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Integrated Resource Recovery Center



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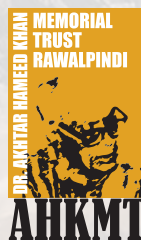
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Preface

Organic farming practices, including the use of organic fertilizers, have garnered significant attention worldwide due to their sustainable and eco-friendly nature. In Pakistan, where agriculture forms the backbone of the economy and supports a large rural population, the adoption of organic fertilizers presents promising opportunities for enhancing agricultural productivity while ensuring environmental stewardship.



Organic fertilizers are derived from natural sources such as compost, animal manure, green manure, and organic residues. They not only provide essential nutrients to crops but also improve soil structure, fertility, and water retention capacity.

The Green Shift: How Organic Farming is Reshaping Modern Agriculture

Unlike synthetic fertilizers, which may degrade soil health over time and contribute to environmental pollution, organic fertilizers promote long-term soil sustainability and biodiversity conservation.

Dr. Akhtar Hameed Khan Memorial Trust (AHKMT) has been an advocate for sustainable agricultural practices in Pakistan, focusing on improving the lives of farmers through innovative and eco-friendly methods. Among these methods, the use of organic fertilizers stands out as a pivotal approach in regions such as Sakrand, Mardan, Islamabad, and Haripur. Here we will explore the numerous benefits of organic fertilizers as observed in AHKMT's projects and compares them to chemical fertilizers, drawing on international studies to reinforce the advantages of organic farming.

In areas like Sakrand and Mardan, Haripur, Malakand and Chakwal, AHKMT's implementation of organic fertilizers has led to significant improvements in soil health. Organic fertilizers, made from natural materials such as compost, manure, and green waste, enhance the organic matter content in the soil. This organic matter is crucial for improving soil structure, which in turn enhances water retention, aeration, and root development. The introduction of organic fertilizers stimulate

microbial activity in the soil. These fertilizers provide a habitat and food source for beneficial micro-organisms, which play a vital role in nutrient cycling and decomposition of organic matter. The presence of these micro-organisms enhances soil fertility and promotes a healthier ecosystem.

In Mardan, the use of organic fertilizers has resulted in higher crop yields and improved produce quality. Organic fertilizers release nutrients slowly and steadily, ensuring that plants receive a consistent supply of essential nutrients throughout the growing season. This slow-release mechanism prevents nutrient leaching and reduces the risk of over-fertilization, a common issue with chemical fertilizers.

Farmers in the regions have reported not only increased yields but also better-tasting and more nutritious produce. For example, vegetables grown with organic fertilizers were found to have higher levels of vitamins and minerals compared to those grown with chemical fertilizers. This improvement in quality has also opened up new market opportunities for farmers, who can now sell their organic produce at premium prices. One of the key advantages of organic fertilizers is their environmental sustainability. Chemical fertilizers are often associated with negative environmental impacts, such as water pollution from runoff and soil degradation. In contrast, organic fertilizers promote a healthier environment by enhancing soil organic matter and reducing the risk of nutrient runoff.

AHKMT's projects have demonstrated that organic farming practices can significantly reduce the environmental footprint of agriculture. By enhancing soil structure and increasing water retention, organic fertilizers help to conserve water resources and reduce the need for irrigation. Additionally, the use of organic fertilizers contributes to carbon sequestration, helping to mitigate the effects of climate change.

Adopting organic fertilizers has also proven to be economically beneficial for farmers involved in AHKMT's projects. While the initial transition to organic farming may require some investment, the long-term benefits outweigh these costs. Organic fertilizers can be produced locally from farm waste, reducing dependency on expensive chemical inputs.

Farmers have experienced lower input costs and higher profitability due to improved yields

and better market prices for organic produce. Moreover, the enhanced soil health resulting from organic fertilizers leads to more sustainable farming practices, ensuring long-term productivity and resilience against climate variability.

Correlation with International Studies

The benefits observed in AHKMT's projects align with findings from numerous international studies on the advantages of organic fertilizers.

1. Soil Health and Fertility



A study published in the journal, *Agriculture, Ecosystems & Environment* highlighted the positive impact of organic fertilizers on soil health. The research found that organic amendments improve soil structure, increase microbial biomass, and enhance nutrient cycling, which are crucial for sustainable agriculture (Mäder et al., 2002). This aligns with AHKMT's findings of improved soil health and structure in their project areas.

2. Crop Yield and Quality



Research from the *American Journal of Alternative Agriculture* demonstrated that organic farming practices, including the use of organic fertilizers, result in comparable or even higher crop yields than conventional methods. The study also noted

that organic produce often has higher nutritional quality and better taste (Reganold et al., 2001). This correlates with the increased yields and improved produce quality reported by farmers in Islamabad and Haripur.

3. Environmental Benefits



The Journal of Environmental Management published findings indicating that organic fertilizers significantly reduce the risk of groundwater pollution compared to chemical fertilizers. The study emphasized the role of organic farming in preserving water quality and promoting biodiversity (Pimentel et al., 2005). This is consistent with the environmental sustainability benefits observed in AHKMT's projects.

4. Economic Viability



A report by the International Federation of Organic Agriculture Movements (IFOAM) underscored the economic benefits of organic farming. It highlighted that organic systems are more resilient to climate variability, reduce input costs, and provide premium market prices for organic produce, thus offering a viable economic model for farmers (IFOAM, 2013). This supports the economic benefits experienced by farmers in AHKMT's project areas.

The use of organic fertilizers by Dr. Akhtar Hameed Khan Memorial Trust in Sakrand, Mardan, Islamabad, and Haripur showcases the substantial benefits of this sustainable practice. Enhanced soil health, increased microbial activity, improved crop yield and quality, environmental sustainability, and economic viability are just a few of the advantages that align with international research findings.

As the global community increasingly turns towards sustainable agricultural practices, the experiences and successes of AHKMT offer valuable insights and a promising model for others to follow. By prioritizing organic fertilizers, AHKMT is not only promoting a healthier and more sustainable environment but also ensuring the long-term well-being and prosperity of farmers. This holistic approach to agriculture holds the key to addressing many of the challenges faced by modern farming and offers a blueprint for sustainable development in the agricultural sector.

In conclusion, the integration of organic fertilizers into large-scale farming practices in Pakistan holds immense potential to transform the agricultural sector towards sustainability and resilience. By promoting soil health, reducing environmental footprint, and enhancing market competitiveness, organic fertilizers contribute to achieving food security, economic prosperity, and environmental conservation goals in Pakistan's agricultural landscape.





Turning Solid Waste in Value

The Economics of Waste: Creating Value from Solid Waste Streams

Insights from Waste Management Studies in Quetta, Haripur, Mansehra and Kohat

Background

Solid waste generation in Pakistan has become an escalating challenge due to rapid urbanization and industrial development. Across the country, municipalities are struggling with mounting volumes of municipal solid waste (MSW), much of which is disposed of in unsafe ways such as open burning or indiscriminate dumping. This poses significant environmental and public health risks. Inefficient waste management systems are not only inadequate to handle the growing waste but also fall short in balancing environmental protection, economic viability, and social acceptance.

Efforts to develop sustainable waste management systems in Pakistan have gained traction in recent years. These initiatives, such as those spearheaded by the Dr. Akhtar Hameed Khan Memorial Trust (AHKMT), aim to implement waste recovery systems like Integrated Resource Recovery Centers (IRRCs), which convert waste into resources. A key part of these initiatives has been the Waste Characterization

and Social Feasibility Studies conducted in various cities, including Quetta (Balochistan), Haripur, and Mansehra and Kohat (Khyber Pakhtunkhwa). These studies assessed the types and quantities of waste generated in different communities, as well as public acceptance and willingness to pay for waste management services.



The results from these studies highlight the potential for waste segregation, recycling, and composting as practical solutions to reduce the environmental impact of waste. However, the challenge remains to build socially acceptable, economically feasible, and environmentally sound systems that can be tailored to Pakistan's diverse socio-economic conditions.

Geographic and Demographic Overview of Quetta, Haripur, Mansehra and Kohat

Quetta



Quetta, the capital of Balochistan, is a vibrant city located near the Pakistan-Afghanistan border, making it a key hub for trade and migration. The city is situated in a mountainous region, with an altitude of about 1,680 meters above sea level, providing it with a unique climate that includes cold winters and hot summers. The geographic terrain of Quetta influences the city's infrastructure, including waste management systems, as many parts are difficult to access due to the rugged landscape. The city is home to a diverse ethnic composition, with Pashtuns, Baloch, Hazaras, and a significant population of Afghan refugees. The Afghan refugee crisis has had a direct impact on Quetta's urban infrastructure, exacerbating existing challenges in public services, including waste management. Areas like Kharotabad and Essa Nagri, which house large numbers of Afghan refugees, represent some of the most underserved neighborhoods in the city, struggling with solid waste issues due to rapid urbanization and population growth.

Haripur

Located in the Hazara Division of Khyber Pakhtunkhwa, Haripur is known for its relatively moderate climate and fertile land. It is part of a district that serves as a gateway to the northern areas of Pakistan and is characterized by its proximity to major highways such as the

Karakoram Highway. The region features a mix of rural and urban settlements. Haripur has seen rapid urbanization in recent years, with a growing population putting pressure on municipal services, including waste management. Ethnically, the area is predominantly Pashto-speaking with a significant Hindko-speaking population, reflecting a blend of cultures. Haripur's waste management challenges are tied to its expanding industrial zones and agricultural waste, which must be integrated into broader urban waste management strategies.



Mansehra

Mansehra is another city in the Hazara Division of Khyber Pakhtunkhwa, situated near the scenic Kaghan Valley. The city is mountainous, surrounded by lush green landscapes, making it a popular tourist destination. Its waste management issues are intertwined with the seasonal influx of tourists and the waste they generate. The demographic composition of Mansehra is primarily made up of Hindko-speaking people, along with Pashto speakers and smaller communities from other ethnic backgrounds. The district has a mix of urban and rural settlements, and its waste management system faces challenges related to both agricultural waste and the growing urban sprawl. Like Haripur, the mountainous terrain complicates waste collection logistics, requiring tailored solutions.





Kohat

Kohat is a historical city located in Khyber Pakhtunkhwa, Pakistan, positioned about 60 kilometers south of Peshawar. Geographically, Kohat is nestled between the rugged hills of the Kohat Pass, which connects it to the rest of the province and beyond. Kohat is ethnically diverse, with Pashtuns making up the majority of the population, followed by smaller groups such as the Afridis, Bangash, and Orakzai. In addition to its local population, Kohat also hosts a significant number of Afghan refugees, primarily concentrated in the Oblen Afghan Refugee Camp, which adds to the demographic complexity and increases pressure on public services, including solid waste management. The city's population has grown rapidly due to urbanization, driven in part by migration from rural areas and the refugee crisis. This demographic expansion has strained Kohat's municipal infrastructure, necessitating improved urban planning and waste management solutions. Additionally, Kohat's mix of urban and rural settlements presents challenges in ensuring consistent waste collection services, especially in outlying areas.



Objectives

The objective of the studies conducted in Quetta (Kharotabad, Essa Nagri, and A-One City), Haripur,

Mansehra, and Kohat aimed to understand and analyze solid waste generation and management practices across diverse socio-economic settings.

These studies focused on both residential households and commercial units to assess the types and quantities of waste generated, as well as the efficiency of existing waste management systems. Using methodologies like “**Waste Wise Cities**,” the studies aimed to:

Quantify Waste Generation: Identify the volume and composition of waste, distinguishing between organic, recyclable, and non-recyclable materials.

Evaluate Segregation Practices: Assess the level of waste segregation at the household and commercial unit levels and identify gaps in existing practices.

Assess Waste Collection Systems: Analyze the efficiency of current waste collection mechanisms, including the frequency and methods of collection, to identify potential improvements.

Study the Socio-Economic Impact: Examine the relationship between waste generation and socio-economic factors to understand how different communities contribute to waste production and management.

Afghan Refugee Context (Kohat and Quetta): In both Quetta and Kohat, where significant Afghan refugee populations reside (such as in Kharotabad and Oblen Afghan Refugee Camp), the study aimed to assess how refugee communities impact waste generation and management, taking into account their specific needs and challenges.



The study in Kohat, specifically, included a detailed Solid Waste Characterization Study to provide insights into both urban (Kohat city) and refugee settlement contexts (Oblen Afghan Refugee

Camp), exploring unique challenges posed by this demographic mix. These objectives collectively aimed to create a comprehensive picture of solid waste management across the regions and provide actionable insights for sustainable waste practices.

Common Methodology: UN Waste Wise Cities Tools

A common methodology used across Quetta, Haripur, and Mansehra and Kohat for waste characterization studies is based on the UN's "Waste Wise Cities Tools." This framework offers a systematic approach to collecting and analyzing municipal solid waste (MSW) data, ensuring the inclusion of key socio-economic and demographic factors. Here's how the methodology is generally applied:

1. Site Selection and Stakeholder Engagement

The first step involved selecting neighborhoods that were representative of the city's socio-economic and demographic diversity. Meetings with municipal officials and local community leaders helped identify potential study sites. For instance, in Quetta, areas like Kharotabad and Essa Nagri and the Oblen camp in Kohat were chosen due to their high refugee populations and significant waste management challenges. In Haripur and Mansehra, and Kohat city urban neighborhoods were selected for their relevance to middle-class waste generation patterns.



2. Sampling and Household Selection

Once the sites were selected, households were chosen for participation through random sampling to ensure a representative cross-section of the population. Typically, around 100 households and 25 to 30 commercial units were involved in these studies. These samples covered a broad range of income levels and living conditions, ensuring the waste data reflected the city's overall waste generation dynamics.

3. Waste Segregation and Collection



The waste was segregated into three main categories: organic, recyclable, and non-recyclable. Daily waste collection was conducted over a seven-day period, ensuring consistency in data. In addition to household waste, commercial waste and public waste bins were also monitored. In the studies conducted in Quetta, Haripur, and Mansehra, waste from households, shops, and public spaces was collected and weighed both at the point of collection and at central segregation facilities to ensure accuracy.

4. Data Collection and Analysis



Detailed records were kept for each household, including the amount and type of waste generated daily. The waste was weighed using portable scales, and the composition is analyzed to identify potential for resource recovery, particularly in terms of organic composting and recyclable materials. The methodology also included socio-economic surveys to capture household attitudes toward waste management and their willingness to pay for waste collection services.

5. Community Engagement

Throughout the study, community workshops and meetings with local stakeholders were conducted

to raise awareness about the importance of proper waste segregation and disposal. These sessions were crucial for building public support and social acceptance of waste management initiatives.



Collaboration between AHKMT and Partner Organizations for Waste Studies

Dr. Akhtar Hameed Khan Memorial Trust (AHKMT) has consistently collaborated with a wide range of organizations to advance sustainable waste management practices in Pakistan. These partnerships have enabled comprehensive waste characterization studies in various cities, including Quetta, Haripur, and Mansehra, contributing to the broader goal of addressing Pakistan’s pressing solid waste challenges.

Sub-National Governance (SNG) Programme:



AHKMT has worked closely with the UK-funded Sub-National Governance (SNG) programme to conduct waste studies, particularly in Mansehra. This collaboration was integral in selecting sample areas, collecting data, and devising sustainable solutions tailored to local conditions. The programme facilitated logistical support and helped integrate

waste management efforts into the broader governance framework of the city.

Metropolitan Corporation Quetta (MCQ):

In Quetta, AHKMT joined forces with MCQ and Qatar Charity, supported by UNICEF, to conduct a comprehensive waste characterization study. The collaboration with MCQ was crucial in identifying appropriate study sites and ensuring access to public infrastructure for waste management initiatives. This partnership culminated in the signing of a Memorandum of Understanding (MoU) in September 2024, establishing the framework for the construction and operation of an Integrated Resource Recovery Center (IRRC) in Quetta. Through this MoU, MCQ pledged support in terms of land allocation and resources for the IRRC project.



Qatar Charity and UNICEF: Both Qatar Charity and UNICEF played significant roles in supporting the waste management efforts in Quetta. Qatar Charity provided financial and technical support for the waste characterization study, while UNICEF Quetta contributed by engaging with the local population and key stakeholders to assess social acceptance of proposed waste management solutions. The organizations’ contributions were pivotal in ensuring the project aligned with international best practices and had a strong community focus.



Tehsil Municipal Administration in Mansehra and Haripur:

In Mansehra and Haripur, the collaboration with the local TMA facilitated the implementation of waste characterization studies and the development of tailored waste management proposals. AHKMT's expertise, combined with the TMA's local knowledge, ensured that solutions were both environmentally sustainable and socially feasible. The study in these regions, especially with the SNG programme's backing, highlighted the importance of government involvement in sustaining long-term waste management reforms.



Water and Sanitation Services Company Kohat (WSSCK):

WSSCK has played a critical role in advancing sustainable waste management in Kohat through its collaboration with the Dr. Akhtar Hameed Khan Memorial Trust (AHKMT). As a key partner, WSSCK provided logistical support and facilitated the Solid Waste Characterization Study in Kohat city and the Oblen Afghan Refugee Camp, conducted in collaboration with UNICEF Peshawar. The company has been instrumental in implementing waste collection systems and integrating waste segregation practices into local operations. Additionally, WSSCK's partnership with AHKMT has helped lay the foundation for the establishment of

an Integrated Resource Recovery Center (IRRC) in Kohat, with a focus on converting waste into resources and promoting community engagement in sustainable waste practices.

Community Engagement and Local Stakeholders: AHKMT has always emphasized the importance of community engagement in its waste studies. The collaboration extended to local households, shop owners, hawkers, and scrap dealers, whose cooperation was vital in understanding the waste generation and segregation practices in each city. These stakeholders were consulted through socio-economic surveys, informal interviews, and focus group discussions, ensuring that waste management solutions were designed with the community's needs and behaviors in mind.

In each of these cities, the partnerships AHKMT forged with international donors, local municipal authorities, and the community proved to be a model for sustainable development. The collaborative efforts not only provided the necessary funding and infrastructure but also helped foster a sense of ownership among the local population, which is essential for the long-term success of any waste management initiative. These collaborations serve as a replicable model for other cities across Pakistan, aiming to tackle solid waste challenges while promoting environmental sustainability and public health.



Results and Findings

Across all three cities, the studies

revealed key insights:

Quetta: In areas like Kharotabad, approximately 55% of the waste was found to be organic, which suggested a strong potential for composting initiatives. About 24% was recyclable, primarily plastics and metals, which could be targeted for recycling programs. There was strong community support for formal waste collection systems, with 81% of households indicating a willingness to pay for services.



Haripur and Mansehra:

These cities displayed similar waste composition patterns, with significant organic waste that could be diverted from landfills through composting. A large proportion of waste was recyclable, though informal recycling efforts were already in place, similar to those in Quetta.

The geographic and ethnic diversity of Quetta, Haripur, and Mansehra presented unique challenges in waste management, but also offered opportunities for tailored solutions. The application of the UN's "Waste Wise Cities Tools" provided a robust framework for developing effective waste management strategies that are environmentally sustainable, economically viable, and socially acceptable. The findings from these studies highlight the importance of community engagement and the potential for revenue generation through organic composting and recycling initiatives. Moving forward, the establishment of Integrated Resource Recovery Centers (IRRCs) will be crucial in transforming waste into valuable resources and improving urban living standards across Pakistan.

The Waste Assessment Studies conducted in Haripur, Mansehra, and Quetta revealed significant insights into the waste composition from 100 surveyed households and 30 shops over a 7-day period. The key findings are as follows:

Waste Composition:

Green Waste: Representing the largest portion, **58%, 59%, 55%, 65%** and **52%** in Haripur, Mansehra and Quetta and Kohat City and Oblen Refugee Camp (Kohat) respectively of the total waste, primarily kitchen and garden waste. This underscores a major opportunity for composting and other organic waste recycling programs.

Recyclables: Comprising **28%, 26%** and **24%, 14%** and **5%** in Haripur, Mansehra and Quetta and Kohat City and Oblen Refugee Camp (Kohat) of the total waste, recyclable materials include soft plastic (the most prevalent), cardboard, paper, and others like glass and metals. This highlights the potential for establishing a local recycling industry in collaboration with chambers of commerce and industries.

Reject: **18%, 15%** and **21%, 21%** and **43%** in Haripur, Mansehra and Quetta and Kohat City and Oblen Refugee Camp (Kohat) respectively of the waste was destined for landfills, including non-recyclable and non-biodegradable materials like diapers, medical waste, and ceramics.

This stark difference in waste composition in Kohat City and Oblen Refugee Camp in Kohat was attributed to the camp's lack of waste collection services and the prevalent use of wood for cooking, resulting in high quantities of ash and dust.

Key Insights:

Organic Waste Dominance:

Across all four cities, organic waste emerged as a significant portion of the total waste generated, particularly from households and markets. This highlighted the potential for large-scale composting initiatives, which could transform organic waste into valuable products like compost or bio-fertilizers. For instance, the study in Kohat revealed substantial organic waste generation, while Haripur and Mansehra also showed strong potential for composting efforts.

Nappies and Diapers:

Non-biodegradable nappies and diapers made up a considerable part of the waste stream, posing major disposal challenges in all cities, particularly in

Quetta and Kohat. These items, which are difficult to manage due to their lack of biodegradability, stress the need for alternative solutions, such as promoting reusable hygiene products or improving waste collection services.

Plastic Waste and Recycling:

Soft plastics were a major component of recyclable waste, especially in commercial areas across all four cities. In Kohat and Quetta, soft plastics dominated the recyclable category, while Haripur and Mansehra faced similar issues. The studies pointed to the potential of using soft plastics in sustainable infrastructure projects like plastic roads, and further underscored the need for organized plastic recycling efforts.

Waste from Commercial Units: A focused assessment of waste from shops and commercial units in all cities revealed gaps in sweeping and waste collection services. In Kohat, 48% of shopkeepers expressed willingness to pay for waste collection services, while in Haripur and Mansehra, a similar openness was observed. However, the lack of sweeping services in many commercial areas remains a challenge to be addressed.



Role of the Informal Sector: The informal sector (sanitary workers, scavengers, and scrap dealers) played a vital role in waste management across all cities, contributing significantly to recycling and resource recovery. In Quetta, Haripur, Mansehra, and Kohat, these workers were responsible for extracting recyclables like plastic, paper, and glass. However, the sector faces obstacles, such as harassment from law enforcement and insufficient knowledge about reprocessing materials. Improving support and formalizing the sector's role could enhance recycling efficiency and reduce environmental impact.

Municipal Collection Systems: Analysis of waste from municipal containers in cities like Quetta and Kohat showed that a significant portion of the waste,

including 13-22% recyclables, could be recovered if proper segregation practices were implemented. The findings emphasize the need to improve municipal waste collection systems, especially by integrating source segregation to increase recycling rates.

Dumping Site Activities: Scavenger activity at dumping sites, such as the Khushki Dodi Mera site in Kohat, was actively reducing the environmental impact by extracting valuable recyclables from waste piles. However, all cities still face the issue of environmental degradation at dumping sites, signaling a need for better-managed waste disposal facilities and more formalized recovery operations.

Community Engagement and Socio-Economic Factors: Across the five studies, socio-economic factors played a crucial role in influencing waste generation and management practices. While community interest in improving waste management was growing, particularly in Kohat and Mansehra, awareness and education programs are essential to encourage waste segregation at the source. This would significantly enhance the efficiency of waste management systems and increase recycling rates.

Overall Implications for Waste Management:

Source Segregation: There is an urgent need to promote waste segregation at the source across all cities to increase recycling and composting potential.

Formalization of Informal Sector: Strengthening partnerships with the informal sector, particularly scrap dealers and scavengers, will help streamline recycling processes and reduce harassment issues.

Infrastructure Development: Investing in sustainable infrastructure projects, such as plastic roads and IRRCs, could effectively manage the high levels of organic and plastic waste.

Community Education:

Educational programs targeting households, businesses, and informal sector workers will enhance waste management practices, ensuring long-term sustainability. The findings from Haripur, Mansehra, and Quetta and Kohat collectively emphasize the potential to improve both waste management efficiency and environmental sustainability through targeted initiatives that promote recycling, composting, and resource recovery.

KP Balochistan	Sample Size	Green	Recyclables	Reject	Secondary Dumping Points	Green	Recyclables	Reject
Haripur	100 HHs	58%	24%	18%	Haripur	30%	28%	42%
Mansehra	100 HHs	59%	26%	15%	Mansehra	75%	10%	15%
Quetta	100 HHs	55%	24%	21%	Quetta	21%	26%	53%
Kohat City	70 HHs	65%	14%	21%	Kohat City	65%	19%	16%
Oblen Refugee Camp (Kohat)	30 HHs	52%	05%	43%	Oblen Refugee Camp (Kohat)	56%	12%	32%

Recommendations for Waste Management in Haripur, Mansehra, Quetta and Kohat

Haripur:

Local Processing of Green Waste: Collaborate with local farms to use green waste for livestock feed or compost production. This approach can significantly reduce landfill loads while providing economic benefits.

Public-Private Partnerships: Encourage partnerships with private waste management companies. Sharing revenue from recyclables can help offset costs, allowing the Tehsil Municipal Administration (TMA) to focus on core sanitation services.

Community Mobilization: Mobilize the community to actively participate in waste management. Public awareness campaigns can emphasize the environmental and health benefits of proper waste disposal, supported by health workers to promote door-to-door initiatives.

Mansehra:

Community-Run Waste Management Model: Replicate the success of the community-run solid waste management model from Noghazi across all zones in Mansehra. By involving the community in waste collection, responsibility and sustainability are ensured.

Development of Integrated Resource Recovery Centres (IRRC): Though transitioning to a resource recovery model may take time, setting up an IRRC is essential for long-term waste management success. Land acquisition and funding should be prioritized for this purpose.

International Funding Opportunities: Given its

location on the CPEC route, Mansehra can seek international funding for comprehensive waste management initiatives. Engaging international organizations can help secure the necessary financial resources.

Quetta:

Construction of IRRCs: In areas like Kharotabad, Essa Nagri, and A-One City, the construction of 5-ton capacity IRRCs to process organic waste will create jobs, reduce medical costs, and improve sanitation. A user fee for households and revenue from recyclables can ensure long-term sustainability.

Promoting Local Waste Management Industry: Work with the Chamber of Commerce in Quetta to develop local recycling industries. This initiative will reduce transportation costs associated with moving waste to Lahore and create local jobs by turning waste into valuable products.

Public Health Awareness: Address public health by advocating sustainable alternatives to non-degradable waste, such as diaper waste, which should be treated as medical waste due to its infectious potential.

Kohat

IRRCs Establishment: Set up IRRCs to process organic waste and recyclables, easing landfill pressure and creating jobs. Ensure sustainability by charging households a small fee and generating revenue from recyclables.

Formalizing the Informal Sector: Integrate scrap dealers and scavengers into formal waste management with training on safe recycling, improving their work conditions and recovery efficiency.

Waste Segregation at Source: Launch a community-wide waste segregation program,

backed by awareness campaigns and door-to-door outreach, to improve recycling and reduce waste.

Composting Facilities: Create composting centers to turn organic waste into compost for local farmers, promoting a circular economy and reducing synthetic fertilizer use.

Public-Private Partnerships: Foster partnerships with private waste companies to manage recyclables, while local authorities focus on waste collection, sharing revenue to reduce costs.

Waste Collection Improvement: Improve municipal waste infrastructure with more collection points and regular services, particularly in commercial areas, to curb illegal dumping.

Health & Environmental Awareness: Run campaigns on the risks of improper disposal, encouraging biodegradable alternatives and better management of non-biodegradable and medical-like waste.

These recommendations aim to foster efficient, sustainable, and locally tailored waste management solutions across Haripur, Mansehra, Quetta and Kohat.

The waste characterization studies conducted in Quetta, Haripur, and Mansehra and Kohat reveal both commonalities and differences in waste generation and management. All three cities exhibit significant quantities of organic and recyclable waste, underscoring the potential for composting and recycling initiatives. However, local factors like Quetta's refugee population and mountainous terrain, Haripur's industrial expansion, and Mansehra's seasonal tourism necessitate tailored approaches to waste management. The studies emphasize the need for enhanced waste segregation, formal partnerships with recyclers, and educational programs to improve waste handling across diverse communities.





Cultivating a Greener Future

AHKMT Laboratory's Commitment to Organic Innovation

Dr Akhter Hameed Khan Memorial Trust (AHKMT) is dedicated to advancing sustainable agriculture through rigorous research, quality control, and product innovation. Therefore, it felt the need of establishing a laboratory, located in Westridge, Rawalpindi and work on the laboratory began in 2024. The laboratory that is functional now specializes in the development and testing of organic products such as compost, vermi-compost, and fertilizers, ensuring that each batch meets the highest standards of quality and effectiveness. AHKMT's commitment to sustainability drives the trust and its team to continuously adapt to changing environmental conditions, adjusting its compost formulations based on material availability and weather variations, ensuring consistent and premium-quality outputs.

Core Activities

Quality Testing: Every batch of compost and fertilizer is rigorously tested for key parameters such as nutrient content, pH levels, moisture, and particle size to ensure it meets our stringent quality assurance (QA) and quality control (QC) standards.

Sustainable Product Design: We focus on developing eco-friendly, cost-effective fertilizers that not only enhance plant growth but also reduce environmental impact, promoting a healthier and more sustainable agricultural sector.

Bacterial Culturing: A key initiative of our lab is the culturing of sulfur-oxidizing bacteria, which enhance plant nutrient uptake by converting sulfur into a form that plants can readily absorb, improving soil fertility.

Plant Growth Monitoring: We conduct comprehensive studies on crops such as sativa and mint, analyzing their growth in response to different fertilizer treatments, aiming to optimize growth conditions and sustainability.

Research and Innovation: Our lab is constantly researching new methodologies to develop environmentally friendly, cost-effective agricultural products, while deepening our understanding of composting processes and plant nutrition.

Laboratory Equipment and Facilities



Our lab is equipped with advanced instruments to ensure precise testing and research. These include:

- Flame Photometer
- Muffle Furnace
- Incubator
- Spectrophotometer
- Microscope
- pH Meter
- Autoclave
- Distillation Unit

These state-of-the-art tools allow the scientists to maintain high standards of accuracy in their experiments, ensuring the quality and reliability of our products.

Safety and Standards

AHKMT is committed to maintaining a safe working environment by adhering to ISO standards and strict lab safety protocols. This includes the use of protective gear, routine equipment maintenance, and best practices for chemical handling.

AHKMT's Mission

AHKMT's mission is to support the agricultural sector by providing high-quality sustainable organic products while fostering innovation in plant nutrition and soil management. The trust strives to make a positive impact on human welfare through environmentally responsible solutions.





Silver Jubilee Celebrations of AHKMT

A Milestone in Pakistan's Sanitation and Waste Management

As Dr. Akhtar Hameed Khan Memorial Trust (AHKMT) marked its 25th anniversary, the celebrations serve as a tribute to its unwavering commitment to improving sanitation and solid waste management in Pakistan. Established over two decades ago, this non-profit organization (NPO) has stood as a beacon of community-driven development, embodying the vision and philosophy of the legendary social scientist, Dr. Akhtar Hameed Khan.

With a focus on transforming the lives of marginalized communities, AHKMT has become a leader in sustainable waste management practices, leaving a profound impact on both urban and rural landscapes. Over its 25 years of operation, the organization has worked relentlessly to address waste-related issues and create cleaner, healthier environments across the country.

In line with this philosophy, Dr. Akhtar Hameed Khan, AHKMT has specialized in the sanitation and solid waste management sectors, providing innovative and efficient systems that not only tackle pressing environmental challenges but also uplift local populations. The Trust was founded on the belief that sustainable change comes from empowering

people and harnessing local resources for long-term solutions.

Expertise in Solid Waste Management and Sanitation



One of AHKMT's core strengths is its ability to devise sustainable waste management solutions that are practical, cost-effective, and environmentally friendly. Over the years, it has developed and implemented various models tailored to both rural and urban areas, including private housing societies and underserved communities. These models

focus on improving sanitation services, introducing efficient waste collection and disposal methods, and fostering community participation.

The organization's work spans the entire waste management cycle—from initial waste generation to final disposal—ensuring that each step is handled with precision and a commitment to environmental sustainability. With a reputation for being specialists in the field, AHKMT has garnered support from a range of stakeholders, including donors, government agencies, UN bodies, and local communities, to deliver lasting solutions to Pakistan's waste management challenges.

From Liquid to Solid Waste Management: A Remarkable Journey

AHKMT's 25-year journey began with a focus on liquid waste management, but as Pakistan's urban centers grew and waste disposal needs evolved, the organization transitioned to solid waste management. This shift allowed AHKMT to develop more comprehensive solutions to the increasing waste generation in both urban and rural settings. The Trust's ability to adapt to emerging waste management issues reflects its deep understanding of local conditions and its capacity to innovate.



The Trust's involvement in solid waste management extends beyond just handling refuse. AHKMT conducts extensive research studies on solid waste management, exploring new techniques and methodologies to improve efficiency and sustainability. Additionally, the Trust imparts crucial training to people from various walks of life, empowering communities with the knowledge and skills necessary to manage waste at the grassroots level.

Collaborations for Lasting Impact

Throughout its history, AHKMT has formed partnerships with various organizations and entities,

including governmental bodies, international organizations, UN agencies, and private sector donors. These collaborations have enabled the Trust to scale up its initiatives and expand its reach. One of the hallmarks of AHKMT's work is its ability to combine global best practices with local solutions, ensuring that each project it undertakes is uniquely tailored to the needs of the community.



The organization's projects not only address immediate waste management issues but also focus on building systems that will endure. By working closely with local communities, AHKMT fosters a sense of ownership, ensuring that its solutions are sustainable in the long term.

A Vision for the Future: Sustainable Sanitation Systems

As it celebrates 25 years of service, AHKMT looks to the future with a renewed commitment to creating sustainable sanitation and solid waste systems across Pakistan. The Trust's goal is to continue building on its expertise and expand its efforts to more communities, both urban and rural. Its mission remains clear: to contribute to a clean environment, which in turn leads to healthier, happier lives for all citizens.

From transforming waste disposal systems in downtrodden areas to introducing eco-friendly practices in private housing societies, AHKMT has demonstrated that sustainable sanitation and waste management are achievable goals. As the Trust moves forward, it aims to strengthen its efforts, leveraging the latest technologies and research to further its cause.

Celebrating 25 Years of Impact

The silver jubilee of Dr. Akhtar Hameed Khan Memorial Trust is not just a celebration of past achievements, but a moment to reaffirm its commitment to the future. With 25 years of

experience in improving the living standards of communities by addressing waste management issues, AHKMT remains at the forefront of Pakistan's efforts to create safe, clean, and sustainable environments for all.

Through its ongoing partnerships, research initiatives, and community-based approach, the Trust will continue to push the boundaries of what is possible in sanitation and waste management, ensuring that its impact resonates for generations to come.

The legacy of Dr. Akhtar Hameed Khan endures, inspiring future generations to think innovatively, act collaboratively, and make meaningful contributions to society. The silver jubilee is a testament to the

enduring power of community-driven development and the vital role AHKMT continues to play in shaping a cleaner, healthier Pakistan.





Panian II IRRC

Solid Waste Management (SWM) is a critical issue in many low-income, developing countries. Despite the significant proportion of municipal revenues allocated to SWM, service levels remain low, and unsafe disposal methods are prevalent. Pakistan, like many other developing nations, grapples with serious environmental challenges due to inadequate waste management systems. In response to this pressing issue, the Integrated Resource Recovery Center (IRRC) model has been developed to efficiently manage and utilize waste. This article details the initiation, progress, and anticipated completion of the IRRC at Panian II in Haripur, which was inaugurated on 17 January 2025.

Pakistan faces severe environmental problems due to poor waste management practices. Municipal waste is often burned, dumped, or buried illicitly, leading to significant environmental damage and health risks. In this context, the IRRC model offers a sustainable solution by utilizing up to 85% of solid waste. The project at Panian II, an Afghan refugee camp in Haripur district, is an effort to address these challenges effectively.

In June 2023, Dr. Akhtar Hameed Khan Memorial Trust (AHKMT), renowned for its expertise in solid

A Eco Friendly Solution for Solid Waste Management and Climate Resilience in Haripur

waste management, was engaged to provide technical assistance for the construction and operation of the IRRC at Panian II. This initiative, supported by UNICEF, aims to serve around 3,000 households.

The project began with a comprehensive waste characterization and social feasibility study in June 2023. The waste characterization study involved collecting and analyzing solid waste from households in Panian II. The study revealed that approximately 60% of the waste was organic, underscoring the need for an IRRC to manage this waste effectively.



The social feasibility study involved physical visits to the area to understand its geographical and social dynamics. The AHKMT team interacted with Afghan refugee families and local community leaders (Maliks) to understand their waste management practices and socio-economic conditions. This in-depth understanding was crucial in designing a model tailored to the community's needs.

On September 4, 2023, AHKMT signed a Memorandum of Understanding (MoU) with the District Administrator and the Commissionerate for Afghan Refugees (CAR). UNICEF committed to providing financial support, while AHKMT offered technical assistance for two years post-establishment.



From the project's onset, AHKMT conducted numerous coordination and mobilization meetings with relevant organizations and government departments. These efforts were pivotal in overcoming initial resistance from some locals and gaining the necessary approvals for the project.

AHKMT addressed concerns raised by locals regarding the project in October 2023. Through dialogue with the district administration, they highlighted the benefits of the IRRC, including the production of organic fertilizer.

A delegation comprising AHKMT and government officials visited a proposed site for the IRRC on March 12, 2024. Discussions with the Assistant Commissioner (AC) Haripur and the Tehsil Chairman emphasized the project's importance and alignment with local needs.

Further meetings solidified support from local authorities. On May 14, 2024, the AHKMT team, along with UNICEF representatives, requested approvals for waste collection and proposed additional services for households.

The waste characterization study conducted in June 2023 was crucial in assessing the quantity and type of waste generated in Panian II. The study found that around 60% of the waste was organic, making the establishment of the IRRC imperative for effective waste management.

The technical assistance phase involved detailed evaluations and design finalizations in which experts assessed the proposed site's suitability, considering factors like size, terrain, accessibility, and environmental impact.

AHKMT oversaw the construction of essential infrastructure elements, including the waste sorting shed and leachate box. The team ensured compliance with environmental regulations and the project's specifications.

The technical team evaluated and selected appropriate technologies for waste management, such as sorting machinery, composting systems, and recycling units. The incorporation of solar panels for energy generation was proposed to enhance sustainability.

Stakeholder consultations ensured that the IRRC's design and operations aligned with community needs. This engagement fostered greater acceptance and participation from local residents and businesses.



The construction phase began in earnest following the site evaluations and design finalizations. AHKMT conducted several technical visits to monitor progress and provide guidance.

Key construction milestones included:

Measurements and construction tasks were

discussed with masons and engineers on February 3, 2024.

On March 5, 2024 AHKMT briefed local authorities about the IRRC model and secured additional land for the project.

On May 1, 2024 meetings with electricians, scrap dealers, and marketing personnel ensured that all aspects of the IRRC's operations were planned effectively. Discussions focused on electrical connections, recyclable items' sale, and compost marketing.

Final construction checks were conducted on May 14, 2024 and suggestions for labeling and displaying IRRC segments were shared. Plans for the inauguration in August 2024 were also discussed.

As of July 2024, the IRRC at Panian II is nearing completion. The final touches are being applied, and the center is set to be inaugurated in August 2024. The successful establishment of the IRRC is expected to significantly improve waste management in Panian II, providing a sustainable solution to the community's waste challenges.



The Panian II Integrated Resource Recovery Center in Haripur represents a significant step forward in addressing Pakistan's solid waste management issues. Through comprehensive planning, community engagement, and technical expertise, the project has progressed from initial studies to its completion. The IRRC is poised to offer a sustainable solution that not only manages waste effectively but also enhances the quality of life for the local community. The anticipated inauguration in August 2024 marks the beginning of a new era in waste management for Panian II and sets a precedent for similar initiatives in other parts of the country.



Afghan commisnerate Shaukat Khan Safi, Ms. Cindy Kushner UNICEF Wash head office, Dr Saima Shafiq from Ministry of Climate Change, Engenier Fateh Ullah, DA Quadrat Ullah, Mr Farooq Khan, Mr Rehman Ullah, Mr Fazal from SNG and Sumaira Gul inaugurating IRRC



The Benefits of Bio-Organophosphate Fertilizer for Farmers

Bio-organo-phosphate fertilizer, comprising a consortia of microorganisms including phosphorus-solubilizing microorganisms and rock phosphate enriched compost, presents a promising solution for enhancing agricultural productivity and sustainability. This innovative fertilizer combines the benefits of organic matter, microbial activity, and mineral nutrients, offering a holistic approach to soil fertility management. When used alongside chemical fertilizers, bio-organo-phosphate fertilizers can provide numerous advantages for farmers. Here's how:

Enhanced Nutrient Availability

1. Improved Phosphorus Solubilization

Phosphorus-solubilizing microorganisms (PSMs) play a crucial role in making phosphorus available to plants. These microorganisms release organic acids and enzymes that convert insoluble phosphorus compounds, such as rock phosphate, into forms that plants can easily absorb. This process increases the efficiency of phosphorus utilization, reducing the need for high doses of chemical phosphorus fertilizers.

2. Balanced Nutrient Supply

Bio-organo-phosphate fertilizers provide a balanced supply of nutrients. The combination of organic matter, microbial activity, and mineral nutrients ensures that plants receive a steady and sustained release of essential nutrients. This balanced nutrient supply supports healthy plant growth and enhances crop yields.



Improved Soil Health

1. Enhanced Soil Structure

The organic matter in bio-organo-phosphate

fertilizers improves soil structure by increasing soil porosity and water-holding capacity. Improved soil structure enhances root penetration, water infiltration, and aeration, creating a more favorable environment for plant growth.

2. Increased Microbial Activity

The consortia of microorganisms in bio-organo-phosphate fertilizers boost soil microbial activity. A healthy soil microbial community is essential for nutrient cycling, organic matter decomposition, and disease suppression. Increased microbial activity leads to improved soil fertility and resilience.

3. Reduced Soil Erosion

By enhancing soil structure and microbial activity, bio-organo-phosphate fertilizers help reduce soil erosion. Stable soil aggregates resist erosion from wind and water, preserving topsoil and maintaining soil productivity over the long term.

Economic and Environmental Benefits

1. Reduced Dependency on Chemical Fertilizers

Bio-organo-phosphate fertilizers can reduce farmers' dependency on chemical fertilizers. By enhancing nutrient availability and soil health, these fertilizers can lower the required amounts of chemical fertilizers, leading to cost savings and reduced environmental impact.



2. Enhanced Sustainability

The use of bio-organo-phosphate fertilizers contributes to sustainable agriculture. Organic matter and beneficial microorganisms improve soil health, reduce chemical inputs, and promote ecological balance. Sustainable farming practices enhance long-term agricultural productivity and environmental stewardship.

3. Lower Production Costs

Farmers can benefit from lower production costs by integrating bio-organo-phosphate fertilizers into their nutrient management programs. Reduced spending on chemical fertilizers, coupled with improved crop yields, can increase farm profitability.

Integration with Chemical Fertilizers

1. Complementary Use

Bio-organo-phosphate fertilizers can be used in conjunction with chemical fertilizers to optimize nutrient management. Chemical fertilizers provide readily available nutrients for immediate plant uptake, while bio-organo-phosphate fertilizers ensure a sustained release of nutrients and improve soil health.

2. Tailored Fertilization Programs

Farmers can develop tailored fertilization programs that combine the strengths of both bio-organo-phosphate and chemical fertilizers. Soil testing and nutrient management planning can help determine the appropriate ratios and application timings to maximize crop performance and soil health.

3. Enhanced Crop Performance

The synergistic effect of bio-organo-phosphate and chemical fertilizers can lead to enhanced crop performance. Improved nutrient availability, soil health, and microbial activity support robust plant growth, higher yields, and better quality produce.

Practical Application

1. Application Methods

Bio-organo-phosphate fertilizers can be applied using various methods, including broadcasting, banding, and fertigation. Farmers should follow recommended application rates and timings to achieve optimal results.



2. Crop Suitability

These fertilizers are suitable for a wide range of crops, including cereals, legumes, vegetables, and fruit trees. Farmers can adjust application rates based on crop type, growth stage, and soil conditions.

3. Monitoring and Evaluation

Regular monitoring and evaluation of soil and crop health are essential to assess the effectiveness of bio-organo-phosphate fertilizers. Soil testing, plant tissue analysis, and yield assessments provide valuable data for refining nutrient management practices.

Conclusion

Bio-organo-phosphate fertilizers, enriched with phosphorus-solubilizing microorganisms and rock phosphate, offer a multifaceted approach to soil fertility management. When used alongside chemical fertilizers, they enhance nutrient availability, improve soil health, and provide economic and environmental benefits for farmers. By integrating these innovative fertilizers into their agricultural practices, farmers can achieve sustainable and productive farming systems that support long-term soil fertility and crop performance.





Water Conservation Awareness Campaign

A Way to Go

Introduction

The looming threat of water scarcity in Rawalpindi has reached alarming levels, with experts predicting severe shortages by 2050. Recognizing this pressing challenge, a ground-breaking Water Conservation Awareness Campaign was launched in Satellite Town, Rawalpindi in October 2024.



This initiative sought to address rampant water wastage at its root by equipping communities with the knowledge and tools needed for conservation. Despite some areas still enjoying adequate water supplies, unchecked wastage has intensified the crisis. The campaign particularly targeted women,

girls, domestic workers, and educators—key influencers in shaping sustainable practices within households and communities.

Collaboration

Dr. Akhtar Hameed Khan Memorial Trust (AHKMT), in collaboration with the Water and Sanitation Agency (WASA) Asian Development Bank, White Rice and Empowerment Thru Creative Integration (ECI), launched the ground-breaking Water Conservation Awareness Campaign in Satellite Town, Rawalpindi.

Campaign Objectives

The campaign focused on actionable goals to inspire sustainable water use:

Raise Awareness: Educate communities about the urgency of conserving water.

Promote Behavioural Change: Address daily habits contributing to wastage.

Provide Practical Solutions: Share cost-effective strategies for reducing water use.

Engage Key Stakeholders: Empower women, educators, and community leaders to drive change.

A central theme was distinguishing between essential water usage and preventable wastage, ensuring sustainable practices without compromising needs.

Activities and Strategies

The campaign adopted a multifaceted approach to maximize impact:

Home Visits

Teams visited households to engage directly with residents, emphasizing simple practices like turning off taps, reusing water, and promptly fixing leaks.

Workshops and Demonstrations

Interactive sessions provided hands-on training in water-saving techniques, such as installing low-flow faucets and reducing shower times.



Group Discussions

Women and girls participated in dialogue sessions to share experiences and co-create solutions, fostering a community-driven approach.



Educational Materials

Visual aids highlighted the tangible impact of daily water wastage. For instance:

- **Showering:** Up to **62** liters wasted per session if taps are left running.
- **Brushing Teeth:** **20** bottles wasted in two minutes with an open tap.
- **Car Washing:** **20** large bottles wasted using hoses instead of buckets.

Proposed Solutions

The campaign offered practical, affordable water-saving measures:

- **Daily Habit Adjustments:** Shorten showers, turn off taps, and adopt mindful cleaning practices.
- **Efficient Cleaning:** Use buckets instead of hoses, and reuse water for non-potable tasks.
- **Technical Fixes:** Repair leaks and install water-efficient appliances.
- **Rainwater Harvesting:** Encourage rainwater collection for gardening and cleaning.

Impact and Feedback

The campaign resonated deeply with participants, who reported increased awareness and enthusiasm for adopting water-saving practices. Key outcomes included:

- Teachers integrating water conservation lessons into school curricula.
- Women, as primary household managers, influencing family habits positively.
- Community leaders advocating for expansion of the campaign to other areas.

The quantification of water wastage in relatable terms made the issue tangible and actionable, driving meaningful change.

Broader Implications

This initiative is part of a larger effort to combat water scarcity in Punjab, aligning with regional and global sustainability goals. It underscores the power of collective action and individual responsibility in addressing environmental challenges.

The Water Conservation Awareness Campaign in Satellite Town, Rawalpindi, marks a vital step towards sustainable water management. By empowering communities through education, practical solutions, and grassroots engagement, the campaign has paved the way for a culture of conservation. This initiative serves as a model for addressing water scarcity and safeguarding resources for future generations.



The LWMC Road Show 2024

Dr. Akhtar Hameed Khan Memorial Trust Shines at the LWMC Road Show 2024

The LWMC Road Show, a landmark event in Pakistan's waste management sector held on May 2-2024, saw a diverse array of stakeholders coming together to discuss and promote innovative waste management practices. CM Punjab Maryam Nawaz graced the occasion with her presence, lauding the Lahore Waste Management Company (LWMC) for its exemplary performance and announcing a substantial budget of 200 billion rupees. This allocation is aimed at implementing a robust solid waste system in 36 districts of Punjab, mirroring the successful model in Lahore. Furthermore, directives were issued for the expeditious construction of 5 scientific landfill sites and 10 material recovery filters. The Road Show was orchestrated to outsource waste management services at the tehsil level under Public Private Partnership, in line with the Chief Minister's directives.

Among the distinguished participants was the team from Dr. Akhtar Hameed Khan Memorial Trust, an organization renowned for its pioneering work in solid waste management. Their presence at the road show not only highlighted their contributions but also provided an invaluable platform to share their experiences and insights with a broad audience.

A Transformative Milestone in Pakistan's Waste Management Sector

Showcasing Innovations in Waste Management

At the LWMC Road Show 2024, the Trust's team comprising Sumaira Gul and Mr Aurangzeb presented their comprehensive approach to solid waste management, which combines environmental sustainability with community development.



The Trust team briefed the visitors how it has been successfully implementing community-based waste collection systems in various urban and rural areas. They were informed that these systems empower local residents to take charge of waste management

in their neighborhoods, promoting a sense of ownership and responsibility.

The visitors were informed about the Trust's approach is waste segregation at the source. The team demonstrated how they educate communities about the importance of separating organic and recyclable waste from non-recyclable waste. They were informed how the segregated waste is then processed to recover valuable materials and reduce the volume of waste sent to landfills. The Trust's recycling programs not only conserve resources but also create income-generating opportunities for local residents.

Through its products, the Trust showed how it has developed successful composting initiatives that transform organic waste into nutrient-rich compost. This compost is used to enhance soil fertility in local agricultural projects, promoting sustainable farming practices. By converting organic waste into a valuable resource, the Trust addresses both waste management and food security challenges.

Education is a critical component of the Trust's strategy. AHKMT team shared insights into their extensive public awareness campaigns, which include waste characterization studies, workshops, seminars, and community meetings. These campaigns aim to educate people about the environmental and health impacts of improper waste disposal and encourage them to adopt sustainable practices. The Trust's efforts have led to significant behavior change and increased community participation in waste management initiatives.

The LWMC Road Show provided an excellent opportunity for the Dr. Akhtar Hameed Khan Memorial Trust to engage with a wide array of stakeholders, including government officials, waste management companies, NGOs, and international donors. The Trust's team participated in panel discussions and workshops, sharing their experiences and learning from others in the field. These interactions facilitated valuable exchanges of knowledge and best practices, fostering collaboration and innovation in the waste management sector.

The Trust's presence at the road show underscored the importance of partnerships in achieving sustainable waste management goals. By collaborating with local governments, private sector entities, and international organizations, the Trust

aims to scale up its initiatives and reach more communities. The road show served as a catalyst for forging new partnerships and strengthening existing ones, paving the way for expanded impact.

The Trust also showcased its adoption of technological innovations in waste management. From mobile applications that facilitate waste collection to advanced recycling techniques, the Trust is at the forefront of integrating technology into its operations. These innovations enhance efficiency, improve data management, and provide real-time insights into waste management processes.

The Dr. Akhtar Hameed Khan Memorial Trust's work has had a profound impact on the communities it serves. Their community-based approach has led to cleaner neighborhoods, improved public health, and enhanced environmental sustainability. The Trust's initiatives have also empowered local residents, creating job opportunities and fostering a sense of community solidarity.

Looking ahead, the Trust plans to expand its programs to more regions, leveraging the momentum gained from the LWMC Road Show

The participation of the Dr. Akhtar Hameed Khan Memorial Trust at the LWMC Road Show 2024 was a testament to their pioneering work in solid waste management. Their innovative, community-driven approach serves as a model for sustainable waste management practices in Pakistan and beyond. By sharing their experiences and engaging with a diverse array of stakeholders, the Trust has furthered its mission of promoting environmental sustainability and community empowerment. As they continue to expand their initiatives and foster new partnerships, the Trust remains a beacon of hope and progress in the waste management sector.





Memorandum of Under-standings (MoUs) Between AHKMT, AHK Foundation, Metropolitan Corporation Quetta, Qatar Charity, and TMA Haripur

The Memorandum of Understanding (MoU) between the Dr. Akhtar Hameed Khan Memorial Trust (AHKMT), Akhtar Hameed Khan Foundation, Metropolitan Corporation Quetta (MCQ), Qatar Charity, and the Tehsil Municipal Administration (TMA) Haripur outlines the collaborative framework to establish and operate Integrated Resource Recovery Centers (IRRCs) and other recycling units in Quetta and Haripur. The MoUs define the roles, responsibilities, and expectations for each party, ensuring clear communication and efficient execution of project objectives.

Key Roles and Responsibilities: AHKMT and AHK Foundation:

The objective of two-year period MoU between AHKMT and AHKF is to establish consortia/ collaborative association to conduct joint ventures, projects, grassroots development programs, trainings and research in thematic areas for marginalized and under-privileged communities of

Pakistan. The focus of both parties will be Sindh, Punjab, Kyber Pakhtunkhwa and ICT areas.

Metropolitan Corporation Quetta (MCQ):



Support and Land Allocation: MCQ will allocate suitable land for the IRRCs and support project implementation by coordinating with local authorities to ensure smooth operations. **Infrastructure and Logistics:** MCQ will also help in

providing logistical support, including necessary public infrastructure and municipal waste management resources, to facilitate the functioning of IRRCs.

Qatar Charity:

Financial and Technical Support: Qatar Charity will contribute by providing financial backing for the construction and development of the IRRCs. Their involvement will also include offering technical support and ensuring that international waste management standards are met.

Community Engagement: Qatar Charity will assist in mobilizing the local community, raising awareness on waste segregation, and ensuring that the project aligns with local needs and practices.

TMA Haripur:

Waste Collection Coordination: TMA Haripur will collaborate with AHKMT to facilitate the door-to-door collection of solid waste, ensuring that the waste is collected from households and commercial units and delivered to designated collection points.

Logistical Support: TMA Haripur will also provide logistical support, including vehicles and personnel, to help transport waste to the IRRCs or other designated disposal sites.

Mutual Benefits and Sustainability:

The partnership aims to enhance solid waste management efficiency in Quetta and Haripur by reducing landfill dependency, increasing recycling rates, and creating sustainable economic opportunities through the sale of recyclables and compost. The collaboration ensures long-term sustainability by integrating local authorities, non-governmental organizations, and communities into the waste management framework. This MoU represents a joint commitment to promoting environmental sustainability, public health, and economic empowerment in these regions.

By clearly defining the roles and expectations of all parties, the MoU sets a strong foundation for the successful operation of IRRCs and other recycling initiatives in Quetta and Haripur.



Assistant Commissioner Hamza Abbas, Mr. Sami Ullah Khan Thesil Chairman Haripur, DA Quadrat Ullah, SNG Rep. Kashif Aslam, UNICEF Engineer Irfan ullah, TMO Gul Naib Khan and Sumaira Gul exchange documents after MoU signing ceremony.



Director Training Program by UNIDO, REECP, PFAN, USAID and NIBEF

July 22-26, 2024

The Director Training Program, held from July 22 to 26, 2024, was organized by UNIDO, REECP, PFAN, USAID, and NIBEF to enhance the knowledge and skills of professionals in corporate governance and risk management. Among the participants was Sumaira Gul, representing Dr. Akhtar Hameed Khan Memorial Trust and e-guard. The program covered a wide range of topics, equipping participants with the tools necessary for ethical and effective leadership. The program commenced with Ahmed Ammar Baseer emphasizing the pivotal role of women in energy projects, shedding light on their potential contributions to the sector. Saif Islam followed with a detailed discussion on corporate governance, addressing board responsibilities, diversity, and operational dynamics. He highlighted the critical importance of evaluating board performance and maintaining ethical management practices, setting the tone for the week ahead.

On the second day, Hussain Kazmi delved into regulatory frameworks, focusing on the Companies

Act 2017 and Securities Act 2015. He stressed the importance of meticulous record-keeping and the ethical responsibilities directors must uphold. Adherence to SECP regulations emerged as a key theme, with Kazmi underscoring that boards are required to meet quarterly with a pre-circulated agenda. He also pointed out the growing importance of environmental oversight, anticipating new climate laws that may impact corporate operations.



The third day featured Hakeem Salman Shahzad, who stepped in for an absent speaker to address critical topics such as Related Party Transactions, share issuance, and financial transparency. Using real-world examples of financial fraud, including Enron and WorldCom, Shahzad illustrated the severe consequences of unethical practices. He emphasized the need for accurate financial reporting and shared essential principles such as Return on Equity (ROE) and DuPont analysis.

Additionally, he highlighted the mandatory inclusion of female directors and provided guidance on shareholder rights and dividend policies.



Risk management was the focus of the fourth day, with WasiUllah delivering an insightful session that explored strategic decision-making frameworks like the “Blue Ocean Strategy.” He discussed topics such as inorganic growth, cost flexibility, and fixed charges, while also introducing participants to methods for risk prioritization and mitigation using probability-impact formulas. Drawing from examples like Nokia and Allied Bank Limited, WasiUllah demonstrated the importance of expert advice in navigating organizational risks and making informed decisions.

The final day of the program brought all the lessons together, synthesizing principles of corporate governance, risk management, and regulatory compliance. Participants left with a strong foundation in these areas, along with actionable insights to implement within their respective organizations.



Overall, the training provided a comprehensive learning experience, equipping directors with the knowledge and tools to lead effectively and ethically while adapting to the evolving landscape of environmental and regulatory challenges. The program not only reinforced the importance of sound governance but also emphasized the critical role of leadership in fostering sustainable and responsible corporate practices.





Dr. Akhtar Hameed Khan Memorial Trust joins GAIA Asia Pacific

A New Chapter in Sustainable Development

Dr. Akhtar Hameed Khan Memorial Trust (AHKMT) achieved a significant milestone by becoming a member of GAIA Asia Pacific (Global Alliance for Incinerator Alternatives), a leading network of grassroots organizations dedicated to promoting environmental justice and zero waste. This membership marked a new chapter in AHKMT's ongoing efforts to promote sustainable development in Pakistan and beyond. The collaboration between these two organizations underscored their shared commitment to addressing environmental challenges and enhancing the quality of life for local communities.

Aligning Missions: A Shared Vision for Sustainable Communities

Dr. Akhtar Hameed Khan Memorial Trust, inspired by the visionary work of Dr. Akhtar Hameed Khan, has long been a beacon of hope for marginalized communities in Pakistan. The Trust is dedicated to improving the socio-economic conditions of the underprivileged through community-led initiatives in areas such as education, health, and solid waste management. Over the years, AHKMT has pioneered several projects, including the establishment of Integrated Resource Recovery Centers (IRRCs), which have become models for sustainable waste management in urban and rural settings.

GAIA Asia Pacific, on the other hand, is part of a global network that works to reduce waste, protect public health, and promote sustainable resource use. GAIA's efforts are centered on advocating for zero waste, opposing waste incineration, and supporting community-based waste management solutions. By focusing on grassroots empowerment, GAIA helps communities across Asia Pacific develop and implement waste management strategies that are environmentally sound and socially just.

Synergy in Action: Empowering Communities Through Sustainable Practices

The partnership between AHKMT and GAIA Asia Pacific is more than just a formal alliance; it is a meeting of minds with a common goal—empowering communities through sustainable practices. Both organizations recognize the critical importance of involving local communities in environmental initiatives. AHKMT's IRRC model, for instance, emphasizes the role of local communities in waste segregation, composting, and recycling, turning waste into a valuable resource rather than a burden. This approach not only addresses the pressing issue

of solid waste management but also creates livelihood opportunities for local populations.

GAIA's work complements AHKMT's efforts by providing a platform for knowledge exchange, capacity building, and advocacy. Through GAIA, AHKMT can now access a wealth of resources and expertise from across the region, enabling it to enhance its existing programs and explore new avenues for community-driven environmental action. The collaboration also opens up opportunities for joint initiatives aimed at promoting zero waste and reducing the environmental footprint of communities in Pakistan and beyond.

The Importance of Local Communities in Global Environmental Efforts

In a world increasingly threatened by environmental degradation and climate change, the work of organizations like AHKMT and GAIA Asia Pacific is more important than ever. Local communities are at the forefront of the struggle for environmental justice, and their involvement is crucial to the success of any sustainable development initiative. By empowering these communities with the knowledge, tools, and resources they need to manage their environment, AHKMT and GAIA are helping to build a more sustainable future for all.

The membership of AHKMT in GAIA Asia Pacific is not only a recognition of its past achievements but also a testament to its potential to contribute to the global zero waste movement. As part of this prestigious network, AHKMT is poised to play a leading role in shaping the future of sustainable development in Pakistan. The Trust's dedication to community-led solutions, combined with GAIA's global reach and expertise, creates a powerful synergy that will undoubtedly yield positive results for local communities.

A Bright Future for AHKMT and GAIA Asia Pacific

The Dr. Akhtar Hameed Khan Memorial Trust's membership in GAIA Asia Pacific is a significant step forward in its mission to promote sustainable development. This partnership will not only enhance the Trust's capacity to address environmental challenges but also amplify its impact on the lives of the communities it serves. Together, AHKMT and GAIA Asia Pacific are poised to lead the way in creating a more sustainable and just world, one community at a time.



Technical Assistance in Swat, Gujjar Khan and Arid University Rawalpindi

Technical Assistance for Waste reduction Centre in Swat

Dr. Akhtar Hameed Khan Memorial Trust (AHKMT), in collaboration with Sustainable Natural Governance (SNG), recently conducted a series of training sessions titled “End-to-End Service Delivery Model” for the staff of the Water & Sanitation Services Company (WSSC) Mingora, Swat. These training sessions built upon previous fieldwork and waste characterization studies carried out by AHKMT in Bahrain and Babuzai, laying a strong foundation for an integrated and sustainable approach to solid waste management in the region.

to set up another centre in the Bahrain locality in collaboration with TMA Bahrain. These waste reduction centres are part of a broader vision to introduce and institutionalize sustainable waste management practices in Swat, focusing on waste segregation, resource recovery, and efficient processing techniques.



The initiative encompassed technical assistance to WSSC Swat, facilitating the establishment of a waste reduction centre, and a parallel effort



Findings from Field Visits

The AHKMT team visited key localities, including Landikas, Rung Mohallah, and Mullan Baba, to evaluate ongoing waste management practices and measure the progress made by groups managing waste in these areas.

The waste management group in Landikas demonstrated remarkable improvement in their operational techniques.

By implementing street-level segregation directly inside hand carts, they streamlined the collection process.

This method enabled one worker to collect approximately 50 kg of organic waste, while the other two collected 20 kg and 30 kg of organic waste, respectively.

Additionally, the workers managed to gather 10 kg of recyclables per person, reflecting significant progress in resource recovery efforts.

Training Outcomes and Waste Reduction Centres

The training sessions by AHKMT emphasized practical skills such as waste segregation at source, composting techniques, and resource recovery methodologies. The staff of WSSC Mingora benefited greatly, translating the training into actionable practices in their daily waste management operations.

The waste reduction centres established in Mingora and Bahrain act as hubs for innovation in sustainable waste management. These centres promote the following:

Waste Segregation at Source: Ensuring organic and recyclable materials are separated efficiently, minimizing contamination and improving processing.

Resource Recovery: Capturing valuable recyclables such as plastics and metals, reducing waste destined for landfills.

Efficient Processing Techniques: Including composting and organic waste management to produce bio-fertilizers.

Impact on the Community

The progress observed in Landikas, Rung Mohallah, and Mullan Baba signifies the growing acceptance and implementation of sustainable waste practices among local groups. Improved waste segregation not only reduces the environmental footprint but also enhances the livelihoods of workers involved in resource recovery.

The establishment of waste reduction centres is poised to have a transformative impact on Swat's waste management landscape. These centres contribute to cleaner neighborhoods and healthier

communities, while also setting a precedent for replicating such models in other regions.

Gujjar Khan

e-guard played a pivotal role in convincing the Punjab government to outsource the waste collection system in Gujjar Khan. The proactive approach taken by e-guard facilitated the transition to a more efficient waste management model. Both organizations are now collaborating with the contractor tasked with managing the system by the provincial government. This model is expected to serve as a blueprint for replicating similar waste management systems across other regions of Punjab, enhancing efficiency and ensuring cleaner urban environments.

Integrated Resource Recovery Center (IRRC) at Arid University, Rawalpindi



AHKMT has a longstanding collaboration with Pir Mehr Ali Shah Arid Agriculture University, Rawalpindi. Building on this partnership, the Trust has renewed its efforts to establish an Integrated Resource Recovery Center (IRRC) on the university premises.

The project, spearheaded by Dr. Arshad Chaudhry from the Soil Sciences Department, focuses on promoting sustainable resource recovery and waste management solutions. The IRRC aims to process organic waste into valuable byproducts, such as compost and animal feed, while serving as a model for future academic and practical collaborations in environmental sustainability.

Through these initiatives, AHKMT continues to demonstrate its commitment to innovative waste management practices and sustainable development.



e-guard

e-guard is committed to

- Integrate innovative technologies and strategies
- Develop efficient low cost systems for waste segregation, recycling, and composting,
- Transform solid waste into valuable resources rather than simply discarded.
- Tackles pressing climate challenges.
- Actively contributes to economic growth, reduces waste and creates value-added solutions.
- Develops products from solid waste,
- transforming what was once discarded into valuable resources, thereby reducing landfill dependency.
- Innovative Cost-Free Models for Waste Management
- Practice Financial & Environmental Efficiency
- Invent nutrient-rich products for agricultural use.
- Establishing zero-waste villages, improving local living conditions, and promoting sustainability.



The type of business was basically to start waste collection free with no fee collection and on the other hand it was held in National Aerospace Science & Technology Park (NASTP) event was arranged by See Pakistan.



e-guard: Pioneering Sustainability and Innovation

e-guard stands as a leading force in the realm of sustainable development, driving innovative solutions to some of the most pressing environmental and community challenges. With a focus on resource recovery, renewable energy, and waste management, e-guard has played a crucial role in transforming vulnerable communities and promoting resilience in the face of environmental adversity.



In collaboration with key partners, such as Catholic Relief Services (CRS), e-guard has successfully spearheaded initiatives like the Zero Waste Villages

project in flood-prone regions of Sindh, including Thatta. This initiative, which aims to convert waste into valuable resources while improving public health and environmental sustainability, is just one of the many projects that demonstrate e-guard's commitment to advancing a circular economy and fostering self-sustaining communities.

e-guard's transformative role extends beyond Thatta, with significant contributions to a variety of other high-impact projects across Pakistan. In Mari Pur, Dharki, Sindh, e-guard introduced an integrated waste management system, combining community engagement, waste segregation, and resource recovery, improving local sanitation and reducing the environmental footprint. In Kasur, the company led efforts to enhance solid waste management infrastructure, focusing on organic waste processing and the promotion of renewable energy, providing the local population with cleaner and more sustainable alternatives.

waste into valuable resources like compost and renewable energy.



By integrating cutting-edge technologies and community-centered practices, e-guard has revolutionized waste management systems and contributed to a cleaner, greener future. Through its expertise in integrated resource recovery centers (IRRCs), renewable energy systems, and sustainable agricultural models, e-guard continues to drive impactful change, ensuring that environmental sustainability and community welfare are at the forefront of development efforts.



e-guard has played significant roles in highlighting these diverse projects, ranging from transforming flood-affected villages to addressing energy solutions and establishing integrated waste management systems. These initiatives not only address immediate challenges but also lay the foundation for long-term, sustainable solutions that improve the quality of life for marginalized communities, paving the way for a healthier, greener future.





Kasur's Clean Future

Integrated Resource Recovery for Sustainable Waste Management

In the modern world, waste management has emerged as a critical issue for communities, especially in small towns where resources and infrastructure are limited. Improper disposal of solid waste and inadequate sewer drainage systems threaten public health, environmental sustainability, and the overall quality of life. Establishing an Integrated Resource Recovery Center (IRRC) addresses these challenges by transforming waste into valuable resources, fostering environmental protection, and promoting community welfare. e-guard, a sister organization of Dr Akhtar Hameed Khan Memorial Trust has contributed to the development of an IRRC in Mustafabad, Kasur, and its anticipated benefits.

A Comprehensive Waste Management Initiative

Mustafabad, Kasur, located 25 kilometers from Kasur city, has evolved from a rural locality into a semi-urban center, primarily due to the establishment of Akhuwat University. However, the area faces significant challenges in managing solid waste and untreated sewage. Waste mismanagement leads

to littered streets, clogged drains, and increased disease risks, while untreated sewage in Nullah Bhainsaan contaminates water bodies and harms the environment.



To address these issues, e-guard stepped in as a technical partner, providing expertise in waste management to establish an IRRC in Mustafabad. Initiated in September 2023, the project commenced with a solid waste characterization study, highlighting the types and quantities of waste generated in the area. This study set the foundation for designing an effective waste management system tailored to the community's needs.

Role of e-guard in IRRC Development



e-guard has played a pivotal role in shaping Mustafabad’s IRRC, from providing technical support to engaging with stakeholders, including local government, community groups, and waste management professionals. The land for the IRRC was allocated by the Government of Pakistan, while all operational expenses are funded by the Akhuwat Foundation. e-guard’s expertise ensures the efficient collection, segregation, and processing of waste from 500 households through a door-to-door collection system. Waste is then segregated and composted in maturing boxes, transforming organic material into nutrient-rich compost.

Waste Analysis and Composition

A detailed analysis of waste in Mustafabad revealed:

Green Waste: 52% (largely organic material from animal feeding and low fruit/vegetable consumption)

Recyclables: 21% (mostly cloth and soft plastics)

Reject Waste: 27% (medical waste, diapers, ceramics)



This composition underscores the potential for

significant resource recovery through proper waste segregation and processing.

Environmental and Economic Benefits



Once fully operational, the IRRC will:

Reduce Pollution: By diverting waste from landfills and open dumping along Nullah Bhainsaan, the IRRC will improve environmental quality and enhance local biodiversity.

Promote Sustainability: By converting waste into compost and other valuable resources, the IRRC supports local agriculture and reduces dependency on external resources.

Boost Economic Growth: Job creation in waste collection, processing, and management, coupled with revenue from the sale of recyclables and compost, will foster local economic development.

Improve Public Health: Better waste and sewage management will reduce disease prevalence, improve air and water quality, and create healthier living conditions for Mustafabad’s residents.

Transforming Mustafabad

e-guard’s efforts in Mustafabad exemplify a transformative approach to sustainable waste management. By engaging the community and implementing innovative solutions, the IRRC will serve as a model for other towns facing similar challenges. With ongoing efforts and community involvement, this project promises a cleaner, healthier, and more prosperous future for Mustafabad and beyond.



Greening Chach Hazro

A Journey in Solid Waste Management

Solid Waste Management (SWM) remains a pressing concern in many low-income, developing countries. Despite a significant portion of municipal budgets being allocated to SWM, service levels often remain inadequate, with unsafe disposal methods contributing to environmental degradation and health risks. In Pakistan, improper waste management practices, such as burning, dumping, and illicit burying of waste, exacerbate these challenges, polluting air, soil, and water. This unsustainable approach also exposes communities to health issues like respiratory diseases, skin conditions, and infections. To address this, the Integrated Resource Recovery Center (IRRC) model presents an innovative and sustainable solution, recovering up to 85% of waste and reducing its impact on the environment.

A solid waste management project was initiated in Weesa, a small town in Chach Hazro, Punjab, where an IRRC is under construction.

Waste Management in Weesa

Located at the edge of the Khyber Pakhtunkhwa-Punjab border, Weesa lies in the Chach area, near the Indus River. This geographic positioning,

coupled with its rural-urban character, makes it a prime candidate for implementing sustainable waste management practices.

Recognizing the severity of waste management issues, the Anmol Welfare Society Weesa, a registered organization actively engaged in community development, spearheaded this initiative. Though formally established in 2018, the society has long been committed to improving healthcare, education, and infrastructure in the town. With waste becoming a growing concern, the society sought to replicate the IRRC model in Islamabad to manage Weesa's waste sustainably.

Project Vision and Progress



In 2018, Malik Amin Aslam, then Prime Minister's Advisor for Local Government, visited the IRRC in Islamabad and recognized its potential for smaller towns. Inspired by this visit, the leadership of Anmol Welfare Society Weesa decided to implement a similar model in their town.

Guided by e-guard, a leader in waste management solutions, the project officially commenced. e-guard provided technical expertise, ensuring that the IRRC aligns with local needs and international best practices.

Construction of the IRRC in Weesa is well underway, with the plant's shed already completed and composting and maturing boxes in progress. Scheduled for completion by October 2024, the IRRC will handle waste from Union Council 22, focusing on sorting, recycling, and composting. Organic waste, a significant portion of the town's waste stream, will be converted into compost to benefit local agriculture.

Environmental and Economic Impact

The IRRC promises substantial environmental benefits by diverting waste from landfills and minimizing open dumping. By producing compost, the center will support local farmers in enhancing soil fertility and crop yields, reducing dependence on chemical fertilizers. Additionally, the recycling of materials such as plastics, paper, and metals will create economic opportunities, with recovered materials sold for reuse.

According to Waseem Khan, President of Anmol Welfare Society Weesa, the project represents a crucial step toward a "Zero Waste" future. The initiative aims to minimize waste ending up in landfills, thereby protecting the environment and improving public health.

Community Engagement and Education

A critical component of the IRRC project is community involvement. Educational campaigns and awareness programs will encourage residents to adopt proper waste segregation and disposal practices. By involving the community, the project aims to ensure its sustainability and success.

Setting a Benchmark

The IRRC in Weesa serves as a model for other towns in Pakistan, demonstrating how community-driven initiatives can lead to meaningful environmental and social improvements. As the project nears completion, it is poised to deliver lasting benefits, including cleaner surroundings, healthier living conditions, and a more sustainable future.

The collaboration between the Anmol Welfare Society Weesa, e-guard, and local authorities exemplifies how partnerships can tackle complex issues like waste management. Weesa's IRRC not only addresses the town's immediate challenges but also sets a precedent for other communities to follow.

A Model for Sustainable Development and Beacon of Hope

The waste management project in Weesa underscores the transformative potential of the IRRC model. By combining technical expertise, community engagement, and sustainable practices, Weesa is on the path to becoming a beacon of environmental stewardship. As other towns and policymakers look for solutions, Weesa's success offers a roadmap to a cleaner, greener, and more resilient future.

The solid waste management project in Weesa represents a beacon of hope for small towns across Pakistan grappling with waste management challenges. By adopting the IRRC model, Weesa is taking proactive steps to protect its environment, improve public health, and move towards a more sustainable future. The project is a testament to the power of community-driven initiatives and the importance of collaboration between local organizations, government officials, and development experts. As the project nears completion, it is poised to bring lasting benefits to the people of Weesa and set a standard for other towns to aspire to.





A Zero-Cost, Zero-Waste Model in D-17

In the bustling private housing society of D-17 in Islamabad, an extraordinary waste management initiative is reshaping the landscape of sustainable living. Spearheaded by e-guard, this initiative represents a groundbreaking approach to waste management, characterized by its zero-cost and zero-waste principles. Unlike conventional systems, which often impose significant costs on households and management bodies, this model is ingeniously funded through the value derived from recyclables, setting new standards for cost-effective and environmentally friendly waste management.

Waste Composition in D-17: A Foundation for Efficiency

The waste generated in D-17 provides a compelling case for the effectiveness of the e-guard model. The composition of waste in this community is as follows:

Green Waste (65%): Organic waste such as food scraps, garden clippings, and other biodegradable materials.

Recyclables (25%): Items including plastics, paper, and metals that can be repurposed.

Discarded Waste (10%): Residual waste that cannot be recycled or composted.

This composition is critical in determining the efficiency of the waste management system. With a predominant portion of waste being green waste, the potential for utilizing and repurposing a significant percentage of the total waste is remarkably high.



The Zero-Investment Waste Collection Model

e-guard's waste management model stands out due to its innovative zero-investment approach.

The system is meticulously designed to maximize community participation and minimize costs through the following steps:

Waste Collection without Charges:

Community Engagement: Waste is collected door-to-door without any charges to residents. This encourages active participation and ensures that waste is disposed of properly, reducing the risk of improper disposal and illegal dumping.



Efficiency and Accessibility: By eliminating financial barriers, the system guarantees that all residents, regardless of their economic status, can contribute to and benefit from a cleaner environment.

Waste Segregation:

Detailed Sorting: Collected waste is sorted into three main categories: green waste, recyclables, and discarded waste. This segregation is crucial for efficient processing and recycling, ensuring that each type of waste is handled in the most appropriate manner.

Utilization of Green Waste:

Local Partnerships: The green waste, which constitutes the majority of the waste, is sold to a local cattle farmer. This arrangement not only provides an eco-friendly disposal method but also supports local agriculture by supplying nutrient-rich feed for livestock.

Environmental Benefits: The use of green waste as animal feed helps reduce landfill usage and lowers methane emissions, a potent greenhouse gas released from decomposing organic waste in landfills.

Revenue from Recyclables:

Economic Model: Recyclables such as plastics,

paper, and metals are sold to recycling companies. The revenue generated from these sales is used to cover the operational costs of the waste management system.

Sustainability and Cost-Efficiency: This revenue stream makes the system financially self-sustaining, eliminating the need for external funding or household charges.

Management of Discarded Waste:

Minimal Impact Disposal: The small fraction of discarded waste, which cannot be repurposed or recycled, is disposed of in an environmentally friendly manner. This ensures that even the least manageable waste is handled responsibly, with minimal environmental impact.

Zero-Investment Success: A Model of Financial and Environmental Efficiency

The success of the D-17 waste management model lies in its zero-investment foundation. By transforming waste into a revenue-generating resource, e-guard has demonstrated that a waste management system can be both cost-effective and sustainable. The key factors contributing to its success include:



Resource Utilization: The system effectively turns waste into a valuable asset. Green waste provides feed for local agriculture, while recyclables generate revenue to sustain the waste management process.

Community Collaboration: The model relies heavily on community involvement and cooperation. By eliminating charges, it encourages residents to participate actively, ensuring high levels of engagement and compliance.

Operational Efficiency: The zero-investment model streamlines operations, reducing administrative overhead and focusing resources on the core aspects of waste collection, segregation, and recycling.

Environmental and Social Impacts

The benefits of the D-17 waste management model extend far beyond financial savings:

Environmental Sustainability:

Reduction in Landfill Use: By diverting 90% of waste from landfills, the model significantly reduces greenhouse gas emissions and environmental pollution.

Lower Carbon Footprint: The reduction in waste sent to landfills and the utilization of green waste for agricultural purposes contribute to a lower overall carbon footprint.

Economic Efficiency:

Job Creation: The system generates employment opportunities within the community, from waste collectors to recycling workers, contributing to local economic development.

Cost Savings: The elimination of waste management fees for residents and the housing society's management body represents substantial financial savings.

Community Engagement: Sense of Responsibility: Residents of D-17 take pride in their contribution to a cleaner environment. The model fosters a sense of collective responsibility and environmental stewardship.

Educational Opportunities: The initiative provides a platform for raising awareness about sustainable waste management practices and their benefits.



An Outline for Sustainable Futures

The waste management model implemented in D-17 Islamabad, led by e-guard, serves as a blueprint for other communities seeking sustainable and cost-effective solutions. It exemplifies how innovative thinking and resourcefulness can transform waste management from a financial burden into a self-sustaining, eco-friendly system.

As urban areas continue to expand and the challenge of waste management grows more complex, models like the one in D-17 offer valuable insights and inspiration. Through community engagement, strategic partnerships, and a commitment to sustainability, it is possible to achieve a zero-cost, zero-waste future.



The D-17 waste management model stands as a testament to the power of innovation and collaboration in addressing environmental challenges. It demonstrates that with the right approach, waste can be managed efficiently, sustainably, and without imposing financial burdens on communities. As other cities and societies look for ways to enhance their waste management practices, the D-17 model provides a compelling example of what is possible when creativity and commitment come together for a cleaner, greener future.



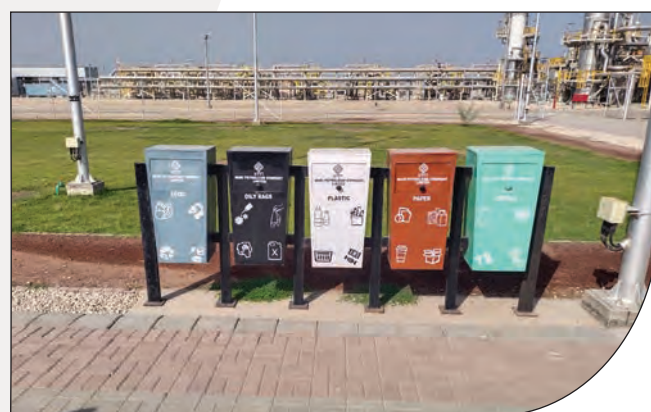
Revolutionizing Waste Management

A Sustainable Approach for Mari Petroleum Colony in Dharki

e-guard has introduced an innovative waste management and sewage treatment model for Mari Petroleum and Gas Company Limited's workers' colony in Dharki, Sindh. This initiative addresses the environmental and logistical challenges posed by the kitchen waste and wastewater generated by the colony's 150 residents. Through a combination of composting, resource recovery, and sewage treatment technologies, e-guard aims to transform waste into valuable resources, improve living standards, and reduce the colony's environmental footprint.

The centerpiece of the proposal is an Integrated Resource Recovery Center (IRRC), a decentralized system designed to process and recycle waste at the local level. This system focuses on segregating waste at its source, composting organic matter, and recycling inorganic materials. The IRRC will not only minimize waste but also contribute to sustainability by turning discarded materials into valuable resources. e-guard has also emphasized the need for contractor training to ensure that waste is properly segregated, processed, and utilized, addressing gaps in the current system where waste is simply collected and dumped without treatment.

To manage kitchen waste more effectively, e-guard has proposed three solutions: a composting unit, a small waste processing plant, and a mechanical unit. The composting unit would enable the conversion of kitchen waste into compost for maintaining green spaces in the colony, providing a cost-effective and environmentally friendly alternative to chemical fertilizers. Workers would be trained in waste segregation and the composting process, ensuring proper handling and utilization of organic waste.



Alternatively, a small waste processing plant could handle kitchen waste more efficiently using basic

machinery to shred and process it into compost or organic fertilizer. This option offers faster processing, higher yield, and scalability to meet the colony's current and future needs. For colonies with limited space, a compact mechanical unit is proposed to process food waste into compost or bio-fertilizer using controlled aerobic digestion. This low-maintenance option is designed for rapid and efficient waste treatment.



e-guard's strategy also includes the development of a customized waste segregation vehicle, tailored for the colony's IRR. Modeled after a rickshaw, this vehicle will be equipped with separate compartments for organic and inorganic waste, allowing for efficient collection and transport. Its compact and environmentally friendly design ensures easy navigation through narrow pathways and minimal environmental impact. By facilitating organized waste collection and segregation at the source, the vehicle will enhance the efficiency of the waste management system.



Additionally, the proposal includes the establishment of a Sewage Treatment Plant (STP) to recycle wastewater for irrigating green belts within the colony. This not only addresses wastewater management but also contributes to the maintenance of green spaces, aligning with the project's sustainability goals.

e-guard's comprehensive approach to waste management in Mari Petroleum Colony exemplifies how localized, innovative solutions can tackle environmental challenges while benefiting communities. By converting waste into resources, reducing dependence on chemical fertilizers, and creating cleaner surroundings, this model sets a benchmark for sustainable waste management in Pakistan. It highlights the potential for broader adoption of similar initiatives across the country, paving the way for a cleaner, greener future.



Transforming Flood-Affected Thatta

e-guard's Vision for Zero Waste Villages

In the flood-prone region of Thatta, Sindh, where over 200 villages struggle with the devastating aftermath of recurrent natural disasters, a transformative initiative is reshaping the way communities address waste management and resilience. Invited by Catholic Relief Services (CRS), e-guard launched an ambitious project to establish Zero Waste Villages, introducing an Integrated Resource Recovery Center (IRRC) model tailored to local needs. This innovative approach addresses critical challenges such as open waste disposal, groundwater contamination, and inadequate infrastructure while creating sustainable solutions for renewable energy, clean water, and eco-friendly agriculture.

The project aims to establish IRRCs in each village, starting with a pilot for 100 households, to manage solid waste, wastewater, human waste, and animal waste. Comprehensive socio-economic surveys and waste characterization studies revealed the community's reliance on agriculture and livestock, frequent load-shedding, and the health risks posed by open waste disposal. The groundwater table, only 15–20 feet deep, faces significant contamination, necessitating urgent interventions. Designed as a closed-loop system, the IRRC model transforms waste into valuable resources, tackling environmental challenges while improving public health and fostering economic opportunities.

At the heart of the initiative are renewable energy solutions, including solar power systems and biogas plants, which reduce reliance on traditional fuels and alleviate the effects of frequent power outages. Complementing these are sustainable agricultural practices that integrate composting and organic crop production, enhancing soil health and providing economic benefits. Infrastructure improvements, such as a sewerage system and a wastewater treatment plant, address health risks and prevent further contamination of the shallow water table. With a budget of PKR 30 million, the project covers energy systems, sanitation infrastructure, agricultural support, operational costs, and land acquisition, guided by detailed community-centric plans.

In Lakho Bhumbharo, a village in Union Council Chatho Chand, Thatta, the project implementation reflects the community's unique needs. Home to 92 households with an average family size of 7.2 members, the village relies on agriculture and livestock, cultivating crops like rice, wheat, and melons. However, challenges such as high medical expenses from waterborne diseases, poor drinking water quality, and open waste disposal underscored the need for structured waste management. Waste characterization studies further highlighted daily per capita waste generation of 0.5 kg, with recyclable waste comprising paper, plastic, and cloth.

To address these challenges, the IRRC transforms waste into biogas, solar energy, and bio-liquid fertilizers, fostering a circular economy within the village. Biogas provides an affordable alternative to wood and conventional fuels, while solar energy mitigates the impacts of load-shedding. Compost supports organic farming, enhancing crop yields and soil health, while vegetation around fish ponds improves biodiversity. Additionally, a planned training center will empower residents with knowledge and skills for sustainable practices.

A diverse team of experts drives the project's success. Specialists in waste management, biogas, horticulture, solar energy, and sanitation contributed to the design and execution of the IRRC. Through site visits, stakeholder engagement, and detailed planning, they developed a comprehensive framework addressing the community's specific needs. The project also emphasizes behavioral change through community awareness programs on waste segregation, clean energy, and sanitation.

This groundbreaking initiative offers a replicable model for building self-sustaining, climate-resilient rural communities across Sindh. By integrating renewable energy, efficient waste management, and sustainable agriculture, e-guard's project in Thatta exemplifies how innovative, community-driven solutions can foster healthier, more resilient futures for vulnerable populations.



Pakistan Private Sector Energy Road Show in Karachi

Revolutionizing waste management and clean energy investment in Pakistan

The Pakistan Private Sector Energy (PPSE) Project held its 2nd Investment Roadshow on May 22-23, 2024, at Karachi's Avari Hotel, highlighting innovative solutions in clean energy, e-mobility, circularity, and energy efficiency. Inaugurated by U.S. Ambassador to Pakistan Donald Blome and Sindh's Secretary for Environment Nabeela Omer, the event brought together 14 companies seeking a combined investment of \$98 million. Ambassador Blome underscored the importance of private sector involvement in promoting sustainability and achieving Pakistan's renewable energy goals, emphasizing that clean energy investments can mitigate climate change effects and drive economic growth. He highlighted that the PPSE initiative has already mobilized \$30 million in cleantech investments since its last road show in 2023 and expressed optimism about the sector's future prospects.

The road show showcased various innovative projects, including electric vehicles, solar-powered systems, and waste management initiatives. e-guard, in collaboration with Console Enterprises, presented its ambitious plan to revolutionize waste management in Pakistan. Their initiative involves establishing ten Integrated Resource Recovery Centers (IRRCs) and a Refuse-Derived Fuel (RDF) facility, with each IRRC processing 100 tons of waste daily. This comprehensive approach aims to reduce landfill dependency, promote resource recovery, and tackle Pakistan's pressing waste management challenges. The project requires an investment of PKR 392 million, primarily secured through debt financing, and allocates resources for infrastructure development, machinery, and working capital.

e-guard's IRRC model addresses inefficiencies in Pakistan's current waste management practices, such as poor collection, transportation, and open dumping, which cause significant environmental and health issues. By integrating solid waste collection with decentralized recovery centers, the IRRCs will utilize 80-90% of collected waste. This includes converting organic waste into compost, recycling materials, and safely disposing of non-recyclable waste. These efforts not only enhance waste management efficiency but also support sustainable agriculture and the circular economy.

e-guard plans to expand its operations by establishing ten additional IRRCs and one RDF facility in private housing societies over the next two years. Each center will process 10 tons of waste daily, serving approximately 3,000 households. Equipped with composting units, sorting areas, and solar-based energy systems, these facilities will generate revenue from recyclables, compost, and fuel, contributing to sustainable waste management and economic opportunities.

The event highlighted the feasibility and impact of e-guard's initiative, garnering interest from stakeholders, with five companies expressing intent to collaborate. The road show concluded with remarks from USAID Pakistan's Stephen Berlinguette, who praised the ingenuity of Pakistan's Cleantech sector, and PFAN Programme Manager Marko Van Hogervorst, who lauded the quality of solutions presented. e-guard's participation marked a significant step in promoting sustainable waste management, advancing its mission to create a cleaner, greener, and more sustainable future for Pakistan.



Pioneering sustainable solutions

e-guard's vision shines at World Future Energy Summit 2024

The World Future Energy Summit (WFES) 2024, held in Abu Dhabi from April 16 to 18, reaffirmed its position as a leading global event, bringing together innovators, policymakers, and business leaders to address pressing energy, sustainability, and environmental challenges. Organized by Masdar, an Abu Dhabi Government-owned renewable energy company, and supported by organizations such as the United Nations Industrial Development Organization (UNIDO), the Private Financing Advisory Network (PFAN), and USAID, the summit became a hub for groundbreaking initiatives in clean energy, waste management, smart cities, and climate change solutions.

Among the participants was e-guard, a Pakistan-based solid waste management company, represented by Sumaira Gul and Mr. Vissal Shakir Rehman. Their participation marked a significant milestone in showcasing Pakistan's strides in sustainable waste management. e-guard's stall at the summit presented materials related to Integrated Resource Recovery Centers (IRRCs), organic compost, and Information, Education, and Communication (IEC) strategies, garnering interest from international attendees keen to learn about

their community-driven waste management models. Through the event, e-guard emphasized its mission of educating communities about the environmental hazards of poor waste practices and engaging them in sustainable solutions.



The summit also featured diverse sessions and presentations. Sumaira Gul attended an eco-waste event by the International Renewable Energy Agency (IRENA), which outlined global efforts to transition to renewable energy and triple renewable power capacity. Such discussions provided valuable insights into strategies that could be adapted to Pakistan's energy and waste management sectors.

Additionally, e-guard representatives explored various stalls showcasing the latest technologies in solid waste management and solar energy, gaining knowledge to enhance their initiatives back home.

One of the highlights was a session by UNIDO’s Climate Technologies Innovation Unit, where Marko van Waveren Hogervorst discussed the Low Carbon Private Equity Fund. The fund, focusing on early-stage, high-impact investments in Pakistan, aims to support projects delivering financial, environmental, and social benefits. This aligns with e-guard’s mission of implementing innovative waste management solutions while addressing broader sustainability goals.



Another key session led by Ms. Naveen highlighted Pakistan’s energy challenges, including the \$18-20 billion annual expenditure on petroleum imports and the critical need for interventions in the road transport sector. She discussed strategies for scaling up electric mobility to mitigate these

challenges and reduce the current account deficit. These discussions underscored the importance of investment and innovation in tackling Pakistan’s energy crisis.

As the summit concluded, participants, including e-guard’s representatives, shared their insights and expressed gratitude for the opportunities provided to showcase their initiatives and foster partnerships. The WFES 2024 underscored the critical role of collaboration, public-private partnerships, and knowledge exchange in addressing global sustainability challenges. For e-guard, the event marked a pivotal moment in advancing its mission of promoting sustainable waste management in Pakistan, inspired by global innovations and strengthened by new connections.



The WFES demonstrated the power of collective action and innovation in driving sustainable change. By bringing together diverse stakeholders, the event not only highlighted cutting-edge solutions but also inspired hope for a greener, cleaner, and more sustainable future.



Visitors Comments

Integrated Resource Recovery Center - IRRC

October 2023

Nasir Hussain,
CPHO RCB

“ The hard work you’ve done is the best for the future of our nation. Solid waste management is essential for improving our society. Well done! ”

Engineer Atiqur Rehman,
Program Coordinator, B-17

“ It’s inspiring that you are turning waste into wealth. This is a commendable service to the earth. Excellent job, well done! ”

November 2023

Samara Bhimji,
Environment Lead, AKAH Geneva

“ An excellent initiative that integrates ecosystem restoration alongside waste management, with direct community benefits. We look forward to learning more and replicating this in AKAH’s operational areas. ”

Saleem Ahmed,
Khairpur Sindh

“ This is hard but essential work. It’s promising for the future of our country. ”

December 2023

Mariam Naveed,
Urban Management at Atomcamp

“ Excellent system with competent management of all resources. IRRC employs innovative techniques and multiple composting methods of superior quality. ”

February 2024

Adeel Anwar,
Advisor GIZ

“ IRRC is a remarkable instrument to save the environment and humanity. ”

Muhammad Samiullah,
DS (Regulation) HCBG Peshawar

“ Visited IRRC B-17 with eight TMOs of KP. The environment and solid waste management practices are amazing. I recommend replicating this at TMA level. ”

Rizwan Ullah,
Tehsil Officer Regulation, TMA Peshawar

“A very impressive and inspiring project.
I will do my best to replicate it within my capacity.”

April 2024

Jawad Khalid,
Specialist, Green Karandaaz

“An impressive facility doing excellent
work in recycling and composting.”

May 2024

Abdul Haq Khan,
Dialwar Khan, M. Qasim Islam, Metropolitan
Corporation Quetta

“This project saves people and generates income.
It should be replicated across Pakistan.”

Ayesha Malik,
Scientific Officer, Social Water Conservation
Research Station, Fateh Jang

Impressed with your efforts to save the earth.
Your team is knowledgeable and cooperative.
“Hoping to collaborate for water conservation
research.”

Ammar Yaser,
PPSC COP, B-17 Multi Garden

“It's a pleasure to see home-grown solutions
achieving 90% resource recovery. Looking forward
to scaling this with a sustainable model.”

July 2024

Tehsil Municipal Officer

“Great work for community betterment and
income generation. Highly appreciable.”

Social Mobilization Consultant,
AVT Mansehra

“Visited the composting plant in Tehsil Oghi
with the community. This should be showcased to
encourage replication.”

WASH Chief,
UNICEF Pakistan

“An impressive and useful effort for sustainable
waste management.”

November 2024

WASH Officer,
UNICEF Peshawar

“Our visit to IRRC Unit B-17 Islamabad was
amazing. We believe this model should be
promoted and replicated in other locations.”

Abdul Rashid,
Project Director (SWM) CDA

“This facility is highly beneficial for reducing waste
through recycling and composting. A great effort!”

Ahmed Hassan,
Senior Manager, NESPAK

“The plant significantly contributes to waste
minimization, environmental improvement, and
reduced transportation costs.”

Iqtidar Ahmed,
AD (SWM) CDA

“A great facility recycling waste and serving the
environment by reducing solid waste disposal.”

Integrated Resource Recovery Center-IRRC

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Turning Waste into Wealth for a Sustainable Tomorrow! **US Ambassador Donald Blome** explores sustainable innovation at the e-guard stall during the Karachi Show.

