

# PAKISTAN

## Sindh Heatwave April-May 2017



Likelihood	Very unlikely	Unlikely	Somewhat likely	Likely	Very likely
Need for international assistance	Not required	Low	Moderate	Significant	Major
Severity/expected impact	Very low	Low	Moderate	Significant	Major

### Anticipated scope and scale

Sindh province in Pakistan has been experiencing extreme hot and dry temperatures since 12 April. Many rural areas of Sindh are currently experiencing daily highs above 40°C, which are forecast to continue until early May. Average annual temperatures are in the mid-thirties at this time and increase to reach their peak in May and June, when urban areas including Karachi will be severely affected by the heatwave.

Heatwaves in the past have caused considerable health impacts including dehydration, sunburn, and heatstroke. Impacts on WASH lead to additional health risks such as waterborne diseases. Increased power needs might lead to blackouts, affecting hospitals, transport, and communication.

Many groups are especially vulnerable when there is a heatwave. Along with many low income people who continue to labour in the heat, children, old people, homeless, and those already sick have been identified as particularly vulnerable to the effects of the heatwave.

### Preparedness and response

**Preparedness and response:** Heatstroke centres have been set up and access to affected populations is open to humanitarian agencies operating in Sindh.

However, the response of the agencies present is unlikely to reach all affected populations.

Availability of drinking water and increased medical infrastructure is the most important part of the response. Also crucial to response is the inclusion of an information campaign about the increased need to drink fluids and the avoidance of harmful behaviour (e.g. not drinking from late May because of Ramadan fasting). It is unclear whether this response has happened or not.

### Priorities for humanitarian intervention

- **WASH:** conditions are already poor, with contaminated water common. Heatwaves lead to increased use of unprotected water sources due to increased demand and potentially diminished supply. Resulting increases in prices disproportionately affect low income residents. Support for advocacy of continuous and uninterrupted water supplies, including reinstating full water supply to Karachi from the government owned Hub Dam after supply was cut in early April.
- **Health:** Dehydration, sunburn, and heatstroke linked to extreme heat, as well as health problems arising from poor WASH conditions require a mobile response to reach all affected people.
- **NFIs:** Electricity needs will increase, leading to a higher risk of blackouts.

### Limitations of this report

No figures on people affected by the current drought or caseloads of heatwave related diseases have yet been provided.

Reliable information on prevalence of chronic and non-communicable diseases, as well as prevalence of disability in Karachi, is lacking.

The effects of previous heatwaves in rural areas is unavailable.

## Anticipated crisis impact

Since 12 April, hot and dry weather has affected Sindh province, with Dadu and Nawabshah becoming the hottest places in the country with temperatures of 46°C. The whole population of Sindh, an estimated 44 million people, is affected, including major cities such as Karachi. As of 19 April all of Sindh's 29 districts experienced temperatures above 40°C when usual temperatures for this period are in the mid-thirties. 22 people across Dadu district have fallen unconscious due to the heat (City Population 01/02/2016; Accuweather 18/04/2017; Dawn 12/04/2017; Dawn 13/04/2017; PMD 19/04/2017). The extreme heat has badly affected daily business activities, as the ability to do outside work is limited, and the prices of ice and cold drinks have soared. In Larkana and its surroundings, hot weather on 14 April reportedly forced the majority of people to remain indoors.

The weather severity has increased incidents of sun-stroke, dehydration, and sunburn, forcing many to travel to public and private hospitals for treatment (Pakistan Observer 14/04/2017). Rural areas including Jacobabad and Sukkur will be experiencing daily highs above 40°C until early May (Accuweather 18/04/2017; Accuweather 18/04/2017; PMD 14/04/2017; Samaa 12/04/2017). Current temperatures are above average annual levels, but still below average temperatures in May and June.

Unsafe water consumption that already affects the majority of Sindh residents is exacerbated as water consumption increases, and water shortages become more likely. Furthermore, organised crime groups push water prices up during heatwaves by siphoning water from main pipelines and reselling it. These actions lead an increasing number of people to increasingly draw water from unsafe sources, potentially leading to the contraction of waterborne diseases. Disproportionately affected are low income residents, who lack the ability to pay for clean water sources. (Pakistan Today 15/04/2017; The Nation 10/04/2016; Jasarat 22/04/2016). Karachi, a densely populated city, has been particularly affected by previous heatwaves.

Among the most at risk are children, elderly, and those who suffer from various medical conditions (NHS 25/05/2014; Nation 23/04/2016).

Prices of key commodities increase sharply in heatwaves. This was previously the case with water prices in Karachi (The Nation 10/04/2016; Jasarat 22/04/2016). In 2015, when more than 2,000 people died, burial prices increased five-fold (Reuters 20/05/2016). The prices of transport, medicine, private health facilities, among other commodities may also rise.

**WASH:** Karachi has a daily water demand of over 4 billion litres per day, and suffers from chronic water shortages. On 7 April, water supply to Karachi from Hub Dam was cut by more than half by the government Water and Power Development Authority (WAPDA) because of unpaid dues (Dawn 07/04/2017).

The heatwave has already created water shortages, which push people to draw water from unsafe sources (Pakistan Today 15/04/2017). Over 70% of water samples in Sindh

showed water unfit for human consumption. More than half of the water samples collected from reverse osmosis plants installed in Tharparkar were found unsafe due to bacterial contamination and high total dissolved solids concentration (Dawn 05/03/2017). Manchar Lake, Sindh's largest source of fresh water, is polluted with arsenic, mercury, magnesium, and cadmium (Dawn 06/03/2017). Around 80% of water samples from Karachi had bacterial contamination, including fecal contamination, according to a March 2017 report by the Pakistan Council of Research in Water Resources, a state agency. The water samples collected from Hyderabad, Larkana, and Sukkur showed similar results. (Dawn 06/03/2017). In Karachi, around 30,000 people die every year after using unsafe water from rivers containing lead, cyanide, and other dangerous substances and materials (The Nation 30/04/2016).

**Health:** Many people perform manual labour during the peak heat hours of the day, increasing the risk of dehydration and heatstroke. Sharecroppers, agricultural labourers, and pastoralists are particularly exposed to the risk of heatstroke as they work outside. They are the most economically vulnerable groups in rural Sindh and thus less likely to skip work because of the heat. Female heads of households are even less likely to skip work in the heat (The Nation 25/04/2016; Food Security Cluster 01/08/2016; Anonymous source, UNICEF Pakistan).

In Sindh, the increase in temperatures previously coincided with an increase in prevalence of diarrhoea and other waterborne diseases. Water shortages push people to increasingly use unsafe water sources, increasing the likelihood of contracting waterborne diseases. (The Nation 29/04/2016).

Long distances to health facilities in rural Sindh and poor connecting roads limit access to healthcare facilities for the rural population (UN 17/02/2017). If health problems arise due to the heatwave, a delay in treatment is therefore inevitable and could result in further complications.

**Food and livelihoods:** People living in poverty in Karachi have access only to low quality and unhygienic food, increasing the risk of severe diarrhoeal diseases. These diseases can lead to severe dehydration, increasing the risks for the health of the people affected by heatwave (The Nation 29/04/2016; Medical News 01/07/2015; NHS 13/04/2015; The News International 25/06/2015). Prolonged high temperatures have damaged harvests in the past. As temperatures are normally lower in April, if heightened temperatures continue, damage to crops can be expected to have an impact later in the year (Samaa 14/05/2016).

**Protection:** In 2015, power outages resulted in many people sleeping on the streets because of the heat in buildings due to a lack of air conditioning. Women and children sleeping in the open were exposed to protection risks (Washington Post 24/06/2015). If severe power outages occur this year, women and children may face a similar risk.

## Impact on critical infrastructure

The heatwave has caused power cuts in interior Sindh (Dunya News 12/04/2017; Dunya News 19/05/2016). Power cuts frequently cause water shortages in Karachi and in rural areas. Hub dam, which supplies water to Karachi, ran dry in 2016 and 2014, a scenario which could recur in 2017 (The News International 11/04/2016; Jasarat 22/04/2016; One Pakistan 02/2014).

## Vulnerable groups affected

The most vulnerable people are children, elderly, the homeless, and those who suffer from various medical conditions (NHS 25/05/2014; Nation 23/04/2016). Most of those who died in the Karachi 2015 heatwave were particularly vulnerable people: homeless people, people misusing drugs and alcohol, and older people. Most were already in poor health. People suffering from diabetes or chronic respiratory and cardiac conditions are particularly at risk (BBC 02/07/2015; NHS 25/05/2014). Children are also at high risk during heatwaves (Nation 23/04/2016).

## Previous similar crises

### 2015 Heatwave in Sindh

Most national and international media sources reported that in 2015 more than 2,000 people died in Karachi alone because of the heatwave, with the number of casualties outside Karachi unclear (The Frontier Post 24/04/2016; Japan Times 24/06/2015; Bloomberg 24/06/2015). Main needs were WASH and health assistance as well as shelter and NFIs, especially electricity. Although most of the dead were vulnerable people such as homeless, those in poor health, and elderly, many others were exposed to severe heat performing physical labour during peak hours (DAWN 22/06/2015; BBC 02/07/2015; NHS 25/05/2014).

The lack of public awareness about appropriate response to the heatwave, the lack of emergency planning, and the failure of weather forecasting systems to release effective warnings contributed to the high number of deaths in 2015. (Reuters 20/05/2016; DAWN 24/06/2015; The Express Tribune 20/05/2016). In addition to the lack of planning, the health system was not able to respond adequately as many hospitals are overcrowded and suffer chronic power cuts, limiting the availability of air conditioning and water pumping (BBC 02/07/2015; DAWN 24/06/2015; Pakistan Today 12/04/2017; Financial Times 23/06/2015; DW 24/06/2015; New York Times 24/06/2015).

## 2016 Heatwave in Sindh and Punjab

Heatwaves occurred again from April-June 2016, though there were few deaths reported. Reports show five deaths in Sardiwal, Punjab, and Karachi, however reporting on deaths from heatwaves is inconsistent and the number may be higher (The Nation 23/04/2016; The Nation 06/06/2017). This was despite conditions similar to 2015, with temperatures of up to 51°C in rural Sindh (The Express Tribune 06/05/2017; The Express Tribune 22/05/2016).

The diminished impact of the heatwave can be almost exclusively attributed to contingency planning and response by local authorities and NGOs. Provincial and city governments in 2016 created a heatwave emergency plan across multiple sectors (Nation 23/04/2016). Schools were closed in Sindh while in Punjab school days were shortened to finish at 11:00. (Pakistan Today 21/05/2016). Hospital capacity and the number of ambulances were increased and 200 response centres were created for first aid in Karachi, as well as 700 relief centres that handed out drinking water (Reuters 20/05/2016).

On 20 April 2016, Sindh Assembly took action to stop power cuts by power companies during heatwaves, hoping to prevent energy shortages that affected the province last year during the 2015 heatwave (The News International 20/04/2016). Awareness campaigns were also launched, and reached a wide range of people (Daily Times 26/04/2016; The Express Tribune 20/05/2016).

## Potential aggravating factors

### Lack of emergency shelter

Karachi's homeless population was estimated to number over 500,000 as of June 2015 (Al Jazeera America 27/06/2015). During the 2015 heatwave, homeless people were among the worst affected (The Borgen Project 08/08/2015).

### "Heat island" effect in Karachi

With over 23.7 million people, Karachi is the most populous city in Pakistan, making it particularly vulnerable to the urban "heat island" effect (Pakistan Today 22/06/2015). Temperatures in urban centres can be significantly higher than temperatures in surrounding areas, causing big cities to be particularly exposed to heatwave-related risks. This effect causes peaks in the demand for energy, an increase in air pollution, and an increase in mortality related to different forms of heat illness, including dehydration,

heat exhaustion and heatstroke, and to the use of contaminated water. (United States Environmental Protection Agency 30/03/2016).

## Urban Migration

Migration from rural areas to urban centres in Karachi has stretched resources and led to shelter, energy, transport, and public facility constraints (Express Tribune 11/01/2014).

## Dissemination of information on the heatwave

A lack of awareness of the population about the effects of the heatwave and appropriate response required was considered the major cause of deaths in the 2015 heatwave (Potdrum 19/05/2016). Furthermore an estimated 20-30% of individuals that were informed did not follow instructions given to avoid adverse effects of heatwaves (Bakhsh et al. 05/06/2016). Despite efforts to disseminate information through digital, print media, and radio, it is unlikely to reach rural areas where this equipment is non-existent.

The Pakistan Meteorological Department has expressed caution in declaring high temperatures as heatwaves since 2015, for unknown reasons (Reuters 23/04/2016). A delay in the dissemination of information from authorities has previously negatively influenced preparedness and response.

## Lack of access to health facilities

In rural areas, health facilities are few, and people need to travel long distances to reach them. Health facilities are located 35-60km away from Tharparkar and Umerkot districts. There is a lack of medicines and health staff, especially female doctors. Roads are poor, few transport options are available, and costs are high (UN 17/02/2017).

## Inadequate WASH facilities

Water scarcity is a critical issue in Pakistan, and Sindh in particular. The main sources of drinking water are wells (protected and unprotected) and rainwater catchment. Few communities rely on government water supply schemes (UN 17/02/2017, UNDP 31/01/2017). Water sources are difficult to access - households often have to travel 2-15km, often using camels or donkey carts, to collect drinking water (UN 17/02/2017). Very few communities use cloth filtration and boiling to improve the quality of drinking water (UN 17/02/2017).

Power cuts frequently cause water shortages in Karachi. The latest episode was on 13 April (Dawn 13/04/2017). On 7 April, water supply to Karachi from Hub Dam was more than halved by the governmental Water and Power Development Authority (WAPDA) due to unpaid dues (Dawn 07/04/2017).

## Tharparkar drought

Tharparkar and Umerkot districts of Sindh have been affected by a severe drought since 2013. 89 children have died in Tharparkar district between January 2017 and the beginning of April from waterborne diseases and malnutrition (Dawn 04/04/2017). As most deaths occur within the community rather than at medical facilities, the reported number of deaths may be far lower than the actual number. Affected areas received very limited assistance between September 2016 and February 2017. The trends of high nutrition and food insecurity that were recorded in 2015 are likely to have persisted. The heatwave is likely to aggravate the impact on livelihoods in these areas, and deteriorating water sources will exacerbate waterborne disease outbreaks. Malnourished children and those already ill will be particularly vulnerable to a heatwave (ECHO 02/03/2017, UN 17/02/2017).

## Water crime

Water shortages are exacerbated by the presence of "water gangs" – organised crime groups that siphon water from pipelines, control the water sources, and force residents to buy water on the black market, with prices increasing significantly during heatwaves (The Nation 10/04/2016; Jasarat 22/04/2016).

## Poverty

According to UNDP, 75.5% of the population in rural Sindh lives below the poverty line as of 2016. Tharparkar has the highest incidence of poverty, at 87% (UNDP 20/06/2016). People who live in poverty are more likely to be homeless or live in houses without air conditioning. They are also likely to continue working when temperatures rise to extreme levels. Furthermore, this population is most vulnerable to price hikes of key commodities such as water (The Borgen Project 08/08/2015).

## Illiteracy

Literacy rates are as low as 31% in rural areas. Rates fall as low as 16-18% among women (Pakistan Bureau of Statistics 03/2016). The low literacy rates make it more challenging to conduct awareness raising activities.

## Additional contextual information

### Heatstroke

Heatstroke is a medical condition in which the body is not able to cool down anymore and the high temperature increases the risk of failure for several organs, including heart, lungs, and liver. (The Nation 25/04/2016; NHS UK 11/06/2015).

### Ramadan

Temperatures are often worst between May and June. This often coincides with the start of Ramadan, which is in late May this year (The Tribune 28/04/2016; Ramadan Calendar 2016). During Ramadan many people fast while performing manual labour in the heat, or while having pre-existing medical conditions (The Nation 25/04/2016). Religious leaders have previously told people to drink during heatwave conditions. However, many still choose to observe Ramadan fasting, which means no food or liquids are consumed between sunrise and sunset (Reuters 20/05/2016).

### The Hub dam

The Hub dam dried up in 2014 and 2016, as well as in the early 2000s. Although there are no reports of the dam drying up as of April 2017, the possibility remains as hot weather is likely to continue through to the monsoon season in June (The News International 11/04/2016; Jasarat 22/04/2016; One Pakistan 02/2014).

## Key characteristics

**Demographic profile:** Pakistan population (2017): 196.6 million, 51% male (World Population Review 22/11/2016). An estimated one-quarter of the population lives in Sindh (Congressional Research Service 29/10/2015). Karachi (2014): 23.7 million; population density: 23,000/km<sup>2</sup> (World Population Review 13/09/2015).

**Food security:** 800,000 people are in need of food assistance as of January across the country (OCHA 09/01/2017). 27% of the population in Sindh is moderately to severely food insecure (ECHO 02/03/2017, UN 17/02/2017).

**Nutrition:** In Sindh: 3.6% severe acute malnutrition, 24.4% chronic malnutrition (Pakistan Data Portal 07/04/2016).

**Health:** Sindh: under-five mortality (2014): 104 per 1,000 live births; infant mortality: 82 per 1,000 live births (DAWN 08/10/2015). Maternal mortality ratio (2012): 214 deaths per 100,000 births (Evidence Project 08/09/2015).

**WASH:** As of 2014, 90% of Sindh's population has access to improved water sources, while 65% has access to improved sanitation. However, 3% of households were reportedly using water contaminated by arsenic, and 39% were using water contaminated by the bacteria *E. coli*. A survey in 2017 indicated that 70% of water was unfit for consumption (Government of Sindh and UNICEF 2014; Dawn 05/03/2017).

**Lighting and cooking:** Main energy sources in Sindh for cooking are firewood and biomass fuel. Of all households' firewood/biomass energy consumption, 82% is for cooking, 18% is for water boiling and heating (World Bank 2015).

**Literacy:** In Sindh, literacy rate was reported to be 56% as of 2014. Female literacy was reported to be 43% in 2014, compared to 47% the previous year. However, in rural areas literacy rates are as low as 16-18% for women. Male literacy also decreased from 72% in 2012-2013 to 67% as of 2014 (The Tribune 05/06/2015; Pakistan Bureau of Statistics 03/2016).

## Response capacity

### Local and national response capacity

The Provincial Disaster Management Authority–Sindh has issued precautionary measures. These include the Provincial Health Department being put on alert and heatstroke management centres being set up at all major hospitals and rural health units. Emergency medicines will be made available. Coordination will be conducted with emergency ambulance services operating in Karachi city, other urban centres and rural areas. A helpline is also planned. An awareness campaign on heatstroke mitigation measures is planned for electronic and print media (Samaa TV 13/04/2017; Pakistan Today 16/04/2017).

The government of Sindh has instructed local administrations to set up heatwave camps in their divisions and to run awareness campaigns. Basic facilities like fans, water and medical staff will be made available at heatwave camps (The Nation 12/04/2017). 12 heatstroke centres have been set up in anticipation by 11 April (Dawn 11/04/2017).

Extra capacity in hospitals is important if large numbers are affected by the heatwave. As none of the government hospitals in Dadu had any centre to treat the 22 heatstroke patients, they had to be taken to private hospitals for treatment (Dawn 12/04/2017).

## International response capacity

There are 77 active NGOs working in Sindh province and 21 UN agencies operating in Pakistan (Sindh Government 18/04/2017; UN Pakistan 18/04/2017). Many have previously responded to heatwaves, but it is unclear how many are responding in 2017.

## Information gaps and needs

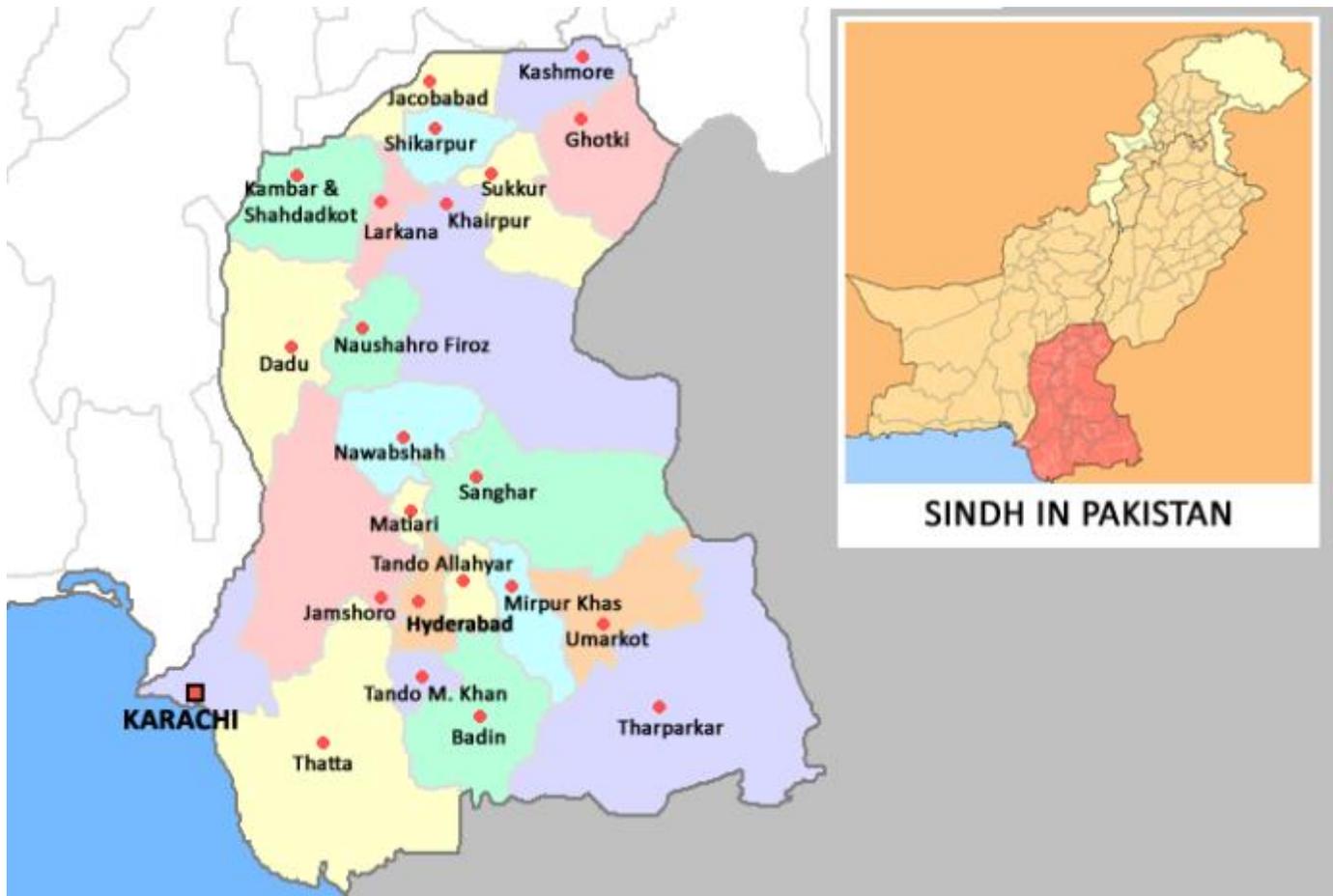
- No figures on people affected by the current drought or caseloads of heatwave related diseases have yet been provided.
- Malnutrition rates have not been updated since 2015.
- Reliable information on prevalence of chronic and non-communicable diseases, as well as prevalence of disability in Karachi, is lacking.
- The effects of previous heatwaves in rural areas is unavailable.
- Level of access to health facilities in rural areas is unclear.

## Lessons learned

- Early intervention is essential in the case of heatwaves such as the implementation of the emergency response plan in 2016 (Dawn 24/06/2015).
- Monitoring and warning as well as dissemination and communication systems have not been adequate in past heatwaves (Pakistan Government 06/2015). Awareness campaigns may not reach the illiterate or rural areas where radio ownership is low. Use of billboards; picture posters; mobile responders; information campaigns speaker trucks etc beneficial.
- Nutrition support and food assistance are both required to address overall food deprivation.
- Scarcity of water can impact food security, lead to livestock diseases, and health and nutrition problems, especially for women and children. Waiting for the monsoon season may be problematic, and it would be beneficial to explore unconventional methods such as solar based pumps
- Crops were severely damaged in 2016 due to the heatwave, and this damage can be expected to affect livelihoods later in the year (Samaa 14/05/2016).

- In 2016, power cuts affected rural areas more than urban areas (Dunya News 19/05/2016)
- In 2015 more men died than women. 60% of people who died were in their homes and 40% from direct sun exposure.

## Districts in Sindh province



Source: Sindhi Dunya