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SDG 12 MONITORING AND REPORTING IN PAKISTAN

An Analysis of National Action Plan on SCP and Recommendations for SDG 12 Monitoring and Reporting

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Acknowledgement

The study “SDG 12 Monitoring and Reporting in Pakistan” is a baseline document on Pakistan’s progress on sustainable consumption and production activities since enactment of National Action Plan on SCP in 2016. It is an account of progress made by provinces on SCP activities, and development on national indicators and its further transformation into inferential data which if monitored and reported regularly can help Pakistan achieve SDG 12 targets and sub-targets by year 2030. The study is part of European Union funded SWITCH-Asia Regional Policy Advocacy Component implemented by the United Nations Environment Programme (UNEP) completed in collaboration with the Ministry of Climate Change (MOCC), Government of Pakistan and Pakistan Institute of Development Economics (PIDE). The study was carried out under the guidance of Irfan Tariq, Director General, Ministry of Climate Change and Mushtaq Memon, Regional Coordinator Resource Efficiency, Regional Office of Asia Pacific, UNEP and Project Manager, SWITCH-Asia RPAC. The PIDE research team Ghulam Samad and Waseem Gulzar have carried out the research study based on information from relevant federal ministries, provincial local governments, and federal and provincial consultations. We would like to thank the advisory team of SWITCH Asia - RPAC, Archana Datta and Tunnie Srisakulchairak whose invaluable inputs at every step made it possible for us to conduct the study with insights into global and national perspectives. We would like to acknowledge with gratitude focal advisory team on SDG: Saima Shafique and Sydeda Hadika Jamshaid at MOCC for creative comments, guidance, constructive reviews and provision of valuable information and data with extended support of assisting, conducting, and partaking in provincial and federal consultations by accompanying us with latitude and cooperation throughout the duration of the study. Their contribution on ‘Proposed Framework’ and ‘Policy Review’ sections in apropos is thoughtful. We are also thankful to provincial departments and ministries for their inputs and participation in the regional consultations.

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Foreword

As a strong supporter of the seventeen Sustainable Development Goals (SDGs) approved in 2015 by the United Nations General Assembly, the EU has shown its commitment in this endeavour through several steps. Firstly, it has ensured that all international and internal support is aligned to each of the seventeen goals through the SDG Policy Mapping tool, highlighting how EU policies address the SDGs.

Secondly, regarding individual SDGs, the EU has taken specific actions. In the case of SDG 12, Sustainable Consumption and Production (SCP), the EU was already realizing the need for action long before the UN approved this goal. For example, in 2007 the EU established the "SWITCH-Asia" programme to specifically promote Sustainable Consumption and Production across 24 Asian countries.

Thirdly, in December 2015 the European Commission started a "Circular Economy Strategy" and in March 2020 adopted the second Circular Economy Action Plan (CEAP). As such, this approach constitutes one of the main building blocks of the European Green Deal, Europe's new agenda for sustainable growth. It is envisaged that transition will reduce pressure on natural resources and will create sustainable growth and jobs. In addition, it is considered a prerequisite to achieve the EU's 2050 climate neutrality target and to halt biodiversity loss. These actions cover the whole cycle of materials and products – from production and consumption to waste management and the market for secondary raw materials. They cover several SDGs, including SDG 6 on energy, SDG 8 on economic growth, SDG 11 on sustainable cities, SDG 12 on sustainable consumption and production, SDG 13 on climate change, SDG 14 on oceans, and SDG 15 with regard to life on land.

Finally, the EU is working closely together with our international partners with respect to providing support where requested and needed. In Pakistan, in particular, the SWITCH-Asia facility supported the Ministry of Climate Change in preparing the detailed Action Plans for SDG 12 published in 2017 for both the federal level and provinces, the latter being considered crucial implementers. More recently, this facility has supported the preparation of a roadmap for a green building code and a strategy for plastics and waste management.

It is noted that some of Pakistan's efforts in addressing SDG 13, Climate Change, are also positively affecting SDG 12, SCP, and include:

- Its "Intended Nationally Determined Contribution (INDC)" to reduce its greenhouse gas emissions by 20 percent below projected 2030 emissions;
- The goal to increase the share of renewable energy in total energy production to 70% by 2030, (including hydro power);
- The Billion Tree Tsunami programme launched in 2014 by the Government of Khyber Pakhtunkhwa restoring 350,000 hectares of forests and degraded land;
- The Clean Green Pakistan Movement with the Clean Green Pakistan Index launched in October 2018 by the Prime Minister, which addresses five components: plantation, solid waste management, liquid waste management/hygiene, total sanitation, and safe drinking water. This movement has a specific focus on empowering citizens to seek access to basic services but also making themselves equally accountable and responsible for Clean Green Pakistan.

Taken together, these actions highlight Pakistan's efforts to change behaviour and strengthen institutions.

The EU and the EU Delegation in Pakistan gratefully acknowledge these efforts and those of the contributors to this report of recommendations for implementing Pakistan's action plan on SCP.

It is envisaged that these recommendations will further contribute to the full and successful implementation of Pakistan's National action plan with regards to SCP and the particular elements they address.

The EU Delegation in Pakistan

Preface

The document is produced as a response to the Sustainable Consumption and Production-National Action Plan SCP-NAP that states *"monitoring and evaluation is essential for continuous validation of the action plan"* (p.62). Proper reporting is important in order to follow up on strong commitments and policies contributing to SCP as well as to encourage cooperation on SCP and to highlight the progress achieved in order to accelerate the implementation; share the challenges and lessons learned with others, and get international recognition.

NAP-SCP acted as the guiding beacon for promoting the efficient use of resources, minimizing the unsustainable patterns of production, assuring food security and modern infrastructure that resulted in socio-economic development, better regional connectivity, and a healthy ecosystem of Pakistan. The report presents an operational monitoring and reporting system devised for strengthening the SCP national policy framework and evaluation of the country's progress in achieving the targets of SDG 12.

The objective of this exercise is to outline, for the benefit of public actors, the barriers to pursuing SCP reporting, and basic tools to overcome these barriers. The core indicators developed in this report matured after extensive analysis of current governance structure and institutional strengths, complemented by input and deliberations of all stakeholders. The report recognizes the role of the Ministry of Climate Change (MoCC) to enhance coordination among various actors for regular and quality reporting in SDG 12 progress.

I trust that this report will serve as an important reference for policymakers, the private sector, and other stakeholders working to promote sustainable production and production while assisting Pakistan to achieve its ambitious SDG targets and Vision 2025.

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Abbreviations

ABBA – Agriculture in the Balochistan Border Areas
ADB – Asian Development Bank
ADP – Annual Development Plan
AEC – Atomic Energy Commission
AEDB – Alternative Energy Development Board
AJK – Azad Jammu & Kashmir
APO – Asian Productivity Organization
ARE – Alternative and Renewable Energy
ASPS – Agriculture Sector Policy and Strategy
AusAID – Australian Agency for International Development
BAP – Balochistan Agriculture Project
BTTAP – Billion Trees Tsunami Afforestation Programme
CAPP – Connected Agriculture Punjab Package
CAREC – Central Asia Regional Economic Cooperation Program
CDM – Clean Development Mechanism
CGPI – Clean Green Pakistan Index
CGPM – Clean and Green Pakistan Movement
CPEC – China Pakistan Economic Corridor
CRS – Crop Reporting Services
CSA – Climate Smart Agriculture
CDA – Capital Development Authority
DFAT – AusAid-Department of Foreign Affairs and Trade
EAD – Economic Affair Division
EIA – Environmental Impact Assessment
EPA – Environmental Protection Agency
EPD – Environment Protection Department
ESRF – Eco-system Restoration Fund
ESRI – Eco-system Restoration Initiative
FAO – Food and Agriculture Organization
FBS – Federal Bureau of Statistics
FBR – Federal Bureau of Revenue
GB – Gilgit - Baltistan
GDA – Gwadar Development Authority
GDP – Gross domestic product
GHG – Greenhouse gas
GIF – Global Indicators Framework
GIS – Geographic Information System
GOP – Government of Pakistan
GSP – Generalized System of Preferences
HEC – Higher Education Commission
IEE – Initial Environmental Examinations
IFPRI – International Food Policy Research Institute
IDR – Indus Deltaic Region
INDC – Intended Nationally Determined Contribution
IPCC – Intergo Panel on Climate Change
IRS – Indus River System
IWM – Integrated Waste Management
IWRM – Integrated Water Resource Management
KPK – Khyber Pakhtunkhwa
LDN – Land Degradation Neutrality
LPG – Liquid Petroleum Gas
LPI – Logistics Performance Indicators
M&E – Monitoring and Evaluation
MAF – Million Acre-Feet
MICS – Multiple Indicator Cluster Survey
mha – Million hectares
MJ – Mega Joules
MOCC – Ministry of Climate Change
MOE – Ministry of Energy
MOF – Ministry of Finance
MoFEPT – Ministry of Federal Education and Professional Training
MOIP – Ministry of Industries and production
MOWR – Ministry of Water Resources
MOAFS – Ministry of Agriculture and Food Security
MOPD&SI – Minisry of Planning, Development and Special Initiatives

MOT&C – Ministry of Transport and Communication
MOPA – Minisitry of Poverty Alleviation
MPCB – Marine Pollution Control Board
MRV – Measurement, Reporting and Verification
MT – Million Tons
MTPY – Million Tons Per Year
MW – Mega Watt
NAP – National Action Plan
NARC – National Agriculture Research Council
NARS – National Agriculture Research Systems
NCCP – National Climate Change Policy
NCEC – National Committee on Establishment of Carbon Market
NCMPR – National Centre for Maritime Policy Research
NDMA – National Disaster Management Authority
NDMC – National Disaster Management Council
NDRMF – National Disaster Risk Management Fund
NEPRA – National Electric Power Regulatory Authority
NEVP – National Electric Vehicle Policy
NFLP – National Freight and Logistics Policy
NIO – National Institute of Oceanography Pakistan
NPO – National Productivity Organization
NTCB – National Tourism Corporation Board
P&D – Planning and Development
PAD – Punjab Agriculture Department
PAEC – Pakistan Atomic Energy Commission
PARB – Punjab Agricultural Research Board
PARC – Pakistan Agriculture Research Council
PBS – Pakistan Bureau of Statistics
PCRWR – Pakistan Council of Research in Water Resources
PDAs – Provincial Development Authorities.
PEPA – Pakistan Environmental Protection Act
PEPC – Pakistan Environmental Protection Council
PIDE – Pakistan Institute of Development Economics
PITAC – Pakistan Industrial Technical Assistance Centre
PMD – Pakistan Meteorological Department
PNRA – Pakistan Nuclear Regulatory Authority
PPAF – Pakistan Poverty Alleviation Fund
PPP&Q – Perceived Product Price and Quality
PBS – Provincial Bureau of Statistics
PSDP – Public Sector Development Program
PTDC – Pakistan Tourism Development Corporation
RCMs – Regional Climate Models
REDD+ – Reducing Emissions from Deforestation and Forest Degradation
RPAC – Regional Policy Advocacy Component
SAGP – Sindh Agriculture Growth Project
SAPIC – Sindh Agriculture Policy Implementation Commission
SCP – Sustainable Consumption and Production
SDG 12 – Sustainable Development Goal 12
SME – Small and Medium Enterprises
SPP – Sustainable Public Procurement
SROs – Statutory Regulatory Orders
STPF – Strategic Trade Policy Framework
SUPARCO – Pakistan Space and Upper Atmosphere Research Commission
TBTTAP – Ten Billion Trees Tsunami Afforestation Programme
UNDP – United Nations Development Programme
UNEP – United Nations Environment Programme
UNESCO – United Nations Educational, Scientific and Cultural Organization
UNFCCC – United Nations Framework Convention for Climate Change

USAID	–	United States Agency for International Development
VNR	–	Voluntary National Reviews
WAPDA	–	Water and Power Development Authority
WASA	–	Water and Sanitation Authority
WASH	–	Water, Sanitation and Hygiene
WFP	–	World Food Programme

Executive Summary

The study explains state of measures for Pakistan National Action Plan (NAP) on SDG 12 Sustainable Consumption and Production (SCP). The main objective of the study is to strengthen SCP national policy framework by establishing an operational baseline monitoring and reporting system for the SDG 12 initiatives in Pakistan. This study provides baseline for scenario development keeping in view key economic growth rate in parallel to SCP based activities in Pakistan. To develop the baseline, 11 different priority areas are analyzed to see if they cohered with national indicators in pertinence to SDG 12 targets. NAP considers these 11 priority areas, most significant with respect to setting up Pakistan's priorities on sustainable development agenda till 2030. To manifest the importance of 11 priority areas besides their social and economic importance, we have accessed national, provincial policies, the policy documentation and communication since inception of NAP till date, which were critically reviewed to see their actual relevance and contributions to ongoing progress on SGD12 agenda in Pakistan.

Beginning with the key task of stakeholders mapping at federal and provincial levels, we identified key responsible actors in ministries and provincial governments who could help us best in not only in finding status of monitoring and reporting progress but first help us figure out national indicators specific to SDG 12 relevant to national context of Pakistan. Therefore, formulation of indicators is the most important part of this study. After initial consultations (provincial and federal), we concluded national indicators which we considered could be a good fit for measuring progress in all 11 sectors. In apropos of this, national indicators were mutually decided, thoroughly researched, and analyzed and formulated based on their economic importance at first.

All the national economic indicators are considered and selected to form a future baseline for Pakistan, which could suffice SDG 12 agenda needs if properly monitored and reported on a regular basis. In each priority area, the section on 'Current Situation' describes what national economic indicators are currently in use or could be potentially used provided their regular monitoring and reporting, and their direct and indirect relevance to SDG 12 targets and sub-targets in each sector. We also reviewed the policy relevance for each sector and its potential implications if implemented properly and with future benefit.

Our findings indicate:

- In Khyber Pakhtunkhwa, the level of efforts are encouraging to collect baseline data for the specified SCP indicators at line departments and ministries. Similarly, Punjab requires little more efforts to develop coherence across the line departments and ministries to collect baseline data for the specific SCP indicators.

- In Baluchistan, line departments and ministries so far work separately and independently to collect baseline data. Sindh has a similar situation which requires uniformity among departments and ministries who independently assume data collection and repositing activities.

- There is no data repository (departmental or central) concept for meaningful use of all such data collected and reported for the purpose of SDG 12 monitoring and reporting. A major factor reasoned to this is that all provinces lack technological infrastructure and the means to create an appropriate data management system. Hence, a clear problem of data management and collation exists quintessential to form a central repository. We analyzed that this cannot be rationalized and materialized without international funding which is essentially a serving pier to make it possible.

- At federal level, MOCC performs the role of lead on SDG 12 agenda in Pakistan. MOCC assumes the responsibility to assign SDG 12 related tasks to its federal counterparts as well as the provincial government departments. As the custodian of SDG 12, MOCC therefore is responsible for carrying out major policy related initiatives on ensuring SCP patterns in Pakistan in government and economic sphere.

- At present, the provincial governments and their local government departments are clear on SDG 12 needs of Pakistan. We conducted an audit-based investigation into localization of responsibilities as designated and assigned in NAP 2016 and Provincial inputs on SCP. Our findings indicate key stakeholder for data sources for future monitoring and reporting at federal level (Annex 1), and at provincial level, the responsible actors with action plans delineating short to medium range objectives in apropos of SGD12 activities at federal level (Annex 2).

The development of national indicators is crucial in all 11 priority areas to enable country's transition to SCP patterns. The baseline framework will help GOP to make informed decision related to SCP at federal, provincial and at local levels.

Chapter 1: Introduction to the study

1.1 Introduction and Background

Sustainable consumption and production has been on the global agenda since the World Summit on Sustainable Development, Johannesburg in 2002, and now is one of the seventeen Sustainable Development Goals (SDGs). SDG 12 is on ensuring Sustainable Consumption and Production (SCP), and encourages reduction of wasteful consumption and efficiency in production patterns by encouraging governments, businesses and consumers.

Pakistan has given a high priority to SDG 12 and to mainstreaming sustainable consumption and production into other SDGs. The National Action Plan on Sustainable Consumption and Production (NAP-SCP) aims to accelerate the shift towards SCP in all sectors. SCP is recognized in the framework of "green" development which will be decoupling economic growth and social development from environmental degradation, thus strengthening the sustainability and resilience of a society. Approved in 2017, one of the important aspects included in the NAP-SCP is on monitoring and evaluation. The NAP-SCP states that "monitoring and evaluation is essential for continuous validation of the action plan" (p.62). Pakistan presented its first Voluntary National Review (VNR) at the 2019 High Level Political Forum on Sustainable Development (HLPF). However, the country decided not to include SDG 12 information into the VNR due to weak data reporting and monitoring system. Proper reporting is important in order to follow up on strong commitments and policies contributing to SCP as well as to encourage cooperation on SCP and to highlight the progress achieved in order to accelerate the implementation; share the challenges and lessons learned with others; and get international recognition.

SWITCH-Asia is a programme funded by the European Union to promote sustainable consumption and production to contribute to the economic prosperity and poverty reduction in Asia. The programme is implemented through three components: i) the SWITCH-Asia Regional Policy Advocacy Component (RPAC); ii) the Sustainable Consumption and Production (SCP) Facility, and iii) the Grant scheme. Every component is managed by a different organization. The RPAC is implemented by United Nations Environment Programme (UNEP) and the overall objective of this component is to strengthen the dialogue at regional, sub-regional and national policies on Sustainable Consumption and Production. To this end, RPAC has identified the need to facilitate dialogue across the region on SDG 12 reporting.

In this context, the national activity to support Pakistan on SDG 12 monitoring and reporting was initiated by SWITCH-Asia RPAC in 2020 after discussions with Ministry of Climate Change (MOCC). The role of MOCC is to spearhead all relevant projects at federal and provincial levels in executing sustainable development agenda on SDG 12 targets and sub-targets. To do this, MOCC core function is to formulate and mainstream SCP related policies as an outcome of NAP-SCP. To carry out this study, UNEP has entered in a small-scale funding agreement with Pakistan Institute of Development Economics (PIDE) to jointly provide technical support to the government.

Based on the feedback of key stakeholders, the project aims to build capacities and supporting the key actors with their roles and responsibilities for strengthening the NAP-SCP and in Pakistan.

To channelize SCP as per the framework of SDG goals, the need for a paradigm shift is mandatory. Engagement with different stakeholders and a policy framework are vital for the successful development, implementation, monitoring and evaluation of SCP actions. This will not only improve the production processes but will also enable the consumers to shift towards sustainable consumption patterns.

In the recent decades, the increase in development has led to paramount stress on the natural resource base all over the world and unfortunately, Pakistan is also among those countries which have been a victim of impacts of development. There has been an increased demand for water, food, energy and other resources which have resulted in environmental degradation, pollution, resource depletion and climate change. MOCC under the EU funded SWITCH-Asia programme developed a National Action Plan (NAP) in 2017, to accomplish SCP targets in a pragmatic and systematic fashion as delineated in SDG 12.

The NAP seeks to incorporate SCP into budgetary processes, sectoral policies and development planning leading to the execution of SCP actions both at provincial and national level. This NAP-SCP document acts as the guiding beacon for promoting efficient use of resources, minimizing unsustainable patterns of production, assuring food security and modern infrastructure that will result in socio-economic development, better regional connectivity and healthy ecosystem of Pakistan. A few priority sectors have been identified under the NAP for the implementation of SCP strategies. These sectors are Climate Change, Energy, Water, Sustainable Transport, Sustainable Food System, Sustainable Buildings and Cities, Marine Ecosystem, Land Ecosystem, Education, and Industry. A detailed situation analysis on these sectors has been described in Chapter 3.

This study is a comprehensive work plan that lays the roadmap through developing relevant indicators that can manifest a system for monitoring and reporting eventually creating an operational manual for meeting NAP-SCP related goals.

1.2 Objective

While incepting the basis for this study, the concurrent national level studies, policy studies and policy documents of MOCC were reviewed in order to identify the current state of national reporting on SDG 12 targets. Unfortunately, no such mechanism exists for SDG 12 reporting. Hence, the main objective of the study is to strengthen SCP national policy framework by establishing an operational monitoring and reporting system apropos of SDG 12 in Pakistan. The system includes key indicators in line with NAP-SCP, which help in international reporting on SDG 12. In light of this, our specific objective further identifies relevant key indicators cohered with NAP-SCP and GIF guidelines to monitor and report on Pakistan's progress on SCP. In sequence to this next step follows to propose a system to monitor the progress of each identified indicator to measure Pakistan's achievements on SDG 12.

1.3 Methodology

Activity 1 : Desk review and gap analysis on SCP in Pakistan

i - Analysis of online or published secondary material

As a first step, a rigorous analysis of available published research papers and data documented on sustainable consumption and production in Pakistan was done to establish clear objectives for this study. It helped to develop a methodical framework later to assess and determine extent of SCP principles in use in core areas of NAP-SCP. Further, analyses helped to identify the current situation on SDG 12 goal and identify gaps in the empirical literature. The account of consolidated review of literature, all relevant policies and studies is discussed below.

ii - Review of monitoring or evaluation studies and policy documents related to NAP-SCP from relevant ministries

To collect data, heads and lead experts of focal government bodies, and UN Environment Programme–SCP Coordinator within MOCC, alongside other contributors and supporting team members who played a pivotal role to schematically accomplish NAP-SCP framework were conferred before and during consultations. Policy studies and documents related to NAP-SCP prepared by policy makers in relevant ministries including any evaluation studies done on reporting and monitoring of SCP were used as reference material for this study. With that data- sources' exploration was completed. The data availability in all related potential indicators pertaining to SDG 12 was discreetly inquired by interviewing key informants and through mutual consultations with all listed stakeholders identified in this document. In addition, the review of institutional arrangement for activation of SCP action plan and data (gap) analyses was completed.

[1] MOCC: http://mocc.gov.pk/frmDetails.aspx, http://mocc.gov.pk/policiesDetails.aspx,
PSDP Projects: http://mocc.gov.pk/projDetails.aspx
UN :http://www.un.org.pk/pakistans-challenges-sustainable-development-goals-2015-2030/, https://www.dawn.com/news/1287096/doing-more-and-better-with-less
https://www.unescap.org/sites/default/files/Pakistan_SYB2017.pdf
Cities Urbanization In Pakistan - UN Habitat: https://unhabitat.org/state-of-pakistan-cities-report-2018
Annual report 2020, progress report on the implementation of the strategic plan 2014—2019 ...leverage the urban-rural divide for strengthened sustainable urbanization. 2019; https://unhabitat.org/annual-report-2019
https://unhabitat.org/knowledge/research-and-publications
HAzardous waste: https://www.unenvironment.org/news-and-stories/story/pakistan-pursues-transformative-chemicals-and-waste-management-project
UN Department of Economic and Social Affairs-Statistics Division: https://unstats.un.org/sdgs/unct-toolkit/

Activity 2: Stakeholder Mapping

Mapping of concerning stakeholders was done using SDG 12 indicators of the GIF as the starting point. This entails key people involved in assisting any developments pertaining to future SCP needs of Pakistan, and involved with related assistance and support of multilateral development organizations. A broad stakeholders' mapping gave an account of all those who incepted the formulation of NAP-SCP in 2016. Focal persons and key participants were enlisted exclusively from MOCC, Provincial Environment departments, Ministry of National Food Security and Research, Ministry of Agriculture (Provinces), Ministry of Planning, Development and Special Initiatives, Securities and Exchange Commission of Pakistan, Public procurement regulatory authority, Higher Education Commission and Ministry Elementary and Secondary Education (Provinces), Ministry of Science and Technologies, Ministry of Culture and Tourism (Provinces), Ministry of Finance (Federal and Provinces), Ministry of Energy, Ministry of Water, Ministry of Production, and Ministry of Commerce.

Moreover, focal persons of JICA, federal and provincial Environment Protection Departments, South Asia Cooperative Environment Programme (SACEP), NDMA; UN Resident Coordinator; European Union; Country Representatives UN Habitat, UNICEF, UNIDO; Development Advisor EU SWITCH-Asia Programme funded the European Union on SCP; and Programme Officers of UN Environment Programme who served as discussants on technical issues of NAP-SCP in roundtable sessions, were engaged.

Activity 3: Identification of SCP Indicators

Process of identifying and formulating potential SCP indicators are based on consultative process, in coherence with NAP-SCP and GIF guidelines.

For identification of targets that contribute in making a shift to SCP patterns, the steps taken were;

- A comprehensive study of government interventions for resource use efficiency in prioritized areas at provincial and national level.
- Review the NAP-SCP, the GIF and other available data/documents on targets, sub-targets, and their corresponding relevant indicators that can be contextualized for Pakistan.

- Browsing through green patents, implementation policies of federal and provincial Public Sector Development Programs (PSDP) that could manifest step-wise data for targets like reduction in GHG emissions; sustainable energy imports, initiatives and innovations; green agriculture imports, processes and sustainable production; cities' masterplans and their integration with resource management of water, energy, etc. Similarly, a comprehensive list of inclusive indicators was developed to monitor and report on the current situation of these listed targets.

- By using snowball sampling, personal or extended contacts were identified in relevant ministries, and their provincial departments to hold key informant interviews and focus group discussions to help gather a clear picture of wastages pertaining to consumption and production and their spillage as a result of industrial or domestic activities into local environment causing environmental degradation.

To conclude, enlisting all the key indicators and assessing the order of their priority in context of Pakistan were summated, along with developing definition of each indicator and it's qualifying parameters.

Activity 4: Capacity Assessment for Monitoring and Reporting of Key Indicators

This capacity assessment takes into account measures such as credibility of data, lack of data or capacity, etc. to identify national capacity needs for monitoring of key indicators. In order to carefully evaluate each indicator for a priority area of NAP-SCP, relevant ministry for data sourcing was contacted to identify if targets related to SCP indicator were materialized.

The proposed list of targets that are closely related to SCP defined areas and their explanation is given in a comprehensive document on facts related to SCP key indicators, corresponding targets and sub-targets on NAP published by UN Economic and Social Commission on Asia and Pacific (UNESCAP) in Pakistan SDG Datasheet 2017. The exhaustive list[2] indicates SDG 12 targets with data available for Pakistan. The indicators corresponding to these targets were to be further be developed through stakeholders' consultations on SDG 12.

[2] https://www.unescap.org/sites/default/files/Pakistan_SYB2017.pdf

Table 1.1: Priority Areas and Current State of Reporting

Priority area	Reporting on SDG 12 Target	Relevant Stakeholders for reporting
Climate change action plan	SDG Target 12.1) Programmes on sustainable consumption and production	MOCC, M/o Water and Power MoWP, NEECA, AEDB, Prov. P&DDs, NDMA, PDMAs, Provincial Irrigation Deptt, Prov. EPDs, M/o National Food Security and Research, GCSIC, Atomic Energy Commission.
Energy sector	Target 12.1; 12.7) Public procurement practices that are sustainable, Sub target 12.7.1) Sustainable public procurement policies	MoWP, NEECA, MOCC, PPIB, AEDB, WAPDA, OGRA, NEPRA, M/o Planning, development and reforms, M/o Finance, M/o Commerce and Trade, TEVTA, NAVTTC, PCRET, and Federal and Prov. EPAs.
Sustainable Food Systems	Target 12.1; Target 12.3) Food waste and food losses, Sub target 12.3.1) Global food loss index; Target12.7	M/o National Food Security and research, M/o Planning, Development and Reforms, MOCC, PARC, NARC, Pakistan Agricultural Storage and Services Corporation Limited, Federal and Prov. Agriculture Departments, Centre for Agriculture and Biosciences International (CABI), and Federal Seed Certification & Registration Department.
Sustainable, Smart & Green Cities	Target 12.1; 12.5) Waste prevention, reduction, recycling and reuse, Sub Target 12.5.1) National recycling rate	M/o Planning, Development and Reforms, MOCC, M/o of Housing and Works, Provincial housing and town planning departments, CADD, LGRDD, and Cantonment Boards.
Transport Sector	Target 12.1	M/o Communication, Provincial Transport Authorities, PPPA, M/o Planning, Development & Reforms, Prov. P&DDs, City Development Authorities, NTRC, NEECA, M/o of Communication, M/o Industries, M/o Trade & Commerce, Federal & Prov. EPAs.

Priority area	Reporting on SDG 12 Target	Relevant Stakeholders for reporting
Water sector	Target 12.2) Sustainable use of natural resources, Sub target 12.2.1) Material footprint, Sub target 12.2.2) Domestic material consumption	MoWP, M/o of Planning, Development and Reform, MOCC, PCRWR, Provincial Local Government and Rural Development Department (LGRDD), Federal & Prov. EPAs, Technical Education & Vocational Trg. Authority (TEVTA), Ministry of National Food Security & Research, PCRWR, PARC, and NARC.
Land Ecosystem	Target 12.2	Provincial Forest Dept; P&DDs, EPD, Finance Deptt; MOCC, Provincial Forest, Wildlife & Fisheries Department.
Marine Ecosystem	Target 12.2	MOCC, Federal & Prov. EPAs, Govt. of Sindh & Balochistan, Pakistan Navy, Maritime Security Agency, Karachi Port Trust, National institute of Oceanography (NIO), Forest Departments of Govt. of Sindh & Balochistan, Fisheries Department.
Industry	Target 12.4) Chemicals and all wastes, Sub target 12.4.1) International agreements on hazardous waste, Sub target 12.4.2) Hazardous waste generated/treated; Target 12.6) Sustainability information reporting by companies, Sub target 12.6.1) Companies publishing sustainability reports; Target 12.7	M/o Industries and Production, M/o Trade and Commerce, MOCC, Prov. P&DDs, FPCCI, SMEDA, Federal & Prov. EPAs, M/o Finance, CBR, Cleaner Production Centers.
Education Sector	Target 12.8) Information and awareness, Sub target 12.8.1) Mainstreaming sustainable development in education	M/o Federal Education and Professional training, HEC, NEVTTC, TEVTA, Provincial Education Depts., and M/o Planning, Development and Reforms.

Activity 5: Monitoring and Reporting Framework

Based on the finalized indicators, a baseline is proposed for conceptual framework to monitor and report on indicators of NAP-SCP. This is to establish a monitoring system that underlies each identified or formulated indicator as responsible actor, frequency and template, etc. This could be turned into an operational manual later, hence describing the various sources that exist to generate the required data to monitor each identified indicator.

Activity 6: Final Reporting on SCP in Pakistan

A detailed report on SGD 12 monitoring and reporting will incorporate data into a national report by ensuring its dissemination to relevant departments and forums. All constituents of our query comprise the priority areas as highlighted in NAP-SCP, which have been explained in drafting the manuscript for SCP. After taking into account the suggestions and recommendations of stakeholders, the final report has been completed.

1.4 Perspective on literature

1.4.1 Targets and Indicators of SDG 12

SDG 12 has 11 targets and 13 indicators as defined by UN. Targets refer to goals whereas indicators represent a metrics by the aid of which, countries can monitor and track the progress regarding the achievement of targets. All the targets and indicators associated with SDG 12 are delineated in the Table 1.2 below.

Table 1.2: List of SDG 12 associated targets and global indicators

Target	Target Description	Indicator	Indicator Description
12.1	Implement the 10-year sustainable consumption and production framework. Implement the 10 Year Framework of Programmes on Sustainable Consumption and Production Patterns by 2030.	12.1.1	Number of countries with sustainable consumption and production (SCP) national action plans or SCP mainstreamed as a priority or a target into national policies.
12.2	By 2030, achieve the sustainable management and efficient use of natural resources.	12.2.1	Material footprint, material footprint per capita, and material footprint per GDP.
		12.2.2	Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP.

Target	Target Description	Indicator	Indicator Description
12.3	By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.	12.3.1	Global food loss index.
12.4	Achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks by 2030.	12.4.1	Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement.
		12.4.2	Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment.
12.5	By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.	12.5.1	National recycling rate, tons of material recycled.
12.6	Encourage companies to adopt sustainable practices and sustainability reporting by 2030.	12.6.1	Number of companies publishing sustainability reports.
12.7	Promote public procurement practices that are sustainable, in accordance with national policies and priorities by 2030.	12.7.1	Number of countries implementing sustainable public procurement policies and action plans.
12.8	Ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature by 2030.	12.8.1	Extent to which (i) global citizenship education and (ii) education for sustainable development (including climate change education) are mainstreamed.

Target	Target Description	Indicator	Indicator Description
12.A	Support developing countries' scientific and technological capacity for sustainable consumption and production through 2030.	12.A.1	Amount of support to developing countries on research and development for sustainable consumption and production and environmentally sound technologies.
12.B	Develop and implement tools to monitor sustainable development impacts for sustainable tourism by 2030.	12.B.1	Number of sustainable tourism strategies or policies and implemented action plans with agreed monitoring and evaluation tools.
12.C	By 2030 rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances.	12.C.1	Amount of fossil-fuel subsidies per unit of GDP (production and consumption) and as a proportion of total national expenditure on fossil fuels.

The above mentioned targets have impacts on different sectors of the country. All the sectors that were prioritized by the NAP and the relevant SDG 12 targets are presented in the Table 1.3.

Table 1.3: List of prioritized sectors and the associated SDG targets

Sectors	SDG 12 Targets
Climate Change	12.1
Energy	12.1
Sustainable Food System	12.1, 12.3
Sustainable Buildings and Cities	12.1, 12.5
Sustainable Transport	12.1
Education	12.8
Water	12.2
Land Ecosystem	12.2
Marine Ecosystem	12.2
Industry	12.4, 12.6

1.5 Natural resource consumption in Pakistan

Pakistan has undergone rapid human development and economic growth in the last few decades. The massive consumption of resources and uncontrolled production patterns to achieve the development have put a lot of stress on Pakistan's natural resource base and caused damage to the environment. In contrast to developed and other developing countries, Pakistan has a much higher per capita consumption of natural resource for production of one dollar of GDP. In context of water, Pakistan consumes 1070 liters as compared to 18 liters water consumption in Asia Pacific OECD[3] countries[4].

In terms of energy generation, Pakistan's energy supply increased from 713 PJ[5] in 1970 to 3,534 PJ in 2010, at the same time, per capita consumption of energy increased from 12 GJ[6] to 20 GJ thus raising the per capita energy footprint from 8 GJ to 11 GJ. Analysis of the energy mix of Pakistan revealed that proportion of renewable energy in energy mix had declined from 64 % to 37 % during the span of 1970-2010. In this, for producing one US $ of GDP, Pakistan consumes 22.3 MJ[7] which is almost three times higher (5.6 MJ) than energy consumption of Asia Pacific OECD countries[8]. Likewise, Pakistan Domestic Material Consumption (DMC) per capita elevated from 2.8 to 3.8 tons while the Material Footprint (MF) per capita rose from 2.5 to 2.7 tons during the time period of 1970-2015. Furthermore, the amount of material usage in Pakistan to produce one US $ of GDP is 3.1 kg in contrast to 0.7 kg used by Asia Pacific OECD countries. All the above-mentioned facts and figures demonstrate the unsustainable management and inefficient use of natural resources.

1.5.1 Pakistan Progress towards Achieving the Targets of SDG 12

In order to promote SCP related progress for sustainable development, Government of Pakistan has initiated a plethora of projects in different sectors described above. A few significant projects along with their goal and target sector are outlined below in Table 1.4.

[3] OECD: Organization for Economic Co-operation and Development

[4] Natural Resources and SDGs, Pakistan, 2016.

[5] PJ: Peta Joules

[6] GJ: Giga Joules

[7] MJ: Mega Joules

[8] Pakistan National Action Plan on SDG 12 (2017)

Table 1.4: Initiatives of Government of Pakistan regarding the SDG 12

Project Name	Project Name	Cost (PKR million)	SCP Policies
Sustainable Land Management Programme to Combat Desertification in Pakistan	Land and Forest Resources	1,400	• Sustainable management of natural resources and land in arid and semi-arid areas for alleviating environmental degradation and maintaining continuous flow of ecosystem services, leading to climate resilience
Neelum Jhelum Hydro Power Project (969 MW) (China Kuwait Saudi Arabia)	Energy	274,882	• To generate cheap hydel electricity to cope up with the increasing energy demand • To increase the share of renewable energy in the energy mix of the country • To create employment opportunities
Green Line Bus Transit System from Municipal Park, Sadder to KESC Power House Chowrangi, Surjani, Karachi	Transport	16,085	• To provide efficient and safe mobility for people and goods • To improve the public mass transportation system by making it affordable and convenient
Greater Karachi Water Supply Scheme (K-IV) (Karachi)	Water	12,755	• To minimize the gap between the supply and demand of water in the city of Karachi
Remedial Measures to Control Waterlogging due to Muzaffargarh & TP Link Canal, Kot Addu, District Muzaffargarh	Agriculture	8,565	• To avoid water logging and salinity of soils • To uplift the socio-economic condition of the people by boosting agriculture and reducing poverty
Sustainable Energy Initiative for Industries	Industry	3,475	• To reduce the greenhouse gas emissions in energy sector by promoting the use of RE/EE[9] technologies
Greater Karachi Sewerage Plant (S-III) (Karachi)	Sustainable Cities	3,991	• To improve the environmental conditions of the city mainly water bodies

[9] RE/EE: Renewable Energy/ Energy Efficiency

Project Name	Project Name	Cost (PKR million)	SCP Policies
Flood Emergency Reconstruction and Resilience Project (Punjab & AJK)	Climate Change	6,500	• To rebuild disaster resilient structure in Punjab province and districts of Kotli, Poonch and Haveli that have been mostly affected by the floods
Rehabilitation & Renovation of Karachi Fish Harbour, External services. Phase-I	Marine Ecosystem	1,438	• To facilitate the fisherman and to improve the economic growth of Fish industry
Prime Minister's Special Initiatives (PMSI) for Hunarmand Pakistan Programme (NAVTTC)	Education	4,648	• To provide students with the knowledge of artificial intelligence, robotics and other technical skills • To promote the economic empowerment of youth

1.5.2 Current Stance of Pakistan on SCP

The crosscutting nature of national literature provides important dimensions of sustainable consumption and production that are inherent and key drivers for sustainable growth. The profusion of existing knowledge and research on adopting SCP practices have led to the overall sustainability conundrum in decoupling the wastages from growth. Empirical evidence posits that modern industrialization has created robust economic cycles in the past two decades, it has also proved to be degenerative for the environment aside from the unpredictability in availability of future non-renewable resources because of ill planning and ineffective use.

With a clear dereliction on this subject for many years previously, time is pressing to carefully use the available resources of today. The governments are urged to take into account measures that interpolate a levee-en-masse in all growth-led economic activities interjected to intensive resource use. These conscriptions can result in potential interventions to stop massive materialization need with the motive of simple lifestyle approaches for sustainable consumption while conserving the precious resources to equate with sustainable production.

To decipher which motif to determine factors that invariably undermine the progress towards the Sustainable Development Goals, the relevant subject literature was examined to extrapolate advancements made till today. In addition, the intent is to identify caveats and potential opportunities to imbue a meaningful explication of SCP related efforts in Pakistan after NAP formulation. This explication purports to be a factual description and helps in ascribing subjective value to SDG 12 targets and sub-targets individually.

A few studies show that sustainability in consumption and production is becoming increasingly popular in energy sector and agricultural production in Pakistan. Growing energy needs have clearly undermined the GHG factor,

which is not as dormant as it appears: for every 1% increase in energy growth a 0.24% increase is expected in CO_2 emissions. Similarly, population growth and urbanization together account for one percent GDP growth are contributing almost equally i.e. 0.84% to CO_2 related emissions hence posing huge threats to environmental degradation (Shaista et al, 2007)[10].

Such negative impacts could be diffused when the energy prices and urbanization costs are valued in economic growth models. Thus, creating an energy finance growth nexus can benefit government by forming a policy that creates ways for energy conservation despite the increasing demand. The relation between energy and financial development is positively significant (Rabia et al., 2014)[11]. Although, energy consumption has direct and positive role in creating a better economy, in Pakistan, agriculture has a major constituent of food crops depending primarily on fossil fuel which is highly straining the agriculture value added. Where cotton and sugarcane crops mainly have a direct correlation with fossil fuel, the sugarcane and wheat crops have a direct correlation with CO_2 emissions. Research also shows that GHGs have exacerbated the agriculture production comprising mainly of cotton, rice and wheat crops (Qureshi et al., 2016)[12].

The missing link here in overall idea of SCP as per NAP highlights the economic growth model which is degenerative to environment over the long run. To figure out such linchpins, here industries as corporate citizens need to play a significant role as part of their CSR-related obligations by taking every critical step to curb GHGs emissions and environmental degradation. The government's role in environmental governance is manifested in EPA's related EIA reports ensuring environmental protection aspect both in startup and running industries by conducting, environmental audits. The frequency of these measures along with stringent implementation can become an effective instrument when formally incorporated as corporate policies of larger industries. An inference is the textile export sector of Pakistan largely comprised of textile production for export purposes is under strong watch of international quality and environmental standards such as ISO 9001/14001 imposed by international governments and buyers collectively. The idea of such standards in Pakistan's textile industries is to create counter checks for wastages both at input and output levels vis-à-vis their adverse impacts to the local environment, hence ensuring environment sustainability (Samad et al, 2016)[13].

The awareness about SCP related priorities can create huge possibilities of purchasing decisions of consumers. When in 2019, the newly selected democrats coalition government undertook a campaign on reduction in usage of plastic bags from major cities and towns of Pakistan, most of populace censured the decision, but in a year after stringent implementation of this campaign to general masses through pecuniary punishment measures, we could see clean roads, cities and towns with an upside of added use of environment friendly (polypropylene plastic) grocery bags or other plastic utilities.

[10] Sustainable development in Pakistan in the context of energy consumption demand and environmental degradation, 2007, Authors; Shaista Alam Ambreen Fatima, Muhammad S.Butt

[11] Linking financial development, economic growth and energy consumption in Pakistan, 2014, Authors; Rabia Komal, Faisal Abbas

[12] Dynamic linkages among energy consumption, air pollution, greenhouse gas emissions and agricultural production in Pakistan: sustainable agriculture key to policy, 2016 Springer, Authors; MI Qureshi, U Awan, Z Arshad, AM Rasli, K Zaman

[13] Environmental Regulations And Compliance In The Textile Processing Sector In Pakistan: Empirical Evidence, 2016, Authors; Ghulam Samad, Waseem Gulzar and Vaqar Ahmed

Among various factors involved in consumers' green purchasing decisions e.g., percieved product price and quality (PPP&Q), the overall awareness and likeness of such environment friendly products can only out-perform the conventional products if they equally compete on price and quality. Hence green marketers and governments can mutually decide to create such green programs (Ali et al., 2016)[14].

Similarly, such innovative notions are underway for production of sustainable green energy alternatives for replacing non-renewable energy resources among which hydroelectric generation is already an important energy sector operative for many decades. To meet the higher and environmentally friendly energy needs non-conventional alternatives are under consideration. A powerful alternative could be bio fuels and biodiesel production from jatropha, plants seed oil and microalgae. In this, Government of Pakistan has taken serious efforts to at least avail 10% share in overall energy sector through bio energy by year 2020 (Shah et al., 2017)[15].

The growing population of Pakistan is also creating a rising demand for nutritional food. Thereby, underutilized food crops with high nutritional value have been considered seriously by few South Asian countries like Pakistan and Nepal. These governments are trying to recreate the damaged crops that contributes significantly to nutritional needs. Hence a framework of food chain security enriched with policies for knowledge spread to regrow such crops and conserve them over longer period of time is becoming inevitable need of current times (Adhikari et al., 2017)[16].

Improving consumption and production patterns pertaining to various targets and sub targets of SCP are becoming significantly important for sustainable development. Clean production processes can play a pivotal role in attaining SCP related targets. Such processes identify any challenges arising in the future with providing solutions in any of the SCP related targets. Such improvements in processes have led to resource use efficiency. The responsible factors here are formulating policies directing emergence of sustainability on multiple fronts such as provision of sustainable water resource, sustainable cities and urbanization, sustainable management, and clean production for better sustainable environment. Research on practical examples and implication of such sustainable policies have shown that government support and incentivizing businesses are crucial in instilling sustainability that gives rise to theoretical models which are pragmatic and effective. Research indicates that production and service processes of businesses are most holistic in creating a socioeconomic environment which is more sustainable (RK Lukman et al., 2016)[17].

[14] Environment friendly products: factors that influence the green purchase intentions of Pakistani consumers, 2016, Authors; A Ali, I Ahmad

[15] Potential of microalgal biodiesel production and its sustainability perspectives in Pakistan, 2018, Authors; SH Shah, IA Raja, M Rizwan, N Rashid

[16] Tapping the potential of neglected and underutilized food crops for sustainable nutrition security in the mountains of Pakistan and Nepal, 2017, Authors; L Adhikari, A Hussain, G Rasul

[17] Sustainable consumption and production–Research, experience, and development–The Europe we want, 2016, Authors;RK Lukman, P Glavič, A Carpenter, P Virtič

Chapter 2: Indicators' Conceptualization

2.1 Contextualization of SDG 12 Current Monitoring and Reporting in Pakistan

Pakistan is seventh on top of countries facing immediate impact of climate change[18]. Government of Pakistan after a thorough conferring with state key stakeholders devised National Action Plan on SCP. Policymakers suggested ways to incorporate it into federal and provincial level constituencies. At federal level, policy documents were formulated with the start of implementing NAP, at provincial level the plan was further developed into strategies and action plans to fulfill objectives of the NAP agenda. The agenda document "Provincial inputs on National Action Plan for Sustainable Consumption and Production" delineates the features of NAP translated into further activities at provincial level.

It highlights key objectives in view of National Indicators of SDG 12 targets and related objectives from short to medium and long term in range and their due course of completion in number of years. Key strategies and action plans were appropriately developed and listed in order to elaborate and highlight key actions by the provinces in order to achieve efficiency on sustainable consumption and production as described in national indicators in NAP. For clarity, the GIF indicates that global goals, targets and indicators are complemented by the country-specific regional and national indicators[19]. Pakistan's NAP identifies targets and sub-targets which further indicates potential indicators which can be construed in national context of Pakistan. A caveat to this, was that these indicators were not localized rather lacked any such specificity due to lack of integration of data produced by various government entities at federal and provincial level.

2.2 Institutional Arrangement for Implementing, Monitoring and Evaluating SCP Actions

After reviewing the available literature, no concrete framework was found related to the implementation, monitoring and evaluation of SDG 12 in various government bodies and institutions of Pakistan. However, according to the NAP (2017) all the related ministries, agencies and departments are recommended to formulate their own methodologies and projects for the implementation of short, medium and long-term action plans that reflect ensuring of the SCP patterns. Moreover, for monitoring and evaluation, it delineates that specific sector relevant indicators should be devised for determining the performance of SCP action plans implemented. A list of such indicators for Education sector is shown in Table 2.1.

[18] The Nation, January 1, 2017, https://www.adaptation-undp.org/pakistan-7th-most-vulnerable-country-climate-change

[19] https://unstats.un.org/sdgs/files/meetings/sdg-inter-workshop-june-2018/Day1_Session1_Global%20Indicator_UNSD.pdf

The collation of the set of defined indicators in Table 2.1 will provide a baseline for the line department and ministry to execute responsibility. The detail of other sectors can be found in NAP 2017. It is the responsibility of both federal and provincial governments to oversee the execution and determine the performance of SDG 12. To perform the task at federal level, the committee that was formed for the implementation of Climate Change Policy played its part for the implementation of NAP-SCP. Furthermore, the committee was repeatedly engaged for the monitoring and evaluation of NAP-SCP and was given the responsibility of updating it after every 5 years. The committee comprised of the following members/stakeholders:

1. Federal Minister of Climate Change (Chair)
2. Secretaries of Ministries responsible for Climate Change/ Planning and Development / Foreign Affairs/ Science and Technology/ Industries and Production/Finance/ Water and Power/ Food and Agriculture/ Health/ Defense
3. Member Infrastructure PC/Additional Chief Secretaries Provincial Planning and Development Departments
4. Chairman NDMA/ Federal Flood Commission
5. Secretaries of Provincial/ AJK/GB/FATA Environment Departments
6. Heads of PMD/ GCISC/ Pak EPA/NEECA
7. Chief Environment, Planning and Development Division
8. Three representatives from the corporate sector/ Chambers of Commerce and Industries
9. Three eminent experts/professionals
10. Three representatives from Civil Society Organizations
11. Director General (Climate Change) Member/ Secretary

Likewise, for the implementation, monitoring and evaluation of NAP-SCP at provincial levels, the committee formed for the implementation of Provincial Climate Change Policies also served for tracking the progress of NAP-SCP. The participants of this committee are following:

1. Provincial Minister for Environment (Chairperson)
2. Chairman/Additional Chief Secretaries Planning and Development Department
3. Secretaries Environment/Agriculture/Forest/Irrigation/Local Government/ Public Health Departments
4. Director Generals of PDMAs[20]
5. Three representatives from corporate sector/Chambers of Commerce and industries
6. Three representatives from Civil Society Organizations
7. Three eminent experts/professionals
8. Director General Environmental Protection Agency, member/ Secretary

[20] PDMA: Provincial Disaster Management Authority

Table 2.1: Monitoring indicators for tracking the progress of SCP actions in Education sector

Sr. No	Monitoring indicators
1	National/ Provincial Policies integrated with SCP Principle
2	No. of courses introduced on SCP
3	No. of teachers, professionals from relevant disciplines and technicians trained with the training module on SCP Principle
4	No. of projects started by public-private partnerships to enhance education quality
5	No. of workshops organized for higher management officials on benefits of SCP in manufacturing, trade and business sector
6	No. of Research and demonstration (R&D) trails dealing with SCP
7	No. of environmental clubs established

2.3 Hurdles in Tracking the Performance of SDG 12 in Pakistan

After holding stakeholder consultations in provinces, it became quite clear that there is huge effort going on for data collection, in Khyber Pakhtun Khaw (KPK), the local EPA is responsible for coordination among all priority areas and their relevant departments, hence monitoring and reporting is done by EPA-KPK. In Punjab, EPD, Statistics Department and local government is responsible for SCP related activities in all priority areas but there is no coherence in collation of this data. Data is being produced and managed locally in every department, it is not being monitored or reported to some central government body for further analysis. In Balochistan and Sindh, data is being produced locally by all the government departments but there is no system to monitor or report it to a central authority. Although, data is scattered and statistics departments collect and reposits it on annual basis. Thus, due to the absence of centralized system for monitoring and reporting, the collected data cannot be analyzed, interpreted and converted to determine the progress of SCP activities.

Additionally, the governmental institutes and other agencies lack district level data of sustainable consumption and production (SCP), which is essential for developing the performance indicators. One reason for this could be the requirement of heavy investment for district level data collection. Therefore, a policy should be formulated that enforces all the sectors relevant to SCP to develop their own specific performance indicators for monitoring their progress. Also, there should be the monitoring and reporting system at the national and provincial level, to identify at what stage Pakistan's national and provincial governments stand in terms of achieving the targets of SDG 12.

2.4 Outcomes of Provincial Consultations

To contextualize provincial consultations' conclusion and way forward for data gathering, following stance approves of our understanding about provincial feedback on SDG 12 related data gathering, monitoring and reporting in every province:

1. In context of data gathering, reporting and monitoring, we think that KPK Consultation highlights clarity on data in terms of conceptual understanding among stakeholder/provincial government departments, hence the reporting of data is being monitored and reported quarterly through regular surveys conducted by EPA-KPK responsible for data gathering in all 11 priority areas under consideration for SDG 12 on sustainable consumption and production, and related monitoring and reporting. Data was received on the completed and ongoing projects in SDG 12 priority areas from EPA till 2017-2018. Data was also received on ongoing projects in agriculture sector till 2020, and the rest of the data for 2018-2020 is expected after the EPA provincial survey is complete.

2. The Punjab consultation yielded focal contacts in environment, energy and agriculture departments, EPD-Punjab is primarily responsible for data gathering, monitoring and reporting.

3. The Balochistan consultation not only developed a clear prespective that there is high level of consciousness among stakeholders on concerns pertaining to water, agriculture, marine, energy and forestry, but in terms of data on key indicators of targets and sub-targets of SDG 12 on SCP, there was high understanding. Though with data scattered, produced and reported irregularly in above areas by agriculture, forestry, energy, planning and development, OREC Lab- University of Balochistan, Gwadar Development Authority, have assured data availability by focal contacts in these departments.

4. The Sindh consultation has led to fruition in terms of data availability in water, agriculture and waste management. Focal persons from these departments shared information during consultation and asked for formal proceeding to attain data upon receiving a formal go ahead with issuance of letter from MOCC and its circulation to the provincial secretariat in Karachi, which eventually can circulate it to relevant departments for data attainment for our use. It has been processed and data gathering has started, though there is great challenge of fragmented or scattered data among various departments especially agriculture, waste and energy.

In federal consultation with stakeholders from the ministries and provincial governments' representatives, it was further evident that on Pakistan's national and provincial level, clarity exists on SDG 12 targets, sub-targets and related indicators' definitions, but data availability yet needs to be developed and matured.

For execution of global indicator framework, IAEG[21]-SDGs categorized all the indicators into three tier system based on the availability of data at global scale and level of methodological development[22].

Tier I

Indicator is conceptually clear, has an internationally established methodology and standards are available, and data are regularly produced by countries for at least 50 % of countries and of the population in every region where the indicator is relevant.

Tier II

Indicator is conceptually clear, has an internationally established methodology and standards are available, but data are not regularly produced by countries.

Tier III

No internationally established methodology or standards are yet available for the indicator, but methodology/ standards are being (or will be) developed or tested. (As of the 51st session of the UN Statistical Commission, the global indicator framework does not contain any Tier III indicators).

Analysis of the existing situation concludes that Pakistan stands on **Tier II** level of the classification of country indicators as defined by IAEG-SDG. Moreover, conceptual clarity exists regarding the SGD 12 related data monitoring and reporting framework of NAP, however, Pakistan is among those countries which lacks regular production and reporting of data required for developing performance indicators. Another outcome of these stakeholders' consultations at provincial and federal level was understanding and localization of national key indicators and their country specific definitions, with agreement of all participants from government, provincial and non-government organization.

Following Table 2.2 summarizes the targets and indicators against which data has to be reported by relevant sectors; It is important to explain that the above template was shared and discussed during all provincial and federal consultations for gaining more clarity on Pakistan-specific indicators, their localization and hence data reporting and related indicators' measurements wherever necessary. The discussion table specified here as template, was developed from NAP, similarly other discussion templates mentioned in 11 priority areas' discussions in chapter three were developed from 'provincial inputs' document shared by MOCC. These discussion templates serve as proposed framework for SDG 12 monitoring and reporting in Pakistan.

[21] IAEG: Inter-Agency and Expert Group

[22] https://unstats.un.org/sdgs/iaeg-sdgs/tier-classification/

Although, it posed some challenge during consultations in provinces as a few participants from local government departments were unable to grasp the understanding on few SDG 12 targets and sub-targets while conceptualizing their indicators in the local scenario. However, it was concluded after federal consultation with stakeholders from relevant provincial departments and federal government that indicators definitions were reviewed, matched, analyzed and revised in country context by conferring with relevant stakeholders after due diligence. Some indicators were framed same as defined by definition sources on SDG 12 framework, along with further atomization of those which were found irrelevant due to their generic nature and were localized in accord. Such improvisations are indicated in tables of each priority area for better understanding due to their relevant importance on indicators for which data is sorted based on their definitions, availability, current level of data, and tier classification along with data sources in provincial and federal government bodies.

Table 2.2: Localization of National Indicators for which data is required for reporting in 11 priority areas against SDG 12 Targets

SDG 12 Targets	Global Indicators	Data required for reporting	Identified Reporting Sectors	Role of MOCC	Data available for reporting on country basic indicators
12.1: Implement the 10-year framework of programs on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.	**12.1.1** No. of countries with sustainable consumption and production (SCP) national action plans or SCP mainstreamed as a priority or a target into national policies.	1) National action plan for SCP. 2) National action plan is mainstreamed. 3) National action plan of SCP is mainstreamed in to national and provincial policies, strategies, and short to medium term action plans.	• Agriculture • Energy • Climate Change • Sustainable Cities • Transport	• Primarily MOCC help in developoing coordination, facilitation, and collecting of the data for reporting purposes.	**National Level:** Yes, the NAP is available and enacted. Currently its implementation is being mainstreamed into national policy, and provincial sectoral policies and action plans pertinent to agriculture, energy, climate change, sustainable cities and transport sectors as per NAP guidelines. **Agriculture:** See the sectoral discussion for the data availibity, and classification.
12.2: By 2030, achieve the sustainable management and efficient use of natural resources.	**12.2.1** Material footprint, material footprint per capita, and material footprint per GDP. **12.2.2** Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP.	1) Proportion of material/natural resources used for production of 1 US$ of GDP proportion of material/natural resources used per capita at domestic level.	• Water • Land Ecosystem • Marine Ecosystem • Energy • Climate Change	• MOCC will facilitate in developing the reporting mechanisms. • Introduction of policy instruments that promote the SCP intervention.	**Water Sector**: See the sectoral discussion for the data availibity, and classification. **Energy Sector**: See the sectoral discussion for the data availibity, and classification. **Climate Change**: See the sectoral discussion for the data availibity, and classification.

SDG 12 Targets	Global Indicators	Data required for reporting	Identified Reporting Sectors	Role of MOCC	Data available for reporting on country basic indicators
		2) Domestic Material Consumption per unit for different categories (e.g. energy usage per capita for energy sector/ for textile waste it could be tons of textiles produced per capita). 3) Material Footprint for different. resource categories 4) Energy Usage (per GDP or per Capita). 5) Water Usage per GDP or per Capita. 6) National energy efficiency – Energy productivity -GDP per unit of energy use.		• Develop the guidance for relevant departments and ministries on SCP).	**Land Ecosystem**: See the sectoral discussion for the data availibity, and classification. **Marine Ecosystem**: See the sectoral discussion for the data availibity, and classification.
12.3: By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.	**12.3.1** Global food loss index.	1) Harvest and post-harvest losses per capita Food waste losses per capita (kg/ year/capita). 2) Food loss Index. 3) Per capita food availability, (Kg per year per person), 4) Post-harvest storage and distribution losses of provinces' pool stocks of wheat and rice. 5) Provinces to scale food loss due to inadequacies in technologies, water usage, crop failures, etc.	• Agriculture • Hospitality • Industry • Households • Waste Management Companies • Climate Change	Primarily MOCC help in developoing coordination, facilitation, and collecting of the data for reporting purposes.	See the sectoral discussion for the data availibity, and classification.

SDG 12 Targets	Global Indicators	Data required for reporting	Identified Reporting Sectors	Role of MOCC	Data available for reporting on country basic indicators
12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.	**12.4.1** No. of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement. **12.4.2** Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment.	1) No. of international multilateral agreements on hazardous waste and chemical and the country's performance in relation to them at provincial/ national level. 2) No. of international multilateral agreements that are reported. 3) Sound chemicals management corporate policies and strategies throughout the value chain. 4) Percentage of hazardous waste produced. 5) Percentage of hazardous waste treated. 6) Contaminants in air, water and soil from industrial sources, agriculture, transport and wastewater and waste treatment plants and progress on the development of technologies for the treatment of these contaminants. 7) Industrial zones, clean technologies and tools for implementing policies regarding the hazardous waste laws regulation.	• Industry • Climate Change • EPA/EPD	Primarily MOCC help in developoing coordination, facilitation, and collecting of the data for reporting purposes.	See the sectoral discussion for the data availibity, and classification.

SDG 12 Targets	Global Indicators	Data required for reporting	Identified Reporting Sectors	Role of MOCC	Data available for reporting on country basic indicators
12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.	**12.5.1** National recycling rate, tons of material recycled.	1) Percentage of recyclable material produced. 2) Percentage of material recycled. 3) Recycling rate for specific materials and sectors. 4) Size of the re-used goods on the market. 5) Develop the policy framework for integrated waste management. 6) Support best practices and technologies for efficient management of waste into city planning with technology usage.*	• Sustainable Cities • Waste Management Sector • Environmental Protection Departments • Climate Change • LGCD[23]	• Primarily MOCC help in developoing coordination, facilitation, and collecting of the data for reporting purposes. • To develop the policy instrument and relevant laws, regulations and laws that supports the implementation of policies. • To establish and strengthen the policy implementation.	See the sectoral discussion for the data availibity, and classification.
12.6: Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.	**12.6.1** Number of companies publishing sustainability reports.	1) No. of companies who have adopted the sustainable practices.* 2) No. of companies reporting on sustainability practices. 3) Industry related waste generation, figures and data management. 4) Data on hazardous chemicals disposal, and aggregation of data on industrial input-output losses.	• Industry • Climate Change		See the sectoral discussion for the data availibity, and classification.

[23] LGCD: Local Government and Community Development Department

* It is mentioned in ministry documents and on NAP as such, hence are into account, but no such clarity exists on specification, measure or data availability exists in recycling except in waste sector

SDG 12 Targets	Global Indicators	Data required for reporting	Identified Reporting Sectors	Role of MOCC	Data available for reporting on country basic indicators
12.7: Promote public procurement practices that are sustainable, in accordance with national policies and priorities.	**12.7.1** No. of countries implementing sustainable public procurement policies and action plans.	1) Development of sustainable public procurement standards and guidelines. 2) Development of sustainable public procurement policies and plans.	• Industry • Agriculture • Energy • Climate Change	• To develop the green procurement guidelines.	See the sectoral discussion for the data availibity, and classification.
12.8: By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.	**12.8.1** Extent to which (i) global citizenship education and (ii) education for sustainable development (including climate change education) are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment.	1) Education policy clearly reflecting sustainable development. 2) Curricula that address the sustainable lifestyles. 3) GOP programs, activities to interject sustainable consumption and production in general school, colleges, and universities curricula, teachers adequacy to promote learning regarding SCP practices.	• Education • Climate Change	• Primarily MOCC help in developoing coordination, facilitation, and collecting of the data for reporting purposes. • To collaborate with HEC for including the SCP guidelines and climate change in national education policy. • To Support in development of curricula that address the SCP themes and Climate Change in teachers and students.	
12.a: Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production.	**12.a.1** Amount of support to developing countries on research and development for sustainable consumption and production and environmentally sound technologies (no meta data).	1) National/provincial R&D spending on environmentally sound technologies. 2) International co-authorship in the field of SCP. 3) GOP programs promoting research and development in low carbon based economies with efficient resource usage.	• Education • Industrial Research and Development Centers • Climate Change • Ministry of Science and Technology		See the sectoral discussion for the data availibity, and classification.

SDG 12 Targets	Global Indicators	Data required for reporting	Identified Reporting Sectors	Role of MOCC	Data available for reporting on country basic indicators
12.b: Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products.	**12.b.1** No. of sustainable tourism strategies or policies and implemented action plans with agreed monitoring and evaluation tools.	1) National policies that include sustainability in tourism.* 2) Development of monitoring and evaluation tool for tourism. 3) GOP achievements on developing tourism, data aggregation on tourism related economy, tourism strategies, ensuring sustainability and creating jobs.	• Tourism • Climate Change		
12.c: Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account their specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities.	**12.c.1** Amount of fossil-fuel subsidies per unit of GDP production and consumption, and as a proportion of total national expenditure on fossil fuels.	1) Tariff subsidies per unit of electricity to commercial, Industrial, residential and agricultural consumers. 2) Fossil fuel subsidies on Natural Gas and Gasoline.	• Energy • Climate Change		See the sectoral discussion for the data availibity, and classification.

Chapter 3: Sector wise Discussion

3.1 Water

3.1.1 Background

Water availability is crucial to sustenance of food security, hence ensures a thriving economy for Pakistan. SDG 12 target 12.2, and sub-targets 12.2.1 and 12.2.2 ensure efficient sustainability of this natural resource in terms of its material footprint in domestic consumption. To do this, relevant policy measures, rules and regulations, financial mechanism and capacity building to strengthen institutions for better integrated water management is essential. The first step towards such goal and then its subsequent transformation into determining and localization in all federal and provincial government departments' polices is to improve, conserve and protect water resource in all regions.

In this, the first objective of The Water Policy (2018) formulated by the Ministry of Water and Power (Now Ministry of Water resources (MOWR)) ensures SCP patterns from abstraction to utilization of water resource by developing key indicators for federal and provincial government units. To do this, strategic priorities and planning principles are delineated for water conservation and efficiency, storage, leveraging technology to recycle water and de-saline sea water for utilization, inventorying water resources through GIS technologies, better irrigation through accurate monitoring, renewable energy through new dams, integrated water resource management through institutional management and capacity building, and efficient use of ground water by industry, and waste water treatment through comprehensive regulatory framework with inherent planning principles. The provincial governments can further work on action plans and develop detailed guidelines to conserve and efficiently utilize water resource as per national policy. Priorities were developed and implemented as short, medium and long term projects after NAP enactment in 2016.

3.1.2 Current Situation

NAP relates SDG 12 Target 12.2, Sub-targets 12.2.1 and 12.2.2 to water sector in Pakistan to conserve and create water footprint in the country. Conceptualization of indicators pertaining to water sector is found among key stakeholders at federal level Ministry of water and power, and its provincial level departments, but data is being produced annually or whenever audits are done. Currently, country and provincial indicators to count for water footprint are; 1) Per capita surface water availability (million cubic meters); 2) Ground water availability (million acre feet); and 3) Total water losses (escapage, evaporation, other losses from rivers/ canals to farmland) in million acre feet. These country and provincial indicators as per NAP correspond to country indicators definitions in GIF. Per capita surface water availability for Pakistan have reached a threshold of 908 cubic meters per capita in 2019 as compared to 5,260 cubic meters per year in 1951, if this trend continues it will reach an alarming level of 860 cubic meters per year in 2025.

The minimum water requirement stays at 1,000 cubic meters per capita year[24]. Water usage is maximum in resource intensive sectors such agriculture, and industry. A large cultivable area of 86 million acres has only 54% cultivable area. Around 50 million acre feet of water is abstracted for irrigation of cultivable land. The largest water reserves of Tarbela, Mangla and Chasma are losing their capacity to conserve water which has reduced upto 5 million acre feet or 27%[25]. But in order to ensure sustainability of water resource, its efficient utilization is the key to save, conserve, and harvest water as much as possible. A fair idea about water availability can be inferred from total water inflow in the country in the statistics below;

Table 3.1: River Flows and Water Availability (1979-2015) million acre feet

Parameter	Average
Total river inflows (a)	143.3
Ground water available (b)	50.0
Total water supply (a+b)	193.3
Average withdrawal through canals	101.0
Escapage below Kotri	26.7
Evaporation and other losses	15.6
Water availability (agriculture)	
Average withdrawal through canals	101.0
Losses (from canal head to farm gate)	24.3
Water available at farm gate (c)	76.7
Groundwater withdrawal (d)	47.0
Overall water availability (c+d)	123.7

Data source: Water and Power Development Authority

Pakistan Council of Research in Water Resources (PCRWR) is an apex body of Ministry of Science and Technology with its regional presence in all provinces of Pakistan. It has given the mandate to implement, coordinate, promote and organize research in different areas associated to the water sector such as surface and groundwater management, irrigation, watershed management, drainage, rainwater harvesting and many others. According to recent statistics, it has been found that the agriculture sector accounts for 91.6 % of total water annually, while environment, domestic and industry accounts for 3.3%, 2.6% and 2.5%[26] respectively. Thus, it is very essential to efficiently utilize the water in agricultural as this sector has the highest water demand and fate of all the other sectors are dependent on it.

[24] National Water Policy - 2018

[25] Water and Power Development Authority, Annual Report, 2019

[26] Development Advocate Pakistan, UNDP (2016)

In order to effectively utilize water, a lot of research and technology development taken place to improve the irrigation practices and reduce the crop water demand. For instance, implementing simple bed and furrow techniques can save 30% water vis-à-vis sprinkler technique can save upto 40% of water in water usage intensive crops, e.g., rice[27]. Similarly, currently, remote areas in Balochistan and Sindh regions are under experimentation of growing low delta crops instead of water intensive crops such as banana.

3.1.3 Institutional arrangements

The provincial consultations brought insight on the level of the ongoing efforts pertinent to SDG 12 and its requisite data. Annual Development Plans (ADPs) are developed by every province and indicate level of completion of such projects with estimated budgets and stage of development and completion. The ADPs of KPK ensure data availability in water sector as the monitoring and reporting is done by EPA through a detailed survey after every two years i.e. 2017-2018 is complete and available, and 2019-2020 is underway. The primary data is compiled by EPA and is reported to MOCC. On the contrary, in provinces of Balochistan, Punjab and Sindh, the local governments are underway to gather, compile and organize data on ADPs related action plans and projects. Mostly data is not produced or compiled regularly, and is in raw or scattered form as collected and monitored by the local department. Also, the central authority on data is unclear to most of the local government departments especially on whom to report although sense of custodianship of data-related tasks at individual department level is very clear.

3.1.4 Challenges

Despite all the efforts by Ministry of Water and Power, and its relevant federal and provincial local government departments, the problem of data availability and its monitoring and reporting is predominant and currently seems to consume more time and effort. With all the perception we gathered from provincial and federal governments respectively, it can posit more future challenges as responsibility localization among the various government departments is not established yet. Since data handling responsibility within departments is discrete hence its repository is assured. But to ensure its accurate use, the monitoring and reporting lacks mechanism on a regular basis i.e. monthly, quarterly or yearly basis with clear absence of channeling data, hence the individual departmental efforts to collect and retain data are futile. The major caveat MOCC currently faces is to create a linchpin among provincial local governments and their respective federal government authority to collaborate on an effective working model for data monitoring, reporting and management.

[27] http://pcrwr.gov.pk/water-management/

3.1.5 Proposed Framework

Table 3.2: SDG 12 Capacity Assessment on Targets, Sub- targets, nationally defined Indicators, and their measurements, localization of responsibility and data sources

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
SDG 12 Target 12.2: By 2030, achieve the sustainable management and efficient use of natural resources				
12.2.1 Material footprint, material footprint per capita, and material footprint per GDP. 12.2.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP.	- Water usage as part of materials footprints in a varying number of economic sectors whose expenditure require materials. For each sector, baselines can be set in order to regulate the water consumption. - Domestic material consumption (household consumption, government consumption and capital investment) and foreign final demand (i.e. exports). - Increased water usage efficiency per sector. - The total volume of groundwater and surface water extracted from their sources for use in sectors such as agriculture, industry, or municipal, expressed as a percentage of the total annual renewable water resources[28]. - Domestic Water Consumption in imports, domestic extraction and exports. - Highest level of usage by sector[29]. - No. of water recycling initiatives and their recycling performance.	1. Per capita surface water availability (million cubic meter). 2. Ground water availability (million acre feet). 3. Total water losses (escapage, evaporation, other losses from rivers/ canals to farmland) in million acre feet. 4. Proportion of total water resources used. 5. No. of legislations on fresh water and underground water conservation and management developed and its enforcement initiated. 6. Percentage distribution of water sharing between provinces. 7. No. of water supply schemes in rural and urban areas & quality of water supplied.	Indicators are conceptually clear, data is available and being produced by relevant government departments, but is not reported regularly.	**Federal:** MOWR WAPDA MOCC SDG Units, MoPD&SI Ministry of Industries and Production **Provincial:** SDG Units/ Planning and development Departments WAPDA WASA PHED LGCD PCRWR EPD

[28] https://unstats.un.org/sdgs/metadata/files/Metadata-12-02-01.pdf

[29] https://unstats.un.org/sdgs/metadata/files/Metadata-12-02-02.pdf

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
		8. No. of water treatment plants & quality of water supplied. 9. Percentage of bodies of water with good ambient water quality. 10. No. and type of methods & techniques applied to minimize wastage of water. 11. No. and type of rain-water-harvesting structures at household and local levels. 12. No. and type of water efficiency equipment produced locally. 13. Water Foot printing.[30] 14. No. and type of high-efficiency irrigation system techniques adopted with number of acreages. 15. No. and type of techniques applied to use grey water for flushing and gardening. 16. No. and length of new canal systems rehabilitated and constructed.		

[30] Water Footprint: It refers to the volume of water, consumed and polluted in all the processing/usage stages by the individual/product/factory/cities/countries. It is calculated in the units of volume of water/ per unit time. Indicator such as “proportion of total water resources used” will aid in the calculation of water footprint.

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
		17. No. and capacity of small, medium and large dams constructed.		
12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.				
12.4.2 Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment.	In order to ensure sustainable water resource management, it is essential to regulate the amount of effluents that are being spilled into water streams by domestic, agricultural and industrial consumers. Therefore, these establishments have to be subjected to water recycling measures through policymaking and legislation.[31]	1. No. of legislations on principle "polluter pays" for water polluting industries and water metering developed and its enforcement initiated. 2. No. of industries and institutions complying National Environmetal Quality Standards (NEQS). 3. Percentage of wastewater treated to comply with NEQS and used for agricultural, industrial and domestic purposes. 4. Distance between water and sewerage lines. 5. No. of water treatment plants & quality of water supplied. 6. No. of legislations on fresh water and underground water conservation and management developed and its enforcement initiated.	Indicators are conceptually clear, data is available and being produced by relevant government departments, but is not reported regularly.	MOWR WAPDA MOCC SDG Units, MoPD&SI Ministry of Industries and Production **Provincial:** SDG Units/ Planning and development Departments WAPDA WASA PHED LGCD PCRWR EPD

[31] Khan DL, Juricich R, Reg US, Fong LV, Hodge D. The California Water Sustainability Indicators Framework.

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
		7. No. and type of techniques applied to use grey water for flushing and gardening.		
12.A Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production.				
Amount of support to developing countries on research and development for sustainable consumption and production and environmentally sound technologies.	Research in water resources is of paramount importance and investment in technologies that lead to water conservation should be encouraged, and the developed indicators allude to the aforesaid.	1. No. of Water policy's gap analysis studies in the context of IWRM & SCP. 2. No. of national and provincial groundwater regulatory framework developed and implemented. 3. No. and type of accredited and non- accredited trainings, workshops, seminars, and study visits conducted for capacity building and skill enhancement through public and private institutions in fields including water quality. 4. No. of public-private partnerships developed for enhancing access of safe drinking water, operation & maintenance of water supply systems, resource mobilization and capacity development.		

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
		5. Amount of financial resources tapped to maintain existing and develop new water infrastructure 6. Management and technical measures adopted to protect groundwater, number of adoption sites		

3.1.6 Policy Relevance

Water scarcity is a pressing issue and with a rapidly growing population, Pakistan is heading towards a situation of water shortage and by corollary, a threat of food insecurity. Per capita surface water availability has declined from 5,260 cubic meters per year in 1951 to around 1,000 cubic meters in 2016. This quantity is likely to further drop to about 860 cubic meters by 2025 marking our transition from a “water stressed” to a “water scarce” country. The developed indicators will help in increasing the adaptation capacity of Pakistan and an informed evidence-based policy decision will lead to better performance with regards to the water use efficiency, water safety plan, ground water regulation, ground water recharge and overall water management.

3.1.7 Existing Projects

The following table displays the projects that are undergoing in the water sector for meeting the targets of SDG 12 in Pakistan.

Table 3.3: Projects list related to SCP in water sector along with their cost

Sr. No.	Name	Cost (Rs. Million)
1	Water Distribution Network for RCB/CCB based on Khanpur Dam Water Source (Phase-III) (Rawalpindi) Punjab	699.500
2	Expansion of Raw Water Filtration Plant & Supply Network for Supplying Clean Water to Hyderabad (Hyderabad Package)	935.000
3	Greater Karachi Water Supply Scheme (K-IV) (Karachi)	12,755.000
4	Necessary Facilities of Fresh Water Treatment, Water Supply and Distribution Gwadar (CPEC)	11,396.000
5	Demarcation of Groundwater Quality Zones in Indus Plain and Marginal Areas for Sustainable Development and Management of Groundwater (Lower Indus Plain) PCRWR	54.946
6	Integrated Water Resources Management in the Highly Depleted Pishin-Lora Basin of Balochistan, PCRWR	48.857
7	Indus 21 Water Sector Capacity Building & Advisory Services, Islamabad (World Bank)	7,659.060

3.2 Agriculture

3.2.1 Background

The NAP highlights that SDG 12 targets 12.1, 12.3 and 12.7, and sub-targets 12.1.1, 12.3.1, 12.7.1 ensure sustainable agriculture. After devolution, the provincial agriculture policies are still under revision to formulate and develop provincial action plans, with further action on food security by developing a comprehensive index to count food loss in terms of nutritious food crops wastages at input and output levels in every province, which is still to be determined. It includes province efforts to scale food loss due to inadequacies in technologies, water usage, crop failures, etc. with ensuring sustainable public procurement in agriculture sector.

Food Security Policy 2017 highlights that agriculture sector constitutes major proportion in economy of the country with a contribution of 19.5 % to GDP and 65% into exports earnings, employing 42% labor force, with a provision of livelihood for 62% populace. The major goal of policy is to achieve 4% growth in agriculture annually with an emphasis of National Agriculture Research Systems (NARS). In July 2012, after the devolution of agriculture sector to provincial governments under 18th Constitutional Amendment, provinces were given increased responsibility of developing provincial agriculture policy.

3.2.2 Current Situation

NAP relates SDG 12 targets 12.1, 12.3 and 12.7, and sub-targets 12.1.1, 12.3.1, 12.7.1 to agriculture sector to mainstream sustainable consumption and production as priority into provincial agriculture policies, and to scale food loss due to inadequacies in technologies, water usage, crop failures, etc. and development on food loss index in Pakistan. Conceptualization of indicators pertaining to the agriculture sector is found be at tier II level among key stakeholders at federal and provincial level, but data is not being produced regularly. Currently, country and provincial indicators to count for agriculture sector are; 1) National agriculture production in million tons and % growth rate, 2) National seasonal water requirement in million acre feet, 3) KPK Funds allocation in ADPs after devolution of agriculture to provinces, 4) KPK Provincial % agriculture share in GDP, 5) KPK No. of provincial projects (dams, curbing and conduiting, etc.) to conserve water, 6) Punjab agriculture sector No. of ADPs (for crop related data reporting services (CRS), digitization of M&E (GIS mapping), advisory & consultancy services, interest free loans, subsidies, and access to information on crops and fertilizers), 7) Balochistan province cash fruit crops/livestock/fisheries %share in country produce, 8) Balochistan no. of ecological zones (available for arid land, forest land, rangeland for livestock, coastal area for fisheries, aqua and marine culture development), 9) Sindh Provincial % agriculture produce share in GDP, 10)% and total land and water in Sindh province (available for cultivation/irrigation of seasonal crops), and 11) Sindh total coastal area for fisheries, aqua and marine culture development. From above national and provincial indicators, only 3, 5, 6, 8, 9, 10 as per NAP correspond to country indicators definitions in GIF.

The agriculture sector observed an overall growth rate of 2.67%, 0.58% higher than 2018-2019, with a growth of 2.98% in crop sector especially in important crops 2.90% in 2019-2020. In this, a rise of 2.90% to a 7.14 million tons (MT) in rice crop, 6.0% to a 7.24 MT in maize, a 2.50% to 24.95 MT in wheat, along with a decline in the production of cotton by 6.9% to 9.178 million bales, and 0.4% to 66.90 MT in sugar cane crops. Similarly for crops such as pulses, oilseeds and vegetables, the production increased by 4.57% overall. In livestock, fisheries and forestry sectors, a growth of 2.58%, 0.60%, and 2.29% was observed respectively. Two main crop seasons Rabi (spring) and Kharif (autumn) require different quantities of water, where former is mostly produced with monsoon water hence requires less dependency on other water resources, the latter requires lot of water from other resources. The total availability of water for the Rabi crops was increased by 17.7% to 29.2 MAF from 36.4 MAF, and for the Kharif crops was increased by 9.4 to 65.2 million MAF from 59.6 MAF between 2019-2020 and 2018-2019 respectively[32]. The provincial situation in this regard as follows;

3.2.2.1 Khyber Pakhtunkhwa Province

After devolution there is a considerable improvement and substantial increase in provincial fund under ADPs. ADPs allocation for KPK province has increased by 65% from 2009 to 2014. Similarly the agriculture sector ADP allocation also doubled to 2.4% which is still a small increase as compared to its share in KPK economy. The agriculture contributes a share of 22% in KPK GDP. A number of projects have been commenced in the past five years such as small dams and curbing of local water drains to conserve water and making use of better irrigation technology.

[32] Ministry of Finance, Pakistan

Similarly, there is improvement in using state of the art scientific techniques for livestock and fish farming. KPK government still faces challenges in employing best agriculture technology and equipping its human resource due to two major impediments: insufficient federal allocation of provincial budget and a reduced availability of foreign multilateral development funds. Despite efforts by the KPK government, activities consummated remained inconclusive due to budget and system deficiencies such as lack of capacity building in human resource development.

3.2.2.2 Punjab Province

Punjab Agricultural Research Board (PARB) is the apex body of Punjab Agriculture Department (PAD) to conduct research with in agriculture sector, and its paraphernalia division livestock in Punjab. PAD works in coordination with Planning and Development (P&D) department vis-à-vis farmers, hence it provides information on every aspect of agriculture from handling grievances of farmers to gender and youth inclusion, technological innovations, subsidies, tariffs and taxation in agriculture export and trade. Its most recent initiatives and currently operative programs are: Connected Agriculture Punjab Package (CAPP) providing advisory & consultancy services, interest free loans, subsidies, and access to information on crops and fertilizers. Within this, a digital mobile platform and 125,000 smartphones have been provided to farmers for digital information access. Farmers' Registration Data service under the Kissan Package, and provision of Data from Crop Reporting Services (CRS) in collaboration with SUPARCO for GIS mapping and drone piloting for better monitoring of arid-able land and related data yielding. Similarly Switch Solutions is providing technological information with best farming techniques, crops diseases, fertilizers for agriculture productivity. An M&E system is currently under transformation at PAD which will streamline all ADP projects in P&D department through better time management in approvals of funds. Similarly PARB works in parallel to the mandate of its federal body National Agriculture Research Council (NARC). PARB also channels funds received under the head of agriculture research development and reforms, and is also undergoing transformation.

3.2.2.3 Balochistan Province

Balochistan has a major share in fruit crop to Pakistan's economy, cash crops such as almonds, cherries, and grapes, (90% of total produce in the country). 70% of total dates produce, and 60% of apricots, peaches and pomegranates produced in the country. Balochistan also has the largest onion produce market in Pakistan. Perhaps the reason to production of fruits and field crops in unique varieties could be its climate with a potential of five agro-ecological zones to grow these crops in huge quantities market value added. Balochistan government also heads in finalization of its agriculture policy though a strategic policy framework which was designed with consultation and funding by USAID and AusAid-Department of Foreign Affairs and Trade (DFAT) of Australia with the help of Food and Agriculture Organization (FAO).

FAO worked with policymakers in Agriculture department, chief secretary and chief justice in two broad projects; Balochistan Agriculture Project (BAP) of USAID, and Agriculture in the Balochistan Border Areas (ABBA) of AusAid, who collectively formulated Agriculture Sector Policy and Strategy (ASPS) in collaboration with P&D department. The main resources pertinent to agriculture development in Balochistan are, fishing areas consisting of coastal belt, rangelands and forests. The fisheries only contribute to 15% in total fish exports. Range land and forests cover about 93% of land in Balochistan approximated to 32.3 million hectares (ha) which is used for livestocking of 12 million sheep, 12 million goats and 0.38 million camels. It is also used for cash food crops such as juniper (141,000 ha), wild olives (190,000 ha) and pistachios (300,000 ha), and Chilghoza pines (25,000 ha). The juniper forest in Ziarat is considered 2nd largest forest of the world and was declared a Biosphere Reserve by UNESCO. The current information on data management is still not known due to lack of technological and developed human resources.

3.2.2.4 Sindh Province

With a population of 58 million growing at a rate of 2.4% annually, Sindh covers 18% of land in the country with 16% arid land. Agriculture is a major instrument of economic growth, food security and poverty reduction in Sindh, which needs a growth rate of 4-5% per annum to cope with rise in population. The main crops in Sindh are wheat, rice, cotton and sugarcane. Livestock and fisheries are inherent part of Sindh Agriculture Growth Project (SAGP) with a 56% of value addition in agriculture produce, and an 11% value add to GDP of the country. Agriculture contributes 23% value add to national agriculture output. After devolution, SAGP funded by the World Bank with further advisory of UN-FAO, USAID and the International Food Policy Research Institute (IFPRI). Sindh Agriculture Policy 2018-2030 was formulated by: Agriculture Supply & Prices department, Livestock & Fisheries department and Planning and Development (P&D) department Sindh.

The implementation of policy was ensured by P&D and Sindh Agriculture Policy Implementation Commission (SAPIC). Sindh enjoys great natural resources potential in terms of climate, location, soil and water. With its three barrages, Sindh has a large canal base consisting of 14 main, 117 branch canals, 1,400 distributary/minor, along with 44,000 water conduits. Sindh shares 41.55% of Indus basin irrigation system of 117.35 MAF to a total of 48.76 MAF i.e. 33.94 MAF in Kharif season, and 14.8 MAF in Rabi season. The combined arid land available for cultivation is 4.77 million hectares. Livestock population accounts for 18.1 million cattle and buffaloes, and 21 million sheep and goats, besides poultry comprising of 5,000 farms contributing to 25% of total meat consumption. Fisheries in Sindh have a 350 km coastal area available off 20 km from main cost, which is ideal for aqua and marine cultures. Sindh provincial government took various initiatives for better irrigation through improvements in canal and water conduits system vis-à-vis better livestock management through digitization i.e. electronic tagging and traceability.

3.2.3 Institutional Arrangement

KPK was the first province to develop the Agriculture Policy 2015-2025. Major elements of agriculture in KPK province are crops, livestock, on-farm water management and fisheries. Previously due to lack of funds and poor implementation of policies it remained neglected. A huge effort in terms of initiatives was taken for enabling environment with the start of a formal policy framework. The primary data obtained by EPA-KPK encompasses a list of projects underway in modern agriculture irrigation techniques with technical assistance from the University of Agriculture, Peshawar on arid agriculture, fisheries and livestock development with definite short to medium term along with allocated budget. However, the specificity of data on projects details such as efficiency, capacity and output is accounted for in ADPs 2019-2020.

EPA collects data every two years but data is qualitative. Punjab and Sindh developed their relevant Agriculture polices in 2017 and 2018, respectively. EPD Punjab and Local government in Sindh and Bureau of Statistics is responsible for collecting and reporting data, as monitoring is done by individual departments. ADPs enlist data on capacity and deliverables but its organization and formal reporting is yet under development both in Punjab and Sindh provinces. Agriculture department proclaims data availability for recent years but lacks composite structure for further use. Balochistan government is still finalizing its agriculture policy, although an agriculture policy and strategy was drafted through funding by USAID and AusAID in 2014. The primary data is available and under compilation by individual departments namely, forestry, agriculture, livestock and fisheries in Gwadar city. Although, the Bureau of Statistics, and Planning and Development (P&D) departments of local government are responsible for monitoring and reporting data yet it lacks coordination due to financial and other political reasons.

3.2.4 Challenges

There are challenges in four provinces of Pakistan mainly pertaining to data attainment for SDG 12 indicators in the agriculture sector. Due to inconsistency in policies for building databases and publishing directories, as well as various accreditations and certifications for crops harvesting methods make it almost impossible to have a collective database or framework for monitoring and reporting in agriculture sector of Pakistan. Challenges are specific to every province within its policy framework and scope related to Sustainable Development Goals. The most important are listed below:

3.2.4.1 Khyber Pakhtunkhwa Province

KPK Government is proactive in conducting surveys to assess and evaluate province agricultural capacity and need related to SDG goals. In the first phase of provincial departmental survey, EPA-KPK faced challenges contemplating data due to lack of repository or analytical software to make the data legible. During consultations, it was highlighted by local government stakeholders from agriculture department that such capability to develop a software needs to be outsourced to a foreign company who specializes in developing such database, but due to limited finances such capacity could not be built. Such bill of technology services and funds approval by the federal government is a cumbersome process and lacks necessary support.

Besides, other limitation such as inter-departmental coordination to share information still lacks coherence among departments and local government due to priority issues. Another element necessary is human resource development which is deficient in the skills required to bring out maximum benefit of such a database.

3.2.4.2 Punjab Province

Currently, PAD M&E system halts as it contemplates and synthesizes large amount of raw data. The data is found scattered within the departments as there is no central database repository. Therefore, it is not available for use due to non-availability of baseline information. Due to a lack of capacity and institutional building, dearth of skillful human resource fully cognizant of latest IT developments for collating and managing data, attainments on SDG 12 targets and sub-targets poses a challenge.

3.2.4.3 Balochistan Province

Balochistan is still under policy development in the agriculture sector. Although, departments of agriculture, forestry and fisheries have undergone immense wide transformation, reasoned to progression in data contemplating from primary information in individual departments, yet they lack inter-departmental coordination. Despite having the data, is underutilized. This data has the potential to be central for agricultural growth and sustainability in the province and required focus by the Balochistan government.

3.2.4.4 Sindh Province

Due to climate change, Sindh is vulnerable to increased flooding and increased severity of typhoons and tsunamis. Therefore, greenhouse gas emissions in agriculture sector are to be addressed through SMART agriculture practices which includes digitization and IT based platforms for up-to-date information on crops growth, storage and preservation, livestock insurance, better aqua and marine cultures for farming with early warnings for disasters such as droughts, floods and rainfall. However, currently these steps seem to be lacking a firm IT base from better collation of data from agriculture sector. Due to a lack of information technology, technical capacity and funds, currently the data is managed with a conventional approach rather than a dynamic communication IT system. Data is collected and stored in the department or without forming a data repository.

3.2.5 Proposed Framework

Table 3.4: SDG 12 Capacity Assessment on Targets, Sub-targets, nationally defined Indicators, and their measurements, localization of responsibility and data sources

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Current level of Data	Data Sources and Responsibility
SDG 12 Target 12.1 Implement the 10-year framework of programs on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.				
12.1.1 Number of countries with sustainable consumption and production (SCP) national action plans or SCP mainstreamed as a priority or a target into national policies.	• To be reported under this indicator, a government should have moved through one or more new stage(s) of the "Policy cycle" on one or more policy instrument(s) during the current reporting period. • As per the 10YFP Indicators of Success, although they can be linked, a policy instrument is not the same thing as a change in practice, a commitment, a coordination mechanism or a knowledge resource or tool. • This indicator is calculated at relevant aggregation levels based on the information collected from the National Focal Points and other government officials; users of the data should be mindful of double counting one same policy, when aggregating data across reporting years[33].	No. of training programmes organized to expose farmers to successful farming practices. 1. Agriculture and National Food Security Policy approved and Strategies / Action Plans developed. 2. Regulatory and legislative framework in place to adopt environmentally friendly agricultural practices. 3. No. of Rural Business Hubs (RBHs) developed to promote SCP concept and save resources. 4. National Land use Policy approved for land use planning and zoning of agricultural land.	Indicators are conceptually clear, data is available and being produced by relevant government departments, and is reported almost regularly.	**Federal:** MOCC NARC PARC MOAFS **Provincial:** PAD Agriculture Depts. In all provinces P&D Depts. Bureau Of statistics EPA

[33] https://environmentlive.unep.org/media/docs/projects/metadata_12_1_1.pdf

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
12.2 By 2030, achieve the sustainable management and efficient use of natural resources.				
12.2.1 Material footprint, material footprint per capita, and material footprint per GDP.	It is imperative to realize the environmental impact of agricultural sector, since there are certain crops in Pakistan that have fair share in the national GDP, but require extensive water for their growth. In this regard, a set of indicators is proposed that caters to the aforesaid.	1) Percentage increase in low delta crops. 2) Percentage decrease in soil and water erosion. 3) Percentage increase in productivity/yield that define water usage. 4) Identified optimized dose of fertilizers and pesticides. 5) Introduce water metering for effective control over wastage of irrigation water.	Indicators are conceptually clear, data is rarely available and being produced by relevant government departments, and is not reported regularly.	**Federal:** MOCC NARC PARC **Provincial:** PAD Agriculture Depts. In all provinces CABI[34] P&D Depts. Bureau Of statistics Agricultural universities Provincial Irrigation departments
SDG 12 Target 12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.				
12.3.1 Global food loss index - Per capita food availability, (Kg per year per person). 12.3.2 Post harvest storage and distribution losses of central/states pool stocks of wheat and rice.	The Food Loss Percentage is the weighted average of all the commodities loss percentages in a given country, where the weights are equal to the commodities value of production. The Food Loss Percentage (FLP) for a country (i), in a year (t) is defined as follows: Harvest and post-harvest losses while calculated on a quantity basis, it is subsequently transformed to dietary energy supplies (in kcal) per capita allowing consistent aggregation and then indexed. Measures the totality of losses occurring from the time at which production of an agricultural product is recorded until it reaches the final consumer as food. Important: It has to be measured in Monetary value not in KGs or K Cals as per definition in link below.	1) No. of projects to improve cold chain infrastructure through public – private partnerships. 2) Percentage increase in storage facilities for agricultural products and food items. 3) Percentage increase in use of harvesting tools to reduce agriculture waste. 4) Percentage increase in low delta crops.	Indicators are conceptually clear, data on indicator "2" is regularly available. For the rest of the indicators relevant government departments produce it occasionly.	**Federal:** MOCC MOAFS NARC PARC FBS **Provincial:** PAD PBS Agriculture Depts. In all provinces P&D Depts. Bureau Of statistics EPA

[34] Centre for Agriculture and Biosciences International

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
	$FLPit = \frac{\sum j\ lijt*(qijt0\ *pjt0\ )}{\sum j\ (qijt0\ *pjt0\ )}$ Where: *lijt* is the loss percentage (estimated or observed) i = country, j = commodity, t = year *t*0 is the base year (set at 2005 for the moment) *qijt*0 is the production plus import quantities by country, commodity in the base period *pjt*0 is the international dollar price by commodity for the base period, The FLP gives the average level of losses[35].			
SDG 12 Target 12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities.				
12.7.1 Number of countries implementing sustainable public procurement policies and action plans.	*Sustainable Public Procurement (SPP)* is a "A process whereby public organizations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life cycle basis in terms of generating benefits not only to the organization, but also to society and the economy, whilst significantly reducing negative impacts on the environment". The methodology developed is computational and required inputs are[36]: existence of SPP action plan, policy and/or SPP regulatory requirements at national, local or both levels SPP regulatory framework is conducive to sustainable public procurement. No. of staff dedicated to supporting the implementation of SPP policy or SPP practitioners Training/Capacity -building of public procurement practitioners on SPP.	1) Prices of food items. 2) No. of products packaged and eco-labelled. 3) Regulatory and legislative framework in place to adopt environmentally friendly agricultural practices. 4) No. of safety nets to provide food to poor at affordable prices. 5) No. of projects to improve cold chain infrastructure through public – private partnerships.	Indicators are conceptually clear, data on food prices is regularly available. The rest of the indicators are not rgularly reorted. Relevant government departments produce it occasionly.	**Federal:** MOCC MOT&C MOPA FBS SBP NARC PARC **Provincial:** PBS PAD Agriculture Depts. In all provinces P&D Depts. Bureau Of statistics EPA

[35] http://www.fao.org/3/ca4012en/ca4012en.pdf

[36] https://unstats.un.org/sdgs/metadata/files/Metadata-12-07-01.pdf

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
	Training/Capacity-building of public procurement practitioners on SPP. SPP purchasing criteria/ buying standards / requirements identified. Existence of an SPP monitoring system Percentage of sustainable purchase of priority products/services.	6) No. of companies adopting circular economy practices by conducting life-cycle assessment of their products. 7) No. of companies using eco-friendly sourcing techniques such as green transport mechanisms. 8) No. of companies sourcing from suppliers with proper sustainability mechanisms in place.		

3.2.6 Policy Relevance

Agriculture sector emitted 174.6 million tonnes (Mt) of carbon dioxide equivalent (CO2-equivalent) emissions, of which 89.8 Mt is methane (CH4) and 83.7 Mt is nitrous oxide (N2O). Carbon monoxide (CO) emissions were found to be 1.07 Mt of CO2-equivalent. Emission from agricultural soils constituted 45.5% of the total agricultural emissions followed by 45.1% from enteric fermentation and 6.5% from livestock manure management. The rest of 1.7% of the emissions were from rice cultivation followed by 1.1% from burning of crop residue. Historical emission trends showed that the agricultural emissions grew from 71.6 to 174.6 Mt of CO2-equivalent from 1994 to 2015, a 143.8% increase over the period of 21 years.

In order to curtail this burgeoning increase, it is of fundamental importance to regulate the emissions from agriculture sector by developing stringent indicators for not only the GHG emissions, but water use as well. In doing so, technologically intensive techniques of dashboards and data analytics would be required to check, monitor and report the data. In addition to this, capacity building of the agriculture sector is necessary to improve the production, as well as using modern techniques that are less energy intensive.

The burning of crops, which leads to smog in the planar areas of Pakistan, can be mitigated through development of indigenous machinery that help the farmers in efficient harvesting. The food industry should be regulated to improve their logistics i.e. use vehicles that emit controlled GHG emissions, whereas the food waste can be used in biogas production which should be duly incentivized.

Furthermore, after doing the desk studies and consultation with different stakeholders, it was observed that there is no reporting and monitoring regarding the public procurement of goods. The main reason for this could be the lack of policies that ensure SCP practices in the procurement of products. Thus, it is essential to formulate such policies in order to put the agriculture sector on the path of meeting the targets of SDG 12.

3.2.7 Existing Projects

The following table displays the projects that are undergoing in agriculture sector for meeting the targets of SDG 12 in Pakistan.

Table 3.5: Projects list related to SCP in agriculture sector along with their cost

Sr. No.	Name	Cost (Rs. Million)
1	Augmentation of Irrigation Water in Islamabad Capital Territory	53.175
2	Enhancement of Agriculture Production through Installation of Water Conveyance Network in ICT	56.530
3	Water Conservation through High Efficiency Irrigation Systems in ICT	52.401
4	Remedial Measures to Control Waterlogging due to Muzaffargarh & TP Link Canal, Kot Addu, District Muzaffargarh	8,565.288
5	Research Studies on Drainage, Land Reclamation, Water Management & Use of Drainage Water (IWASRI, Mona & LIM) (All Pakistan)	348.335
6	Extension of Pat Feeder Canal for Utilization of Indus Water in Balochistan	2,370.000

3.3 Energy

3.3.1 Background

In NAP, SDG targets 12.1, 12.7, 12.c, and sub-targets 12.1.1, 12.7.1, 12.c.1 correspond to energy and power sector of Pakistan. Country indicators based on these targets and sub-targets describe the number of policies incorporating sustainable consumption and production into national and provincial government organizations, their enactment with further implementation. This trickledown effect reaches at firm level both in production, coal and fossil fuel based energy generation sector, and in consumption, industry and agriculture sectors in Pakistan. The energy sector in Pakistan works under Ministry of Energy (MOE) power and petroleum divisions. It is comprised of public and private power generation as well as petroleum generation companies.

Both divisions are working relentlessly to switch production of power to clean energy sources hydro, solar and wind with least dependency on fossil fuels such as diesel and coal. Alongside Pakistan Atomic Energy Commission (PAEC) is working in collaboration with National Electric Power Regulatory Authority (NEPRA), Pakistan Nuclear Regulatory Authority (PNRA) and Indus River System Authority (IRSA) on decommissioning of nuclear generation plants in Pakistan. Ministry of Energy, Power Division and Petroleum Division are apex bodies regulating and formulating energy policies for energy sector in Pakistan.

The energy and power policies are being renewed in apropos of SCP concepts and guidelines as identified in NAP. Industry can report on best business practices in the form of incorporating SCP into corporate policies, annual reports, with international certifications and third-party audits for clean energy. In agriculture sectors, provincial governments are to follow less fossil fuel based alternatives, less agriculture waste or its burning and composting, with a commitment to protect the environment. Federal government is to ensure implementation through formulation of stringent regulations (carbon-taxation), better implementation frameworks by creating linkages with chambers of commerce across all provinces, industry associations for awareness campaigns, and regular audits.

In Pakistan, the energy sector is controlled and managed under National Electric Power Regulatory Authority (NEPRA) which devise new polices after every four years. In February 2020, GOP decided a National Electricity Plan with an initial draft of National Electricity Power Policy (2020) superseding the previous Power Generation Policy of 2015. Keeping in perspective the clean energy production in Pakistan, GOP recently announced the Alternative and Renewable Energy (ARE) Policy in August 2020, which ensures 20% renewable energy by 2025 rising further to 30% in 2030.

The major proportion of ARE would include hydro power contributing about 60% by 2030. To promote ARE in Pakistan GOP is determined to zero-tax regime for equipment to produce renewable energy after revising duties and tax structure with wind and solar tariff to a new low of 3.5% from a 4.5%. Water and Power Development Authority (WAPDA) is responsible for hydropower generation with a capacity of 8,341 MegaWatt (MW). Pakistan Atomic Energy Commission (PAEC) is responsible for nuclear energy based power generation and has an almost 1430 MW capacity.

3.3.2 Current Situation

The NAP underlines SDG Targets 12.1, 12.7, 12.c, and their respective sub-targets 12.1.1, 12.7.1, 12.c.1 ensure SCP patterns in energy and power sector of Pakistan. These targets and sub-targets collectively induce sustainable consumption and production in national energy sector, with provincial governments to undertake programs for energy efficiency to reduce carbon related GHG emissions pertinent to industry and transport with induction of clean energy technology. It also requires the provincial governments to revise accruing of expenditure on fossil fuels, vis-à-vis re-proportionate subsidiaries and taxation in public procurement as well as in monitoring and regulating private sector.

Conceptualization of indicators pertaining to energy sector is found be at tier II level among key stakeholders at federal and provincial level, but data is not being produced regularly. The energy indicators at national and provincial level are; 1) Percent share of petroleum, coal, hydel, solar, wind, atomic energy in total energy produce, 2) Total amount of energy (petroleum products, petrol, diesel, LPG, natural gas) consumed per sector in million tonnes per year/metric ton per annum/billion cubic feet per day, 3) No. of Energy procurement and conservation methods, 4) No. of Energy efficient appliances, 5) No. of National policies and Baseline Energy audits by NEPRA/Energy management certifications (ISO 50001), 6) No. of Renewable energy projects (hydro, hydel, solar, wind), 7) No. of Renewable energy subsidies (petroleum products and power sector), 8) No. of training programs and workshops for energy efficiency and productivity, quality 5S/5T (SME units), total productive maintenance, and 9) No. of Projects on decommissioning of atomic reactors by AEC for environmental safety. All the indicators as per NAP correspond to country indicators definitions in the GIF. These indicators ensure safe production of energy at national level with resource efficiency and productivity, progressive working on renewable energy production in public procurement, raising awareness on energy conservation and environmental safety, devising policies for private sector monitoring and auditing on energy consumption regularly. Industry and transport sector are major consumers of energy produce of various nature, therefore, GOP is formulating appropriate legislation in both sectors pertinent to abate environmental degradation and pollution.

3.3.3 Institutional Arrangement

The data on energy profile of Pakistan is available at NEPRA, although alternative energy development board (AEDB), PAEC, and WAPDA hold departmental data individually in collaboration with their provincial government department. Yet there is no comprehensive way to extrapolate such data for SDG 12 related indicators due to lack of a central database. The energy sector in KPK province reports data to EPA KPK which is still underway to compile this data formally. In Punjab, Balochistan and Sindh, energy sector lacks coordination with provincial government although data is being managed in a conventional way at local departments for their own use. The statistics departments, P&D departments, local government secretariat respectively work in three provinces to collect data on provincial energy profile.

3.3.4 Challenges

Although, there is coherence among national and provincial level indicators with NAP on SDG 12 targets and sub-targets in contrast to GIF, however it cannot assure Pakistan's attainment on these without developing a basic mechanism for systemic reporting and monitoring of national and provincial indicators. Therefore, a huge challenge is development of a monitoring and reporting mechanism to ensure its connectivity at local government level in provinces and with federal government i.e. Ministry of Energy and Power and its sub-divisions petroleum and power, and other relevant government bodies i.e. NEPRA, WAPDA, AEDB, and PAEC. All have to work in collaboration for formulation of energy conservation, efficiency at production and consumption level, increased reliance on renewable alternatives while minimizing dependency on fossil-fuels.

The information produced by individual departments cannot be used if it cannot either be transformed or transmitted regularly to develop a picture of the progression made on SCP pathway throughout the year. There are challenges in this regard for execution of such an energy plan. However, strategizing these priorities through formulation of new energy policies with stringency of implementation by GOP can ensue desirable results by close coordination of federal with provincial government departments in four provinces both on energy projects and action plans to pace with data communication requirement for SDG 12 indicators.

3.3.5 Proposed Framework

Table 3.6: SDG 12 Capacity Assessment on Targets, Sub-targets, nationally defined Indicators, and their measurements, localization of responsibility and data sources

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Current level of Data	Data Sources and Responsibility
SDG 12 Target 12.1 Implement the 10-year framework of programs on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.				
12.1.1 Number of countries with sustainable consumption and production (SCP) national action plans or SCP mainstreamed as a priority or a target into national policies.	• To be reported under this indicator, a government should have moved through one or more new stage(s) of the "Policy cycle" on one or more policy instrument(s) during the current reporting period. • As per the 10YFP Indicators of Success, although they can be linked, a policy instrument is not the same thing as a change in practice, a commitment, a coordination mechanism or a knowledge resource or tool.	1) No. of studies undertaken to revise National Energy Conservation Policy, revised policy document prepared. 2) No. of provincial energy resource and information centers established. 3) Energy conservation legislation and audit standards enacted and number and type of measures taken to enforce these. 4) No. of punitive laws developed to protect illegal connections.	Indicators are conceptually clear, data for indicator "1" is achievable. TThe rest of the indicators are established. However, their enforcement is a challenge. Therefore, data is not regularly available. Relevant government departments produce will produce it after its enforcement.	**Federal:** MOE (power and petroleum Divisions) NEPRA ISRA PAEC AEDB WAPDA PNRA **Provincial:** WAPDA EPA Provincial Energy departments in all provinces

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
	• This indicator is calculated at relevant aggregation levels based on the information collected from the National Focal Points and other government officials; users of the data should be mindful of double counting one same policy, when aggregating data across reporting years[37]. Using IPCC (2006) methodology, the emissions related to energy production can be calculated, the basic equation of which suggests Emissions GHG, *fuel,technology* = FuelConsumption *fuel,technology* • Emission Factor GHG, *fuel, technology.*	5) No. of measures taken to develop in house technological capacity for manufacturing of renewable power generation in the country. 6) No. and type of Certification standards introduced for efficient heating and cooling appliances, equipment's and machineries. 7) No. of studies undertaken to review and streamline Public Procurement rules and regulations with SCP to include energy efficiency criteria.	Indicators are conceptually clear, data is rarely available and being produced by relevant government departments, and is not reported regularly.	**Federal:** MOCC NARC PARC **Provincial:** PAD Agriculture Depts. In all provinces CABI[34] P&D Depts. Bureau Of statistics Agricultural universities Provincial Irrigation departments
SDG 12 Target 12.c: Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account their specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities.				
12.c.1 Amount of fossil-fuel subsidies per unit of GDP (production and consumption) and as a proportion of total national expenditure on fossil fuels.	It is proposed that countries report on the subsidy categories listed below as sub-indicators[38]; Direct transfers; Induced transfers (reporting on regulated prices and calculation of the total amount); Tax expenditure, other government revenue foregone and under-pricing of goods and services, including risk (optional). Number of divestment initiatives undertaken by public and private sector entities in the country.	1) Amount of money raised through public private partnership for energy efficiency. 2) No. and type of measures taken to provide tax rebate on energy efficient appliances, equipment's and machineries.	Indicators are conceptually clear, data on indicators "3,4 and 5" are regularly available. However, for indicator "1" and "2" we might get irregular data. Relevant government departments produce almost regularly.	**Federal:** MOE (power and petroleum Divisions) FBR NEPRA ISRA PAEC AEDB WAPDA PNRA Provincial: WAPDA EPA

[37] https://environmentlive.unep.org/media/docs/projects/metadata_12_1_1.pdf

[38] https://unstats.un.org/sdgs/metadata/files/Metadata-12-0c-01.pdf

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
		3) No. and type of investment friendly initiatives and financially attractive policies introduced to promote renewables. 4) Amount of Foreign development investment (FDI) in energy sector. 5) No. and type of incentives provided to promote solar energy.		Provincial Energy departments in all provinces.

3.3.6 Policy Relevance

The sustainability of energy sector can be ensured by increasing the proportion of renewable energy sources in the national grid, as the Prime Minister of Pakistan has suggested the phasing out of coal. With regards to economic sustainability, the issue of circular debt remains a pressing issue and through independent power producers focusing on renewable energy resources, this issue can be resolved. Moreover, the data on material footprint of fossil fuel based energy generation will help in developing national database on energy related environmental standards, which can be ultimately integrated into material flow accounting.

3.3.7 Existing Projects

The following table displays the projects that are undergoing in energy sector for meeting the targets of SDG 12 in Pakistan.

Table 3.7: Projects list related to SCP in energy sector along with their cost

Sr. No.	Name	Cost (Rs. Million)
1	Promoting Sustainable Energy Production and Use from Biomass in Pakistan	716.00
2	Productive Uses of Renewable Energy in Chitral District, Pakistan (PURE-Chitral)	565.00
3	Power Distribution Enhancement Project; (Tranche-I & II) Rehabilitation Capacitor Installation & Energy Efficiency (ADB) (GEPCO)	3,577.000
4	Power Distribution Enhancement Project; (Tranche-I & II) Rehabilitation Capacitor Installation & Energy Efficiency (ADB) (HESCO)	2,500.000
5	Power Distribution Enhancement Project; (Tranche-I & II) Rehabilitation Capacitor Installation & Energy Efficiency (ADB) (IESCO)	2,717.860
6	Power Distribution Enhancement Project; (Tranche-I & II) Rehabilitation Capacitor Installation & Energy Efficiency (ADB) (LESCO)	3,273.000
7	Power Distribution Enhancement Project; (Tranche-I & II) Rehabilitation Capacitor Installation & Energy Efficiency (ADB) (MEPCO)	3,606.000
8	Power Distribution Enhancement Project; (Tranche-I & II) Rehabilitation Capacitor Installation & Energy Efficiency (ADB) (PESCO)	1,689.000
9	Power Distribution Enhancement Project; (Tranche-I & II) Rehabilitation Capacitor Installation & Energy Efficiency (ADB) (FESCO)	2,318.000
10	Power Distribution Enhancement Project; (Tranche-I & II) Rehabilitation Capacitor Installation & Energy Efficiency (ADB) (GEPCO)	1,125.000
11	Power Distribution Enhancement Project; (Tranche-I & II) Rehabilitation Capacitor Installation & Energy Efficiency (ADB) (HESCO)	2,622.000
12	Power Distribution Enhancement Project; (Tranche-I & II) Rehabilitation Capacitor Installation & Energy Efficiency (ADB) (IESCO)	2,633.390
13	Power Distribution Enhancement Project; (Tranche-I & II) Rehabilitation Capacitor Installation & Energy Efficiency (ADB) (LESCO)	2,346.000
14	Power Distribution Enhancement Project; (Tranche-I & II) Rehabilitation Capacitor Installation & Energy Efficiency (ADB) (PESCO)	2,305.820

Sr. No.	Name	Cost (Rs. Million)
15	Power Distribution Enhancement Project; (Tranche-I & II) Rehabilitation Capacitor Installation & Energy Efficiency (ADB) (QESCO)	8,731.660
16	Power Distribution Enhancement Project; (Tranche-I & II) Rehabilitation Capacitor Installation & Energy Efficiency (ADB) (FESCO)	2,576.000
17	Power Distribution Enhancement Project; (Tranche-I & II) Rehabilitation Capacitor Installation & Energy Efficiency (ADB) (MEPCO)	3,678.790
18	Quaid-e-Azam Solar Park, Bahawalpur (MEPCO)	763.000
19	Water Conservation through High Efficiency Irrigation Systems in ICT	52.401
20	Provision of Solar System at Pakistan Railways Headquarter Office, Lahore	36.000
21	Quaid-e-Azam Solar Park at Lal-Suhanra (Phase-II) Evacuation of 600 MW Solar (Proposed to be carried out by NTDC)	4,065.730
22	Evacuation of power from wind power projects at Jhimpir and Gharo Wind Clusters	12,572.660
23	4 MW Hydel Project at Thack Nullah Chilas (ADB)	1,320.117
24	Construction of 14 MW Hydel Power Project Naltar-V	3,843.753
25	Construction of 16 MW Hydel Power Project Naltar-III	2,900.000
26	Establishment of Hydropower Training Institute (HPTI) Mangla (AFD)	486.151
27	Golan Gol Hydro Power Project (106 MW) (Chitral)	28,202.402
28	Keyal Khawar Hydro Power Project, Khyber Pakhtunkhwa, (Battagram) (122 MW)	27,803.010
29	Neelum Jhelum Hydro Power Project (969 MW) (China Kuwait Saudi Arabia	274,882.590
30	Pattan Hydro Power Project (2800 MW) (Kohistan) (Study)	731.233
31	Refurbishment & Up-gradation of Generation Units of Mangla Power Station (310 MW)	52,224.307

Sr. No.	Name	Cost (Rs. Million)
32	Shyok Dam Multipurpose Project (Feasibility Study)	159.583
33	Tarbela Fourth Extension Hydro Power Project (1410 MW) (Swabi)	83,601.040
34	Thakot Hydro Power Project (2800 MW) (Battagram) (Study)	719.628
35	1200 MW LNG Based Power Plant Baloki	81,406.000
36	1200 MW LNG Based Power Plant Haveli Bahadurshah	81,406.000

3.4 Industry

3.4.1 Background

SDG 12 targets 12.4, 12.6, 12.7, and sub-targets 12.4.1, 12.4.2, 12.6.1 12.7.1 in NAP correspond to industry sector pertinent to industrial waste, its handling and management in Pakistan. Under GIF, the countries and their respective governments are to ensure management of all hazardous wastes and harmful chemicals from industrial input to output cycles as per international frameworks for environmentally sound practices. In this, it urges industries, or multinational companies to adopt sustainable business practices. Similarly, it requires government to promote and interject sustainable consumption and production into public procurement practices while modifying and formulating national policies, hence prioritize SDG related needs by turning them into national indicators.

The country indicators for SDG 12 in GIF are: no. of countries signing up for international multilateral environmental agreements on hazardous waste and chemicals, and conformance to terms and conditions such as of required by these agreements. It also requires industry of partisan countries to account for hazardous waste generated per capita, and proportion of hazardous waste treated, by type of treatment. Similarly, the number of companies publishing sustainability reports in these countries, and number of countries implementing sustainable public procurement policies and action plans. Under NAP, federal and provincial governments are required to take into account industry related waste generation, the figures and data management on its key indicators, with steps to ensure generating data on hazardous chemicals disposal, aggregation of data on industrial input-output losses, details on large exporting industries ensuring waste handling, recycling and technology upgradation or entering into international environmental agreements.

At the federal level, Ministry of Industries and Production (MOIP) is taking steps for sustainable industrial expansion especially in sub-sectors. During the period 2017-2018 major policy aspects underwent reforms: such as development of industrial parks with public-private partnerships, technology and skill upgradation, international exposure to engineering industry, all aimed at industrial equitable development and socio-economic wellbeing of people along within sustainable consumption and production paraphernalia.

Although, there are caveats to industrial policy as it still needs upgrade in the form of national policy framework. However, the main function of industries and production division SROs to date has led the necessary updates and changes, with some of the new development projects. For value addition in construction industry through cement research and development institute upgradation, upgradation of ceramics and sanitary ware sector, skill development and training, industrial technology benchmarking, industrial designing and automation in KPK, Punjab, Balochistan and Sindh provinces, and infrastructure development at Gwadar export zone in Balochistan[39]. Pakistan Steel Mills Karachi is the largest steel plant of Pakistan with a production capacity of 1.1 million tonnes per year. It is currently committed to minimizing process wastages, rejections and recycling wastes[40]. Similarly, a public private partnership joint venture Spun Yarn Research and Development Company Pvt Ltd currently works with the scope to use waste of cotton ginning industry as an input raw material for next process. Pakistan Industrial Technical Assistance Centre (PITAC), Lahore conducts trainings and workshops for especially reduction of wastages with cost efficient strategies to maximize profits for small and medium enterprises with a special focus on women entrepreneurs.

3.4.2 Current Situation

As NAP identifies SDG 12 Targets 12.4, 12.6, 12.7, and Sub-targets 12.4.1, 12.4.2, 12.6.1 12.7.1 relevant to industrial waste and its safe disposal. Conceptualization of indicators pertaining to industry sector is found to be at tier II level among key stakeholders at federal and provincial level, but data is not being produced regularly. Currently, country and provincial indicators for industry in Pakistan are: 1) Total production/Quantity/Inventory in million tons per year(in manufacturing sub-sectors in domestic or import/export units (MTPY), 2) Total value of production/Quantity/Inventory in billion RS per year (in all industrial sub-sectors), 3) % share of groups and commodities in domestic output, exports and imports (food, textile, petroleum group and coal, other manufacturers e.g. carpets rugs mats, leather goods, foot wear, surgical equipment, cutlery, onyx, chemicals & pharmaceutical group, engineering goods, 4) Total volume of above groups and commodities in million tons per year, 5) Total value of above groups and commodities in million dollars per year, 6) Unit value of above groups and commodities in million dollars per year, 7) No. of productivity and Quality Audits, 8) No. of material cost flow accounting certifications, 9) No. of HR professional trained under capacity building programs by NPO or other industry related public and private institutions in Pakistan. Although, all indicators correspond to country indicators listed in NAP and GIF, yet directly related are: 7, 8, 9 which correspond directly to national indicators of SDG 12 Targets 12.4, 12.6, 12.7, and Sub-targets 12.4.1, 12.4.2, 12.6.1 12.7.1.

The industrial sector in Pakistan is composed of export and import related manufacturing. Pakistan's major exports are in textiles, food products, metals and minerals, other manufactures and leather products. The short term export enhancement measures are focused on products such as basmati rice, horticulture, meat products, jewellery, for focused international markets of Iran, China, Afghanistan, European Union. Textile still holds main share of 56% in Pakistan's exports. By share, main imports are; machinery (14.9%), transport group (21.7%), food group (18.5%), chemical group (11%), metal group, (20.3%) and miscellaneous group (18.8%). Also, a significant decline of 21.3% in import of petroleum products, 4.4% in textile group has been observed[41].

[39] Ministry of Industries and Production (MOIP), Government of Pakistan

[40] MOIP Year Book 2017-18

[41] Ministry of Commerce, Government of Pakistan

For industrial progress, provincial governments of KPK, Punjab, Balochistan and Sindh are re-evaluating existing policies for resource intensive industry such as steel, textile, sugarcane, cement, auto manufacturing, and other relevant small and medium enterprises to ascertain resource efficiency and clean technologies especially in engineering industries. Industries involved in exporting are capable of increasing their output manifold if efficiency of industrial units is enhanced and resource use is minimized. The priority objective is to enhance the production and processing capacity of industrial units, therefore reducing input and output losses with minimum wastages. This will ensure resources conservation, value addition, environmental compliance and competitiveness by developing industrial zones. National Productivity Organization (NPO) is a public sector company and subordinate body of MOIP, and is member of Asian Productivity Organization (APO) Japan and works as liaison office of APO Japan in Pakistan. With its function of enhancement of productivity and quality (5S, Kaizen Management, Benchmarking, Industrial Engineering Tools, Total Productive, Maintenance, Six Sigma, Human Resource Management and Factory Improvement) in industrial sector in Pakistan, it performs a crucial role in campaigning green productivity and efficient resource utilization.

NPO has an assigned role of conducting energy efficiency audits of industry, capacity building and development of professional energy management practitioners, vis-à-vis material flow cost accounting and energy management system of international certification i.e. ISO 50001. Similarly, industrial compliance to environmental aspects as well as to waste reductions at input and output sides both in public and private corporations, is NPO's utmost priority as its actively working on internal system improvement, knowledge management and HRD development for green productivity improvement.

3.4.3 Institutional Arrangement

The data on the indicators mentioned above is found in various departments of Ministry of Industries and Production (MOIP) and documents such as industrial policy of provinces in provincial industrial departments. Furthermore, EPA in KPK province is responsible to gather and collate all SDG related data among the provincial departments. In Punjab, Balochistan, and Sindh the department of statistics, local governments, and environmental departments are reported to be responsible for managing data and its reporting when required, however the actual responsibility for monitoring and reporting data is yet to be localized. Also, no repository exists in individual departments, hence there is no central repository neither at federal or provincial departments which increases the urgency for data management system at both level.

3.4.4 Challenges

Currently, challenges faced by the industry in Pakistan are collective in nature with regard to data-related documentation. With the advent of China Pakistan Economic Corridor (CPEC), the emphasis on industrial productivity and quality management pertaining to value add especially in export mix of Pakistan is ineluctable. Strategic Trade Policy Framework (STPF) 2015-2018 still serves as potential policy document related to Pakistan international trade which highlights potential areas of improvement related to industrial wastages and labor related issues.

This major shift in improving industrial sub-sectors to optimize industrial processes and product use to its full potential cannot be achieved without efforts to collude data on industry-related business cycles of inputs and outputs in all provinces.

A key enabler in Strategic Trade Policy Framework (STPF) is industrial compliance to composite environmental and quality standards with convergence of local and international standards. Another key enabler is international competitiveness in global value chain with assurance of quality of products and infrastructure, and labour productivity and technological development. It urges Pakistan industry to improve on environmental issues in order to maintain GSP plus status essential for access to the market. While progress on these aspects is still ongoing, where documentation of industry related data, and knowledge management is essential for dynamic globalization, the monitoring and reporting on data related to industry on industrial wastages is still in the incubation phase. In this, there is lack of clarity on the custodianship of data-related monitoring and reporting among the provinces pertinent to waste especially input and output losses and solid and liquid waste treatment.

3.4.5 Proposed Framework

Table 3.8: SDG 12 Capacity Assessment on Targets, Sub-targets, nationally defined Indicators, and their measurements, localization of responsibility and data sources

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Current level of Data	Data Sources and Responsibility
12.2 By 2030, achieve the sustainable management and efficient use of natural resources				
12.2.1 Material footprint, material footprint per capita, and material footprint per GDP.	Calculation of carbon footprint for every item produced through a cradle to grave approach that includes raw material extraction, processing, transport, manufacturing, distribution and disposal.	1) No. & type of programmes, projects and activities initiated for upgradation and modernization of technologies for enhancing resource conservation and value addition. 2) No. and type of industries introduced Eco-standards and labeling to meet international standards particularly related to SCP.	Indicators are conceptually clear, data on indicator "1 and 8" is available. However, for indicator "2,3" and "4" we might get irregular data. Rest of the indicators data are not easily available. Relevant government departments produce the data which is available.	**Federal:** MOIP MOCC PSQCA[43] PNAC[44] **Provincial:** Local Industries Depts. EPA's

[43] PSQCA: Pakistan Standards and Quality Control Authority

[44] PNAC: Pakistan National Accreditation Council

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
		1) No. & type of programmes, projects and activities initiated for upgradation and modernization of technologies for enhancing resource conservation and value addition. 2) No. and type of industries introduced Eco-standards and labeling to meet international standards particularly related to SCP. 3) Energy conservation achieved through Eco-standards and labeling. 4) No. and type of industries utilizing local raw materials/ natural resources in their production system. 5) No. and type of initiatives taken for compliance of 5Rs[42] for water efficiency. 6) R & D for promoting SCP in industries. 7) No. obsolete equipment replaced to promote SCP in industries.		

[42] Reuse water, redcue waste, recharge ground water, recycle waste water, respect water.

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
		8) No. and type of industries having individual wastewater treatment/ pre-treatment plants. 9) Percentage reduction in energy consumption by industry.		
SDG 12 Target 12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to.				
12.4.1 Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement. 12.4.2 Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment.	International multilateral agreements e.g. Basel convention, Rotterdam convention, Stockholm convention, Montreal protocol, Minamata Convention etc. The Country Score depends on the amount of information that is sent to the Conventions' Secretariat, and is calculated as follows (and communicated by the Secretariats)[45]. Designation of the Focal Point and one or more Competent Authorities, Submission of the national reports during the reporting period e.g. import responses under Rotterdam convention Hazardous waste generated = hazardous waste collected through municipal service or private companies + hazardous waste given by generatror to treatment or disposal facilities + estimation of hazardous waste unaccounted for Proportion of hazardous waste treated (%) = Quantity of hazardous waste treated during the reporting year*100* Total quantity of hazardous waste generated during the reporting year * Hazardous waste treated in the country plus materials exported for treatment minus the materials imported for treatment[46].	1) No. and type of rules, regulations, guidelines for achieving resource conservation in industrial sector. 2) No. & type of reports monitoring environmental and water wastages. 3) Steps taken to measure chemiclas and wastages emissions in industrial sector. 4) No. and type of industries introduced ISO Certification and global accreditation. 5) No. and type of steps taken through corporate social responsibility (CSR) specifically for reduction of chemicals emissions.	Indicators are conceptually clear, data on indicator "1 and 2" is available mostly from annual reports. Data on indicator "6" can be also be confirm from EPA. However, for indicator "3" and "4" we might not get data specially for small and medium firms. Relevant government departments produce the data which is available.	**Federal:** MOIP MOCC **Provincial:** Local Industries Depts. EPAs

[45] https://unstats.un.org/sdgs/metadata/files/Metadata-12-04-01.pdf

[46] https://unstats.un.org/sdgs/metadata/files/Metadata-12-04-02.pdf

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
		6) No. and type of industries having individual wastewater treatment/ pre-treatment plants.		
SDG 12 Target 12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.				
12.6.1 Number of companies publishing sustainability reports.	**Minimum Requirement:** Institutional and governance: Materiality assessment* Sustainability strategy and/or principles related to sustainability Management approach to address materiality topics Governance structure, including for economic, environmental and social issues Key impacts, risks, opportunities Anti-fraud, anti-corruption and anti-competitive behaviour practices. Economic: Direct measure of economic performance (revenue, net profit, value added, payouts to shareholders) Indirect measure of economic performance (community investment, investment in infrastructure or other significant local economic impact). Environmental: Energy consumption and energy efficiency Water consumption, wastewater generation, integrated water resource management practices, or water recycling/re-use and efficiency Greenhouse gas emissions Other emissions and effluents, including Ozone-depleting substances, Nitrogen Oxides (NOX), Sulphur Oxides (SOX), and chemicals Waste generation, including hazardous wastes Waste minimization and recycling practices Use and/or production of hazardous chemicals and substances.	1) No. of industries reporting as per SMART parameters to the respective EPAs. 2) No. and type of surveys taken and reports generated to identify the industrial zones that need major technological improvement for emission reduction and SCP. 3) No. and type of reports generated and published on GHG emissions in industrial sector. 4) No. & type of reports monitoring environmental, water.	Indicators are conceptually clear, data on given indicators is available from the relevant departments and ministries annual reports. Rest of the Relevant government departments and chamber of commerce and industreis produce the data annually.	**Federal:** MOIP MOCC FCC&I **Provincial:** Local Industries Depts. EPAs

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
	Social: Occupational health and safety Total number of employees, by contract type and gender Employee training Unfair and illegal labour practices and other human rights considerations Diversity, equal opportunity and discrimination in governance bodies and among employees Worker rights and collective agreements.			
SDG 12 Target 12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities				
12.7.1 Number of countries implementing sustainable public procurement policies and action plans.	- Development of sustainable public procurement standards and guidelines - Development of sustainable public procurement policies and plans Sustainable Public Procurement (SPP) is a "A process whereby public organizations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life cycle basis in terms of generating benefits not only to the organization, but also to society and the economy, whilst significantly reducing negative impacts on the environment". The methodology developed is computational and required inputs are[47]: existence of SPP action plan, policy and/or SPP regulatory requirements at national, local or both levels SPP regulatory framework is conducive to sustainable public procurement Number of staff dedicated to supporting the implementation of SPP policy or SPP practitioners Training/Capacity-building of public procurement practitioners on SPP. Training/Capacity-building of public procurement practitioners on SPP. SPP purchasing criteria/ buying standards / requirements identified. Existence of an SPP monitoring system Percentage of sustainable purchase of priority products/services.	1) Public procurement rules and regulation are formed. 2) Purchases of products and services follow public procurement ruels and regualations. 3) Government and companies adopting life-cycle assessment of their products and services. 4) Government and companies using eco-friendly sourcing techniques for their product and services. 5) No. of companies sourcing from sup-pliers with proper sustainability mechanisms in place.	Indicators are conceptually clear, data on indicator "1" is available. However, for indicator "2,3, 4"and "5" we might not get data. These indicators data are not easily available. Relevant government departments can not produce it for general public.	**Federal:** MOIP MOCC MOF **Provincial:** Local Industries Depts. EPAs

[47] https://unstats.un.org/sdgs/metadata/files/Metadata-12-07-01.pdf

3.4.6 Policy Relevance

Sustainable industries are incumbent upon three major interventions: (a) implementation of best and technologically intensive practices for improving the production performance, (b) introducing energy efficient and eco-friendly measures to reduce the environmental impact and (c) capacity building of employees and offering safe working conditions with decent wages. The developed indicators will help in receiving actionable intelligence for evidence-based policymaking in setting the minimum emission standards for the industries, improving the production processes to increase the net revenue and providing a source of income to unskilled, semi-skilled and skilled labor with focus on reducing gender disparity.

3.4.7 Existing Projects

The following table displays the projects that are undergoing in industry sector for meeting the targets of SDG 12 in Pakistan.

Table 3.9: Projects list related to SCP in industry sector along with their cost

Sr. No.	Name	Cost (Rs. Million)
1	Sustainable Energy Initiative for Industries	3,475.00
2	Promoting Employment & Productivity in the Garment Industry	300.00
3	Pak-Korean Garments Technology Training Institute, Karachi	609.330
4	GEF UNIDO Cleantech Programme for SMEs	536.0

3.5 Climate Change

3.5.1 Background

According to NAP, climate change is the fifth priority area in SCP related progress in Pakistan. SDG 12 Target 12.1 and Sub-target 12.1.1 can help examine if federal and provincial governments are advancing on climate change national indicators throughEnvironmental Impact Assessments (EIAs) with data availability on monitoring and evaluation of mandatory environmental law National Environmental Protection Act, and environmental policies on carbon emissions, afforestation, promoting renewable energy, and fuel efficient based transportation. The Climate Change Policy (2012) is a comprehensive framework in response to natural disasters wreaking havoc on millions of populace in extreme climate change stricken regions. It has already resulted in the largest displacement of 10 million population during the 2010 floods.

The policy was prepared with inputs of Ministry of Planning and Development, Ministry of Water and Power, Ministry of Food Security, Ministry of Industries and Production, Ministry of Foreign Affairs, along with government institutions National Disaster Management Authority (NDMA), WAPDA, EPA and Enercon. Provincial governments of KPK, Punjab, Balochistan, Sindh, Azad Jammu and Kashmir, and Gilgit–Baltistan, and provision of UNDP funding also played an important role in shaping this policy. The policy describes measures such as Initial Environmental Examinations (IEE), Environmental Impact Assessments (EIA) to ensure environmental compliance while addressing paraphernalia issues of deforestation and promoting Clean Development Mechanisms (CDM).

Pakistan is considered in top ten countries most vulnerable to the impacts of climate change. Therefore, to curtail this negative impact and reverse the phenomenon, the Climate Change Policy proposed adaptation measures by prioritizing sectors in order as conserving water resources, food security in agriculture and livestock, health and immunity, protection of land and marine ecosystem. It further distinguished climate change mitigation areas such as energy efficiency and conservation, transport system and town planning, industries and waste handling, food security.

To assume all these functions, capacity building and institutional development through international cooperation for funding and technology transfer, and collaboration among provinces to strengthen policy implementation mechanism are essential. Herein, it is important to indicate that Pakistan's share in GHG related emissions is among the lowest in the world, yet the extreme vulnerability to catastrophoc events due to cllimate change burdens its future with natural calamities and climatic threats. In the last twenty years, Pakistan has suffered severely due to this vulnerability in terms of GDP loss and increased frequency of extreme weather events. A GDP loss of 0.53% per unit of GDP equivalent to an economic loss of worth US$ 3,792.52 million, and an expulsive thrust of 152 extreme weather catastrophic events since 1999 were two most atrocious sequel of natural calamities. Hence, climate change adaptation needs to be inclusive of socioeconomic cost related to environmental impacts worth around 7 to 14 billion USD per year[48].

The increase in glacier lakes as a result of glacier meltdown had increased the river outflows annually within Indus River System along with irregularity in monsoon patterns are causing floods and droughts on a similitude. Therefore, GOP called on provinces for water conservation and storage infrastructure through an integrated water resource management (IWRM). Following this, waste water treatment and disposal have been legislated. It also accentuated for capacity enhancement in policy sector in order to expedite policy implementation across the country with technologies and techniques to recycle sea water for utilization with emphasis on minimal domestic water use, better irrigation planning, use of GIS tracking of water resource, better agriculture zones, afforestation to prepare a database of resource inventory in the country including; arid land, forest management, and surface and ground water. Similarly, for disaster management to minimize its impacts pertaining to climate change National Disaster Risk Management Fund (NDRMF) funds the socioeconomic distressed populace to adapt them to the climate impacts.

[48] Economic Survey of Pakistan 2020

3.5.2 Current Situation

To know the developments on SDG target 12.1 and sub-target 12.1.1 under climate change, it is essential to collate information on its national indicators as the first step. Conceptualization of indicators pertaining to climate change sector is found to be at tier II level among key stakeholders at federal and provincial level, and data is not managed and shared regularly. Currently, national and provincial indicators in use in this priority area in Pakistan are: 1) Total emissions per capita, 2) Percentage change in temperature rise, 3) Total volume of CO2 emissions in giga grams, 4) Mitigation cost per year in billion USD, 5) Total abatement cost and backstop price in USD, 6) Mitigation participation rate in %, 7) Total emissions to output ratio in % for each sector (agriculture, energy, industry, water, land and marine ecosystems, sustainable cities and transport), 8) % of waste produced in each sector, 9) Total waste produced in million tons,[49] 10) No. of IEEs per month in every province, and 11) No. of EIAs per month in every province. Although, all indicators enlist country indicators for SDG 12.1 and 12.1.1 definitions and descriptions listed in NAP and GIF, yet the data on above indicators is not uniform although it is produced regularly by departments like EPAs and PDM.

Recent studies conducted by Pakistan Meteorological Department (PMD) show that since Pakistan is in high impact zones of GHG emissions, therefore it has high GHG inventory in its climate, hence Pakistan faces extreme climate change potential risk. The annual surface mean temperature in Pakistan rises by 0.6 to 1.0 degree centigrade. Due to 0.7% increase in solar radiation in Balochistan the humidity levels are down by 5%. Due to high temperatures the rainfall has reduced by 10% to 15% in coastal areas, whereas 18% to 32% increase in rainfall has been observed in monsoon climate zone.

According to the SCHENGEN model climate change scenarios, the projected changes in precipitation and temperature estimates that in the next half of the 21st century, temperature, rainfalls patterns will be irregular especially in south-western coastline and western Balochistan. However, RCMs projections indicate positive results for precipitations measures for southeast Sindh and Cholistan regions during the same time. The major ecological impacts are all related to water factor, whether it is irrigation for arid plains, surface or ground water, glacier melts and river flows or natural disasters such as floods[50].

It is important to mention here that MOCC after revision of Nationally Determined Contributions (NDCs) is currently collaborating on Measurement, Reporting and Verification (MRV) and GHG emission inventory strengthening components within the revision of NDCs for the United Nations Framework Convention on Climate Change (UNFCCC) reporting. With NDC partnership, Pakistan is mapping its climate resilient development trajectory. The reason Pakistan holds 6 positions at COP-25 at UNFCCC beholds Pakistan's commitment to climate change. Additionally, National Committee on Establishment of Carbon Market (NCEC) was formed to mitigate the carbon emissions impacts by transport sector in Pakistan, GOP took initiative to formulate National Electric Vehicle Policy (NEVP) targeting a 30% shift to electric vehicles by 2030 which is currently under approval stage.

[49] Ministry of Climate Change. Government of Pakistan

[50] Pakistan Meteorological Department

A remarkable step towards NEVP implementation is the world's first "zero emissions" metro line project launched in Karachi, the largest metropolitan city of Pakistan. With above achievements on climate change, Pakistan has also submitted its Second National Communication to the UNFCCC Secretariat. MOCC has prepared its First Biennial Update Report with the support of UNFCCC secretariat[51]. The Clean and Green Pakistan Movement (CGPM) under Water, Sanitation and Hygiene (WASH) project of MOCC is a practical example of SDGs agenda being swiftly driven in Pakistan. Forestry comes next with its Ten Billion Tree Tsunami Programme (TPTTP) in all provinces including AJK, GB with budgetary allocation in addition to 4.51 million hectares of forests almost covering 5.01% of land in Pakistan, besides other seasonal tree planting campaigns. The Clean Green Pakistan Index (CGPI) provides system of monitoring and reporting on CGPM of WASH Project.

It consists of five pillars comprising of 35 indicators besides the data of the Multiple Indicator Cluster Survey (MICS) for ranking cities. The city councils and administration in each district coordinate with local government departments in provinces for monitoring and reporting on monthly basis. Currently, 13 cities of Punjab province are under survey[52].

3.5.3 Institutional Arrangement

The MOCC, and its various departments of EPA in provinces, regularly review and produce documents such as EIAs and IEEs related to industry and manufacturing activities. Currently, these two indicators "No. of IEEs per month in every province; and No. of EIAs per month in every province" are considered to be most important when it comes to industry, which contributes largest carbon emission share in overall carbon profile of Pakistan. Collaboration across the federal and provincial bodies is essential for development of database.

3.5.4 Challenges

PMD have data repository concerning GIS based database both on carbon emissions by sectors and climate change related changing precipitation patterns in the country for over 20 years. So far its correspondence with th SDG 12 related targets 12.1 and sub target 12.1.1 within national indicators context is found to be absent. MOCC faces multifaceted challenges for development of indices on SDG related progress due to non-uniformity of data and its meaningful presence in the form of a comprehensive repository despite persistent efforts since the enactment of NAP in 2016. During SDG 12 consultations with all provincial departments, the biggest challenge and issues were related to the consolidation of huge data and its channeling and availability on regular basis to all. MOCC is clear on its agenda pertaining to NAP in climate change linked aspects especially capacity building of technical staff to handle data and make it useful.

[51] Ministry of Climate Change, Government of Pakistan

[52] Pakistan Economic Survey 2020.

Despite regional efforts and stakeholders' consensus the efforts lack some coherence with major rising challenge of scarcity in funding from international donors. Pakistan's national interests in this regard can be protected with assurance and availability of sufficient capacity of institutional human resource with special emphasis on technical training and specialized analytical skills for transformation of raw data into useful information. In this regard climate change and environmental policies need to be up-to-date with current developments on the climate change conundrum around the world. Lessons and best pratices need to be replicated from advanced nations to developing nations which involves technology transfer and training.

3.5.5 Proposed Framework

Table 3.10: SDG 12 Capacity Assessment on Targets, Sub-targets, nationally defined Indicators, and their measurements, localization of responsibility and data sources

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Current level of Data	Data Sources and Responsibility
SDG 12 Target 12.1 Implement the 10-year framework of programs on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.				
12.1.1 Number of countries with sustainable consumption and production (SCP) national action plans or SCP mainstreamed as a priority or a target into national policies.	• To be reported under this indicator, a government should have moved through one or more new stage(s) of the "Policy cycle" on one or more policy instrument(s) during the current reporting period. • As per the 10YFP Indicators of Success, although they can be linked, a policy instrument is not the same thing as a change in practice, a commitment, a coordination mechanism or a knowledge resource or tool. • This indicator is calculated at relevant aggregation levels based on the information collected from the National Focal Points and other government officials; users of the data should be mindful of double counting one same policy, when aggregating data across reporting years[53].	1) National and Provincial Implementing Entities (NIE & PIE) created to deal with adaptation and mitigation projects at federal and provincial levels. 2) Climate change and related SCP curricula developed. 3) Water, food and energy security policies prepared and implemented.	Indicators are conceptually clear, data on indicators is available. Indicators data areavailable. Relevant government departments produce the data.	**Federal:** MOCC MOPD&SI PMD Federal EPA Pakistan **Provincial:** Federal and Provincial EPAs, P&D Divisons, Forestry and Landuse Depts.

[53] https://environmentlive.unep.org/media/docs/projects/metadata_12_1_1.pdf

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
12.2 By 2030, achieve the sustainable management and efficient use of natural resources				
12.2.1 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP.	The indicators can be categorized into three major categories: • changes of biodiversity, directly resulting from climate change, and addresses three thematically distinct indication fields. • indirect changes in biodiversity due to climate change and includes indicators addressing pressures on biodiversity caused by sectoral adaptation measures of different land uses, such as forestry, agriculture, and water management. • indicators which relate to the adaptation of nature conservation strategies, measures to climate change, its direct and indirect impacts on biodiversity, and reflect the success of such adaptations.	1) Best available technologies identified through "Technology Needs Assessment" to make a clean energy transition to reduce emissions. 2) Percentage of forest area increased 3) Percentage increase in resilient Infrastructure, including telecommunication, power, utilities and transport. 4) GHG emission inventory updated on scientific lines.	Indicators are conceptually clear, data on indicator "2 and 4" is available. However, for indicator "1" and "3" we might not get data. Indicators 3 and 1 are not easily available because intricacies attached. Relevant government departments produce the data which is available.	**Federal:** MOCC PMD Ministry of Water and Power Federal EPA Pakistan **Provincial:** Provincial EPAs, Forestry and Landuse Depts. Planning and Development Departments Electricity Supply companies
12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.				
12.5.1 National recycling rate, tons of material recycled.	The emissions and wastes from domestic, commercial and industrial sectors are involved in climate change process, in one way or another. Therefore, the initiatives such as waste recycling, 3R, EPR, etc. are essential.	1) No. of 3R practices adopted by domestic, commercial and industrial sector 2) No. of waste management establishments for recycling of plastic waste. 3) Tons of material recycled annually.	Indicators are conceptually clear. However, data for these 3 indicators are not available.	**Federal:** MOCC Federal EPA Pakistan **Provincial:** Provincial EPAs, Planning and Development Departments Industries, Trade & Commerce
12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.				

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
12.8.1 Extent to which (i) global citizenship education and (ii) education for sustainable development (including climate change education) are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment.	Development of a climate change curriculum is necessary to ensure that people are aware of the grave dangers of climate change. In doing so, both formal and informal means should be used to disseminate information. Investment in educational facilities and job facilitation in sparsely populated areas would also benefit economic development in rural centers of the economy. Gender equality and adequate access to educational facilities will ensure that women are able to take initiative and contribute to enterprise development across multiple sectors in the economy.	1) Establishment of national and regional Expert Groups on Climate Change. 2) Establishment of national cell for sharing, networking and regularly updated climate change related data. 3) No. of schools infrastructure made resilient to natural disasters. 4) Climate change and related SCP curricula developed.	Indicators are conceptually clear. Data for these 4indicators are available. However the frequency is not regular.	**Federal:** MOCC Federal EPA Pakistan GCISC HEC, M/o Federal Education & Professional Training **Provincial:** Provincial EPAs, Planning and Development Departments Prov. Education Depts.

3.5.6 Policy Relevance

Climate Change is an overarching concept that cuts across to all the sub-categories mentioned. The Prime Minister of Pakistan has put much focus on this pressing issue, and strong measures are being taken to increase the adaptation capacity of Pakistan, Ten Billion Tree Tsunami being a part of this initiative. Being one of the most vulnerable countries to the dangers of climate change, Pakistan needs strong mechanisms for monitoring and controlling of emissions. The emissions data from industries, transport, agriculture and energy sector can be used to develop baselines for policy measures. In addition to this, the water data would help in reducing the vulnerability to climate change by identifying areas for water recycling. Moreover, the inclusion of sustainability in national curriculum will increase the awareness with regards to climate change.

3.5.7 Existing Projects

The following table displays the projects that are undergoing in climate change sector for meeting the targets of SDG 12 in Pakistan.

Table 3.11: Projects list related to SCP in climate change sector along with their cost

Sr. No.	Name	Cost (Rs. Million)
1	Establishment of Geomatic Centre for Climate Change and Sustainable Development	48.885
2	Scaling-Up of Glacial Lake Outburst Flood (GLOF) Risk Reduction in Northern Pakistan	3,600.00
3	Generating Global Environmental Benefits from Improved Decision Making Systems and Local Planning in Pakistan	1,935.00
4	Flood Emergency Reconstruction and Resilience Project (Punjab & AJK)	6,500.0

3.6 Land Ecosystem

3.6.1 Background

SDG 12 Target 12.2, and Sub-targets 12.2.1, 12.2.2 refer to land ecosystem in Pakistan according to NAP. Since the target 12.2 describes situation in which a country has to efficiently use and manage its natural resources to achieve sustainability, it also describes country definitions of the targets and sub-targets through providing details on indicators to measure them. Country indicators are defined as total material footprint, material footprint per capita, and material footprint per GDP, domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP. Governments need to ensure producing and reporting the data on use of natural resources.

Land ecosystem is a natural resource which Pakistan sees as potential risk or opportunity in the future. Keeping in view opportunities GOP believes in sustainable management of its forests that cover 5.01% of total land in Pakistan accounting to 4.51million hectares (mha) in which 3.44 mha area of forests across the country. Second short to medium range objective of GOP is to stop desertification, deforestation, reverse degradation of land and forests ultimately check biodiversity loss. For this GOP urges provinces to manage data on protecting forests by curbing deforestation, desertification and reversing land and forests degradation to accord measures taken by GOP in the form of policy initiatives to protect arid and hyper arid lands, forests, rangelands and other vulnerable land ecosystems as described in the national Climate Change Policy 2012. Forests have been given top priority among all in land ecosystem and adaptation measures to mitigate climate change are an essential element in forests protection and forest dependent economy and communities.

3.6.2 Current Situation

As explained earlier that SDG 12 Target 12.2, and sub-targets 12.2.1, 12.2.2 relates to the land ecosystem the 6th priority area in SCP in Pakistan. An account of national indicators on the land ecosystem related aspects is still undergoing transitions specific to forest policy review. Before summarizing national indicators on above targets it is important to note that land ecosystem is considered as primary sub-sector of the climate change related perspective and its prospective goals. Yet an overview on the conceptualization of indicators pertaining to climate the land ecosystem is found to be at tier II level among key stakeholders at federal and provincial level, Currently, national and provincial indicators in use in this priority area in Pakistan are: 1) Total land covered (arid plains, forests, rangeland, mountain land, etc.) in million hectares, 2) % change (increase/decrease) in covered land (arid plains, forests, rangeland, mountain land, etc.) e.g. some response indicators are expansion of cultivated area/range lands/farm lands, 3) % change in deserted / degradable land, 4) Change in land salination, acidification, water erosion from floods, 5) No. of floods, other natural calamities, 6) Change in no. of floods, other natural calamities, 7) No. of soil management technologies in use e.g. land levelers to know level of soil especially after floods inundation, 8) Total capital investment in land ecosystem in terms of USD, 9) Change in afforestation, deforestation, desertification and mountain lands and 10) Change in land productivity in million hectares. Although, all indicators represent country indicators' definitions in one to one mapping with Target 12.2, and Sub-targets 12.2.1, 12.2.2 listed in NAP and GIF, yet the data on above indicators is not uniform though is produced regularly by local government forest, statistics departments and departments like EPAs in KPK and Punjab.

The current situation of land ecosystem as per current climate change adaptation trajectory for Pakistan is good due to the impeccable transition in Pakistan Climate Change Policy framework active in the following: 1) Formulation of Climate Change Policy (2012) and Its updation to date, 2) Environmental Policy (2005) and its updation through issuance of regular Statutory Regulatory Orders (SROs), 3) Forest Policy, 4) Eco-system Restoration Initiative (ESRI) and Eco-system Restoration Fund (ESRF), 5) Nationally Determined Contribution (NDC) and attaining Land Degradation Neutrality (LDN), and 6) Clean-Green Cities Index.

3.6.3 Institutional Arrangement

The data related to the indicators is produced, managed and held in the local government departments of forestry in Balochistan, and Sindh. In Punjab and KPK data on land ecosystem is bit organized and data flows to EPD and EPA on audit basis regularly. This data is obtained through surveys conducted in the provinces by the relevant departments and their district level offices.

3.6.4 Challenges

Due to poor technological infrastructure especially availability of large database handling capacity and its upgradation with regard to skills, technicalities and human resource development, it is difficult for provinces to manage data on large scale. Land related data is handled within the departments which is a major reason for non-uniformity in primary data, since every department in a province has its own measure to scale various indicators. The real challenge is to manage such a huge volume of primary raw information with consistency at unit level data and its meaningful iteration into using it for different aspects of land related research and developments to monitor and report on SDG 12 agenda with regard to SCP roadmap. A prerequisite for data management is technological infrastructure and capacity. With limited funding, provinces lack the capacity to adopt modern data handling mechanisms and triangulations for interpretation of the raw data.

3.6.5 Proposed Framework

Table 3.12: SDG 12 Capacity Assessment on Targets, Sub-targets, nationally defined Indicators, and their measurements, localization of responsibility and data sources

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Current level of Data	Data Sources and Responsibility
SDG 12 Target 12.2: By 2030, achieve the sustainable management and efficient use of natural resources				
12.2.1 Material footprint, material footprint per capita, and material footprint per GDP.	Material footprint (MF) is the attribution of global material extraction to domestic final demand of a country. It is calculated as raw material equivalent of imports (RMEIM) plus domestic extraction (DE) minus raw material equivalents of exports (RMEEX)[54]. Can include main material categories used in Economy Wide Material Flows Accounting i.e. biomass, fossil fuels metal ores, and non-metallic minerals from land ecosystems. Domestic Material Consumption (DMC)[55] is a standard material flow accounting (MFA) indicator and reports the apparent consumption of materials in a national economy.	1) Percentage decrease in deforestation. 2) No. of protected areas increased.	Indicators are conceptually clear. Data for these indicators are available. The reporting frequency is regular.	**Federal:** MOCC MOIP **Provincial:** EPA-KPK Forestry Dept. – Balochistan, EPD –Punjab, Forestry and Agriculture Depts

[54] https://unstats.un.org/sdgs/metadata/files/Metadata-12-02-01.pdf

[55] https://unstats.un.org/sdgs/metadata/files/Metadata-12-02-02.pdf

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
	It is calculated as direct imports (IM) of material plus domestic extraction (DE) of materials minus direct exports (EX) of materials measured in metric tonnes. DMC measures the amount of materials that are used in economic processes. It does not include materials that are mobilized the process of domestic extraction but do not enter the economic process. The land ecosystems are susceptible to deterioration through unchecked urbanization, population explosion and excessive use of resources that have led to economic disparity. On the environmental front, the loss of biodiversity is a critical issue that needs to be addressed. Therefore, the indictors that suggest preservation of biodiversity are identified.			
12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.				
12.5.1 National recycling rate, tons of material recycled.	Land recycling is defined as the reuse of abandoned, vacant or underused land for redevelopment. It includes 'grey recycling' and 'green recycling'. Grey recycling is when 'grey' urban objects, such as buildings or transport infrastructures, are built under redevelopment. Green recycling is when 'green' urban objects, such as green urban areas or sport facilities, are built. Land densification is defined as the land development that takes place within existing communities, making maximum use of the existing infrastructure instead of building on previously undeveloped land.	1) No. of redevelopment projects undertaken by the national government. 2) No. of programmes developed under REDD+. 3) Preventive measures taken to promote sustainable forest management. 4) Programmes initiated for Sustainable Land Management and forest management.	Indicators are conceptually clear. Data for these indicators are available. The reporting frequency is irregular.	**Federal:** MOCC **Provincial:** EPA-KPK Forestry Dept. – Balochistan, EPD –Punjab, Forestry and Agriculture Depts.

3.6.6 Policy Relevance

Land degradation in Pakistan is a pressing issue, and desertification and degradation can affect ~68 million hectares. Therefore, conservation and preservation of land ecosystems in necessary in order to combat issues such as salination, soil degradation, soil fertility depletion, erosion, etc. In doing so, the adaptation capacity of Pakistan needs to be increased and the developed, indicators will provide solid baselines to identify susceptible areas and take informed policy measures to increase the mitigation capacity.

3.6.7 Existing Projects

The following table displays the projects that are undergoing in land ecosystem sector for meeting the targets of SDG 12 in Pakistan.

Table 3.13: Projects list related to SCP in land ecosystem sector along with their cost

Sr. No.	Name	Cost (Rs. Million)
1	Sustainable Land Management Programme to Combat Desertification in Pakistan	48.885
2	Sustainable Forest Management to Secure Multiple Benefits in High Conservation Value Forests	3600.00
3	Mountain and markets: Biodiversity & Business in Northern Areas	1935.00
4	REDD+ Readiness Preparation Project	6500.0

3.7 Marine Ecosystem

3.7.1 Background

Marine Ecosystem in Pakistan is also considered under SDG target 12.2 and sub-targets 12.2.1, 12.2.2. The country indicators that correspond with these targets are to efficiently use and manage its marine ecological system natural resources to achieve sustainability. Country indicators are defined as total material footprint, material footprint per capita, and material footprint per GDP, domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP.

NAP correlates provincial efforts so far have been put forth by Balochistan and Sindh government to manage data on protecting coastal and marine ecosystem, reduce pollution, sustainable use of coastal and marine resources such as fisheries, aquaculture and tourism. The NAP emphasizes to meet its objective by reducing marine pollution and sustainably using marine resources, through sustainable management of fisheries, aquaculture and tourism. To do so, the main criteria to be considered is the availability of primary data to measure indicators correctly. Indicators will have the ability to detect change in marine ecosystem either as a result of policy or intervention.

Coastal and marine ecosystem in Pakistan exists in Balochistan and Sindh provinces. Coastal areas in these provinces are already exposed to severity of climate change. Frequency of cyclones, sea storm, floods, coastal line degradation and erosion have already cost huge economical and human life losses. The projected sea level rise in Pakistan can further cause inundation of wet and drylands especially in Indus Deltaic Region (IDR), salinization of surface and ground water vis-à-vis intense risk of cyclones from Arabian Sea. It can further exacerbate deterioration of marine ecosystem causing changes in sea water temperature, sea water acidification, increased risk of cyclones, with relocation and migration of fish and marine mammals. A huge risk faced by Pakistan is drying of IDR.

GOP has taken policy measures to protect coastal and marine ecosystem in Pakistan. GOP under the Climate Change Policy have devised policy framework to ensure all the needs pertaining to three main outcomes of managing marine ecosystem fisheries, aquaculture and tourism are met with foreign intervention and funding. The salient aspects of the marine ecosystem policy feature: creating natural barriers through plantation of palms and other tropical trees to curb soil erosion; and mangroves to minimize impacts of cyclones and tsunamis along with constructing barriers to barricade rising sea levels, salinity tolerant crops for agriculture and vegetation, reduce solid and liquid wastes disposal into sea, protecting fish habitats along with fish farming to protect fishing sector, and adaptation measures to promote aqua culture. Similar policy was introduced to protect wetlands i.e. rivers, lakes and streams in Pakistan. Three prominent research organizations: 1) National Institute of Oceanography Pakistan (NIO); 2) National Centre for Maritime Policy Research (NCMPR); and 3) Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) are working with local government departments such as Marine Fisheries Department, Hydrographic office and provincial fisheries departments to produce policy research to create and strengthen institutional frameworks to conserve marine ecosystem in Pakistan. An important step taken by GOP was to establish Marine Pollution Control Board (MPCB) with primary responsibility of monitoring and protecting marine ecosystem.

3.7.2 Current Situation

In NAP SDG 12 Target 12.2 and Sub-targets 12.2.1, 12.2.2 are related to Marine Ecosystem in Pakistan. Currently, national indicators to measure change in condition, quality or state (e.g. type, degree, spatial extent and or rate of change for instance, of vegetation, soil, water, nutrients) of coastal and marine in statistical terms, and to comply to national and regional scales on similitude but spatially distinct in terms of area and environment. The conceptualization of indicators pertaining to the marine ecosystem is found to be at tier II level among key stakeholders at federal and provincial level, and data is produced, managed and held in the local government departments of forestry and fishers in Balochistan, and Sindh.

The data on marine ecosystem is not organized and is produced irregularly. Currently, national and provincial indicators in use in this priority area in Pakistan are; 1) Total coastal and marine area in kilometers; 2) % change (increase/decrease) in coastal lines, 2) % change in salinization of dry and wetlands, 3) Change in dry and wetlands salinization, acidification, erosion of coastal lines in km, 4) Frequency/No. of cyclones, sea storms, flood, 5) Change in no. of cyclones, 6) No. of coastal management technologies in use e.g. mangroves, barricading, 7) Total capital investment in marine ecosystem in terms of USD, 8) Total production of salinity resistant crops/agriculture/vegetation near coastal areas in million tons, and its total value in million USD/billion PKR, 9) Change in marine ecosystem productivity in KM, 10) No. of marine ecosystem products and services, 11) % share of marine ecosystem products and services in GDP in billion PKR, 12) Total volume of marine ecosystem products in million tons and 13) Total value of marine ecosystem services in million USD/PKR.

Although all indicators represent country indicators' definitions in one to one mapping with Target 12.2, and Sub-targets 12.2.1, 12.2.2 listed in NAP and GIF, yet the data on above indicators is not uniform though is produced regularly by local government forest, fisheries statistics departments, and there is no regular monitoring or reporting.

Pakistan has coastal line of 990 km and a coastal zone of 240,000 km adjacent to northern Arabian Sea. The spread of coastal zone is shared by Sindh and Balochistan provinces over an area of 370 km with a passive margin for Sindh, and an area of 760 km with an active margin for Balochistan. In Sindh, coastal area has covered 280,470 ha under mangroves. The living resources are the mangrove forests along coasts of Sindh and Balochistan with Indus Deltaic Region. The Indus Delta is considered to be world's 6th largest mangrove forest. Some of these mangrove forests are used for fish farming. Other potential resources are fisheries comprising of 350 species, and is significantly important and strategic for Pakistan economically due to its proximity to Iran, Oman, India and other Central Asian countries. Most Economic and commercial uses of coastal areas in Pakistan are fisheries and agriculture and forestry, ports and shipping, building boats and ships, salt and mineral production, oil and gas exploration, and energy and power generation. The coastal and marine areas produce 596,980 metric tons of fish, 25,000 metric tons of shrimps. Port Qasim handles 35% of national cargo amounts to 17 million tons per year. The fisheries export volume and revenue amounts approximately 131,000 metric tons and Rs. 7,272 respectively.

3.7.3 Institutional Arrangement

Marine Fisheries Department, Hydrographic office and provincial fisheries departments are ensuring sustainable marine ecosystem for food security, but still there is huge need to focus on neglected areas especially in Balochistan coastal zone. Therefore, structuring of the research community seems marginalized and essential with capacity building in ecosystem sciences by providing latest data related facilities, despite use of GIS based automation and imaging monitoring system in land and marine ecosystems related data on measurements of environmental and ecological factors. The use of data with regard to SDG 12 progress on the national indicators on SCP in Marine ecological system is limited in terms of its sharing to relevant provincial departments and ministries, all could be reasoned to lack of appropriate technological interface to make such data uniform and consistent.

3.7.4 Challenges

The challenges faced by the marine ecological system in Pakistan are related to strategic planning by the local governments of Sindh and Balochistan, effective coordination among departments within, and between both provinces. Improved communication among stakeholders responsible for surveys and audits of coastal area can improve data collation process its updating with regard to data handling capacity of coastal institutions such as NIO, NCMPR and SUPARCO. Due to CPEC related development initiatives at Gwadar, the environmental fallout seems to plummet in future, hence the need to expedite SDG 12 monitoring and reporting on SCP in marine related pollution calls for better coastal management and database management services.

3.7.5 Proposed Framework

Table 3.14: SDG 12 Capacity Assessment on Targets, Sub-targets, nationally defined Indicators, and their measurements, localization of responsibility and data sources

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Current level of Data	Data Sources and Responsibility
SDG 12 Target 12.2: By 2030, achieve the sustainable management and efficient use of natural resources.				
12.2.1 Material footprint, material footprint per capita, and material footprint per GDP.	Material footprint (MF)[56] is the attribution of global material extraction to domestic final demand of a country. It is calculated as raw material equivalent of imports (RMEIM) plus domestic extraction (DE) minus raw material equivalents of exports (RME_{EX}). Can include main material categories used in Economy Wide Material Flows Accounting i.e. biomass, fossil fuels metal ores, and non-metallic minerals from marine ecosystems. Domestic Material Consumption (DMC)[57] is a standard material flow accounting (MFA) indicator and reports the apparent consumption of materials in a national economy.	1) Percentage increase in mangrove cultivation. 2) Percentage increase in sustainable yields of fisheries and quality management. 3) No. of hatcheries & nurseries developed for supporting sustainable harvesting of fish, shrimp and frogs and other permissible marine species.	Indicators are conceptually clear. Data for these indicators are available. The reporting frequency is irregular.	**Federal:** MOCC **Provincial:** 1) National Institute of Oceanography Pakistan (NIO); 2) National Centre for Maritime Policy Research (NCMPR); and 3) Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) are working with local government departments such as Marine.

[56] https://unstats.un.org/sdgs/metadata/files/Metadata-12-02-01.pdf

[57] https://unstats.un.org/sdgs/metadata/files/Metadata-12-02-02.pdf

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
	It is calculated as direct imports (IM) of material plus domestic extraction (DE) of materials minus direct exports (EX) of materials measured in metric tonnes. DMC measures the amount of materials that are used in economic processes. It does not include materials that are mobilized the process of domestic extraction but do not enter the economic process.			Fisheries Department, Hydrographic office and provincial fisheries departments
12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.				
12.5.1 National recycling rate, tons of material recycled.	The marine ecosystems ar prone to environmental pollution as they serve as dumping grounds for industrial and municipal waste, with plastic waste being the major deterrent in the flourishing of the marine life. Therefore, the protection of marine areas and the indicators that point towards the biodiversity associated with marine ecosystem are essential to be developed, reported and then constantly analyzed.	1) Strategies developed to control pollution of wetlands. 2) Percentage decrease in solid and liquid waste disposal in the bay areas.	Indicators are conceptually clear. Data for these indicators (1 and 2) are available. The reporting frequency is irregular.	MOCC **Provincial:** 1) National Institute of Oceanography Pakistan (NIO) 2) National Centre for Maritime Policy Research (NCMPR); and 3) Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) are working with local government departments such as Marine Fisheries Department, Hydrographic office and provincial fisheries departments.

3.7.6 Policy Relevance

Pakistan's marine ecosystem is breeding, rearing and wintering ground for over a 100 species, and the freshwater establishments are very lucrative for these species. Unfortunately, due to rising temperatures, the marine bodies are either getting depleted or polluted. Since there is a significant economic value of these ecosystems, stringent measures need to be taken for making them sustainable. Data such as percentage of total population living in coastal areas, proportion of coastal areas affected by pollution, coastal water quality, number and area of marine aquaculture sites, percentage change in coastal areas lost, number of marine species (mangroves, fisheries, etc) threatened and extinct, change in area under mangrove forest, proportion of marine area protected, total & per capita marine fish catch, total & per capita marine aquaculture fish catch, proportion of fish stocks within safe biological limits, and number of people making a living from marine resources, etc. will help MOCC in developing policy interventions to improve the performance of marine ecosystems.

3.7.7 Existing Projects

The following table displays the projects that are undergoing in marine ecosystem sector for meeting the targets of SDG 12 in Pakistan.

Table 3.15: Projects list related to SCP in marine ecosystem sector along with their cost

Sr. No.	Name	Cost (Rs. Million)
1	Establishment of National Central Marine Research Laboratory at NIO, Karachi. Phase-I	39.500
2	Rehabilitation & Renovation of Karachi Fish Harbour, External services. Phase-I (R: 1438.021)	1,438.021
3	Strengthening and Improvement of Fish and Shrimp Hatcheries in Sindh	784.013
4	Development of Public Water (lakes) & surveillance of Coastal waters to improve productivity & enhance availability of fish	57.796
5	Rehabilitation of Pilot Shrimp Farm Garho as Training & Research Centre	261.792

3.8 Sustainable Cities

3.8.1 Background

The NAP envisions SDG 12 Targets 12.1, 12.5 and 12.1.1, 12.5.1 with regard to developing sustainable cities the 8th priority area for SDG 12 related monitoring and reporting in Pakistan. The referral sub-target 12.1.1 hints country indicators as number of countries with the SCP infused national policies and action plans. GIF elicits 12.5 primarily to inhibit countries capacity for waste generation by measures such as recycling, reduction and reuse, hence its sub-target is indicative of measures such as rate of recycling in percent and amount of material recycled in tons.

The NAP in this reference, is clear on short to medium range objectives till 2030 in particular: enhancing national capacity of relevant institutions to integrate SCP principles into planning and management of 'sustainable cities'. This is to further objectify the development of policy and a comprehensive legal framework for integrated waste management (IWM) and in apropos bring into use best technologies and practices for waste management. In connection to this, provincial governments to take into account list of programs for training and capacity building of HR on waste management with technology use and best practices such as recycling of waste[58].

The waste generation in Pakistan annually reaches an amount of 48.5 million tons with an increase of 2% per year. Recent figures of 2019-2020 show a horrific estimate of 87,000 tons of solid waste per day in major cities of Pakistan. Karachi, the largest metropolitan city disposes off 13,500 tons of waste on daily basis. Second comes Lahore generating a daily waste of 7,510 tons of municipal waste. So far only Lahore has proper waste management system currently managed by two Turkish companies. Although, rules, regulations and guidelines exist for the collection, handling and disposal of solid waste in documents such as "Draft Solid Waste Management Regulations", "Solid Waste Management Directives of the Municipality of Punjab" etc., however, till now no comprehensive waste management policy has been formulated at the national level by the EPA.

The basic framework for town planning comes under the Climate Change Policy 2012, which define parameters; installation of sewage treatment plants as an integral part of waste management in all major cities, ensuring separate collection of recyclable, biodegradable and non-organic waste; urban planning with low carbon emissions e.g. zero emission buildings by using renewable energy, land use planning through vertical expansion, and industry relocation to industrial zones. Furthermore, recycling of industrial and agriculture waste water is ensured through treatment plants and reuse through artificial wetlands for ground water replenishment respectively. Similarly, prevention of accumulation of solid waste and unwanted biomass in mountain areas for reducing glacier meltdowns; reducing the spread of solid waste, trash disposal in bay and coastal areas installation of power plants to use municipal waste to generate power.

[58] National Action Plan, Ministry of Climate Change, Government of Pakistan

3.8.2 Current Situation

The NAP SDG 12 Targets 12.1, 12.5 and Sub-targets 12.1.1, 12.5.1 prompt various directions to develop national indicators. These national indicators have been localized yet their further development have been pending after a system of managing, monitoring and reporting such information on regular basis. It can be intuited after national and provincial consultations that a great improvement on waste management related data in metropolitan cities such as Karachi, Lahore and Multan, and data seems to be produced on regular basis by the local city waste management companies – the public private partnership companies. Whereas cities like Rawalpindi and Islamabad are yet to phase in this waste management regime. Hence it can be inferred that the conceptualization of indicators pertaining to the sustainable cities on waste management is found to be at tier II level among key stakeholders at federal and provincial level, and data is produced, managed and held in the local waste management companies repositories in Karachi-Sindh, Lahore-Punjab and Multan-Punjab.

The data is organized and is produced regularly. However, it is insufficient to meet SDG 12 targets and country indicators. Currently, national and provincial indicators in use on this priority area in Pakistan are: 1) No. of sewage wastewater treatment plants in city expansion schemes, 2) Amount of waste collected under recyclable, biodegradable and nor organic categories in each city in thousand tons, 3) No. of town designs with principles for lower carbon footprints, 4) No. of Zero emission buildings, 5) No. renewable technologies in use in the each city, 6) No. of agro based towns with infrastructure and support facilities to reduce urbanization, 7) No of vertical buildings in cities periphery expansion, 8) No. of industries relocated to industrial zones, 9) No. of Effluent Treatment Plants in industrial zones, 10) No. of solar heating systems in buildings, 11) Total land allocated for artificial wetlands in hectares, 12) Total amount of water recycled from agriculture and industry in cubic meter, 13) total amount of recycled water used in cubic meter, 14) No. of power plants to generate power from municipal waste, 15) Total power generated from municipal waste in kilo watt and 16) Total amount of solid waste and biomass collected in thousand tons from mountain areas in Pakistan[59]. Although all indicators represent country indicators' definitions in one to one mapping with Targets 12.1, 12.5 and Sub-targets 12.1.1, 12.5.1 listed in NAP and GIF, yet the data on above indicators is yet to be organized and produced in other cities in Pakistan.

3.8.3 Institutional Arrangement

In Karachi –Sindh, Lahore-Punjab and Multan-Punjab, the waste management companies produce and organize data regularly on monthly basis, yet in Karachi the data is limited to a few municipalities and lacks conformity to standards data sheets and indicators of waste management company under the wastewater treatment and solid waste heads. In Multan this idea is developing, as per the federal SDG consultation has not been functional in many areas of waste management such as recycling.

[59] Environmental Protection Agency, Government of Pakistan, EPA-KPK, Waste Management Company Punjab/ EPD, EPA/Government of Balochistan, Waste Management Company Sindh Government

3.8.4 Challenges

In our provincial consultations in Sindh and Punjab, and federal consultation in Islamabad, it became clear that all waste management companies are currently managing data on their own. The data is updated regularly on monthly basis. But in order to expand the waste management horizon to other categories of SDG 12 targets it is essential to upgrade current system and IT infrastructure within government departments such as Water and Sanitation and local government municipalities within large cities. The data management and databases handled within the waste management companies in above cities are self-reliant. However, most problems faced by waste management companies in Lahore, Karachi and Multan are to develop communication system with local government and an upgrade of HR and IT systems is a dire need first.

3.8.5 Proposed Framework

Table 3.16: SDG 12 Capacity Assessment on Targets, Sub-targets, nationally defined Indicators, and their measurements, localization of responsibility and data sources

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Current level of Data	Data Sources and Responsibility
SDG 12 Target 12.1 Implement the 10-year framework of programs on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.				
12.1.1 Number of countries with sustainable consumption and production (SCP) national action plans or SCP mainstreamed as a priority or a target into national policies.	• To be reported under this indicator, a government should have moved through one or more new stage(s) of the "Policy cycle" on one or more policy instrument(s) during the current reporting period. • As per the 10YFP Indicators of Success, although they can be linked, a policy instrument is not the same thing as a change in practice, a commitment, a coordination mechanism or a knowledge resource or tool. • This indicator is calculated at relevant aggregation levels based on the information collected from the National Focal Points and other government officials; users of the data should be mindful of double counting one same policy, when aggregating data across reporting years.	1) Land use planning and governance updated on the principle of SCP. 2) Standard design developed for collection, transfer and safe disposal of waste. 3) Legislations developed for safe management and disposal of electronic waste.	Indicators are conceptually clear. Data for these indicators are not available. The relevant department pubilshes preliminary information, however, a concrete information are not available.	**Federal:** Federal EPA-Pakistan MOCC CDA **Provincial:** Local Governments, WASA, Provincial Development Authorities. EPA KPK, Lahore waste management company, Multan Waste Management Company, Karachi waste management company,

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
SDG 12 Target 12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.				
12.5.1 National recycling rate, tons of material recycled.	National Recycling Rate will be defined as the quantity of material recycled in the country plus quantities exported for recycling out of total waste generated in the country, minus material imported intended for recycling. Note that recycling includes co-digestion/ anaerobic digestion and composting/ aerobic process, but not controlled combustion (incineration) or land application. (Material recycled + material exported for recycling – material imported for recycling) / total waste generated Total waste generated = Waste from manufacturing (ISIC 10 - 33) + Waste from electricity, gas, steam and air conditioning supply (ISIC 35) + Waste from other economic activities (excluding ISIC 38) + Municipal waste (excluding construction and mining)[60].	1. Percentage improvement in sanitation system of cities. 2. No. of large development schemes provided with wastewater treatment and solid waste management facility. 3. Percentage decrease in open burning of waste. 4. Percentage increase in the safe disposal of domestic and hazardous waste including hospital and industrial waste. 5. Percentage of urban solid waste collected. 6. No. of pilot projects started for waste segregation at source. 7. Percentage decrease in the use of polythene bags. 8. No. of units installed for recycling of waste. 9. No. of plants installed for waste to energy recovery.	Indicators are conceptually clear. Data for indicators (2,5,6,8 and 9) are available. The reporting frequency is irregular. Similarly, the rest of indicator are not reported regularly, therefore, data is not sure. These are project based interventions.	**Federal:** Federal EPA-Pakistan MOCC AEDB **Provincial:** Planning and Development Departments, Urban units EPAs Waste management companies

[60] https://unstats.un.org/sdgs/metadata/files/Metadata-12-05-01.pdf

3.8.6 Policy Relevance

The improvement in living conditions and the articulation of the sustainable cities idea not only carries economic and environmental significance, but social benefits as well. Acting as a strong lever for a just society, sustainable cities provide residents with affordable and clean energy, food security and adaptation against adverse impacts of climate change. The indicators developed above will help in developing model cities in Pakistan that have circular economy at the helm. The concept of sustainable cities will play a key role in the success of Clean Green Pakistan initiative through proper waste management and eco-friendly practices.

3.8.7 Existing Projects

The following table displays the projects that are undergoing in sustainable cities sector for meeting the targets of SDG 12 in Pakistan.

Table 3.17: Projects list related to SCP sustainable cities sector along with their cost

Sr. No.	Name	Cost (Rs. Million)
1	Greater Karachi Sewerage Plant (S-III) (Karachi)	3,991.000
2	Water Supply & Drainage Scheme of Tando Jam (Hyderabad Package) (District Hyderabad)	131.820
3	Construction of Drainage (Waste Water Channel) Existing Saim Nullah at Mamoon Kanjan, Tehsil Tandlianwala, District Faisalabad (Federal Share)	251.0

3.9 Transport

3.9.1 Background

Transport sector is assigned SDG Target 12.1 and Sub-target 12.1.1 under NAP to reduce carbon emissions hence minimize the carbon footprint in the country. Under country definition and description of GIF for these targets the correct way to measure developments in the transport sector is to ensure data monitoring and reporting by developing a system based on digital communication between provincial and federal departments for efficient transmitting of data with technological infrastructure to retain and resposit such information volume. In NAP provincial action plans and their short to medium range objectives, the provinces have to increase low carbon efficiency in transportation sector of the country. In this they have to achieve modern and efficient transport standards for better competitiveness domestically and internationally with developed logistics (handle, store and transport goods) in Asian region.

The NAP urges local governments to sensitize and educate stakeholders and develop appropriate market tools to promote importance of value chain of transport management in the country. The main question posited in this regard ask provincial local governments of initiatives taken, and on ground development of efficient public and private transit system while counting its integral role in value chain of transport management. In this account the significance of planning documents and data generated for awareness and campaigning for efficient transport system and tools so far is paramount to scale the level of efforts of local governments on the country. Such developments can further add to SDG 12 related monitoring and reporting perspective which can help Pakistan on many international trade fronts with increased access to international markets[61].

Ministry of Communication is responsible for transportation, inbound and outbound logistics in Pakistan. The National Freight and Logistics Policy (NFLP) 2020 is the framework for inbound and outbound transportation in the country. The important parts of transport system are road, rail, maritime, air, inland waterways, urban and rural transports. GOP have initiated projects on transport infrastructure improvements through investments. A big chunk of such progress on infrastructure development has already been made on CPEC and the Central Asia Regional Economic Cooperation Program (CAREC) related projects. The developments include agreeing to international trade and transport conventions to facilitate major stakeholders i.e. businesses. With the advent of National Transport Policy 2018, GOP set off strategic changes in freight and logistics sector with multimodal logistics techniques i.e. a multimode composite of air, road, rail, and water.

To explore the potential of freight and logistics sector in Pakistan for further competitiveness internationally, the NFLP is comprehensive framework to enhance capacity of transport sector by facilitating, modernizing and reforming to increase overall competitiveness in domestic value chain. The enhancement of domestic value chain can further streamline the competitiveness of Pakistan in global value chain. For ensuring implementation of NFLP, the Logistics Performance Indicators' (LPI) were set to be tool for measuring and evaluating progress on the way. It envisioned that with overcoming issues in transport sector and increased competitiveness can decrease transportation costs, hence the prices of goods domestically and internationally.

3.9.2 Current Situation

The NAP SDG 12 Target 12.1 and Sub-target 12.1.1 focus federal and provincial governments' attention towards development of national indicators in transport sector. In earlier communication of the MOCC with local governments pertaining to provincial inputs on national action plan for sustainable consumption and production in 2017, the local governments were given objectives to be completed on SDG 12 in next communication. The conceptualization of indicators pertaining to area transport on carbon emissions and carbon material foot print is still found to be at tier II level among key stakeholders at federal and provincial level, and data is produced, managed and withheld in the local government transport departments and transport authority databases on self-data management basis.

[61] National Action Plan, Ministry of Climate Change, Government of Pakistan.

The data is organized and produced regularly. But it is insufficient and inconsistent due to absence of regular evaluation and monitoring, therefore lacks perspective into SDG 12 targets monitoring and reporting on the national indicators in direct way. Currently, national and provincial indicators in use on this priority area in Pakistan are: 1) Total freight transport share in percent in multimodal logistics i.e. transported by air (air cargo), road (trucks and other transportation vehicles), rail (railway cargo), and water (shipping cargo), 2) No. of vehicles in trucking sector by province, 3) Total no. of registered and non-registered vehicle by province, 4) No. of vehicles with higher fuel consumption and emissions, 5) No. of vehicles with fuel efficient engines in use in the each city, 6) Total amount of fuel consumed by road vehicles per year in cubic meter tons, 7) Total amount of road cargo in million tons, 8) No. of railway cars transporting cargo in the country, 9) Amount of fossil fuel consumed by railway cargo system in cubic meter tons, 10) No. of airplanes transporting cargo, 11) Total amount of air cargo in million tons, 12) No. of ships transporting cargo in maritime and inland water, and 13) Total amount of shipping cargo in million tons[62]. Although, all are key performance indicators that represent national indicators' definitions in one to one mapping with Targets 12.1 and Sub-target 12.1.1 in NAP and hence GIF. The data on above indicators is yet to be regularly monitored and used specially to produce carbon emissions trajectory in all the provinces by local government departments in Pakistan.

The transport sector shares almost 13% to GDP second to agriculture, with a share of 5.4% to total jobs in Pakistan. The 95% of total import and export freight is moved through Karachi port and Port Qasim currently. Transportation across the country is mainly dependent on road. About 500,000 privately owned registered vehicles operating in the country, mostly are obsolete, which have deleterious effect on environment due to high carbon emissions owing to high fossil fuel consumption. All can be reasoned to weak regulatory regime and policy implementation. In aftermath of COVID19 pandemic country wide lockdowns, the transport, storage and communication sectors faced a 7.13% decline in overall economic growth.

3.9.3 Institutional Arrangement

The findings of provincial consultations depict that the national indicators have been localized while their monitoring and reporting information seems to be invisible due to lack of information technology based infrastructure essential for developing a repository. Although on regular basis such data is stored in local repositories of transport departments in KPK, Punjab and Sindh, and provincial transport authority in Balochistan, yet its coherence at national level with the Ministry of Communication is constrained and missing.

[62] Ministry of Communication, Government of Pakistan, Transportation Departments of KPK, Punjab, Sindh and Transportation Authority of Balochistan local government.

3.9.4 Challenges

From the discussion above the current challenges faced by transport sector it is evident the data management is evolving. It requires attention in terms of focus vis-à-vis the current development on key performance indicators of this sector. At the same time information availability do not ensure its effective use without following system approach for its reporting. It is difficult to conduct periodical audits and incur costs and use human resource without capacity building and framing developments on data through monitoring and reporting on SCP agenda in Pakistan. Lack of financial aspects in this regard and adequately skilled HRD create impediment in following policy course. Technology transfer and international funding are important piers for provincial connectivity and progress on tracking carbon footprint in Pakistan.

3.9.5 Proposed Framework

Table 3.18: SDG 12 Capacity Assessment on Targets, Sub-targets, nationally defined Indicators, and their measurements, localization of responsibility and data sources

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Current level of Data	Data Sources and Responsibility
SDG 12 Target 12.1 Implement the 10-year framework of programs on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.				
12.1.1 Number of countries with sustainable consumption and production (SCP) national action plans or SCP mainstreamed as a priority or a target into national policies.	• To be reported under this indicator, a government should have moved through one or more new stage(s) of the "Policy cycle" on one or more policy instrument(s) during the current reporting period. • As per the 10YFP Indicators of success, although they can be linked, a policy instrument is not the same thing as a change in practice, a commitment, a coordination mechanism or a knowledge resource or tool. • This indicator is calculated at relevant aggregation levels based on the information collected from the National Focal Points and other government officials; users of the data should be mindful of double counting one same policy, when aggregating data across reporting years.	1. Develop policies for promotion of intermodal transport system for introduction of smart and integrated transportation system. 2. Engine efficiency standards introduced. 3. No. of projects started for development of interprovincial and trans-border transportation corridors ensuring integrating of SCP Principles.	Indicators are conceptually clear. Data for indicators are available. The reporting frequency is irregular. These are project based interventions not a systematic intervention.	**Federal:** Ministry of Transport and Communication **Provincial:** transport departments in KPK, Punjab and Sindh, and provincial transport authority in Balochistan

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
SDG 12 Target 12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities				
12.7.1 Number of countries implementing sustainable public procurement policies and action plans.	Sustainable Public Procurement (SPP) is a "A process whereby public organizations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life cycle basis in terms of generating benefits not only to the organization, but also to society and the economy, whilst significantly reducing negative impacts on the environment". The methodology developed is computational and required inputs are[63]:existence of SPP action plan, policy and/or SPP regulatory requirements at national, local or both levels. SPP regulatory framework is conducive to sustainable public procurement. Number of staff dedicated to supporting the implementation of SPP policy or SPP practitioners Training/Capacity-building of public procurement practitioners on SPP. Training/Capacity-building of public procurement practitioners on SPP. SPP purchasing criteria/ buying standards / requirements identified. Existence of an SPP monitoring system. Percentage of sustainable purchase of priority products/services.	1) No. of public-private partnerships developed to expedite infrastructure development. 2) No. and type of Incentives provided to fuel efficient vehicles and trains. 3) Percentage decrease in import of second hand vehicles not older than five years. 4) Percentage increase in new nodes for efficient freight transport.	Indicators are conceptually clear. Data for indicators (2 and 3) are available. The reporting frequency is regular. However, indicators (1 and 4) are not reported regularly in a systematic manner.	**Federal:** MOE (power and petroleum Divisions) NEPRA ISRA PAEC AEDB WAPDA PNRA **Provincial:** WAPDA EPA Provincial Energy departments in all provinces

[63] https://unstats.un.org/sdgs/metadata/files/Metadata-12-07-01.pdf

3.9.6 Policy Relevance

Currently the transport sector in Pakistan is quite inefficient when it comes to environmental performance. The lack of regulatory framework for emissions testing, fuel quality and minimum acceptable levels of emissions has caused this issue to aggravate. With the danger of climate change and the respiratory diseases cause by the toxic gases, it is essential to move towards cleaner and eco-friendly modes of transportation. It is imperative to improve the quality of fuels and move to Euro 5 or above technology. In addition to this, mass transit plans should be developed to provide eco-friendly transport to the public at low rates, thus increasing the mobility and improving the social performance.

The National Electric Vehicle Policy was approved in November 2020 and numerous economic incentives were given to importers and indigenous technology manufacturers. The policy aims to have 30% of the passenger and heavy-duty vehicles as electric by 2030, a figure supposed to rise up to 90% by 2040. In addition to this, the goals for two and three-wheeler vehicles are very optimistic i.e. 50% by 2030 and 90% by 2040. The proposed goals not only help in meeting the climate goals but can also help mitigating the energy issues.

3.9.7 Existing Projects

The following table displays the projects that are undergoing in transport sector for meeting the targets of SDG 12 in Pakistan.

Table 3.19: Projects list related to SCP transport sector along with their cost

Sr. No.	Name	Cost (Rs. Million)
1	Pakistan Sustainable Transport Project	7,802.0
2	Green Line Bus Transit System from Municipal Park, Sadder to KESC Power House Chowrangi, Surjani, Karachi	16,085.000
3	NTRC Axle Load Survey on National Highways & Motorways	46.937

3.10 Education

3.10.1 Background

Education is the 10th priority area of NAP. SDG 12 Targets 12.8, 12.a and Sub-targets 12.8.1, 12.a.1 further delineate the need to discourse a country's efforts in improving its education system to instill thinking in young minds on sustainable development and climate change. To accomplish this, the parameters to be followed are revising national educational policies along with curricula. The human resource development in education sector are to be aligned through training and assessments. Teachers and students need to be trained, taught and assessed. It is to be further strengthened with lead and support from developed countries to render research and development to follow SCP country agenda and environmentally sound technologies. NAP urges education sector in provinces and federal level to inculcate education and learning to achieve resource efficiency and adopt low-carbon lifestyles. It encourages education departments to adjust SCP based principles and concepts into education curricula in two dimensions of knowledge and skills crucial to promote SCP based lifestyles for sustainability. To increase efforts to attain this, it requires provincial governments to develop and upgrade existing educational and research facilities in short to medium range objectives of their ADPs.

Education Sector in Pakistan has lowest enrollment rate at primary education level when compared to India, Iran, Sri Lanka and Nepal. With a population of 220 million, youth ratio of 65%, it has become a key responsibility to educate and equip them to be model citizens. The main factor for this lack in progress in this sector as compared to regional counterparts was inadequate education indicators and their streamlining with SDG 12. The development in education sector lacked budget spending into raising quality to international standards. The Ministry of Federal Education and Professional Training (MoFEPT) is responsible actor for formulation of all education related policies. In this regard, MoFEPT have gone through transformation and prepared number of policies since 2013 as: National Plan of Action, 2013, National Education Policy 2014, Minimum Standards for Quality Education in Pakistan 2017, National Curriculum Framework 2017, Draft National Education Policy 2017, National Education Policy 2018, and Higher Education Commission Policies 2020. However these policies lacked Pakistan's vision on SDG 12 goal.

3.10.2 Current Situation

The NAP on SDG 12 goal Targets 12.8, 12.a and Sub-targets 12.8.1, 12.a.1 urges federal and provincial governments to identify and streamline national indicators in education sector reflecting on SCP based education, learning and lifestyle changes. To follow this course, GOP took initiatives pertaining to tertiary educational system curricula in various disciplines of social and life sciences. After the provincial and federal consultations, it became clear that efforts so far by MOCC in federal to work with academia, and recommendations for MoFEPT to ensure a revised education policy framework aligned to SDG 12 goal have not led to fruition.

In this, the provincial governments are to adjust curricula to SCP principles, conduct seminars and awareness discussions on SDG in universities and educational forums. Research community, departments and organizations of various natures in the country are to build their capacity with modern educational techniques, learning and skillset development and environmentally sound technologies for showing progress on sustainable lifestyle patterns. Findings from our regional consultations show that the national indicators of education sector in Pakistan are already in use by MoFEPT, HEC and other provincial education departments and directorates.

Therefore, they are localized in national context of education but their streamlining with SDG 12 targets, along with regular monitoring and reporting in this regard is yet to be developed. The conceptualization of indicators in pertinence to curricula modification is still found to be at tier II level among key stakeholders at federal and provincial level, and data is produced, managed and held in the local government education directorates' databases on regular basis. Currently, national and provincial indicators in use on this priority area in Pakistan are: 1) Government expenditure on education as % of GDP, 2) Expenditure on education as % of total government expenditure, 3) No. of ADPs under MoFEPT, 4) Provincial literacy rate of population in % (10 years and above), 5) National literacy rate of population in % (10 years and above), 6) No. of out-of-school children of primary school age in each province, 7) Provincial gender parity index for gross enrollment ratio of primary school age in %, and 8) Adult literacy rate in % (15 years and above). Although, all are key performance indicators that represent national indicators' definitions in one to one mapping with SDG 12 Targets 12.8, 12.a and Sub-targets 12.8.1, 12.a.1 in NAP and hence GIF, yet the data on above indicators is yet to be regularly monitored and updated, and especially streamlined into educational, and research and development periphery in all the provinces by local government departments in Pakistan.

MOCC along with key actors in academia and private sector have devised SCP related subjectivity into the curriculum of tertiary education. In 2017, MOCC suggested a framework on 'Integrating sustainable consumption and production in tertiary curricula in Pakistan' under SDG Target 12.8 with advisory and funding of the EU-Switch Asia, UNEP and 10YFP. This framework includes the need and rationale for inclusive SCP related patterns in curriculum of programs such as environmental science, management and engineering, business and public administration, development studies, sociology, economics, geography and education was deemed essential to provide knowledge on SCP concepts and its practicability in national context. The framework also emphasizes education about production processes and consumption patterns leading to environmental impacts considered necessary for life cycle assessment.

3.10.3 Institutional Arrangement

The data on education sector national indicators is available with MoFEPT, Federal and Provincial Education Directorate, Provincial Board of Intermediate and Secondary Education across Pakistan, and Federal and Provincial Bureaus of Statistics. The data is stored in local repositories of these departments in KPK, Punjab, Balochistan and Sindh, and at Federal level.

3.10.4 Challenges

It is eminent from country wide consultations that data related to education and learning in Pakistan is deficit in streamlining SCP patterns in the education sector. It can be reasoned to disorderly data, lacking triangulations and their meaningful interpretation. Similarly, there is lack of assessments and learning among responsible government instituitons due to data deficiency or irreugularity on current status of education sector on SDG 12 targets. Regular addition to existing data can only provide feedback on performance of the country on SCP related progress in education sector. Despite current public investment in education sector results are yet to come. But an enabling education policy and its implementation is imperative for doing so. The policy challenge currently is the lack of perspective on SDG advancement and SCP direction in Pakistan's educational environment. Similarly, despite presence of data on national indicators, its use with methodical approaches to gauge scale of education sector performance on SDG 12 goal have not be researched, tested or implemented due to lack funds and absence of country based data repository. Only presence of database information system ensures and recommends improvement measures. Also, the database information system can help improve SDG 12 agenda in setting national education goal with regular education policy reform cycles.

3.10.5 Proposed Framework

Table 3.20: SDG 12 Capacity Assessment on Targets, Sub-targets, nationally defined Indicators, and their measurements, localization of responsibility and data sources

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Current level of Data	Data Sources and Responsibility
SDG 12 Target 12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.				

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
12.8.1 Extent to which (i) global citizenship education and (ii) education for sustainable development (including climate change education) are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment.	Measures the extent to which countries mainstream Global Citizenship Education (GCED) and Education for Sustainable Development (ESD) in their education systems. This is an indicator of characteristics of different aspects of education systems: education policies, curricula, teacher training and student assessment as reported by government officials, ideally following consultation with other government ministries, national human rights institutes, the education sector and civil society organizations. It measures what governments intend and not what is implemented in practice in schools and classrooms. Indicate which GCED and ESD themes (cultural diversity and tolerance, gender equality, human rights, peace and non-violence, climate change, environmental sustainability, human survival and well- being, and sustainable consumption and production). Are covered in national or sub-national laws, legislation or legal frameworks on education. Are covered in national or sub-national education policies, frameworks or strategic objectives. Are taught as part of the curriculum. Are taught in primary and secondary education. Pre-service or in-service training is available for teachers, trainers and educators. Are generally included in student assessments or examinations. Indicate whether national or sub-national education policies, frameworks or strategic objectives on education provide a mandate to integrate GCED and ESD.	1) Revised curriculum at primary, secondary, tertiary and vocational level to include SCP. 2) No. of teachers, professionals from relevant disciplines and technicians trained with the training module on SCP Principle. 3) No. of vocational training centers established. 4) No. of awareness campaigns for behavioral change about vocational training. 5) No. of workshops organized for higher management officials on benefits of SCP in manufacturing, trade and business sector.	Indicators are conceptually clear. Data for indicators (3,4,and 5) are available and reported. However, the rest of the indicators are not properly reported. The reporting frequency is yet to develop.	**Federal:** MoFEPT HEC MOCC MOE NAVTEC **Provincial:** Local Education Directorates Provincial Vocational Training Centers

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
	Indicate the approaches used to teach GCED and ESD in primary and secondary education. Indicate whether teachers, trainers and educators are trained to teach GCED and ESD during initial or pre-service training and/or through continuing professional development[64] .			
SDG 12 Target 12.a: Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production.				
12.a.1 Amount of support to developing countries on research and development for sustainable consumption and production and environmentally sound technologies.	This indicator will describe the amount of funds utilized for the research, development and promotion of indigenous developed cleaner technologies, cleaner production methodologies, curriculum development, etc.	1) No. of partnerships established between technical Colleges/ Universities and industries for applied research. 2) No. of Research and demonstration (R&D) trails dealing with SCP.	Indicators are conceptually clear. Data for indicator "1" can be accessed. However, is not reported officially. The data for indicator "2" is not available. The reporting frequency is yet to establish.	**Federal:** Higher Education Commission Ministry of Education MoFEPT **Provincial:** Vocational Training institutes Education departments

3.10.6 Policy Relevance

Investment in education reaps high rewards, and it is essential to disseminate education that encourages people to develop a sustainable lifestyle by catering to social, economic and environmental dimensions. In order to meet the 2030 targets stipulated by UN, Pakistan has to make sincere efforts in making sustainability a part of the curriculum. In doing so, it is essential to have all the educational boards on one page to revise the curriculum and include sustainability, whereas the intermediate and graduate level courses must include the outcomes as a function of sustainable development goals. Economics, Engineering, Medical and Environmental Sciences resources will be of great help in this regard, and this deliberation would aim to develop sound professionals that are aware of their duties in a just society.

3.10.7 Existing Projects

The following table displays the projects that are undergoing in education sector for meeting the targets of SDG 12 in Pakistan.

[64] https://unstats.un.org/sdgs/metadata/files/Metadata-12-08-01.pdf

Table 3.21: Projects list related to SCP education sector along with their cost

Sr. No.	Name	Cost (Rs. Million)
1	Pak-China Technical & Vocational Institute at Gwadar (CPEC)	984.000
2	Establishment of National Capacity Building Institute (NCBI) for Water Quality Management at Islamabad	323.573
3	Capacity Building of TTIs and Training of Elementary Schools Teachers in ICT, FATA, FANA & AJK	730.828
4	Financial Management for Good Governance (FMGG) Phase-II, Islamabad	43.223
5	Modernization and Standardization of Examination System	50.000
6	Prime Minister's Special Initiatives (PMSI) for Hunarmand Pakistan Programme (NAVTTC)	4,648.000
7	Provision of Quality Education Opportunities for Students of Balochistan, FATA & 3 PMUs	481.360

3.11 Tourism

3.11.1 Background

The NAP portrays tourism as 11th priority area under SDG 12 Goal. SDG 12 Targets 12.b and Sub-target 12.b.1 focuses on the tourism sector to develop and implement policy instruments to monitor SCP impacts for sustainable tourism. It is further ratified with creating employment and promotion of local culture and green businesses and products. Under GIF definitions of indicators a country can report number of sustainable tourism strategies, action plans and policies with their implementation, and monitoring and evaluations tools.

The tourism departments in all provinces are highlighting their priorities and working on them after localization of responsibility and objectives in short to medium range projects. Currently, the policy framework on tourism is under review. Once complete, this would lead to National Tourism Policy Framework for 2020-30. GOP have already done restructuring and reforms in major tourism organizations to boost the Pakistan tourism industry. The National Tourism Corporation Board (NTCB), under which the Pakistan Tourism Development Corporation (PTDC) functions is the apex body for various functional areas in tourism sector. Another achievement on this is the establishment of Pakistan Tourism Development Endowment Fund. Following this, the National Tourism Strategy of Pakistan 2020-2030 is underway and being actualized. In addition, a detailed 5 years' National Tourism Action Plan will be submitted by the PTDC.

3.11.2 Current Situation

NAP under SDG 12 Goal, relates to Targets 12.b and Sub-target 12.b.1 to tourism in Pakistan. Under NAP Pakistan is urged to see GOP attainments on developing tourism in the country, so far progress undertaken on data related to tourism country indicators, its aggregation, and reporting are almost in pilot phase. The conceptualization of indicators pertaining to tourism sector of Pakistan is found to be at tier II level among key stakeholders at federal and provincial level, and data is produced irregularly on national indicators within tourism departments. Currently, national and provincial indicators in use on this priority area in Pakistan are: 1) Total tourism sector share in percent to GDP annually, 2) Total tourism revenue in billion USD annually, 3) No. of tourism destinations by province, 4) Total no. of tourism destinations in the country, 5) No. of destination types (cultural heritage, ecotourism, coastal, land, etc.) by province, 6) Total no. of arrivals (international inbound visitors), 7) Total amount of spending in USD/PKR, 8) No. of tourism policies at provincial and national level ,9) No. of tourism based businesses, 10) No. of tourism services, 11) No. of inbound flights for international tourists, 12) No. of vehicles for transporting tourists, and 13) No. of accommodations for tourists in each destination[65]. Although, all national and provincial indicators are currently under use in tourism sector of Pakistan, and relevant government bodies across the four provinces. However, their significant purpose and use for NAP targets (12.b, 12.b.1) in national context is missing. Hence the aspect of monitoring and reporting is truant in one to one mapping with SDG 12- NAP and hence GIF.

Tourism is one of the Pakistan's top priority area in NAP. Tourism sector in Pakistan can become a major catalyst for economic of Pakistan. It has potential for employment generation, poverty alleviation hence the economic development considering its 5% contribution to the GDP. Before, COVID-19 pandemic, Pakistan's gross revenues from tourism itself were nearly 20 billion USD. After the pandemic, the tourism sector faced a decline of -0.27%. The current government has made it top priority and is pursuing tourism promotion options most viable for Pakistan since northern areas have most exotic natural mountain and 26 national heritage places. For this, PTDC has strategized a few actions for the future.

For new beginnings, PTDC introduced the Tourism Promotion and Regional Integration (TPRI) license in 2019 in apropos of NAP enactment. Another step towards healthy tourism is taken in promoting community-based tourism. The Pakistan Poverty Alleviation Fund (PPAF) is providing small loans to its communities in Azad Jammu and Kashmir to upgrade their houses and provide hospitality and lodging services to tourists. Under "Neelum Valley Project" of PPAF's partner organizations Akhuwat and Himalayan Wildlife Foundation, community in Sharda have been micro financed to initially upgrade 17 houses with amenities and nature views of mountains and river of Neelum Valley. It is utmost priority of GOP to protect biodiversity and forest areas, as described in National Environmental Policy. It is also to promote ecotourism concept and its practice. Policy instrument to be used effectively with the help of economic and market-based instruments in opportunities for green business. Similarly businesses and service industry associated with tourism are urged to be environmentally certified and sell green products.

[65] PTDC, Government of Pakistan, and Provincial tourism development corporations

3.11.3 Institutional Arrangement

The data on SDG 12 targets is not currently organized. Hence it is insufficient and inconsistent due to absence of regular evaluation and monitoring, therefore it lacks perspective into SDG 12 targets monitoring and reporting on the national indicators.

3.11.4 Challenges

Due to COVID-19 the tourism economy currently faces a setback around the world tourism has come to a halt and this trend is expected to continue for the next two years. In Pakistan, beside challenges on data, tourism sector majorly faces a lack of coherence among main constituent partners i.e. accommodations, catering, recreation and entertainment, transportation, and travel services. PTDC along with other provincial PTDC corporations is still striving to straighten up tourism sector's functional aspects. In this regard, efforts to monitor or report data are still to phase in. Major limitation in this regard is information collation on national tourism indicators regularly and consistency for better predictions on tourism trends in Pakistan. Due to lack of budget and other HR capacity issues, the idea of creating such a database is still in inception stage.

3.11.5 Proposed Framework

Table 3.22: SDG 12 Capacity Assessment on Targets, Sub-targets, nationally defined Indicators, and their measurements, localization of responsibility and data sources

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Current level of Data	Data Sources and Responsibility
SDG 12 Target 12.b: Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products.				
12.b.1 Number of sustainable tourism strategies or policies and implemented action plans with agreed monitoring and evaluation tools.	Implementation of standard accounting tools to monitor the economic and environmental aspects of tourism sustainability = total number of tables produced by countries out of the tables identified below: TSA Table 1 on inbound tourism expenditure TSA Table 2 on domestic tourism expenditure TSA Table 3 on outbound tourism expenditure TSA Table 4 on internal tourism expenditure	1. Implementation of standard accounting tools to monitor the economic and environmental aspects of tourism sustainability.	Indicators are conceptually clear. Data for indicator "1" can not be accessed. The data is not reported officially. The project based intervention does exist but not reported in a systematic maners.	**Federal:** PTDC **Provincial:** PTDC

SDG 12 Global Indicators	Indicator definitions, and calculation	National Indicators	Understanding and Data availability	Data Sources and Responsibility
	TSA Table 5 on production accounts of tourism industries TSA Table 6 domestic supply and internal tourism consumption TSA Table 7 on employment in tourism industries SEEA table water flows SEEA table energy flows SEEA table GHG emissions SEEA table solid waste * System of Environmental-Economic Accounting - Central Framework is an international statistical standard for measuring the environment and its relationship with the economy[66].			

3.11.6 Policy Relevance

The Prime Minister of Pakistan has put a major focus on promoting tourism in Pakistan, since it has the potential to be one of the major factors in bringing high value foreign exchange into Pakistan. However, it is imperative to ensure the environmental protection of these sites and this requires SMART goals to not only enhance the environment protection, but also the social development by creating jobs which ultimately lead to improved standard of living. Sustainable tourism can only be articulated if eco-friendly businesses are promoted, by using various eco-indicators such as number of energy efficient appliances, water consumption per visitor, amount of waste collected and recycled, etc. On the other hand, social indicators need to be developed to ensure that the tourists are not been detrimental to the destination and are well-versed with the local customs, traditions and culture. Sustainable tourism will bring in much needed revenue for Pakistan, and will also ensure the sanctity of the tourist destinations so that it serves as a model for rest of the world to follow.

3.11.7 Existing Projects

The following table displays the projects undergoing in tourism sector for meeting the targets of SDG 12 in Pakistan.

[66] https://unstats.un.org/sdgs/metadata/files/Metadata-12-0b-01.pdf

Table 3.23: Projects list related to SCP tourism sector

Sr. No.	Name	Cost (Rs. Million)
1	Promotion of Ecotourism in the Project Areas of Pakistan Wetlands Program	-
2	Capacity Building of Tourism Promotion Association of Kaghan Valley (T-PAK) for the Promotion of Sustainable Tourism in the Region	-
3	Community Development through Ecotourism on Fairy Meadows side of Nanga Parbat	-

Chapter 4: Conclusions and Recommendations

4.1 Introduction and Background

The objective of this cooperation is to propose a feasible framework for monitoring and reporting on SDG 12 for Pakistan. The result of the capacity assessment on SDG 12 targets, current and proposed indicators provides a guidance on the reporting framework for federal and provincial governments. The proposed framework highlights national adequacy to monitor and report on SDG 12 related national indicators, as well as, on localizing responsibilities such as identifications of the data sources. The assessment proposes a mechanism that identifies suitable indicators, definitions with verification methods. This includes data availability at the local level with defined responsibility to gather, monitor, report and manage the data flow in future.

The assessment also took account of the national indicators of which data is currently available i.e. it is being collected, and managed mostly in local repositories of departments on yearly basis. The proposed framework highlights the institutional arrangement at federal and provincial level by sectors on regular collection, monitoring and storage. This framework proposed stakeholders for SDG 12 data collection by creating cross responsibility between federal and provincial levels who can hold accountable for data flow within and between departments. It can be used to iterate on SDG 12 reporting at national level.

The finding of the assessment also presents baseline and relevant indicators that are currently used but not available on a regular basis. Yet, they can be used for SDG reporting if there are reporting, monitoring and collection mechanisms in place. This will require up-to-date technology on database and data management tools. Institutional arrangement will play a key role in ensuring data collection, reporting and availability especially at provincial level, and in strengthening monitoring and reporting at the national level.

The assessment recognized the advancement of GOP in understanding, designing, and forming of policies to overcome the barriers impeding the process of SDG 12, its progress and development. It also touched upon National Action Plan for Sustainable Consumption and Production (2016), stating provincial inputs to the SDG 12 and recommendations for applying policy framework and legal approach to support the execution and delivery of SDG 12. The NAP on SCP for Pakistan 2016, however, requires monitoring and reviewing process against the SCP related developments in all 11 priority areas considering their socioeconomic importance.

The current challenge to achieve SDG 12 agenda in Pakistan is data collection on priority sectors and their subsequences at provincial level. There is a strong need to identify mutual actions first at department level, then inter-department level and inter-provincial level. The mutual actions including the development of information technology and exchanging platform should be addressed under the policy framework of every sector at both federal and provincial levels to foster data sharing and reporting. The platform shall facilitate data repository and storage, facilitating the collaboration among relevant agencies and departments of GOP. Laws and regulations are important in ensuring inclusivity of certain action plans. But to strengthen and execute them is the key to assure their deliverance. GOP has so far informed in framing the SDG agenda in Pakistan however its implementation needs strengthening. It is strongly recommended that MOCC take lead in initiating the transition due to its custodian role, and clear mandate on SDG 12 among ministries of GOP. The further deliverance on this needs to be placed in SOPs of government bodies and organizations to assist, help, inform and collaborate with MOCC on whatever comes under its legal jurisdiction under SDG paraphernalia on following up SCP agenda.

It was also discussed during the project consultation that the role of MOCC as a national custodian and avant-garde of SDG was not yet fully known, resulting in delay on information reporting and data flow among departments at provincial and provincial to federal government. In addition, there was no clear role and responsibility defined to authorities on SDG 12 at the provincial level. The consultation also recognized issues of lacking capacity, under-developed HR, lacking time and financial resources to manage SDG 12. It was proposed that in order to be effective on SDG 12 reporting, there is a need to obtain more support on capacity building on (1) SCP concept and knowledge at grass root level, and (2) SDG 12 targets and indicators to outgrow their abilities especially in data processing.

In the light of above challenges, it can be said that GOP needs basic tools to pursue and promote its SDG 12 agenda realistically. It is evident from our regional consultations a dire need for educating the local departments and reflect as such in the HR base. In this, GOP can recommend MOCC as focal point ministry to assume and mainstream this role into working environs of other ministries and government bodies at federal and provincial level.

MOCC has all the tools to carefully guide and usher other government organizations while keeping a keen eye on progress of SDG agenda in Pakistan. It has all the ability to organize all other government departments to work collectively on SDG agenda. GOP role is to gather all to build an alliance on a whole-of-government approach and foster cross-government coordination by promoting partnerships within departmental constituencies and across.

Under MOCC guidance, other bodies of GOP can be interactive related to monitoring and reporting of national indicators with a baseline developed in this document, from existing national economic, social and other indicators that somehow indirectly correspond to country indicators as defined and described by GIF. Since such country economic data is already being generated on yearly, biannually, quarterly and monthly basis on various indicators, utilising it to SDG 12 database would be great addition to SDG 12 data repository. In this MOCC can prepare an audit questionnaire delineating features of national indicators and their salient role in measurement which can then be shared with all provincial bodies of local governments to further provide the required information on these national indicators to comprehend data into SCP practices emerging trends and patterns. Similarly, task of development of subsequent policies could be assigned to local EPD, EPA, statistics, P&D departments under the advisory of MOCC. In this, the role of MOCC should include all priority areas data aggregation from local government departments of bureau of statistics, P&D, agriculture, livestock, fisheries, and forestry, industry, energy, transport, education, housing and construction; EPAs, water and sanitation authorities, municipalities and waste management companies. Based on the responses of country survey questionnaires, scores or indices could be developed to scale performance on each indicator, indicative of monitoring and reporting on SDG 12 targets.

Finally, the financial and technical support from donor communities and international organizations working on SDG 12 and other development initiatives should all be aligned and mutually supportive in national context. SDG 12 is cross-cutting in nature and hence complex. Working collectively on this can be a great way forward for GOP's policymaking and monitoring abilities. In data management field the help and assistance coming from foreign companies and organizations should be transboundary without any additional barricading such as huge financial aspects (hi-bids) or lacking interest for technology transfer on best database related platforms or software and their technical use.

Annex

Annex 1: Stakeholders' Mapping at Federal level (SCP indicators and responsibility sources' localization)

SCP indicators and responsibility sources' localization (Federal level)[i]:

Sustainable Development Goal 12: Ensure sustainable consumption and production patterns				
SDG 12 Targets	**Indicators**	**Localization/Measurements of indicator/sub-indicators and Role of responsible actors**	**Data Sources**	**Focal Person(s)**
SDG 12 Target 12.b: Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products				
Target 12.1: Implement the 10-year framework of programmes on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries.	**12.1.1** No. of countries with sustainable consumption and production (SCP) national action plans or SCP mainstreamed as a priority or a target into national policies.	- National action plan for SCP. - National action plan is mainstreamed. - National action plan of SCP is mainstreamed in to national policies strategies.	**Ministry of Climate change (MOCC)**	Mr. Irfan Tariq (DG) Mr. Syed Mahmood Nasir, IG Forest Mr. Asif Sahibzada, Dir (Env and Policy)
Target 12.2: By 2030, achieve the sustainable management and efficient use of natural resources.	**12.2.1** Material footprint, material footprint per capita, and material footprint per GDP. **12.2.2** Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP.	- MOCC will facilitate in developing the reporting mechanisms. (- Introduction of policy instruments that promote the SCP intervention. - Develop the guidance for relevant departments and ministries on SCP). - Proportion of material/ natural resources used for production of 1 US$ of GDP proportion of material/natural resources used per capita at domestic level.	**Statistics House/ Bureau of Statistics** **Statistics House/ Bureau of Statistics**	Mr. Muhammad Sarwar Gondal, Mem. Resource Dr. Bahrawar Jan, Mem and DDG Mr. Muhammad Sarwar Gondal, Mem.Resource Dr. Bahrawar Jan, Mem and DDG
Target 12.3: By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.	**12.3.1** Global food loss index.	- Harvest and post-harvest losses. - Food loss Index.	**Ministry of National food security and research**	Syed Anwar-ul-Hasan Bokhari, Additional Secretary Dr. Syed Waseem-ul-Hassan, Food security commissioner-I

[i] Source Document: SDG Framework for Climate change, MoCC

SDG 12 Targets	Indicators	Localization/Measurements of indicator/sub-indicators and Role of responsible actors	Data Sources	Focal Person(s)
Target 12.4: By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.	**12.4.1** No. of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement.	- No of international multilateral agreements on hazardous waste and chemical. - No of international multilateral agreements that are reported.	**MOCC**	Mr. Irfan Tariq (DG) Mr. Syed Mahmood Nasir, IG Forest Mr. Asif Sahibzada, Dir (Env and Policy)
	12.4.2 Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment.	- % of hazardous waste produced. - % of hazardous waste treated.	**MOCC**	Mr. Irfan Tariq (DG) Mr. Syed Mahmood Nasir, IG Forest Mr. Asif Sahibzada, Dir (Env and Policy)
Target 12.5: By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.	**12.5.1** National recycling rate, tons of material recycled.	(MOCC to develop the policy instrument and relevant laws , regulations and laws that supports the implementation of policies Establish and strengthen the policy implementation). -% of recyclable material produced. -% of material recycled.	**MOCC**	Mr. Irfan Tariq (DG) Mr. Syed Mahmood Nasir, IG Forest Mr. Asif Sahibzada, Dir (Env and Policy)
Target 12.6: Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle.	**12.6.1** No. of companies publishing sustainability reports.	- No. of companies who have adopted the sustainable practices. - No. of companies reporting on sustainability practices.	**MOCC**	Mr. Irfan Tariq (DG) Mr. Syed Mahmood Nasir, IG Forest Mr. Asif Sahibzada, Dir (Env and Policy)
Target 12.7: Promote public procurement practices that are sustainable, in accordance with national policies and priorities.	**12.7.1** No. of countries implementing sustainable public procurement policies and action plans.	(MOCC to lead on developing the green procurement guidelines). - Development of sustainable public procurement standards and guidelines. - Development of sustainable public procurement policies and plans.	**MOCC**	Mr. Irfan Tariq (DG) Mr. Syed Mahmood Nasir, IG Forest Mr. Asif Sahibzada, Dir (Env and Policy)

SDG 12 Targets	Indicators	Localization/Measurements of indicator/sub-indicators and Role of responsible actors	Data Sources	Focal Person(s)
Target 12.8: By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.	**12.8.1** Extent to which (i) global citizenship education and (ii) education for sustainable development (including climate change education) are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment.	(MOCC and HEC to include the SCP guidelines including the climate change in national education policy. - Support in development of curricula that address the SCP themes and Climate Change in teachers and students). - Education policy clearly reflecting sustainable development. - Primary , secondary and tertiary student and teachers. - Curricula that address the sustainable development life styles.	**HEC**	Dr. Tariq Banuri Chairman, HEC, Mr. Arshad Mirza Secretary, Ministry of Federal Education and Professional Training
Target 12.a: Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production.	**12.a.1** Amount of support to developing countries on research and development for sustainable consumption and production and environmentally sound technologies **(no meta data).**	(Not yet developed)	**MOCC/ Ministry of science and technology!**	Ms. Ismat Gul Khattak, DG, PNAC
Target 12.b: Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products.	**12.b.1** No. of sustainable tourism strategies or policies and implemented action plans with agreed monitoring and evaluation tools.	(Not yet developed)	**Ministry of Tourism**	Syed Intikhab Alam, MD, PTDC

SDG 12 Targets	Indicators	Localization/Measurements of indicator/sub-indicators and Role of responsible actors	Data Sources	Focal Person(s)
Target 12.c: Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account their specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities.	**12.c.1** Amount of fossil-fuel subsidies per unit of GDP (production and consumption) and as a proportion of total national expenditure on fossil fuels **(no meta data).**	(Not yet developed)	**Ministry of Commerce**	Ms. Aisha Humera Ch. JS WTO Mr. Waqas Azeem DG, Focal Person for Prime Minister's Strategic Reforms Implementation Unit

Annex 2: Provincial level Mapping (SCP Actions, responsibility and data sources' localization)

SCP Actions, responsibility and data sources' localization (Provincial level Mapping):
Sustainable Development Goal 12: Ensure sustainable consumption and production patterns

Priority Areas with respective SDG 12 Targets and Objectives	Actions and Roles on indicators/ sub-indicators by responsible actors	Punjab Data Sources	Sindh Data Sources	Khyber Pukhtun Khaw Data Sources	Baluchistan Data Sources
Water **SDG target 12.2** **Obj 1:** Develop and strengthen relevant institutions, policies and framework to promote integrated water resource management with special focus on implementation of rules and regulations, financial mechanisms and capacity building. **Obj 2:** Improve water quality manage and protect water resources through technical measures ensuring sustainable availability of water at macro and micro level through equitable access of water resources. **Obj 3:** Ensure efficient use of water in agriculture, irrigation, industry and domestic purposes. **Obj 4:** Develop Contingency plans and adopt measures to increase water shortage capacity.	• Initiate training programs for enhancing water resource management • Enforcement of National Environmental Quality Standards (NEQs). • Fulfill the gap in data regarding water e.g. for percentage of total available water resources used. • Development of Punjab rural drinking water policy and strategy. • Launch and implement Punjab municipal water act. • Building capacity and developing the knowledge base to manage the large and complex canal delivery water system • Minimizing system losses by improving operational management of canal system for wet, average, and dry season scenarios and by monitoring of water discharges at mogaaz . • Legislate and enforce principle "polluter pays" for water polluting industries. • Encourage water metering and effective control over wastage of municipal water. • Develop and implement rules and regulations for Punjab to prevent over-exploitation of groundwater. • Enforce industrial and domestic wastewater treatment and management practices to protect environment, in particular water resources, from further degradation. • Carry out periodic scientific monitoring of water aquifers and fresh water bodies and identify hot spot areas of contamination and their resources. • Regularly monitor the quality of water being supplied to the consumers	- Punjab Planning and Development Department (P & DD) - Punjab Local Government Elections and Rural Development Department) (LGRDD) - Punjab EPA - Ministry of Water and Power, Planning and Development - Punjab Industries and Commerce Department, - Fed EPA, - Water and Sanitation Agency (WASA) - Punjab Agriculture Department	- Sindh Planning and Development Department (P & DD) - Sindh Local Government Elections and Rural Development Department (LGRDD) - TEVTA, - NAVTTC, - PHED - Sindh EPA - Ministry of Water and Power, Planning and Development Department - PCRWR - Sindh Planning and Development Department, - Sindh Industries and Commerce Department, - Sindh EPA - WASA	KPK Planning and Development Department (P & DD) KPK Local Government Elections and Rural Development Department (LGRDD) TEVTA, NAVTTC, PHED KPK EPA Ministry of Water and Power, Planning and Development, KPK Planning and Development Department, KPK Industries and Commerce Department, Water and Sanitation Agency (WASA)	Balochistan Planning and Development Department (P & DD) Baluchistan Local Government Elections and Rural Development Department (LGRDD), TEVTA, NAVTTC, PHED Balochistan EPA Ministry of Water and Power, Planning and Development Department, PCRWR

Priority Areas with respective SDG 12 Targets and Objectives	Actions and Roles on indicators/ sub-indicators by responsible actors	Punjab Data Sources	Sindh Data Sources	Khyber Pukhtun Khaw Data Sources	Baluchistan Data Sources
Key stakeholders: Ministry of Water and Power, Ministry of Planning, Development and Reform, Ministry of Climate Change, PCRWR, Provincial Local Government and Rural Development Department (LGRDD), Federal & Prov. EPAs, Technical Education & Vocational Trg. Authority (TEVTA), Ministry of National Food Security & Research, PCRWR, PARC, and NARC	• Invest in proven methods and technologies to minimize wastage (e.g. in the agricultural sector), promote conservation and gain efficiencies. • Create awareness and promote rain-water-harvesting at household and local levels. • Invest in local manufacture of water efficiency equipment's (fixtures and appliances).				
Agriculture **SDG Target 12.1, 12.3 and 12.7** **Obj 1:** Promoting SCP concept in agriculture by adopting Sustainable agriculture practices, technologies for sustainable production system and to meet food security. **Obj 2:** Reduce food loss and waste and ensure quality nutrition. **Obj 3:** Increase and ensure protection and preservation of prime agricultural land and combat Desertification and Drought. **Obj 4:** Adoption of climate resilient techniques and measures for ensuring food security and sustainable agriculture.	• Focus on improving water use efficiency for irrigation through using sprinkler and trickle irrigation etc. • Optimization of fertilizers and pesticides use on different crops through R & D. • Promote treatment of grey water and its recycling for agricultural purposes. • Introduce training programs for exposing farmers to international successful farming practices. • Promote biological control of pests through encouraging the use of bio-pesticides and integrated pest management (IPM) techniques for rational use of agrochemicals. • Promotion of indigenous and non-hybrid variety of seeds. • Standardization of practices and processes for sustainable cotton ginning for improved economic, social and environmental returns to the industry as rural communities.	Punjab Agriculture Department, Ministry of National Food Security and Research, Ministry of Climate Change Punjab Agriculture Department, PARC LG & RDD , Agricultural Universities WWF In-Service Agriculture Training Institutes (IATI), Water Management training and Research Institute (WMT &RI)	Sindh Agriculture Department, Ministry of National Food Security & Research, Ministry of Climate Change PARC, Agricultural Universities In-Service Agriculture Training Institutes, PPRA	KPK Agriculture Department, Ministry of National Food Security and Research, Ministry of Climate Change PARC, Agricultural Universities, TEVTA, NAVTTC, PPRA	Balochistan Agriculture Department, Ministry of National Food Security and Research, MOCC, PARC, Agricultural Universities,

Priority Areas with respective SDG 12 Targets and Objectives	Actions and Roles on indicators/ sub-indicators by responsible actors	Punjab Data Sources	Sindh Data Sources	Khyber Pukhtun Khaw Data Sources	Baluchistan Data Sources
Key stakeholders: M/o National Food Security and research, M/o Planning, Development and Reforms, MOCC, PARC, NARC, Pakistan Agricultural Storage and Services Corporation Limited, Federal and Prov. Agriculture Departments, Centre for Agriculture and Biosciences International (CABI), and Federal Seed Certification & Registration Department	• Evaluation and application of innovative ways to use information and communication technologies (ICTs) in the rural domain, with a primary focus on agriculture. • Focus on on-farm crop residue management. • Impart on-farm trainings to the famers for reduction and management of agricultural waste. • Increase appropriate storage facilities for agricultural products and food items to reduce food loss and waste with the participation of civil society organizations including CBOs. • Develop Punjab Land use Policies to protect land use planning and zoning of agricultural land • Use of organic fertilizer, crop rotation techniques for progressively improving land and soil quality. • Employ environmentally sound multi-cropping and crop management practices. • Enhance water retention in the soil through farming methods and systems such as residue management, conservation tillage, bunds, contouring and field levelling. This will reduce the amount of water that needs to be applied to the field.	Punjab Agriculture Department PPRA, Sustainable Rice Platform (SRP) Pakistan Rice Growers/ exporters Association, International and National donor Organisations			
Energy **SDG Target 12.1 and 12.7** **Obj 1:** Strengthening of relevant institutions, policies, rules and regulations, financial mechanisms, innovative and accessible resources for energy efficiency.	• Initial Environment Examination (IEE) and Environment Impact Assessment (EIA) must be carried out before commencement of all energy projects. •Build capacity to examine IEE & EIA reports in the relevant institution. • Skill development through Hands-on training, refresher courses, Staff exchange programs and Coordination with the local and foreign academia and technical institutions.	Punjab Energy Department, Ministry of Water & Power, EPA, Water and Power Development Authority (WAPDA), Private Power Infrastructure Board (PPIB),	Sindh Energy Department, Ministry of Water & Power, EPA Water and Power Development Authority (WAPDA) , Private Power Infrastructure Board (PPIB),	KPK Department of Energy and Power, Ministry of Water & Power, EPA Water and Power Development Authority (WAPDA),	Balochistan Deptt. of Energy, Ministry of Water & Power, EPA Water and Power Development Authority (WAPDA) , Private Power Infrastructure Board (PPIB),

Priority Areas with respective SDG 12 Targets and Objectives	Actions and Roles on indicators/ sub-indicators by responsible actors	Punjab Data Sources	Sindh Data Sources	Khyber Pukhtun Khaw Data Sources	Baluchistan Data Sources
Obj 2: Promote R & D for clean energy technology and tap Pakistan's huge potential for indigenous and renewable resources and technologies such as bio-fuel (biogas) solar, wind, geothermal and hydrogen energy. **Obj 3:** Reduce the carbon footprint by promoting energy efficiency. **Key Stakeholders:** Ministry of Water and Power, NEECA, MOCC, PPIB, AEDB, WAPDA, OGRA, NEPRA, Ministry of Petroleum and Natura resources, M/o Planning, development and reforms, M/o Finance, M/o Commerce and Trade, TEVTA, NAVTTC, PCRET, and Federal and Prov. EPAs.	• Enhance public private partnership investment for energy efficiency. • Formulate guidelines for Punjab for establishment of climate resilient energy infrastructure and other development sectors. • Give preferential status and tax incentives to IPPs (Independent Power Producers) for investment in Power Sector. • Create awareness regarding advantages of installing solar PV systems for ensuring undisrupted supply of energy for domestic and commercial use. • Minimize line losses by upgrading the transmission lines. • Increase capacity of persons in transmission and distribution (T & D) system. • Develop punitive laws to protect illegal connections. • Prepare baseline primary data on solar, biogas, and hydrogen energy potential. • Build capacity of farmers for upgrading livestock farms to produce biogas. Medium term • Install plants to generate power from municipal waste. • Disseminate fuel efficient cookers and energy saving devices • Switch from incandescent bulbs to energy efficient bulbs in public and open spaces, streetlights, buildings, industries and commercial places. • Install sensors for increasing efficiency. • Encourage solar water heaters	Oil and Gas Regulatory Authority (OGRA), NEPRA, AEDB, ENERCON (NEECA), Pakistan Council of Renewable energy technologies (PCRET), M/o Petroleum and Natural Resources, TEVTA, PCRET	Oil and Gas Regulatory Authority (OGRA), NEPRA, AEDB, PCRET, ENERCON (NEECA), M/o Petroleum and Natural Resources, TEVTA	Private Power Infrastructure Board (PPIB), Oil and Gas Regulatory Authority (OGRA), ENERCON (NEECA), Pakistan Council of Renewable energy technologies (PCRET), NEPRA, AEDB, ENERCON (NEECA), M/o Petroleum and Natural Resources, TEVTA	Oil and Gas Regulatory Authority (OGRA), NEPRA, AEDB, Pakistan Council for Renewable ,energy technologies (PCRET), ENERCON (NEECA), M/o Petroleum and Natural Resources, TEVTA

Priority Areas with respective SDG 12 Targets and Objectives	Actions and Roles on indicators/ sub-indicators by responsible actors	Punjab Data Sources	Sindh Data Sources	Khyber Pukhtun Khaw Data Sources	Baluchistan Data Sources
Industry **SDG Targets 12.6, 12.4 and 12.7** **Obj 1:** Harmonizing and reinforcing policies and mechanisms to support the introduction of resource efficiency and clean technologies in industry for sustainable consumption and Production (SCP). **Obj 2:** Enhance the capacity and capability of industrial units and sectors for resource conservation, value addition, environmental compliance and competitiveness. **Obj 3:** Encourage environment friendly industrial zones and also support medium and small scale industries to green their supply chain. **Key stakeholders:** Ministry of Industries and Production, M/o Trade and Commerce, MOCC, Prov. P&DDs, FPCCI, SMEDA, Federal & Prov. EPAs, Ministry of Finance, FBR, Ministry of Climate Change, Cleaner Production Centers.	• Enforce National Environmental Quality standards (NEQs). • Develop and Enforce Pollution Penalty Rules for the violators of NEQS. • Enforce implementation of Occupational Health and Safety standards in industries and institute strict monitoring system. • Strengthening public-private for sustainable industrial development • Enforce Self-Monitoring, Analysis, and Reporting Technology (SMART) and establish effective monitoring guidelines to specify what needs to be reported, when it would be reported, how it would be reported and to whom. • Implement Eco-standards and labeling to meet international standards particularly related to SCP. • Endorse and implement ISO Certification and global accreditation in manufacturing and service institutions to access international market. • Engage the consumer in SCP practices through promoting dynamism in the green industry market (leaflets, TVs spots, webpage, hotline, etc.) by engaging the civil society organizations and NGOs in the awareness campaigns, and events targeting the producers and the consumers. • Undertake the initial survey to identify the industries that need technological improvement for emission reduction. • Ensure polluting industries to construct individual wastewater treatment plants. • Secure landfills for industrial solid waste disposal. • Installation of Combined Effluent Treatment Plants (CETPs) in all industrial estates. • Upscale production of traditional craftsmanship to provide employment.	Punjab Environment Protection Agency (EPA) Punjab Industries, Commerce and investment Department, Ministry of Industries and Production, FPCCI Industrial estate management companies Punjab Industries, Commerce and investment Department, PSDF Local Financial Institutions (FIs), Ministry of Finance, SMEDA, International development organizations	Sindh EPAs, Sindh Industries and Commerce, Ministry of Industries and Production, FPCCI, Industrial estate management companies, Local Financial Institutions (FIs), International development organizations, TEVTA, NAVTTC, Pakistan National Accreditation Council (PNAC), Industrial Association Chamber	KPK Department of Industries, KPK Chamber of Commerce and Industries, KPK EPA, Ministry of Industries and Production, FPCCI Industrial estate management companies, Local Financial Institutions (FIs), Ministry of Finance, International development organizations, SMEDA	Balochistan Deptt. of Industries and Commerce Balochistan EPA Ministry of Industries and Production, FPCCI Industrial estate management companies, Local Financial Institutions (FIs), Ministry of Finance, International development organizations, SMEDA

Priority Areas with respective SDG 12 Targets and Objectives	Actions and Roles on indicators/ sub-indicators by responsible actors	Punjab Data Sources	Sindh Data Sources	Khyber Pukhtun Khaw Data Sources	Baluchistan Data Sources
	• Increase financial services to SMEs through establishing dedicated credit lines for soft term loans.				
Climate Change **SDG Target 12.1** **Obj 1:** Take urgent action to combat climate change and its impacts. (we will examine adaptation and mitigation measures taken to mitigate carbon related emissions such as effectiveness of EIA as mandatory regulation, forestation as carbon sinks, switching to renewable energy and fuel efficient vehicles for reduced GHG emissions, etc) **Key Stakeholders:** Ministry of Climate Change, Ministry of Water and Power, NEECA, AEDB, Prov. P&DDs, NDMA, PDMAs, Provincial Irrigation Deptt, MOCC, Prov. EPDs, Climate Change Centers, Ministry of Water and Power, Ministry of National Food Security and Research, NEECA, GCSIC, Ministry of Communication, Atomic Energy Commission	• Undertake flood and other climate triggered disasters management through appropriate measures. • Strengthen disaster management institutions at Provincial and District levels. • Establish a Provincial cell for sharing, networking and regularly updated climate change related data. • Create Provincial Fund for catalyzing matched financing for climate change initiatives. • Strengthen existing hydrological network, early warning system and monitor river flows in collaboration with Pakistan Meteorological Department (PMD) and district authorities. • Formulate and enforce “River Flood Plain” regulations and laws to prevent growth of settlements in flood plains. • Construct disaster resilience multipurpose school buildings that can also be used as shelters during natural calamities. • Analyzing flood routing through dam break studies • Plan, design, construct and strengthen appropriate flood embankments, dykes, protective bunds to protect flood plains.	Provincial Climate Change Centers, Ministry of Climate Change, EPDS, PDMAs, Federal Flood Commission, NDMA, DDMAs P &DD, EPA, Dept. of Water, PMD, Federal Flood Commission, Provincial Irrigation Deptts; District Governments Sectoral ministries like Agri, Water & Power, industries, Trade & Commerce, Finance, Statistics Div. Dept. of Education, M/o Education Punjab, Higher Education Department, Punjab (HED), Punjab Text Book Board LGRDD, NEECA, PCRET, Alternate Energy Dev. Board	Provincial Climate Change Centers, Ministry of Climate Change , EPDS, PDMAs, Centers, Federal Flood Commission, NDMA, P &DD, EPA, Dept. of Water, PMD, Provincial Irrigation Deptts; District Governments	Provincial Climate Change Centers, Ministry of Climate Change , EPDS, PDMAs, Provincial Climate Change Centers, Federal Flood Commission, NDMA, Dept. of Water, P & DD, PMD, Provincial Irrigation Deptts; District Governments Dept. of Education, HEC, M/o Federal Education & Professional Training,	Provincial Agri Deptt; P&DD, Provincial Agri Deptt, Ministry of Climate Change , KIU, NGO’s, EPA, NARC, Provincial Forest Deptt; Provincial Agri. Dept., CBOs, Provincial Forest Depts., Council of Common Interest Sectoral ministries like Agri, Water & Power, industries, Trade & Commerce, Finance, Statistics Div.

Priority Areas with respective SDG 12 Targets and Objectives	Actions and Roles on indicators/ sub-indicators by responsible actors	Punjab Data Sources	Sindh Data Sources	Khyber Pukhtun Khaw Data Sources	Baluchistan Data Sources
Land Ecosystem **SDG target 12.2.** **Obj 1:** Sustainably manage forests, combat desertification, halt deforestation and reverse land & forest degradation, halt biodiversity loss. **Key stakeholders:** Provincial Forest Deptt; P&DDs, EPD, Finance Deptt; Ministry of Climate Change, Provincial Forest,	• Substitute firewood in the upland ecosystems by providing incentives for alternative sources of energy, like piped natural gas, liquefied petroleum gas (LPG), solar energy and micro-hydel power stations to the local inhabitants • Set Biodiversity Indicators and tap financial resources for implementation of the Biodiversity Action Plan (BAP). • Encourage empirical research on flora and fauna in the context of their responses to current and historical climatic changes and ecosystem conservation • Promotion of habitat conservation for animals and birds • Promote plantation of indigenous species. • Capacity building and incentivize farm forestry and social forestry	Provincial Agri Deptt; P&DD, Ministry of Climate Change , KIU, NGO's, EPA, MARC, Provincial Forest Deptt; Academia, Forest, Wildlife & Fisheries Department Punjab Planning and Development Department, Punjab Forest Research Institute Faisalabad, Agriculture Department, The Urban Unit, Council of Common Interest,	Provincial Agri Deptt; P&DD Ministry of Climate Change , KIU NGO's EPA: MARC Provincial Forest Dept.; Academia, Sindh P & D and EPA NGOs, CBOs Council of Common Interest	Provincial Agri Deptt; P&DD, Ministry of Climate Change , NGO's EPA, Provincial Forest Deptt; Academia, CBOs Provincial wildlife and forestry Dept. Council of Common Interest	Provincial Agri Deptt; P&DD, Ministry of Climate Change, KIU, NGO's, EPA, NARC Provincial Forest Deptt; Academia, CBOs, Council of Common Interest
Marine Ecosystem **SDG target 12.2.** **Obj 1:** Reduce marine pollution and sustainably use marine resources, including through sustainable management of fisheries, aquaculture and tourism	• Reduce and control solid and liquid waste disposal in the bay areas by developing facilities of integrated waste management at source through Public Private Partnership • Establish a Marine Pollution Control Commission. • Protect fish habitats against both encroachment and pollution • Monitor sustained freshwater flows into the marine eco-systems. • Harvest fisheries and other marine resources on a sustainable yield basis through capacity building • Improve quality management for export and domestic fist catches through capacity building and demonstrations		EPD & P&DD &, Govt. Sindh MOCC, National institute of Oceanography (NIO), Karachi Fisheries Deptt; P&DD, EPD, Govt. Sindh NIO, Export Promotion Bureau, Indus Water Commission,		EPD & P&DD &, Govt. Balochistan MOCC, Fisheries Deptt; P&DD, EPD, Govt. Balochistan NIO, Export Promotion Bureau, Indus Water Commission, Ministry of Water and Power, Provincial

Priority Areas with respective SDG 12 Targets and Objectives	Actions and Roles on indicators/ sub-indicators by responsible actors	Punjab Data Sources	Sindh Data Sources	Khyber Pukhtun Khaw Data Sources	Baluchistan Data Sources
Key stakeholders: Ministry of Climate Change, Federal & Prov. EPAs, Govt. of Sindh & Balochistan; MOCC, Pakistan Navi, Maritime Security Agency, Karachi Port Trust, National institute of Oceanography (NIO), Forest Departments of Govt. of Sindh & Balochistan, Fisheries Deptt	• Develop hatcheries & nurseries for supporting sustainable harvesting of fish, shrimp and frogs and other permissible marine species to increase their export. • Construct embankments/ barriers and vegetative cover near the low lying coastal human clusters to safeguard against rising sea level and cyclones.		Ministry of Water and Power, Provincial Planning and Development Departments Govt. Sindh Sindh Coastal Dev. Authority		Planning and Development Departments Govt. Balochistan Balochistan Coastal Dev. Authority
Sustainable Cities SDG Target 12.1 and 12.5 **Obj 1:** Enhance capacity of relevant institutions for sustainable Cities planning and management to integrate SCP Principles. **Obj 2:** Develop the Policy, legal framework and Governance for Integrated waste Management and support Best Practices and technologies for efficient management of waste. **Key Stakeholders:** M/o Planning, Development and Reforms, MOCC, M/o of Housing and Works, Provincial housing and town planning departments, CADD, LGRDD, and Cantonment Boards	• Ensure implementation of existing legislations and policies e.g. National Housing Policy 2001, National Katchi abadi Policy 2001, Naional sanitation Policy 2006. • Develop Mechanism for laying of infrastructure services like sewerage and drainage line as per town planning regulations and building by-laws. • Ensure adequate protection and maintenance of heritage sites and buildings in urban centers. • Ensure strict compliance of provisions of building by-laws for construction of disaster resilient buildings and infrastructure. • Prevent encroachment of fertile agricultural and forest land through, responsive urban land use, strict zoning enforcement and targeted legislation. • Increase green spaces and initiate projects for greening pillars of bridges to enhance air quality. • Replace Katchi abadis by low income residential buildings and service plots developed with local community participation. • Stop open burning of waste by enforcing rules and regulations.	LGRDD, Punjab Urban Unit Punjab Housing Urban Development and Pub-lic Health Engineering Department, Planning and Development Department, Ministry of Housing and Works Provincial Housing and Town Planning Departments, WASA, Ministry of Climate Change, ENERCON,	LGRDD, Urban Directorate Sindh Provincial Housing Authority, Planning and Development Department, Ministry of Housing and Works Sindh Provincial Housing Authority, Provincial Housing and Town Planning Departments, WASA,	LGRDD, Urban policy unit KPK, Provincial Housing Authority, Planning and Development Department, Ministry of Housing and Works Public Housing and Works, Provincial Housing and Town Planning Departments, WASA	LGRDD, Urban Planning Department Balochistan, Ministry of Housing & Pakistan Public Works Department, Planning and Development, Provincial Housing and Town Planning Departments, WASA

Priority Areas with respective SDG 12 Targets and Objectives	Actions and Roles on indicators/ sub-indicators by responsible actors	Punjab Data Sources	Sindh Data Sources	Khyber Pukhtun Khaw Data Sources	Baluchistan Data Sources
	• Ensure implementation of Hospital waste Management Rules, 2005 at all levels. • Set up pilot projects for waste segregation at source e.g. separate collection of packaging material like plastic and paper from schools, universities and government building etc.				
Transport **SDG Target 12.1.** **Obj 1.** Development of Sustainable Public and Private Transport System for reducing carbon footprint and increase efficiency. **Obj 2:** Sensitize and educate stakeholders and develop appropriate market tools to promote Value Chains of transport management. **Key stakeholders** Ministry of Communication, Provincial Transport Authorities, PPPA, Ministry of Planning, Development & Reforms, City Development Authorities, NTRC, NEECA, M/o of Communication, M/o Industries, M/o Trade & Commerce, Prov. P&DDs, Ministry of Communication, Federal & Prov. EPAs, and NTRC.	• Encourage and construct cycling and walking in urban centers. • Promote model shift from private to public transport through development of mass transit system(Bus Rapid Transport system (BRT), metro train, circular railway) to facilitate rapid movement. • Introduce engine efficiency standards (EURO I, EURO II) for vehicles and branding of sustainable locally produced transport products and services. • Earmark and enforce creation of dedicated lanes for cyclists, buses/ trucks, cars. • Improve and strengthen the motor vehicle examination system. • Promote computerized engine tuning. • Terminate driving licenses after three violations of traffic rules and reissue licenses after re-qualifying driving test. • Rehabilitation of existing road networks • Introduce specific timings for allowing heavy duty vehicles into the city centers.	Punjab Provincial Transport Authority, Ministry of Communication, City Development Authorities. ENERCON LGRDD NTRC	Sindh Transport and Mass Transit Department, Ministry of Communication, City Development Authorities, ENERCON National Highway Authority, NTRC, Sindh Transport and Mass Transit Department, Ministry of Communication, ENERCON Development Department	KPK Transport Authority City Development Authorities. KPK Transport Authority, National Highway Authority, Traffic and Motorway Police	Balochistan Transport Authority, Ministry of Communication, Provincial Transport Authorities City Development Authorities. Balochistan Transport Authority, Ministry of Communication

Priority Areas with respective SDG 12 Targets and Objectives	Actions and Roles on indicators/ sub-indicators by responsible actors	Punjab Data Sources	Sindh Data Sources	Khyber Pukhtun Khaw Data Sources	Baluchistan Data Sources
Education **SDG target 12.8.** **Obj 1:** Achieve resource efficiency and low-carbon lifestyles by integrating Sustainable Consumption and Production (SCP) into education in order to acquire knowledge and skills needed to promote sustainable development and lifestyles. **Obj 2:** Create Inclusive And effective learning environment by building and upgrading education facilities . **Key stakeholders:** Ministry of Federal Education and Professional training, HEC, NEVTTC, TEVTA, Provincial Education Deptts., and Ministry of Planning, Development and Reforms	• Re-evaluate and revise curriculum for integration of SCP concepts, principles and procedures at primary, secondary, tertiary, technical and vocational level. • Ensure inclusion of SCP concepts in the training module for teachers, professionals from relevant disciplines and technicians. • Ensure training of teachers especially in rural areas. • Disseminate concept of SCP at primary, secondary, tertiary and at vocational levels for behavioral and lifestyle changes ensuring improvement in resource use efficiency and value addition. • In consultation with religious leaders establish and mainstream madrasas curriculum to meet new challenges like SCP. • Arrange specialized reorientation training workshops for higher management on benefits of SCP in manufacturing, trade and business sector in Punjab. • Increase girl's enrolment in schools by provision of female teachers, and necessary infrastructure e.g. toilets, boundary walls, and clean drinking water. • Educational budget to be increased by the Government.	Punjab Education Department, Ministry of Federal Education and Professional training Board of Intermediate and Secondary Education, Higher Education Commission Provincial education Department Ministry of Women Development, Punjab Department of Industries, Commerce and Labour. Ministries of Industries and Production Ministry of Climate Change	Sindh Education Department, Ministry of Federal Education and Professional training Board of Intermediate and Secondary Education, Higher Education Commission Universities, Vocational training Institutes Community driven Institutes, NGOs Sindh Department of Industries, Commerce and Labour. Ministry of Climate Change, Ministry of Industries Planning and Development Department P& DD, PPRA, LGRDD	KPK Education Department, Ministry of Federal Education and Professional training Board of Intermediate and Secondary Education, Higher Education Commission Universities, Vocational training Institutes NGOs, KPK Department of Industries, Commerce and Labour. Ministries of Industries and Production Ministry of Climate Change, PPRA	Balochistan Education Department, Ministry of Federal Education and Professional training Board of Intermediate and Secondary Education, Higher Education Commission Provincial education Department Universities, Vocational training Institutes