



HEATWAVE GUIDELINES 2024

NATIONAL DISASTER
MANAGEMENT AUTHORITY
OF PAKISTAN



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1. Heatwave Situation Analysis – Pakistan 2024

In recent years, Pakistan has increasingly been vulnerable to the impacts of climate change, particularly evident in the rising frequency and intensity of heatwaves. Accordingly, the National Disaster Management Authority (NDMA) has developed a ***Heatwave Action Plan-2024*** for Pakistan aimed at mitigating the adverse effects of extreme heat events.

Pakistan's climate is primarily influenced by its geographical location and topography, with diverse climatic conditions. However, most parts of the country, particularly **southern** and **central Pakistan**, are **susceptible to heatwaves**, which further gets worse due to rapid-urbanization, deforestation and air pollution. The meteorological parameters relevant to heatwaves include **temperature, humidity, wind speed, and air quality**.

Climate change exacerbates the intensity and frequency of heatwaves. Rising temperatures not only increase the risk of heat-related illnesses and fatalities but also contribute to secondary hazards such as drought, wildfires, and degraded air quality.

This Plan represents NDMA's proactive response to the escalating threat of heatwaves. By addressing meteorological, climatological, and socio-economic dimensions, the plan aims to enhance country's resilience to heat-related disasters while advancing climate adaptation and mitigation objectives. NDMA's Tech team focuses on monitoring and analyzing global and local indicators of potential heatwaves, issues heatwave projections with a lead time of 3–6-month and calculates potential impacts, vulnerabilities and exposure with remarkable accuracy.

Sustained efforts and investments are imperative to effectively implement the plan and safeguard vulnerable populations from the adverse impacts of heatwaves in the years to come.

1. Heat Index

2.1 Temperature and Relative Humidity Forecast

NDMA has timely forecasted heatwave impacted areas based on projected temperature and relative humidity profiles using Coupled Model Intercomparison Project (CMIP-6) (Fig 1 & 2).

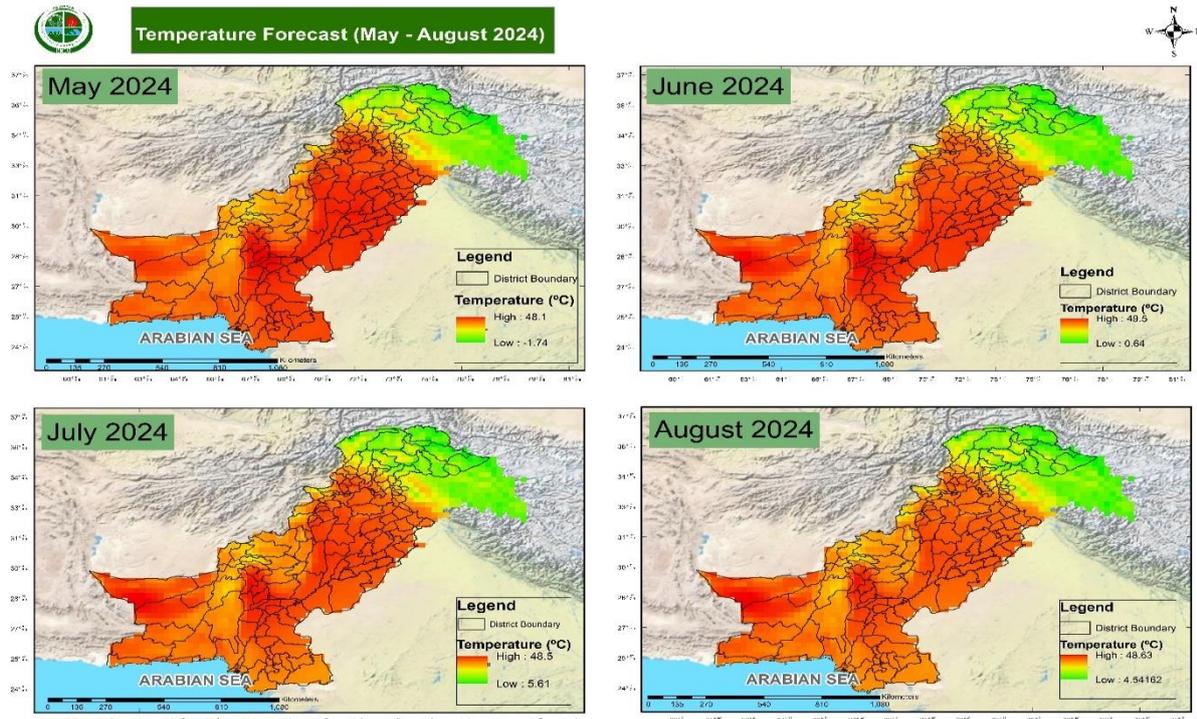


Figure 1 Temperature forecast (May – August 2024)

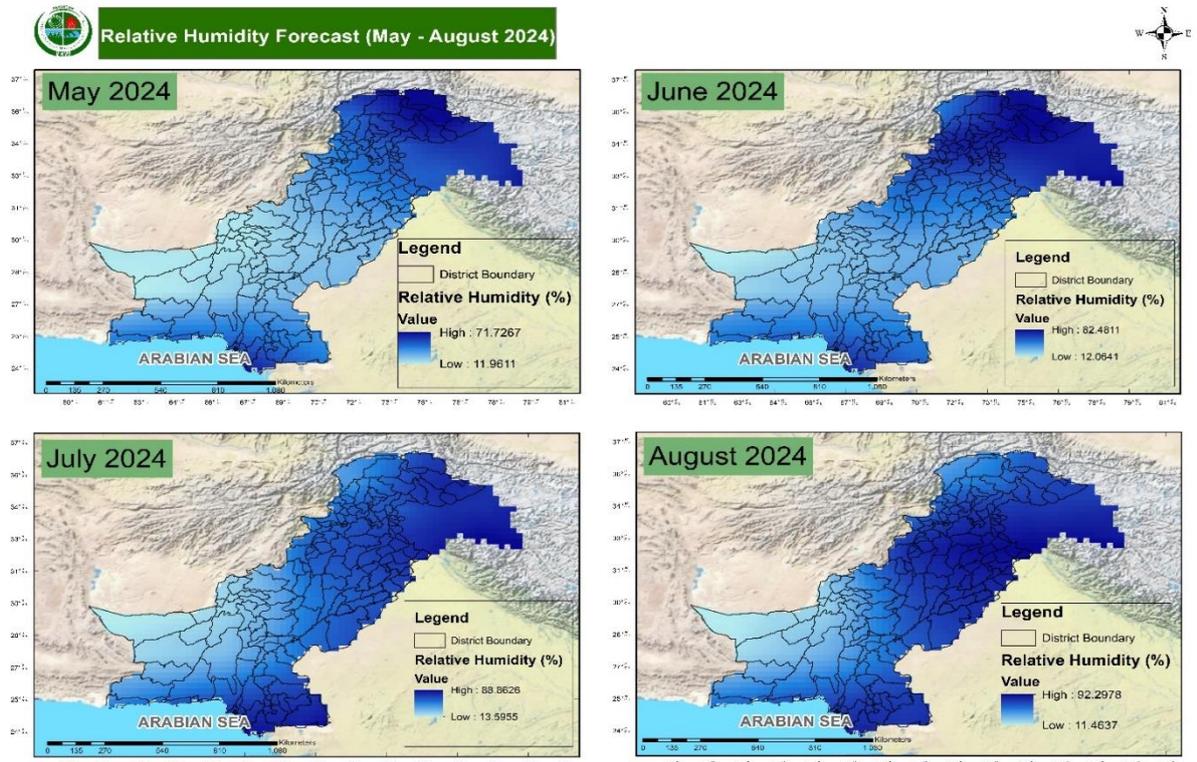


Figure 2 Relative Humidity Forecast (May - August 2024)

| Relative Humidity % | Temperature °C | | | | | | | | | | | | | | | | |
|---------------------|----------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 |
| 40 | 27 | 28 | 29 | 30 | 31 | 32 | 34 | 35 | 37 | 39 | 41 | 43 | 46 | 48 | 51 | 54 | 57 |
| 45 | 27 | 28 | 29 | 30 | 32 | 33 | 35 | 37 | 39 | 41 | 43 | 46 | 49 | 51 | 54 | 57 | |
| 50 | 27 | 28 | 30 | 31 | 33 | 35 | 36 | 38 | 41 | 43 | 46 | 49 | 52 | 55 | 58 | | |
| 55 | 28 | 29 | 30 | 32 | 34 | 36 | 38 | 40 | 43 | 46 | 48 | 52 | 54 | 58 | | | |
| 60 | 28 | 29 | 31 | 33 | 35 | 37 | 40 | 42 | 45 | 48 | 51 | 55 | 59 | | | | |
| 65 | 28 | 30 | 32 | 34 | 36 | 39 | 41 | 44 | 48 | 51 | 55 | 59 | | | | | |
| 70 | 29 | 31 | 33 | 35 | 38 | 40 | 43 | 47 | 50 | 54 | 58 | | | | | | |
| 75 | 29 | 31 | 34 | 36 | 39 | 42 | 46 | 49 | 53 | 58 | | | | | | | |
| 80 | 30 | 32 | 35 | 38 | 41 | 44 | 48 | 52 | 57 | | | | | | | | |
| 85 | 30 | 33 | 36 | 39 | 43 | 47 | 51 | 55 | | | | | | | | | |
| 90 | 31 | 34 | 37 | 41 | 45 | 49 | 54 | | | | | | | | | | |
| 95 | 31 | 35 | 38 | 42 | 47 | 51 | 57 | | | | | | | | | | |
| 100 | 32 | 36 | 40 | 44 | 49 | 56 | | | | | | | | | | | |

Caution

Extreme Caution

Danger

Extreme Danger

Figure 3 NOAA Heat Index

Heat index is the measure of how hot it is actually felt when the effect of relative humidity is coupled with actual temperature. The above table describes various scenarios taking into account, the actual temperature and relative humidity.

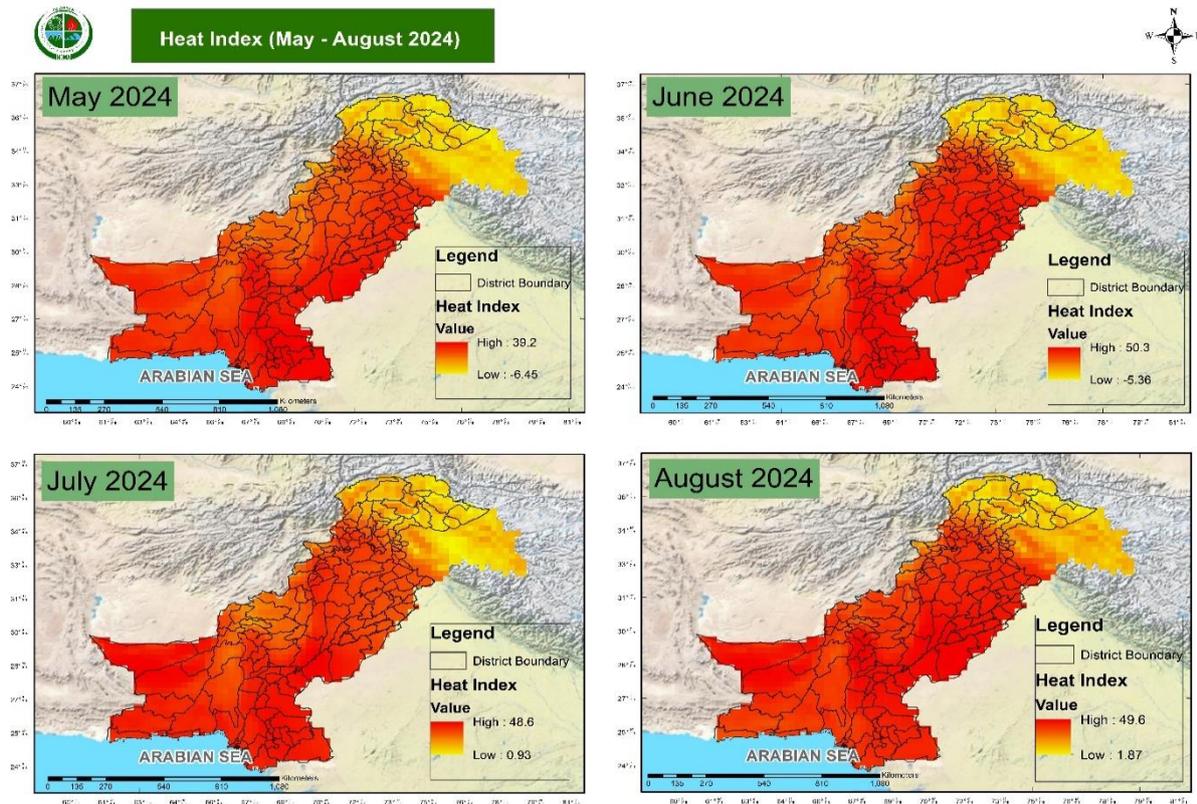


Figure 4 Heat Index (May - August 2024)

2. Heatwave Layout May-June 2024

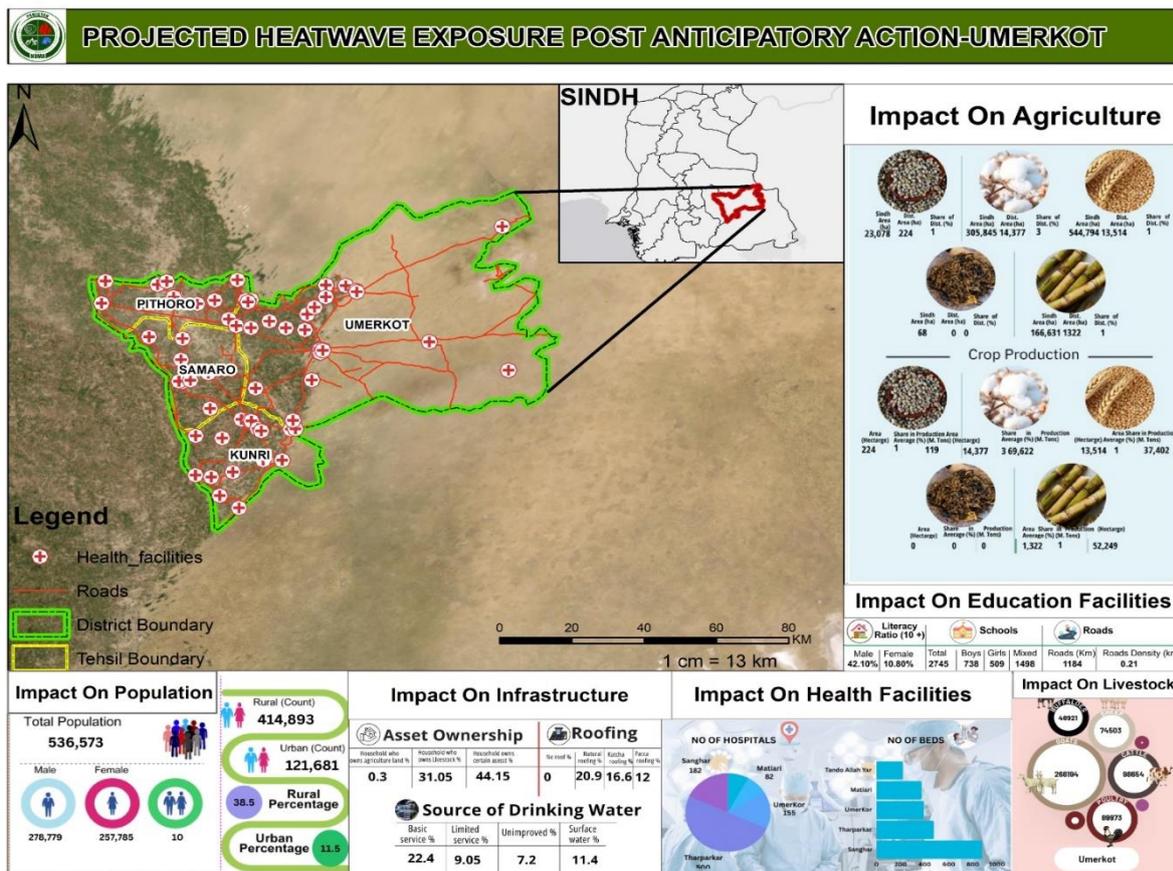
As per projections, Districts *Umarkot, Tharparkar, Tando Allahyar, Matiari and Sanghar in Sind* and *Bahawalpur and Rahim Yar Khan in Punjab*, will likely experience heatwaves during **May** and **June**. Urgent action is needed to implement tailored adaptation strategies to protect communities in these districts. The effects are as following:

- 1. Medical Emergencies:** Heat waves increase heat-related illnesses, straining healthcare services, particularly among vulnerable populations.
- 2. High Energy Demand:** Heat waves spike energy usage for cooling, stressing infrastructure and causing power disruptions.

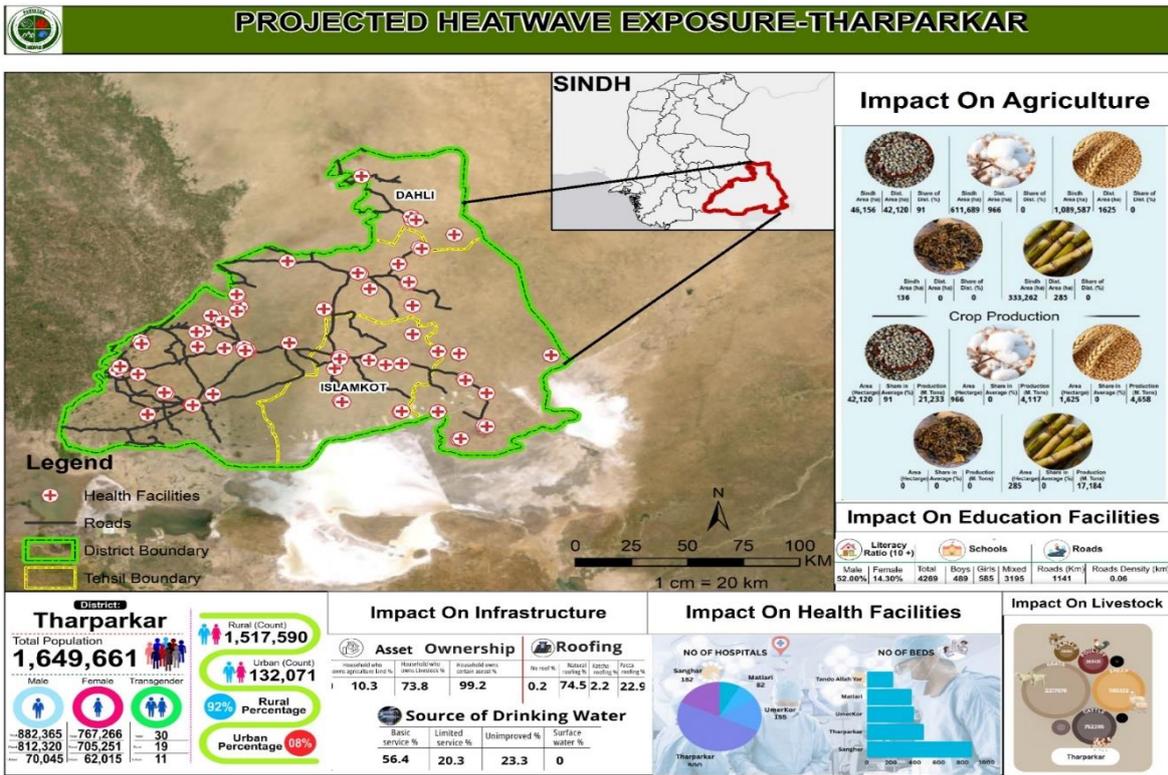
To addressing impacts of heat wave, we require readiness, adaptation, and mitigation, including improved warning systems, response plans, water conservation, and climate change mitigation efforts.

The heatwave impact on vulnerable districts is as under:-

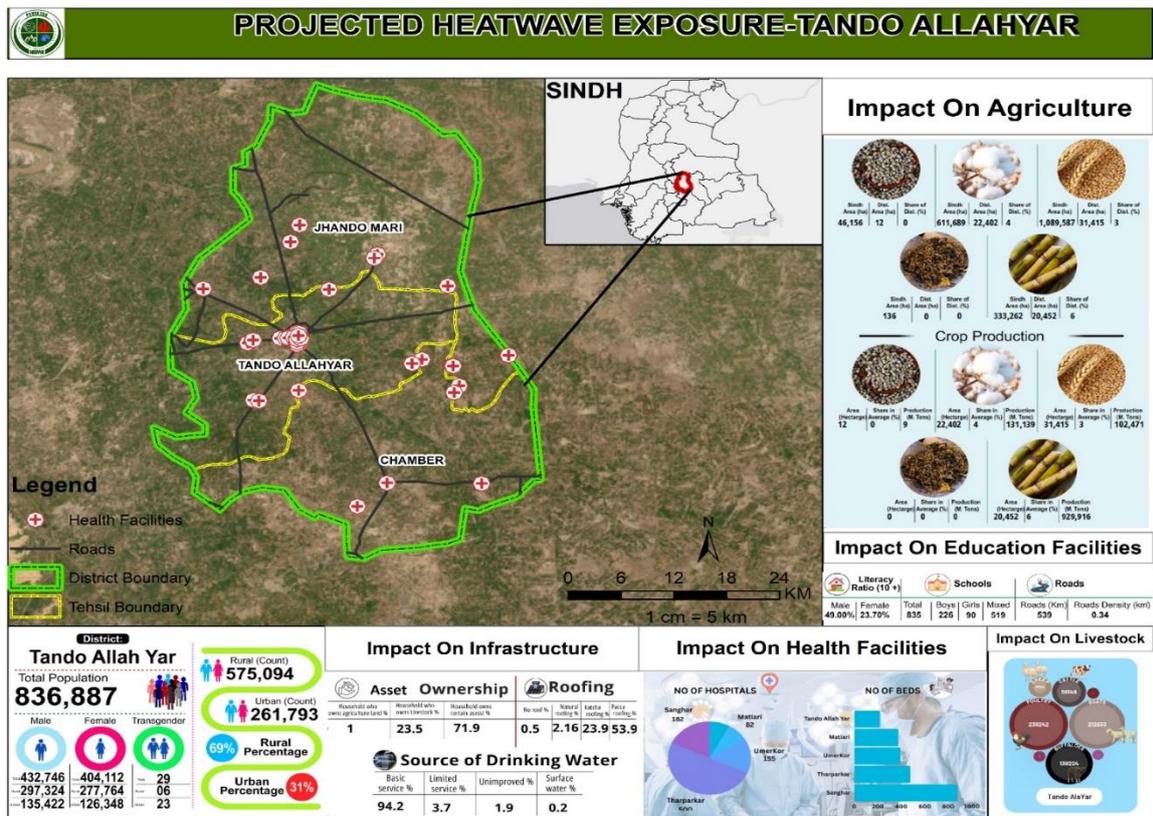
District Umarkot



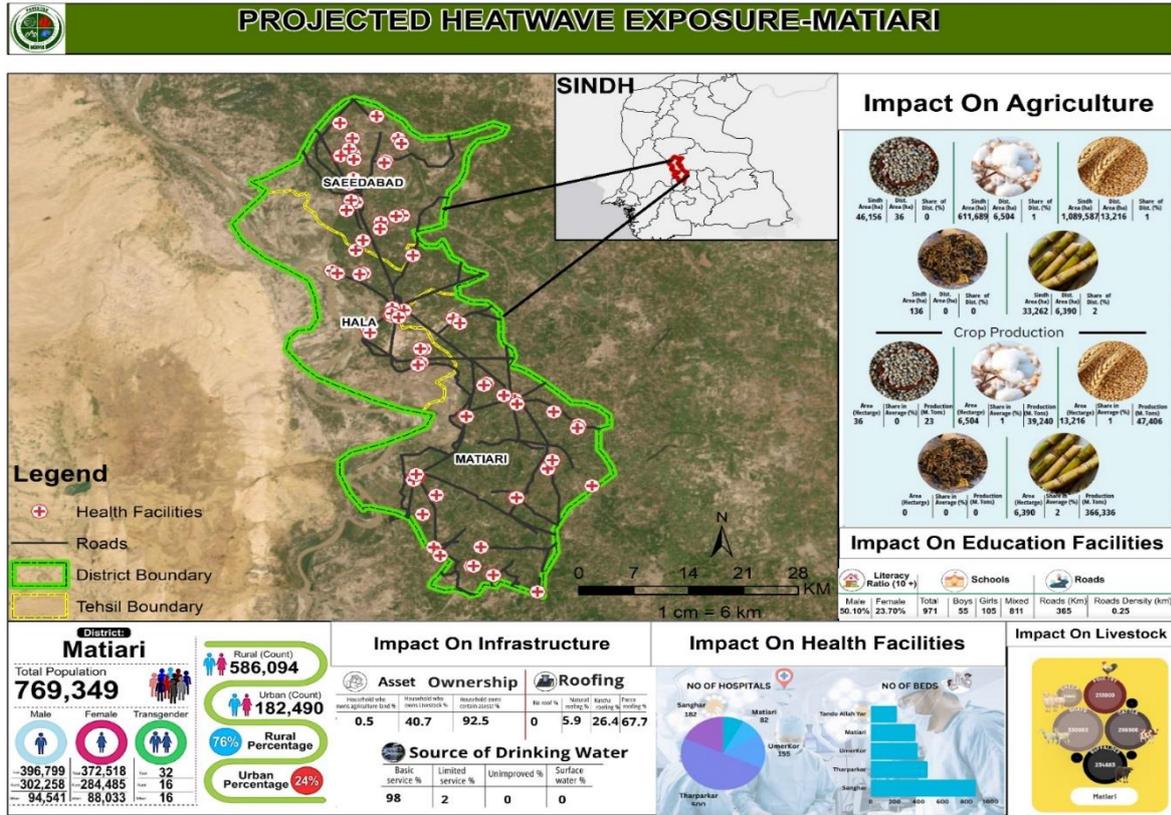
District Tharparker



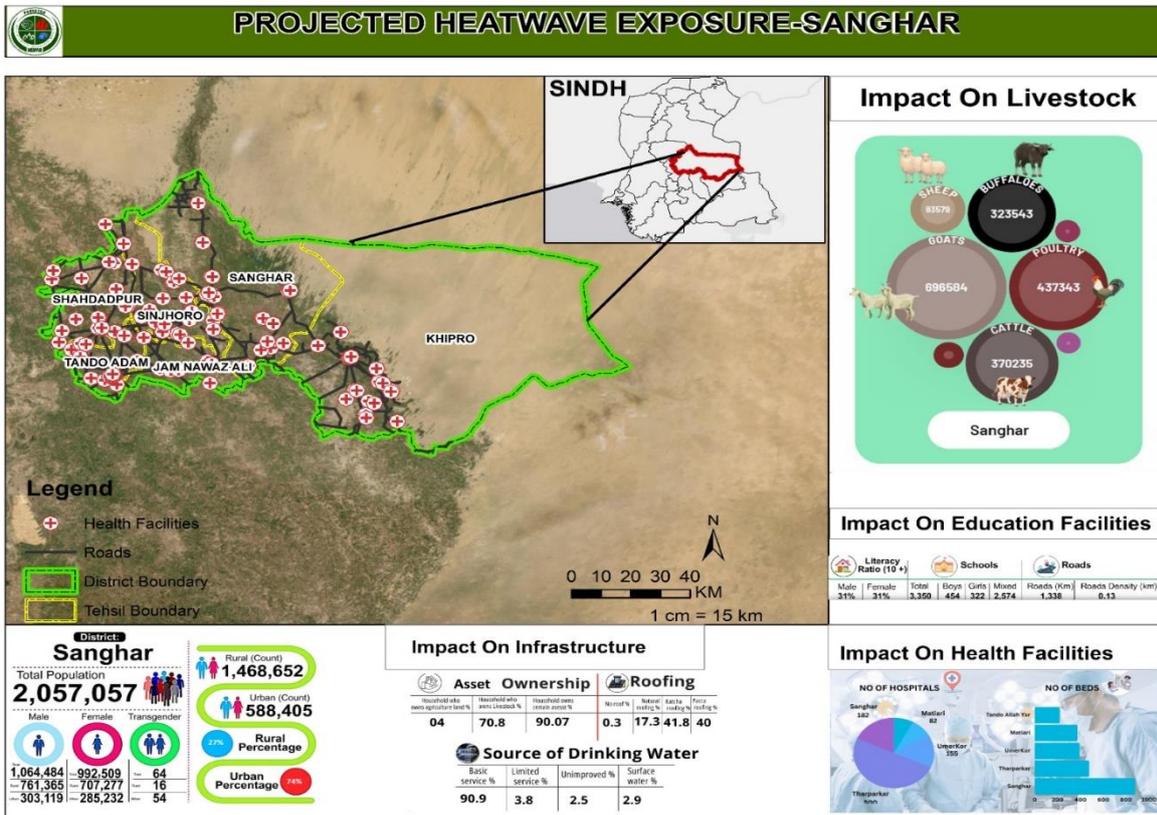
District Tando Allahyar



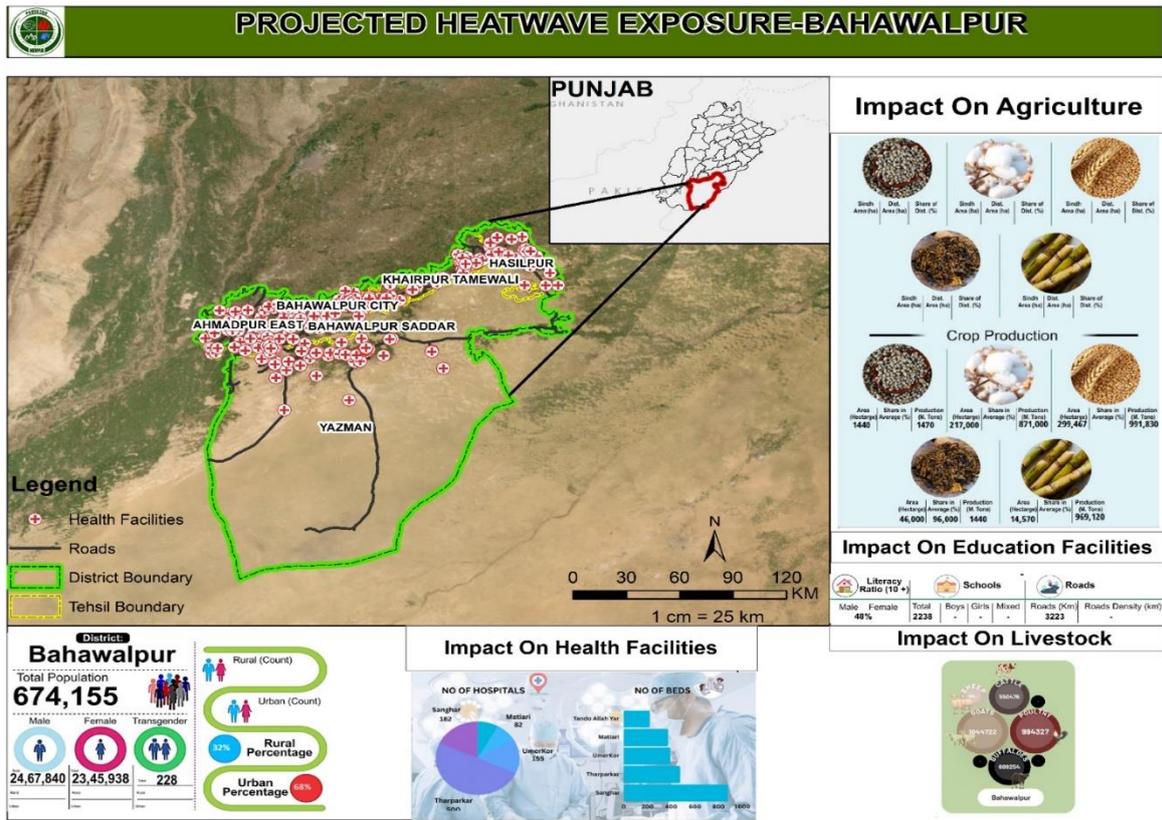
District Matiari



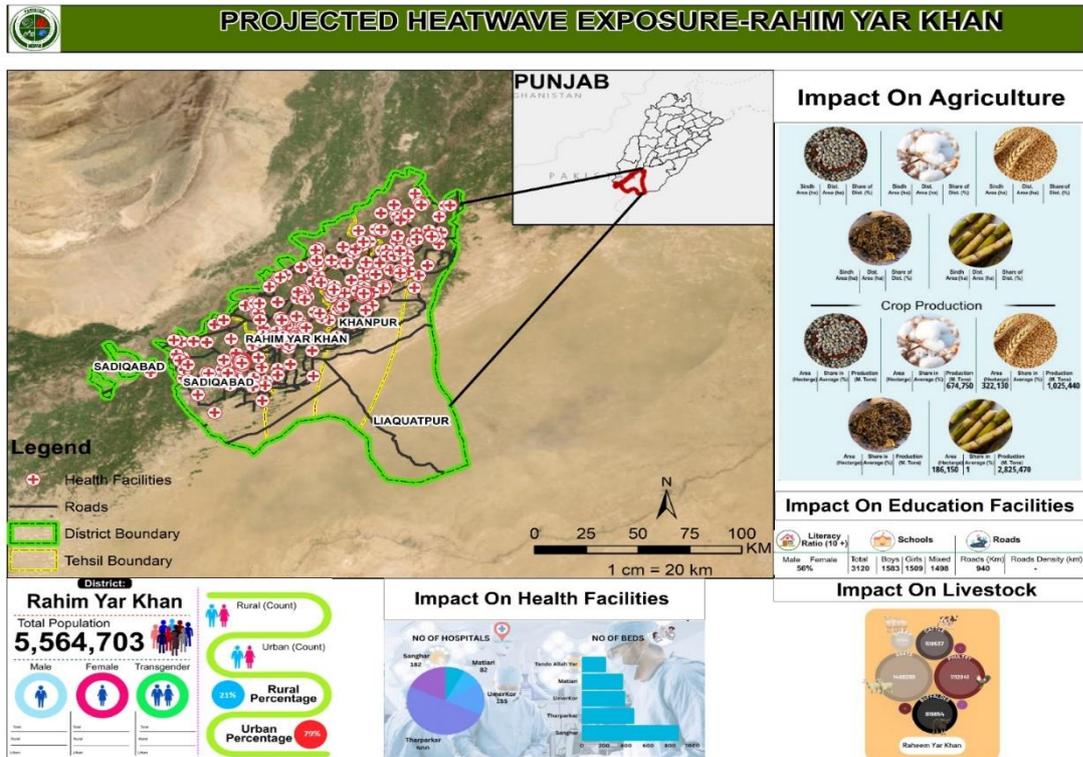
District Sanghar



District Bahawalpur

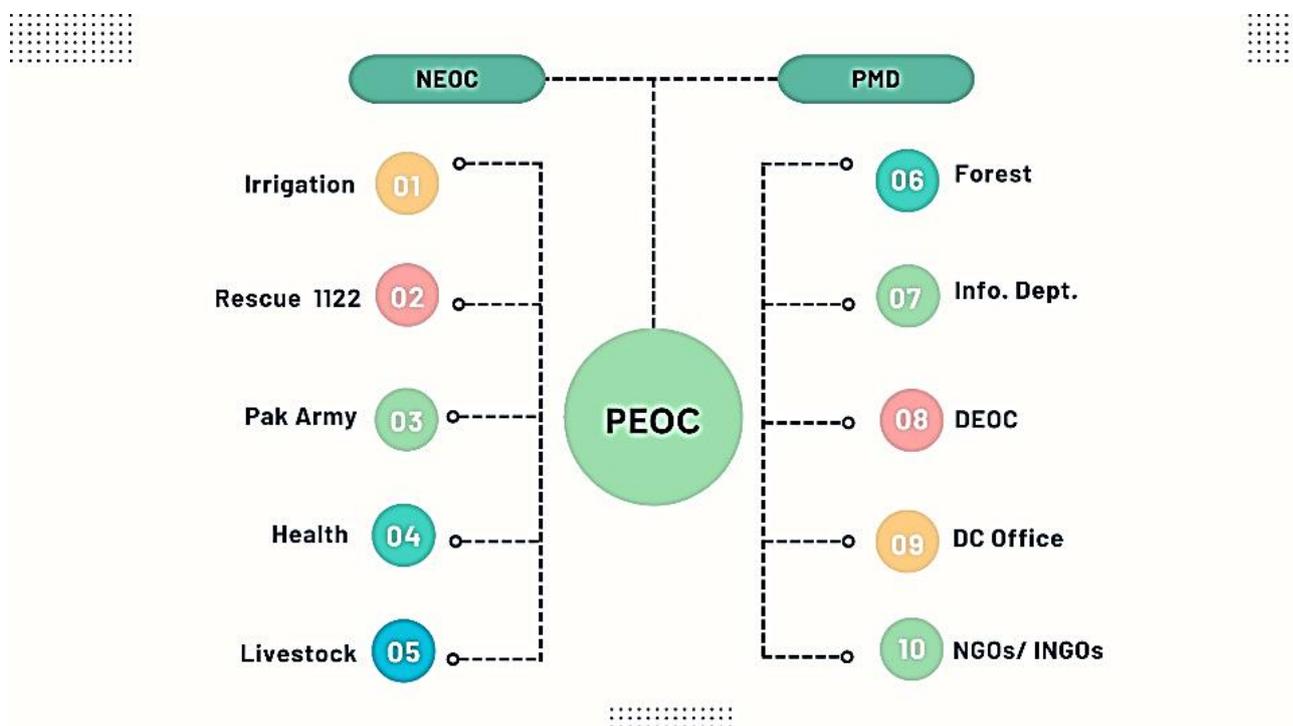


District Rahim yar Khan



3. NEOC’s Heatwave Alert.

The heatwave alert is disseminated to the concerned line departments through following mechanism:



4. National and Global Best Practices Against Heat Wave:

Different best practices exercised across the globe and national input to mitigate effects of heat wave are as under.

| Ser | National Academia Input | Global Academia Input |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Individual & Community | | |
| 1. | Avoiding exposure to heat waves and increase water intake. | Drink plenty of water throughout the day, even if you do not feel thirsty. |
| 2. | Avoiding strenuous activities during the hottest part of the day and take frequent breaks in the shade or indoors. | Wear light colored clothing made from breathable fabrics such as cotton to help stay cool. Consider wearing a wide brimmed hat and sunglasses |
| 3. | Using natural materials such as cotton or wool. | Close curtains or blinds during the hottest part of the day to block out the sun's heat. |
| 4. | Increasing tree plantings around buildings to shade parking lots and along public rights-of-way. | Encouraging installation of green roofs, which provide shade and remove heat from the roof surface and surrounding. |
| 5. | Combine recycled elements with locally sourced materials for aid items, capitalizing on their standardized nature. | Use low-tech, high-efficiency methods like a double-roof system and walls constructed with plastic bags filled with compacted earth for effective cooling in refugee camps. |

| Area Governance | | |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6. | Use evaporative cooling techniques by wetting a surface like cloth or mat, allowing water to evaporate and naturally cool the surrounding air. | Planting trees and plants to shade walls and windows in summer. |
| 7. | Creating more cooling shelters. | Plant trees or install shade sails to create shade in outdoor areas. |
| 8. | In desert regions, the adoption of sustainable irrigation systems like drip irrigation or recycled water systems can contribute significantly to water conservation efforts. | The use of smart irrigation technologies is another option, which involves sensors and data analysis to adjust watering schedules based on plant requirements and weather patterns. |
| 9. | Using materials with higher solar reflectance can help reduce heat absorption and lower surface temperatures. | Use of green roofs and walls have been shown to reduce ambient temperatures by up to 5 degrees Celsius. |
| 10. | Promote urban greening. | Choose homes with limestone and natural materials to naturally control humidity, absorbing moisture in humid conditions and releasing it on sunny days. |
| Federal Organizations | | |
| 11. | Encourage Construction of thick-walled houses using materials like adobe (soil, water, and organic additives) or stone for insulation. | Instalment of solar powered appliances such as fans and air conditioners to stay cool and comfortable. |
| 12. | Include green spaces such as parks, gardens in Urban planning that can benefit greatly from green spaces as they serve important functions. | Green spaces can be highly beneficial in desert cities, notorious for their extreme heat. |
| Private Sector & Local Industry | | |
| 13. | Harness natural energy for passive summer cooling. | Smart building design considerations: Minimize solar heating in hot seasons. Maximize indoor cooling rate in summer. Optimize orientation and window size for efficiency. |
| 14. | Invest in highly insulative building materials for improved energy efficiency in construction. | Companies must assess and reduce their carbon footprint, compensating for any remaining emissions. |
| 15. | Encourage the use of heat resistant paints (containing boric acid and calcium chloride), chemical prophylaxis, and processed foods. | Maximize shade by building narrow roads and alleys that offer natural relief from sunlight. |
| NGOs, Humanitarian Resource Enablers | | |
| 16. | Deploy personnel to vulnerable locations. | Provide essential health services, nutrition supplements, counselling, preschool activities, and awareness programs for children. |
| 17. | Organizing outreach to vulnerable populations, including establishing and promoting accessible heating or | Capacity building of local communities to better prepare for and respond to heatwaves. This includes training |

| | | |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | cooling centres in the community. | community members in first aid, heat stress management, and disaster preparedness. |
| Area Academia, Think Tanks | | |
| 18. | Conduct research to understand the impacts of extreme temperatures on ecosystems, agriculture, infrastructure, and human health. | Develop innovative solutions to mitigate these impacts, such as heat-tolerant crops, energy-efficient cooling technologies, and urban planning strategies to reduce the urban heat island effect. |
| 19. | Analyze existing policies related to extreme temperatures and identify gaps and opportunities for improvement. | Provide recommendations to policymakers on measures to enhance resilience to extreme temperatures, such as building codes, land-use planning, and public health policies. |
| Local Media, Early Warning Center | | |
| 20. | Awareness to be increased for planners, architects, local administration and the policymakers. | The development of appropriate heat wave advisories. |
| 21. | Disseminating accurate information about impending heatwaves, educating the public about the dangers of extreme heat, and providing tips on how to stay safe and cool during heat waves. | Regular monitoring of weather patterns and issuing early warnings about potential heatwaves, allowing authorities and communities to take proactive measures to mitigate their impact. |
| 22. | Educating citizens regarding the dangers of extreme heat and the steps they can take to protect themselves when extreme temperatures occur. | Educate communities about the consequences of heat stress risks, preventive measures, and available resources. |
| Search & Rescue, Law Enforcement | | |
| 23. | Establishment of Heat health warning system. | Ambulances should initiate early cooling treatment upon picking up the patient. |
| 24. | Locating and rescuing individuals who may be at risk due to the heat, such as hikers, elderly individuals, or those experiencing heat-related illnesses. | Coordinate with other emergency response agencies to provide medical assistance and evacuate individuals from dangerous situations. |

6. Guidelines; Roles and Responsibilities:

The management of heat wave is a complex task involving different stakeholders for taking necessary actions for mitigation of the overall heat wave situations. The following section details roles and responsibilities of various departments.

| Ser | Action | Resp |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 1. | <ol style="list-style-type: none"> 1. Individuals should stay updated on heatwave warnings issued by local authorities and take appropriate precautions to stay safe during extreme heat events. 2. Individuals should prepare an emergency kit that includes items such as water, electrolyte beverages, sunscreen, hats, and light-colored clothing to stay hydrated and protected from the sun during heatwaves. 3. Individuals should avoid outdoor activities during peak heat hours and seek shelter in air-conditioned or well-ventilated spaces to prevent heat-related illnesses. 4. Individuals should check on neighbors, especially the elderly, children, and those with chronic illnesses, to ensure they are coping with the heatwave and offer assistance if needed. | Individuals |
| 2. | <ol style="list-style-type: none"> 1. Households should install and maintain air conditioning units or fans to provide relief from the heat during heatwaves. 2. Households can designate a cool room /area in the home where family members can retreat during extreme heat, equipped with fans or air conditioning. 3. Stock up plenty of water and electrolyte beverages to stay hydrated during heatwaves and ensure an adequate supply of emergency supplies such as non-perishable food and first aid it. 4. Use blinds, shades, or reflective window films to block out direct sunlight and reduce indoor temperatures during heatwaves. | Households |
| 3. | <ol style="list-style-type: none"> 1. Set up cooling centres in public buildings such as community centres or libraries to provide relief from the heat for residents without access to air conditioning. 2. Community organizations can organize outreach programs to educate vulnerable populations about the dangers of heatwaves and provide assistance, such as distributing fans or arranging transportation to cooling centres. 3. : Organize water distribution initiatives during heatwaves to ensure that residents have access to clean drinking water, especially those experiencing water scarcity. 4. Community organizations can coordinate volunteer efforts to conduct wellness checks on vulnerable residents, distribute water and supplies, and provide transportation to cooling centres during heatwaves. | Local Community |
| 4. | 1. Disaster management authorities should develop | Area Disaster |

| | | |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| | <p>comprehensive heatwave emergency response plans that outline protocols for heatwave warnings, cooling centre operations, and public outreach strategies.</p> <ol style="list-style-type: none"> 2. Authorities should monitor weather forecasts for heatwave conditions and issue timely warnings and advisories to residents, along with recommendations for staying safe during extreme heat events. 3. Disaster management authorities should coordinate with local healthcare facilities to ensure they are prepared to handle an increase in heat-related illnesses and provide medical assistance during heatwaves. 4. Authorities should allocate resources for heatwave mitigation measures such as urban greening initiatives, cool roof programs, and distribution of heat-relief items to vulnerable populations. | Management Authority |
| 5. | <ol style="list-style-type: none"> 1. Provincial disaster management authorities should develop and implement heatwave-specific response plans tailored to the needs of medium-density localities, including protocols for heatwave warnings, heat-related health services, and public communication strategies. 2. Authorities should ensure effective coordination between municipalities and communities within localities to streamline response efforts, share resources, and disseminate information about heatwave preparedness and response measures. 3. Provincial authorities should implement measures to enhance heatwave resilience in medium-density localities, such as improving access to cooling centres, promoting urban green spaces, and conducting heat risk assessments to identify vulnerable areas. 4. Authorities should organize training sessions and capacity-building initiatives for local emergency response teams, healthcare professionals, and community volunteers to enhance their readiness to respond effectively to heatwave emergencies. | Provincial Disaster Management Authority |
| 6. | <ol style="list-style-type: none"> 1. Ensure healthcare are equipped to handle heat-related illnesses and emergencies during heatwaves, including adequate staffing, medical supplies, and cooling facilities. 2. Collaborate with local municipalities to integrate heatwave resilience measures into urban planning strategies, such as designing heat-resilient infrastructure, implementing cool pavement technologies, and enhancing green spaces. 3. Provide guidance and support to farmers and agricultural communities in medium-density localities to mitigate the impact of heatwaves on crops, livestock, and agricultural productivity through measures such as water conservation, shade provision, and heat-tolerant crop varieties. 4. Implement measures to reduce the urban heat island effect in medium-density localities, such as planting trees, increasing vegetation cover, and promoting sustainable land use practices to mitigate the intensity of heatwaves. | Provincial Government (Related Departments) |
| 7. | <ol style="list-style-type: none"> 1. Provide logistical support for the distribution of heat relief | Area Military |

| | | |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| | <p>supplies, such as water, sunscreen, and cooling equipment, to the localities during heatwave emergencies.</p> <ol style="list-style-type: none"> 2. Assist local authorities in conducting emergency response operations, including evacuations, heat-related medical assistance, and welfare checks on vulnerable populations in areas affected by heatwaves. 3. Collaborate with local law enforcement agencies and community organizations to raise awareness about heatwave risks and promote heat safety measures among residents through community outreach programs and educational campaigns. 4. Conduct joint training exercises with local emergency response teams and healthcare professionals to enhance their capacity to respond effectively to heatwave emergencies. | Formations |
| 8. | <ol style="list-style-type: none"> 1. Manage traffic and ensure the smooth flow of vehicles, especially during evacuations and emergency response operations in the localities affected by heatwaves, to minimize congestion and ensure public safety. 2. heatwave safety regulations, such as restrictions on outdoor activities during extreme heat conditions and enforcement of heat-related health advisories, to protect the health and well-being of residents. 3. Collaborate with community policing initiatives to engage with residents, address concerns, and provide support to vulnerable populations, including the elderly, children, and individuals experiencing homelessness, during heatwave emergencies. 4. Collaborate with local businesses, security firms, and community organizations to develop security plans and coordination mechanisms to prevent heatwave-related incidents, such as looting or vandalism. | Law Enforcement Office |
| 9. | <ol style="list-style-type: none"> 1. Operationalization of a National Emergency Operations Centre (NEOC) is a strategic and dynamic process aimed at transforming a designated facility into a fully functional hub for managing and coordinating responses to national emergencies and disasters. 2. SITREPS are being issued timely (on hourly or 2-hourly basis) to the respective Districts / Provinces to coordinate response. 3. Satellite and on ground monitoring and Reconnaissance Heatwave effected sites. 4. Conduct comprehensive risk assessments for Heatwave areas, identifying potential hazards and vulnerabilities. Develop hazard maps and vulnerability assessments to guide anticipatory actions. 5. Dissemination of Timely Warnings to all Stakeholders. 6. Formulate policies and guidelines for disaster management in Heatwave prone Areas, addressing the unique challenges posed by such environments. Ensure that national policies consider both prevention and response measures. 7. Facilitate training programs for emergency responders, local authorities, and relevant stakeholders on Heatwave disaster preparedness, response, and recovery. Enhance the capacity of | National Disaster Management Authority |

| | | |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| | <p>local communities to respond effectively to Heatwave emergencies.</p> <ol style="list-style-type: none"> 8. Collaborate with provincial, regional, and local disaster management authorities to ensure a coherent and synchronized approach to disaster management. Share information, resources, and best practices to enhance overall preparedness. 9. Allocate resources for the procurement of specialized equipment, technology, and supplies needed for disaster management. Coordinate logistics for the rapid deployment of resources to affected areas during emergencies. 10. Collaborate with international organizations and neighboring countries to share information, resources, and expertise. Participate in joint exercises and initiatives for cross-border disaster response. 11. Develop strategies and plans for post-disaster recovery & rehabilitation. Coordinate support affected communities in rebuilding their lives. | |
| 10. | <ol style="list-style-type: none"> 1. Coordinate with healthcare providers to ensure the availability of medical resources, including heat-related illness treatment protocols, medications, and medical equipment, to respond effectively to heatwave emergencies. 2. Implement measures to address climate change and urban heat island effects, such as promoting green infrastructure, sustainable urban planning, and heat-resilient building designs, to mitigate the impact of heatwaves on communities. 3. Coordinate national responses to heatwave emergencies, including the deployment of emergency personnel, equipment, and resources, to support local authorities in managing heatwave-related incidents and ensuring public safety. 4. Allocate funds for heatwave preparedness, response, and recovery efforts, including infrastructure upgrades, public health initiatives, and community resilience programs, to enhance the country's resilience to heatwave events. | Federal Government (Related Ministries) |
| 11. | <ol style="list-style-type: none"> 1. Conduct research on heatwave dynamics, climate modelling, and adaptation strategies to improve understanding of heatwave risks and inform evidence-based policies and interventions. 2. Provide educational programs and outreach activities to raise awareness about heatwave risks and promote heat safety measures among the public, including schools, communities, and vulnerable populations. 3. Offer technical assistance and expertise to government agencies, NGOs, and community organizations in developing heatwave preparedness and response plans, conducting risk assessments, and implementing resilience-building initiatives. 4. Collaborate with national and local governments, NGOs, and other stakeholders to develop interdisciplinary research projects, share best practices, and foster innovation in heatwave preparedness and response strategies | Academia |

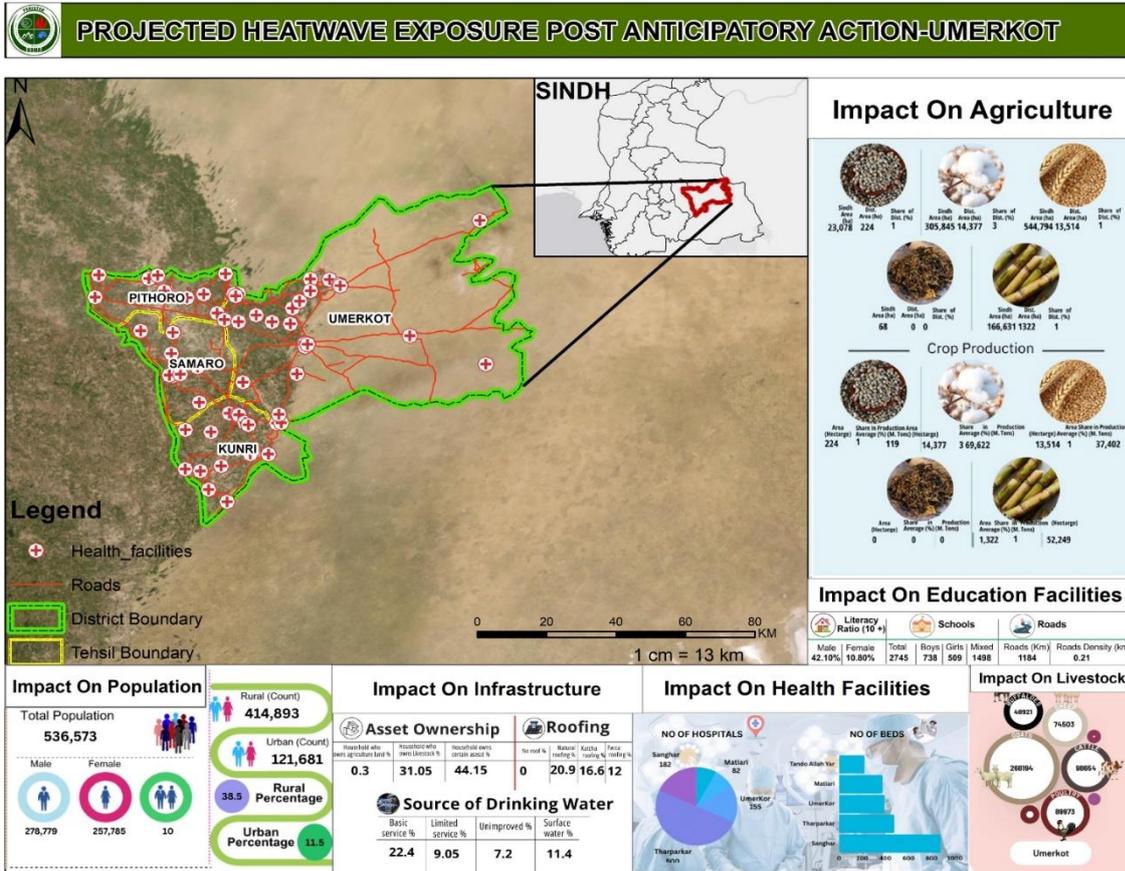
| | | |
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| 12. | <ol style="list-style-type: none"> 1. Implement community-based initiatives to build resilience and promote adaptive strategies among vulnerable populations, including the elderly, children, and low-income communities, to reduce heatwave-related health risks and impacts. 2. Advocate for policies and regulations that prioritize heatwave preparedness, mitigation, and adaptation measures, including investments in green infrastructure, public health programs, and social safety nets, to protect communities from heatwave hazards. 3. Provide capacity-building workshops, training sessions, and technical assistance to local authorities, community organizations, and frontline responders to enhance their capacity to prepare for, respond to, and recover from heatwave emergencies. 4. Conduct public awareness campaigns and communication initiatives to raise awareness about heatwave risks, heat safety tips, and available resources and support services, empowering individuals and communities to take proactive measures to protect themselves during heatwave events. | NGOs |
| 13. | <ol style="list-style-type: none"> 1. Provide financial support and funding opportunities for heatwave resilience projects, including infrastructure upgrades, capacity-building programs, research initiatives, and community-based interventions aimed at reducing heat-related risks and enhancing adaptive capacity. 2. Offer technical expertise, knowledge exchange platforms, and capacity-building workshops to support government agencies, NGOs, and local communities in developing and implementing effective heatwave resilience strategies, leveraging international best practices and lessons learned. 3. Assist in data collection, monitoring, and analysis efforts related to heatwave impacts, vulnerability assessments, and early warning systems, providing technical tools, methodologies, and resources to enhance the understanding of heatwave risks and inform evidence-based decision-making. 4. Facilitate multi-stakeholder collaboration and partnerships between government agencies, civil society organizations, private sector entities, and academic institutions to foster innovation, knowledge sharing, and collective action in addressing heatwave resilience challenges and promoting sustainable development. | Development Partner Organizations |
| 14. | <ol style="list-style-type: none"> 1. Provide emergency relief assistance, including food, water, shelter, and medical care, to populations affected by heatwave emergencies, particularly vulnerable groups such as refugees, internally displaced persons, and communities living in informal settlements. 2. Collaborate closely with local authorities, NGOs, community-based organizations, and other stakeholders to assess needs, coordinate response efforts, and deliver timely and appropriate assistance to heatwave-affected communities, ensuring a coordinated and effective humanitarian response. 3. Advocate for the rights and well-being of vulnerable | Humanitarian Organizations Representatives |

| | | |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| | <p>populations impacted by heatwaves, including the elderly, children, people with disabilities, and marginalized groups, by raising awareness about their specific needs and advocating for inclusive policies and programs to address heat-related risks.</p> <p>4. Support capacity-building and resilience-building initiatives in heatwave-prone areas, including training programs, community-led projects, and awareness campaigns aimed at enhancing preparedness, reducing vulnerability, and strengthening adaptive capacity to heatwave events.</p> | |
| 15. | <p>1. Disseminate timely and accurate information on heatwave risks, early warning alerts, and protective measures through various media channels, including television, radio, social media, and mobile platforms, to reach diverse audiences and raise awareness about heat-related hazards.</p> <p>2. Conduct public education and awareness campaigns on heatwave preparedness, heat safety tips, and health risks associated with extreme heat, utilizing multimedia platforms, community events, and educational materials to promote heatwave resilience and behavior change.</p> <p>3. Amplify community voices and experiences through storytelling, interviews, and community engagement initiatives that highlight local perspectives on heatwave impacts, adaptive strategies, and resilience-building efforts, fostering empathy, solidarity, and collective action.</p> <p>4. Collaborate with government agencies, NGOs, academic institutions, and local authorities to ensure accurate and consistent messaging, facilitate data sharing, and strengthen communication networks for heatwave early warning dissemination, emergency response coordination, and public outreach efforts.</p> | DRR Media |

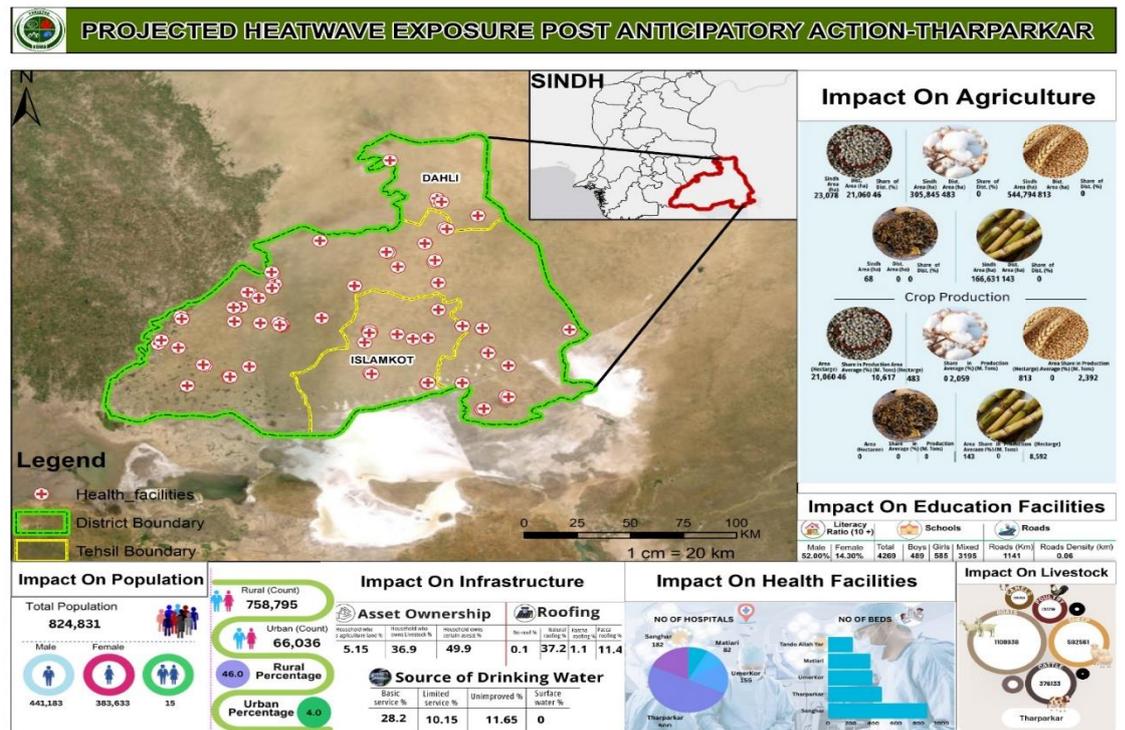
5. Heat Wave Impact Post Guidelines:

The heatwave impact on vulnerable districts is as under:-

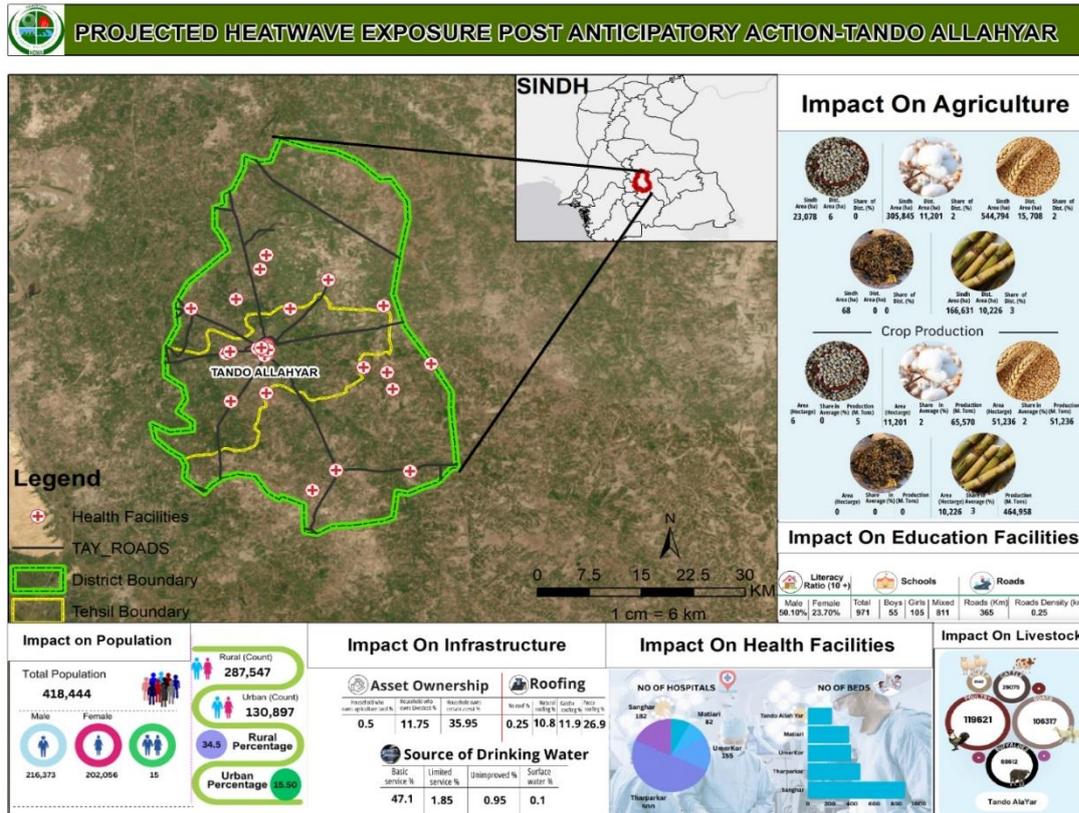
District Umarkot



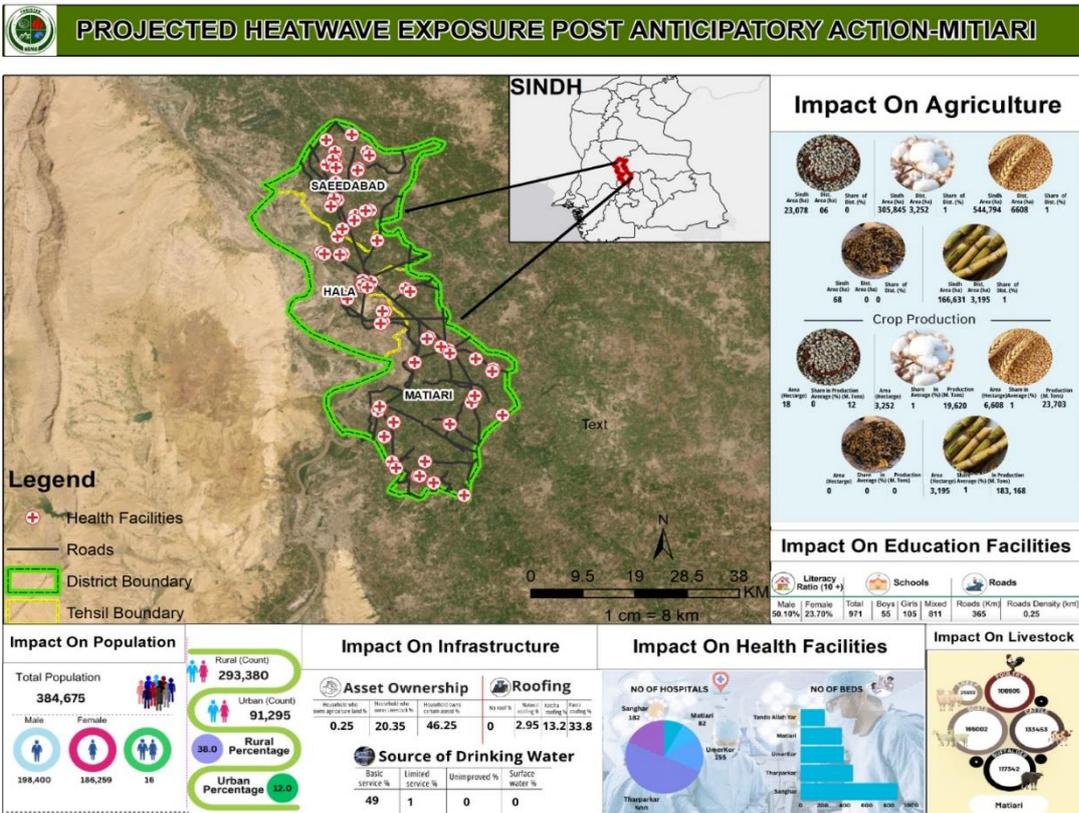
District Tharparkar



District Tando Allahyar

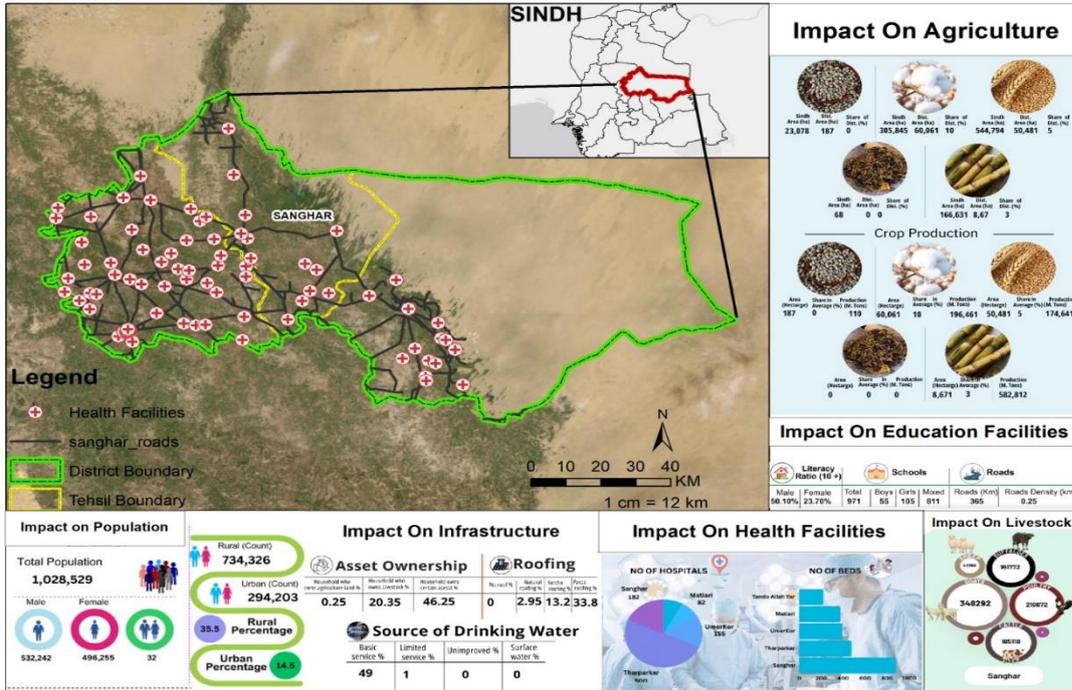


District Matiari



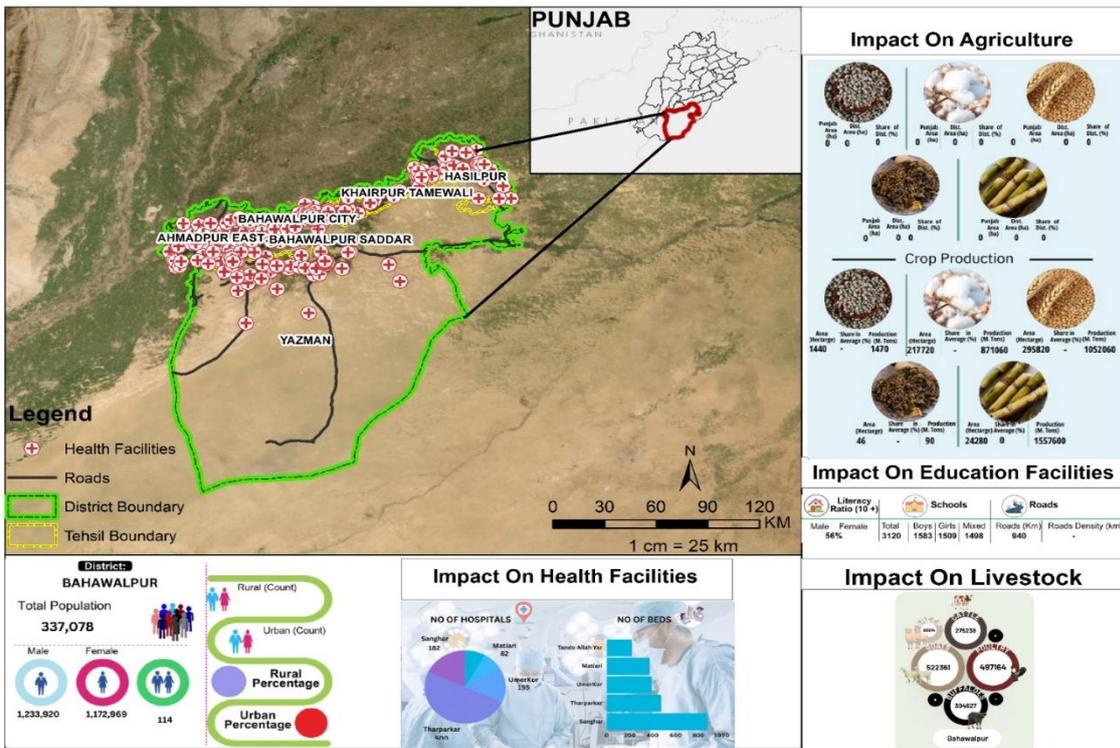
District Sanghar

PROJECTED HEATWAVE EXPOSURE POST ANTICIPATORY ACTION-SANGHAR

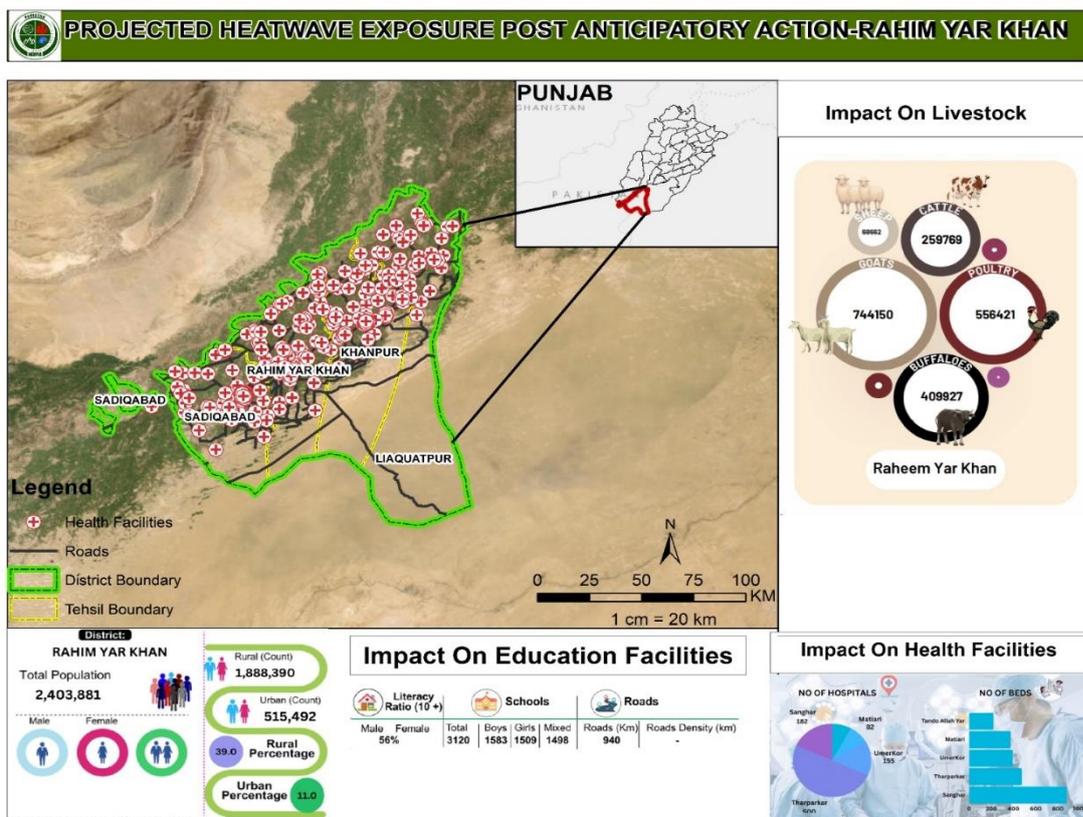


District Bahawalpur

PROJECTED HEATWAVE EXPOSURE POST ANTICIPATORY ACTION-BAHAWALPUR



District Rahim Yar Khan



The heatwave impact on vulnerable districts will be minimized by following the guidelines in true letter and spirit. The difference in effects of heat wave before and after following guidelines is tabulated as under:-

| Impact On | Pre Guidelines Impact | Post Guidelines Impact |
|-----------------------------------------|-----------------------|------------------------|
| Tharparkar | | |
| Population | 1778407 | 889204 |
| Health | | |
| No. of Hospitals | 500 | 500 |
| Bedding Capacity | 477 | 477 |
| Livestock | | |
| Cattle | 752265 | 376133 |
| Buffaloes | 46328 | 23164 |
| Sheep | 1185122 | 529561 |
| Goats | 2217876 | 1108938 |
| Poultry | 263431 | 131716 |
| Agriculture (Production in tons) | | |
| Bajra | 21233 | 10617 |
| Cotton | 4117 | 2059 |
| Wheat | 4658 | 2329 |
| Tobacco | 0 | 0 |
| Sugarcane | 17184 | 8592 |
| Schools | 4269 | 4269 |

| | | |
|-----------------------------------------|---------|---------|
| Roads | 1141 | 1141 |
| Umerkot | | |
| Population | 1159831 | 579915 |
| Health | | |
| No. of Hospitals | 155 | 155 |
| Bedding Capacity | 394 | 394 |
| Livestock | | |
| Cattle | 197308 | 98654 |
| Buffaloes | 97842 | 48921 |
| Sheep | 149006 | 74503 |
| Goats | 536387 | 268194 |
| Poultry | 179945 | 89973 |
| Agriculture (Production in tons) | | |
| Bajra | 237 | 119 |
| Cotton | 139243 | 69622 |
| Wheat | 74804 | 37402 |
| Tobacco | 0 | 0 |
| Sugarcane | 104498 | 52249 |
| Schools | 2745 | 2745 |
| Roads | 1184 | 1184 |
| Sanghar | | |
| Population | 2308465 | 1154233 |
| Health | | |
| No. of Hospitals | 182 | 182 |
| Bedding Capacity | 880 | 880 |
| Livestock | | |
| Cattle | 370235 | 185118 |
| Buffaloes | 323543 | 161772 |
| Sheep | 83579 | 41790 |
| Goats | 696584 | 348292 |
| Poultry | 437343 | 218672 |
| Agriculture (Production in tons) | | |
| Bajra | 219 | 110 |
| Cotton | 392921 | 196461 |
| Wheat | 349282 | 174641 |
| Tobacco | 0 | 0 |
| Sugarcane | 1165624 | 582812 |
| Schools | 3350 | 3350 |
| Roads | 1338 | 1338 |
| Matiari | | |
| Population | 849383 | 424691 |
| Health | | |
| No. of Hospitals | 82 | 82 |
| Bedding Capacity | 376 | 376 |
| Livestock | | |
| Cattle | 266906 | 133453 |
| Buffaloes | 234683 | 117342 |
| Sheep | 51865 | 25933 |

| | | |
|-----------------------------------------|---------|---------|
| Goats | 330003 | 165002 |
| Poultry | 213809 | 106905 |
| Agriculture (Production in tons) | | |
| Bajra | 23 | 12 |
| Cotton | 392921 | 19620 |
| Wheat | 349282 | 23703 |
| Tobacco | 0 | 0 |
| Sugarcane | 1165624 | 183168 |
| Schools | 971 | 971 |
| Roads | 365 | 365 |
| Tando Allah Yar | | |
| Population | 922012 | 461006 |
| Health | | |
| No. of Hospitals | 80 | 80 |
| Bedding Capacity | 220 | 220 |
| Livestock | | |
| Cattle | 58149 | 29075 |
| Buffaloes | 139224 | 69612 |
| Sheep | 17124 | 8562 |
| Goats | 212633 | 106317 |
| Poultry | 239242 | 119621 |
| Agriculture (Production in tons) | | |
| Bajra | 9 | 5 |
| Cotton | 131139 | 65570 |
| Wheat | 102471 | 51236 |
| Tobacco | 0 | 0 |
| Sugarcane | 929916 | 464958 |
| Schools | 835 | 835 |
| Roads | 539 | 539 |
| Bahawalpur | | |
| Population | 4284964 | 2142482 |
| Livestock | | |
| Cattle | 550476 | 275238 |
| Buffaloes | 609254 | 304627 |
| Sheep | 160027 | 800136 |
| Goats | 1044722 | 522361 |
| Poultry | 994327 | 497164 |
| Agriculture (Production in tons) | | |
| Bajra | 1470 | 735 |
| Cotton | 871060 | 435530 |
| Wheat | 1052060 | 526030 |
| Tobacco | 90 | 45 |
| Sugarcane | 1557600 | 2778800 |
| Schools | 3914 | 3914 |
| Roads | 3223 | 3223 |
| Rahim Yar Khan | | |
| Population | 5564703 | 2782351 |
| Livestock | | |

| | | |
|-----------------------------------------|----------|---------|
| Cattle | 519537 | 259769 |
| Buffaloes | 819854 | 409927 |
| Sheep | 137324 | 68662 |
| Goats | 1488299 | 744150 |
| Poultry | 1112841 | 55642 |
| Agriculture (Production in tons) | | |
| Bajra | 230 | 115 |
| Cotton | 736100 | 368050 |
| Wheat | 1028050 | 514025 |
| Tobacco | 0 | 0 |
| Sugarcane | 17401040 | 8700520 |
| Schools | 3102 | 3102 |
| Roads | 940 | 940 |