



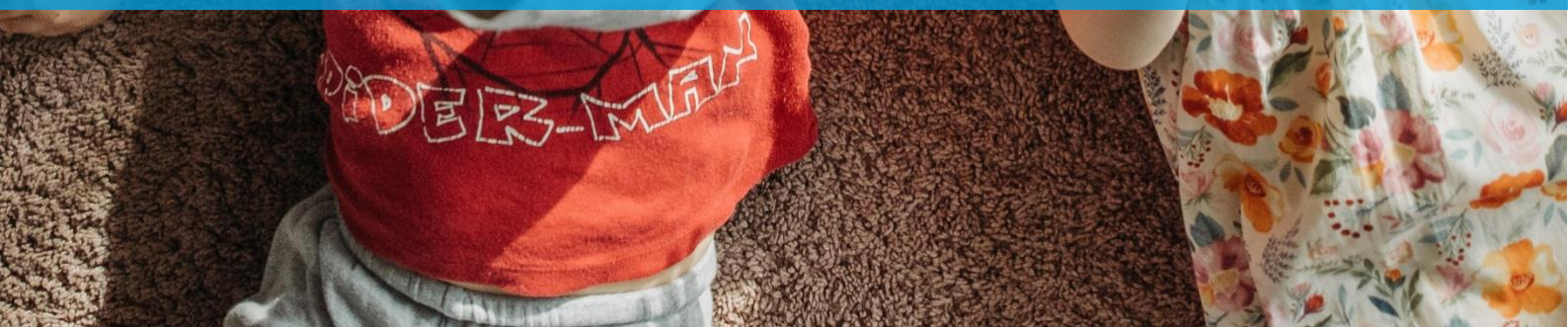
UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION



# Global consultations on circular economy 2022-2023

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Written statements of the regional preparatory meeting  
for the Asia-Pacific Group





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### Written statements of the regional preparatory meeting for the Asia-Pacific Group

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I. National Productivity Council, India

Towards Additional Statement(s)

on

**Statements/Steps and approaches submission to UNIDO for achieving Circular Economy Outputs and Outcomes as part of Regional / Global Consultations on Circular Economy**



National Productivity Council  
5-6 Institutional Area  
Lodhi Road  
New Delhi - 110003

Submitted by

Harsh Thukral, Dy. Director, ECA Group and NCPC/NPC, National Productivity Council  
Email : [harsh.thukral@npcindia.gov.in](mailto:harsh.thukral@npcindia.gov.in) and [harsht.ncpcindia@gmail.com](mailto:harsht.ncpcindia@gmail.com)

(19 October, 2022)

## **Statements and submission to UNIDO regarding Regional/Global Circular Economy Consultations from NPC/NCPC India**

As advised by email by UNIDO office on the subject matter, from National Productivity Council (NPC) / National Cleaner Production Centre (NCPC), India, may we reflect on some of the ongoing initiatives occurring in India in the Circular Economy perspective as well as vision elements on Circular Economy being envisaged as bullet points, and accordingly what are desirable areas of outputs/outcomes that may need to be accomplished in the field of Circular Economy (CE) and Resource Efficiency (RE) in India, and internationally, and nature of industries that may be sought to participate and who may benefit etc., and indicatively on potential complementary aspects that can be enablers.

Part 1 : Indications of a set of ongoing initiatives in India

Part 2 : Potential areas for further action and activities nationally and internationally

Part 3 : A few Annexures : Potential domains for early initiatives and Concept Elements for consideration

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### **Part 1 : Indications of a set of ongoing range of initiatives in India towards directly or indirectly promoting / facilitating Circular Economy and Resource Efficiency**

(1) MoEF&CC document on National Resource Efficiency policy with action plan for achieving circular economy. Additionally are Roadmaps and activities to facilitate Circular Economy initiatives by Institutions in India and allocation of focus areas on Sustainable Development Goals for line Ministries etc., as advised by the Central Government and contributed to by Institutions and Environmental NGOs and Civil Society Organisations.

(2) Formulation and Notification of various legislations and Acts since 1970s towards Pollution Prevention and Control and Setting of Emission Norms and Standards across sectors and being strengthened and amended from time to time by Ministry of Environment Forest and Climate Change and Central Pollution Control Board.

(3) Establishment of the National Green Tribunal to strengthen Environmental initiatives in India and provisioning legal strength for implementation of Sound Environmental Management practices and checking problems of pollution and ecological loss and promoting environmental justice

(4) COP 26 Commitments by India and focus on achieving Net Zero by 2070 etc to guide action towards Circular Economy. The commitments also include such as :- Increasing the Non fossil fuel use capacity to generate 500 GW capacity by 2030; 50% of Energy requirements to be met by renewable by 2030; Reducing carbon intensity by 45% (base year 2005) by 2030 etc. India's track record on international initiatives and in commitments in

Multilateral Environmental Agreements and related follow initiatives are an example for the World.

(5) Establishment of Bureau of Energy Efficiency and development of Certified Energy Auditors/Energy Managers and further Star Rating program on Energy Efficiency parameters for a vast range of products manufactured or marketed in India for industrial and consumer use and applications

(6) International Solar Alliance and progress on National Solar Mission and GHG reduction initiatives, besides focus on carbon sequestration and capture

(7) Increasing focus on Hydrogen as fuel for automobiles and other sectors, besides promotion of hybrid vehicles and Electric Vehicles; in continuation with the Bharat Stage VI norms for fuel quality and efficiency in automobiles applications and research and development for new age batteries

(8) Formulation of notification of Six Waste Management Rules in year 2016 ( addressing Solid Waste Management, Plastic Waste Management, Electronics Waste Management, Hazardous Waste Management, Construction and Demolition Waste Management, Bio – Medical Waste Management ) and their amendments. Several of these rules and guidelines associated have emphasised Extended Producer Responsibilities and indicatively reflected Consumer Responsibilities as well. The Ministry of Environment Forest and Climate Change and Central Pollution Control Board enabling capacity building efforts in ULBs / Cities on the matter by engaging institutions such as NPC for the same.

(9) Swachh Bharat Mission of India and Swachh Survekshan and city/ULBs assessments and scoring/ranking on cleanliness achievements etc as being taken forward and spearheaded by MoHUA (Ministry of Housing and Urban Affairs) for strengthening Circular Economy initiatives

(10) Project and follow up initiatives ongoing related to UNEP programme on Countermeasures for Marine (and riverine) plastic litter in a set of Cities of India and as undertaken by Technical partner such as NPC towards field studies and policy formulations, along with other partners in policy facilitation and communications / research work. The scope for Circular Economy for Plastics and banning of a set of Single Use plastics and studies of the outputs/outcomes/successes being achieved

(11) Promotion of CNG (Compressed Natural Gas) based public and private transport to counter pollution problems and check particulate and gaseous emissions and promotion of Pollution Under Control (PUC) Certificates to improve Air Quality Indices. In addition promotion / facilitation of continuous monitoring systems for air quality and waste water and water quality parameters and developing real time information databases and response systems for the parameters being monitored / logged

(12) Extensive initiatives in design and development of Metro projects as new infrastructure for public transport in major cities and strengthening connectivity to rural areas/ city boundaries by optimised over-ground and underground tracks of the metro rails including monorails

- (13) National initiatives on Green Highways and Golden Quadrilateral and other projects for improving green connectivity and fuel economy
- (14) Promotion of Start-ups for manufacturing / development of eco-friendly products and establishing of Incubators to facilitate the same
- (15) Increasing attention to Business Responsibility and Sustainability Reporting (BRSR) as evolving from BRR stage and Sustainability Reporting and National Voluntary Guidelines and Corporate Social Responsibility mandates
- (16) Emerging focus on Carrying Capacity Studies and regional considerations, beyond the phase of Zoning atlases and continuing attention to facilitating Eco-Industrial Parks and Industrial Ecology
- (17) Emphasis on Water consumption evaluation and monitoring and water auditing in Industry and also focus on optimisation of ground water consumption aspects including via demand sidemanagement approach. Developments towards certified Water auditing professionals.
- (18) Development of Comprehensive Industry Document Series for various industrial sectors and such publications for facilitating resource conservation objectives besides setting standards and norms
- (19) Development and launch of Industrial Park Rating Scheme including environmental parameters and objectives in the framework and methodology
- (20) Upgradation of National Parivesh Portal to facilitate post Environmental Clearances monitoring of Environmental Conditions etc. Scope for development of Certified Environmental Auditors being worked upon as well.
- (21) Facilitation / promotion of Sector specific industrial clusters and parks and circular economy potential / channels besides economies of scale
- (22) Enablement of Public Interest Litigations and focus on Environmental Damage Compensations where essential to obtain environmental justice and strengthening deterrence towards environmental damage and to attend to remediation initiatives
- (23) Climate resilience initiatives and Natural Disaster Management Efforts for enabling disaster prevention, mitigation and response
- (24) Promoting Zero Liquid Discharge in industrial sectors and clusters
- (25) Undertaking of National and International Trade Fairs and Eco-Friendly Product promotions and branding such as via 3R forum, Eco-Products International Fair, Engineering Fairs, Sector specific Fairs etc.
- (26) Promotion and adoption of National and International Certifications (such as ISO certifications) towards including systems and product certifications and standards (via Bureaus of Indian Standards) and strengthening product labeling and quality parameters etc.

(27) Some examples of Circular Economy activities include (a) Cement sector related Green cement manufacture and substitute of lime stone, besides reducing clinker to filler ratio and alternate Fuel Use and co-processing of various inputs. (b) Use of biomass and agri residues as fuel and alternatives to coal in Thermal Power Plant. Further, waste heat recovery by advanced technologies. (c) Circular economy initiatives with respect to plastics waste and upcycling to textiles and other goods. (d) Carbon Capture and Utilisation steps being undertaken in a set of industries and sectors such as Cement and Thermal Power sector., further in tourism sector several Indian Hotels striving for achieving carbon neutrality

(28) Ongoing initiatives to develop e-guides for industrial and infrastructure projects to support project proponents to identify technologies for adoption to strengthen circular economy objectives.

(29) In leather sector development of compendium of best practices for sustainable leather manufacture including clean technologies and further Compendium of Case studies on Waste Minimisation of various sectors to set examples for multiplier effect.

(30) Application of iot tools in industrial units and sectors and promotion of industry 4.0 for enabling circular economy objectives.

(31) Compendium of Technologies Developed under CSIR Fast Track Translation (FTT) projects in tranches covering various sectors including aerospace, infrastructure, healthcare, agri sector, nutrition and biotech, iron and steel, etc. , and efforts to improve yield.

(32) Applications of nano-technology in various industrial sectors including pulp and paper, health and pharma as well as application of AI to improve quality consistency aspects etc..

## **Part 2 : Potential areas for further action and activities nationally and internationally towards evolving / strengthening of Circular Economy**

### **Towards a set of indicative vision elements concerning RE and CE :-**

(a) To seed and propagate the idea of 'Product Composition Declaration' as a driving force to power the circular economy momentum as a deep material flow analysis across the nodes and participants of the economy (from the investor, manufacturing enterprises and range of businesses across sectors, to the consumer and resource recovery cycle as a stakeholder response and mapped action).

(b) Strengthened Implementation of Extended Producer Responsibility initiatives across sectoral domains and the stakeholder eco-system and infusing consumer responsibility elements nationally and internationally

(c) Undertaking of demonstration projects on Circular Economy in individual manufacturing enterprises (MSME and large units) and facilitating multiplier effects amongst sectors and industrial clusters / zones via case studies that emerge



- (d) Undertaking of grouped enterprises oriented projects on RE and CE in possibly Concentric Vendor Circles amongst tiers of enterprises and across nodes in Value Chains, and in the process development and application of suitable CE toolkits and techniques
- (e) Engagement with national and international green and climate finance systems and with financial institutions to design and implement suitably funded projects and programmes of RE / CE action in industrial units across priority sectors and undertaking Monitoring and Evaluation of the programmes and schemes
- (f) Guiding and implementing ESG (Environment, Social and Governance) initiatives in enterprises in public and private sector and facilitating responsible investment and reporting systems. Strengthening harmonisation of ESG ratings systems across the various varieties of ESG ratings that have and are emerging for guiding responsible investments in Green portfolios and Green real economies and industrial units including Indigenous and Foreign Direct Investments
- (g) Development of Circular Economy Incubator(s) and enabling establishment of Green start-ups and their growth support mechanisms etc.
- (h) Construction of sector based RE and CE focused information exchange frameworks and related dashboards for aggregating as well as diffusing RE/CE data and analytics on RE / circular economy related material benchmarks and applications of AI / ML aspects on the data generated based on which automated recommendations for CE / RE initiatives also be generated for consideration/applications across regions and spatial scales
- (i) The conduct of Technology Mapping exercises and establishment of systems of innovations via Machine Design Laboratories and Machine Design Parks in PPP modes in India and internationally towards addressing sectoral modernisation processes etc., in the context of manufacturing equipment and manufactured products and the automation processes
- (j) Development of new range of Circular Economy focused toolkits and case studies and enabling programmatic efforts for development of green chemistry, alternative green products and substitutes to hazardous or non – recyclable and non – modular products and systems
- (k) Institutional Redesign as a focus area to strengthen institutionalism and inter-institutional cooperation and collaboration nationally and internationally
- (l) Strengthening of research methods and research designs for evaluation of impacts and ecological dimensions and eco-system services valuations from Circular Economy initiatives, as well as addressing these aspects regarding adverse impacts on the same by business as usual systems and linear economy related paradigms
- (m) Undertaking development of rating systems for various infrastructure projects and thematic sector initiatives (e.g. highways, Gas pipelines; water supply, airports, railways, ports and harbours etc) for establishing productivity and environmental benchmarks

towards comparative assessments in national and international contexts and spatial scales for strengthening circular economy objectives

(n) Undertaking and propagating research in RE and CE themes in the industry – academia partnership space and enabling the mainstreaming of research outputs/outcomes in the industrial eco-system and the research landscape (a set of potential research areas reflected below)

The scope and range of research studies that could be taken up is significant. The themes and topics can be indicative at this stage but more will emerge as the States drive towards waste management picks up further under the project. Some of the topics that could be indicated at this stage could include :-

Green retailing and green products usage and green products retailing

Green procurement and applications and assessment of green product performances at users end

Analysis of ESG funding pattern and trends / returns on green indices and scope for Green Bonds and Institutional Bonds besides ESG ratings harmonization prospects

Inter-regional trade and flows of green products amongst cities / and or rural belts as well as from industrial zones including identifying range and pricing / economic parameters through suitably designed field works and empirical studies

Assessment of green products usage and recycling aspects and management in various infrastructure development works including highways/railways/airports/Ports and harbours and other contexts and regulations

Establishment of suitable benchmarks around the waste recovery and reverse logistics value chain for different sectors etc.

Perception studies on green products use and management amongst citizens and households and commercial establishments and various stakeholders

Waste characterization and composition studies for different industrial sectors through sample / representative units related analysis

Assessment and analysis of financing models for start-ups and development of angel investors in the regions and assessment of nature of investments occurring in the regions for start-ups that promote circular economy (including those that make products from waste blends)

Monitoring and analysis of existing units including large scale manufacturing plants as regards their waste management and use of green products / substitutes and recycled options

In the consumers domain and use of green products in households assessment and promotion of waste segregation, Collection, Transportation, Storage aspects and the

knowledge regarding raw material substitutes and modifications including composites and polymers and plastics recycling technologies promotion etc.

Waste leakages entering the environment and into sensitive zones and their quantification and assessment of impacts

Testing of different methodologies that are being adopted or promoted in assessing waste management / leakage in various countries through demonstration of the methodologies and comparing of country specific scenario related applications

Mapping of waste management and recycling potential and status across different regions say in coastal zones/urban regions and rural areas and use of field studies, drones/annotation and software applications / models and reflecting the spread across categories and processes and technologies being suitably utilized in the re cycling systems

#### **Nature of industries and institutions that may participate :-**

Public and Private Sector large scale units

Listed Micro Small and Medium Enterprises and units

Informal sector and recycling units/industries

Technology developers/providers (national / international) and various institutions and service sector firms etc.

International Multilateral Organisations / Institutions, Line Ministries across countries, autonomous bodies and research organizations amongst Ministries, Financial institutions / Private Equity Firms and Banks etc.

#### **Complementary / Supplementary aspects :-**

International and National initiatives and partnerships on RE / CE related technology development and related collaborations and ventures

Knowledge exchange and knowledge creation on RE and CE domains via in-depth research work initiatives and development of case studies and sharing the best practices amongst the enterprises

Development of programmes of action and innovative approaches/methodologies and techniques/tools on RE / CE and implementation with suitable financing models and engagement of the stakeholders in structured frameworks

Engaging in and propagating Industrial Clusters Analysis and Benchmarking / Rating / Ranking systems and modelling and interpreting data and information towards scoping and implementing RE/CE action for enabling responsible investments across regions

Facilitation of eco-friendly products development and diffusion including their branding and promotion for green consumerism and green lifestyle evolution etc.

It is hoped the above perspectives are indicative of some of the potential areas for action that may be useful to undertake to strengthen the momentum on RE/CE initiatives ahead in national and international contexts.

### **A few Annexures :-**

Annexure 1 : Concept Note on Industrial Clusters Analysis and Benchmarking  
Annexure 2 : A perspective on Technology Mapping

Annexure 3 : Some additional areas of Circular Economy related projects / programmes and demonstration for multiplier effect

Annexure 1

## **An Indicative Conceptual Framework parameters for Industrial clusters related analysis and benchmarking (via qualitative data and its scaling and quantitative data inputs and statistical analysis and interpretations)**

### **A. Introduction to Framework Parameters and Sub-Parameters**

The framework parameters for the analytics are highlighted below with sub-parameters reflected under the various categories indicated as an outline to the study elements.

1. Model of Industrial cluster and economic performance characteristics and competitiveness features
2. Entrepreneurship features in the cluster and the state of internationalisation Industrial structure, including industry sectors present and related concentration and distribution features of firms
3. Locational features and access to resources (including access to finance)
4. Technology and innovation scenario
5. Infrastructure aspects (Physical / social / technical infrastructure)
6. Human capital availability and employment aspects
7. Social capital elements
8. Business focus and firm level drivers, including SME pro-activity and Sustainability orientation and resource use

## 9. Institutional environment and cluster / park management elements

### **Sub – Parameters under the framework parameters for cluster analysis and benchmarks creation**

#### **1. Model of Industrial cluster and economic performance characteristics and competitiveness features**

##### 1.1. Age of firms

Age of firms (as regards entrepreneurialism) with attention to percentage of young firms (of age < 7 years) and others.

Pie chart on : Percentage of Firms of age < 7 years since establishment / initiating operations (young firms) ; Percentage of firms of age 7 to 15 Years (Sustaining firms) ; Percentage of firms between 15 to 25 years (middle age firms) and Percentage of firms > 25 years since establishment and operationalisation ( Mature firms)

1.2.1 The above sub - parameter also can be possibly utilized to reflect indicatively as proxy to average age of machinery / equipment (or this information can be sought from entrepreneurs towards indication of modernisation)

Pie chart of Average age of machinery : Percentage of firms having average age of machinery < 5 years (post modern plants) ; Percentage of firms having average age of machinery 5 to 10 years (modern plants) ; Percentage of firms having average age of machinery 10 to 20 years (aging plants); Percentage of units having average age of machinery (> 20 years) (Vintage plants)

1.2.2 Fixed capital formation in cluster : Investments in plant and machinery in recent 5 years since 2017 (in Rs. Crores) ( again an indication of state of modernization)

Scale 1 : < 100 Crores

Scale 2 : 100 to 249 Crores

Scale 3 : 250 to 499 Crores

Scale 4 : > 500 Crores

##### 1.3 Cluster size in terms of land within its boundary

Scale : 1 if Cluster area < 25 acres ; Scale 2 : If Cluster area of 25 to 100 acres ; Scale 3 : If cluster area 100 to 250 acres ; Scale 4 if cluster area > 250 acres

1.4 Cluster land productivity in terms of Gross turnover of all enterprises in Rs. Crores per sq.km of cluster land (within cluster boundary) for year 2018 - 19

Pie charts can be prepared and percentage range can be indicated and number of clusters in those ranges can be mapped.

Also this can be scored (from 1 to 4) on the basis of percentile ranking of the participant clusters !! For example, Score 1 can be given to Bottom 24.99% of the percentile ranking of responding clusters against the indicator.

1.5 Fixed capital formation in cluster : Investments in plant and machinery in past 5 years since 2017 (in Rs. Crores)

Pie charts can be prepared and percentage range can be indicated and number of clusters in those ranges can be mapped. Further, Scores 1 to 4 could be developed for suitable range of investments that would have occurred.

1.6 Gross turnover of cluster (sales volume of both manufacturing and service sector combined and those located within 5 km boundary of the cluster) (Rs. Crores) Pie charts can be prepared and percentage range can be indicated and number of clusters in those ranges can be mapped. Further, Scores 1 to 4 could be developed for suitable range of gross turnover that would have been achieved.

1.7 Land rates for industrial plots in Rs. Per acre and scoring the values in suitable perspective, as indicator for demand and quality of infrastructure and modernization status of the cluster as well. Also this can be scored (from 1 to 4) on the basis of percentile ranking of the participant clusters !!

## **2. Entrepreneurship features in the cluster and the state of internationalisation Industrial structure, including industry sectors present and related concentration and distribution features of firms**

2.1 Entrepreneurial mix as of year 2022 as Percentage of entrepreneurs / owners of firms from outside the state (or from a foreign country) in this cluster

The mapping of entrepreneurial mix can also include highlighting international / national as well as various states and domestic entrepreneurs. The entrepreneurial mix can reflect on the forthcoming nature of cluster management towards diversity and ease of doing business and entrepreneurial community strength as well depending on the encouragement received for outstation entrepreneurs.

2.2 Ratio between Male and female entrepreneurs

The parameter would be viewed in the gender balance in the cluster and can include manufacturing and service sector enterprises to reflect as sub-category perspective. The ratio ranges could be mapped and scored suitably.

2.3 Age of entrepreneurs as of year 2022 (Dynamic potential)

The possibility involves considering benchmark level if > 40% of entrepreneurs in indicated in specific age group range in years. The age element could be a proxy to dynamism element per se, and for firms with partners or family businesses, average age of entrepreneur for the enterprise could be reflected in the scoring element.

2.4 Qualification of entrepreneurs as per criteria indicated by year 2022

The sub - parameter seeks to reflect on the entrepreneurial drive potential towards past and prospective modernization and collaboration frame especially with international enterprises. The element can also be scored in the context of levels of qualifications and pie charts could be drawn, that may provide insights on the key qualifications that are desirable and strengthen the benchmark turnover and other elements of the cluster.

2.5 Entrepreneurial density (sum of entrepreneurs in manufacturing + Service sector / Gross area of cluster)

This element can be infused to reflect on the cluster demand amongst entrepreneurial initiatives.

2.6 International investments i.e. FDI in the cluster for manufacturing establishments only in past five years (since year 2017) in Rupees Crores

Scoring on a scale / range of investments or on ratio of FDI investments to gross turnover of the cluster and other formats, including in the context of area of the cluster. Correlations could also be made with regard to country of origin of FDI and Exports from the cluster to those countries of origin as well.

2.7 Total number of joint ventures / collaborations / direct linkages as tier 1 linkages for technology/product/business / service etc., with Multi – National Corporations / Foreign Businesses in India or abroad across all sectors.

This to be addressed by scoring the number of suitable JVs (as per nature of JVs indicated in the clusters). Qualitative description of types of JVs and their features could add further value.

2.8 Export earnings (average per annum) in Rs. Crores per enterprise located in cluster regarding

The benchmark leading to indications of cluster dynamic on internationalization and also on the network strength. In addition scoring could be towards Number of countries on the export map of the cluster (where the manufactured products from the cluster have been reached or sold as of date)

### **3. Locational features and access to resources (including access to finance)**

3.1 Towards scoring and analysis of locational features and access to resources, the quantum of land and distances from national highway, railway station, airport, seaport, and to A Class cities and skilled labour hubs etc., can be brought into the ambit of the sub-parameter.

3.2 Availability of plots or land for establishment of enterprises (i.e. vacancy status of plots)

The focus would be on plot area vacant as percentage of total utilizable land for manufacturing base in the cluster and benchmarked with cluster dynamic elements.

3.3 Ground water supply / regime and quality

This can be scored and structured based on a combination of qualitative and quantitative features (including copious supply as surplus and / or scarce resource and quality elements with regard to key characteristics of the ground water regime.

3.4 Access to finance

This can be accounted for via assessing Number of bank branches / ATMs and financial institution offices within cluster and within 5 km boundary of cluster. Further, the sub-

parameter can be analysed with regard to quantum of loans / debt and or credit features per enterprise (especially MSME as may be differentiated as well).

3.5 Access to primary raw material resources (as average distance with respect to all manufacturing enterprises combined)

#### **4. Technology and innovation scenario**

4.1 Awards or citations (national / international ), as received by industrial units in the cluster within recent 10 years since 2012, regarding technology developed / innovations undertaken etc.

The quantitative insights on the achievements by units operating in the industrial cluster can be reflected bringing into ambit technology developed or innovations undertaken. In this context also the product variety ranges could be included / considered with regard to innovation capabilities demonstrated. The scoring on scales 1 to 4 could be prepared accordingly.

4.2 Cluster brand and its product brands

A suitably structured matrix can be built that highlights the range of product brands at national and regional levels from the clusters and via market analysis reports on brand recognition etc.

4.3 Product Patents registered by the enterprises in the cluster

The aspect concerning number of patent registrations has the potential to reflect on the innovations capacity and initiatives in the cluster and can be benchmarked as a ratio (a) with respect to number of patented products vis a vis number of enterprises and / or (b) ratio with regard to sales value from patented products vis a vis gross turnover in cluster etc as well.

4.4 Technology and knowhow providers located in the cluster or associated with the cluster (national / international) within recent 5 years since 2017

A key element of the potential and prospects for technology upgradation is associated with proximity of technology providers who may service the scope for imported technology or indigenous technology. Indeed, the investments made in plant and machinery towards imported and indigenous technologies also is critical to the clusters and the agility to cost effectively modernize and reflect on machine design capabilities in the region.

4.5 Total expenditure on Research and Development (in Rs. Crores per enterprise in the cluster)

This parameter reflects on the willingness to invest in research and the growth dynamic and demand on the for research in specific sectors and nature of enterprises located in the cluster. The scoring can be accordingly structured.

#### **5. Infrastructure aspects (Physical / social / technical infrastructure)**

5.1 Energy Supply Infrastructure and Energy Consumption per capita in the region / cluster

This infrastructure component can be scored from the range of inadequate and much below national average feature to advanced Energy systems and supply arrangement for the cluster



including attention to solar energy and other resources and cluster also supplying energy to the grid from cluster based captive power plants etc.

5.2 Availability of Mobile telephony, internet broadband and Computing facilities in Enterprises in the cluster (possibly a proxy indicator for ICT usage as Number of computers per enterprise)

This infrastructure feature can be quantified for scoring for a cluster. The prospects of data from mobile telephony data providers could be sought, including the data consumption levels in the cluster in aggregate and these could be benchmarked with suitable ratios.

5.3 Number of entrepreneurship development institutes and / or incubators in the cluster (or associated with or supported by the cluster enterprises)

This aspect can be scaled quantitatively and also combined with number of tool rooms and tool design centres, availability of CSIR labs and other common facilities etc.

5.4 Social infrastructure such as guest houses / hostel or dormitories for employees etc whether available and condition of the same

This sub parameter to be scaled on a matrix basis from inadequate levels to substantive provisions that could also accommodate future demand with expandability aspects inbuilt.

5.5 Logistics infrastructure (Number of logistics companies – national / international – catering to the cluster enterprises)

This can be utilized as a quantitative sub-parameter and reflect on the trade potential and capacity at the cluster while scoring and interpreting the feature.

5.6 The density elements (Running km of roads, water supply lines, drainage network etc within cluster boundary) per sq.km of cluster area. The physical infrastructure such as these are significantly important to quantify and score and benchmark for comparison amongst clusters.

5.7 Common Infrastructure investments in cluster : Investments in physical / technical and social infrastructure in past 5 years since 2014 (in Rs. Crores) ( again an indication of state of modernization and upkeep of cluster)

Scale 1 : < 10 Crores

Scale 2 : 10 to 24.99 Crores

Scale 3 : 25 to 49.99 Crores

Scale 4 : > 50 Crores

## **6. Human capital availability and employment aspects**

6.1 Employment Growth Rate in last 3 years since year 2019 (as reflection of employment generation) in the cluster

This sub-parameter reflects on the employment generation scenario and inherent strength aspects of the cluster units in terms of capabilities to address new initiatives. The scoring can be from negative growth rate status to significantly positive rates.

#### 6.2 Employment rate in a cluster

In this context the assessments of Number of worker or employees including entrepreneurs per enterprise or per unit in the cluster brings insights on the human engagement status and labour intensity aspects could be developed through the ratios on employment scenario vis a vis gross turnover etc. The features could be extended to employment density with regard to the area of the cluster as well.

#### 6.3 Average wages in the cluster

The Sum total of gross wages or salary of all employees in cluster including small, medium and large enterprises across manufacturing and service sector vis a vis number of employees in the cluster could be the reflection of the benchmark

#### 6.4 Number of Industrial Training Institutes and other vocational training colleges / institutes in the cluster or its neighbourhood that supplies manpower to the cluster

The access and availability of human capital and its development could be scored on a suitable scale and highlighted as a key feature.

#### 6.5 Percentage of contractual employees in the cluster with respect to total

This could be another important benchmark on the cluster capacity to employ permanent workers or the orientation to utilize non permanent workers / staff that may have competitiveness implications as well.

### **7. Social capital elements**

#### 7.1 Corporate Social Responsibility related activities

The CSR activities carried out by the cluster enterprises and overall expenditure towards this account and suitable ratios towards benchmarks on the theme could be reflected in the social initiatives context.

#### 7.2 Health service scenario in the cluster

This can be assessed in terms of number of inhabitants of the cluster in 1000s per physician (physicians located within 5 km of boundary of cluster) and / or other measures that could be benchmarked

#### 7.3 Number of Civil society organizations / NGOs active in the cluster

The importance of enabling NGOs and CSOs to function and assist enterprises and the personnel in the cluster can be also benchmarked. In addition companies certified for SA 8000 and ISO 14001 etc could be included in the measures for social capital works.

## **8. Business focus and firm level drivers, including SME pro-activity and Sustainability orientation and resource use**

### **8.1 Systems Certifications**

The feature could be scored and benchmarked for clusters via a qualitative and quantitative matrix.

### **8.2 Product featuring**

In this aspect the scoring matrix could range from points for Basic minimal product quality focus to meet job work oriented requirements for manufacturing or assembling / formulating products to service local markets and participation in unbranded product value chains in general to the feature of Innovation driven organization of the cluster introducing new product varieties at regular intervals which not only achieve Indian BIS standards but strive to obtain quality certifications internationally as per export norms etc.

### **8.3 Environmental compliance**

The sub-parameter seeks to reflect on environmental compliance focus in the enterprises in aggregate in the cluster. This could be outlined on a matrix from the range of say non installation or Lack of attention to establishing Effluent Treatment Plants and Air Pollution Control Devices or having improper pre-treatment systems. And Orientation towards reliance on Common Effluent Treatment plants and unsecured common landfills in general etc. to Establishment of advanced Pollution Control systems for effluents, air emissions and for solid waste management with significant investments towards achieving and maintaining standards and norms for all parameters.

### **8.4 Green procurement**

The prospects and focus on green procurement not only by public sector enterprises but especially by private sector enterprises is a reflection of business focus and SME pro-activity in the region.

## **9. Institutional environment and cluster / park management elements**

### **9.1 Tax base of enterprises in percentage per cluster for various taxation components put together**

This could be scored in quantitative terms and reflected in the cluster management feature. It could also include the tax contributions to Government from the cluster for comparison and benchmarking.

### **9.2 Participation in percentage by MSMEs in National and State level schemes for MSMEs as promoted by various institutions and Central / State Government**

As indicative percentage of participants in national Schemes the inclusiveness element is discerned amongst the clusters regarding engagement of MSME units on a broad based approach as well. This can be scored for comparison.

### **9.3 Utilisation of Common Infrastructure**

The use of Common infrastructure and rate of revenue generation from the facilities per sq.km of cluster area can be benchmarked as a key features about cluster management and the sustainability aspects involved.

#### P9.7 International linkages of Cluster

Another key feature that can be scored on a scale is qualitatively and quantitatively depicted that emphasizes cluster management scenario in terms of industrial development corporations having international linkages to promote exports / imports and adoption of best practices etc.

#### **B. Conclusion of Concept Note**

The above sections reflected is an indicative range of parameters and sub-parameters that can be further developed and evolved towards developing a suitable framework for analysis of industrial clusters and enabling the process of visibility for considerations towards Foreign Direct Investments as well as towards infrastructure development support and facilitation and strengthening of the cluster dynamics in India and various countries internationally.

## **Mapping Technology**

### Annexure 2

(Methods, Features, Techniques, and assessments/scales etc)

**Definitions and Mappings pertaining to technology can include the following focus aspects**

Products (Design, characteristics, quality, quantity of production etc.)

Process (Design, flowcharts, equipment outputs and outcomes and performances and regarding value chains)

Value / Valuations focused and investments (Size / Scale)

Patents and patents map focused

Age and trends focused (With Linkages with scientific developments and era's and origins / range / evolution) – Organic developments or Implanted via interventions (Govt. / TDBs etc)

Productivity focused and resource efficiencies / utilities needed and applications benchmarks and the Clean Technology perspective

Inter and Intra – industry linkages / differentiation focused

Concentration vs Diffusion status focused

Regional characteristics and brands focused including competitiveness

Forward – Backward linkages focused

Labour intensity / Capital intensity (including Human Capital / Skills applications and Demographics focused)

Lean Manufacturing Techniques applications focused

Risks and Scenarios focused Operations Management Focused ( Flexible, Assembly lines, Craft, Modular and other layouts)

Life cycle focused (including chemicals and toxics involved and prospects for green chemistry applications)

Durability focused (material and composites and material behavior changes)

Futuristic / Forecasting ( Demand / Supply focused) and potential

Stakeholders / Networks focused and eco-systems involved

Disruptiveness focused

Technology integration / Technology migration and its potential focused (and inter –sectoral linkages)

Materials of construction focus

Land parcels / space applications focused

Social lines and cultural characteristics focused ( including inclusion – exclusion features and entrepreneurial characteristics linkages)

SDGs focused (including data analytics / iot involvement / industry 4.0 etc)

Annexure 3

## **Some additional Indicative areas for project activities for Circular Economy**

Development of Certified Environmental Auditors and Managers

Development and facilitation of Circular Economy Investment Centres and Financial institutions and Banking Networks

Circular Economy Incubators and Circular Economy Groups in MSME clusters / Value chains

Promotion and Demonstration of Circular Economy initiatives in Metals and Mining

To Evaluate and Document Circular Economy initiatives in identified product specific streams for example in Electrical & Electronics Sector

Strengthening Circular Economy for Construction and Demolition Waste

Circular Economy in Plastics Industry

Circular Economy in Automobile Sector

A World Summit on Circular Economy and Exhibition (engagement with a range of stakeholders)

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Vienna International Centre  
Wagramerstr. 5, P.O. Box 300,  
A-1400 Vienna, Austria



+43 1 26026-0



[www.unido.org](http://www.unido.org)



[CircularEconomy@unido.org](mailto:CircularEconomy@unido.org)



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