry points:** Support the plan in designing indicators to measure benefits to children due to plan activities. Support the plan to ensure educational and awareness activities target children as well as adults

			to enhance the integration of renewable energy sources.	

14 Annex 4 CEE-focused projects with potential entry points for UNICEF engagement

CEE Project Name	Policy areas included Climate change	Environmental degradation	Energy (renewables and access)	Are CEE-child linkages included?
Development of Kazakhstan's National communication to the UNFCCC and Biennial Report **UNDP/ GEF. $1.7m USD Finalised** **Ministry of Environment and Water Resources** To assist Kazakhstan in the preparation of its Biennial Report (BR) and National Communication (NC) for the implementation of the obligations under the UNFCCC	Greenhouse gas inventories, Collect, analyse, and update information related to national circumstances; geography, climate, natural resources and socio-economic conditions related to the GHG emissions and absorption; GHG emissions projections for the period 2017-2040; A GHG emission abatement action plan until 2040 will be developed;	Not ED focused. The development of the NC and BR will assist to implement the Green Economy Concept in a more effective and transparent manner in synergy with other environmental conventions	Energy sector is strongly included within GHG mitigation strategies Promoting of introducing renewable energy and energy efficiency will be carried out in consultations with stakeholders and partners.	No substantive inclusion of the specific vulnerabilities or needs of children in the climate context, despite the project document stating that: "In addition to gender disaggregated data collection for the National Circumstances chapter, the NC and BR project will ensure that the needs of women, **but also children**, indigenous and marginalized people and communities are adequately considered. The project stated that "During the inception phase, the project will design a strategy to ensure the adequate participation of women and local groups in activities to address climate change that may impact or benefit them. This will seek to address gender and vulnerable community dimensions, especially in the mitigation and V&A work."

	Education: Education, along with training and awareness raising are cited as outputs from the project in order to achieve its objective of mitigating an increase in GHG emissions.			UNDP, as the Government's main partner in CC strategy development will require assistance to adequately understand the needs of children and to ensure that the participation of children is undertaken using child-sensitive methodologies and best-practices. Clear opportunity for UNICEF engagement
CEE Project Name	Policy areas included Climate change	Environmental degradation	Energy (renewables and access)	Are CEE-child linkages included?
Ecosystem-based adaptation to climate change in high mountainous regions of Central Asia	Climate change adaptation focused Together with local	Ecosystem based adaptation measures are employed to build CC adaptation	Not EE or RE based	Children are not included as a group with specific vulnerabilities, however inclusion of children as agents of change and recipients of environmental education has been successfully implemented in Kyrgyzstan

GIZ 2015-2019 Department of Green Economy at the Ministry of Energy of the Republic of Kazakhstan The project is part of the German Government's International Climate Initiative (IKI). It aims to introduce an ecosystem-based approach to climate adaptation, in which people continue to use natural resources to secure their livelihoods without harming the environment. This will ensure that ecosystems can provide the services important to people's survival, in the long term.	communities, the project focuses on innovative processes for adapting livelihoods to climate change, involving testing cost-effective strategies and appropriate economic activities, including the efficient use of natural resources alongside efforts to maintain and further develop ecosystem services.			A number of capacity building measures focusing on ecosystem-based approaches and the green economy have been completed for the national partner organisations in Kazakhstan This typically involves introducing alternative sources of income and the sustainable management of forests, land and water resources.
	Education: So far the project has not implemented strongly in Kazakhstan, however work in Kyrgyzstan involved emphasis on environmental education of children and youth through so-called "citizen science" - when volunteers and enthusiasts are involved in research and help to collect important environmental information utilizing accessible and affordable means.			As the project steps up it's activities in Kazakhstan **there may be opportunities for UNICEF engagement** and partnerships to replicate activities the project has already achieved in partner countries

CEE Project Name	Policy areas included Climate change	Environmental degradation	Energy (renewables and access)	Are CEE-child linkages included?
Sustainable and climate sensitive land use for economic development in Central Asia **GIZ 2016-2019 Committee of Forestry and Fauna of the Ministry of Agriculture** Land users, government agencies and the private sector in Central Asia adopt integrated, economically and ecologically sustainable forms of land use, taking climate change into account.	Focus on building CC adaptation capacity of rural, natural resource using communities	Focus on sustainable land of renewable resources, and poverty	Not energy focused	Yes, children are explicitly included in the partner country projects as stakeholders and change agents
	Education: In collaboration with the American University of Central Asia, the programme supports the development of curricula aimed at building capacities among the younger generation for land use planning and adaptation to climate change. It also contributes to interactive television programs developed for the younger generation. These are intended to raise awareness among children and adolescents, to help them form a sense of responsibility for the sustainable use of natural resources and ensure environmantal conservation.			Opportunities for UNICEF to contibute to the inclusion of children within these projects should be explored. The project has so far only achieved forestry related goals. Learning from GIZ's project partner country activities could help ensure Kazakhstan's children are included as toroughly
CEE Project Name	Policy areas included Climate change	Environmental degradation	Energy (renewables and access)	Are CEE-child linkages included?

Southeast Europe and Central Asia Catastrophe Risk Insurance Facility **World Bank/ GEF. Europa Re 5m USD** To assist Kazakhstan with developing a modern catastrophe insurance market infrastructure that will support the launch of affordable, innovative catastrophe insurance products covering the risks of extreme weather variability.	Climate risk management focused: Increased access to sound and affordable weather risk coverage and catastrophe insurance for millions of people and thousands of SMEs, and agricultural producers; Education: No school/ child-based educational components	Not ED focused. The project will increase household resilience to environmental degradation related threats, such as landslides and mudslides. No direct environmental degradation reduction activities	No energy focus	No child focus| Threats to children, i.e. through increasing household poverty are not considered, meaning insurance products are not child-sensitive. Engagement with the project to build awareness of impacts on children from extreme weather events/ reductions in household income should be considered
CEE Project Name	Policy areas included? Climate change	Environmental degradation	Energy (renewables, efficiency and access)	Are CEE-child linkages included?
De-risking Renewable Energy Investment	This project targets SDG 13: Take urgent	SDG12: Ensure sustainable	SDG 7: Ensure access to affordable, reliable,	No child-focused design, however the Eurasian Development Bank (the main credit facility) is committing 30m USD in loans,

2017- 2022 UNDP/GEF To promote private-sector investment in large and small-scale renewable energy in order to achieve Kazakhstan's 2030 renewable energy target The project targets both large-scale and small-scale renewable energy. The goal of the project is to achieve energy market transformation in Kazakhstan by significantly scaling-up the deployment of renewable energy in electricity generation. Technologies will include wind energy and solar photovoltaic (PV).	action to combat climate change and its impacts	consumption and production patterns	sustainable and modern energy for all Promote private-sector investment in renewable energy in Kazakhstan in order to achieve Kazakhstan's 2030 target for renewable energy. Technologies may include solar PV (roof-top), solar water heating and small-scale wind.	focusing on renewable energy in public buildings including nurseries, schools and clinics The project will promote investment in "Renewable Energy Sources (RES) for urban life", on-grid small-scale renewable energy applications, targeting urban households and businesses; and " RES for rural life", both on-grid and off-grid small-scale renewable energy applications, targeting farms and rural SMEs. – EXPLORE EE INVESTMENT POTENTIAL FOR REDUCING HOUSEHOLD RELATED AIR POLLUTION/ IMPROVING CHILD RESPIRATORY HEALTH
	Education: not a strong focus. Min of Education not mentioned. "a significant share of Component 2 will be devoted to building domestic capacity for small-scale RES, through provision of vocational training and other type of learning and educational activities.			
	Policy areas included			

CEE Project Name	Climate change	Environmental degradation	Energy (renewables and access)	Are CEE-child linkages included?
GEF Small Grants Programme **UNDP/ GEF** To build the social-ecological resilience of steppe and desert landscapes of Kazakhstan by securing global environmental benefits from community-based management of biodiversity, ecosystem function, and land, water and biomass resources A number of small grants have been provided to projects focusing on EE and RE, including: **Akbota NGO** - Schools EE, WASH and environmental improvements	The project will support resiliency-enhancing activities in a contained geographic zone, and will seek to increase the adaptive capacity of people being exposed to climate risks. The project seeks to build resilience, so that people are better equipped and prepared to deal with climate risks. EE and RE focus will contribut to emission reductions	**Strong environmental focus**. The project focuses on supporting coordinated community projects, utilising a "landscape approach" that will generate ecological, economic and social synergies that will produce greater and potentially longer-lasting global environmental benefits, as well as increased social capital and local sustainable development benefits	Identifying opportunities for application of renewable energy technologies is a focal areas of the project Trainings on EE technologies will be disseminated as part of the SGP. Development, piloting and dissemination of EE will be supported, including: • Renewable energy sources such as wind or solar • Biogas facilities • pyrolysis furnaces • Water and heat saving technologies such as solar water heaters	Priority on community-based organizations (CBOs), indigenous peoples, farmers, scientific community, women's groups, **and youth and children organizations** Strong gender focus and recognition of child-care responsibilities falling to women Heavy metal risks to children identified as an area for concern **Opportunities** exist to provide SGP fund recipients (that are already including a focus on children within their projects) with trainings on improving their capacities to measure benefits to children/ identify and use child-sensitive indicators **Akbota NGO** has already established itself as a leading NGO in this regard, assisting a Secondary School in Vyacheslavka village of Arshaly district in Akmola region championing the Green Economy Concept of Kazakhstan through mobilizing resources to demonstrate water sanitation and hygiene (WASH) practices in schools using renewable energy sources, as well as partnering with a number of donors to develop energy and water efficient indoor horticulture pilots.

	Edcuation: schools and education-focused projects have been recipients of grants in previous SGP rounds.			
	Policy areas included			
CEE Project Name	Climate change	Environmental degradation	Energy (renewables and access)	Are CEE-child linkages included?
Kazakhstan Energy Efficiency Project **World Bank $23m USD, 2013-2019 on-going** The Energy Efficiency Project for the Republic of Kazakhstan will improve energy efficiency in public and social facilities and the enabling environment for sustainable energy financing. The project consists of two components, investment and technical assistance. The first part will finance eligible subprojects to support a reduction in energy use of public buildings such as schools, kindergartens, clinics/hospitals,	While not CC mitigation or adaptation focused, the project will have strong benefits on reducing CO2 emissions by addressing wasteful energy use CO2 emissions reduction will be measured by the project	Pollution reduction benefits are foreseen, but no measurement tools are evident form the design. Pollution "hotspots" may be improved through project activities "Energy-related pollution is one of the reasons for the existence of a number of environmental “hot spots” in the country with localized pollutants (e.g., NOx, SOx and particulate	Energy efficiency is the main focus of the projects, with publically -owned building retrofitting being the main target Insulation and improved/upgraded technology for heating and lighting are the main technologies being utilised to achieve EE Some renewable energy focus, mainly solar water heating	Expected beneficiaries of the project are: (a) Clients in public facilities (school students, elderly people, hospital patients, etc.). Improvements in EE are expected to have positive impacts on living and working conditions in the targeted facilities by improving indoor comfort levels and healthier environments (e.g. better lighting and heating, improved indoor air quality). Schools, kindergartens and hospitals are a main focus of EE retrofits While benefits to children, such as "reduced student sick days" are noted within the project design, there is no mechanism for recording these benefits to children

and street lighting. These subprojects will generate demonstrable energy cost savings and social co-benefits. The second part concerns technical assistance (TA) to help ensure effective project implementation. The TA includes: (iii) awareness, outreach and information campaigns;		emissions) posing significant health risks."		
	Education: is mentioned, but may not be child-focused Awareness, outreach and information campaigns related to the EE demonstration projects financed under Part 1. This will include marketing of the program, development of early subproject case studies to draw lessons learned, videos and other information, education and communication materials to help increase awareness of the benefits and importance of EE.			**UNICEF entry points:** Support the project in designing indicators to measure benefits to children due to project activities Support the project to ensure educational and awareness activities target children as well as adults
CEE Project Name	Policy areas included Climate change	Environmental degradation	Energy (renewables and access)	Are CEE-child linkages included?
CISC ECO FUND				
CEE Project Name	Policy areas included? Climate change	Environmental degradation	Energy (renewables, efficiency and access)	Are CEE-child linkages included?

Conservation and Sustainable Management of Key Globally Important Ecosystems for Multiple Benefits (Resubmission) **UNDP/ GEF 8m USD Forestry and Wildlife Committee of the Ministry of Agriculture** Improve conservation status and management of key forest and associated grassland, riparian and arid ecosystems important for conservation of biodiversity, land resources and provision of livelihoods for local communities	Not CC focused, but contributes to: Aichi Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	**Highly environmentally focused including:** Aichi Target 5: (loss of all natural habitats, including forests) and Target 11: conservation of terrestrial and inland water, and coastal and marine areas Prevent loss of conservation important forest and associated non-forest ecosystems and their biodiversity:	Fuel energy-deforestation nexus is highlighted, but not developed. The need to identify sustainable fuel-wood extraction solutions is included.	Children and youth not included in design. No participation of children or youth is considered Fire-wood and deforestation linkages are included, but IAP/ health component is absent. Including children within conservation activities could be supported by UNICEF highlighting the important role children and youth can play in adopting technology and environmental conservation and protection actions Potential for including use of FES/ alternative renewable energy options for win-win env/child benefits could be highlighted
	Education:	**No**	**strong**	**linkages**

	"Educational level, access to information and new technologies" is considered within the Gender strategy			
CEE Project Name	Policy areas included Climate change	Environmental degradation	Energy (renewables and access)	Are CEE-child linkages included?
Minamata Initial Assessment **UNDP 0.4m USD, 2017-ongoing Ministry of Energy** Undertake a Mercury Initial Assessment (MIA) to enable the Government of Kazakhstan to determine the national requirements and needs for the ratification of the Minamata Convention and establish a national foundation to undertake future work towards	Not climate related	Environmental pollution due to coal emissions and mining are recognised as a major source of environmental mercury	No energy focus	Risk to children and foetuses are specifically included: The project highlights impacts to children - "Generally, three groups are most at risk from the effects of mercury. The unborn child, small children and people who are regularly exposed (chronic exposure) to high levels of mercury (such as populations that rely on subsistence fishing, people who are exposed through their occupations (e.g. mercury mining, ASGM) or those exposed to mercury containing products. As mercury is passed on from the mother to the child (in utero and during breastfeeding), and fetuses and children are most susceptible to developmental effects from mercury, the MIA will pay particular attention to assessing national capacity to keep such risk groups safe."

the implementation of the Convention				No further details on child-specific actions are described Entry points: UNICEF should consider engaging with the project to ensure child-related risks are fully included within assessment, and potential benefits to children are measured.
	Education: No inclusion of education activities			
CEE Project Name	Policy areas included Climate change	Environmental degradation	Energy (renewables and access)	Are CEE-child linkages included?
Supporting Sustainable Land Management in Steppe and Semi-arid Zones through Integrated Territorial Planning and Agro-environmental Incentives **UNDP/GEF 1.9m USD Approved-On-going** **Ministry of Environmental Protection** To transform land use practices in steppe and semi-arid zones of Kazakhstan to ensure ecological	Some mitigation benefits envisaged through soil management activities	Through LD-focused activities (restoration, efficient irrigation etc), the project helps to prevent soil erosion, loss of productivity and other ecosystem services in the steppe zone in Kazakhstan,	No energy focused activities included	Youth and school children as well as children of farmers will be engaged as participants in workshops and field days. The project is expected to engage the rural youth, about 50 people, in project activities related to establishment of green fallow and development of land use management plan. The project will provide support to vulnerable population groups in the Karabulak rural okrug, mainly to disabled people, pensioners, and large families. Over the past 3 years "Zher-Ana Astana" PA invited 88 orphans and disabled children to Olzhas CF every year. In 2015, this charity event will be supported by the two farmers as the project's participants.

integrity, food security and sustainable livelihoods	Education: Higher and college education focus only			
CEE Project Name	Policy areas included Climate change	Environmental degradation	Energy (renewables and access)	Are CEE-child linkages included?
Supporting Kazakhstans Transition To a Green Economy **UNDP/ EU/ UNECE 7.1m Euro On-going** The overall objective of the Project is to contribute to the long-term environmentally sustainable and inclusive economic development of Kazakhstan through introduction of modern environmental governance system, state-of-the-art water management policies and practices, enhanced environmental impact assessment procedures and	To promote the GE transition at local level with focus on water resources and climate change No educational activities	To promote a modernized environmental governance system aimed at generating incentives for the transition to a Green Economy model with focus on water resources and climate change	No	Not explicitly.

economic incentives for sustainable use of water resources.				
CEE Project Name	Climate change and	Environmental degradation	Energy (renewables access)	Are CEE-child linkages included?
CAREC - The Education for Sustainable Development Programme Mainstreaming SDG 4 "Quality Education" in education systems, integrating "green" knowledge, skills, competnencies and principles in training processes, as well as promoting leadership as a capacity-building tool for teachers, young leaders, public	Yes	Yes - including designing and implementing elective bachelor degree and technical courses on "Environment and sustainable development" and " Energy Efficiency and sustainable development" in Kazakhstan	Yes	Improving education for sustainable development has clear benefits for children. The programme includes the delivery of "Green Packs" - education resource materials adapted to specific contexts, i.e. the Central Asia context, that provide educational insturments and practices. One of the programmes core activities is" Reorienting Education and Training Systems to Improve Lives of Indigenous and Marginalized Youth"

officials and civil society representatives http://old.carececo.org/en/projects/tsentralno-aziatskaya-programma-liderstva-po-okruzhayushchey-srede-dlya-ustoychivogo-razvitiya-tsapl/	Capacity training on key sustainable development themes - including water, climate change, energy, biodiversity, gender, and health - of various target groups, including teachers, young leaders, civil servants, NGOs and businesses.			
CAREC - Environment and Health Programme Recognizing public health as a key factor in socio-economic development and the strong role environmental conditions play in disease prevalence and prevention, the programme seeks to identify the interrelationships between human and environmental health with a view to reducing the environmental burden of disease.	Yes, climate change is being looked at specifically	Yes, air pollution is a key consideration	No	The programme is implementing projects aimed at control, reduction and prevention of diseases associated with: WASH, Climate Change, Air Pollution Research and analysis of these topics is being undertaken to establish empirical causal associations between anthropogenic environmental impacts and disease dynamics in populations, *however* so far the studies are not looking at children's health specifically. **Opportunities** exist to work with CAREC to ensure child-specific vulnerabilities are captured and any linkages between

The programme is a regional approach - it is unclear to what extent it has been operationalized in Kazakhstan				environmental degradation ad children's wellbeing are established. UNDP - are also looking into the linkages between human and environmental health in Kazakhstan.
	Education per-se is not a focus, however public and stakeholder awareness raising on the severity of public health issues provoked by adverse influences on the environment is a key approach.			
CEE Project Name	Climate change	Environmental degradation	Energy (renewables and access)	Are CEE-child linkages included?
Eko-shkoly– Green Flag Scheme EcoSchools is a program of environmental management and certification and education for sustainable development for schools. Its comprehensive approach, based on participation and involvement, and a combination of learning and action make the program an ideal way for the school to begin significant improvements in the school and community, to influence the way of life of young	Yes, reducing emissions and adapting to climate conditions is included within supported themes	Yes, recycling and maintaining a clean environment in and around schools is integral to the programme	Yes, highly focused on energy efficiency in schools	Child learning focused. Eco Schools supports sustainable school management and provides avenues for schools to attract funding for investments such as energy efficient and sustainable water use technologies in school buildings. UNICEF should consider engaging with the Eko-Shkoly initiative in Kazakhstan, with potential for providing support to schools that achieve Green Flag status, or those that require assistance n order to improve the physical, infrastructural conditions of their schools. Eco Schools undertake assessments of schools (with Ministry of Education) to evaluate whether schools are meeting Green Flag criteria. There is potential to capitalise on Green Flag assessments of schools in Kazakhstan to help identify schools

people, the school community, families, local authorities, NGOs, etc				likely to be at high risk of climate induced hardships (water and energy poverty, low WASH standards).
CEE Project Name	Climate change	Environmental degradation	Energy (renewables and access)	Are CEE-child linkages included?
SEACRH II - IMELS Making Schools Healthy (now closed) The SEARCH initiative (School Environment and Respiratory Health of Children) is a research project implemented within the international frameworks of the EU Action Plan on Environment and Health; and the World Health Organization's Children's Environment and Health Action Plan for Europe. The SEARCH initiative is supported financially and technically by the Italian Ministry for the Environment, Land and Sea (IMELS).	No School learning environment focused The Air Pack educational toolkit provides resources for teaching children about indoor air quality in schools. It focuses on indoor and outdoor sources of pollution, and on perceptions of comfort in the classroom.	Yes - Indoor and outdoor air pollution focused	No	The results of the SEARCH 2 project (2010–2013) were based on assessments of children's comfort and exposure to indoor air pollution in schools. A working paper was produced focusing on the role of policies to mitigate indoor pollution. The SEARCH 2 project's conclusions and recommendations support the development of environmental and health policies in Central and Eastern Europe and beyond. The recommendations on indoor air quality risk management that were identified and developed under SEARCH 2 have been translated into the user-friendly educational toolkit AirPack for teachers of children aged between 8 and 11.

15 Annex 5 Resources

15.1 List of CEE organization in Kazakhstan

Institution
GEF Focal points
GCF National Designated Authority
Ministry of Energy
Ministry of Health

Ministry of Education and Science
State Committee of Water Economy
Statistics Committee
UNDP-Small Grants Programme
UN Environment
ADB
CAREC
Aarhus Centre
Eco-Schools
Akbota NGO

15.2 Climate and Environment online tools and resources

The *One UN Climate Change Learning Partnership* (UN CC:Learn)	http://www.uncclearn.org/ The *One UN Climate Change Learning Partnership* (UN CC:Learn) is a collaborative initiative involving more than 30 multilateral organizations which supports countries in designing and implementing country-driven, results-oriented and sustainable learning to address climate change. Choose courses at https://unccelearn.org/ (registration required) Courses include: • Introductory e-Course on Climate Change • Children and Climate Change

UNICEF Publications on CEE and Children	Clear the air for children: the impact of air pollution on children Unless we act now: the impact of climate change on children Why Sustainable Energy Matters to Children Children and the Changing Climate (UNICEF UK) Understanding and Addressing the impact of air pollution on children in Mongolia
Online resources appropriate for child learning on climate change	For kids: • https://climatekids.nasa.gov/climate-change-meaning/ • https://vimeo.com/112042837 • http://worldslargestlesson.globalgoals.org/global-goals/protect-the-planet/ • http://www.comicsunitingnations.org/ Carbon Footprint and Sustainable Development tools: • http://www.myclimate.org/education/ • http://wwf.panda.org/how_you_can_help/live_green/footprint_calculator/ • http://calc.zerofootprint.net/ • http://tfl.kopymark.com/index.php

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