







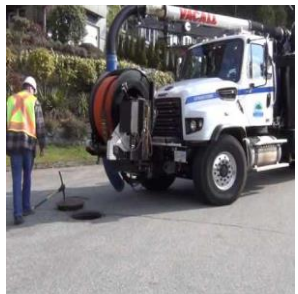
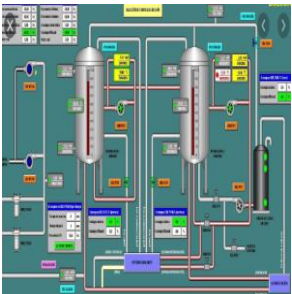







LIST OF ADAPTED INNOVATIONS


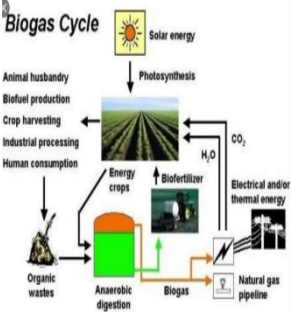
	Climate Resilient Features and Innovations	Name	Short Description	Reference
<u>Water Supply and Sanitation</u>				
1.		Eliminate or minimize the use of ground water source and depletion of ground water table	<p>Sustainable Surface Water source for Drinking Water</p> <p>Ground water source will be replaced with surface water source in two cities. Ground water is depleting quickly in these cities with hilly terrains. Provision of surface water source is a sustainable and more environmental-friendly solution.</p> <p>Location: Abbottabad and Mingora</p>	<p>Based on recommendations of Situation Analysis and Concept Reports</p> <p>https://drive.google.com/file/d/1v2AUsiPPu4ILNVN0gxJ-M6LAfeVkabYm/view?usp=sharing</p>
2.		Water Conservation	<p>Leak detection and Metering to reduce or eliminate NRW in Water Distribution Systems</p> <p>New water distribution networks with metering will avoid the line losses and leakages and thus reduce the non-revenue water (NRW). It will also help in increasing the supply pressures at user end. Leak detection apparatus will be provided to each WSSC that will help in identifying the leaks in pipes and thus eliminate the leaks. Location: Abbottabad, Kohat, Mingora, and Peshawar</p>	<p>Based on recommendations of Situation Analysis and Concept Reports</p> <p>https://www.youtube.com/watch?v=atVD8LdC6iw</p>
3.		Eliminate contamination in Drinking Water Networks	<p>Reduce the Water borne diseases by installing new water distribution networks by replacing old and leaking pipes.</p> <p>Improved water distribution network will result in eliminating the contamination in the water supply pipes. Currently most of the water supply pipes are leaking and have cross connections with sewage drains. With new water distribution system, these problems will be minimized or eliminated.</p> <p>Location: Abbottabad, Kohat, Mingora, and Peshawar</p>	<p>Based on recommendations of Situation Analysis and Concept Reports</p>


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4.		Uniform flow at user end	Flow regulated Water Networks	<p>Different types of flow regulating valves are proposed in the water supply distribution network for better regulation of the supplied flow within the network. It will ensure uniform flow at user end, as well as help in isolating the systems during maintenance.</p> <p>Location: Abbottabad, Kohat, Mingora, and Peshawar</p>	<p>Based on recommendations of Situation Analysis and Concept Reports</p> <p>https://www.youtube.com/watch?v=h1XXUBIU10U</p>
5.		Effective use of water and increase in revenue for WSSCs	Digital Water Meters	<p>Installation of approximately 130,000 water meters at customer connections will promote the efficient use of water and also will help in water conservation and revenue generation for the operating agencies.</p> <p>Location: Abbottabad, Kohat, Mingora, and Peshawar</p>	<p>Based on recommendations of Situation Analysis and Concept Reports</p> <p>https://www.youtube.com/watch?v=0U7H96yTNqw</p>
6.		Water Quality Management	Water Quality Laboratory at the proposed drinking water treatment plants	<p>Water quality laboratory at the two proposed water treatment plants will help in monitoring the water quality of raw and treated water. This will help in identifying water quality problems and rectifying them in timely manner.</p> <p>Location: Abbottabad and Mingora</p>	<p>Based on recommendations of Situation Analysis and Concept Reports</p>

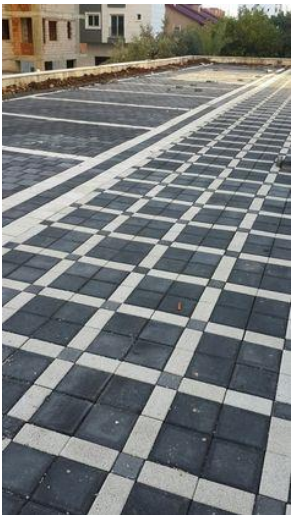

	Climate Resilient Features and Innovations		Name	Short Description	Reference
7.		Reduced groundwater contamination	Separate Closed Pipe Sewerage System	<p>The use of closed piped sewerage system instead of open drains will result in reducing contamination in the overall system due to open drains and is more environmentally friendly. For example, Mardan having shallow ground water table, closed piped conduit system will help to reduce the ground water contamination.</p> <p>Location: Kohat and Mardan</p>	Based on recommendations of Situation Analysis and Concept Reports
8.		Reduce urban flooding by introducing dedicated sewerage system	Separate Closed Pipe Sewerage System	<p>Provision of new piped sewerage network will result in reduced flows in the existing drains, ultimately helping in reducing the flooding during storm events. Drains will cater to storm water flows only.</p> <p>Location: Kohat and Mardan</p>	Based on recommendations of Situation Analysis and Concept Reports
9.		Operational Sustainability of Sanitation systems	Maintenance equipment for flushing the sewerage system (Sewer flushing trucks)	<p>Provision of maintenance equipment for the new proposed sewerage system will ensure smooth and regular operation and maintenance of the system and thus make the operations of the system sustainable and minimize operational issues.</p> <p>Location: Kohat and Mardan</p>	Based on recommendations of Situation Analysis and Concept Reports https://www.youtube.com/watch?v=3YjTgoFn-OM



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10.		SCADA System	<p>SCADA (Supervisory Control and Data Acquisition) systems are used to monitor and control a plant or equipment in water and wastewater systems. This system will be used for remote operation of major facilities such as pump stations and plants. In particular, flow metering will be carried out that will report to WSSCs main offices.</p> <p>Location: All KPCIP Cities</p>	Based on recommendations of Situation Analysis and Concept Reports
11.		Rapid gravity sand filter treatment Plant	<p>A sustainable surface water treatment technology effectively used with SCADA system to overcome the shortage of potable drinking water in Mingora city by drawing water from River Swat.</p> <p>Location: Abbottabad and Mingora</p>	<p>Based on recommendations of Situation Analysis and Concept Reports</p> <p>https://www.youtube.com/watch?v=S7irrwTqloc</p>
12.		Activated Sludge Technology for Wastewater Treatment	<p>An effective & space efficient, conventional biological system using bacteria and air for treatment of wastewater.</p> <p>Location: Kohat and Mardan</p>	<p>Based on recommendations of Situation Analysis and Concept Reports</p> <p>https://www.youtube.com/watch?v=R9R9jYUvgSI</p>




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13.		Municipal Wastewater treatment	<p>Sewage treatment by aeration</p> <p>A high rated suspended growth technology comprising of an enrichment culture of microbial consortia in order to remove impurities and transform wastewater into environmentally acceptable quality. Treatment of sewage will result in reduced pollution loads to the receiving bodies.</p> <p>Location: Kohat and Mardan</p>	<p>Based on recommendations of Situation Analysis and Concept Reports</p> <p>https://www.youtube.com/watch?v=cIPFC3Y2rkq</p>
14.		Drinking water purification	<p>Rapid gravity sand filter</p> <p>A physical treatment process providing rapid and efficient removal of relatively large suspended particles. This system provides adequate drinking water to people of Abbottabad, Khyber Pakhtunkhwa with pre-treatments and disinfection with reduced footprints of land required.</p> <p>Location: Abbottabad and Mingora</p>	<p>Based on recommendations of Situation Analysis and Concept Reports</p> <p>https://www.youtube.com/watch?v=DSOtTE7U7xE</p>
Solid Waste Management				
15.		Door to door collection	<p>ABC (All Bags in Containers)</p> <p>The current system of waste collection in most of the cities is container based and street sweeping. Under this system, the households throw the waste on the streets that is collected by the workers manually and then taken to containers, which are cleared by vehicles. Under the new ISWM system being designed, all household waste would be collected from the doorstep (door to door), through vehicles, and hence the waste would not touch the ground, till its treatment / disposal site. There would be no containers in the residential areas, which are a visual &</p>	<p>Based on recommendations of Situation Analysis and Concept Reports</p> <p>https://www.youtube.com/watch?v=gXfYyf63ztM</p>




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			<p>environmental nuisance. As of today, no city in Pakistan has been able to convert successfully to this system and hence in our context this is a definitely first. (Many Indian cities, like Indore & Surat have successfully adopted this model).</p> <p>Location: All KPCIP cities</p>	
16.		Material Recovery Facilities (MRF)	<p>“Throwback”/ Trash Treasure</p> <p>The new system is proposing Integrated waste management plan, that includes establishing Materials recovery facilities in almost all cities, that would significantly reduce the quantities of waste going to the landfill site (LFS). The recovered inorganics would be either recycled or converted to RDF to be used in industry. The organic component would be processed as well.</p> <p>Location: All KPCIP cities</p>	<p>Based on recommendations of Situation Analysis and Concept Reports</p> <p>https://www.youtube.com/watch?v=CzLnA2-ouo</p>
17.		Bio-Energy from Bio Digesters	<p>BE Resource</p> <p>In cities with inadequate land (Mingora & Abbottabad), we plan to install anerobic bio digesters that convert organic waste into manure & biogas, that can be further used as fuel and soil conditioner. This model has not yet been adopted in Pakistan at a city level and would be an innovation. This is a huge step in the direction of achieving the goal of Zero Waste.</p> <p>Location: Abbottabad and Mingora</p>	<p>Based on recommendations of Situation Analysis and Concept Reports</p> <p>https://www.youtube.com/watch?v=Ez3zrpuxYGw</p>
18.		Campaign	<p>ACT (Active Citizen Engagement)</p> <p>The Integrated waste management plan, especially door to door collection and recycling plant cannot be successful without</p>	Based on recommendations of Situation

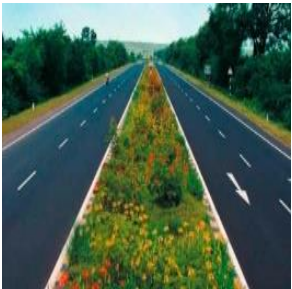


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				<p>comprehensive cooperation by the citizens. The implantation plan includes a civic education plan, using social mobilizers, who would be visiting homes, as well educating commercial visitors. We believe that this shall change the whole cityscape, making it a litter free urban settlement.</p> <p>Location: All KPCIP cities</p>	<p>Analysis and Concept Reports</p> <p>https://www.youtube.com/watch?v=aOEI-MmZedk</p>
Green Urban Spaces Projects					
Green Sports Complex (Kohat)					
19.		Climate Change Adaptation	Tree plantation, creepers and benches along pathways & boundary walls	<p>About 5 percent of the surface area of the sports complex will have a tree cover. The tree cover will reduce the urban heat of the area, produce oxygen, reduce dust pollution and absorb carbon dioxide gas. The creepers will provide greenery along the boundary wall and some sitting areas while only occupying minimal space.</p> <p>Location: Kohat</p>	<p>https://www.youtube.com/watch?v=MwrCzI0IIXc</p>




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20.		Groundwater Recharge	Permeable sidewalk	<p>Tuff tiles will be used to pave sidewalks, thereby enhancing ground water recharge at the sports complex.</p> <p>Location: Kohat</p>	
21.		Health & Fitness	Athletic and Sports	<p>The hockey, football and cricket stadiums at the complex will be redesigned to encourage more people to engage in physical activities for better health.</p> <p>Tennis, basketball, badminton and volleyball courts will be developed in the available vacant spaces.</p> <p>Location: Kohat</p>	https://www.youtube.com/watch?v=ribw-EKXufU




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Women's Business Development & Community (WBDC) Centre (Kohat)				
22.		Climate Changed Adaptation	Green wall with terraces	<p>A vegetated wall and plantation on terraces will help keep the building cool during summers.</p> <p>Location: Kohat</p> <p>https://www.youtube.com/watch?v=K7FQd7DXdWc</p>
23.		Women Empowerment	Women empowerment through vocational training and provision of women-run shops	<p>The vocational school will provide training in skills such as tailoring, woodworking and cooking for catering businesses. Women will have the opportunity to become business owners and have the option of renting shops within the WBDC compound.</p> <p>Location: Kohat</p> <p>https://www.youtube.com/watch?v=uqV7zrxI55k</p>


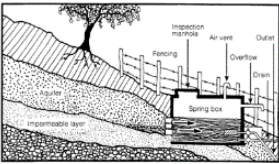

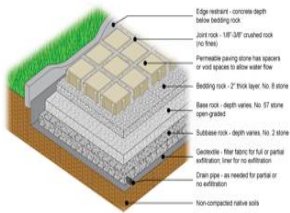
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24.	 	Physical & Mental Wellbeing	Recreational park for women and children. Location: Kohat	
Ghulam Nabi Park (Mardan)				
25.		Biodiversity Conservation	Preservation of ecosystem & soft scaping 40 percent of the site will have dense vegetation. Existing trees and shrubs will be kept intact. Location: Mardan	https://www.youtube.com/watch?v=5sFnTXrU3gw https://www.youtube.com/watch?v=JwdksDej6y0




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26.		Physical & Mental Well-being	Recreational Urban Space for Communities Location: Mardan	https://www.youtube.com/watch?v=sPRLbx92EN4
Linear Park for Women & Children on N-45 (Mardan)				
27.		Physical & Mental Wellbeing	Recreational Urban Space for Communities Location: Mardan	https://www.youtube.com/watch?v=O0k2wPaNbO8

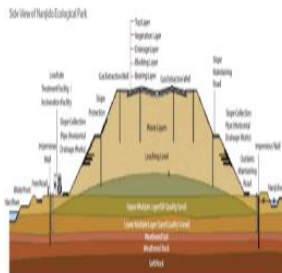


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Ring Road Green Belt & N-45 Vegetated Median (Mardan)				
28.		Climate Change Adaptation	<p>Green Mardan Initiative</p> <p>Dense plantation of trees and shrubs along the periphery of the city</p> <p>The plantation of about 6000 trees and 5500 shrubs along the 46.5 km stretch surrounding the city will serve as a carbon sink. The green belt will reduce the urban heat island effect, become a source of oxygen production and improve the ambient air quality of city.</p> <p>Location: Mardan</p>	https://www.youtube.com/watch?v=J9LYaJ_zLGM&feature=youtu.be
29.		Climate Change Adaptation	<p>Vegetated medians</p> <p>The vegetated median will not only improve air quality but also the aesthetic quality of the N-45 (i.e. the main highway running across Mardan city).</p> <p>Location: Mardan</p>	Same as above
Jambil & Marghuzar Khwar Canal Development (Mingora)				
30.		Health & Fitness	<p>Strengthening and hard and soft landscaping of stream banks</p> <p>Embankments will be developed to strengthen the stream banks. Green patches will be hard and soft landscaped to create sitting space.</p> <p>Location: Mingora</p>	https://www.youtube.com/watch?v=IBSoGbve-Tk




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31.	 	Health & Fitness Cycling & walking tracks	<p>The tracks will be open to the public for physical outdoor exercise. Densely populated neighborhoods of Mingora will be served.</p> <p>Location: Mingora</p>	




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32.		Health Safety	Cleanup of stream water and bed Solid waste collection meshes will be installed to trap solid waste discarded in the natural water ways (locally referred to as khwar). Dustbins will be provided to encourage the community to dispose waste appropriately. Location: Mingora	
Neighborhood Park (at old slaughterhouse) (Mingora)				
33.		Health & Fitness	Treatment of contaminated land and conversion into recreational space for densely populated neighbourhood. Facilities such as open-air gyms will be developed. The existing park poses health hazards to the surrounding community through land, water and air contamination. The remediation of the site and development as a park will benefit residents of all ages and genders. Location: Mingora	https://www.youtube.com/watch?v=mCFKlvZo2Qk&feature=youtu.be
Shimla Hill (Sherwan Rd) Urban Forest (Abbottabad)				
34.		Biodiversity Conservation	Preservation of existing urban forest & boardwalks for interaction with the forest Forests moderate air temperature and help mitigate climate change. The forest at Shimla Hill on Sherwan Road will be preserved and boardwalks will be constructed in sensitive areas to minimize the footprint on the forest while also providing recreational opportunities. Location: Abbottabad	




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35.		Urban Forestry	Seed spraying to expand forest Location: Abbottabad	https://www.youtube.com/watch?v=nXophqU-rp4
36.	 	Water Conservation	Harvesting water from natural springs Location: Abbottabad	https://www.instructables.com/id/Spring-Water-Collection-System/
Pedestrian Market in Old City Centre (Abbottabad)				
37.		Groundwater Recharge	Permeable Pavement	All pedestrian pathways and sidewalks will be paved using tiles with joints wide enough to allow storm water to permeate into sublayers (including a joint aggregate layer). This will reduce excess storm water runoff, enable ground water recharge and relieve burden from the existing drainage system of
				https://www.youtube.com/watch?v=mpoTPHe8_Rs https://www.youtube.com/watch?v=b_DTnOzYTR4



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			the streets. Location: Abbottabad	
38.		Sustainable Transport	Promotion of walking as a more sustainable mode of transport Location: Abbottabad	Karachi Neighbourhood Improvement Project: https://knip.gos.pk/project-area-saddar/
39.		Climate Change Adaptation	Façade uplift Location: Abbottabad	https://www.youtube.com/watch?v=SNsjDsim244
40.		Physical & Mental Wellbeing	Green pockets Location: Abbottabad	https://www.youtube.com/watch?v=LGOzhPp4yOY Note: Design will be adapted to the local culture.

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Remediation of Solid Water Dump in Lower Salhad and Conversion into Park (Abbottabad)					
41.		Land Remediation	Treatment of contaminated land	Decontaminating the land prior to conversion into a recreational space will be critical to maintain adequate health and safety standards. Location: Abbottabad	https://seoulsolution.kr/en/content/landfill-recovery-project-transformation-landfill-ecological-park
42.	 	Organic Waste Recycling	Composting toilets and composting planter boxes	In the absence of a formal sewage and waste collection system, composting can be carried out at the site. The compost can be used to fertilize the soil at the park and distributed to other green public spaces in Abbottabad. Location: Abbottabad	https://www.youtube.com/watch?v=ISHGIQYdA0&feature=youtu.be

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43.		Climate Change Adaptation, Health & Fitness	Urban forest and recreation space	This will significantly improve the aesthetic and environmental quality of area. Location: Abbottabad	
Besai Park (Peshawar) & Bagh-e-Naran Extension (Peshawar)					
44.		Health & Fitness	Playgrounds & outdoor sports facilities (basketball, volleyball and cricket)	Construction materials will be carefully selected to make the sports facilities as eco-friendly as possible. Designs will be integrated with the existing landscape to preserve the natural beauty of the area. Location: Peshawar	https://www.youtube.com/watch?v=xBGqZdOXCmk
45.		Physical & Mental Wellbeing	Outdoor activities such as life-size chess and Ludo	Opportunities for low-intensity physical exercise will attract people of all ages to the park. Location: Peshawar	https://www.youtube.com/watch?v=Ke0X73EbSFc

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46.	 	Skate parks for children and integration of slopes and stairs on natural contours to create sitting spaces	<p>Land use at the two park sites in Peshawar will be maximized through appropriate landscaping and hardscaping interventions. A multi-purpose amphitheater will be constructed on using natural contours.</p> <p>Location: Peshawar</p>	<p>https://www.youtube.com/watch?v=Tiej8ops71c</p> <p>https://www.youtube.com/watch?v=CjSKBIPWEpk</p> <p>https://www.youtube.com/watch?v=d cEFBBd4hxY</p>

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47.	 	Climate Change Adaptation	<p>Tree and shrub plantation, botanical gardens and green corridors</p> <p>In addition to the plantation of trees and shrubs, arched green corridors or garden pergolas create a more comfortable walking environment for users. The arches consist of wooden/steel frames and climbing plants.</p> <p>Location: Peshawar</p>	https://www.youtube.com/watch?v=2J5ECbcZ_5o

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48.		Groundwater Recharge	<p>Porous walking and cycling tracks</p> <p>Porous tracks are another way of ensuring ground water recharge.</p> <p>Location: Peshawar</p>	https://www.youtube.com/watch?v=3uNfzEMggRk
49.		Waste Recycling	<p>Facilitating solid waste disposal and collection</p> <p>The provision of recycling bins will help segregate solid waste and enable collection.</p> <p>Location: Peshawar</p>	https://www.youtube.com/watch?v=r-loJYGKOCU