FOSTERING A CLIMATE RESILIENT MULTAN PROJECT
A CAPACITY BUILDING INITIATIVE FOR GREEN INFRASTRUCTURE AND SUSTAINABLE URBAN GROWTH IN PUNJAB.

2nd Quarterly Progress Report

Period Covered- 1st Apr to 30th Jun. 2026

Abstract

This quarterly project report provides detailed insights into the BMZ-funded Fostering a Climate Resilient Punjab (FCRP) project, implemented by FDO in District Multan, along with nine (09) other highly urban flood-affected districts of Punjab. The report highlights the progress made during the quarter in strengthening climate resilience through sustainable green infrastructure development activities, technical interventions, and community engagement initiatives aimed at mitigating the impacts of urban flooding. Key achievements, challenges faced, and lessons learned are summarized to inform stakeholders and guide the planning of upcoming project activities.

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Abbreviations:

ABG	Above-Ground Carbon Stock
AGC	Above-Ground Carbon Stock
BGC	Below-Ground Carbon Stock
BMZ	Federal Ministry for Economic Cooperation and Development (Germany)
BOQs	Bills of Quantities
BZU	Bahauddin Zakariya University, Multan
CDA	Capital Development Authority
D-CAP	District Climate Action Plan
DCAC	District Climate Action Committee
DDMA	District Disaster Management Authority
DRR	Disaster Risk Reduction
EPA	Environmental Protection Agency
EUM	Emerson University, Multan
FCRP	Fostering a Climate Resilient Multan Project
FDO	Farmers Development Organization
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GPBS	Green Pakistan Code
HAM	Horticulture Authority Multan
LGCDD	Local Government and Community Development Department
MDA	Multan Development Authority
MSNAUM	Muhammad Nawaz Sharif University of Agriculture, Multan
NAP	National Adaptation Plan
NBS	Nature-Based Solutions
NGO	Non-Governmental Organization
P&D	Planning and Development Department
PCRAP	Punjab Climate Resilient Action Plan & Vision Policy 2024
PDMA	Provincial Disaster Management Authority
PHA	Parks and Horticulture Authority
PWD	Person with Different Abilities

Executive Summary:

Ranked among the world's ten most climate-vulnerable countries, Pakistan has witnessed significant shifts in weather patterns over recent decades. In response to these growing climate challenges and in alignment with the strategic priorities of the Government of Pakistan's **National Adaptation Plan (2023)** and the **Punjab Climate Resilient Vision and Action Plan (2024)**, the **Farmers Development Organization (FDO)**, with technical support from **GIZ**, is implementing the **"Fostering Climate-Resilient Multan, Punjab"** project to enhance local resilience and promote climate-adaptive development practices. Punjab is the largest province of Pakistan, which contributes 54% into Country's GDP. Number of cities of Punjab province including Lahore, Rawalpindi, Faisalabad, Sargodha, Sialkot, Multan are most affected cities from climate variability. During the recent flood 4.7 million peoples were affected, with 2.5 million hectares of crop and 1.3-1.8 billion losses to infrastructure.

Fostering a Climate Resilient Multan, Punjab Project, is funded by BMZ and implemented by FDO, is being carried out across ten districts of Punjab. Multan serves as the primary focus area for project interventions, while the remaining nine districts have been targeted based on their vulnerability to urban flooding, as highlighted in the *Punjab Climate Action Plan* and *Vision 2024*. Through this initiative, FDO aims to develop a cohort of 1,500 individuals from academia, government line departments including WASA, district administration, development authorities, provincial disaster management authorities and other relevant departments to contribute to climate-resilient efforts. The beneficiary selection process will consider gender, age, disability and other intersecting vulnerabilities to promote inclusive participation. The project will encourage partner institutions and stakeholders to nominate diverse participants, with particular attention to marginalized groups.

The project will undertake proactive outreach to women through universities, government departments, professional networks and community stakeholders, encourage their involvement in practical trainings, demonstrations, consultations and decision-making, and address practical barriers to participation where feasible.

The project will also promote accessibility for persons with disabilities and other vulnerable groups. Participation data will be disaggregated by sex and, where feasible, age and disability, enabling the project to identify underrepresented groups and undertake targeted outreach to ensure meaningful and equitable participation in the 1,500-person capacity-building cohort. This will be achieved through practical demonstration and hands-on training on development of green infrastructures, heat wave mitigation measures, improving drainage systems, rain water harvesting and identification of root causes of urban flooding and management in target districts.

During the reporting quarter, significant progress was made in implementing FCRP interventions, including:

1. Signing of Memorandum of Understanding (MOU), with Emerson University, Multan.
2. Capacity building of 99 students including 60 male and 39 females' students, support staff and faculty members 01 PWD and 1 participant from minority groups from partner universities on establishment and maintaining the urban forest theoretical as well as practical sessions. The women participation remained as 39%.
3. Completed capacity building training of 31 participants including skilled and unskilled labor and workers in two partner universities namely BZU & EUM at 02 demonstration sites of solarized tubewells. Participants were given first-hand knowledge and skills about operations and maintenance of solar tubewells, its installation procedures. These 31 training participants were comprising of 22 men and 09 women with an average of 30% female participation.
4. Developed BOQs (bills of quantities) and requested invitation for tendering for selection of consultant firm for training of 30 individuals on applying high albedo reflective coating on 38,000 square feet of rooftop at target locations. The high-albedo coating will be a premium acrylic & elastomeric, UV-resistant and waterproof coating with high solar reflectance, thermal emittance and SRI >100, compliant with ASTM D6083, ASTM C1549 and ASTM E1980. Application will include thorough surface cleaning, crack/joint filling and compatible primer, followed by a minimum of three coats achieving approximately 1.5–2.0 mm total Dry Film Thickness (DFT). The coating shall be durable against UV degradation, weathering, peeling, cracking, blistering and chalking. Temperature reduction will be assessed through standardized before-and-after measurements of roof surface temperature, using comparable locations and weather conditions, with the project targeting approximately 6–7°C reduction.
5. Completed BOQs and tendering process and survey of target sites for 12 re-charge wells along with on boarding of consultant for training of 30 individuals on recharge well demonstration sites for ground water recharge demonstration sites. Recharge wells are designed to capture runoff from 300–500 m² catchments (roads/roofs) using 110 mm/hr storm water / rainfall. Each well is typically 6.5 ft × 6.5 ft × 7.5 ft (≈8.10 m cube), sometimes with a deeper perforated bore for infiltration. A multi-layer filter is used including pebbles (lose boulders) 1.5-3" , crush1/2"-3/4" Organza mesh , Charcoal, Salica sand to remove silt and debris. The shrubs are added as primary filter around the recharge basin to filter out the debris & silt at the initial stage. The recharge rate is 10–15 L/s per well, depending on soil conditions. The moisture / ground water table is 90-150 ft deep, with at least 1–2 m unsaturated zone maintained for safe percolation. During training delivery, the participants were also educated to wash out Salica sand up to 2–3-inch layer and to place it instead of repayment very before monsoon season

begins. . Operations and Maintenance will include regular cleaning of inlets, periodic desilting, and replacement of filter media every 6–12 months to prevent clogging and maintain efficiency.

6. Completed the BOQs and tendering process for water drainage system up gradations for 17 gully grating points at Bosan road main corridor.
7. Completed 2 afforestation plantation campaigns in district Multan in close coordination with district administration, parks and horticulture agency, Multan and relevant stakeholders. These campaigns were conducted as attended by 402 individuals including 238 men, 164 women (41% women participation), 04 PWDs (01 women, 03 men).
8. Completed the establishment of rooftop gardens at all 25 targeted locations. Toolkits were also provided to beneficiaries to support the sustainable maintenance and management of the rooftop gardens. Prio to the establishing the rooftops, the sites were assessed for structural strength/load-bearing capacity and water drainage arrangements, as required under the Roof Assessment guidance in the Practical Manual Guide for Rooftop Gardening.

   The rooftop garden design and selection of growing media were guided by the assessed roof conditions. The manual covers different growing media, including peat, perlite, coconut coir, vermiculite and bark, as well as rooftop garden design and layout.
9. The training intervention on Sponge city model strengthened the capacity of district-level government officials through five two-day trainings covering 10 districts of Punjab. The training adopted a participatory and practical approach rather than relying solely on lectures. Participants undertook practical exercises in flood risk profiling, flood hotspot identification and mapping, runoff estimation using the Rational Method, drainage capacity assessment, institutional role mapping, Nature-Based Solutions (NBS) feasibility assessment, cost and feasibility analysis, and District Level Climate Action Plan (DL-CAP) development.

   In the flood-risk profiling exercise, district groups identified major flood hazards and hotspots, exposed areas, vulnerable groups and critical services, developed flood-risk profiles on flip charts, and presented their findings for comparative discussion. Participants also applied runoff estimation and drainage-capacity assessment concepts through hands-on exercises, helping them relate rainfall variability to stormwater runoff and identify appropriate flood-management measures.

   For NBS (Nature based Solutions), participants assessed the **technical and practical feasibility of Nature-based Solutions**, including consideration of soil infiltration, permeability, water-storage potential, costs, operational requirements and maintenance.

   The training also included a dedicated **DL-CAP practical exercise**, where participants worked in district groups to identify climate risks and urban flooding challenges, propose

resilience measures, complete a DL-CAP template and present their draft plans for feedback. Thus, the training provided evidence of applied capacity development beyond attendance and knowledge acquisition.
Regarding gender inclusion, 22 women participated among the reported participants. More importantly, the training included a dedicated Gender Equality and Social Inclusion (GESI) session in which participants worked on identifying flood-related barriers faced by women and other vulnerable groups and proposed appropriate NBS responses. The report also identifies opportunities for stronger involvement of women in early-warning dissemination, community preparedness and emergency-response planning. The available training evidence demonstrates women's participation and engagement in the learning process; however, evidence of subsequent application of their skills or their influence on district planning would require post-training follow-up.

Training effectiveness was also demonstrated through pre- and post-training assessments. Among 73 participants who completed both assessments, the average score increased from 62% to 90%, representing an average knowledge gain of 28%.

10. Further during the reporting period, four training manuals, one DCAP for Multan, and a solar-powered tubewell O&M brochure were developed, while Urban Flood Management/Sponge City trainings were conducted in three cities and an MoU was signed with Emerson University Multan.

Key challenges:

During the reporting period, the FDO team encountered several operational and implementation challenges that affected the pace and efficiency of project activities.

These challenges are summarized below:

Heatwaves Affecting Plantation Survival and Training Activities

The project area experienced prolonged and intense heatwave conditions, which posed significant challenges to both plantation activities and capacity-building interventions. Extremely high temperatures increased the risk of moisture stress for newly planted saplings, necessitating additional watering, monitoring, and maintenance to improve plant survival and establishment.

.Temperatures reached over 46°C during the May 2026 heatwave, with the heat index approaching 50°C in some areas, highlighting severe heat stress conditions.

The extreme weather also affected the implementation of capacity-building activities. Outdoor practical sessions, field demonstrations, and plantation events had to be carefully managed, as prolonged exposure to high temperatures posed health and safety risks for participants, trainers, and project staff. To minimize these risks while ensuring continuity of project activities, training schedules were adjusted to cooler periods of the day, primarily during the early morning and late afternoon.

Extreme heat during June 2026 adversely affected rooftop gardens, causing increased plant mortality despite regular maintenance, highlighting the need for heat-resilient gardening measures.

Plant mortality was primarily driven by extreme heat stress conditions combined with agronomic and design limitations. Although heat-tolerant species were introduced in rooftop gardening, challenges persisted due to shallow growing media with insufficient root-zone buffering, irrigation scheduling not fully aligned with peak evapotranspiration demand, inadequate shading during peak solar exposure, urban heat island effects, and partial drainage inefficiencies affecting root oxygenation. As a remedial measure, replacement planting has been ensured along with progressive improvement of species selection, irrigation management, shading, and drainage systems to enhance overall system resilience.

Despite these challenges, the project successfully implemented the planned interventions through adaptive scheduling, enhanced plantation maintenance, and continuous field monitoring.

Eid Holidays, Government Work-from-Home Modality, and University Examination Schedule Causing Training Delays

The implementation timeline of several project activities was affected by the overlap of Eid holidays, the Government of Pakistan's work-from-home modality announced during the holiday period from 08 May to 31 May 2026 and end-of-semester examinations in universities. Many government officials, students, faculty members, and other stakeholders were either unavailable due to official holidays, remote working arrangements, academic commitments, or holiday-related travel. These factors limited the availability of participants and resource persons, making it challenging to convene training sessions and coordination meetings as originally planned.

As a result, the scheduling and attendance of participants in both theoretical and practical training sessions on urban forestry, as well as onsite training related to solar tubewell installation, operation, and maintenance, experienced delays. The project team had to adjust activity timelines, reschedule several sessions, and coordinate closely with government departments, universities, and partner institutions to ensure adequate participation and effective delivery of training activities in the subsequent implementation period.

Increase in Project Costs Due to Fuel Price Fluctuations

During the reporting period, fluctuations in fuel prices, reaching increases of up to **60%** combined with rising inflation significantly affected project implementation costs. Pakistan's Consumer Price Index (CPI) inflation increased from **7.3% in March 2026** to **10.9% in April 2026** and **11.7% in May 2026**, resulting in higher transportation, logistics, and utility expenses.(https://www.pbs.gov.pk/monthly-inflation-report-for-april-2026/?utm_source=chatgpt.com).

These economic conditions directly impacted field travel, stakeholder consultations, monitoring visits, transportation of training materials, and the deployment of technical staff, all of which became more costly than originally budgeted. Consequently, the project experienced increased financial pressure on operational activities and logistics.

To mitigate these challenges, the project team strengthened cost-control measures, optimized travel planning, consolidated field activities where feasible, and closely monitored budget utilization. These adaptive financial management measures enabled the project to continue implementing planned activities efficiently while maintaining the quality of deliverables and achieving the intended project outcomes.

Low Women Participation in Urban Flood Management Training

The project faced challenges in achieving the desired level of women participation in urban flood management training activities. A total of **115 government officials** participated in the training, including **93 male** and **22 female** officials. As a result, **female participation accounted for 19%** of the total participants, while **male participation represented 81%**. . Beyond departmental nomination patterns, the low female participation reflects broader institutional and structural constraints, including occupational segregation within technical departments, lower representation of women in operational and field-based engineering and disaster management roles, traditional nomination practices that prioritize staff perceived as “field available,” and mobility and travel-related constraints for female staff during training deployments. In some cases, implicit assumptions regarding the suitability of women for technical or field-oriented flood management roles also influenced nomination decisions. To address these barriers, the project has initiated corrective institutional measures, including requesting partner departments to nominate both male and female participants for each training cycle, setting an indicative minimum female participation target per institution, and strengthening targeted outreach to departments with historically low female representation. Future training design will further incorporate gender-responsive scheduling and engagement strategies to improve accessibility and ensure progressive alignment with gender inclusion targets.

Last but not least according to “Punjab Gender Parity Report 2021” Women’s representation in government service in Punjab remains low, particularly in district administration and municipal institutions. Available data indicates that women constitute approximately 14–20% of staff in district offices, with even lower participation in technical and field-based municipal roles. Despite a 15% policy quota, effective representation often remains below this threshold due to structural, occupational, and institutional barriers.

https://wdd.punjab.gov.pk/system/files/PGPR-2021.pdf?utm_source=chatgpt.com

Recognizing the importance of gender-inclusive participation, the project team has engaged with partner organizations and stakeholders to encourage the nomination of more female participants in future training events. Targeted efforts will be undertaken in upcoming activities to improve female participation and ensure that overall gender-related project targets are achieved.

C. Contextual Developments

Fostering a Climate Resilient Multan, Punjab Project (FCRP) is closely aligned with the **Punjab Climate Action Plan & Vision 2024**, the **National Adaptation Plan (2023)**, and the **Framework for Implementation of the Climate Change Policy (2014–2030)**. The project promotes **nature-based solutions (NBS)**, emphasizes the development of **climate-resilient infrastructure**, and converts conventional grey infrastructure into green infrastructure wherever possible.

A key feature of the project is the adoption of the **sponge city model**, designed to absorb, retain, and reuse rainwater to mitigate urban flooding and reduce the effects of heatwaves. In line with the Punjab Climate Action Plan & Vision 2024, the project addresses core areas such as urban floods, heatwaves, green infrastructures development, rain water harvesting, and air pollution, enabling Multan and the nine other targeted districts to anticipate, manage, and recover from climate shocks. FCRP interventions contribute directly to the main policy pillars of **mitigation**, **adaptation**, and **capacity building**.

All materials and techniques used in demonstration sites comply with **low-carbon emission standards** and adhere to the **Green Pakistan Building Code**, reflecting the policy’s core goal of promoting sustainable economic and social development through low-emission growth, strengthened climate adaptation, and resilience across sectors.

To comply with the Green Pakistan Building Code, FDO ensured the use of low-carbon construction materials to support embodied carbon reduction. Locally available masonry and gravel filtration layers were utilized to minimize transport-related emissions, while large-scale tree plantation initiatives contributed to carbon sequestration. To address urban heat challenges,

high-albedo surface coatings were applied to reduce heat absorption in urban infrastructure, complemented by shade creation and evapotranspiration-based cooling effects from vegetation. For ecosystem restoration and biodiversity enhancement, three urban forests were established comprising more than 7,500 indigenous plant species, strengthening ecological resilience in the project area. **Punjab Government** has recently initiated measures for **groundwater recharge**, including rainwater harvesting and the re-use of rooftop rainwater for domestic purposes. These initiatives have significantly contributed to increasing the groundwater table at targeted sites. Similarly, the **Capital Development Authority (CDA)** is establishing groundwater recharge wells to return filtered rainwater to aquifers, addressing water insecurity in urban areas.

The *Fostering a Climate Resilient Punjab (FCRP)* project follows a similar approach and has incorporated 12 **groundwater recharge wells** into its interventions. These wells will be installed at partner universities' campuses, demonstrating practical methods for sustainable water management and serving as model sites for research, learning, and replication.

The project also focuses on identifying the **root causes of urban flooding** and developing practical mitigation strategies in the ten highly affected districts of Punjab. The base line report grounds its site selections in a combination of spatial hazard profiling, institutional operational data, and community-level lived experience. For that purpose, we analyzed satellite imagery, elevation contours, and historical monsoon data to map flood-prone zones across project districts.

Along with evaluation and desk review of WASA, DDMA, and Municipal records to pinpoint conveyance bottlenecks, undersized collectors, and pump-dependent sites. The team involved in base line assessment also conducted Key information interviews , and focus group discussions and verified micro-drainage breakdowns, overland runoff paths, and high-impact hotspots through 62 KIIs and 20 FGDs with 187 residents.

Based on the findings the district wise breakdown of hotspots , structural deficiencies and runoff dynamics the details are as;

District	Mapped Hotspots & High-Risk Zones	Drainage & Runoff Deficiencies	Site-Specific Intervention Justification
Multan	Timber Market, inner-city low-lying pockets, canal-adjacent zones, and Bosan Road corridor	Low natural gradient, mixed sewer-stormwater lines, severe siltation, and impervious surface sealing leading to localized runoff accumulation.	Priority Zone: Ideal for gully-grating upgrades, high-albedo coatings, and groundwater recharge wells to restore natural infiltration and relieve low-lying ponding.
Lahore	Low-lying inner city, canal corridors, and bund-side	Heavily sealed surface catchment, severe spatial constraints for surface	Requires permeable pavement retrofits, urban forest buffers, and strategic retention basins

	settlements.	absorption, and reliance on energy-intensive pumping stations.	to reduce runoff peaks reaching main WASA collector lines.
Faisalabad	D-Ground, Millat Town, Gulberg, Susan Road, and industrial zones.	Governance and structural disconnects between WASA main trunk lines and local body tertiary drains, resulting in severe surface runoff backing up into commercial hubs.	Requires localized runoff management (Sponge City principles) to reduce pressure on fragmented tertiary-primary drain interfaces.
Gujranwala	Haider Underpass, Noshera Road, Nabi Pura, and Sharif Pura.	Topographic depressions causing fast overland runoff pooling; heavy solid waste deposition in open channels restricting conveyance.	Suited for trash-rack installation, structural cross-drainage expansion, and localized retention gardens upstream of underpasses.
Kasur	Chukki Piyaray Laal, Eisa Nagar, and Jamatpura.	High contamination risks due to mixed wastewater intrusion, missing tertiary linkages, and standing water in dense residential streets.	Immediate need for channel restoration, de-siltation, and community-managed bioswales to prevent hazardous household inundation.
Sialkot	Rangpura and Ugoki.	Historical flow channels obstructed by urban encroachment, narrow legacy drains, and heavy industrial/domestic waste dumping.	Focus on natural drainage corridor restoration, encroachment clearance, and decentralized stormwater filtration.
Chiniot	Mohallah Ghafoor Abad, Dil Khushab, MC Chowk, and Katchery Road.	Rapid runoff from elevated surrounding roads into low-lying residential pockets lacking integrated stormwater outlets.	Targeted micro-drainage connections, gully-inlet integration, and roadside soak away pits.
Jhang	Encroached drainage corridors, commercial squares, and major road intersections.	Construction over historical flood routes leading to delayed water clearance during peak monsoon downpours.	Demarcation and clearance of natural flow paths combined with localized infiltration zones.
Hafizabad	Low-lying residential pockets, market stretches, and roads near unlined nullahs.	Slower clearance rates due to flat terrain, undersized sewer mains, and unorganized solid waste disposal clogging inlets.	Low-regret Sponge City pilots, including bioswales, runoff diversion channels, and community waste-trap systems.
Sargodha	Mapped hotspots cover major commercial hubs like	Chronic road ponding from unlined channels, undersized sewer mains, and heavy	Runoff-- diversion channels, permeable pavement retrofits, and decentralized stormwater

	Club Road, Karkhana Bazaar, Fatima Jinnah Road, and University Road, where unorganized solid waste disposal and capacity-constrained drainage channels cause recurring monsoon waterlogging.	waste accumulation blocking surface runoff paths.	infiltration basins along major commercial corridors

In addition, it strengthens the capacity of government officials in managing urban flooding by improving district-level climate action plans. Lessons learned and findings from these activities will contribute to the development of a **sponge city module**, which will be integrated into partner universities' curricula. Urban forests established under the project will serve as **living laboratories** for academic research and experiential learning, supporting evidence-based decision-making, cross-sectoral climate integration, and green investment priorities outlined in the provincial climate action framework.

To ensure the sustainability of the project interventions, FDO has already signed Memoranda of Understanding (MoUs) with relevant line departments and universities, emphasizing their continued collaboration in promoting climate-resilient urban development, institutionalizing the Sponge City approach, integrating project knowledge products into academic curricula and government planning processes, and supporting the long-term implementation and replication of project interventions beyond the project period.

To ensure the long-term sustainability of the ongoing project activities and interventions, the following measures have been undertaken:

- ✓ Operation and Maintenance (O&M) Committees have been established to oversee the operation, maintenance, and sustained performance of the solarized tubewells.
- ✓ Focal persons have been designated within partner universities to coordinate and support the continuation of project-related academic and capacity-building initiatives.
- ✓ Memoranda of Understanding (MoUs) have been signed with relevant line departments and universities to institutionalize collaboration and ensure the continued implementation, replication, and scaling up of project interventions beyond the project period.

In line with the climate policy's emphasis on **inclusive participation**, FCRP adopts a participatory approach by engaging all segments of society, with particular focus on women,

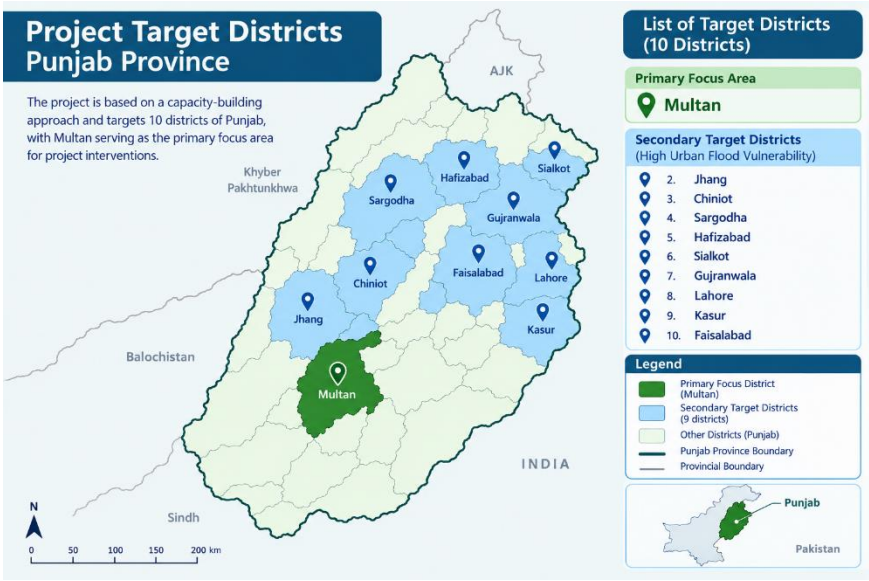
persons with disabilities, transgender individuals, and minority groups. These stakeholders are trained as a resilient workforce capable of applying climate-smart practices in the field.

Overall, FCRP not only aligns with national and provincial climate policies but also complements ongoing and past initiatives by scaling up best practices, integrating multi-sectoral approaches, and fostering sustainable and inclusive climate resilience in Punjab.

Project Background

Fostering a Climate Resilient Multan, Punjab *(FCRP)*, funded by BMZ and implemented by FDO with the technical support of GIZ, aims to address the growing challenges of urban flooding, heatwaves, and climate-induced water stress in Multan and nine other highly urban flood effected districts of Punjab.

The project is based on a capacity-building approach and targets 10 districts of Punjab, with Multan serving as the primary focus area for project interventions. The remaining nine districts—Jhang, Chiniot, Sargodha, Hafizabad, Sialkot, Gujranwala, Lahore, Kasur, and Faisalabad—have been selected due to their high vulnerability to urban flooding.



Multan is the primary focus area of the project, where all demonstration interventions are being implemented. The remaining nine target districts are primarily being engaged through baseline assessments to identify the root causes of urban flooding, the development of technical training manuals, and capacity-building training. for district government officials to strengthen climate-resilient urban flood management and revise / improve existing district climate action plans.

Why Multan?

Multan, home to over 5.3 million residents, is one of Pakistan's most climate-vulnerable cities due to its arid climate, rapid urbanization, and increasing exposure to extreme weather events. The city receives an average of only 175 mm of rainfall annually, making it one of the driest major cities in the country. However, nearly one-third of this annual rainfall occurs during July, often within a short period, significantly increasing the risk of urban flooding. Summers in Multan are characterized by extreme heat, with average daytime temperatures exceeding 42°C, while severe heatwaves frequently push temperatures beyond 46°C. The city's average temperature has already increased by approximately 0.9°C, further intensifying heat stress and increasing energy and water demands. Climate vulnerability in Multan is further exacerbated by rapid urban expansion, the continuous loss of green spaces, and declining groundwater resources. Excessive groundwater extraction has caused water tables in parts of the Multan region to decline by more than one foot (approximately 0.3 meters) annually, posing a growing threat to the city's long-term water security and climate resilience.

Rapid urbanization, impervious surfaces, and inadequate green infrastructure have increased the frequency and severity of floods and heat events, impacting communities, public services, and local ecosystems.

Fostering a Climate Resilient Punjab (FCRP) project aims to develop a **cohort of 1,500 individuals** from government line departments (including WASA, PHA, MDA, and disaster management authorities), academic institutions, and local communities. These participants will be trained in practical climate adaptation measures, enabling them to **lead sustainable interventions** in their respective areas. The project also establishes **urban forests and demonstration sites** as living laboratories for research, education, and replication of climate-resilient practices.

The FCRP project reports the following impact level and progress-based results with a clear distinction between overall project targets and achievements completed to date;

A total of 1,500 individuals (including 40% women) is targeted for training under Sponge City principles. To date, 120 government officials and 120 university participants have been trained under structured modules across partner institutions. Post-training assessments indicate an estimated 70–80% improvement in technical understanding, measured through pre/post evaluation questionnaires and field-based applied exercises.

1. To achieve the target of a 25% increase in green cover, contributing to an estimated 2°C-3C reduction in surface temperature at pilot sites, FDO established three urban forest sites along with metro corridor plantation activities covering major arterial roads in Multan. The urban forest initiative is based on the plantation of approximately 9,000 native plant species

and has expanded green cover over an area of 3 acres (1.214 hectares) using indigenous species, including mulberry, java plum, moringa, neem, peepal, arjun, albizia, pilkan, bakain, ber, lasoora, and kachnar.

According to research conducted by Bahauddin Zakariya University (BZU), a mature Pilkan (Albizia) tree stores a total carbon stock of 7,364.56, comprising 5,844.89 Above-Ground Carbon (AGC) and 1,519.67 Below-Ground Carbon (BGC). The carbon stock ratios for the other tree species planted in the urban forest are presented below:
https://www.pakbs.org/pjbot/papers/1720160803.pdf

Selected native species (including neem, peepal, moringa, and mulberry) are widely documented in urban forestry literature to contribute to microclimate cooling through canopy shading and evapotranspiration processes. Their combined effect in urban forest systems can reduce local air temperature by approximately **5°C to 6°C**, depending on canopy density, site conditions, and irrigation availability.

https://www.nature.com/articles/s43247-024-01908-4?utm_source=chatgpt.com

Against the anticipated target of a 1-meter annual rise in groundwater levels, 12 recharge wells have been established and equipped with flow meters to monitor recharge into the aquifer system. Given the influence of rainfall variability and groundwater abstraction, changes in groundwater levels are reported as an indicative trend based on site-level monitoring rather than as a direct causal impact of the intervention. The pre-rehabilitation hydraulic capacity of the Bosan Road drainage corridor was reduced by up to 60% during the rainy season, primarily due to sediment/silt accumulation, blocked gully inlets, missing pipeline connections, and increased surface roughness. An estimated 50% blockage/silting reduced the effective capacity of gully grating points by up to 60%, from approximately 8.3 L/s for drainage areas of up to 600

2. The existing Bosan Road drainage system is being rehabilitated and augmented through the installation of **17 gully grating points** to improve stormwater interception and conveyance. Based on the applicable design criteria, each gully is estimated to manage approximately **8.3 L/s from a 600 m² paved catchment**, while the **Ø160 mm PVC-U connections** have a design discharge capacity of approximately **22 L/s per connection**, subject to the approved BOQ/design specifications. The intervention is expected to improve drainage performance and reduce urban flooding, with actual performance to be verified through post-installation monitoring.

The post-rehabilitation hydraulic performance is defined in accordance with WASA-specified standards, including Ø160 mm PVC-U connecting pipelines and standardized gully grating dimensions outlined in the approved BOQ, ensuring improved stormwater conveyance and reduced surface flooding during peak rainfall event.

3. **Ten (10) District Action Plans** developed and endorsed for climate-resilient infrastructure planning and urban flood management, aligned with the National Adaptation Plan (NAP) 2023.

4. Against the overall project target of 100,000 sq. ft. of rooftop surfaces, 16,000 sq. ft. were coated with high-albedo reflective material during the reporting period, achieving 16% of the target and resulting in an observed reduction of approximately 4–5°C in room temperature. intervention.**120 students** and **faculty members** are certified from three partner universities on accredited **One-Month University Course** on "Sponge City Principles.

5. Project approach **scaled up** by other districts (at least 05 districts) under government or donor-funded initiatives.

E. Summary of Project Activities completed this quarter/ half-yearly

#	Key Activity	Date of Completion
Coordination		
1	Coordination with the stakeholders'/line departments for the training on urban flood management and the sponge city model	08 May,2026
Memorandum of Understanding (MOUs) signing status		
2	MOU singing with Emerson University, Multan	20 May 2026
Terms of Reference (TOR's) Development and invitation for tender		
3	Invitation for tender (IFT) for hiring service provider for solar tube well installation for the 30 participants	30 April, 2026
4	Invitation for tender (IFT) for hiring service provider ground water recharge well installation and training of the 75 participants form the targeted universities	30 April, 2026
5	Hiring of service provider for hand on training on the drainage technology (Establishment and Upgradation of the System)	12 June, 2026
6	Hiring service provider for hands on training on application and benefits of cool roof technologies high albedo reflective coating	24 June, 2026
Capacity Building		
7	2 afforestation Plantation campaigns	30 April, 2026
8	Training of 115 Government Officials on Climate Resilience and Urban Flood management, sponge city Principles.	08 May, 2026
9	Training of 31 participants Solar Tube Well Installation, Operation, and Maintenance.	20 May, 2026
10	Training of 75 students on urban foresting	05 June, 2026
11	Practical training session on urban forest management	30 June, 2026
Progress Review Meetings		
12	4rth Progress Review Meeting with GIZ.	11 April 2026

13	5th Progress Review Meeting with GIZ.	04 June 2026
14	6th Progress Review Meeting with GIZ	04 June 2026
15	FDO-PRM_FCRP March 2026 – internal FDO Management	07 April, 2026
16	FDO-PRM_FCRP April 2026 – internal FDO Management	05 May, 2026
17	FDO-PRM_FCRP May 2026 – internal FDO Management	03 June, 2026
18	Project extension supplement request submission	30 June 2026

F. Program Implementation

Details of Completed activities (as per agreed workplan)

Completed activities (as per agreed workplan)

Celebration of International Day of Forest

Date/Duration:
01-04-2026

Location:
Faculty of Agricultural Sciences & Technology BZU Multan

Activity Description:
During the reporting period, the FDO team celebrated the International Day of Forests under the theme “Forests and Economies” in coordination with the Faculty of Agricultural Sciences and Technology (FAS&T), BZU Multan. Experts highlighted the role of forests in sustaining livelihoods and economic opportunities, followed by the plantation of 200 plants at the urban forest site. The event was attended by 60 students (51 male and 9 female) from partner institutes.

Participants (type & number, disaggregated by gender/age if possible)
1. 51 Male and 09 Females participants.

Outputs:
Approximately 60 students, teachers, support staff and project team activity participated in the event and more than 200 saplings were planted at the site.

Completed activities (as per agreed workplan)

Afforestation Plantation Campaign

Date/Duration:
02-04-2026 and 30-04-2026

Location:
Zakriya Park Multan and Shah Shamas Park Multan

Activity Description:
Under the project FCRP, FDO successfully conducted two community-led afforestation campaigns in close collaboration with key stakeholders, including the Horticulture Authority Multan, Water and Sanitation Agency (WASA) Multan, civil society organizations, academic institutions, and local communities.

As part of these campaigns, more than 1,500 mixed tree saplings and soil erosion-control shrubs were planted in a double-row arrangement along the Metro Bus corridor from Kumharanwala Chowk to the Bahauddin Zakariya University (BZU) Main Gate. The plantation was designed to establish a continuous green buffer that will contribute to reducing dust pollution, stabilizing soil, mitigating the urban heat island effect, improving air quality, and enhancing the aesthetic value of the corridor. The species included in the plantation drive comprised both native and exotic varieties. Since the activity was conducted in collaboration with the Horticulture Agency Multan (HAM), whose mandate focuses primarily on urban beautification rather than carbon sequestration, the selected species were aligned with landscape and aesthetic objectives. The plantation included arjun, Buddha tree, tabebuia, pilkan, ficus longifolia, cassia glauca, neem, Indian mahogany, amla (Indian gooseberry), Ficus elastica, grafted fig, peach (Early Grand), Tacoma stans, Dombeya, and Buddha tree.
All saplings were planted at a space of 3 feet with height of approximately 8–10 feet and transported in 12-inch growing media bags to ensure protection during transplantation.
As the activities were carried out along the metro corridor in the city, the Horticulture Agency assumed responsibility for irrigation and maintenance of the plants, as part of its mandate for managing urban green belts. The reported survival rate of the plantation is more than 90% across all species.

To maximize public awareness and community engagement, the project implemented a comprehensive plantation awareness campaign. Promotional billboards were installed at strategic locations, including Bosan Road, Chungi No. 9, and Brand Road, while audio-visual awareness messages were disseminated through digital display platforms. In addition, informational brochures highlighting the environmental and social benefits of tree plantation were distributed among community members to encourage public participation and promote long-term stewardship of urban green spaces.
Through these combined outreach activities, an estimated 5,000–7,000 individuals were reached across roadside commuters, local residents, students, and visitors at high-traffic urban nodes, based on average daily footfall and vehicular movement at the intervention sites.

Based on the C&W Punjab Traffic Summary Book 2022, Bosan Road carries approximately 12,715 vehicles per day, translating into an estimated 19,000–32,000 daily individuals exposed to the corridor environment, based on standard urban occupancy assumptions. This represents total daily corridor user exposure rather than unique individuals, due to repeated commuter movement and overlapping traffic patterns.
https://cnw.punjab.gov.pk/system/files/Traffic%20Summary%20Book%202022.pdf?utm_sourc

e

These interventions not only increased urban green cover but also strengthened community ownership and institutional collaboration in advancing climate resilience and sustainable urban environmental management in Multan.

Participants (type & number, disaggregated by gender/age if possible)
402 individuals including 238 men, 164 women (41% women participation), 04 PWDs (01 women, 03 men).

Outputs:

02 (Two) community-led afforestation campaigns successfully conducted in collaboration with the Horticulture Authority Multan, WASA Multan, academic institutions, civil society organizations, and local communities. While more than 1,500 mixed tree saplings and soil erosion-control shrubs planted along the Metro Bus corridor from Kumharanwala Chowk to the Bahauddin Zakariya University (BZU) Main Gate, establishing a continuous green buffer.

Completed activities (as per agreed workplan)

Capacity building of Government Officials on Sponge City principles and Climate Resilient Urban Flood Management in Punjab

Date/Duration:
15 and 16 April, 20 and 21 April, 22 and 23 April, 5 and 6 May, 7 and 8 May2026 (2 Days Each)

Location:
Grand Shalimar Hotel Multan, Hotel One Faisalabad, Hotel One Gulberg Lahore

Activity Description:
During the reporting period, the FDO team, with technical support from project consultants, conducted a series of capacity-building training sessions on Climate-Resilient Urban Flood Management and **Sponge City Principles**. The trainings were designed to strengthen the technical knowledge and practical capacities of government officials responsible for urban planning, infrastructure development, disaster risk reduction, and environmental management, enabling them to integrate climate resilience considerations into routine planning and implementation processes.
The training sessions also enhanced participants' understanding of the Sponge City concept, nature-based solutions, and integrated urban water management approaches as effective strategies for reducing flood risks, improving groundwater recharge, and building climate-resilient cities.

Officials from a wide range of government departments actively participated in the sessions, including the District Government (DG), Local Government (LG), Horticulture Authority (HA), Water and Sanitation Agency (WASA), Municipal Corporation (MC), Environmental Protection Agency (EPA), Rescue 1122, Provincial Disaster Management Authority (PDMA), Pakistan

Meteorological Department (PMD), and other relevant district authorities. The interactive sessions provided a platform for participants to share district-specific challenges, exchange experiences, and identify practical solutions for improving urban flood management and strengthening institutional coordination.

Participants were assessed through pre- and post-training tests to evaluate their knowledge of the subject matter. Across the five trainings, participants who completed both assessments demonstrated a significant improvement in knowledge levels. The average score increased by 28 percentage points, from 62% to 90%.

The methodology focused continuous interaction between facilitators, and participants. Traditional lecture-style delivery was limited, and lengthy presentations were avoided. Instead, facilitators focused on creating interactive sessions, providing practical insights, real-world examples, and clear guidance to improve participants' understanding of the concepts and practical application.

Overall Learning Objectives

- **Enhance Conceptual Understanding**: To build participants' understanding of urban flooding dynamics, climate change impacts, and the principles of the Sponge City model for sustainable urban water management.
- **Strengthen Technical Knowledge**: To equip participants with practical knowledge of nature-based solutions (NbS), including permeable surfaces, green infrastructure, urban wetlands, and rainwater harvesting systems
- **Promote Climate-Resilient Planning**: To enable participants to integrate climate resilience and flood risk reduction measures into urban planning, development control, and infrastructure design processes.
- **Improve Institutional Coordination**: To enhance understanding of roles and coordination mechanisms among key departments (e.g., P&D, WASA, PDMA, Local Government) for effective urban flood management.

Participants (type & number, disaggregated by gender/age if possible)

21 Male and 04 Females participants of Multan and Jhang District
19 Male and 06 Female participants of Chiniot and Faisalabad Districts
18 Male and 03 Female Participants of Sargodha and Hafizabad Districts
18 Male and 01 Female Participants of Sialkot and Gujranwala Districts
17 Male and 08 Female Participants of Lahore and Kasur.
Total 93 Males and 22 Females participated in the training sessions

Outputs:

A total of **115 officials** from key line departments were capacitated on Climate-Resilient Urban Flood Management and the fundamental principles of the Sponge City model. In addition, 10 draft District climate action plans are developed based training program and serve as a technical reference for participants and district's administration.

Completed activities (as per agreed workplan)

Capacity Building on Solar tub well installation, operation and maintenance

Date/Duration:
20 May 2026 (1 Day Each)

Location:
Onsite BZU and Emerson University Multan

Activity Description:
During the reporting period, two solar-powered tube wells were successfully installed at Bahauddin Zakariya University (BZU) and Emerson University Multan, each equipped with a 6 kW solar PV system ((14 × 585 W panels) and 7.5 HP submersible pump, with a 160-ft bore depth and provision for at least 6 hours of daily solar operation. Following the installation, on-site training sessions were conducted on the operation, management, and maintenance (O&M) of the solar-powered tube wells. The training was attended by 31 participants including students, faculty members, and support staff to enhance their technical understanding and ensure the sustainable operation of the systems. Additionally, an Operation and Maintenance (O&M) Committee was established at each institution to oversee the management, routine maintenance, and long-term functionality of the installed solar-powered tube wells. Discharge/yield, storage capacity and system downtime will be monitored through operational records following commissioning.

Participants (type & number, disaggregated by gender/age if possible)
12 Male and 04 Females participants at BZU site.
09 Male and 05 Female participants at Emerson site
Total 21 Males and 09 Females participated in the training sessions

Outputs:

- 31 participants were capacitated through two demonstration models on the installation, safe operation, routine inspection, cleaning, basic troubleshooting, and maintenance of solarized tubewells. Participants received hands-on practice in these key O&M tasks, while institutional O&M committees were established to support routine operation and maintenance. Two operational solar-powered tube well demonstration sites were established at partner universities, and institutional capacity for their operation and maintenance was strengthened through practical training and the formation of O&M Committees.

Completed activities (as per agreed workplan)
Training on Establishment and maintenance of Urban Forest in Emerson, MNS UAM and BZU Multan **(theoretical and practical sessions)**

Date/Duration:
18, 19 and 20 May 2026 in Emerson and MNS UAM (3 Days Each)
03, 04 and 05 June in BZU Multan (3 Days Each)

Location:
Emerson University, Muhammad Nawaz Sharif University of Agriculture and Bahaudin Zakriya University Multan

Activity Description:
During the reporting period, FDO's team and consultant conducted training on the establishment and maintenance of urban forests. Students, faculty members, and support staff participated in the plantation of saplings at the designated urban forest sites as part of the practical training. Following the training, participants continued to monitor and maintain the urban forest sites through regular follow-up activities to support the healthy growth and sustainability of the plantation.

Participants (type & number, disaggregated by gender/age if possible)
17 Male and 14 Female participants at Emerson University.
26 Male and 10 Female participants at MNS UAM Multan
17 Mael and 15 Female Participants at BZU Multan
Total 60 Males and 29 Females participated in the training sessions

Outputs:
- Approximately 99 students, faculty members and support staff imparted the training session.
- Following the training, university participants independently initiated routine maintenance of urban forest demonstration sites, demonstrating improved ownership and practical application of acquired knowledge.

Challenge/ s*:*

- *Final term examination and summer vacations*
- *Intense Heat wave consistently raising temperature above 47C and feeling like 52-53 C.*
- *Budget constraints due to high spikes of dollar / POL prices.*

G. Procurement / Resources**:** *Equipment/materials procured, delivered, and in use*

During the reporting period, the FDO Procurement Department initiated the following procurements / services. *Their respective status is outlined in the remark's column below:*

Budget #	*Procurement / Service Title*	*Status*
2	External services (type/content of service)	
2.6	Hiring of Firm for Training on Solar tube well installation, operation,	*Process*

	and maintenance & practical demonstration (Participants lunch, Trainer Cost, Solar tube wells)	*completed*
2.8	Service provider for the training on Water Conservation techniques-recharge wells and practical demonstration (Training manual, trainer charges, Participants lunch, venue and establishment for hands on training on recharge wells).	*Process initiated*
2.9	Hiring of Consultant for Capacity building on drainage techniques (Trainer cost)	*Process initiated*
2.10	Service Provider for the training on Drainage Techniques (Participants refreshment & Venue)	*Process initiated*
2.11	Hiring of Service Provider for hands on training on Drainage Techniques (establishment & upgradation of system)	*Process initiated*
2.12	Hiring of Service Provider for Hands on Training on Application & benefits of cool roof technologies (Participants lunch, venue and Trainer cost, training material)	*BOQs developed and process initiated*
2.13	Hiring of Services of Consultant for developing one month Course on: Sponge City Principles for Climate-Resilient Urban Development (Course development cost)	*Process initiated*
2.14	Hiring of Services of Institutes for the Training of students on Sponge City Principles for Climate-Resilient Urban Development	*Process initiated*
2.15	Hiring of Service provider for the installation of Two Green Shady stands	*BOQs developed and shared with GIZ*
5	Procurement for material	
5.4	Early warning system (Dissemination of messages and TV programs-message development, translation, and production costs)	*Material has been developed and shared*
6	Other costs / consumables	
6.1	Consumables (Office cleaning, kitchen items)-Regional office	*Ongoing*
6.2	Stationery-Regional office	*Ongoing*
6.3	Office rent -Regional office	*Ongoing*
6.4	Utilities & Communication-Regional office	*Ongoing*
6.5	Generator Fuel & Maintenance -Regional office	*Ongoing*
6.6	Training Materials & Resources (manuals, banners, certificates, IEC material and Case Studies)	*Ongoing*

H. Monitoring & Evaluation **(0.5 page, in narrative form):** *Progress against agreed upon indicators, pre- and post-assessments, lessons learned*

During the reporting period, the project strengthened capacities for green infrastructure development by training a total of 647 individuals through various technical and community-

based interventions. As part of these efforts, 99 participants (60 men and 39 women), received onsite training on the establishment and maintenance of urban forests through a comprehensive program comprising three days of theoretical instruction and 17 days of practical field-based learning. Women actively participated in the establishment and maintenance of urban forests, contributing to community-based climate resilience and environmental sustainability. To promote women's participation in green employment opportunities, training on solar-powered irrigation systems and climate-resilient boring works was provided to 31 participants, including 9 women and 22 men. Similarly, 23 participants (14 men and 9 women) were trained on rooftop garden installation and maintenance for community institutions and commercial entities, enhancing their technical capacities and creating opportunities for climate-smart livelihoods. The project also implemented two large-scale community-led afforestation campaigns, resulting in the plantation of approximately 1,500 trees. These campaigns engaged a trained cohort of 402 participants, comprising 40% women and 60% men, and provided opportunities for women to actively contribute to environmental conservation, climate action, and community mobilization efforts.

In addition, a comprehensive provincial baseline study was completed and disseminated among key stakeholders to support evidence-based planning and decision-making.

At the institutional level, five two-day capacity-building workshops were conducted for government officials from ten districts, including representatives from Commissioners' Offices, Finance Departments, WASAs, Municipal Corporations, PHEDs, Planning & Development Departments, and Disaster Management Authorities. More than 100 officials participated in these workshops, of whom 19% were women, strengthening women’s participation in climate resilience capacity-building and providing a foundation for more inclusive climate governance and decision-making.

The capacity-building initiatives yielded significant learning outcomes, with average post-test scores increasing from 62% in the pre-test to 90% in the post-test assessments, reflecting a knowledge gain of 28 % points. Furthermore, participating districts developed and submitted ten draft action plans, demonstrating their commitment to integrating climate-resilient and green infrastructure approaches into district-level planning and implementation processes.

I: List of Annexures Attached with the Report

Annex I: (updated) M&E Plan – Mandatory to attach

Annex II: Photographs – in JPG format, attached in separate zip folders with caption included – Mandatory to attach

Annex III: Webinars/events database – Mandatory to attach

Annex IV: Add as many as required

Google drive link for all documents is;

https://drive.google.com/drive/folders/1CP2_sXOisxngpTbOCjpqQnaaYNQhbLU9