

パキスタン国  
環境モニタリング支援プロジェクト  
中間レビュー調査報告書

平成24年5月  
(2012年)

独立行政法人国際協力機構  
地球環境部

環境
JR
12-081



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## 序 文

国際協力機構は、パキスタン・イスラム共和国からの技術協力要請に基づき、同国において「環境モニタリング支援プロジェクト」を2009年2月から2012年1月まで実施しています。

当機構は、同プロジェクト中間地点における協力実績の把握や協力効果の評価を行うとともに、プロジェクト終了後を見据えた課題の改善に向けて両国政府に提言することを目的として、2010年6月18日から7月3日まで、当機構地球環境部環境管理第一課長 鈴木和哉を団長とする中間レビュー調査団を現地に派遣しました。

調査団は、パキスタン・イスラム共和国政府関係者と共同で「環境モニタリング支援プロジェクト」の現地調査、成果の確認及び評価を行い、帰国後、国内作業を経て調査結果を本報告書に取りまとめました。

終わりに、プロジェクトの実施にご協力とご支援をいただいた両国の関係者の皆様に、心から感謝の意を表します。

平成24年5月

独立行政法人国際協力機構

地球環境部長 江島 真也



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# 調査対象都市位置図





## 略 語 表

略 語	正 式 名 称	日 本 語
CADD	ISLAMABAD : Capital Administration and Development Division	首都圏開発局
CIDA	Canadian International Development Agency	カナダ国際開発庁
CD	Copacity Development	能力開発
C/P	Counterpart Personnel	カウンターパート
EMS	Environmental Monitoring System Project	環境モニタリングシステムプロジェクト
EPA	Environmental Protection Agency	環境保護局
ISO	International Organization for Standard	国際標準化機構
JCC	Joint Coordinating Committee	合同調整委員会
JET	JICA Expert Team	JICA 専門家チーム
JICA	Japan International Cooperation Agency	国際協力機構
KP(KPK)	Khyber Pakhtunkhwa Province	ハイバルパシュトゥンクワ州 (元 NWFP 州)
M/M	Minutes of Meeting	協議議事録
NEQS	National Environmental Quality Standards	国家環境基準
Pak-EPA	Pakistan Environmental Protection Agency	連邦環境保護局
PC-1	Project Commission Form -1	計画実施様式1に基づく開発事業計画予算
PDM	Project Design Matrix	プロジェクト・デザイン・マトリックス
PO	Plan of Operation	活動計画表
R/D	Record of Discussion	討議議事録
QA	Quality Assurance	品質保証
QC	Quality Control	品質管理
WHO	World Health Organization	世界保健機関



# 第1章 中間レビュー調査の経緯

## 1-1 案件の要請背景

パキスタン・イスラム共和国（以下、「パキスタン」と記す）では自動車の排気ガスや生活排水、工業廃水等により、大気汚染や水質汚染が進行している。国際協力機構（JICA）が実施した汚染実態調査（2000年）などによると、汚染物質は、日本やWHOの環境基準値を20～90%超過しており、浮遊粒子状物質の大気への排出や廃水の地下水への浸透等、市民の健康への悪影響が懸念されている。

パキスタン国政府はカナダ国際開発庁（CIDA）による支援により、1992年に国家自然保護戦略（NCS）を策定、2001年にはNCSに基づく国家環境実行計画（NEAP）を策定しており、国連開発計画（UNDP）との協力のもと、現在同計画を推進している。

しかしながら、環境モニタリング網の未整備や人材不足のため、パキスタン国の現状に適した環境基準の整備や汚染源に対する規制法令の適用が遅れており、適切な環境行政を行ううえでの課題になっている。適切な環境行政を行うために必要な環境モニタリング体制を整備することが喫緊の課題となっており、わが国政府は、パキスタン国における定常的な全国環境モニタリングシステムの基礎を確立することを目的として、2006年度無償資金協力「環境監視システム整備計画」により、中央環境分析ラボラトリー建設（イスラマバード）、大気モニタリング用機材（Pak-EPA及び各州EPA）、水質モニタリング用機材（Pak-EPA及び各州EPA）、ラボラトリー用分析機材（Pak-EPA及び各州EPA）の整備を行い、2007年4月に完了した。

その後、連邦環境保護局（Pakistan Environmental Protection Agency : Pak-EPA）及び各州環境保護局（Environmental Protection Agency : EPA）の大気・水の環境モニタリングを実施する能力が強化されることをプロジェクト目標とする、「環境モニタリング支援プロジェクト」について協議が行われ、2008年11月に討議議事録（R/D）の署名が行われ、2009年2月からプロジェクトが開始された。

## 1-2 協力内容

### (1) カウンターパート機関

連邦環境保護局（Pak-EPA）及び州環境保護局〔EPA（Sindh, KPK, Balochistan, Punjab）〕

### (2) 協力期間

2009年2月～2011年12月1日

### (3) 専門家・派遣分野

チームリーダー/環境管理計画、水環境モニタリング（全体計画/ラボ管理、分析/解析、ガスクロ）、大気環境モニタリング（全体計画/観測、解析）、品質保証/品質管理（QA/QC）、通信システム改善

### (4) プロジェクト枠組み

上位目標：連邦環境保護局（Pak-EPA）及び州EPAに環境モニタリングシステムが整備されて、機能する。

プロジェクト目標：Pak-EPA 及び州 EPA の大気・水の環境モニタリングを実施する能力が強化される。

- 成果 1) Pak-EPA 及び州 EPA が環境モニタリング計画を策定できる。
- 2) Pak-EPA 及び州 EPA が、採取や分析を国家環境基準（National Environmental Quality Standards：NEQS）に基づき測定することができる。
  - 3) Pak-EPA 及び州 EPA において、ラボラトリー管理システムが改善され、QA/QC システムが導入される。
  - 4) Pak-EPA 及び州 EPA が国際的に認められる環境基準あるいは NEQS に基づき、モニタリングデータを解析、評価できる。
  - 5) パキスタン国の環境データ管理システムに基づき、Pak-EPA 及び州 EPA がモニタリングデータを整理し一般に公開できる。

### 1-3 中間レビュー調査の目的

今回実施の中間レビュー調査では、本プロジェクトの目標達成度や成果等を分析するとともに、プロジェクトの残り期間（1年7カ月）の課題及び今後の方向性について確認し、同結果を中間レビュー報告書として取りまとめたうえで、合同調整委員会（JCC）において Pak-EPA 及び協力対象の州 EPA と同内容を合意することを目的とする。

### 1-4 調査団の構成

分野	氏名	所属	期間
総括	鈴木 和哉	JICA 地球環境部 環境管理第一課長	6月30日～7月3日
協力企画	宇多 智之	JICA 地球環境部 環境管理第一課	6月24日～7月3日
環境モニタリング	重本 匡史	(株) グローバル企画 技術顧問	6月18日～7月1日

### 1-5 調査日程

調査日程は付属資料 2 参照。

## 第2章 対処方針と調査結果

### 2-1 達成度、進捗状況の確認

達成度、進捗状況の確認を行い、合同評価報告書の Annex に取りまとめた。

(1) 日本側、パキスタン側の投入実績の確認

Annex 4 : List of the Input from the Japanese Side

Annex 5 : List of the Input from the Pakistan Side

(2) 各活動項目の達成状況の確認

Annex 6 : Activities and Status of Their Achievement

(3) 暫定活動計画 (PO) の進捗を確認 (計画 (点線) 実態 (実線) 比較)

Annex 1.2 : Plan of Operation (PO ver.0) with the Actual Time Frame of Project Implementation

### 2-2 評価5項目

評価設問の設定を評価5項目ごとに行い、評価デザインとして「評価グリッド」を作成し、現地調査で関係者へのインタビュー及び各分野の評価・分析並びにプロジェクトの総合的な評価を行った。結果の詳細は付属資料1を参照。

表-1 評価5項目における各項目と視点

項目	視点
妥当性	プロジェクトのめざしている効果（プロジェクト目標や上位目標）が、評価を実施する時点において妥当か（受益者のニーズに合致しているか、問題や課題の解決策として適切か、相手国と日本側の政策との整合性はあるか、プロジェクトの戦略・アプローチは妥当か等）を問う。
有効性	プロジェクトの実施により、本当に受益者もしくは社会への便益がもたらされているか（あるいは、もたらされるのか）を問う。
効率性	プロジェクトのコストと効果の関係に着目し、資源が有効に活用されているか（あるいは、されるか）を問う。
インパクト	プロジェクト実施によりもたらされる、より長期的・間接的効果や波及効果を見る。予期していなかった正・負の効果・影響を含む。
持続性	援助が終了しても、プロジェクトで発現した効果が持続する見込みがあるかを問う。

### 2-3 Project Design Matrix (PDM) の見直し

現行 PDM (Ver.0) は、2008 年度に実施された事前調査時の議論を踏まえた内容であり、指標などが現状を踏まえた記載でないという指摘が専門家チームから出されているところ、今次調査において PDM の見直しを先方と検討し、同結果を合同評価報告書の Annex に取りまとめた。

Annex 2.1 Proposed PDM (PDM ver.1)

Annex 2.2 Comparative Sheet for PDM (ver.0) and PDM (ver.1)

## 2-4 カウンターパート (C/P)

C/P の配置や給与はパキスタン側の内政事項ではあるが、一方でプロジェクトの成否に影響する重要事項である。現時点においても給料の未払い、地位が不安定等、C/P が業務に集中できる環境が整備されておらず、改善に向けた働きかけを専門家チームからも継続して行っている。もっとも給与未払いについては、ここ数カ月で改善傾向にあるという聞き取り調査結果もあった。

パキスタン側も要員の雇用については適切な措置が必要であることは認識しており、Pak-EPA の定めた定員数を満たすべく雇用を要請する環境省事務次官から公式レターが発行されるなど実施されているものの、州における環境モニタリングシステムプログラム (EMS) 要員の雇用はそれぞれの州 EPA 側の事項であり、大きな進展は見られておらず、引き続き注視が必要な事項である。

## 2-5 予算措置

### (1) PC-1<sup>1</sup>

今回のプロジェクトのプロジェクト要員の賃金、ラボラトリーの消耗品、燃料代等は、無償資金協力実施の際に合意された PC-1 によりカバーされている。

本プロジェクトの PC-1 は 2010 年 6 月 30 日で完了する予定であったところ、プロジェクト実施期間である 2011 年 12 月末までの PC-1 にかかる延長要請が Pak-EPA から環境省に対してなされていた。環境省の Additional Secretary に当該要請の承認プロセスを確認したところ、7 月 1 日現在、環境省内の省内手続きにあり、引き続き PC-1 によりパキスタン側の負担がカバーされることが見込まれる。

なお、パキスタン政府の財政緊縮などの影響を受け、本プロジェクトの PC-1 にはプロジェクトの円滑な実施を阻害し得る以下の課題がプロジェクト開始当初から生じており、パキスタン側に対しては、引き続き是正を求める必要がある。

- ・ EMS 要員賃金支給の遅れ
- ・ 消耗品購入予算の不足
- ・ パキスタン側が負担すべき資機材購入の遅れ

### (2) 修理費用

無償資金協力「環境監視システム整備計画」により整備された施設・機材にかかる必要な修理費用のうち、本案件の実施上必要不可欠な機材については、JICA 側で対応する方針である。一方、研修や測定にかかる試薬、消耗品は、パキスタン側の負担とすることで 2009 年 4 月の運営指導調査団時に合意済である。

なお、バロチスタン州及び PKP 州にある機材の修理については、専門家チームが立ち入ることができないので、基礎訓練を実施した EPA 職員の中から習熟度の高い人員を派遣する対応方針である。

<sup>1</sup> 計画実施様式 1 に基づく開発事業計画予算。



## 2-6 国内研修

パキスタン国内で行われる研修については、単なる機材の操作法の習得といった目先の活動にとらわれすぎることではなく、プロジェクトの一環として行われ、常に研修結果がプロジェクトに反映されるよう留意することの重要性について関係者の理解を得る。

また、研修を受講する C/P と実際のモニタリング計画策定の責任者や策定者が極力同一となるよう、働きかけを調査団から行った。

## 2-7 プロジェクトの前提条件（安全措置による立入禁止）

機材の使用方法やモニタリング技術について専門家チームから直接指導を受けたい旨、強い要望が折りにふれバロチスタン州から出されている。これに対し、本邦外務省の安全情報に基づく JICA の安全措置はプロジェクト前提条件であり、その枠組みの中でどのように最適な協力を構築していくか探していきたい旨、プロジェクト運営委員会（PSC）等を通じて説明をしてきた。

Pak-EPA もしくは州 EPA の職員が、PKP-EPA、バロチスタン-EPA を巡回して指導する可能性を今回協議し、関係者から大枠について合意を得た。同方法は、巡回指導を行う州 EPA の能力の引き上げに直接的につながると同時に、各州 EPA 間の情報共有が行われ連携が促進する観点からも非常に有益と考えられる。

## 2-8 環境モニタリング対象物質の扱い

国家環境基準（NEQS）が定めている分析対象物質は水質分析で 32 項目、環境大気 5 項目である。これらの項目のうち、対象物質名が農薬（NEQS No.16 Pesticide）や総有毒金属（NEQS No.25 Total Toxic Metals）と規定されている 2 項目は実際の測定対象物質が何なのか明確でないので、本案件における測定対象物質から取り除く可能性について検討した。

## 2-9 本プロジェクトの将来展開

本プロジェクトの直接的な目的はモニタリング能力の強化であるが、モニタリング自身が最終目的ではなく、当然のことながら最終的にはパキスタンの水、大気環境が改善（もしくは悪化の抑制）することが目標となる。

パキスタン全体のモニタリングデータの収集・整理、各 EPA の技術情報交換のハブ機能、モニタリング活動結果を踏まえた制度・基準の適正化提言等、Pak-EPA が果たすべき役割を果たせるような支援を継続していくことが肝要である。

## 第3章 団長所感

本プロジェクトは、2006年度無償資金協力「環境監視システム整備計画」により、2007年4月に整備された、中央環境分析ラボラトリー建設（イスラマバード）、2007年4月に大気モニタリング用機材（Pak-EPA及び各州EPA）、水質モニタリング用機材（Pak-EPA及び各州EPA）、ラボラトリー用分析機材（Pak-EPA及び各州EPA）を活用し、Pak-EPA及び各州EPAの大気・水の環境モニタリングを実施する能力が強化することを目的として実施しているものである。

今回の調査は、2009年2月から開始した本プロジェクトの中間レビューを行うことを目的としており、JICA 専門家チーム、先方政府関係者、そして、JICA パキスタン事務所からの全面的な協力を得て、中間レビュー報告書を作成し、7月2日午前、合同調整委員会（JCC）においてその結果を報告し、了承を得た。

以下に気づいた点を示す。

### (1) 総論

本プロジェクトの主な成果は、教育されたスキルのある人材組織された環境モニタリング部局が中央・地方のEPAに確保されることであり、その結果として、科学的検証に耐え得る環境モニタリングデータが定期的に生成、蓄積され、環境政策立案の判断材料となるような解析、解釈がされるようになる。

また、プロジェクトの実施は、無償資金協力で供与された機材の活用が前提となっている。

パキスタンの環境課題に対する姿勢は変わっておらず、ディーゼル車に対するEuro3<sup>2</sup>の導入促進など、活発な印象である。それに対し、現在のパキスタンの経済・財政状況は、無償資金協力実施時に比して、明らかに悪化しており、中央・地方ともに、財政・人員などの面で思ったような対応をしきれていない状態である。

本プロジェクトのこれまでの活動は、まさにパキスタンの経済、財政状況が下降している中で実施している状況にあり、それに付随するさまざまな外部条件に対し、対応を余儀なくし続けることが求められる時期でもあった。そのため、想定されていたプロジェクト活動と、前提条件を整えるための追加的な活動を平行して実施することとなり、これがプロジェクトの進捗に少なからず影響を与えた。

#### 1) 追加的な活動

前提条件を整えるための追加的な活動は、大きく分けて、①機材のメンテナンス、②PC-1の円滑な執行の促進に分けられる。

##### ① 機材のメンテナンス

不安定な電力供給、不適切なラボラトリー環境、パキスタン側の予算不足といった諸要因が、プロジェクトの進捗に影響を及ぼした。具体的には、修理が必要な機材の同定、原因の特定、修理/置き換えに必要な費用の算定、調達等である。

<sup>2</sup> Euro3：欧州委員会が2000年1月に導入した自動車排ガス規制。

## ② PC-1 の円滑な執行の促進

本プロジェクトの C/P の多くは、PC-1 により雇用されている。そのほか、化学薬品の購入、旅費、その他消耗品等も PC-1 によって負担されている。したがって、PC-1 の執行の遅れは、プロジェクト実施の遅れに直結する。常態的であった給料の遅配などが C/P のモチベーション低下、離職等に影響を及ぼしてきた。JICA パキスタン事務所、専門家チームからの継続的な働きかけなどにより、状況は徐々に改善され、この数カ月の間では給料の遅配はほぼ解消されるなどの改善が見られている。

また、パキスタン側の PC-1 期間が 2010 年 6 月末日で完了することから、2010 年 7 月 1 日からプロジェクト終了時までの、PC-1 期間の延長が必要である。今回、環境省の Additional Secretary を訪問し、延長手続きについて基本的に承認されており、事務的な手続きの途上であるとの説明があり、プロジェクト期間中の PC-1 は基本的には確保される見込みであることを確認した。

## 2) 安全面に配慮したプロジェクト実施

プロジェクト開始時より、専門家チームから直接指導を受けたい旨、バロチスタン州、KPK 州から出されているが、JICA 安全措置により、両州への JICA 関係者の立ち入りは厳しく制限されている。

基本的にすべての EPA に対し、同様の能力開発 (CD) を行う観点から、ラホール等他州における研修への合流、EPA 間における情報共有、相互研修などをより充実していくことの必要性が確認された。プロジェクト後半は、前半で蓄積されたデータを基にして CD を行っていくことが必要であり、これまで以上に困難性が高い活動が必要とされる。プロジェクト実施効果が確保されるよう、十分に上記の事項に留意してプロジェクト活動計画を作成することが必要である。

## 3) 本プロジェクトの将来展開

パキスタン側からは、再三にわたり、大気自動観測ステーションの増強 (6 カ所の固定ステーション、1 基の移動ステーション) にかかる要請があった。当方からは、本プロジェクトは人材育成を主眼とした協力であることを再三伝え、また、無償資金協力で供与した機材を十分に活用できていないこと、さらには、導入に必要な電圧の安定等の基本条件が備わっていないことなどの理由を示し、現時点で議論する事項ではないと伝えた。今後も再三にわたり要請があると思われるが、過去の無償資金協力要請時に生じた理解の齟齬が現在の状況を生み出している。案件形成時に明確にすべき点はその場で解決しておくべきであることを今後の教訓としておきたい。



## 付 属 資 料

### 1. 合同評価報告書

Annex 1-1 Project Design Matrix (PDM ver.0)

Annex 1-2 Plan of Operation (PO ver.0) with the Actual Time Frame of Project Implementation

Annex 2-1 Proposed PDM (PDM ver.1)

Annex 2-2 Comparative Sheet for PDM (ver.0) and PDM (ver.1)

Annex 3 Evaluation Grid of the Mid-Term Review

Annex 4 List of the Input from the Japanese Side

Annex 5 List of the Input from the Pakistani Side

Annex 6 Activities and Status of Their Achievement

### 2. 調査日程



Mid-Term Review Report  
for  
on Technical Cooperation for  
Establishment of Environmental Monitoring System  
in the Islamic Republic of Pakistan

July 1, 2010

Mid-Term Review Team

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## ANNEXES

### Annex 1:

Annex 1.1: Project Design Matrix (PDM ver.0)

Annex 1.2: Plan of Operation (PO ver.0) with the Actual Time Frame of Project Implementation

### Annex 2:

Annex 2.1: Proposed PDM (PDM ver.1)

Annex 2.2: Comparative Sheet for PDM (ver.0) and PDM (ver.1)

Annex 3: Evaluation Grid of the Mid-Term Review

Annex 4: List of the Input from the Japanese Side

Annex 5: List of the Input from the Pakistani Side

Annex 6: Activities and Status of Their Achievement

## **Chapter 1. OUTLINE OF THE REVIEW STUDY**

### **1.1. Background of the Project**

Air and water pollution is on the rise in Pakistan due to automobile emissions, as well as wastewater discharged from domestic and industrial sources. According to the Pollution Conditions Survey conducted by JICA in 2000, concentrations of pollutants exceed Japanese or WHO environmental standards by 20-90%. A concern is growing over the emission of particulate matter in the atmosphere, wastewater seepage into aquifers, and adverse health effects on the population.

However, the country has not established fully functional environmental monitoring network and fully trained personnel fit for this circumstances.

Given this situation, the establishment of an environmental monitoring system is urgently required to conduct appropriate environmental administration. With the aim of establishing the basis of a permanent nationwide environmental monitoring system in Pakistan, under the "Establishment of Environmental Monitoring System" grant aid program of 2006, the Japanese government has built a central environmental analysis laboratory (Islamabad), and completed the implementation of air and water quality monitoring systems and the analysis equipment in April 2007.

This Technical cooperation project had started in February 2009 to help enhancing the capacity of environmental monitoring system in Pakistan while utilizing above facilities and equipment.

### **1.2. Objectives of the Mid-term Review Study**

The objectives of the Mid-term Review Study are as follows.

- To identify the extent of achievement of the project purpose and outputs stipulated in the PDM.
- To identify the positive issues and negative issues, if any, for project implementation.
- To reconsider and revise the Project Design Matrix (PDM) and Plan of Operation (PO), if necessary.

### **1.3. Members of the Mid-term Review Team**

The Mid-term Review was executed by the Mid-term Review Team (hereinafter referred to as “the Team”) consisting of the following members.

#### Japanese Side

- Mr. Kazuya Suzuki (Leader), Director, Environmental Management Division, JICA
- Mr. Tomoyuki Uda (Cooperation Planning), Environmental Management Division, JICA
- Mr. Tadashi Shigemoto (Environmental Monitoring), Global Planning Co., Ltd.
- Mr. Tomohiro Kozono (Evaluation Management), JICA Pakistan Office

#### Pakistani Side

- Mr. Asif Shuja Khan (Leader), Director General, Pakistan Environmental Protection Agency
- Mr. Asad Ullah Faiz (Evaluation Management), Director, Pakistan Environmental Protection Agency

### **1.4. Process and Schedule of the Mid-term Review Study**

The Mid-term Review Study was executed in the following process and schedule.

#### **1.4.1. Initial Examination**

In middle of June 2010, the Mid-term Review members of Japanese side reviewed available documents related to the Project, clarified information additionally required, and prepared an evaluation grid, which lists the specific review points and the data collection methods.

#### **1.4.2. Study in Pakistan**

The Team studied in Pakistan for the following objectives.

- To identify to what extent the activities, outputs, project purpose, and overall goal described in the PDM have been implemented and/or achieved.
- To review the process and results of technology transfer.
- To observe the current conditions of procured equipment and facilities.
- To derive recommendation for the implementation of the rest of the Project period.

The study was mostly carried out by interviewing the C/Ps and the Japanese experts. Information was also collected from relevant stakeholders such as Planning Commission, etc. The reviewers also observed the laboratories, monitoring stations and the equipment provided for project implementation. The following table indicates the schedule of the mission. The Mid-term Review Report, evaluation grids, PDM and PO were reviewed and finalized based on the findings and discussions during the mission.

### 1.4.3. Study Schedule in Pakistan

Date	Day	Activity	Place
June 19	Sat	Interview to JICA Experts	Islamabad
		Document Preparation	
June 20	Sun	Document Preparation	Islamabad
June 21	Mon	Interview to C/P of Pak-EPA	Islamabad
		Interview to Balochistan-EPA and KPK-EPA C/P	
June 22	Tue	Interview to C/P of Pak-EPA	Karachi
June 23	Wed	General orientation of Mid-term review	Karachi
		Interview to C/P of Sindh-EPA	
June 24	Thu	Interview to C/P of Sindh-EPA	Lahore
		Document Preparation	
June 25	Fri	Courtesy call and interview to Secretary and Director General of Punjab-EPA	Lahore
		Interview to C/Ps of Punjab-EPA	
		Field Visit (Punjab-EPA laboratory)	
June 26	Sat	Document Preparation	Lahore
June 27	Sun	Document Preparation	Karachi
June 28	Mon	Courtesy call and interview to Secretary and Director General of Sindh-EPA	Islamabad
		Interview to C/P of Sindh-EPA	
		Field Visit (Sindh-EPA laboratory)	
June 29	Tue	Interview to JICA Experts	Islamabad
		Interview to C/P of Pak-EPA	
		Discussion on Joint Coordinating Committee	
June 30	Wed	Discussion with JICA Experts	Islamabad
		Interview to C/P of Pak-EPA	
July 1	Thu	Discussion on Joint Evaluation Report with all Director Generals	Islamabad
		Discussion with Additional Secretary of Ministry of Environment	
July 2	Fri	Joint Evaluation Committee, Signing on M/M	Islamabad
		Report to Embassy of Japan and JICA Pakistan Office	

## **1.5. Methodology of Review**

### **1.5.1. PDM and PO referred to for review**

Initially, Project Design Matrix (PDM) (ver.0) and Plan of Operation (PO) (ver.0) was prepared when the Record of Discussion (R/D) was signed by the Resident Representative JICA Pakistan Office, Deputy Secretary-ADB/Japan of Ministry of Economic Affairs and Statistics, Joint Secretary of Ministry of Environment and Director General of Pak-EPA in November 2008. Although Joint Coordination Committee (JCC) was held on April 2009, no revision was made. These PDM and PO are shown in Annex 1.

### **1.5.2. Points for the review**

#### ***Achievement and Implementation Process of the Project***

The achievement levels in terms of Inputs, Activities, Outputs, and Project Purpose were assessed comparing the actual progress of the Project and the PDMs (ver.0) and POs (ver.0). The implementation process of the Project was also confirmed from the various viewpoints such as monitoring and interview.

#### ***Evaluation Criteria***

In addition to verification of achievement level and implementation process of the Project, the mid-term review study assessed the Project from the following five evaluation criteria.

- (1) Relevance: Relevance of the Project is reviewed by the validity of the Project Purpose and Overall Goal in connection with the Government development policy and the needs of the target group and/or ultimate beneficiaries in Pakistan.
- (2) Effectiveness: Effectiveness is assessed to what extent the Project has achieved its Project Purpose, clarifying the relationship between the Project Purpose and Outputs.
- (3) Efficiency: Efficiency of the Project implementation is analyzed with emphasis on the relationship between Outputs and Inputs in terms of timing, quality and quantity.
- (4) Impact: Impact of the Project is assessed in terms of positive/negative, and intended/unintended influence caused by the Project.
- (5) Sustainability: Sustainability of the Project is assessed in terms of institutional, financial and technical aspects by examining the extent to which the achievements of the Project will be sustained after the Project is completed.

## **Chapter 2. OUTLINE OF THE PROJECT**

The Project has been carried out since February 2009 and at present it follows the PDMs (ver.0). The expected Overall Goal, Project Purpose and Outputs written in the PDMs (ver.0) are as follows:

### **2.1. Overall Goal:**

Environmental monitoring systems are in place at the Federal EPA (Pak-EPA) and Provincial EPAs.

### **2.2. Project Purpose:**

Pak-EPA's and Provincial EPA's capacity of environmental monitoring on air and water is enhanced.

### **2.3. Output:**

1. Pak-EPA and Provincial EPAs are capable of formulating Environmental monitoring plans.
2. Pak-EPA and Provincial EPAs are capable of measuring all the parameters of National Environmental Quality Standards (NEQS) based on uniform methodologies of sampling measurements and analysis.
3. Laboratory management system is improved and Quality Assurance /Quality Control (QA/QC) system is established in Pak-EPA and Provincial EPAs.
4. Pak-EPA and Provincial EPAs are capable of interpreting and evaluating monitoring data based on the internationally recognized environmental standards/ NEQS.
5. Based on the Pakistan nationwide environment data management system, Pak-EPA and Provincial EPAs are capable of compiling monitoring data and disseminating to the public.

## **Chapter 3. ACHIEVEMENT AND IMPLEMENTATION PROCESS**

### **3.1. Inputs**

#### **3.1.1. Inputs from the Japanese side**

(1) Dispatch of Japanese experts

The following experts were dispatched and assigned. The information is detailed in Annex 4.

- Chief Advisor / Monitoring Planning
- Waste Monitoring

- Air Monitoring
- Quality Assurance / Quality Control (QA/QC)
- Data Communication
- Coordinator

#### (2) Training in Japan

To date, in total four C/Ps were sent to the two weeks training course from August 26, 2009 to September 11, 2009 in Japan. The information is detailed in Annex 4

#### (3) Provision of equipment

The provided equipment by the Project is detailed in Annex 4 such as spare parts of monitoring equipment and consumables, etc.

### **3.1.2. Inputs from Pakistani Side**

#### (1) Allocation of counterpart personnel(C/P)

Pakistani side has assigned counterpart personnel as shown in Annex 5. Each EPA formulated an Environmental Monitoring Task Team including a task team leader, and the persons in charge of monitoring planning, water monitoring, and air monitoring.

#### (2) Others

The physical input included office space with necessary furniture and operation cost necessary for project implementation were the input by the Pakistani Side.

## **3.2. Achievement of the Project**

### **3.2.1. Project Purpose**

**“Pak-EPA’s and Provincial EPA’s capacity of environmental monitoring on air and water is enhanced.”**

There are a few measurable outputs produced that partly satisfy the indicator for the Project Purpose at the time of the Mid-term Review.

Verifiable Indicator 1 “Environmental monitoring reports including the interpretation and evaluation of the water and ambient air quality in the pilot areas are published by Pak-EPA and provincial EPAs” was not planned to be prepared by this time, Punjab-EPA and Sindh-EPA prepared some of the output of their monitoring activities which could be the part of the monitoring report.

In this moment of conducting of Mid Term Review, Verifiable Indicator 2 “The monitoring results with appropriated significant digits required for NEQS are obtained.” is not planned to be prepared.

Verifiable Indicator 3 “Laboratory in each EPA is properly operated and maintained based on QA/QC system.” is planned to taken place in JFY2010, no achievement was made on QA/QC.

### 3.2.2. Outputs

#### **Output 1. “Pak-EPA and Provincial EPAs are capable of formulating Environmental monitoring plans”**

Output 1 is partially achieved.

Regarding to activity 1-2, organization setup for environmental monitoring“, Pakistani side has assembled the organization set up, however, the roll, responsibility and authorization of the assigned personnel are not clearly defined. Therefore, it doesn’t work enough for effective project implementation. The improvement of organization setup shall be required.

Activity 1-3, “Training of a developing Process of an Environmental Monitoring Plan”, was conducted. After the trainings, Guidelines for Ambient Air/Water monitoring, Emission Air and Effluent were prepared.

Water environmental monitoring was conducted by Sindh- and Punjab-EPA even though some parameters were not analyzed in accordance with lack of SOP. Air environmental monitoring has been conducted by using air monitoring stations. Pak-EPA, Punjab-EPA and Sindh-EPA are utilizing the outcomes of the monitoring.

#### **Output 2. “Pak-EPA and Provincial EPAs are capable of measuring all the parameters of National Environmental Quality Standards (NEQS) based on uniform methodologies of sampling measurements and analysis.”**

Some of the Activities related to Output 2 is still under process.

The development/modification of SOP was allotted to the five states as shown in table 1. Draft version of the SOPs for each parameter of water environmental monitoring were prepared, which was earlier than planned.

Table 1 Schedule of Preparation of SOP for Water Quality Analysis

Process	Person in charge	Original	Revised	Outcome
---------	------------------	----------	---------	---------



		schedule	schedule	
1. Preparation of the proposed uniformed method	JICA Expert	Middle of April	Middle of April	
2. Collection of existing method from each EPA	Pak-EPA and each EPA	From Middle of April to End of April	From Middle of April to End of April	
an omission of a middle part				
10. Preparation/ make up the parts of SOP in each EPA	Pak-EPA and each EPA	From Middle of June to End of October	From Middle of June to End of October	
11. Collection of the parts of SOP from each EPA	Pak-EPA and each EPA	End of October	Middle of November	
12. Modify the parts of SOP in each EPA and again, Collection of the modified SOP	Pak-EPA Support by JICA Expert	From End of October to End of November	Middle of November	
13. Completion of the draft SOP (ver.1)	Pak-EPA Support by JICA Expert	End of November	End of December	Draft SOP (ver.1)
14. Distribution of the draft SOP (ver.1)	Pak-EPA	End of November	Middle of January, 2010	
15. Collection of the comments of the draft SOP (ver.1)	Pak-EPA and each EPA	Whenever necessary	Whenever necessary	
16. Revise the draft SOP (ver.1) to draft SOP (ver.2)	Pak-EPA Support by JICA Expert	June of 2010	June of 2010	Draft SOP (ver.2)
17. Collection of the comments of the draft SOP (ver.2)	Pak-EPA and each EPA	Whenever necessary	Whenever necessary	
18. Revise the draft SOP (ver.2) to Final SOP Completion of Final SOP	Pak-EPA and each EPA Support by JICA Expert	June of 2011	June of 2011	Final SOP

Preparation of maintenance manual has been allotted to 5EPAs as shown in Table 2. Due to the unavailability of some equipments, preparation of maintenance manual is not fully completed yet. On the other hand, record sheets for usage of major analyzers had been prepared.

Table 2 Role Sharing in EPAs and Assigned Equipment in Preparation of Maintenance Manual

EPA	Assigned Equipment
Pak-EPA	· Wastewater Treatment Apparatus · Draft Chamber
Punjab-EPA	· Spectrophotometer · Atomic Absorption Spectrophotometer (AAS) with Hg Analyzer · Muffle Furnace · Microwave Digester
Sindh-EPA	· Ion Chromatography (IC) · Pure Water Maker
NWFP-EPA	· Gas Chromatography (GC) · Rotary Evaporator

	· Dry Oven / Incubator
Balochistan-EPA	· pH meter · DO meter · Auto Clave

The explanation of the concepts of detection limit (DL) and quantitation limit (QL) were conducted.

The activities related to quality control methods for sampling and analysis will be conducted in the middle part of 2nd year to 3rd year.

**Output 3. “Laboratory management system is improved and Quality Assurance /Quality Control (QA/QC) system is established in Pak-EPA and Provincial EPAs.”**

Output 3 is partially achieved, since most of the related activities have been just started.

Laboratory management rules or procedures were assigned to be prepared to each EPA. The first draft version was presented from Balochistan-EPA and a few documents from.KPK-EPA.

Personnel assigned for QA/QC activities were determined in Balochistan-EPA and KPK-EPA. However, for Pak-EPA, Punjab-EPA and Sindh-EPA, further approaches and promotion are required with top management.

QA/QC activity plans will be prepared in second year of the Project for the establishment of laboratory management system.

**Output 4. “Pak-EPA and Provincial EPAs are capable of interpreting and evaluating monitoring data based on the internationally recognized environmental standards/ NEQS.”**

Output 4 is merely achieved, since most of the related activities have not been even started yet.

Related activities on interpretation and evaluation monitoring data had not been conducted yet and will be conducted from 2nd year to 3rd year of the Project.

**Output 5. “Based on the Pakistan nationwide environment data management system, Pak-EPA and Provincial EPAs are capable of compiling monitoring data and disseminating to the public.”**

Output 5 is merely achieved, since most of the related activities have not been even started yet.

Fundamental part of related training on nationwide environment data management system had been conducted. The environmental data management system formulation will be conducted from 2nd year to 3rd year of the Project.

The upload of acquired information with proper QA/QC processes will be conducted from 2nd to 3rd year. The monitoring report will be prepared and published in 3rd year.

### **3.2.3. Implementation Process**

Although, most of the activities planned to be conducted in 1st year were implemented, the overall progress of the activities relatively delayed due to the unavailability of major equipments like gas chromatography (GC), atomic absorption spectrophotometer (AAS), iron chromatography (IC) and air monitoring stations while their maintenance activities had to be carried out at first. As a result, the schedule of the activities of output 3 was postponed for approximately half a year.

Although the degree and its speed of improvements are varies, as went through the given trainings, most of the C/P showed some degree of improvements in both knowledge and technical skill, which can be observed by technical proficiency test held by JET occasionally.

The progress of the Project has been monitored by both Japanese side and Pakistani side. The communication between JET and Pakistani side has been sufficiently and effectively conducted. Administrators of EPAs were able to understand the Project situation through reporting, committee such as JCC and PSC, and daily communication with JET. While Experts are absent in Pakistan, the Project activities sometimes showed delay, and further improvement is required.

The communication between JET and JICA has been sufficiently and effectively conducted through official documentation such as progress reports, committee such as JCC and PSC, daily communication by using e-mail.

Also, commitment and punctuality on submission shall be secured by Pakistani side.

Although, great improvements are observed as going through the 1st year activities and tackling keep coming obstacles like budgetary issues, organizational setting together among stakeholders, further recognition and determination of their own responsibility is expected in the rest of the Project period.

## Chapter 4. REVIEW BY FIVE CRITERIA

### 4.1. Relevance

- The Project is consistent with the needs of Pakistan. Recently, as industrialization proceeds, urbanization and development without proper planning around industrial facility is going on, and the issue on air and water pollution is expected to be even more severe.
- The importance and needs of environmental quality management in Pakistan is high and the Project has contributed to fulfill the needs through assisting EPAs in the field of environmental monitoring.
- The Project is also consistent with the official development policy in Japan and JICA's country-specific implementation plan for Pakistan as well. In the "Assistance Plan for Pakistan" which has been determined by the Ministry of Foreign Affairs in Japan, it states the importance of "environmental conservation including strengthening of administrative capacity, measures for general waste disposal and industrial pollution, and natural environmental conservation", thus environmental issues is one of the priority areas in the Assistance Plan. The environmental related programs are included in the "Environment Challenges" under "Sustainable Economic Growth for More Employment", which is one of the policy pillars in the Assistance Plan.
- According to the Pollution Conditions Survey conducted by JICA in 2000, concentrations of pollutants exceed Japanese or WHO environmental standards by 20-90%. A concern is growing over the emission of particulate matter in the atmosphere, contamination of river water and groundwater by wastewater, and adverse health effects on the population.
- To consider the situation, the Project appropriately addresses the priority concerns and issues in Pakistan, however, the Project only is not sufficient enough to tackle with issues of environmental pollution.
- As some C/Ps were unable to attend training continuously, sometimes experts need to repeat the previous contents of the training which lead to slow down the speed of training.

### 4.2. Effectiveness

- The five Outputs which were settled at the beginning of the Project were found to be sufficient to achieve the Purpose of the Project.
- There is no sufficient evidence to conclude the successful achievement of the Project Purpose at the time of the Mid-term Review.
- Considering inhibiting and promoting factors of the Output, lack of man power

directly leads to the monitoring activities, especially related to Output 3. The proper procedure of approving monitoring data is also found out to be an essential factor as well.

### **4.3. Efficiency**

#### Achievement of output

- The followings are considered potential inhibiting factors, and clarified as external factors of respective achievement. No other inhibiting factors of the achievement of output were found.  
Output 3: Recruitment of monitoring personnel in PC-1 plan is successfully conducted.  
Output 5: The Data is properly approved by Pakistan government with proper procedures.

#### The amount and timing of input

- The interviews with the C/Ps indicate that input is generally satisfactory on human resources (Japanese experts), trainings and equipment. The timing of the input is almost appropriate. Assigning Pakistan C/Ps to the project has been delivered at proper timing, however, the preparation of project budget has been delayed. Overall, input for the implementation based on the plan was appropriate in terms of quantity, quality and timing.

#### Operation and management system of the Project

- The operation and management system of the Project was found out to be effective for the project implementation. Joint Coordinating Committee (JCC) and Project Steering Committee (PSC) were held occasionally, among Pak-EPA and Provincial EPAs, JICA Expert Team and JICA Pakistan office, the representative from Planning Commission and Ministry of Environment. The issues such as proper procedure of recruitment, operation and maintenance of EMS equipment, regularization of EMS staff after project completion and annual environmental monitoring work plan were generated in those committees.
- As a conclusion, operation and management system is effectively working through JCC and PSC for the project implementation, however, some of the items discussed in the JCC or PSC are still on the process. As duration of the Project is limited and the delay affects the Project implementation, the decision made in those committees is preferable to be taken in place quickly.

#### **4.4. Impact**

##### Positive impact

- Through the publicity of C/Ps organization on this project, other organization showed great interests in the Project. Azad Jammu Kashmir (AJK)-EPA, Gilgit Baltistan (GB)-EPA, National University of Science and Technology, Fatima-Jinnah Women University, Bahria University, COMSATS Institute of Information Technology, University of Arid Agriculture participated in the Project's trainings.

##### Negative impact

- Very few negative impacts by the implementation of the Project were found.

#### **4.5. Sustainability**

- In Pakistan Environmental Protection Act, it is clearly stated that capacity development of all the related personnel is defined as a political objective, in order to achieve protection of environmental resources and better environmental management. It is expected that after the termination of the Project, institutional and administrative assistance from Pakistan government continues.
- Extension of PC-1 until December 2011 for procurement of provincial and federal budget is taking place, which is essential for the sustainability of whole environmental monitoring system. After the termination of the Project, budget allocation through PC-4 shall be well acknowledged among all the EPAs.
- C/Ps who have received technical transfer from the Project may disseminate after the Project. Regularization of C/Ps is most essential for capacity development of each EPA.
- For better mobilization of the organization, middle management shall be conducted to fill up the gap between analysts, engineers and administrators.
- Technical transfer was implemented in line with their technical capability. As went through various trainings, C/Ps learned basic knowledge, concepts, skills and experienced actual operation of monitoring related activities.

## **Chapter 5. RESULTS OF REVIEW**

### **5.1. Conclusions**

- Although some delay have been observed, the progress and achievement of the Project is adequate. The Team recognized that motivation and potential of counterpart personnel for improving environmental monitoring in Pakistan is high. Based on the R/D, each activity is implemented steadily.
- Important assumption of the Project such as unstable power supply, financial crunch of governmental organization both central and provincial level, is significantly influence to implementation of the Project.
- Unstable power supply has caused a lot of additional work such as fixing equipments, supplying spare parts etc.
- Due to the financial crunch of governmental organizations, budget allocation to human and physical resources is often disturbed and this could threaten the sustainability of the Project.
- Consequently, since the start of the grant aid project, suitable manpower for planned monitoring activities were not completely recruited yet. The followings are the current condition of the Project; 1) Shortage of manpower for designated monitoring system, 2) Failure participation of necessary training because of current assigned tasks, 3) Failure of concentration on supplying trainings due to insecurity of the position. In addition to issue of insufficient number of staff, the arrangement of shifting EMS staff to permanent employee of provincial EPA has also not been fixed among federal and provincial EPAs.
- All the EPAs, however, have to manage fiscal measures to implement the environmental monitoring activities. Since surrounding circumstance of the financial situation is unexpectedly and drastically changing, the approval process on PC-1 extension, influence from amendment of Article 18 of constitution, as well as proper fund releasing should be treated properly with the cooperation of all the related organization.

### **5.2. Recommendations**

#### **Insufficient manpower and its arrangement**

- C/Ps are always occupied in their routine work because insufficient staff in the laboratory are assigned. This may cause difficulties for C/Ps to fully attend the counterpart training. It makes them lost of opportunities to obtain necessary capabilities for proper environmental monitoring. At least, each EPA should take necessary action(s) such as additional assignment to the vacant posts, sharing work among other laboratory personnel during training period etc.

- There should be the management system for each EPA by assigning proper management personnel, and clarifying roles, authorities and procedures for each activities and its output.
- Due to the delay of personnel recruitment, the scheduled numbers of persons are still not placed in the proposed positions of the EPA structure. As a result, vacant posts are remarkably observed particularly in Pak-EPA, KPK-EPA and Balochistan-EPA. Under the present conditions, project activities need to be implemented by existing manpower.

#### Maintenance Work of the Equipment

- It is observed that some laboratory staffs do not properly understand necessity of maintenance or do not implement even though they recognize the necessity. This situation is especially found in general/common equipment (refrigerator, dry oven, e.g.) and relatively unsophisticated equipment such as pH-meter and balance. In addition, not a few staff might misunderstand that unused equipment is not necessary to maintain regularly. Therefore, to enhance the necessity of maintenance through daily on-the-job training is recommended.
- It is one of the major purposes of the Project to train maintenance work, to enhance the trainees to raise incentive. While it is important to point out that EPA staff themselves shall closely read manuals to understand the equipment, and take the initiative in raising incentive and implementing the maintenance.
- It is needless to say to secure sufficient budget according to monitoring schedule and tasks with laboratory works for proper and sustainable environmental monitoring. Sufficient control under limited budget is also important. Therefore, selection of reasonable and cost-effective consumables is suggestible. For instance, regarding some chemicals such as effluent and reagent for ion chromatography, it is possible for cost saving to choose pure chemicals from common chemical product company instead of pre-treated chemicals provided by the company that produces the equipment. Not only conduction of evaluating of the contents of the developed monitoring plans is required, but also considering and evaluating of realistic budgetary arrangement, and allocation of the human/physical resources shall be evaluated.

#### Revision of the Project Design Matrix (PDM)

- The team suggests that the current PDM (version 0) be revised as Annex 2.1 for the reasons indicated as Annex 2.2 of the Report. It is also recommended to update and modify the PO to reflect the revisions made on the proposed PDM (version 1) if necessary for smooth implementation of the rest of the project period. The revision of PO should be discussed at JCC among parties concerned.



#### Annual Activity Plan

- The submission of the Annual Activity Plan to Pak-EPA have been assigned to each EPA, which has been agreed on previous JSC held in February 2010.
- Not only conduction of evaluating of the contents of the developed monitoring plans is required, but also considering and evaluating of realistic budgetary arrangement, and allocation of the human/physical resources shall be evaluated.

#### Parameters on monitoring

- Not all the items written in NEQS have been defined clearly like total toxic metals and pesticides. Therefore, the arrangement and discussion shall be made for selecting the items for treating in this project which most likely hazardous and representing the current industrial/agricultural activities between the JET and Pakistani Side.

#### Training among C/Ps themselves

- Due to the security reason, JET has not been able to visit Balochistan and KPKprovinces. Therefore, JET plans to visit the rest of three EPAs; Pak-EPA, Punjab-EPA and Sindh-EPA, while inviting personnel from Balochistan and KPK-EPA to the laboratory of one of three EPAs.
- Dispatching high-skilled CPs to Balochistan and KPK-EPA might be worth considering. Since all the EPAs had received nearly identical equipment for environmental monitoring under the “Establishment of Environmental Monitoring System” grant aid program of 2006, the difficulty which arises from using different equipment should be minimized. CPs who received technical transfer could visit Balochistan and KPK-EPA, and tutor EPA staffs, which is more economical. This visit is also expected to promotes mutual understanding and information sharing among respective EPAs.

#### Other issues

- It is observed that all the expenses of public activities including maintenance of equipment, transportation/accommodations fees and etc have to be paid by responsible person first while official payment for those expenditure will be covered after the submission of evidences. This is one of the bottle-neck elements for preventing of smooth implementation of various activities of the Project and decreasing the performances of EPAs.

Name of Project: The Project for Establishment of Environmental Monitoring System in the Islamic Republic of Pakistan

Terms of Project: Three years

Project Area: Whole Pakistan, mainly Islamabad and Punjab, Sindh, NWFP and Balochistan Province.

Target Group: Pak-EPA and four Provincial EPAs. Ver.0

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
<p><b>Overall Goal</b> Environmental monitoring systems are place at the Federal and Provincial EPAs.</p>	<p>1 Each EPA can secure the budget for environmental monitoring. 2 Each EPA formulates environmental monitoring plans by themselves 3 Pak-EPA and the provincial EPAs publish environmental monitoring reports in a regular basis.</p>	<p>1 Budget plan 2 EPA's monitoring pan 3 EPA's web-sites and brochures</p>	<p>• Environmental commitment of the government of Pakistan will not be changed • Government laws / regulations/ standards related to environmental monitoring are formulated.</p>
<p><b>Project Purpose</b> The federal and Provincial EPA's capacity of environmental monitoring on air and water is enhanced.</p>	<p>1 Environmental monitoring reports including the interpretation and evaluation of the water and ambient air quality in the pilot areas are published by Pak-EPA and provincial EPAs. 2 The monitoring results with appropriated significant digits required for NEQs are obtained. 3 Laboratory in each EPA is properly operated and maintained based on QA/QC system.</p>	<p>1 Environment reports 2 Accuracy control surveys 3 Maintenance records /Questionnaire</p>	<p>• Duties and responsibilities of Pak-EPA and provincial EPAs will not be changed • Budget for post PC-1 period is secured by the Government of Pakistan</p>
<p><b>Output 1</b> Pak-EPA and Provincial EPAs are capable of formulating Environmental monitoring plans.</p>	<p>1-1 Organizational setup the environmental monitoring is established 1-2 A guideline of environmental monitoring is prepared, 1-3 Environmental monitoring plans in pilot areas are formulated in each EPA.</p>	<p>1 Organization Chart in each EPA. 2 Technical guideline of environmental monitoring 3 Environmental monitoring plans</p>	
<p><b>Output 2</b> Pak-EPA and Provincial EPAs are capable of measuring all the parameters of National Environmental Quality Standards (NEQS) based on uniform methodologies of sampling measurements and analysis.</p>	<p>2-1 SOP for each parameter is developed. 2-2 Maintenance plans and manuals of the equipment are formulated and in place. 2-3 Quality control methods for</p>	<p>1 SOP 2 Maintenance plans and manuals for the equipment 3 Quality control records and log books of analysts 4 Results of chemical analysis</p>	

	<p>sampling and analysis are operated in each laboratory.</p> <p>2-4 The analytical results of each reference material are put into their certified ranges.</p>	<p>based on certified reference materials</p>	
<p><b>Output 3</b> Laboratory management system is improved and Quality Assurance /Quality Control (QA/QC) system is established in Pak-EPA and Provincial EPAs.</p>	<p>3-1 Laboratory management manual is prepared in each EPA.</p> <p>3-2 QA/QC organization is established in each EPA.</p> <p>3-3 QA/QC activity plans are prepared.</p>	<p>1 Laboratory management manuals</p> <p>2 QA/QC organization charts</p> <p>3 QA/QC activity plans.</p>	
<p><b>Output 4</b> Pak-EPA and Provincial EPAs are capable of interpreting and evaluating monitoring data based on the internationally recognized environmental standards/ NEQs.</p>	<p>4-1 Qualities of river waters and ambient air are evaluated based on the internationally recognized standards in the pilot areas</p> <p>4-2 Pollution sources and pollution loadings are estimated based on the environmental monitoring data in the pilot areas.</p> <p>4-3 Environmental management plan(s) are prepared for at least one pilot area.</p>	<p>1 Draft monitoring reports in each EPA</p> <p>2 Inventory of pollution sources</p> <p>3 Environmental management plan(s)</p>	
<p><b>Output 5</b> Based on the Pakistan nationwide environment data management system, Pak-EPA and Provincial EPAs are capable of compiling monitoring data and disseminating to the public.</p>	<p>5-1 Nationwide environment data management system is in place</p> <p>5-2 EPA's websites are properly updated.</p> <p>5-3 National and provincial environmental monitoring reports are published at least once during project period.</p>	<p>1 Nationwide environment data management system diagram</p> <p>2 Data upload records</p> <p>3 National and provincial environmental monitoring reports.</p>	
<p><b>Activity</b> 1-1 Capacity assessment of EPAs 1-2 Selection of appropriate methodologies for sampling, measurements and physical, chemical and bacteriological analysis of each parameter. 1-3 Training on sampling, measurements and analysis of effluents and flue gas in point and non-point emission sources. 1-4 Training on sampling, measurements and</p>	<p><b>Input</b> 1. Japanese side 1) Short term experts 2) Tanning in Japan 3) Tanning in Pakistan 4) Equipment  2. Pakistan side 1) Counterpart personnel 2) Building and facilities</p>		<p><b>Preconditions</b> Financial and human resources are allocated each EPA to implement the project during the project period</p>

<p>analysis of natural water and ambient air.            1-5 Development /Modification of the standard operation procedures (SOP) for each parameter.            1-6 Introduction of quality control methods for sampling, measurements and analysis.            1-7 Preparation and utilization of maintenance plans and manuals of the equipment and setting up of laboratory management system.            1-8 Revision of maintenance plans and manuals of the equipment, and laboratory management systems.</p>	<p>3) Project operation and maintenance cost</p>		
<p>2-1 Capacity assessment of EPAs            2-2 Selection of appropriate methodologies for sampling, measurements and physical, chemical and bacteriological analysis of each parameter.            2-3 Training on sampling, measurements and analysis of effluents and flue gas in point and non-point emission sources.            2-4 Training on sampling, measurements and analysis of natural water and ambient air.            2-5 Development/Modification of the standard operation procedures (SOP) for each parameter.            2-6 Introduction of quality control methods for sampling, measurements and analysis.            2-7 Preparation and utilization of maintenance plans and manuals of the equipment and setting up of laboratory management system.            2-8 Revision of maintenance plans and manuals of the equipment, and laboratory management systems.</p>			
<p>3-1 Capacity assessment of the EPAs.            3-2 Training on laboratory management based on the ISO17025.            3-3 Preparation of a laboratory management</p>			

<p>manual, establishment of QA/QC organization and development of QA/QC activity plan in each EPA.</p> <p>3-4 The QA/QC system is run based on the activity 3-3.</p>			
<p>4-1 Capacity assessment of EPAs.</p> <p>4-2 Training on data processing and interpreting methods.</p> <p>4-3 Training on interpretation and evaluation of the monitoring data obtained in the pilot areas by the internationally recognized standards/ NEQS.</p> <p>4-4 Preparation of (an) environmental management plan(s) for pilot area(s).</p>			
<p>5-1 Capacity assessment of EPAs.</p> <p>5-2 Training on data processing with accumulated monitoring data.</p> <p>5-3 Establishment of a nationwide environment data management system.</p> <p>5-4 Data input by each EPA based on the activity 5-3.</p> <p>5-5 Upload of the ambient air and water quality monitoring data on EPA's websites.</p> <p>5-6 Publishing of national and provincial environmental monitoring reports as s part of preparing state environment report.</p>			

Annex 1-2 Plan of Operation (PO ver.0) with the Actual Time Frame of Project Implementation

Fiscal year		2009												2010												2011														
		Month												Month												Month														
Activities	Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12			
<b>Output1. Pak-EPA and Provincial EPAs are capable of formulating Environmental monitoring plans.</b>																																								
1-1	Capacity assessment of EPAs						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1-2	Organization setup for environmental monitoring.						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1-3	Training of a developing process of an environmental monitoring plan.						■		■																															
1-4	Development of a technical guideline for developing environmental monitoring plans.						■	■	■	■	■																													
1-5	Selection of pilot areas.							■	■	■																														
1-6	Collection of relevant information required for the development of the monitoring plan such as meteorological data and those on pollution sources in the pilot areas.						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1-7	Development of environmental monitoring plans in pilot areas.							■	■	■																														
1-8	Implementation of environmental monitoring plans in pilot areas.													■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
1-9	Revision of environmental monitoring plans and technical guideline based on the actually obtained monitoring data																																							

Fiscal year		2009												2010												2011																			
		Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12							
<b>Output2. Pak-EPA and Provincial EPAs are capable of measuring all the parameters of National Environmental Quality Standards (NEQS) based on uniform methodologies of sampling measurements and analysis.</b>																																													
2-1	Capacity assessment of EPAs			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■					
2-2	Selection of appropriate methodologies for sampling, measurements and physical, chemical and bacteriological analysis of each parameter.				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■					
2-3	Training on sampling, measurements and analysis of effluents and flue gas in point and non-point emission sources.				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				
2-4	Training on sampling, measurements and analysis of natural water and ambient air.				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
2-5	Development/Modification of the standard operation procedures (SOP) for each parameter.				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
2-6	Introduction of quality control methods for sampling, measurements and analysis.				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
2-7	Preparation and utilization of maintenance plans and manuals of the equipment and setting up of laboratory management system.				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
2-8	Revision of maintenance plans and manuals of the equipment, and laboratory management systems.											■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
2-9	Repair works for stable operation of equipment				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
2-10	Improvement of communication system										■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■







Name of Project: Technical Cooperation for Establishment of Environmental Monitoring System in the Islamic Republic of Pakistan

Terms of Project: Three years

Project Area: Whole Pakistan, mainly Islamabad and Punjab, Sindh, NWFP and Balochistan Province.

Target Group: Pak-EPA and four Provincial EPAs. PDM Ver.1 (change at Mid-Term Evaluation on 2nd of July, 2010)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
<p><b>Overall Goal</b> Environmental monitoring systems are place at the Federal and Provincial EPAs.</p>	<p>1 Each EPA can secure the budget for environmental monitoring. 2 Each EPA formulates environmental monitoring plans by themselves 3 Pak-EPA and the provincial EPAs publish environmental monitoring reports in a regular basis.</p>	<p>1 Budget plan 2 EPA's monitoring pan 3 EPA's web-sites and brochures</p>	<ul style="list-style-type: none"> <li>Environmental commitment of the government of Pakistan will not be changed</li> <li>Government laws / regulations/ standards related to environmental monitoring are formulated.</li> </ul>
<p><b>Project Purpose</b> The federal and Provincial EPA's capacity of environmental monitoring on air and water is enhanced.</p>	<p>1 Environmental monitoring reports including the interpretation and evaluation of the water and ambient air quality in the pilot areas are prepared by Pak-EPA and provincial EPAs. 2 The monitoring results with appropriated significant digits required for NEQS are obtained. 3 Laboratory in each EPA is properly operated and maintained based on QA/QC system.</p>	<p>1 Environment reports 2 Accuracy control surveys 3 Maintenance records /Questionnaire</p>	<ul style="list-style-type: none"> <li>Duties and responsibilities of Pak-EPA and provincial EPAs will not be changed</li> <li>Budget for post PC-1 period is secured by the Government of Pakistan</li> </ul>
<p><b>Output 1</b> Pak-EPA and Provincial EPAs are capable of formulating Environmental monitoring plans.</p>	<p>1-1 Responsible person for formulating environmental monitoring plan (air/water) are properly assigned. 1-2 A guideline of environmental monitoring is prepared. 1-3 Environmental monitoring plans in pilot areas are formulated in each EPA.</p>	<p>1 Organization Chart with the responsible persons (formulation/ authorization) in each EPA. 2 Technical guideline of environmental monitoring. 3 Environmental monitoring plans.</p>	<ul style="list-style-type: none"> <li>Transfer or resignation of assigned stuff(s) is(are) not occurred.</li> </ul>
<p><b>Output 2</b> 2. Pak-EPA and Provincial EPAs are capable of measuring the major parameters of National Environmental Quality Standards (NEQS) based on uniform methodologies of sampling measurements and analysis.</p>	<p>2-1 (water) SOP for 30 parameters of NEQS. (Air-Ambient) SOP for 8 parameters (Air-Emission) SOP for 15 particular parameters in NEQS defined by the Expert is developed. 2-2 Maintenance plans and manuals of the equipment are formulated and in place. 2-3 Quality control methods for sampling and</p>	<p>1 SOPs for defined parameters 2 Maintenance plans and manuals for the equipment 3 Quality control records and log books of analysts 4 (Water) Results of chemical analysis based on QC</p>	

	<p>analysis are operated in each laboratory.</p> <p>2-4 (Water) The analytical results of QC samples of are put into 20% range of QC sample while target parameters will be differently defined in each EPA, Pak-EPA is 16, Punjab-EPA is 18, Sindh-EPA is 7, KPK-EPA is 11 and Balochistan-EPA is 11.</p> <p>(Air -Ambient) The difference of calibration factors of each air analyzer is less than 4 % at every calibration.</p> <p>(Air-Emission) The difference of calibration factors of PG250 is less than 4 % in every measurement.</p>	<p>samples</p> <p>(Air-Ambient) Record of the maintenance check sheet for monitoring station.</p> <p>(Air-Emission) Record of the check sheet for PG250 analyzer.</p>	
<p><b>Output 3</b> Laboratory management system is improved and Quality Assurance /Quality Control (QA/QC) system is established in Pak-EPA and Provincial EPAs.</p>	<p>3-1 Laboratory management manual is prepared in each EPA.</p> <p>3-2 Responsible person(s) for QA/QC is (are) properly assigned on the work process chart.</p> <p>3-3 QA/QC activity plans are prepared.</p>	<p>1 Laboratory management manuals</p> <p>2 Organization charts, and Assignment chart on the work process flow.</p> <p>3 QA/QC activity plans.</p>	<ul style="list-style-type: none"> <li>• Transfer or resignation of assigned stuff(s) is(are) not occurred.</li> </ul>
<p><b>Output 4</b> Pak-EPA and Provincial EPAs are capable of interpreting and evaluating monitoring data based on the internationally recognized environmental standards/ NEQS.</p>	<p>4-1 Qualities of river waters and ambient air are evaluated based on the internationally recognized standards in the pilot areas</p> <p>4-2 Pollution sources and pollution loadings are presumed based on the environmental monitoring data in the pilot areas.</p> <p>4-3 Conceptual environmental management plan(s) are proposed for at least one pilot area.</p>	<p>1 Results of evaluation process on monitoring report in pilot area.</p> <p>2 Result of estimation processes.</p> <p>3 Conceptual environmental management plan(s).</p>	<ul style="list-style-type: none"> <li>• Legal background to support or give authority to EPAs is secured while their ability of formulating policy and conduction of it is secured.</li> </ul>
<p><b>Output 5</b> Based on the Pakistan nationwide environment data management system, Pak-EPA and Provincial EPAs are capable of compiling monitoring data and disseminating to the public.</p>	<p>5-1 Nationwide environment data management system is in place.</p> <p>5-2 Pak-EPA's Websites are properly updated.</p> <p>5-3 Environmental monitoring report in pilot</p>	<p>1 Nationwide environment data management system diagram.</p> <p>2 Data upload records.</p> <p>3 Published environmental monitoring report in pilot areas.</p>	<ul style="list-style-type: none"> <li>• The Data is properly approved and authorized by Pakistan government with proper procedures.</li> </ul>

	areas is published at least once during project period.		
<b>Activity</b> 1-1 Capacity assessment of EPAs. 1-2 Organization setup for environmental monitoring. 1-3 Training of a developing process of an environmental monitoring plan. 1-4 Development of a technical guideline for developing environmental monitoring plans. 1-5 Selection of pilot areas. 1-6 Collection of relevant information required for the development of the monitoring plan such as meteorological data and those on pollution sources in the pilot areas. 1-7 Development of environmental monitoring plans in pilot areas. 1-8 Implementations of environmental monitoring plans in pilot areas. 1-9 Revision of environmental monitoring plans and technical guideline based on the actually obtained monitoring data.	<b>Input</b> 1. Japanese side 1) Short term experts 2) Training in Japan 3) Training in Pakistan 4) Equipment  2. Pakistan side 1) Counterpart personnel 2) Building and facilities 3) Project operation and maintenance cost		<b>Preconditions</b> Financial and human resources are allocated each EPA to implement the project during the project period
2-1 Capacity assessment of EPAs 2-2 Selection of appropriate methodologies for sampling, measurements and physical, chemical and bacteriological analysis of each parameter. 2-3 Training on sampling, measurements and analysis of effluents and flue gas in point and non-point emission sources. 2-4 Training on sampling, measurements and analysis of natural water and ambient air. 2-5 Development/Modification of the standard operation procedures (SOP) for selected parameters 2-6 Introduction of quality control methods for sampling, measurements and analysis.			

<p>2-7 Preparation and utilization of maintenance plans and manuals of the equipment and setting up of laboratory management system.</p> <p>2-8 Revision of maintenance plans and manuals of the equipment, and laboratory management systems.</p>			
<p>3-1 Capacity assessment of the EPAs.</p> <p>3-2 Training on laboratory management based on the ISO17025.</p> <p>3-3 Preparation of a laboratory management manual, establishment of QA/QC organization and development of QA/QC activity plan in each EPA.</p> <p>3-4 The QA/QC system is run based on the activity 3-3.</p>			
<p>4-1 Capacity assessment of EPAs.</p> <p>4-2 Training on data processing and interpreting methods.</p> <p>4-3 Training on interpretation and evaluation of the monitoring data obtained in the pilot areas by the internationally recognized standards/ NEQS.</p> <p>4-4 Preparation of (an) environmental management plan(s) for pilot area(s).</p>			
<p>5-1 Capacity assessment of EPAs.</p> <p>5-2 Training on data processing with accumulated monitoring data.</p> <p>5-3 Establishment of a nationwide environment data management system.</p> <p>5-4 Data input by each EPA based on the activity 5-3.</p> <p>5-5 Upload of the ambient air and water quality monitoring data on Pak-EPA's websites.</p> <p>5.6 Publishing of environmental monitoring report in pilot areas.</p>			

## Comparative Sheet for PDM (Ver.0) and PDM (Ver.1)

		PDM (Ver.0)	Revised PDM (Ver.1)	Reasons/Explanation
<b>Overall Goal</b>	<b>Narrative Summary</b>	Environmental monitoring systems are place at the Federal and Provincial EPAs.	Environmental monitoring systems are place at the Federal and Provincial EPAs.	
	<b>Objective Verifiable Indicators</b>	<ol style="list-style-type: none"> <li>1 Each EPA can secure the budget for environmental monitoring.</li> <li>2 Each EPA formulates environmental monitoring plans by themselves</li> <li>3 Pak-EPA and the provincial EPAs publish environmental monitoring reports in a regular basis.</li> </ol>	<ol style="list-style-type: none"> <li>1 Each EPA can secure the budget for environmental monitoring.</li> <li>2 Each EPA formulates environmental monitoring plans by themselves</li> <li>3 Pak-EPA and the provincial EPAs publish environmental monitoring reports in a regular basis.</li> </ol>	
	<b>Means of Verification</b>	<ol style="list-style-type: none"> <li>1 Budget plan</li> <li>2 EPA's monitoring pan</li> <li>3 EPA's web-sites and brochures</li> </ol>	<ol style="list-style-type: none"> <li>1 Budget plan</li> <li>2 EPA's monitoring pan</li> <li>3 EPA's web-sites and brochures</li> </ol>	
	<b>Important Assumptions</b>	<ul style="list-style-type: none"> <li>· Environmental commitment of the government of Pakistan will not be changed</li> <li>· Government laws / regulations/ standards related to environmental monitoring are formulated.</li> </ul>	<ul style="list-style-type: none"> <li>· Environmental commitment of the government of Pakistan will not be changed</li> <li>· Government laws / regulations/ standards related to environmental monitoring are formulated.</li> </ul>	
<b>Project Purpose</b>	<b>Narrative Summary</b>	The federal and Provincial EPA's capacity of environmental monitoring on air and water is enhanced.	The federal and Provincial EPA's capacity of environmental monitoring on air and water is enhanced.	
	<b>Objective Verifiable Indicators</b>	<ol style="list-style-type: none"> <li>1 Environmental monitoring reports including the interpretation and evaluation of the water and ambient air quality in the pilot areas are published by Pak-EPA and provincial EPAs</li> <li>2 The monitoring results with appropriated significant digits required for NEQS are obtained.</li> <li>3 Laboratory in each EPA is properly operated and maintained based on QA/QC system..</li> </ol>	<ol style="list-style-type: none"> <li>1 Environmental monitoring reports including the interpretation and evaluation of the water and ambient air quality in the pilot areas are published by Pak-EPA and provincial EPAs</li> <li>2 The monitoring results with appropriated significant digits required for NEQS are obtained.</li> <li>3 Laboratory in each EPA is properly operated and maintained based on QA/QC system..</li> </ol>	Changed to more specific description.
	<b>Means of Verification</b>	<ol style="list-style-type: none"> <li>1 Environment reports</li> <li>2 Accuracy control surveys</li> <li>3 Maintenance records /Questionnaire</li> </ol>	<ol style="list-style-type: none"> <li>1 Environment reports</li> <li>2 Accuracy control surveys</li> <li>3 Maintenance records /Questionnaire</li> </ol>	
	<b>Important Assumptions</b>	<ul style="list-style-type: none"> <li>· Duties and responsibilities of Pak-EPA and provincial EPAs will not be changed</li> <li>· Budget for post PC-1 period is secured by the</li> </ul>	<ul style="list-style-type: none"> <li>· Duties and responsibilities of Pak-EPA and provincial EPAs will not be changed</li> <li>· Budget for post PC-1 period is secured by the</li> </ul>	

		PDM (Ver.0)	Revised PDM (Ver.1)	Reasons/Explanation
		Government of Pakistan	Government of Pakistan · Budget for post PC-1 period is secured by all Provincial EPA	Add the expression of for provincial EPA
Output 1	<b>Narrative Summary</b>	1 Pak-EPA and Provincial EPAs are capable of formulating Environmental monitoring plans.	1 Pak-EPA and Provincial EPAs are capable of formulating Environmental monitoring plans.	
	<b>Objective Verifiable Indicators</b>	1-1 Organizational setup for the environmental monitoring is established. 1-2 A guideline of environmental monitoring is prepared. 1-3 Environmental monitoring plans in pilot areas are formulated in each EPA.	1-1 Responsible person for formulating environmental monitoring plan (air/water) are properly assigned. 1-2 A guideline of environmental monitoring is prepared. 1-3 Environmental monitoring plans in pilot areas are formulated in each EPA.	Changed to more specific description.
	<b>Means of Verification</b>	1 Organization Chart in each EPA. 2 Technical guideline of environmental monitoring. 3 Environmental monitoring plans.	1 Organization Chart with the responsible persons (formulation/ authorization) in each EPA. 2 Technical guideline of environmental monitoring. 3 Environmental monitoring plans.	Changed to more specific description.
	<b>Important Assumptions</b>		1. Transfer or resignation of assigned staff(s) is(are) not occurred.	Add specific condition of assumption.
Output 2	<b>Narrative Summary</b>	2. Pak-EPA and Provincial EPAs are capable of measuring all the parameters of National Environmental Quality Standards (NEQS) based on uniform methodologies of sampling measurements and analysis.	2. Pak-EPA and Provincial EPAs are capable of measuring selected parameters of National Environmental Quality Standards (NEQS) based on uniform methodologies of sampling measurements and analysis.	For corresponding to the change of the indicator of 2-4, the description is specified.
	<b>Objective Verifiable Indicators</b>	2-1 SOP for each parameter is developed. 2-2 Maintenance plans and manuals of the equipment are formulated and in place. 2-3 Quality control methods for sampling and analysis are operated in each laboratory. 2-4 The analytical results of each reference material are put into their certified ranges.	2-1 (water) SOP for 30 parameters of NEQS. (Air-Ambient) SOP for 8 parameters (Air-Emission) SOP for 15 particular parameters in NEQS defined by the Expert is developed. 2-2 Maintenance plans and manuals of the equipment are formulated and in place. 2-3 Quality control methods for sampling and analysis are operated in each laboratory. 2-4 (Water) The analytical results of QC samples of are put into 20% range of QC sample while target parameters will be differently defined in each EPA, Pak-EPA is 16, Punjab-EPA is 18, Sindh-EPA is 7,	2-1 Target parameter of preparation of SOP specified. (excluded non-specific parameter, total toxic metal, pesticide, smoke meter)  Target of accuracy is specified.

		PDM (Ver.0)	Revised PDM (Ver.1)	Reasons/Explanation
			KPK-EPA is 11 and Balochistan-EPA is 11. (Air -Ambient) The difference of calibration factors of each air analyzer is less than 4 % at every calibration. (Air-Emission) The difference of calibration factors of PG250 is less than 4 % in every measurement.	
	<b>Means of Verification</b>	1 SOP 2 Maintenance plans and manuals for the equipment 3 Quality control records and log books of analysts 4 Results of chemical analysis based on certified reference materials	1 SOPs 2 Maintenance plans and manuals for the equipment 3 Quality control records and log books of analysts 4 (Water)Results of chemical analysis based on QC samples 4 (Air-Ambient)Record of the maintenance check sheet for monitoring station. 4 (Air-Emission) Record of the check sheet for PG250 analyzer.	For corresponding to the change of the indicator of 2-4, the description of is modified.
	<b>Important Assumptions</b>			
<b>Output 3</b>	<b>Narrative Summary</b>	3. Laboratory management system is improved and Quality Assurance /Quality Control (QA/QC) system is established in Pak-EPA and Provincial EPAs.	3. Laboratory management system is improved and Quality Assurance /Quality Control (QA/QC) system is established in Pak-EPA and Provincial EPAs.	
	<b>Objective Verifiable Indicators</b>	3-1 Laboratory management manual is prepared in each EPA. 3-2 QA/QC organization is established in each EPA. 3-3 QA/QC activity plans are prepared.	3-1 Laboratory management manual is prepared in each EPA. 3-2 Responsible person(s) for QA/QC is (are) properly assigned on the work process chart. 3-3 QA/QC activity plans are prepared.	Changed to more specific description.
	<b>Means of Verification</b>	1 Laboratory management manuals 2 QA/QC organization charts 3 QA/QC activity plans.	1 Laboratory management manuals 2 Organization charts, and Assignment chart on the work process flow. 3 QA/QC activity plans.	Items for verification specified.
	<b>Important Assumptions</b>		1. Transfer or resignation of assigned stuff(s) is not occurred.	Add specific condition of assumption.
<b>Output 4</b>	<b>Narrative Summary</b>	4. Pak-EPA and Provincial EPAs are capable of interpreting and evaluating monitoring data based on the internationally recognized environmental	4. Pak-EPA and Provincial EPAs are capable of interpreting and evaluating monitoring data based on the internationally recognized environmental	



		PDM (Ver.0)	Revised PDM (Ver.1)	Reasons/Explanation
		standards/ NEQS.	standards/ NEQS.	
	<b>Objective Verifiable Indicators</b>	<p>4-1 Qualities of river waters and ambient air are evaluated based on the internationally recognized standards in the pilot areas</p> <p>4-2 Pollution sources and pollution loadings are estimated based on the environmental monitoring data in the pilot areas.</p> <p>4-3 Environmental management plan(s) are prepared for at least one pilot area.</p>	<p>4-1 Qualities of river waters and ambient air are evaluated based on the internationally recognized standards in the pilot areas</p> <p>4-2 Pollution sources and pollution loadings are presumed based on the environmental monitoring data in the pilot areas.</p> <p>4-3 Conceptual environmental management plan(s) are proposed for at least one pilot area.</p>	<p>As responding to unavailability of concrete supporting information and limitation of the activity area, modification is made from “estimate” to “presumed” for better understanding of the maximum goal of the project.</p> <p>As responding to unavailability of legal stand point of the Project Activity’s output, add the word “Conceptual” for better understanding of the maximum goal of the Project.</p>
	<b>Means of Verification</b>	<p>1 Draft monitoring reports in each EPA.</p> <p>2 Inventory of pollution sources.</p> <p>3 Environmental management plan(s).</p>	<p>1 Results of evaluation process on monitoring report in pilot area.</p> <p>2 Result of estimation processes.</p> <p>3 Conceptual environmental management plan(s).</p>	<p>As responding to unavailability of concrete supporting information and limitation of the activity area, the report can represent neither whole country nor whole province, hence the goal should be “monitoring report in pilot area”.</p> <p>For corresponding to unavailability of concrete supporting information and limitation of the activity area, the output can not have legal background, therefore the expression is modified to conceptual plan as the project formulate the outcome.</p>
	<b>Important Assumptions</b>		<p>1. Legal background to support or give authority to EPAs is secured while their ability of formulating policy and conduction of it is secured.</p>	<p>Add the description for future realization of above plan.</p>
<b>Output 5</b>	<b>Narrative Summary</b>	<p>5 Based on the Pakistan nationwide environment data management system, Pak-EPA and Provincial EPAs are capable of compiling monitoring data and disseminating to the public.</p>	<p>5 Based on the Pakistan nationwide environment data management system, Pak-EPA and Provincial EPAs are capable of compiling monitoring data and disseminating to the public.</p>	

		PDM (Ver.0)	Revised PDM (Ver.1)	Reasons/Explanation
	<b>Objective Verifiable Indicators</b>	5-1 Nationwide environment data management system is in place. 5-2 EPA's websites are properly updated. 5-3 National and provincial environmental monitoring reports are published at least once during project period.	5-1 Nationwide environment data management system is in place. 5-2 Pak-EPA's Websites are properly updated. 5-3 Environmental monitoring report in pilot areas is published at least once during project period.	Target website specified.
	<b>Means of Verification</b>	1 Nationwide environment data management system diagram. 2 Data upload records. 3 National and provincial environmental monitoring reports.	1 Nationwide environment data management system diagram. 2 Data upload records. 3 Published environmental monitoring report in pilot areas.	Type of report is specified as responding to the limitation of available information.
	<b>Important Assumptions</b>			
<b>Activity for Output 1</b>	<b>Activity</b>	1-1 Capacity assessment of EPAs. 1-2 Organization setup for environmental monitoring. 1-3 Training of a developing process of an environmental monitoring plan. 1-4 Development of a technical guideline for developing environmental monitoring plans. 1-5 Selection of pilot areas. 1-6 Collection of relevant information required for the development of the monitoring plan such as meteorological data and those on pollution sources in the pilot areas. 1-7 Development of environmental monitoring plans in pilot areas. 1-8 Implementations of environmental monitoring plans in pilot areas. 1-9 Revision of environmental monitoring plans and technical guideline based on the actually obtained monitoring data.	1-1 Capacity assessment of EPAs. 1-2 Organization setup for environmental monitoring. 1-3 Training of a developing process of an environmental monitoring plan. 1-4 Development of a technical guideline for developing environmental monitoring plans. 1-5 Selection of pilot areas. 1-6 Collection of relevant information required for the development of the monitoring plan such as meteorological data and those on pollution sources in the pilot areas. 1-7 Development of environmental monitoring plans in pilot areas. 1-8 Implementations of environmental monitoring plans in pilot areas. 1-9 Revision of environmental monitoring plans and technical guideline based on the actually obtained monitoring data.	
	<b>Pre-condition</b>	Financial and human resources are allocated each EPA to implement the project during the project period.	Financial and human resources are allocated each EPA to implement the project during the project period.	
<b>Activity</b>	<b>Activity</b>	2-1 Capacity assessment of EPAs.	2-1 Capacity assessment of EPAs.	

		<b>PDM (Ver.0)</b>	<b>Revised PDM (Ver.1)</b>	<b>Reasons/Explanation</b>
<b>for Output 2</b>		2-2 Selection of appropriate methodologies for sampling, measurements and physical, chemical and bacteriological analysis of each parameter. 2-3 Training on sampling, measurements and analysis of effluents and flue gas in point and non-point emission sources. 2-4 Training on sampling, measurements and analysis of natural water and ambient air. 2-5 Development/Modification of the standard operation procedures (SOP) for each parameter. 2-6 Introduction of quality control methods for sampling, measurements and analysis. 2-7 Preparation and utilization of maintenance plans and manuals of the equipment and setting up of laboratory management system. 2-8 Revision of maintenance plans and manuals of the equipment, and laboratory management systems.	2-2 Selection of appropriate methodologies for sampling, measurements and physical, chemical and bacteriological analysis of each parameter. 2-3 Training on sampling, measurements and analysis of effluents and flue gas in point and non-point emission sources. 2-4 Training on sampling, measurements and analysis of natural water and ambient air. 2-5 Development/Modification of the standard operation procedures (SOP) for selected parameters 2-6 Introduction of quality control methods for sampling, measurements and analysis. 2-7 Preparation and utilization of maintenance plans and manuals of the equipment and setting up of laboratory management system. 2-8 Revision of maintenance plans and manuals of the equipment, and laboratory management systems.	For corresponding to the change of indicator 2-5, description is modified.
	<b>Pre-condition</b>	Financial and human resources are allocated each EPA to implement the project during the project period.	Financial and human resources are allocated each EPA to implement the project during the project period.	
<b>Activity for Output 3</b>	<b>Activity</b>	3-1 Capacity assessment of the EPAs. 3-2 Training on laboratory management based on the ISO17025. 3-3 Preparation of a laboratory management manual, establishment of QA/QC organization and development of QA/QC activity plan in each EPA. 3-4 The QA/QC system is run based on the activity 3-3.	3-1 Capacity assessment of the EPAs. 3-2 Training on laboratory management based on the ISO17025. 3-3 Preparation of a laboratory management manual, establishment of QA/QC organization and development of QA/QC activity plan in each EPA. 3-4 The QA/QC system is run based on the activity 3-3	
	<b>Pre-condition</b>	Financial and human resources are allocated each EPA to implement the project during the project period.	Financial and human resources are allocated each EPA to implement the project during the project period.	
<b>Activity for Output 4</b>	<b>Activity</b>	4-1 Capacity assessment of EPAs. 4-2 Training on data processing and interpreting methods. 4-3 Training on interpretation and evaluation of the monitoring data obtained in the pilot areas by the internationally recognized standards/ NEQS. 4-4 Preparation of (an) environmental management	4-1 Capacity assessment of EPAs. 4-2 Training on data processing and interpreting methods. 4-3 Training on interpretation and evaluation of the monitoring data obtained in the pilot areas by the internationally recognized standards/ NEQS. 4-4 Preparation of (an) environmental management	

		<b>PDM (Ver.0)</b>	<b>Revised PDM (Ver.1)</b>	<b>Reasons/Explanation</b>
		plan(s) for pilot area(s).	plan(s) for pilot area(s).	
	<b>Pre-condition</b>	Financial and human resources are allocated each EPA to implement the project during the project period.	Financial and human resources are allocated each EPA to implement the project during the project period.	
<b>Activity for Output 5</b>	<b>Activity</b>	5-1 Capacity assessment of EPAs. 5-2 Training on data processing with accumulated monitoring data. 5-3 Establishment of a nationwide environment data management system. 5-4 Data input by each EPA based on the activity 5-3. 5-5 Upload of the ambient air and water quality monitoring data on EPA's websites. 5-6 Publishing of national and provincial environmental monitoring reports as s part of preparing state environment report.	5-1 Capacity assessment of EPAs. 5-2 Training on data processing with accumulated monitoring data. 5-3 Establishment of a nationwide environment data management system. 5-4 Data input by each EPA based on the activity 5-3. 5-5 Upload of the ambient air and water quality monitoring data on Pak-EPA's websites. 5.6 Publishing of environmental monitoring report in pilot areas.	Target website is specified.  For corresponding to the change of indicator 5-3, type of report is specified.
	<b>Pre-condition</b>	Financial and human resources are allocated each EPA to implement the project during the project period.	Financial and human resources are allocated each EPA to implement the project during the project period.	

## Evaluation Grid

## 1. Verification of Achievement

Items	Sub-items	Questions	Review Results	
Achievement	Inputs	Were inputs of the Japanese side secured as scheduled?	<p><b>Japanese Experts:</b> Seven experts comprising of a chief advisor in charge of Environmental Monitoring Planning and six experts in charge of Water Monitoring, Air Monitoring, Quality Assurance / Quality Control (QA/QC), Data Communication and Coordinator were engaged. In terms of total man-month, the input of the experts was implemented as scheduled. The detail assignment schedule is attached in Annex 4.</p> <p><b>Training in Japan:</b> The training in Japan was conducted from August 26, 2009 to September 11, 2009 in Japan. In total 4 C/Ps took part in it.</p> <p><b>Equipment:</b> All the equipment from the Japanese side was procured and provided within the expected schedule as attached in Annex 4. The status of each item is as follows.</p> <ul style="list-style-type: none"> <li>● Equipment for air monitoring</li> <li>● Equipment for water quality monitoring</li> <li>● Equipment for water quality analysis</li> </ul>	
		Were inputs from Pakistani side secured as scheduled?	<p><b>Counterpart Personnel:</b></p> <p><b>Office Space with Furniture:</b> The office space was secured with adequate furniture.</p> <p><b>Running Expenses Necessary for the Project Implementation:</b> The input from Pakistani side is as attached in Annex 5.</p> <p>The budget is 10.8 in 2007/2008, 35.7 in 2008/2009, and 39.6million Rs. in 2009/10.</p>	
	Achievement of Outputs	Outputs	Objectively Verifiable Indicator (PDM(0))	Review Result
	1. Pak-EPA and Provincial EPAs are capable of formulating Environmental monitoring plans.	1-1 Organizational setup the environmental monitoring is established.	Pakistani side has assembled the organization setup, but the roll, responsibility and authorization of the assigned personnel are not clearly defined. The revision shall be required.	
		1-2 A guideline of environmental monitoring is prepared,	"Training of a developing Process of an Environmental Monitoring Plan" was conducted. After the trainings, Guidelines for Ambient Air/Water monitoring, Emission Air and Effluent had been prepared.	

Items	Sub-items	Questions	Review Results	
			1-3 Environmental monitoring plans in pilot areas are formulated in each EPA.	<p>Although, the trainees seem to have good idea on formulating monitoring plans, submission as documented material had not been properly conducted, delayed many times.</p> <p>Water monitoring was conducted by Sindh- and Punjab-EPA even though some parameters was not analyzed in accordance with SOP, This is caused that training of laboratory work has been under progress.</p> <p>Air monitoring have been conducted by using air monitoring stations, Pak-EPA, Punjab-EPA and Sindh-EPA are utilizing the outcomes.</p>
		2. Pak-EPA and provincial EPAs are capable of measuring all parameters of National Environmental Quality Standards(NEQS) based on uniform methodologies of sampling measurements and analysis	2-1 SOP for each parameter is developed.	<p>The SOP making was allotted to the five states. Draft of the ver.1 of the SOPs of water quality monitoring were prepared in the first year, though the submission of them was delayed.</p> <p>The draft SOP is scheduled to be updated through the technical transfer trainings in 2<sup>nd</sup> and 3<sup>rd</sup> year.</p>
			2-2 Maintenance plans and manuals of the equipment are formulated and in place.	Preparation of maintenance manual has been allotted to 5EPAs. Due to the unavailability of some equipments, preparation of maintenance manual is not fully completed yet. On the other hand, record sheets for usage of major analyzers had been prepared.
			2-3 Quality control methods for sampling and analysis are operated in each laboratory.	<p>The explanation of the concepts of DL and QL were conducted.</p> <p>Before the training, C/P didn't have techniques of estimate of DL and QL. Although, further trainings and deeper understanding are required, C/P showed some degree of improvements.</p> <p>Currently, progress in preparation of list of equipment/reagents, analytical record were observed.</p>
			2-4 The analytical results of each reference material are put into their certified	The related activities will be conducted since after the middle part of 2nd year to 3rd year.

Items	Sub-items	Questions	Review Results
			ranges.
		3. Laboratory management system is improved and Quality Assurance / Quality Control (QA/QC) system is established in Pak-EPA and Provincial EPAs.	<p>3-1 Laboratory management manual is prepared in each EPA. Laboratory management rules or procedures were assigned to be prepared to each EPA by June. So far, these are still under preparation in Pak-EPA. The first draft version was presented from Balochistan-EPA and a few documents from.KPK-EPA.</p> <p>3-2 QA/QC organization is established in each EPA. Persons assigned for QA/QC activities were determined in Balochistan-EPA and KPK-EPA. However, for Pak-EPA, Punjab-EPA and Sindh-EPA, further approaches and promotion are required with top management.</p> <p>3-3 QA/QC activity plans are prepared. Activity plans will be prepared in 2<sup>nd</sup> year for the establishment of laboratory management system according to the said manual.</p>
		4. Pak-EPA and Provincial EPAs are capable of interpreting and evaluating monitoring data based on the internationally recognized environmental standards/ NEQS.	<p>4-1 Qualities of river waters and ambient air are evaluated based on the internationally recognized standards in the pilot areas. Related activities had not been conducted yet.</p> <p>4-2 Pollution sources and pollution loadings are estimated based on the environmental monitoring data in the pilot areas. Related activities had not been conducted yet and will be conducted from 2nd year to 3rd year.</p> <p>4-3 Environmental management plan(s) are prepared for at least one pilot area. Related activities had not been conducted yet and will be conducted from 2nd year to 3rd year. The plan is planned to be formulated in 3rd year.</p>
		5. Based on the Pakistan nationwide environment data management system, Pak-EPA and Provincial EPAs are capable of compiling	<p>5-1 Nationwide environment data management system is in place. Fundamental part of related training had been conducted. The system formulation will be conducted from 2nd year to 3rd year.</p> <p>5-2 EPA's websites are properly updated. The upload of acquired information with proper QA/QC processes will be conducted from 2nd to 3rd year.</p> <p>5-3 National and provincial environmental monitoring reports are published at Monitoring report will be prepared and published in 3rd year.</p>

Annex 3

Items	Sub-items	Questions	Review Results	
		monitoring data and disseminating to the public.	least once during project period.	
	Achievement of Project Purpose	<p>Project Purpose</p> <p>Pak-EPA's and Provincial EPA's capacity of environmental monitoring on air and water is enhanced.</p>	<p>Objectively Verifiable Indicator (PDM(0))</p> <ol style="list-style-type: none"> <li>1 Environmental monitoring reports including the interpretation and evaluation of the water and ambient air quality in the pilot areas are published by Pak-EPA and provincial EPAs</li> <li>2 The monitoring results with appropriated significant digits required for NEQS are obtained.</li> <li>3 Laboratory in each EPA is properly operated and maintained based on QA/QC system.</li> </ol>	<p>Review Results</p> <p>Although, in this moment of conducting of "Mid Term Review" the outcomes are not planed to be prepared, Punjab-EPA and Sindh-EPA prepared some of the output of their monitoring activities which could be the part of the monitoring report.</p> <p>In this moment of conducting of "Mid Term Review", the outcomes are not planed to be prepared.</p> <p>In this moment of conducting of "Mid Term Review", the outcomes are not planed to be prepared.</p>



## 2. Verification of Implementation Process

Items	Sub-Items	Questions Concerned	Study Result
Implementation Process	Progress of Activities	Are the activities implemented as scheduled? If revision is needed, why?	Although, most of the activities planned to be conducted in 1 <sup>st</sup> year were implemented, the overall progress of the activities relatively delayed due to the unavailability of major equipments like GC, AAS, IC and Air monitoring stations while their maintenance activities had to be carried out before. As a result, the schedule of the activities of output 3 was postponed.
	Technology Transfer	Has the capacity of individuals and of organizations been developed?	Although, the degree and its speed of improvements are varies, as went through the given trainings, most of the C/P showed some degree of improvements in both knowledge and technical skill. Also, as the project proceeded, organization capacity, coordination and management was improved. However, to pursue the sustainability of environmental monitoring matters, further improvement of organizational capacity and the sense of ownership shall be developed.
	Implementation Status of Monitoring	Who has been monitoring the progress? How and how often was the Project monitored? Was monitoring result reflected to project operation?	The progress of the Project has been monitored by both Japanese side, JICA, JET and Pakistani side, administrator of EPAs through, reporting (periodically), JCC and PSC and daily communication by JET and administrator.  The results of the monitoring activities have just beginning to come, therefore, further observation is required to evaluate the effects of them.
	Relationship and Communication among the C/Ps, the Japanese Experts, and Others Concerned	Is the communication between the Japanese experts and JICA (headquarters and Pakistan office) effective?  Is the communication among project teams (among Japanese experts / between the Japanese experts and the C/P) effective?	The communication between JET and JICA side has been sufficiently and effectively conducted through, official documentation (monthly, progress) reports, meetings JCC, PSC, daily communication and electrical and verbal communication by using e-mail/mobile phone. However, for monitoring activity of stuffs while JET's absence in Pakistan, further improvement is required.  The communication between JET and Pakistani side has been sufficiently and effectively conducted through, JCC, PSC, daily communication and electrical communication by using e-mail/mobile phone. However, through the 1 <sup>st</sup> year activity, non-conduction of particular activities, and several

Annex 3

Items	Sub-Items	Questions Concerned	Study Result
			failures of transferring information/request from Pakistan administrator to monitoring stuffs observed as the absence of JET, therefore, further improvement is required. Also, commitment and punctuality on submission shall be secured by Pakistani side.
	Ownership of the Recipient Country	Do the C/Ps have ownership of the Project?	Although, great improvements are observed as going through the 1st year activities and tackling keep coming obstacles like budgetary issues, organizational setting together among stakeholders, further recognition and determination of their own responsibility will be expected.
	Other issues	Are there any issues to be sorted out for project implementation? What are their causes?	It is required until 11:00am to acquire the permission of using public car in Sindh-EPA while it is required whole day for inspect emission of industry.

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3. Review by Five Evaluation Items

Items	Sub-items	Questions	Review Results
Relevance	Needs	Is the Project consistent with the needs of Pakistan?	The relevancy of the Project is high. Although air pollution due to industrial facility is more severe than what Japan has experienced in 1960's, because there is usually some distance between industrial and residential area, damage to people seems to be smaller for the moment. Recently, as industrialization proceeds, urbanization and development without proper planning around industrial facility is going on, and the issue on air and water pollution is expected to be even more severe. The importance and needs of environmental quality management in Pakistan is high and the Project has contributed to fulfill the needs through assisting EPAs in the field of environmental monitoring. Overall, the needs of the Project are deemed to be high.
	Consistency with the national policy with Japan and Pakistan	Is the Project consistent with the environmental pollution prevention policy in Pakistan?	Under the government, support at the ministry level for environmental management is getting strengthened. In the National Environmental Action Plan, it states the importance of strengthening each EPAs' capacity of respective provinces, as well as to promote the policy for air monitoring by introducing air monitoring station. The Project activities are consistent with the environmental monitoring policy in Pakistan.
		Is the Project consistent with the official development policy in Japan and JICA's country-specific implementation plan for Pakistan?	In the "Assistance Plan for Pakistan" (by the Ministry of Foreign Affairs in Japan), it states the importance of "environmental conservation including strengthening of administrative capacity, measures for general waste disposal and industrial pollution, and natural environmental conservation", thus environmental issues is one of the priority areas in the Assistance Plan. The environmental related programs are included in the "Environment Challenges" under "Sustainable Economic Growth for More Employment", which is one of the policy pillars in the Assistance Plan.
	Appropriateness in term of procedures ※手段としての適切性について言及	Is the project appropriate in terms of strategy issues of environmental pollution in Pakistan?  ※対象分野の開発課題(環境汚染対策)に対する効果を挙げる戦略として適切か、という設問	According to the Pollution Conditions Survey conducted by JICA in 2000, concentrations of pollutants exceed Japanese or WHO environmental standards by 20-90%. A concern is growing over the emission of particulate matter in the atmosphere, wastewater seepage into aquifers, and adverse health effects on the population. To consider the situation, the Project appropriately addresses the priority concerns and issues in Pakistan, however, the Project only is not sufficient enough to tackle with issues of environmental pollution.
		Is the transfer of technology	The capacity of the C/Ps regarding formulating environmental monitoring plans, capable of

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		and experience conducted appropriately?	measuring all the parameters of NEQS, establishment of QA/QC system, has been developed to some extent through the assistance of the Japanese experts as well as C/P training in Japan. The capacity development of interpreting and evaluating monitoring data, as well as compiling monitoring data utilizing environment data management system not been acknowledged since most of activities has not yet been started. As some C/Ps were unable to attend training continuously, sometimes experts need to repeat the previous contents of the training which lead to slow down the speed of training.
Effectiveness	Prospect of Project Purpose	Is the achievement level of the Project Purpose adequate at this stage?	Please refer to the “1. Verification of Achievement” of the Evaluation Grid for details.
	Outputs	Were the Outputs sufficient to achieve the Project Purpose	The five Outputs which were settled at the beginning of the Project were found to be sufficient to achieve the Purpose of the Project.
	Inhibiting and promoting factors	Are there any changes in external factors? 成果に対する外部条件の変更	“Recruitment of monitoring personnel in PC-1 plan” is added as an external factor of Output 3, since lack of man power directly leads to the monitoring activities. “The proper procedure of approving monitoring data” is added as an external factor of Output 5 as well. This is also essential external factor for publishing environmental report. Those two additions are changes in external factors.
Efficiency	Achievement of output	Is the achievement level of the output is sufficient?	Please refer to the “1. Verification of Achievement” of the Evaluation Grid for details.
		Are there inhibiting factors of the achievement of output? 成果の達成に対する阻害要因は？	The followings are considered potential inhibiting factors, and clarified as an external factors of respective achievement. Output 3 Recruitment of monitoring personnel in PC-1 plan is successfully conducted. Output 5 The Data is properly approved by Pakistan government with proper procedures.
	The amount and timing of input	Is the input for the implementation based on the plan appropriate in terms of quantity, quality and timing?	The interviews with the C/Ps indicate that input is generally satisfactory on human resources (Japanese experts) and trainings and equipment provided enough and that the timing of the input is almost appropriate. Assigning Pakistan C/Ps to the project has been delivered at proper timing, however, the preparation of project budget has been delayed.
	Operation and	Is the operation and	Joint Coordinating Committee (JCC) was held twice during the first year of the project

	management system of the Project	management system of the Project effective for the project implementation?	<p>period on April 8, 2009 and February 17, 2010. The main items discussed on the first JCC was; (1) Acceptance of the Inception Report, (2) Necessary Expense (Operational and Maintenance Cost) of Project Activities and (3) Confirmation of Plan of Operation and budget estimate, which have been agreed by both sides.</p> <p>The second JCC Meeting was held for reviewing the project progress and improve its implementation through better coordination, communication and documentation. In the second JCC, the further cooperation toward the Project, including staff regularization and equipment maintenance, the preparation of Annual Environmental Monitoring Work Plan, were confirmed.</p> <p>Project Steering Committee (PSC) was held on February 17, 2010 for promoting coordination and cooperation among relative ministries and organization. Besides Pak-EPA and Provincial EPAs, JICA Expert Team and JICA Pakistan office, the representative from Planning Commission and Ministry of Environment joined the PSC and issues such as proper procedure of recruitment, operation and maintenance of EMS equipment, regularization of EMS staff after project completion and annual environmental monitoring work plan were generated.</p> <p>As a conclusion, operation and management system is effectively working through JCC and PSC for the project implementation, however, some of the items discussed in the JCC or PSC are still on the process. As duration of the Project is limited and the delay affects the Project implementation, the decision made in those committees needs to be taken in place more speedy.</p>
Impact	Prospect of achievement of overall goal	<p>Are there prospects that the Overall Goal will be achieved as an effect of the Project? プロジェクト実施により上位目標は発現が見込まれるか？</p>	<p>(1) the operation and maintenance of EMS equipment become routine work of EPAs, (2) regularization of EMS staff after project completion is achieved and therefore staffs who have received technical transfer remained at respective EPAs, (3) necessary budget is to be allocated for environmental monitoring, Even if those above items have been achieved, the Overall Goal, “Environmental monitoring systems are place at the Federal and Provincial EPAs” is quite ambitious to achieve in a few years after the Project period.</p> <p>Proper management, especially top management with well-supporting middle management of the Project is one of the indispensables for achieving Overall Goal. Therefore, the importance of the middle management shall be highlighted and well acknowledged among all C/Ps.</p>
		<p>Are there any inhibiting factors to achieve the Overall Goal? 上位目標の達成を阻害する要因</p>	<p>The overall goal is not likely to be achieved if the following take place: Proper O/M of Equipment, budget allocation, human resources and proper management (1) Proper Operation and Maintenance of Environmental Monitoring Equipment. Preparing maintenance plans and manuals of the equipment is important, however, taking</p>

Annex 3

			<p>into action of the manuals is far more indispensable and hard working.</p> <p>(2) Financial support for Pak- and Provincial-EPAs to formulate and implement their environmental monitoring plans.</p> <p>(3) C/Ps who have received technical transfer from the Project may disseminate after the Project. Regularization of C/Ps is most essential for capacity development of each EPA. Even if above three conditions have been fulfilled, without proper management, especially top management with well-supporting middle management in which realistic approach shall be taken between the analysts/engineers and administrator, the Overall goal, “Environmental monitoring systems are placed at Federal and Provincial EPAs” is quite ambitious to achieve. Therefore, the importance of the middle management shall be highlighted and well acknowledged among all C/Ps</p>
	Influential effect	Are there any ripple effects to the other target groups such as other ? (波及効果の確認)	No any ripple effect at this moment.
	Negative impact	Are there any negative impacts by the implementation of the Project?	Very few negative impacts by the implementation of the Project were found.
Sustainability	Administrative and institutional aspects 政策・制度	Do the institutional and administrative assistances by Pakistan government continue after the Project implementation?	In Pakistan Environmental Protection Act, it is clearly stated that capacity development of all the related personnel is defined as a political objective, in order to achieve protection of environmental resources and better environmental management. It is expected that after the termination of the Project, institutional and administrative assistance from Pakistan government continues.
		Are there any mechanisms to give an impact to other areas in Pakistan?	In this project, the experience and knowledge can be shared with neighboring Provinces through the technical transfer seminars and workshops. In addition, the establishing laboratory management system and QA/QC system and environment data management system will be useful for other Province to improve their environmental monitoring as well. Through the publicity of C/Ps organization on this project, other organization showed great interests in the Project. Actually Azad Jammu Kashmir (AJK)-EPA, Gilgit Baltistan (GB)-EPA, National University of Science and Technology, Fatima-Jinnah Women University, Bahria University, COMSATS Institute of Information Technology, University of Arid Agriculture participated in the Project’s trainings.
	Organizational and financial aspects	Does the organization have financial capability for the	Most of the equipment for environmental quality monitoring is costly and sophisticated, it required adequate maintenance with sufficient consumables. Also, certain budget is

組織・財政	<p>project implementation with sustainability?          ※経常経費を含む予算の確保は行われているか。予算措置は十分に講じられているか</p>	<p>required for accommodating monitoring activities include the Project activities which shall be procured and supplied by C/P.          However, little supply of above was made in 1st year while many efforts had been made by both Pakistani side and Japanese side.          On the other hand, extension of PC-1 until December 2011 and procurement of provincial and federal budget after the period is essential for the sustainability of whole environmental monitoring system.          Therefore, all the efforts of all the organizations, EPAs, MOE, P&amp;D and JET, JICA shall be required.</p>
	<p>Does the organization related to environmental monitoring have the capability of operation and management?           ※組織として自らの運営能力を有するか。組織能力(人材配置や意思決定プロセス)の評価、プロジェクトに対するオーナーシップがあるか、等。</p>	<p>As the project started, C/P formulated monitoring team setup for better conducting monitoring related activities.          However, there are many obstacles, like financial crunch of governmental organizations, various duties which C/P also spend great amount of resources with inexperience organizational setting, as results, modification and increase of ownership of C/P shall be made for acquiring better performance and conduction of monitoring related activities by C/P.          For better mobilization of the organization, middle management shall be conducted to fill up the gap between analysts, engineers and administrators.</p>
Technical aspect	<p>Is technical transfer implemented in line with their technical capability?</p>	<p>When the project started, a baseline assessment was conducted to assess the initial capacity of C/Ps. Based on this assessment, JET formulated appropriate capacity development plan.          After the start of actual trainings, assessments of C/Ps were carried out eventually to provide proper level of trainings by modifying the contents of the trainings according to above assessment. Therefore, technical transfer was implemented in line with their technical capability.</p>
	<p>Did the C/P acquire the technical knowledge and experience in the process of technical transfer?</p>	<p>As went through various trainings, C/Ps learned basic knowledge, concepts, skills and experienced actual operation of monitoring related activities.</p>

Annex 4: List of the Input from Japan

## 1. List of the Japanese Experts

Task	Name	Assigned period
Team Leader/ Monitoring Planning	Daisaku KIYOTA	16/02/2009-26/02/2009 19/03/2009-16/04/2009 01/06/2009-29/08/2009 02/10/2009-06/11/2009 13/01/2010-03/03/2010
Water Monitoring A	Nobuyuki SATO	24/02/2009-21/04/2009 03/06/2009-26/06/2009
Water Monitoring B	Takahsi ONUMA	16/02-2009-16/04/2009 26/10/2009-24/12/2009 13/01/2010-03/03/2010
Water Monitoring C	Kenichi KURAMOTO	16/02-2009-16/04/2009 01/06/2009-14/08/2009 27/10/2009-12/12/2009 13/01/2010-14/02/2010
Air Monitoring A	Toshiharu OCHI	16/02-2009-16/04/2009 01/06/2009-14/08/2009 29/10/2009-27/12/2009 15/01/2010-01/03/2010
Air Monitoring B	Misturu FUJIMURA	16/02-2009-16/04/2009 24/06/2009-01/08/2009 29/10/2009-28/11/2009 22/01/2010-26/02/2010
QA/QC	Kazuyoshi KAGEYAMA	23/02/2009-30/03/2009 13/01/2010-03/03/2010
Data communication	Tatsuya AKIMOTO	14/10/2009-12/11/2009
Coordinator	Takuya HARADA	08/06/2009-07/07/2009
	Daniel NEAGARI	14/10/2009-12/11/2009



## 2. List of Provided Equipments

Category	Price (include tax)
Maintenance (Spare parts) in Lot2 (Air Monitoring Station)	4,737,684
Maintenance (Spare parts) in Lot3 (Emission Monitoring)	4,337,787
Maintenance (Spare parts) Lot4 (Analitical Equipments, GC, AAS and etc.)	5,650,006
Labor Cost in Lot4 (Maintenance of Analitical Equipments)	340,067
Consumables in Lot2 (Air Monitoring Station)	7,215,236
Standard gas in Lot2 (Air Monitoring Station)	1,984,752
Consumables in Lot3 (Emission Monitoring)	118,489
Consumables in Lot4 (Analitical Equipments Quality Analysis)	3,633,180
Projector and other	609,876
Office Equipments (PC, Printers and etc.)	5,737,230
Standard Methods	164,398
<b>Total in Pakistan Rupees</b>	<b>34,528,705</b>

## 3. Training in Japan

The training for C/Ps has been implemented from August 27, 2009 to September 10, 2009 in Japan.

The participants are as follows.

Name of Participant	Name of EPA	Position at the time	Remarks
Mr. Ghulam Rasool Jamali	Balochistan-EPA	Director General	Transferred later
Mr. Shams Ur Rehman	NWFP-EPA	Chief Analyst	
Mr. Usman-Ul-Haq	Punjab-EPA	Research Officer (Water)	
Mr. Naem Ahmed Mughal	Sindh-EPA	Director General	

Annex 5 List of the Input from the Pakistani Side

Annex 5: List of the Input from Pakistan side

1. List of C/P

Present C/P Personnel in Each EPA.

(1) Pakistan Environmental Protection Agency

Project Position	Name	Position at EPA	Task	Remarks
National Project Director	Mr. Asif S. Khan	Director General	Overall responsibility for administration, coordination and implementation of the project at Pak-EPA	
Project Manager	Mr. Asad Ullah Faiz	Director	Responsibility of implementation, managerial and technical matters of the project at Pak-EPA	Joined in December, 2009
Chief C/P for Preparation of Environmental Monitoring Plan	Mr. Asad Ullah Faiz	Director	Preparation of environmental monitoring plans and supervision and guidance to working group members at Pak-EPA about the monitoring activities	Joined in December, 2009
Chief C/P for Preparation of Air Monitoring Plan	Mr. Sajid Mehmood	Chemist (Air)	Responsibility of preparation of air monitoring plan	
Chief C/P for Preparation of Water Monitoring Plan	Mr. Munzer Ullah	Chemist (Water)	Responsibility of preparation of water monitoring plan	
W/G Members for Air Quality Monitoring	Mr. Sajid Mehmood Mr. Murad Khan Mr. Zafar Abbas	Chemist (Air) Chemist (Air) Electrician	Responsibility to conduct air quality monitoring activities	
W/G Members for Water Quality Monitoring	Mr. Munzer Ullah Mr. Sajid Mehmood Mr. Imtiaz Hussain	Chemist (Water) Laboratory Assistant Assistant Inspector	Responsibility to conduct air quality monitoring activities	
W/G Members for Database Management	Mr. M. Khurram Shafique Mr. Kashif Riaz Mr. Farhan Muqem Khan	Data Analyst Data Analyst Data Analyst	Responsibility for connection and communication with air monitoring stations and managing the air quality monitoring data received from air monitoring stations	

(2) Balochistan - Environmental Protection Agency

Project Position	Name	Position at EPA	Task	Remarks
Provincial Project Director	Mr. Muhammad Ibrahim Sumalani	Director General	Responsibility of implementation, managerial and technical matters of the project at Balochistan-EPA	
Chief C/P for Preparation of Environmental Monitoring Plan	Mr. Muhammad Khan	Deputy Director (Lab.)	Preparation of environmental monitoring plans and supervision and guidance to working group members at Balochistan-EPA about the monitoring activities	
Chief C/P for Preparation of Air Monitoring Plan	Mr. Muhammad Khan	Deputy Director (Lab.)	Responsibility of preparation of air monitoring plan	
Chief C/P for Preparation of Water Monitoring Plan	Mr. Muhammad Khan	Deputy Director (Lab.)	Responsibility of preparation of water monitoring plan	
W/G Members for Air Quality Monitoring	Mr. Muhammad Khan Mr. Muhammad Dawood Mr. Abdul Hakeem	Deputy Director (Lab.) Lab. Technician Lab. Assistant	Responsibility to conduct air quality monitoring activities	
W/G Members for Water Quality Monitoring	Mr. Muhammad Khan Mr. Javaid Hussain Mr. Abdul Waheed Mr. Abdul Hakeem	Deputy Director (Lab.) Lab. Technician Lab. Assistant Lab. Assistant	Responsibility to conduct water quality monitoring activities	
W/G Members for Database Management	Mr. Muhammad Khan Mr. Muhammad Dawood	Deputy Director (Lab.) Lab. Technician	Responsibility for connection and communication with air monitoring stations and managing the air quality monitoring data received from air monitoring stations	

(3) KPK - Environmental Protection Agency

Project Position	Name	Position at EPA	Task	Remarks
Provincial Project Director	Dr. Muhammad Bashir Khan	Director General	Responsibility of implementation, managerial and technical matters of the project at KPK-EPA	
Chief C/P for Preparation of Environmental Monitoring Plan	Mr. Shams Ur Rehman	Chief Analyst	Preparation of environmental monitoring plans and supervision and guidance to working group members at KPK-EPA about the monitoring activities	
Chief C/P for Preparation of Air Monitoring Plan	Mr. Naseer Ullah Khan	Senior Chemist	Responsibility of preparation of air monitoring plan	
Chief C/P for Preparation of Water Monitoring Plan	Mr. Rooh Ullah	Chemist (Water)	Responsibility of preparation of water monitoring plan	
W/G Members for Air Quality Monitoring	Mr. Naseer Ullah Khan Mr. Fareed Ullah Shah	Senior Chemist Monitoring Inspector	Responsibility to conduct air quality monitoring activities	
W/G Members for Water Quality Monitoring	Mr. Rooh Ullah Mr. Wajid Ali Mr. Aman Ullah  Mr. Anwar Ul Haq Mr. Muhammad Zyad	Chemist (Water) Junior Analyst Senior Chemist (Provincial-EMS, BPS-17) Lab. Assistant Lab. Assistant	Responsibility to conduct water quality monitoring activities	
W/G Members for Database Management	Mr. Hassan Adnan	Data Analyst	Responsibility for connection and communication with air monitoring stations and managing the air quality monitoring data received from air monitoring stations	

(4) Punjab Environmental Protection Agency

Project Position	Name	Position at EPA	Task	Remarks
Provincial Project Director	Dr. Shagufta Shahjehan	Director General	Responsibility of implementation, managerial and technical matters of the project at Punjab-EPA	
Chief C/P for Preparation of Environmental Monitoring Plan	Mr. Ahmed Nadeem	Deputy Director (Lab)	Preparation of environmental monitoring plans and supervision and guidance to working group members at Punjab-EPA about the monitoring activities	Joined in February, 2010
Chief C/P for Preparation of Air Monitoring Plan	Mr. Farooq Alam	Research Officer (Air)	Responsibility of preparation of air monitoring plan	
Chief C/P for Preparation of Water Monitoring Plan	Mr. Usman Ul Haq	Research Officer (Water)	Responsibility of preparation of water monitoring plan	
W/G Members for Air Quality Monitoring	Mr. Farooq Alam, Mr. Rizwan Haider, Mr. Babar Zaheer Mr. Ajmal Nadeem Mr. Nabeel Zaman Mr. Muhammad Adnan Khan Mr. Muhammad Rafique Mr. Sarfaraz Ahmad Mr. Ijaz Ahmed	Research Officer (Air) Assistant Director (Vehicular Pollution) Data Analyst Research Assistant (Air) Electrician Electrician Lab. Assistant (Air Pollution) Lab. Assistant (Air) Lab Attendant (Air Pollution)	Responsibility to conduct air quality monitoring activities	
W/G Members for Water Quality Monitoring	Mr. Usman Ul Haq Ms. Firdous Kausar Mr. Tariq Javaid Mr. Nadeem Shami Mr. Moazzam Mian Mr. Junaid Yousaf	Research Officer (wastewater) Chemist (Water) Research Assistant (Wastewater) Research Assistant (Wastewater) Lab. Assistant (Water) Lab Attendant (Water)	Responsibility to conduct water quality monitoring activities	
W/G Members for Database Management	Mr. Babar Zaheer	Data Analyst	Responsibility for connection and communication with air monitoring stations and managing the air quality monitoring data received from air monitoring stations	

(5) Sindh Environmental Protection Agency

Project Position	Name	Position at EPA	Task	Remarks
Provincial Project Director	Mr. Naeem Ahmed Mughal	Director General	Responsibility of implementation, managerial and technical matters of the project at Sindh-EPA	
Chief C/P for Preparation of Environmental Monitoring Plan	S. M. Yahya	Director (Lab)	Preparation of environmental monitoring plans and supervision and guidance to working group members at Sindh-EPA about the monitoring activities	
Chief C/P for Preparation of Air Monitoring Plan	Mr. Jahangeer Asad	Chemist (Air)	Responsibility of preparation of air monitoring plan	
Chief C/P for Preparation of Water Monitoring Plan	Mir Mureed Ali Talpur	Chemist (Water)	Responsibility of preparation of water monitoring plan	
W/G Members for Air Quality Monitoring	Mr. Jahangeer Asad Mr. Niaz Ali Wahocho Mr. Muhammad Hashim Mr. Shabbir Ahmed	Chemist (Air) Data Analyst Lab. Technician Environmental Inspector	Responsibility to conduct air quality monitoring activities	
W/G Members for Water Quality Monitoring	Mir Mureed Ali Talpur	Chemist (Water)	Responsibility to conduct water quality monitoring activities	
W/G Members for Database Management	Mr. Niaz Ali Wahocho	Data Analyst	Responsibility for connection and communication with air monitoring stations and managing the air quality monitoring data received from air monitoring stations	

## 2. Main Project Operation Cost in 1<sup>st</sup> year

Item	Inputted during March, 2009 – June, 2010
Human Resource Development / Training	0.5 mil
Procurement of Chemicals / Consumables / Laboratory Equipment etc.	0.117 mil
P.O.L Charges/ Repair/ Maintenance etc.	1.3 mil
Total	Rs 1.917 mil

Annex 6: Activities of Their Activities

## 1. Pak-EPA

## 1.1 Output-1

	Activity	Status		C/P	Finding
		Planned Time Frame	Progress		
Output-1	1-1 Capacity assessment of EPAs.	From Apr. 2009 to Sep. 2011	In progress		Capacity assessment had been conducted to confirm their experiences of formulating of monitoring plans. One of participants have experience of formulating monitoring plan.
	1-2 Organization setup for environmental monitoring.	From Apr. 2009 to Jun. 2010	In progress		Due to the delay of salary of EMS stuff, EMS stuffs seemed feel insecurity of their position. Clarification of the role. Clarification of responsibility and roles for formulation, acceptance and authorization are required.
	1-3 Training of a developing process of an environmental monitoring plan.	Jul. 2009	Conducted		Clarification of responsibility and roles for formulation, acceptance and authorization are required.
	1-4 Development of a technical guideline for developing environmental monitoring plans.	From Jul. 2009 to Aug. 2009	In progress		Clarification of responsibility and roles for formulation, acceptance and authorization are required.
	1-5 Selection of pilot areas.	From May 2009 to Jan. 2010	Conducted		Clarification of responsibility and roles for formulation, acceptance and authorization are required. Submission condition was very poor. Recently improved.
	1-6 Collection of relevant information required for the development of the monitoring plan such as meteorological data and those on pollution sources in the pilot areas.	From Jun. 2009 to May. 2010	In progress		Little to no information is submitted. Further confirmation of existence and availability of relevant information is required while further effort and recognition of the importance are required.
	1-7 Development of environmental monitoring plans in pilot areas.	From Aug. 2009 to Apr. 2010	In progress		Although, the trainees seem to have good idea on formulating monitoring plans, submission as documented material had not been properly conducted, delayed many times. Recently improved.



	1-8 Implementations of environmental monitoring plans in pilot areas.	From Jan. 2009 to Dec. 2011	In progress		It's seems the allocation of the fund had not been properly conducted. It shall be allocated by Pak-EPA. It's not confirmed if Pak-EPA could prepare the enough operating budget.
	1-9 Revision of environmental monitoring plans and technical guideline based on the actually obtained monitoring data.	From Jul. 2010 to Jun. 2011	Not started yet		This activity will be conducted during 2 <sup>nd</sup> year to 3 <sup>rd</sup> year.

#### Output-2 (Water)

	Activity	Status		C/P	Finding
		Planned Time Frame	Present		
Output-2	2-1 Capacity assessment of EPAs	From Feb. 2009 to Oct. 2011	In progress	Munzal Imtiaz	Capacity assessment was conducted to two C/P for confirm to the experience of analysis. Experiences of analysis of the C/P are few, C/P are required to continue the training of analysis.
	2-2 Selection of appropriate methodologies for sampling, measurements and physical, chemical and bacteriological analysis of each parameter.	From Apr. 2009 to Jul. 2010	In progress	Munzal Imtiaz	The Uniformed method and some supplementary method were selected based on the existing analytical method of Pak-EPA and provincial EPAs. The method was selected based on EPA-Method or JIS method basically.
	2-3 Training on sampling, measurements and analysis of effluents and flue gas in point and non-point emission sources.	From Jun. 2009 to Dec. 2011	In progress	Munzal Imtiaz	The C/Ps have some experiences of sampling activity of wastewater. However they don't equip a uniformed check list or field notebooks. The uniformed check list and field notebook were prepared in training activity.
	2-4 Training on sampling, measurements and analysis of natural water and ambient air.	From Jun. 2009 to Dec. 2011	In progress	Munzal Imtiaz	The C/Ps have some experiences of sampling activity of environmental water. However they don't equipped with uniformed check list or field notebooks. The uniformed check list and field notebook were prepared in training activity.
	2-5 Development/ Modification of the standard operation procedures (SOP)	From Jun. 2009 to Sep. 2011	In progress	Munzal Imtiaz	Preparation of SOP was allotted to 5 EPAs. Pak-EPA was made chapter of heavy metals. Preparation of SOP was delay the

	for each parameter.				schedule, completion of Draft SOP ver.1 was made on Jan. of 2010.
	2-6 Introduction of quality control methods for sampling, measurements and analysis.	From Jun. 2009 to Dec. 2011	In progress	Munzal Imtiaz	DL or QL was explained in training. C/P didn't have techniques of estimate of DL and QL before the training. Presently, progress in preparation of list of equipment/ reagents, preparation of analytical record.
	2-7 Preparation and utilization of maintenance plans and manuals of the equipment and setting up of laboratory management system.	From Jul. 2009 to Feb. 2010	In progress	Munzal Imtiaz	Preparation of maintenance manual has been allotted to 5EPAs. Some equipment is un-experiences for C/P. Therefore, preparation of maintenance manual is not complete yet. On the other hand, record sheet for use of main analyzer was prepared on the Joint Training.
	2-8 Revision of maintenance plans and manuals of the equipment, and laboratory management systems.	From Feb. 2010 to Jun. 2011	In progress	Munzal Imtiaz	
	2-9 Repair works for stable operation of equipment	From Jul. 2009 to Feb. 2010	Completed	--	A necessary repair works was completed in 1st year.
	2-10 Improvement of communication system	--	--	--	--

## 1.2 Output-2 (Air)

	Activity	Status		C/P	Finding
		Planned Time Frame	Progress		
Output-2	2-1 Capacity assessment of EPAs	From Feb. 2009 to Oct. 2011	In progress		Capacity assessment had been conducted to confirm their experiences of sampling and analysis. Not enough experience had been recorded due to the unavailability of Air monitoring station.
	2-2 Selection of appropriate methodologies for sampling, measurements and physical, chemical and bacteriological analysis of each	From Apr. 2009 to Jul. 2010	In progress		Although, the trainees seem to have good experience on discussion of selecting, submission as documented material had not been properly conducted, delayed many times. Some improvement was observed recently.

	parameter.				
	2-3 Training on sampling, measurements and analysis of effluents and flue gas in point and non-point emission sources.	From Jun. 2009 to Dec. 2011	In progress		Although they keep high motivation for learning, due to the delay of salary, they used to feel insecurity on their position. Some improvement was observed recently.
	2-4 Training on sampling, measurements and analysis of natural water and ambient air.	From Jun. 2009 to Dec. 2011	In progress		Although they keep high motivation for learning, due to the delay of salary, they used to feel insecurity on their position. Some improvement was observed recently.
	2-5 Development/Modification of the standard operation procedures (SOP) for each parameter.	From Jun. 2009 to Sep. 2011	In progress		Deeper understanding will be required for C/Ps to revise first edition of SOP.
	2-6 Introduction of quality control methods for sampling, measurements and analysis.	From Jun. 2009 to Dec. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year.
	2-7 Preparation and utilization of maintenance plans and manuals of the equipment and setting up of laboratory management system.	From Jul. 2009 to Feb. 2010	In progress		The maintenance works must be managed by regulated maintenance plan.
	2-8 Revision of maintenance plans and manuals of the equipment, and laboratory management systems.	From Feb. 2010 to Jun. 2011	In progress		No action was observed for revising the 1 <sup>st</sup> version annual maintenance sheet. Self efforts are required.
	2-9 Repair works for stable operation of equipment	From Jul. 2009 to Feb. 2010	Conducted		Budget shall be secured.
	2-10 Improvement of communication system	From Jul. 2009 to Mar. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year.

### 1.3 Output-3

Activity	Status	C/P	Finding
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		Planned Time Frame	Progress		
Output-3	3-1 Capacity assessment of the EPAs.	From Jan. 2009 to Jun. 2011	In progress	Ms. Farzana Mr. Murad Mr. Sajid	The presence of rules for laboratory management is to be confirmed and can be used as baseline data for capacity assessment. In fact, rules might exist in the laboratory but not documented in most cases.
	3-2 Training on laboratory management based on the ISO17025.	Jan. 2009	Conducted	Ms. Farzana Mr. Murad Mr. Sajid	It was understood that the documentation of the above-mentioned rules would be one of the basic elements for laboratory management system based on international standard.
	3-3 Preparation of a laboratory management manual, establishment of QA/QC organization and development of QA/QC activity plan in each EPA.	From Jan. 2009 to Sep. 2011	In progress	Ms. Farzana Mr. Murad Mr. Sajid	Out of 14 different rules or procedures for laboratory management, half the number should be documented by CP by June this year as part of manual preparation. Due to the vacancies in key posts of the organization, QA/QC system is insufficient for proper management of laboratory. The activity plan of QA/QC is scheduled to begin in the second fiscal year.
	3-4 The QA/QC system is run based on the activity 3-3.	From Aug. 2010 to Dec. 2011	Not started yet	Ms. Farzana Mr. Murad Mr. Sajid	It is scheduled to begin in the second fiscal year.

#### 1.4 Output-4

	Activity	Status		C/P	Finding
		Planned Time Frame	Progress		
Output-4	4-1 Capacity assessment of EPAs.	From Nov. 2009 to Nov. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year.
	4-2 Training on data processing and interpreting methods.	From Nov. 2009 to Nov. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year.
	4-3 Training on interpretation and evaluation of the	From Oct. 2009 to Jun. 2011	Not started yet		This activity will be conducted during 2 <sup>nd</sup> year.

	monitoring data obtained in the pilot areas by the internationally recognized standards/ NEQS.				
	4-4 Preparation of (an) environmental management plan(s) for pilot area(s).	From Jan. 2010 to Sep. 2011	Not started yet		This activity will be conducted during 3 <sup>rd</sup> year.

### 1.5 Output-5

	Activity	Status		C/P	Finding
		Planned Time Frame	Progress		
Output-5	5-1 Capacity assessment of EPAs.	From Jan. 2010 to Dec. 2011	In progress		Capacity assessment had been conducted to confirm their experiences of spread sheet processing, database processing and program writings. Due to the availability accessibility of PC, C/P' ability varies. No experience of database and program writing.
	5-2 Training on data processing with accumulated monitoring data.	From Nov. 2009 to Jul. 2010	In progress		C/P showed good motivation to learn. Good progress is expected.
	5-3 Establishment of a nationwide environment data management system.	From Jan. 2010 to Oct. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year to 3 <sup>rd</sup> year.
	5-4 Data input by each EPA based on the activity 5-3.	From Jul. 2010 to Dec. 2011	Not started yet		This activity will be conducted during 2 <sup>nd</sup> year.
	5-5 Upload of the ambient air and water quality monitoring data on EPA's websites.	From Jan. 2010 to Jun. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year to 3 <sup>rd</sup> year.
	5-6 Publishing of national and provincial environmental monitoring reports as s part of preparing state environment report.	From Jun. 2010 to Nov. 2011	Not started yet		This activity will be conducted during 3 <sup>rd</sup> year.

## 2. Balochistan-EPA

### 2.1 Output-1

	Activity	Status		C/P	Finding
		Planned Time Frame	Progress		
Output-1	1-1 Capacity assessment of EPAs.	From Apr. 2009 to Sep. 2011	In progress		Capacity assessment had been conducted to confirm their experiences of formulating of monitoring plans. One of participants have experience of formulating monitoring plan.
	1-2 Organization setup for environmental monitoring.	From Apr. 2009 to Jun. 2010	In progress		Clarification of responsibility and roles for (formulation, acceptance and authorization) are required.
	1-3 Training of a developing process of an environmental monitoring plan.	Jul. 2009	Conducted		
	1-4 Development of a technical guideline for developing environmental monitoring plans.	From Jul. 2009 to Aug. 2009	In progress		
	1-5 Selection of pilot areas.	From May 2009 to Jan. 2010	Conducted		Although, the trainees seem to have good idea on selecting pilot area, submission as documented material had not been properly conducted, delayed many times.
	1-6 Collection of relevant information required for the development of the monitoring plan such as meteorological data and those on pollution sources in the pilot areas.	From Jun. 2009 to May. 2010	In progress		Little to no information is submitted. Further confirmation of existence and availability of relevant information is required while further effort and recognition of the importance are required.
	1-7 Development of environmental monitoring plans in pilot areas.	From Aug. 2009 to Apr. 2010	In progress		As same as 1-5, although, the trainees seem to have good idea on formulating monitoring plans, submission as documented material had not been properly conducted, delayed many times.
	1-8 Implementations of environmental monitoring plans in pilot areas.	From Jan. 2009 to Dec. 2011	In progress		It's seems the allocation of the fund had not been properly conducted. It shall be allocated by Pak-EPA.
	1-9 Revision of environmental monitoring plans and technical	From Jul. 2010 to Jun. 2011	Not started yet		—

	guideline based on the actually obtained monitoring data.				
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## 2.2 Output-2 (Water)

	Activity	Status		C/P	Finding
		Planned Time Frame	Present		
Output-2	2-1 Capacity assessment of EPAs	From Feb. 2009 to Oct. 2011	In progress	Javaid Abdul	Capacity assessment had been conducted for 2 C/P to confirm their experiences of analysis. Experiences of analysis of the C/Ps are not enough, C/P are required to participate and continue the training of analysis for building up their skills ad more works.
	2-2 Selection of appropriate methodologies for sampling, measurements and physical, chemical and bacteriological analysis of each parameter.	From Apr. 2009 to Jul. 2010	In progress	Javaid Abdul	The Uniformed method and some supplementary method were selected based on the existing appropriate analytical method for Pak-EPA and provincial EPAs. The selected methods were EPA-Method or JIS method basically.
	2-3 Training on sampling, measurements and analysis of effluents and flue gas in point and non-point emission sources.	From Jun. 2009 to Dec. 2011	In progress	Javaid Abdul	The C/Ps have some experiences for sampling activity of wastewater. However they don't equip a uniformed check list or field notebooks during 5 EPAs. The uniformed check list and field notebook were made in training activity.
	2-4 Training on sampling, measurements and analysis of natural water and ambient air.	From Jun. 2009 to Dec. 2011	In progress	Javaid Abdul	The C/Ps have some experiences for sampling activity of environmental water. However ,no personnel equip uniformed check list or field notebooks. The uniformed check list and field notebook were prepared in training activity. The accuracy of TSS analysis was not enough on the training of NEQS parameters. Also, Training of some analyzer was started from initial operation for the experiences of operation of C/P are few.
	2-5 Development/Modif	From Jun. 2009 to Sep. 2011	In progress	Javaid Abdul	Preparation of SOP was allotted to 5 EPAs. Balochistan-EPA was

	ication of the standard operation procedures (SOP) for each parameter.				made chapter of Field sampling for environment. Preparation of SOP was delay the schedule, completion of Draft SOP ver.1 was made on Jan. of 2010.
	2-6 Introduction of quality control methods for sampling, measurements and analysis.	From Jun. 2009 to Dec. 2011	In progress	Javaid Abdul	DL or QL was explained in training. C/P didn't have techniques of estimate of DL and QL before the training. Presently, progress in preparation of list of equipment/ reagents, preparation of analytical record.
	2-7 Preparation and utilization of maintenance plans and manuals of the equipment and setting up of laboratory management system.	From Jul. 2009 to Feb. 2010	In progress	Javaid Abdul	Preparation of maintenance manual has been allotted to 5EPAs. Some equipment is un-experiences for C/P. Therefore, preparation of maintenance manual is not complete yet. On the other hand, record sheet for use of main analyzer was prepared on the Joint Training.
	2-8 Revision of maintenance plans and manuals of the equipment, and laboratory management systems.	From Feb. 2010 to Jun. 2011	In progress	Javaid Abdul	
	2-9 Repair works for stable operation of equipment	From Jun. 2010 to Feb. 2010	Not yet		This activity will be conducted during 2 <sup>nd</sup> year.

### 2.3 Output-2

	Activity	Status		C/P	Finding
		Planned Time Frame	Progress		
Output-2	2-1 Capacity assessment of EPAs	From Feb. 2009 to Oct. 2011	In progress		Capacity assessment had been conducted to confirm their experiences of sampling and analysis. Not enough experience had been recorded due to the unavailability of Air monitoring station.
	2-2 Selection of appropriate methodologies for sampling, measurements and physical, chemical and bacteriological	From Apr. 2009 to Jul. 2010	In progress		—



	analysis of each parameter.				
2-3	Training on sampling, measurements and analysis of effluents and flue gas in point and non-point emission sources.	From Jun. 2009 to Dec. 2011	In progress		The understanding level of some C/Ps on the theory and operation technique is still in basic level. Deeper understanding is required for acquiring accuracy of analytical result.
2-4	Training on sampling, measurements and analysis of natural water and ambient air.	From Jun. 2009 to Dec. 2011	In progress		The understanding level of some C/Ps on the theory and operation technique is still in basic level. Deeper understanding is required for acquiring accuracy of analytical result.
2-5	Development/Modification of the standard operation procedures (SOP) for each parameter.	From Jun. 2009 to Sep. 2011	In progress		Deeper understanding will be required for C/Ps to revise first edition of SOP.
2-6	Introduction of quality control methods for sampling, measurements and analysis.	From Jun. 2009 to Dec. 2011	In progress		The understanding level of some C/Ps on the theory and operation technique is still in basic level. Deeper understanding is required for acquiring accuracy of analytical result.
2-7	Preparation and utilization of maintenance plans and manuals of the equipment and setting up of laboratory management system.	From Jul. 2009 to Feb. 2010	In progress		—
2-8	Revision of maintenance plans and manuals of the equipment, and laboratory management systems.	From Feb. 2010 to Jun. 2011	In progress		C/P seems to accept the results of other EPA's discussion without questioning enough, therefore, further discussion and consideration is essential for deeper understanding.
2-9	Repair works for stable operation of equipment	From Jul. 2009 to Feb. 2010	Conducted		This activity will be conducted during 2 <sup>nd</sup> year.
2-10	Improvement of communication system	From Jul. 2009 to Mar. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year.

2.4 Output-3

	Activity	Status		C/P	Finding
		Planned Time Frame	Progress		
Output-3	3-1 Capacity assessment of the EPAs.	From Jan. 2009 to Jun. 2011	In progress	Mr. Muhammad Ibrahim Mr. Muhammad Khan	The presence of rules for laboratory management is to be confirmed and can be used as baseline data for capacity assessment. In fact, rules might exist in the laboratory but not documented in most cases.
	3-2 Training on laboratory management based on the ISO17025.	Jan. 2009	Conducted	Mr. Muhammad Ibrahim Mr. Muhammad Khan	In response to the request of CP, training has been conducted in Pak-EPA. It was understood that the documentation of the above-mentioned rules would be one of the essential elements for laboratory management system based on international standard.
	3-3 Preparation of a laboratory management manual, establishment of QA/QC organization and development of QA/QC activity plan in each EPA.	From Jan. 2009 to Sep. 2011	In progress	Mr. Muhammad Ibrahim Mr. Muhammad Khan	Out of 14 different rules or procedures for laboratory management, half the number should be documented by CP by June this year as part of manual preparation. Many vacant posts are seen in organization chart just like Pak-EPA, so it will be necessary to consider the possibility of conducting planned activities for proper management of laboratory. The activity plan of QA/QC is scheduled to begin in the second fiscal year.
	3-4 The QA/QC system is run based on the activity 3-3.	From Aug. 2010 to Dec. 2011	Not yet started	Mr. Muhammad Ibrahim Mr. Muhammad Khan	It is scheduled to begin in the second fiscal year.

2.5 Output-4

	Activity	Status		C/P	Finding
		Planned Time Frame	Progress		
Out	4-1 Capacity	From Nov. 2009	In progress		This activity will be conducted

	assessment of EPAs.	to Nov. 2011			during 2 <sup>nd</sup> year.
	4-2 Training on data processing and interpreting methods.	From Nov. 2009 to Nov. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year.
	4-3 Training on interpretation and evaluation of the monitoring data obtained in the pilot areas by the internationally recognized standards/ NEQS.	From Oct. 2009 to Jun. 2011	Not started yet		This activity will be conducted during 2 <sup>nd</sup> year.
	4-4 Preparation of (an) environmental management plan(s) for pilot area(s).	From Jan. 2010 to Sep. 2011	Not started yet		This activity will be conducted during 3 <sup>rd</sup> year.

## 2.6 Output-5

	Activity	Status		C/P	Finding
		Planned Time Frame	Progress		
Output-5	5-1 Capacity assessment of EPAs.	From Jan. 2010 to Dec. 2011	In progress		Capacity assessment had been conducted to confirm their experiences of spread sheet processing, database processing and program writings. Due to the availability accessibility of PC, C/P' ability varies. No experience of database and program writing.
	5-2 Training on data processing with accumulated monitoring data.	From Nov. 2009 to Jul. 2010	In progress		C/P showed shy to handling PC. Future positive attitude will be expected.
	5-3 Establishment of a nationwide environment data management system.	From Jan. 2010 to Oct. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year to 3 <sup>rd</sup> year.
	5-4 Data input by each EPA based on the activity 5-3.	From Jul. 2010 to Dec. 2011	Not started yet		This activity will be conducted during 2 <sup>nd</sup> year.
	5-5 Upload of the ambient air and water quality monitoring data on EPA's websites.	From Jan. 2010 to Jun. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year to 3 <sup>rd</sup> year.

	5-6 Publishing of national and provincial environmental monitoring reports as s part of preparing state environment report.	From Jun. 2010 to Nov. 2011	Not started yet		This activity will be conducted during 3 <sup>rd</sup> year.
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### 3. NWFP-EPA

#### 3.1 Output-1

	Activity	Status		C/P	Finding
		Planned Time Frame	Progress		
Output-1	1-1 Capacity assessment of EPAs.	From Apr. 2009 to Sep. 2011	In progress		KPK-EPA put importance environmental policy. C/P's shows higher performances and knowledge on environmental monitoring.
	1-2 Organization setup for environmental monitoring.	From Apr. 2009 to Jun. 2010	In progress		Due to the delay of salary of EMS stuff, EMS stuffs seemed feel insecurity of their position. Clarification of the role. Clarification of responsibility and roles for formulation, acceptance and authorization are required.
	1-3 Training of a developing process of an environmental monitoring plan.	Jul. 2009	Conducted		Clarification of responsibility and roles for formulation, acceptance and authorization are required.
	1-4 Development of a technical guideline for developing environmental monitoring plans.	From Jul. 2009 to Aug. 2009	In progress		Clarification of responsibility and roles for formulation, acceptance and authorization are required.
	1-5 Selection of pilot areas.	From May 2009 to Jan. 2010	Conducted		Clarification of responsibility and roles for formulation, acceptance and authorization are required.
	1-6 Collection of relevant information required for the development of the monitoring plan such as meteorological data and those on pollution sources in the pilot areas.	From Jun. 2009 to May. 2010	In progress		Little to no information is submitted. Further confirmation of existence and availability of relevant information is required while further effort and recognition of the importance are required.
	1-7 Development of environmental monitoring plans in pilot areas.	From Aug. 2009 to Apr. 2010	In progress		Although, the trainees seem to have good idea on formulating monitoring plans, submission as documented material had not been properly conducted, delayed many times.
	1-8 Implementations of environmental monitoring plans in pilot areas.	From Jan. 2009 to Dec. 2011	In progress		It's seems the allocation of the fund had not been properly conducted. It shall be allocated by Pak-EPA. It's not confirmed if Pak-EPA could prepare the

					enough operating budget.
	1-9 Revision of environmental monitoring plans and technical guideline based on the actually obtained monitoring data.	From Jul. 2010 to Jun. 2011	Not started yet		This activity will be conducted during 2 <sup>nd</sup> year to 3 <sup>rd</sup> year.

### 3.2 Output-2(Water)

	Activity	Status		C/P	Finding
		Planned Time Frame	Present		
Output-2	2-1 Capacity assessment of EPAs	From Feb. 2009 to Oct. 2011	In progress	Rooh Wajid	Capacity assessment was conducted to two C/P for confirm to the experience of analysis. Experiences of analysis of the C/P are few, C/P are required to continue the training of analysis.
	2-2 Selection of appropriate methodologies for sampling, measurements and physical, chemical and bacteriological analysis of each parameter.	From Apr. 2009 to Jul. 2010	In progress	Rooh Wajid	The Uniformed method and some supplementary method were selected based on the existing analytical method of Pak-EPA and provincial EPAs. The method was selected based on EPA-Method or JIS method basically.
	2-3 Training on sampling, measurements and analysis of effluents and flue gas in point and non-point emission sources.	From Jun. 2009 to Dec. 2011	In progress	Rooh Wajid	The C/Ps have some experiences of sampling activity of wastewater. However they don't equip a uniformed check list or field notebooks during 5 EPAs. The uniformed check list and field notebook were made in training activity.
	2-4 Training on sampling, measurements and analysis of natural water and ambient air.	From Jun. 2009 to Dec. 2011	In progress	Rooh Wajid	The C/Ps have some experiences of sampling activity of environmental water. However they don't equipped a uniformed check list or field notebooks. The uniformed check list and field notebook were prepared in training activity. The participants of training were changed occasionally for the joint training conducted on Islamabad only.
	2-5 Development/Modification of the standard operation	From Jun. 2009 to Sep. 2011	In progress	Rooh Wajid	Preparation of SOP was allotted to 5 EPAs. NWFP-EPA was made chapter of general parameters of COD or BOD <sub>5</sub> etc.

	procedures (SOP) for each parameter.				Preparation of SOP was delay the schedule, completion of Draft SOP ver.1 was made on Jan. of 2010.
	2-6 Introduction of quality control methods for sampling, measurements and analysis.	From Jun. 2009 to Dec. 2011	In progress	Wajid	DL or QL was explained in training. C/P didn't have techniques of estimate of DL and QL before the training. Presently, progress in preparation of list of equipment/ reagents, preparation of analytical record.
	2-7 Preparation and utilization of maintenance plans and manuals of the equipment and setting up of laboratory management system.	From Jul. 2009 to Feb. 2010	In progress	Wajid	Preparation of maintenance manual has been allotted to 5EPAs. Some equipment is un-experiences for C/P. Therefore, preparation of maintenance manual is not complete yet. On the other hand, record sheet for use of main analyzer was prepared on the Joint Training.
	2-8 Revision of maintenance plans and manuals of the equipment, and laboratory management systems.	From Feb. 2010 to Jun. 2011	In progress	Wajid	
	2-9 Repair works for stable operation of equipment	From Jun. 2010 to Feb. 2010	Not yet		A required repair works will conduct in 2nd year.
	2-10 Improvement of communication system				--

### 3.3 Output-2(Air)

	Activity	Status		C/P	Finding
		Planned Time Frame	Progress		
Output-2	2-1 Capacity assessment of EPAs	From Feb. 2009 to Oct. 2011	In progress		One of the C/P showed a great progress of understanding while others showed basic understandings or little less.
	2-2 Selection of appropriate methodologies for sampling, measurements and physical, chemical and bacteriological analysis of each parameter.	From Apr. 2009 to Jul. 2010	In progress		—
	2-3 Training on	From Jun. 2009	In progress		Although they keep high

	sampling, measurements and analysis of effluents and flue gas in point and non-point emission sources.	to Dec. 2011			motivation for learning, self effort and self-training is required for further achievement.
2-4	Training on sampling, measurements and analysis of natural water and ambient air.	From Jun. 2009 to Dec. 2011	In progress		Due to the unavailability of monitoring station, training progressed relatively slowly till above fixed.
2-5	Development/Modification of the standard operation procedures (SOP) for each parameter.	From Jun. 2009 to Sep. 2011	In progress		While the stuffs showed great motivation for preparing 4 SOPs, no reply from the stuff despite the expert's repeated requests.
2-6	Introduction of quality control methods for sampling, measurements and analysis.	From Jun. 2009 to Dec. 2011	In progress		—
2-7	Preparation and utilization of maintenance plans and manuals of the equipment and setting up of laboratory management system.	From Jul. 2009 to Feb. 2010	In progress		This activity will be conducted during 2 <sup>nd</sup> year.
2-8	Revision of maintenance plans and manuals of the equipment, and laboratory management systems.	From Feb. 2010 to Jun. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year and 3 <sup>rd</sup> year.
2-9	Repair works for stable operation of equipment	From Jul. 2009 to Feb. 2010	Conducted		It is desirable to secure the repair budget. The responses of the stuffs were not good on this matter.
2-10	Improvement of communication system	From Jul. 2009 to Mar. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year.

### 3.4 Output-3

Activity	Status		C/P	Finding
	Planned Time Frame	Progress		



Output-3	3-1 Capacity assessment of the EPAs.	From Jan. 2009 to Jun. 2011	In progress	Mr. Shams Mr. Naseer	The presence of rules for laboratory management is to be confirmed and can be used as baseline data for capacity assessment. In fact, rules might exist in the laboratory but not documented in most cases.
	3-2 Training on laboratory management based on the ISO17025.	Jan. 2009	Conducted	Mr. Shams Mr. Naseer	Lecture has been delivered in the joint meeting with Pak-EPA. It was understood that the documentation of the above-mentioned rules would be one of the essential elements for laboratory management system based on international standard
	3-3 Preparation of a laboratory management manual, establishment of QA/QC organization and development of QA/QC activity plan in each EPA.	From Jan. 2009 to Sep. 2011	In progress	Mr. Shams Mr. Naseer	Out of 14 different rules or procedures for laboratory management, half the number should be documented by CP by June this year as part of manual preparation. Many vacant posts are seen in the organization chart, so it will be necessary to consider the possibility of conducting planned activities. The activity plan of QA/QC is scheduled to begin in the second fiscal year.
	3-4 The QA/QC system is run based on the activity 3-3.	From Aug. 2010 to Dec. 2011	Not started yet	Mr. Shams Mr. Naseer	It is scheduled to begin in the second fiscal year.

### 3.5 Output-4

	Activity	Status		C/P	Finding
		Planned Time Frame	Progress		
Output-4	4-1 Capacity assessment of EPAs.	From Nov. 2009 to Nov. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year.
	4-2 Training on data processing and interpreting methods.	From Nov. 2009 to Nov. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year.
	4-3 Training on interpretation and evaluation of the monitoring data obtained in the pilot areas by the	From Oct. 2009 to Jun. 2011	Not started yet		This activity will be conducted during 2 <sup>nd</sup> year.

	internationally recognized standards/ NEQS.				
	4-4 Preparation of (an) environmental management plan(s) for pilot area(s).	From Jan. 2010 to Sep. 2011	Not started yet		This activity will be conducted during 3 <sup>rd</sup> year.

### 3.6 Output-5

	Activity	Status		C/P	Finding
		Planned Time Frame	Progress		
Output-5	5-1 Capacity assessment of EPAs.	From Jan. 2010 to Dec. 2011	In progress		Capacity assessment had been conducted to confirm their experiences of spread sheet processing, database processing and program writings. Due to the availability accessibility of PC, C/P' ability varies. No experience of database and program writing.
	5-2 Training on data processing with accumulated monitoring data.	From Nov. 2009 to Jul. 2010	In progress		C/P showed shy to handling PC. Future positive attitude will be expected.
	5-3 Establishment of a nationwide environment data management system.	From Jan. 2010 to Oct. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year to 3 <sup>rd</sup> year.
	5-4 Data input by each EPA based on the activity 5-3.	From Jul. 2010 to Dec. 2011	Not started yet		This activity will be conducted during 2 <sup>nd</sup> year.
	5-5 Upload of the ambient air and water quality monitoring data on EPA's websites.	From Jan. 2010 to Jun. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year to 3 <sup>rd</sup> year.
	5-6 Publishing of national and provincial environmental monitoring reports as s part of preparing state environment report.	From Jun. 2010 to Nov. 2011	Not started yet		This activity will be conducted during 3 <sup>rd</sup> year.

#### 4. Punjab-EPA

##### 4.1 Output-1

	Activity	Status		C/P	Finding
		Planned Time Frame	Present		
Output-1	1-1 Capacity assessment of EPAs.	From Apr. 2009 to Sep. 2011	In progress		Enthusiasms on environmental policy and matter were observed.
	1-2 Organization setup for environmental monitoring.	From Apr. 2009 to Jun. 2010	In progress		Due to the delay of salary of EMS staff, EMS staffs seemed feel insecurity of their position. Clarification of responsibility and roles for formulation, acceptance and authorization are conducted well and outcomes of them are very good.
	1-3 Training of a developing process of an environmental monitoring plan.	Jul. 2009	Conducted		Outcomes of the trainings are very good while further understanding of the importance of ambient environmental monitoring is required.
	1-4 Development of a technical guideline for developing environmental monitoring plans.	From Jul. 2009 to Aug. 2009	In progress		Outcomes of the trainings are very good and one of the C/P leaded the other trainees to formulate guidelines.
	1-5 Selection of pilot areas.	From May 2009 to Jan. 2010	Conducted	Farooq Alam	Outcomes of the trainings are very good and one of the C/P leaded the other trainees to formulate guidelines.
	1-6 Collection of relevant information required for the development of the monitoring plan such as meteorological data and those on pollution sources in the pilot areas.	From Jun. 2009 to May. 2010	In progress		Some information is submitted. Further confirmation of existence and availability of relevant information is required while further effort and recognition on this matter are required.
	1-7 Development of environmental monitoring plans in pilot areas.	From Aug. 2009 to Apr. 2010	In progress		Although, submission of the plans were delayed, formulation of the plan itself is satisfactory.
	1-8 Implementations of environmental monitoring plans in pilot areas.	From Jan. 2009 to Dec. 2011	In progress		Although, submission of the plans were delayed, conduction of environmental monitoring is satisfactory while further instruction of experts necessary.
	1-9 Revision of environmental monitoring plans and technical	From Jul. 2010 to Jun. 2011	Not started yet		This activity will be conducted during 2 <sup>nd</sup> year to 3 <sup>rd</sup> year.

	guideline based on the actually obtained monitoring data.				
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#### 4.2 Output-2 (Water)

	Activity	Status		C/P	Finding
		Planned Time Frame	Present		
Output-2	2-1 Capacity assessment of EPAs	From Feb. 2009 to Oct. 2011	In progress	Usman Firdaus	Punjab-EPA has some experiences of water monitoring. On the other hand, their understanding of theory and their experiences had not been fully integrated and therefore, C/Ps still do not reached comprehensive understanding. Further improvement is still required.
	2-2 Selection of appropriate methodologies for sampling, measurements and physical, chemical and bacteriological analysis of each parameter.	From Apr. 2009 to Jul. 2010	In progress	Usman Firdaus	The Uniformed method and some supplementary method were selected based on the existing analytical method of Pak-EPA and provincial EPAs. Appropriate methods were selected based on EPA-Method or JIS method basically.
	2-3 Training on sampling, measurements and analysis of effluents and flue gas in point and non-point emission sources.	From Jun. 2009 to Dec. 2011	In progress	Firdaus	The levels of analytical skills are relatively higher.
	2-4 Training on sampling, measurements and analysis of natural water and ambient air.	From Jun. 2009 to Dec. 2011	In progress	Firdaus	The C/Ps have some experiences of sampling activity of environmental water. However they did not equipped a uniformed check list or field notebooks. The uniformed check list and field notebook were prepared in training activity.
	2-5 Development/Modification of the standard operation procedures (SOP) for each parameter.	From Jun. 2009 to Sep. 2011	In progress	Usman Firdaus	Preparation of SOP was allotted to C/Ps. Although, preparation of SOP was delayed, completion of Draft SOP ver.1 was made on Jan. of 2010.
	2-6 Introduction of quality control methods for sampling, measurements and	From Jun. 2009 to Dec. 2011	In progress	Firdaus	C/P had been understood QC as knowledge about DL or QL, but the understanding of above is not integrated as to conduct satisfactory actual activities like a precision test or report in

	analysis.				laboratory. Progress in preparation of list of equipment/ reagents, preparation of analytical records were observed recently.
	2-7 Preparation and utilization of maintenance plans and manuals of the equipment and setting up of laboratory management system.	From Jul. 2009 to Feb. 2010	In progress	Usman Firdaus	Preparation of maintenance manual has been allotted to all EPAs. Some equipment had not been utilized by C/P. Therefore, preparation of maintenance manual is not complete yet. On the other hand, record sheet for use of main analyzer was prepared on the Joint Training.
	2-8 Revision of maintenance plans and manuals of the equipment, and laboratory management systems.	From Feb. 2010 to Jun. 2011	In progress	Usman Firdaus	This activity will be conducted during 2 <sup>nd</sup> year.
	2-9 Repair works for stable operation of equipment	From Jul. 2009 to Feb. 2010	Completed		A necessary repair works was completed in 1st year.
	2-10 Improvement of communication system	--	--		This activity will be conducted during 2 <sup>nd</sup> year.

#### 4.3 Output-2 (Air)

	Activity	Status		C/P	Finding
		Planned Time Frame	Present		
Output-2	2-1 Capacity assessment of EPAs	From Feb. 2009 to Oct. 2011	In progress	Muhamad Babar Rizwan Ajima	Capacity assessment was conducted for confirming of the experience of analysis. The capacity of the C/P is good due to the support of provincial EPA and one of the leading staff.
	2-2 Selection of appropriate methodologies for sampling, measurements and physical, chemical and bacteriological analysis of each parameter.	From Apr. 2009 to Jul. 2010	In progress	Muhamad Babar Rizwan Ajima	Roles for selecting of the appropriate methods had been fixed while the completion and submission are expected in 2 <sup>nd</sup> year.
	2-3 Training on sampling, measurements and analysis of effluents and flue gas in	From Jun. 2009 to Dec. 2011	In progress	Muhamad Babar Rizwan	The outcomes of this activity are very good while further improvements are required with high expectation.

	point and non-point emission sources.			Ajima	
2-4	Training on sampling, measurements and analysis of natural water and ambient air.	From Jun. 2009 to Dec. 2011	In progress	Muham mad Babar Rizwan Ajima	The outcomes of this activity are very good while further improvements are required with high expectation. The enthusiasms for learning is very high while submission and reply of expert's requites tend to be delayed.
2-5	Development/Modification of the standard operation procedures (SOP) for each parameter.	From Jun. 2009 to Sep. 2011	In progress	Muham mad Babar Rizwan Ajima	One of assigned SOP was submitted. Despite continuous request for submission by the Expert, other 2 have not been submitted.
2-6	Introduction of quality control methods for sampling, measurements and analysis.	From Jun. 2010 to Dec. 2011	Not started yet	Muham mad Babar Rizwan Ajima	This activity will be conducted from 2 <sup>nd</sup> year to 3 <sup>rd</sup> year.
2-7	Preparation and utilization of maintenance plans and manuals of the equipment and setting up of laboratory management system.	From Jul. 2009 to Feb. 2010	In progress	Muham mad Babar Rizwan Ajima	Part of the activity was conducted as a part of the activity of 2-4 and the rest will be conducted from 2 <sup>nd</sup> year to 3 <sup>rd</sup> year.
2-8	Revision of maintenance plans and manuals of the equipment, and laboratory management systems.	From Feb. 2010 to Jun. 2011	In progress	Muham mad Babar Rizwan Ajima	Part of conduction of revising the planning was observed in this stage while this activity planed to be conducted in 2 <sup>nd</sup> year.
2-9	Repair works for stable operation of equipment	From Jul. 2009 to Feb. 2010	Conducted		This activity had been conducted successfully in 1 <sup>st</sup> year.
2-10	Improvement of communication system	From Jul. 2009 to Mar. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year.

#### 4.4 Output-3

	Activity	Status		C/P	Finding
		Planned Time Frame	Present		
3	3-1 Capacity	From Jan. 2009	In progress	Mr. Amir	The presence of rules for

	assessment of the EPAs.	to Jun. 2011		Farooq Mr. Farooq Alam Mr. Usman	laboratory management is to be confirmed and can be used as baseline data for capacity assessment. In fact, rules might exist in the laboratory but not documented in most cases.
	3-2 Training on laboratory management based on the ISO17025.	Jan. 2009	Conducted	Mr. Amir Farooq Mr. Farooq Alam Mr. Usman	It was understood that the documentation of the above-mentioned rules would be one of the basic elements for laboratory management system based on international standard.
	3-3 Preparation of a laboratory management manual, establishment of QA/QC organization and development of QA/QC activity plan in each EPA.	From Jan. 2009 to Sep. 2011	In progress	Mr. Amir Farooq Mr. Farooq Alam Mr. Usman	Out of 14 different rules or procedures for laboratory management, half the number should be documented by CP by June this year as part of manual preparation. Due to the vacancies in key posts of the organization, QA/QC system is insufficient for proper management of laboratory. The activity plan of QA/QC is scheduled to begin in the second fiscal year.
	3-4 The QA/QC system is run based on the activity 3-3.	From Aug. 2010 to Dec. 2011	Not started yet		It is scheduled to begin in the second fiscal year.

#### 4.5 Output-4

	Activity	Status		C/P	Finding
		Planned Time Frame	Present		
Output-4	4-1 Capacity assessment of EPAs.	From Nov. 2009 to Nov. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year.
	4-2 Training on data processing and interpreting methods.	From Nov. 2009 to Nov. 2011	In progress	Muham mad Babar Rizwan Ajima	This activity will be conducted during 2 <sup>nd</sup> year.
	4-3 Training on interpretation and evaluation of the monitoring data obtained in the pilot areas by the internationally recognized	From Oct. 2009 to Jun. 2011	Not started yet		This activity will be conducted during 2 <sup>nd</sup> year.

	standards/ NEQS.				
	4-4 Preparation of (an) environmental management plan(s) for pilot area(s).	From Jan. 2010 to Sep. 2011	Not started yet		This activity will be conducted during 3 <sup>rd</sup> year.

#### 4.6 Output-5

	Activity	Status		C/P	Finding
		Planned Time Frame	Present		
Output-5	5-1 Capacity assessment of EPAs.	From Jan. 2010 to Dec. 2011	In progress		Capacity assessment had been conducted to confirm their experiences of spread sheet processing, database processing and program writings. No experience of database and program writing.
	5-2 Training on data processing with accumulated monitoring data.	From Nov. 2009 to Jul. 2010	In progress		C/P showed good motivation to learn. Good progress is expected,
	5-3 Establishment of a nationwide environment data management system.	From Jan. 2010 to Oct. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year to 3 <sup>rd</sup> year.
	5-4 Data input by each EPA based on the activity 5-3.	From Jul. 2010 to Dec. 2011	Not started yet		This activity will be conducted during 2 <sup>nd</sup> year.
	5-5 Upload of the ambient air and water quality monitoring data on EPA's websites.	From Jan. 2010 to Jun. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year to 3 <sup>rd</sup> year.
	5-6 Publishing of national and provincial environmental monitoring reports as s part of preparing state environment report.	From Jun. 2010 to Nov. 2011	Not started yet		This activity will be conducted during 3 <sup>rd</sup> year.



5. Sindh-EPA

5.1 Output-1

	Activity	Status		C/P	Finding
		Planned Time Frame	Present		
Output-1	1-1 Capacity assessment of EPAs.	From Apr. 2009 to Sep. 2011	In progress		Capacity assessment had been conducted to confirm their experiences of formulating of monitoring plans. Little to few experiences of formulating of environmental monitoring plan as the time of baseline survey.
	1-2 Organization setup for environmental monitoring.	From Apr. 2009 to Jun. 2010	In progress		Due to the delay of salary of EMS staff, EMS staffs seemed feel insecurity of their position and two of them left EPA. Improvement of this was observed recently. Clarification of responsibility and roles for formulation, acceptance and authorization for formulating/operating of environmental monitoring is required.
	1-3 Training of a developing process of an environmental monitoring plan.	Jul. 2009	Conducted		Clarification of responsibility and roles for formulation, acceptance and authorization are required. Also, self motivated actions and determination on the formulation of their own monitoring plan shall be taken.
	1-4 Development of a technical guideline for developing environmental monitoring plans.	From Jul. 2009 to Aug. 2009	In progress		Clarification of responsibility and roles for formulation, acceptance and authorization are required.
	1-5 Selection of pilot areas.	From May 2009 to Jan. 2010	Conducted		Clarification of responsibility and roles for formulation, acceptance and authorization are required. Also, self motivated actions and determination on the formulation of their own monitoring plan shall be taken. On the other hand, due to heavy mandate corresponding to courts orders, activities on this disturbed often.
	1-6 Collection of relevant information required for the development of the monitoring plan such as meteorological data and those on	From Jun. 2009 to May. 2010	In progress		Little to no information is submitted. Further confirmation of existence and availability of relevant information is required while further effort and recognition of the importance are required.

	pollution sources in the pilot areas.				
	1-7 Development of environmental monitoring plans in pilot areas.	From Aug. 2009 to Apr. 2010	In progress		Clarification of responsibility and roles for formulation, acceptance and authorization are required. Also, self motivated actions and determination on the formulation of their own monitoring plan shall be taken. On the other hand, due to heavy mandate corresponding to courts orders, activities on this disturbed often.
	1-8 Implementations of environmental monitoring plans in pilot areas.	From Jan. 2009 to Dec. 2011	In progress		It's seems the allocation of the fund had not been properly conducted. It shall be allocated by Pak-EPA. It's not confirmed if Pak-EPA could prepare the enough operating budget.
	1-9 Revision of environmental monitoring plans and technical guideline based on the actually obtained monitoring data.	From Jul. 2010 to Jun. 2011	Not started yet		This activity will be conducted during 2 <sup>nd</sup> year to 3 <sup>rd</sup> year.

## 5.2 Output-2 (Water)

	Activity	Status		C/P	Finding
		Planned Time Frame	Present		
Output-2	2-1 Capacity assessment of EPAs	From Feb. 2009 to Oct. 2011	In progress	Mureed Shahid	Capacity assessment was conducted to two C/P to confirm the experience of analysis. Few activities of analysis of the C/P were conducted, therefore C/P are required to continue the training on this field.
	2-2 Selection of appropriate methodologies for sampling, measurements and physical, chemical and bacteriological analysis of each parameter.	From Apr. 2009 to Jul. 2010	In progress	Mureed Shahid	The Uniformed method and some supplementary method were selected based on the existing analytical method of Pak-EPA and provincial EPAs. The method was selected based on EPA-Method or JIS method basically.
	2-3 Training on sampling, measurements and analysis of effluents and flue gas in point and non-point	From Jun. 2009 to Dec. 2011	In progress	Mureed Shahid	The C/Ps have some experiences for sampling activity of wastewater. However they don't equipped uniformed check list or field notebooks. The uniformed check list and field notebook were

	emission sources.				prepared in training activity.
2-4	Training on sampling, measurements and analysis of natural water and ambient air.	From Jun. 2009 to Dec. 2011	In progress	Mureed Shahid	The C/Ps have little experience on sampling activity of environmental water. They don't equipped uniformed check list or field notebooks. The uniformed check list and field notebook were prepared in training activity. The result of the accuracy test on TSS analysis was not satisfactory level during given training. Training of some analyzer was began covering initial operation of analytical equipments
2-5	Development/Modification of the standard operation procedures (SOP) for each parameter.	From Jun. 2009 to Sep. 2011	In progress	Mureed Shahid	Preparation of SOP was allotted and Sindh-EPA takes the roles for preparing SOP of effluent water. Although, preparation of SOP was delayed, draft SOP ver.1 was completed on Jan. of 2010.
2-6	Introduction of quality control methods for sampling, measurements and analysis.	From Jun. 2009 to Dec. 2011	In progress	Mureed Shahid	DL or QL was explained in training. C/P didn't have experiences of estimation of DL and QL before the training. Presently, progress in preparation of list of equipment/ reagents, preparation of analytical record.
2-7	Preparation and utilization of maintenance plans and manuals of the equipment and setting up of laboratory management system.	From Jul. 2009 to Feb. 2010	In progress	Mureed Shahid	Preparation of maintenance manual has been allotted. Several equipments have never been utilized, therefore, preparation of maintenance manual is not complete yet. On the other hand, record sheet for use of main analyzer was prepared on the Joint Training.
2-8	Revision of maintenance plans and manuals of the equipment, and laboratory management systems.	From Feb. 2010 to Jun. 2011	In progress	Mureed Shahid	This activity will be conducted from 2 <sup>nd</sup> year to 3 <sup>rd</sup> year.
2-9	Repair works for stable operation of equipment	From Jul. 2009 to Feb. 2010	Completed		This activity was conducted in 1st year.
2-10	Improvement of communication system				This activity will be conducted during 2 <sup>nd</sup> year.

5.3 Output-2 (Air)

	Activity	Status		C/P	Finding
		Planned Time Frame	Present		
Output-2	2-1 Capacity assessment of EPAs	From Feb. 2009 to Oct. 2011	In progress	Jahang eer Mudassar Muhammad	Capacity assessment had been conducted to confirm their experiences of sampling and analysis. Not enough experience had been recorded due to the unavailability of Air monitoring station. Laboratory was not maintained properly and disorganized due to leakage of water, intrusion of sand/dust and lack of cleaning. Currently improve of this observed due to the renovation of laboratory.
	2-2 Selection of appropriate methodologies for sampling, measurements and physical, chemical and bacteriological analysis of each parameter.	From Apr. 2009 to Jul. 2010	In progress	Jahang eer Mudassar Muhammad	The Uniformed method was selected and reached on agreement among C/Ps in August, 2009.
	2-3 Training on sampling, measurements and analysis of effluents and flue gas in point and non-point emission sources.	From Jun. 2009 to Dec. 2011	In progress	Jahang eer Mudassar Muhammad	Although they keep high motivation for learning, due to the delay of salary, they used to feel insecurity on their position. Some improvement was observed recently.
	2-4 Training on sampling, measurements and analysis of natural water and ambient air.	From Jun. 2009 to Dec. 2011	In progress	Jahang eer Mudassar Muhammad	Although they keep high motivation for learning, due to the delay of salary, they used to feel insecurity on their position. Some improvement was observed recently.
	2-5 Development/Modification of the standard operation procedures (SOP) for each parameter.	From Jun. 2009 to Sep. 2011	In progress	Jahang eer Mudassar Muhammad	Due to heavy mandate corresponding to courts orders, activities on this field disturbed often. PC shall be provided to C/P for smooth operation of this activity.
	2-6 Introduction of quality control methods for sampling, measurements and analysis.	From Jun. 2010 to Dec. 2011	Not started yet	Jahang eer Mudassar Muhammad	This activity will be conducted during 2 <sup>nd</sup> year.

	2-7 Preparation and utilization of maintenance plans and manuals of the equipment and setting up of laboratory management system.	From Jul. 2009 to Feb. 2010	In progress	Jahang eer Mudassar Muhammad	The maintenance works must be managed by regulated maintenance plan.
	2-8 Revision of maintenance plans and manuals of the equipment, and laboratory management systems.	From Feb. 2010 to Jun. 2011	In progress	Jahang eer Mudassar Muhammad	Budget shall be secured, especially for post PC-1 period.
	2-9 Repair works for stable operation of equipment	From Jul. 2009 to Feb. 2010	Conducted		This activity will be conducted during 2 <sup>nd</sup> year.
	2-10 Improvement of communication system	From Jul. 2009 to Mar. 2011	In progress		Budget shall be secured.

#### 5.4 Output-3

	Activity	Status		C/P	Finding
		Planned Time Frame	Present		
Output-3	3-1 Capacity assessment of the EPAs.	From Jan. 2009 to Jun. 2011	In progress	Yayha Ashique Jahang eer	The presence of rules for laboratory management is to be confirmed and can be used as baseline data for capacity assessment. In fact, rules might exist in the laboratory but not documented in most cases. Sindh-EPA renovated part of the laboratory for preventing
	3-2 Training on laboratory management based on the ISO17025.	Feb.2010	Conducted	Yayha Ashique Jahang eer	It was understood that the documentation of the above-mentioned rules would be one of the basic elements for laboratory management system based on international standard.
	3-3 Preparation of a laboratory management manual, establishment of QA/QC organization and development of	From Jan. 2009 to Sep. 2011	In progress	Yayha Ashique Jahang eer	Out of 14 different rules or procedures for laboratory management, half the number should be documented by C/P by June this year as part of manual preparation. Due to the vacancies in key posts of the organization, QA/QC

	QA/QC activity plan in each EPA.				system is insufficient for proper management of laboratory. The activity plan of QA/QC is scheduled to begin in the second fiscal year.
	3-4 The QA/QC system is run based on the activity 3-3.	From Aug. 2010 to Dec. 2011	Not started yet		It is scheduled to begin in the second fiscal year.

#### 5.5 Output-4

	Activity	Status		C/P	Finding
		Planned Time Frame	Present		
Output-4	4-1 Capacity assessment of EPAs.	From Nov. 2009 to Nov. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year.
	4-2 Training on data processing and interpreting methods.	From Nov. 2009 to Nov. 2011	In progress	Jahangeer Mudassar Muhammad	This activity will be conducted during 2 <sup>nd</sup> year.
	4-3 Training on interpretation and evaluation of the monitoring data obtained in the pilot areas by the internationally recognized standards/ NEQS.	From Oct. 2009 to Jun. 2011	Not started yet		This activity will be conducted during 2 <sup>nd</sup> year.
	4-4 Preparation of (an) environmental management plan(s) for pilot area(s).	From Jan. 2010 to Sep. 2011	Not started yet		This activity will be conducted during 3 <sup>rd</sup> year.

#### 5.6 Output-5

	Activity	Status		C/P	Finding
		Planned Time Frame	Present		
Output-5	5-1 Capacity assessment of EPAs.	From Jan. 2010 to Dec. 2011	In progress		Capacity assessment had been conducted to confirm their experiences of spread sheet processing, database processing and program writings. Due to the availability accessibility of PC, C/P' ability varies. No experience of database and

				program writing.
5-2 Training on data processing with accumulated monitoring data.	From Nov. 2009 to Jul. 2010	In progress		C/P showed good motivation to learn. Good progress is expected.
5-3 Establishment of a nationwide environment data management system.	From Jan. 2010 to Oct. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year to 3 <sup>rd</sup> year.
5-4 Data input by each EPA based on the activity 5-3.	From Jul. 2010 to Dec. 2011	Not started yet		This activity will be conducted during 2 <sup>nd</sup> year.
5-5 Upload of the ambient air and water quality monitoring data on EPA's websites.	From Jan. 2010 to Jun. 2011	In progress		This activity will be conducted during 2 <sup>nd</sup> year to 3 <sup>rd</sup> year.
5-6 Publishing of national and provincial environmental monitoring reports as s part of preparing state environment report.	From Jun. 2010 to Nov. 2011	Not started yet		This activity will be conducted during 3 <sup>rd</sup> year.

## 2. 調査日程

### パキスタン国環境モニタリング支援プロジェクト 中間レビュー 調査日程

	全体工程	EPA	重本団員	宇多団員	鈴木団長
6月16日	水				
6月17日	木				
6月18日	金	評価ミッション(コンサルタント団員) 日本出発	(成田→イスラマバード) 11:00成田 15:30/バンコク TG641 19:00/バンコク 22:10イスラマバード TG349		
6月19日	土	中間評価方法説明 NWFP-, Baloへの聞き取り調査	(AM)評価方法、スケジュールについて関係者(Pak, NWFP, Balo-EPA)へ説明 (PM)NWFP-, Balo聞き取り調査		
6月20日	日	休	休		
6月21日	月	関連機関訪問 Pak-EPA聞き取り調査	(AM)Pak-EPA聞き取り調査 (PM)環境省聞き取り調査、P&D訪問		
6月22日	火	Pak-EPA聞き取り調査 移動: イスラマバード→カラチ	(AM)Pak-EPA聞き取り調査 (PM)Clean訪問 (イスラマバード→カラチ) 22:00イスラマバード 23:55カラチ PK319		
6月23日	水	評価手法の説明 Sindh-EPA聞き取り調査	(AM)評価方法説明(含むSecretary) (PM)Sindh-EPA聞き取り調査		
6月24日	木	Sindh-EPA聞き取り調査 移動: カラチ→ラホール	(AM)Sindh-EPA聞き取り調査 (PM)Sindh-EPA聞き取り調査 (カラチ→ラホール) 19:00カラチ 20:45ラホール PK306	(成田→ラホール) 11:00成田 15:30/バンコク TG641 19:50/バンコク 22:30ラホール TG345	
6月25日	金	評価手法の説明 Punjab-EPA聞き取り調査	(AM)評価方法説明 (PM)Punjab-EPA聞き取り調査		
6月26日	土	Punjab-EPA聞き取り調査 <b>Punjab-EPAからの評価報告</b>	(AM)Punjab-EPA聞き取り調査 (PM)Punjab-EPAからの評価報告		
6月27日	日	(鈴木課長)日本出発 (宇多+ミッション)カラチ移動	(ラホール→カラチ) 18:00ラホール 19:45カラチ PK305	(成田→カラチ) 10:00成田 14:30/バンコク TG643 15:35/バンコク 18:35カラチ TG507	
6月28日	月	Sindh-EPA聞き取り調査 <b>Sindh-EPAからの評価報告</b>	(AM)Sindh-EPA 協議(中間レビュー内容、機材修理、予算、今後の対応) (PM)Sindh-EPA 協議 (カラチ→イスラマバード) 19:00カラチ 20:55イスラマバード PK370		
6月29日	火	環境省打合せ Pak-EPA聞き取り調査	(AM)JICA/パキスタン事務所と打合せ、環境省打合せ(予算措置、機材修理) (PM)Pak-EPAと協議(それぞれの州EPAの進捗状況の確認、Joint Evaluation Report 内容、機材修理他)		
6月30日	水	合同評価報告書(案)作成 Pak-EPAと協議	(AM)中間レビュー調査団 団内打合せ ・Joint Evaluation Report(案)作成 ・M/M(案)作成 (PM)Pak-EPAと協議(それぞれの州EPAの進捗状況の確認、Joint Evaluation Report 内容、機材修理他)		
7月1日	木	最終調整	(AM)JICA/パキスタン事務所と打合せ Pak-EPA、NWFP、Baloと協議 (PM)Joint Evaluation Report、M/Mの最終調整		
7月2日	金	<b>合同評価委員会(JCC)開催</b> <b>M/M署名</b> 日本帰国(イスラマバード→成田)	(AM) <b>合同調整委員会(JCC)</b> (PM)M/M署名、在パキスタン日本国大使館報告 (イスラマバード→バンコク) 23:20イスラマバード 6:25/バンコク TG350		
7月3日	土	日本到着	(バンコク→成田) 7:35/バンコク 15:45成田 TG676		
7月4日	日				





