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An Assessment of the Effectiveness of the Climate Change Initiatives of the PTI Government in Khyber Pakhtunkhwa (2013–2023)

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Abstract

The current paper evaluates the efficacy of the Pakistan Tehreek-e-Insaf (PTI) government of Khyber Pakhtunkhwa (KP), Pakistan in its climate change efforts made during the period of 2013-2023. It is highly concerned with its effectiveness over how it describes the policy environment: it is not the question of what the government did, but the question of whether the government did the right thing. The case-study design used in the study is qualitative based on the use of nine purposely chosen key-informants the judgements of which are triangulated with policy documents, departmental survey data and peer-reviewed literature across seven thematic areas: the Billion Tree Tsunami, provincial climate policy, waste management, industrial compliance, traffic and air quality, green energy, and structural weaknesses. The results indicate that there is a high disparity of efficiency. The only program sustainable intervention that was proven to be effective and yielded measurable outcomes in the form of increased employment, forest cover, and flood resilience was the Billion Tree Tsunami, in contrast to programs that relied on technology and multi-agency cooperation such as waste-to-energy conversion, industrial compliance on a sector-wide level, and air-quality management, producing no significant outcomes. The research finds that the most finalizing climate results were obtained in areas where one and effectively resourced flagship work could be executed in a direct way, and the poorest results when success could be attained through ongoing coordination and technical capability.

Keywords: effectiveness; climate change initiatives; Khyber Pakhtunkhwa; PTI government; Billion Tree Tsunami; climate governance, and Pakistan.

1. Introduction

The problem of climate change belongs to the list of characteristic threats of the current century, which is transforming the policy priorities of countries under threat (Akram, 2023). Although only a marginal fraction of the global emissions is dispersed by Pakistan, this country is at the fifth position on the Global Climate Risk Index (Muhammad, 2022). Khyber Pakhtunkhwa (KP) has been feeling the heat and feeling the pain of flash flooding and rising temperatures (Babar, 2012; OCHA, 2022). With the new system of environmental policy, the Eighteenth Amendment, which devolved the powers of the environment to the provinces, KP also has direct responsibility in ensuring climate policies in its surrounding (KP Climate Change Policy, 2016).

The province began a series of programmes in 2013-23 under the PTI provincial government, the most publicized one being the Billion Tree Tsunami, which was subsequently included in the federal Clean and Green Pakistan movement (Dawn, 2018; Syed, 2021).

Although these efforts have been well reported, their effectiveness has hardly been measured to the standard of the practitioners who designed and implemented them. The analysis of the existing scholarship leans more towards the description of institutional processes than the assessment of the results. To answer that shortcoming, this paper evaluates both the success of climate initiatives undertaken by the province in meeting the purpose of those initiatives, and the reasons why some areas showed such differently relative effectiveness.

This question acquired a subnational quality, by the devolution of environmental responsibility under the Eighteenth Amendment. The provinces were now the main location where mitigation and adaptation policy were formulated, funded, and implemented, whereas previously climate governance was largely a federal matter. Khyber Pakhtunkhwa is an especially educative example in this sense, as it joined in acute physical exposure to climatic challenges, and unusually ambitious and high-profile reform agenda. The types of tenuous ecology of the mountains, its reliance on rain-fed and glacier-fed waters, and its frequent exposure to flash flooding listed it among more climatologically sensitive administrative entities in the county, and its location as the stronghold of the PTI made it the guinea pig of party water promises. It led to a clustering of climate action that is uncommon at the subnational level in Pakistan, and that provides an erroneously productive platform of assessment.

However, these initiatives have not had an equal level of scrutiny to their outcomes. Studies on climate governance have consistently been faced with a recurring challenge of overlooking the differences between policy output and policy outcome; that is, the difference between programmes declared, budgets granted and (finally) the institutions established, and the corresponding change in the environment that such programmes actually effect. The two do not interchange: a government can be active in legislation, plant widely, and regulate in the sight of the eye without real increase in the output of the results of the emissions, the quality of air or ecological stability. It is the second of these registers that is of concern in relation to this study. Through the use of foregrounding effectiveness, as opposed to activity, the process of assessing the effectiveness applies the climate initiatives of KP, and anchoring the evaluation to the evidence that the programmes had a positive effect, and under what conditions success was possible. The discussion below is arranged in terms of seven main themes, which are then considered through the single prism of effectiveness, so that the climate record of the province could be evaluated as a whole, not as an assemblage of miscellaneous projects.

2. Literature Review

The emission reduction, however, became gradually a system within the global law and the global obligation, through the international climate regime that is anchored on the Montreal Protocol and the Kyoto Protocol and the Paris Agreement (Breidenich, 2017; Nofil, 2020). The process of domestic response in Pakistan is similar, beginning with its membership of the United Nations Framework Convention on Climate Change in 1994 and leading to the National Climate Change Policy of 2012 which has since been updated following the PTI government in 2021 (National Climate Change Policy, 2021).

At subnational level, the literature aids more towards observing individual aspects of the reaction of KP with no stringent analysis to test them with stakeholder appraisal. Syed et al. (2022) and Syed (2021) follow the institutional phases of the Clean and Green Pakistan movement, but refrain from assessing the outcomes. One of the limited effectiveness-oriented reviews is provided by Haq et al. (2024), who report the quantifiable improvements in forest cover which can be attributed to the Billion Tree Tsunami. Other research considers single sectors separately, such as agriculture (Awan, 2017), industrial emissions (Jadoon, 2022), and renewable energy (Asif and Ijaz, 2019) and does not connect these outlooks into each other. It is this fragmentation that is exactly what is overcome in the present study.

Behind this research lies the evolution of a conceptual difference that has gradually gained more and more traction in the environmental-governance literature: the disparity between policy officially accepted and its reality. By effectiveness, in this case, we define what a programme is capable of, not whether or whether it intends to fulfill some environmental aim with which the programme was created. This difference in particular can also be highly consequential in the climate front where the difference between proclaimed intent and an actual outcome can often be long and wide and where the time-lengths of ecological transition are often too long to result in an outcome of the kind that can be easily noticed within a single political term. Measuring success thus involves a concern about documentary and quantitative measures - forest cover, emissions levels, generation capacity - as well as for the judgement in the situation of those who enact policy and are able to explain the institutional circumstances in which this policy can lead to success or failure. It is in this bilateral lurid grounding that the current clarification embraces.

Another relevance strand relates to management of climate policy in cases of devolution. The Eighteenth Amendment gave up considerable environmental control powers to the provincial governments of Pakistan, and the academic community has been slow to determine the effectiveness with which the provincial governments have implemented that power. The literature on KP programme has been biased towards focusing on the identity and implementation of flagship interventions, which has increasingly been the afforestation drive identified by Syed (2021) and Syed et al. (2022) but generally the outcome-oriented work, including the work by Haq et al. (2024) on the forest-cover, has been limited to a single sector. Similar parallels in parallel studies of agriculture (Awan, 2017), industrial emissions (Jadoon, 2022), and renewable energy (Asif and Ijaz, 2019) highlight discrete aspects of the provincial effort, though they do not put them into a shared analytical perspective. The net result has been a literature that, though richly prospective in sectoral detail, is mostly silent as to the climate performance of the province as an integrated unit, and is generally unconcerned with the judgments of the practitioners who effected it. The current research fits right at this crossroads and does not dismiss stakeholder judgement as just a mere anecdote: it is regarded as one of the central sources of evidence on effectiveness.

3. Research Question

The research question is one effectiveness-centred question:

What was the effectiveness of the climate change efforts of PTI government of Khyber Pakhtunkhwa during the period between 2013 and 2023?

The question focuses the analysis all on effectiveness: did every initiative meet the environmental goal it was intended to meet, and to the extent to which is respondent testimony and documentary evidence bearing that out. The following thematic analysis uses this one question in all sectors of the province climate programme.

4. Research Gap

Despite these well-documented climate change efforts of the PTI government in Khyber Pakhtunkhwa, there are three gaps in the available literature. First, the literature is mostly descriptive: it documents the stages of institutional design and implementation of the programmes like the Billion Tree Tsunami and the Clean and Green Pakistan movement, but seldom it tests on whether the programmes have attained the intended environmental outcomes. Second, the literature is not sector-wide, looking at afforestation, industrial emissions, renewable energy and waste management individually, instead of evaluating these aspects as one provincial climate action. Third, and most notably to this project, it is rarely that the results of these initiatives are measured against the opinion of those practitioners who designed and implemented them. What came out of this is an explanation of what was done that is much more eloquently written than that which worked. This paper fills that gap and provides a synthesis of the key informant testimony and documentary evidence to create a cross-sectoral analysis that centers on effectiveness.

5. Research Methodology

The research utilises a qualitative case-study design, which is well-suited to effectiveness evaluation since it is able to address the contextualised, practitioner-based judgement. The primary data were collected in the form of open-ended respondent interviews of nine respondents who were selected purposively, held between the years August and October 2024. The participants were the officials of the Environmental Protection Agency (EPA), the current and former politicians, environmental scientists, and the employees of the Billion Tree Afforestation Project. They were all requested to rate on whether an initiative had met its objectives and the barriers to better performance. These judgements were triangulated by using secondary sources such as policy documents, departmental reports of their survey, and peer-reviewed literature. Thematically analysed, the material of the interview was subsequently sorted by groupings into seven themes related to effectiveness and this structure sets up the following analysis.

6. Problem Statement

Despite the wide publicity of the climate change efforts that the government of PTI has initiated in Khyber Pakhtunkhaw between 2013 and 2023, the available literature has primarily focused on the theoretical framework of the efforts and their process phases instead of evaluating whether or not they succeeded in capturing the goal of environmental protection that the initiatives are designed to achieve. Current studies have considered single sectors such as afforestation, industrial emissions, renewable energy, waste management one at a time, and few of them have compared the performance of the programmes to the opinion of the practitioners who will be carrying out the programmes. As a result, whether these initiatives were effective in practice or not, how effective they were so disparaged in each sector, and what structural circumstances made the successful interventions different than the unsuccessful ones, is still a question of considerable concern. The current research paper fills this gap by not only describing,

but also by assessing the efficiency of the climate work done by the province using the synergetic approaches of stakeholder narratives and documentations.

7. Climate Change Initiatives by PTI Government in Khyber Pakhtunkhwa

The PTI provincial government planned a wide range of climate policies in the period 2013 to 2023, which includes afforestation, policy, waste management, industry, transport, and energy. The key initiative was its flagship program of the Billion Tree Tsunami afforestation initiative, which rolled out in 2014 to reverse damaged forests and subsequently expanded into the federal Clean and Green Pakistan initiative (Dawn, 2018; Syed, 2021). At the policy level, the province published the Khyber Pakhtunkhwa Climate Change Policy in 2016 and followed with the Climate change action plan in 2022 creating a formal system of governance on provincial mitigation and adaptation (KP Climate Change Policy, 2016, 2022). At the urban level, the government established Water and Sanitation Services Companies at the divisional headquarters and landfill sites were formalised to formalise solid-waste collection. In the case of the industrial sector, it encouraged the use of zigzag kiln to reduce toxic emissions by brick kilns and through the EPA siting rules on stone-crushing plants were enforced. It has rolled out the Bus Rapid Transit (BRT) in Peshawar to deal with transport emissions, as well as initiated Vehicle Emission Testing Stations. Lastly, in energy, the province increased relatively clean hydropower production, and engaged in massive solarisation of schooling institutions, mosques and health care centres. Combined, these efforts showed one of the most ambitious subnational climate programmes in Pakistan, and it is the effectiveness, not its existence, which this study examines.

These plans did not appear out of the blue but were an acknowledgment of a careful match-making between provincial agendas and those of the PTI in general, where environmental reform--and in this case forest cover--was a feature line commitment. The constitutional latitude which allowed this agenda was offered by the eighth amendment which decentralized the environmental administration system to provincial level and the long time and continued electoral presence in the Khyber Pakhtunkhwa across the several terms offered the party with certain unusual and persistent thread through policy. This persistence enabled programmes like the Billion Tree Tsunami to be thought of, developed and ultimately scaled up to the national level and marked the difference between the climate action taken by KP and the more piecemeal and temporary efforts of provinces with less stable governing systems. The portfolio as such is not only a collection of technical interventions but a programme with a political underpinning which has been maintained over the course of the decade.

At the institutional level, the programme used various provincial organizations such as the Environmental Protection Agency, Forest and Wildlife Department, Water and Sanitation Services Companies and the Energy and Power Department which had different aspects of the overall endeavor. This sharing of responsibility among several agencies is important to the ensuing analysis, as they predetermined not only the success of the programme but its potential constraints as well: interventions that could be achieved via a lead agency were more likely to progress than those that had to involve ongoing connection between a number of agencies. The seven themes discussed below thus not only evaluate the environmental performance of the respective initiative, but also the institutional circumstances in which the performance support was attained which forms the empirical base of the study central argument of the relation between delivery structure and effectiveness.

8. Thematic Analysis

8.1 Effectiveness of the Billion Tree Tsunami Project

The effectiveness of the Billion Tree Tsunami Project would be evaluated considering the following aspects:

There was a general likeing of Billion tree Tsunami among the respondents mixed with a modicum of criticism. By 2023, the Monitoring and Evaluation Officer of the project, Murad Ali, stated that about half a million jobs had been established throughout the province by nurseries and forest-protection work - an achievement that was particularly useful during the COVID-19 experience - and that the model had by 2018 been sought by fifteen countries to emulate (Aslam, 2023). These assertions are backed by independent data: the percentage of well-stocked forest cover increased by two percentage points to 35 per cent, and that the overall green cover in KP improved compared to 51 per cent in 1990 and reached 64 per cent (Haq et al., 2024).

The direct climatic impact of the project was however split between the respondents. Afsar Khan (2024) quoted a report of a temperature drop at Ghari Chandan between 39 °C and 29-30 °C within three years, whereas Dr. Nafees (2024) claimed it was too early to state it, as a minimum of three decades of data would be needed to gain credibility. Inayat Ullah (2024) confirmed the relevance of the project and echoed the fact that climate mitigation is a long-term project in nature. The data on disaster mitigation were more evident, the forested part of Matta, Swat, experienced significantly fewer damages during the 2022 floods as the trees cover provided a natural barrier (Mir, 2022). Its overall outcome is that the theme proved to be very effective financially, socially, and disaster-resilient despite its not being clear what its direct impact on climate was.

Analytically, the importance of the Billion Tree Tsunami is not so much in this or that measure as in the meeting of other independent lines of evidence in it. In areas where respondent testimony, departmental reporting, and peer-reviewed measurement point concur, as in these cases does employment generation and forest-cover expansion, the argument of effectiveness takes on the triangulated and not the self-reported basis, and is proportionately strong (Haq et al., 2024). The argument concerning the direct climatic impact of the project is didactive in another sense. The antagonistic stances of Afsar Khan (2024) and Dr. Nafees (2024) can be seen not as a contradiction but simply as a difference in evidentiary level: a local temperature reading with a limited time range is no longer able to sustain a province-wide climate claim, precisely because enanthropic evidence that temperature change is linked to afforestation cannot yet be provided on a multi-decadal scale. The theme, therefore, demonstrates repeated aspect of climate assessment that the socio-economic and disaster-resilience outcomes can be read in a matter of several years, but the outcomes that are strictly climate-related are tentative in much longer terms. Importantly, the delivery structure facilitating the phenomenal success of the intervention was the delivery of that intervention, in the form of a single, well-resourced, and politically prioritised project being implemented by a specially purpose implementing body - a set-up which is repeated, in the absence of which we can find an explanation of the poorer performance elsewhere within the programme.

Being able to adjust to climate change depends on how well climate change policies work.

8.2 Effectiveness of Climate Change Policies

A majority of the respondents in the survey provided an enthusiastic judgement of provincial climate policy that was qualified. According to Afsar Khan (2024), 417 types of climate-related initiatives were funded in 2017 through 2024, and twelve per cent of the applicable budget was funded, and evaluated the measures taken as effective in mitigation of carbon emissions, alleviation of energy crisis, and prevention of plastic contamination. The less optimistic perspective was given by Inayat Ullah (2024), who cited corruption, leakage of resources and the slowness of afforestation to this effect as inhibiting the effectiveness of individual province. Dr. Nafees (2024) approved the Billion Tree Tsunami and solarisation but warned of the fact that the effects of climate change take about thirty years to be seen. Dr. Shadman (2024) ranked effectiveness sector by sector-successful in plantation, weak in the control of industries due to the poor institution of regulation, and Dr. Yousaf (2024) noted that the weak management ruined the advantages of policy ownership. The theme indicates that the policy in use was practically good but it was not evenly distributed.

The trend along these evaluations is one that would mean capacity concentration on the formulation-funding axis and impulsivity on the enforcement-implementation axis. On the policy design and resource allocation, there was agreement among the respondents, who cited the province as being relatively effective, as illustrated in the 417 funded initiatives and twelve per cent budgetary commitment cited by Afsar Khan (2024) but there was a significant divergence when the respondents were questioned about the implementation, with corruption, resource leakage and poor management often cited as limiting factors (Inayat Ullah, 2024; Dr. Yousaf, 2024). The sector-by-sector distinction provided by Dr. Shadman (2024) of the relative success of plantation and failure of industrial regulation is analytically informative: it indicates that the effectiveness of provincial climate policy was discouraged not insufficiently tightly set policy instruments, but the capacity to enforce in each sector. In this sense, policy was a required but inadequate requirement of efficacy; where it could be self-executive, it worked, and where it required a continual regulatory petroleum, it failed.

8.3 Effectiveness of Recycling and Waste Management

The Water and Sanitation Services Companies were established in seven divisional headquarters and landfill sites, which that time- Minister of Local Government (2024) Inayat Ullah Khan said were acquired with 819 kanals acquired by WSSP in 2018. Dr. Yousaf (2024), confirmed that unregulated dumps in cities were almost neutralized, however, he added that there were still no results in disposal and recycling, he emphasized that there is no significant activity in terms of recycling in the province. Afsar Khan (2024) explained by the fact that there was no waste-to-energy technology. Peshawar is currently producing app. 1,331 tons of waste per day (Khan, 2024) and Ali (2019) approximated that 544.38 tons of waste would produce 18.5 megawatts of electricity at the national average tariff, however; no such facility has been set up (Dr. Yousaf, 2024). Collection of waste was thereby enhanced greatly and conversion to energy did not materialised.

This topic reveals especially vividly the difference between the organizational transformational changes and motivation of technology. The merging of waste collection by the Water and Sanitation Services Companies was a real institutional success in eliminating the uncontrolled urban dumps that had been ascertained by Dr. Yousaf (2024) as having been all-

consuming. But effectiveness caught in a tangle here because, here, not administrative reorganisation but investment in technology was the next step forward. The potential opportunity is impressive: among 1,331 tons of waste produced daily in Peshawar (Khan, 2024), one of the large proportions could have been turned into approximately 18.5 megawatts of electricity, but a waste-to-energy plant was not put in place (Dr. Yousaf, 2024). The province was effective in that which it could do with its own administrative apparatus, and ineffective in that which required specialised machinery, and capital expenditure. The lack of materials recycling is thus not a chasmatic fault but a specialized case of the overall challenge of the programme in transforming managed resources into a supply of superior environmental output.

8.4 The effectiveness of Industrial-Sector Climate Compliance can be described as follows:

There was mixed feedback among industrial respondents. Abdul Ghafar (2024), Assistant Director of the Industries Department, indicated that zigzag kiln technology did save toxic emissions, as seen as a brick kiln that were reopened after upgrading and passing EPA inspection (EPA, 2021). The enforcement was also extended to stone crushing plants violating residential distance law in the same way that was overruled by the Peshawar High Court (Judgment Sheet, 2018). However, Dr. Yousaf (2024) considered the implementation to be rather inconsistent, pointing out that the protocol was not delivered to the existing industrial units in an effective manner. Ghafar traced it to the lack of awareness and profit motives and Dr. Shadman (2024) noted that it was prohibitively expensive to comply without assistance on small enterprises. The outcome was selective efficacy: focused enforcement was effective, but the compliance across the sector was lacking.

The industrial theme, shows efficacy of a kind of selectiveness. Victimisation was effective if it was practiced on active targets which could be identified and discussed individually, the single brick kiln which had to be made to adopt zigzag technology and had to be re-certified by the EPA (EPA, 2021), the stone crushing plants which needed to be moved when the injunction was challenged on appeal (Judgment Sheet, 2018). According to the explanation provided by respondents, it was fundamentally a political-economic reason: in situation concerning established units it was the profit motive not to spend money on costly upgrades, combined with the lack of awareness, which overwhelmed the infrequent threat of enforcement (Ghafar, 2024), whereas for small businesses the fixed cost of compliance was prohibitive by itself, without supportive subsidy (Dr. Shadman, 2024). The effectiveness here was therefore not limited by the suitability of the regulation standard, but rather by the weak capacity and willingness of the state to incumbent it with the same force against the established economic interests. The ensuing structure of selective enforcement against individual offenders against the persistence of non-compliance with the broader industry reflects the pattern in policy implementation more generally, and supports the new divide in the study between the discrete task that the province could govern and the systemic result that it could not.

8.5 Effectiveness of Traffic-Congestion and Air-Quality Measures

An effect of traffic congestion and air quality is determined by investigating how traffic congestion influences air quality and the reverse as well.

Respondents affirmed that congestion and emissions were still major issues with interventions. Afsar Khan (2024) and Dr. Tariq Usman (2024) attributed the Bus Rapid Transit (BRT) scheme to substituting 500 high-emission buses and reducing the costs and emission per

rider. Inayat Ullah (2024) and Dr. Yousaf (2024) refuted the fact that the construction of BRT actually added to the pollution and congestion. The data shows un-optimal performance: PM2.5 significantly increased its level potentially up to 69.6 µg/m bear in 2017 and 91.21 µg/m bear in 2022 and dropped only during the COVID-19 lockdowns (Peshawar Clean Air Alliance, 2022). Dr. Nafees (2024) also noted that the government merely installed BRT and Vehicle Emission Testing Stations (VETS) which were impotent regarding province-wide emission and Dr. Usman (2024) shared the notion that VETS did not have the resources to be effective. The transit interventions therefore enhanced mobility, which did not decrease air pollution.

Among the themes, air quality provides the clearest evidence of ineffectiveness, which happens to it despite the obvious and expensive measures. The Bus Rapid Transit system can plausibly have increased mobility and reduced per-rider emissions by replacing some 500 buses with high emissions (Afsar Khan, 2024; Dr. Usman, 2024), but overall the air-quality trend moved in the decisively incorrect direction, PM2.5 concentrations increasing during the exogenous shock of the COVID-19 lockdowns (91.21 µg/m3 to 69.6) and only exceeding it during the endogenous shock of the Bus Rapid Transit implementation (Peshawar Clean Air Alliance, 2022). This disjuncture between a planned intervention in mobility and a worsening environmental metric has an analytic significance, as it proves that a single point intervention, no matter how thoughtfully designed, is unable to counteract the large number of uncontrolled sources of city emissions. The fact that the province implemented only the BRT and inadequately fund Vehicle Emission Testing Stations, as observed by Dr. Nafees (2024) represent the very diagnosis: air-quality management is a systemic, multi-source issue, and the province was implementing only very discrete tools, which could not ensure the coverage of the problem at the scale required by the province. Even the fact that BRT constructions themselves also produced pollution and traffic congestion (Inayat Ullah, 2024; Dr. Yousaf, 2024) only adds to the fact that, even the most iconic transport project produced a mixed impact on the environment.

8.6 Green-Energy Measures and their Effectiveness

According to Afsar Khan (2024) and the Energy and Power Department (2024), KP produces a significant portion of its electrical energy by relatively clean hydropower facilities like Tarbela and Warsak. Over 7,400 school, 5,672 mosque, 134 health unit have been solarised, and hydropower plants are expected to earn a total of more than Rs 37 billion annually (News, 2022). Such steps were found to be merely marginally effective, as Inayat Ullah (2024) refers to them as having been piecemeal measures, without the existence of a coordinated approach. Larger projects like the Balakot plant had to be put on hold due to political instability--a fact accepted by Asad Iqbal (2024)-and Faraz (2021) discovered that instability discouraged the investment of renewable-energy regardless of its technical viability. Solarisation on small scales proved successful and on a larger scale the governance factor limited a larger-scale expansion.

The energy theme can be interpreted as an experiment on the impact of scale on effectiveness. Decentralised, tiny-scale solarisation Out of the over 7,400 schools, 5,672 mosques, and 134 health units mentioned by the Energy and Power Department (2024), distributed and not centrally financed solarisation was actually more successful since it involved a single, discrete, independently deliverable unit of work that did not need an inter-agency coordination effort. Massive generation took the converse route: big-scale plans like the Balakot hydropower plant were postponed by political instability rather than any technical infeasibility,

a factor Asad Iqbal (2024) admits straight up, and Faraz (2021) sees as the main deliberative obstacle to renewable-energy investment. The analytical aspect of this judgement which Inayat Ullah (2024) avers that these actions and measures were only marginally effective, and were piecemeal without a concerted strategy, is that the province could scale up small installations of clean energy but could not bundle them into an effective generation strategy of sufficient scale, since such a strategy required the continuity in political and institutional conditions which its governance environment could not reliably offer. A high level of coordination of the objective in the energy sector therefore had an inverse relationship with effectiveness.

8.7 Structural Weaknesses Affecting Overall Effectiveness

The structural weaknesses named by respondents were an indicator of poor performance. In this instance, Dr. Nafees (2024) mentioned that afforestation was done separately by the Forest, Irrigation, Soil Conservation, EPA, and Agriculture Departments, which repeated efforts and wasted resources due to a lack of coordination (Sheti, 2024). Inayat Ullah (2024) and Dr. Nafees (2024) had suggested that the almost solely-centered attention on afforestation overlooked other mitigation levers such as oceanic carbon regeneration that the United Nations (2024) attributes to the absorption of about a quarter of global emissions. Abdul Ghafar (2024) also found an overall lack of awareness of climate both among officials and citizens. These strength areas show that it was successful in the project but not in the programme level.

This latter one is not an area but a diagnosis, which gathers up the institutional shortcomings which are repeated throughout the others. The obvious observable sign of the deficiency in coordination is the duplication of the work of afforestation in the Forest, Irrigation, Soil Conservation, EPA, and Agriculture Departments (Sheti, 2024), and the apparent focus on the farmers to ensure effective implementation of mitigation means, other than the fixation on planting trees being close to overlooking the presence of other exploitable mitigation instruments such as the oceanic regeneration of carbon, which the United Nations has reported (2024), demonstrates the narrowness of the strategies employed by the province in conceptualizing the act of mitigating climate conditions (Inayat Ullah, 2024; Dr. Nafees, 2024). To make things worse, the lack of climate awareness among the government and its citizens that Abdul Ghafar (2024) discovered undermined the need to enact an effective policy in all sectors and in its execution, as well. United, these failure points make sense of why the programme had always been successful at the level of the discrete project and always failed at the level of the coordinated system: the province had the capability to provide individual interventions, but lacked the integrative institutional architecture to ensure that its overall climate work is more than the sum of its parts. It is the discontinuity between project-level competence and programme-level coherence that is the subject of the study.

9. Major Findings

Going across the seven themes, the evidence results in few large cross-cutting effectiveness findings, as opposed to a train of sectoral results. All the findings below are about what was tried, and not the distance it was taken by the province.

First, the effectiveness was grossly skewed. The province was not an overall success or failure, but results were harshly contrasting in one endeavor to the other. Others provided quantifiable environmental outputs whereas others had virtually none despite the similar policy focus and funding. Instead of a particular sectoral result, the primary result of the study is this

imbalance, since its re-posts the question whether the climate programme of KP was successful to why it was successful in certain regions and not others. And all the findings that came later are only efforts to provide answers to this pattern.

Second, there was one form of intervention in the province that was, undoubtedly, successful: The Billion Tree Tsunami. It was the sole endeavor that both collided the testament of the respondent and autonomous documentary substances. It yielded quantifiable benefits in employment (around half a million jobs), in forest and in green cover in general (two points improvement in well-stocked cover and green cover to 64 per cent), and in flood resilience, as shown by less flood damage in forested Matta during the 2022 floods. Its single untested category is direct climatic effect: plausible attribution of temperature change would take decades of data, not three years as are presently available. The conclusion is that the effort was highly successful socio-economically and disaster-resilience wise and optimistic though not confirmed climatically.

Third, most visible failures were where success relied on technology and continued inter-agency coordination. There was poor performance in waste-to-energy conversion, industrial compliance in the sector and air-quality management even with specific focus on the policies. The large waste stream generated in Peshawar did not get converted into energy; industrial compliance was never sustained above a few cases that were enforced; and the PM2.5 concentrations in fact increased during the time frame. In both cases the goal required some form of ability that the province would not be able to provide reliably, specialised infrastructure, regular enforcement, or cross-departmental co-operation. The success was lacking, that is not because of the intent but because of the lack of the institutional and technical capability.

Fourth, a number of projects were partly or selectively successful, but failed to scale. The gathering of waste was enhanced along with recycling being halted, specific industrial control being affected where general control was low and small scale solarisation was gaining success where large-scale hydro power expansion was prevented by political and resource limitations. In both instances a directly deliverable, slender and strictly focused component progressed where the systemic interest held generally was not. This observation narrows down the second and the third: the province was always efficient in the degree of the discrete and manageable duty, and always inefficient in the degree of the concerted and system-wide programme.

Fifth, the effectiveness was also related to delivery structure, but not to the intensity of the activity. Best results were achieved where only one flagship project delivery with its own resources, could be undertaken by a single lead agency, and worst results were achieved where the successes of such ventures involved a number of agencies over time which had to coordinate. The structural weaknesses noted by the respondents such as duplication of afforestation efforts by five departments, a virtual preoccupation with tree-planting, and a lack of climate awareness among officials and citizens, justify why the effectiveness of the province was not increased in proportion to the number of initiatives that the province initiated. The inference of the general result is that the subnational climate effectiveness in KP crucially relied on the degree in which the government acted, rather than how the government delivered the service was structured.

10. Recommendations

The results show the same thing: in the province where effectiveness focused on delivery, it was effective, and where it was disjointed, it was not. Recommendations based on the

structure weaknesses and sector failures highlighted by the respondents are the following: to improve efficiency within the less effective parts of the programme.

The government needs to first, have a single coordinating agency of climate action to remove the duplication of afforestation/ mitigation efforts which are currently practiced among the Forest, Irrigation, Soil Conservation, EPA and Agriculture Departments to focus effort and resources in one place rather than ensure that it is dispersed. Second, it ought to invest in waste-to-energy facilities, as a significant portion of the daily Peshawar waste can be transformed into electricity but it is not the case because of the lack of technology. Third, compliance with industrial climate should be provided not only in separate enforcement situations but also on a broader industry level with specific support to small businesses on which compliance costs are otherwise prohibitive. Fourth, an air-quality management necessitates a resource base other than the BRT and the Vehicle Emission Testing Stations such as extended monitoring and enforcement able to control region-wide emissions. Fifth, the province must also expand its mitigation strategy to go beyond afforestation to incorporate other leverages and adopt a co-ordinated renewable-energy plan to transform piecemeal solarisation to large-scale renewable generation. Sixth, the government is advised to institutionalise long-term environmental media monitoring, as to assess honestly the climatic impact, especially that of the Billion Tree Tsunami, decades of identical parameter would be necessary to measure its influence. Lastly, long term public and institutional climate-sensitive programmes should be introduced to counter the fact that the respondents cited the level of awareness as a hindrance to efficacy in all the sectors.

11. Conclusion

This paper aimed to evaluate the efficacy, as opposed to the mere presence, of the climate change efforts made by the PTI government in Khyber Pakhtunkhwa in 2013-23. As the evidence demonstrates, there was a vast disparity in effectiveness. The province had the greatest results where one, well-resourced flagship project, most notably the Billion Tree Tsunami, could be implemented directly, with quantifiable effects on getting more people to work, improving forest cover and flood resilience. It reported the worst results where it had to rely on technology and the sustained inter-agency coordination including waste-to-energy conversion, industrial compliance throughout the sector, and air-quality management.

Such asymmetry can be attributed to the flaws in the structure of responses observed by respondents, such as duplication, the almost exclusive emphasis on afforestation, and poor awareness. The findings indicate that the efficiency of subnational climate governance does not go hand in hand with the amount of initiatives taken, but is inherently linked to more enduring coordination, technological investment, and institutional processes that can control the slow-moving environmental change over decades. This assessment would be expanded and enhanced by longitudinal research that would rely on long-term data.

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