LSCM Master Thesis – Defense Presentation

Enhancing Sustainable Sourcing in Humanitarian Relief Materials through Business Analytical Tools: A Strategic Framework for Ethical and Environmental Compliance in Crisis Zones

First examiner:

Prof. Dr -Ing. Thomas Masurat

Abdul Halim Bin Abdul Hamid

Second examiner:

Doctor Miquel Angel Piera

Pro

Agenda

01 Introduction
- Introduction
- Literature Review Insights

02 Approach & methodology
- Research Approach
- Research Methodology & Analysis Techniques

03 Framework Development
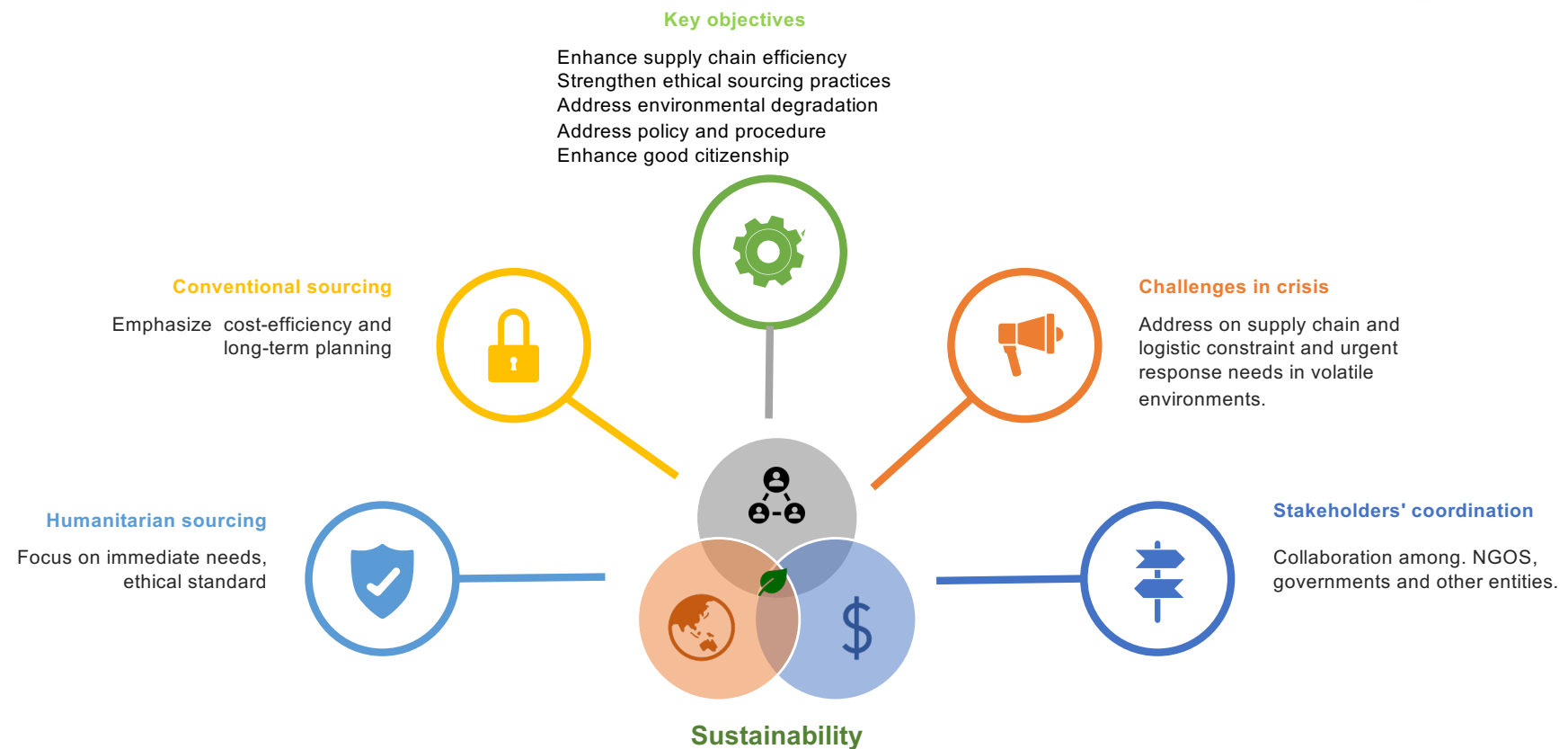- Data Visualization
- Metrics development
- Mechanism continuous improvement & monitoring
- Framework application in case studies

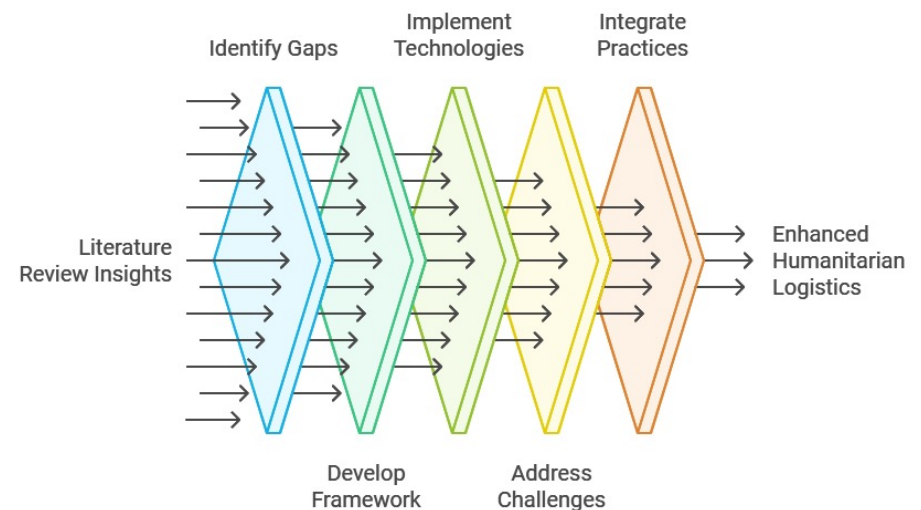## 04 Discussion & conclusion
- Discussion
- Conclusion

Introduction

Key objectives

Enhance supply chain efficiency
Strengthen ethical sourcing practices
Address environmental degradation
Address policy and procedure
Enhance good citizenship

Conventional sourcing

Emphasize cost-efficiency and
long-term planning

Challenges in crisis

Address on supply chain and
logistic constraint and urgent
response needs in volatile
environments.

Humanitarian sourcing

Focus on immediate needs,
ethical standard

Stakeholders' coordination

Collaboration among. NGOS,
governments and other entities.
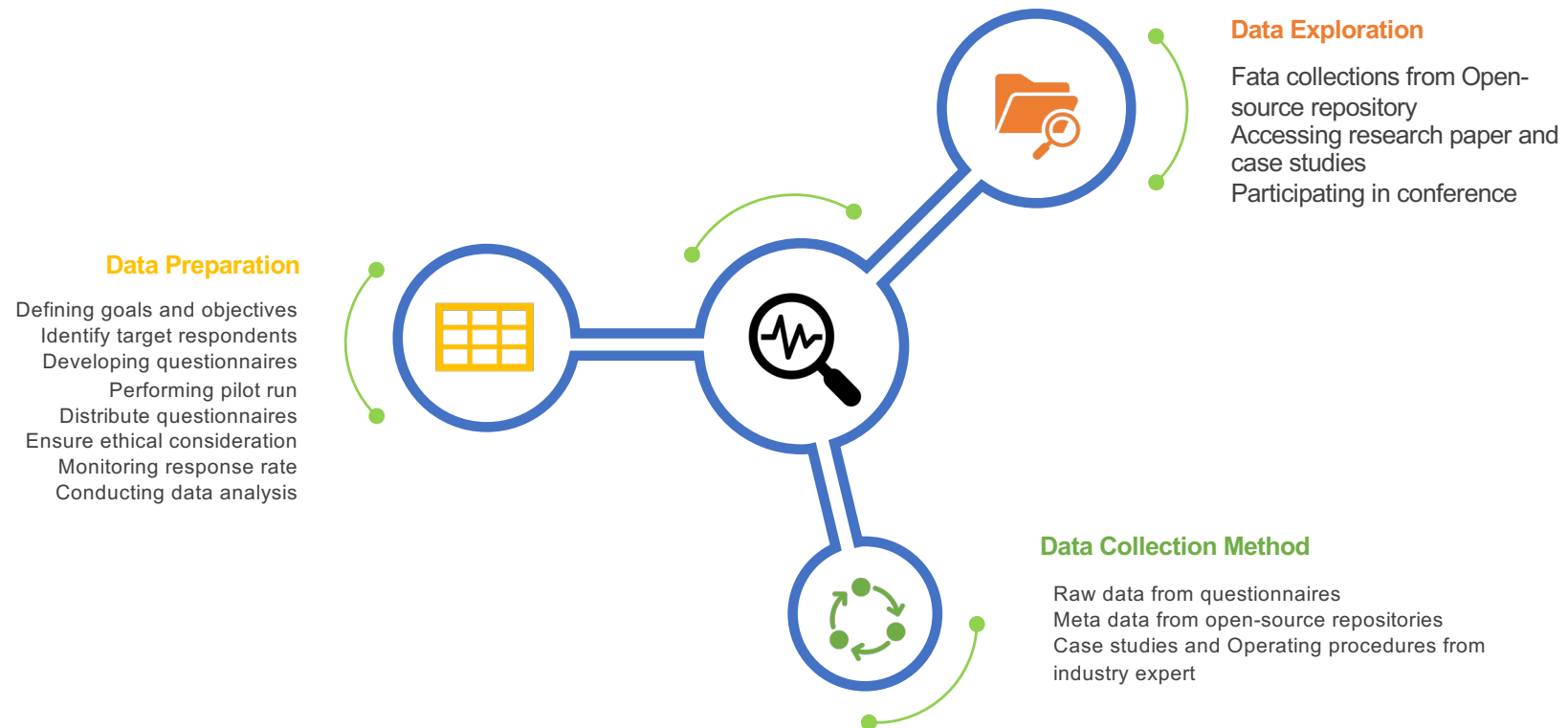
Sustainability

Literature Review Insights

Anjomshoae et al., 2023

- Suggest that suppliers are evaluated not only based on their financial status but also on their social and environmental factors and sustainability.

- Sustainable sourcing criteria influence procurement outcomes, alongside other production requirements, the potential cost of ethically procuring humanitarian .

- Sustainable strategies also improve humanitarian operations efficiency and effectiveness.

- Big data analytics can improve humanitarian operations with real-time insights into disaster-affected areas, resource availability, and supply chain performance.
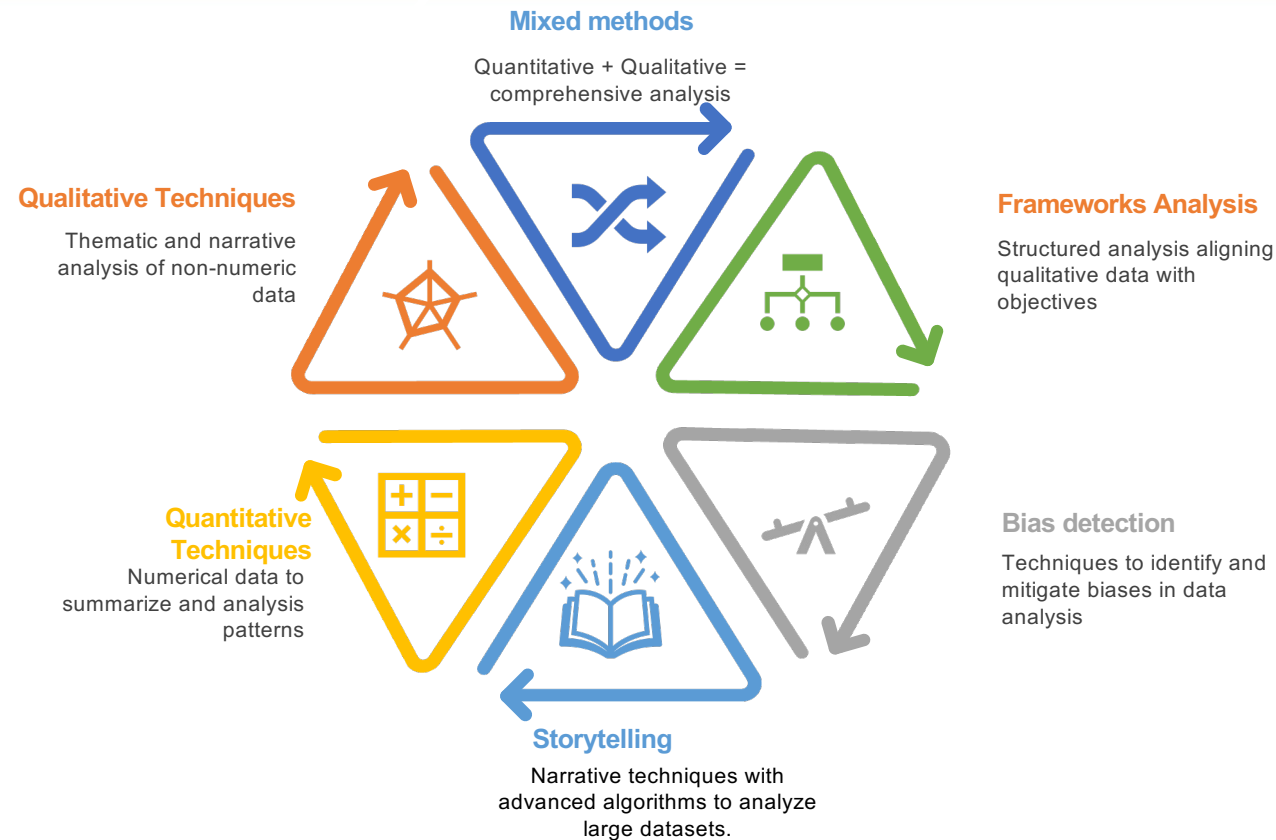
Sustainable Sourcing in Humanitarian Logistics

Research Approach

Data Exploration

Fata collections from Open-source repository
Accessing research paper and case studies
Participating in conference

Data Preparation

Defining goals and objectives
Identify target respondents
Developing questionnaires
Performing pilot run
Distribute questionnaires
Ensure ethical consideration
Monitoring response rate
Conducting data analysis

Data Collection Method

Raw data from questionnaires
Meta data from open-source repositories
Case studies and Operating procedures from industry expert

Research Methodology & Analysis Techniques

Mixed methods

Quantitative + Qualitative = comprehensive analysis

Qualitative Techniques

Thematic and narrative analysis of non-numeric data

Frameworks Analysis

Structured analysis aligning qualitative data with objectives

Quantitative Techniques

Numerical data to summarize and analysis patterns

Bias detection

Techniques to identify and mitigate biases in data analysis

Storytelling

Narrative techniques with advanced algorithms to analyze large datasets.

Research Development: Roadmap 1 – Result Development

Stage 1: Development of Data visualization

Collecting data from QR
and Open-source repository
Data Gathering

Creating dashboard using
Tableau & QGIS
Data Visualization

Develop metrics through
assessments
Metric development

Data Cleaning

Ensuring data integrity
With Excel and ML

AI Integration

Enhancing analysis
with Julius AI and
Python

Scenario management

Conducting ethical
sourcing assessment

Evaluate suppliers, through
audit, develop KPI and
radar chart visualization
Supplier scorecards

Develop KPI base don
metrics assessments
Environmental KPI

Stage 2: Development of mechanism continuous improvement and monitoring

Ethical sourcing KPI

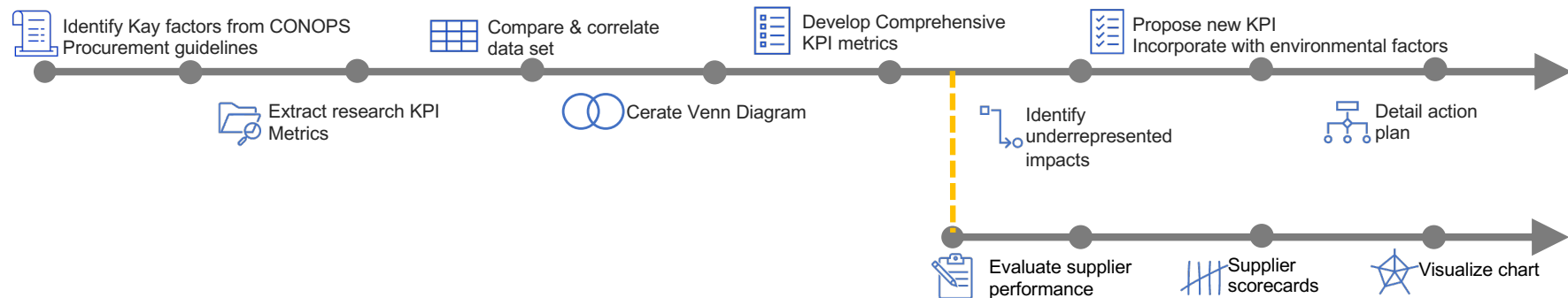Develop KPI based on
result from ethical sourcing
assessment
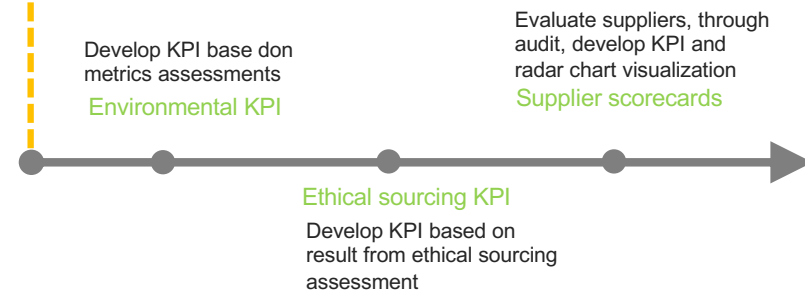
Research Development: Roadmap 2 – Applying Research Result in Case study

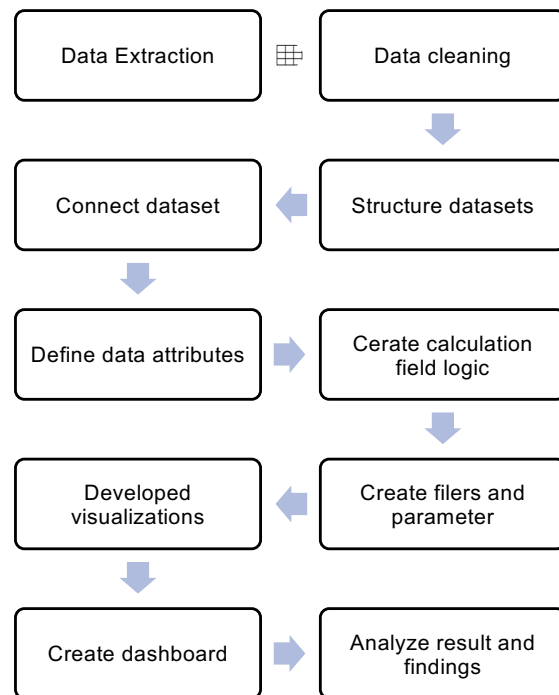Integrating UNEP case study guidelines and research KPI metrics

- Identify environmental impact
- Extract research KPI Metrics
- Compare & correlate data set
- Cerate Venn Diagram
- Develop Comprehensive KPI metrics
- Identify underrepresented impacts
- Propose new KPI
- Detail action plan
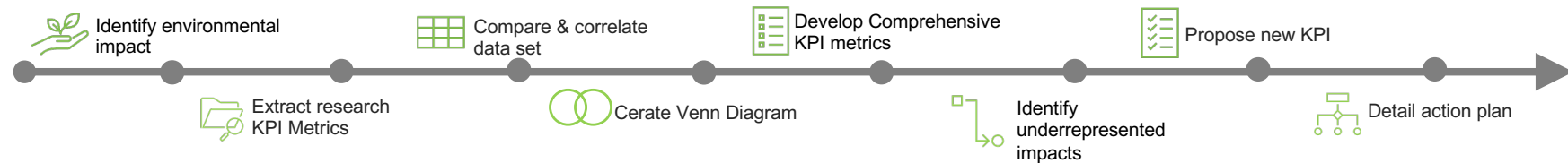
Integrating CONOPS case study guidelines and research KPI metrics

- Identify Kay factors from CONOPS Procurement guidelines
- Extract research KPI Metrics
- Compare & correlate data set
- Cerate Venn Diagram
- Develop Comprehensive KPI metrics
- Identify underrepresented impacts
- Propose new KPI Incorporate with environmental factors
- Detail action plan
- Evaluate supplier performance
- Supplier scorecards
- Visualize chart

Framework Development: Data Visualizations

Process steps

- Data Extraction
- Data cleaning
- Connect dataset
- Structure datasets
- Define data attributes
- Cerate calculation field logic
- Developed visualizations
- Create filers and parameter
- Create dashboard
- Analyze result and findings

Results

The research result produced, the total new displacements and cumulative displacements caused by attacks involving civilians critical situation for internally displaced persons (IDPs) in Gaza. The data serves as a key indicator to expedite the demand and supply of shelter and non-food items, helping to address the growing humanitarian needs effectively.

People in the West Bank and Gaza receive the lowest access to safe drinking water and sanitation compared to neighboring Levant countries. The ongoing situation has led to severe shortages in IPC/WASH supplies, alongside other medical items. Ensuring hygiene for the affected population is critical

Framework Development: Enviromental Metrics & Trend Analysis

Process steps

Data Extraction → Filtered by country

Select 51 key indicators ← Lookup process

Categorized metrics → Structure datasets

Heatmap creations ← Visualize metrices

Finalized 5 key metrics ← Develop additional country trends and tracking data

Constructed metrics with 5 key indicators →

Constructed trend analysis for all Levantine countries →

Results

Measure V.. 1.08 — 100.00

Sustainable Metrics of Enviromental Impact by Key Indicators

Country Name	Access to electricity (%..	Renewable energy consu..	CO2 emissions (metric tons ..	PM2.5 air pollution, me..	People using at least basic ..
Cyprus	100.00	15.02	5.47	15.57	99.77
Israel	100.00	5.61	6.35	19.76	100.00
Jordan	99.90	11.04	1.92	30.65	98.97
Lebanon	100.00	6.71	3.79	28.96	92.60
Syrian Arab..	88.82	1.08	1.21	30.95	94.08
West Bank ..	100.00	14.73		31.30	98.44

Environmental Trend Analysis over a Simulated 5-Year Period in Israel

Measure N.. ■ Access to electr.. ■ CO2 emissions (.. ■ PM2.5 air pollut.. ■ People using at .. ■ Renewable ener..

	2018	2019	2020	2021	2022
Access to el..	90.0	95.0	100.0	105.0	110.0
CO2 emissi..	5.7	6.0	6.3	6.7	7.0
PM2.5 air p..	17.8	18.8	19.8	20.7	21.7
People usin..	90.0	95.0	100.0	105.0	110.0
Renewable ..	5.0	5.3	5.6	5.9	6.2

Raework Development: Ethical Sourcing Assessment

Process steps

```
┌─────────────────┐      ┌─────────────────┐
│ Data Collection │ ⊞    │ Keywords counting│
└─────────────────┘      └─────────────────┘
                                  │
                                  ▼
┌─────────────────┐      ┌─────────────────┐
│ Analyze key     │ ◄─── │ Identify        │
│ themes          │      │ plausible       │
│                 │      │ scenarios       │
└─────────────────┘      └─────────────────┘
        │
        ▼
┌─────────────────┐      ┌─────────────────┐
│ Develop         │ ───► │ Create relevance│
│ plausible       │      │ matrix          │
│ scenarios       │      │                 │
└─────────────────┘      └─────────────────┘
                                  │
                                  ▼
┌─────────────────┐      ┌─────────────────┐
│ Plot system grid│ ◄─── │ Create Influence│
│                 │      │ matrix          │
└─────────────────┘      └─────────────────┘
```

Results

Ethical Sourcing Framework

Ethical Sourcing
Integrates ethical considerations into sourcing practices, aligning with humanitarian principles.

Environmental Impact
Focuses on reducing the ecological footprint of sourcing activities.

Sustainability
Emphasizes long-term practices that balance environmental, social, and economic considerations.

Transparency
Ensures clear communication about sourcing practices and supply chain operations.

Social Responsibility
Addresses the broader social impacts, including labor conditions and human rights.
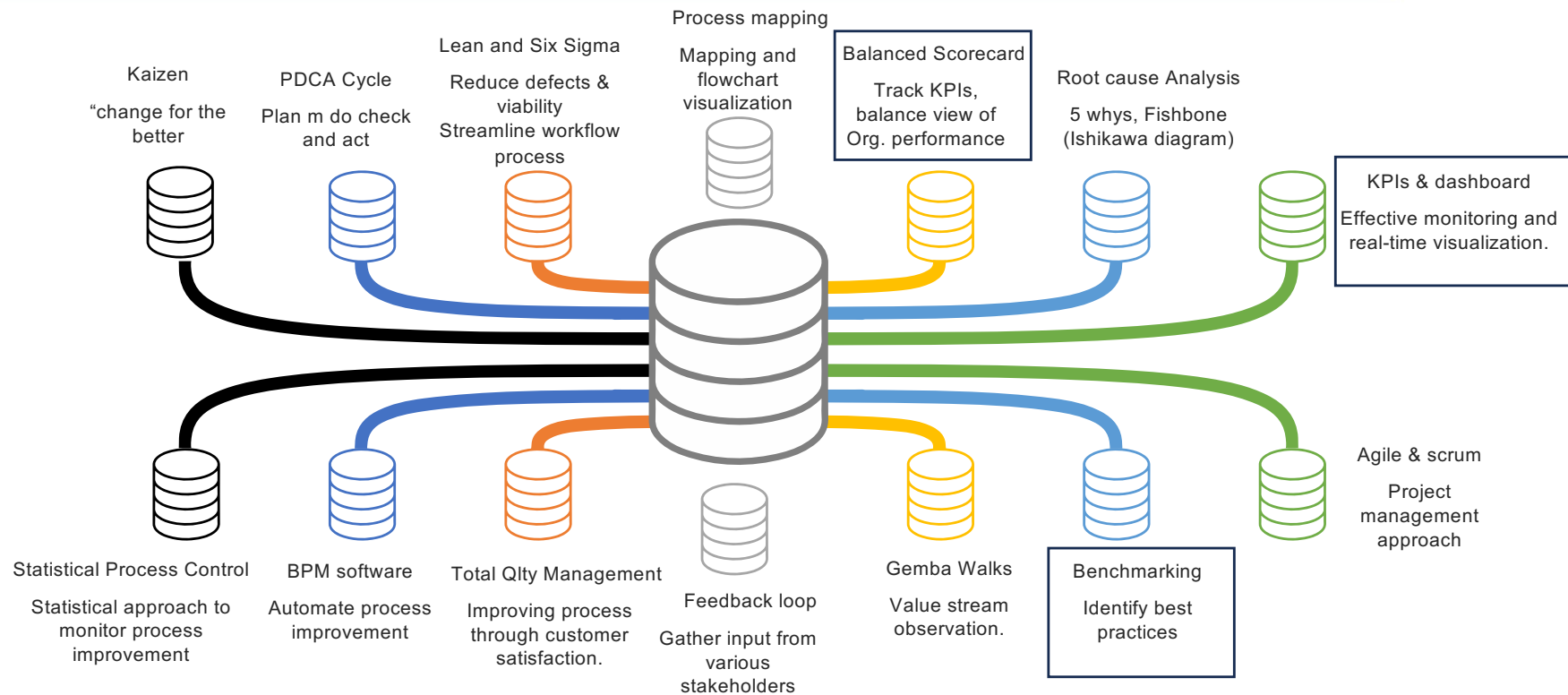
Scenarios Impact Metric

Scenarios1	Environmental Impact	Ethical Sourcing	Transparency	Renewable Energy	Community Engagement	Eco-friendly Practices	Sustainability	Social Responsibility
Scenario 1	2	2	3	3	1	3	3	3
Scenario 2	1	3	2	3	3	3	1	3
Scenario 3	3	2	1	1	3	2	1	1
Scenario 4	2	1	1	3	3	1	3	1
Scenario 5	3	2	1	3	2	3	3	2

Measure Values 1 — 3

Relevance Metric

Variable	Transparency	Eco-friendly Practices	Social Responsibility
Sustainability	0.102	0.102	0.000
Ethical Sourcing	0.395	0.791	0.707
Community Engagement	0.688	0.563	0.559
Renewable Energy	0.375	0.250	0.559
Environmental Impact	0.535	0.134	0.598
Transparency	1.000	0.563	0.839
Eco-friendly Practices	0.563	1.000	0.839
Social Responsibility	0.839	0.839	1.000

Influence Metric

Variable (ES!!!Metric)	Social Responsibility (ES!!!Metric)	Sustainability (ES!!!Metric)	Transparency (ES!!!Metric)
Community Engagement	-0.559	-0.612	-0.688
Eco-friendly Practices	0.839	-0.102	0.563
Environmental Impact	-0.598	0.218	-0.535
Ethical Sourcing	0.707	-0.645	0.395
Renewable Energy	0.559	0.612	0.375
Social Responsibility	1.000	0.000	0.839
Sustainability	0.000	1.000	0.102
Transparency	0.839	0.102	1.000

System Grid

Dependence 0.000 — 10.000
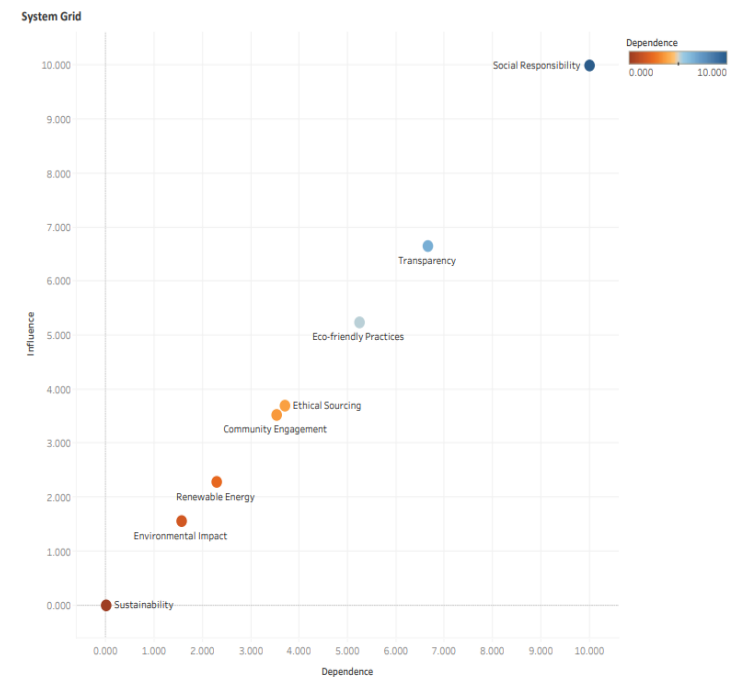
Faework Development: Supplier Eveluation result through Scorecard

Process steps

Extract data from KPI metrics → Develop procedures → Design technical evaluation → Develop evaluation template → Structure key measure for evaluation → Develop evaluation form & scorecards → Perform result recording → Develop visual representation
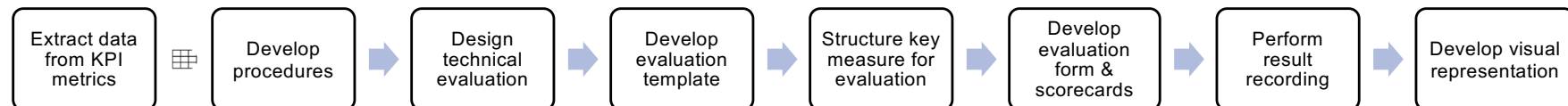
Results

Supplier	Environmental Impact	Ethical Sourcing	Transparency	Renewable Energy	Community Engagement	Eco-friendly Practices	Sustainability	Social Responsibility	Total Score
Supplier A	1	2	3	2	2	5	3	2	2.55
Supplier B	4	5	4	2	1	5	4	5	3.9
Supplier C	5	2	2	1	4	2	5	3	3.1
Supplier D	4	3	3	2	3	4	5	1	3.3
Supplier E	5	2	3	2	4	1	4	5	3.2
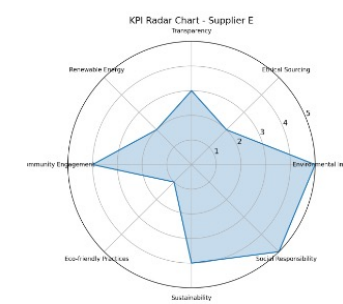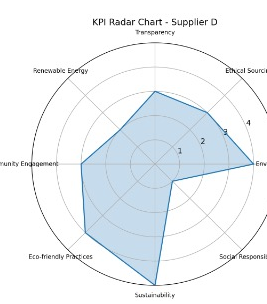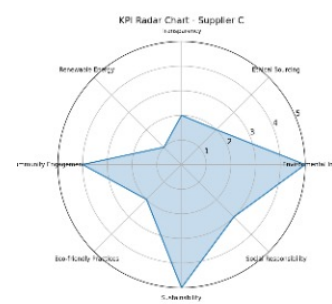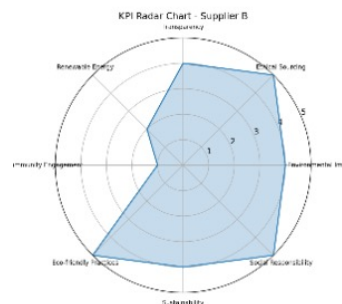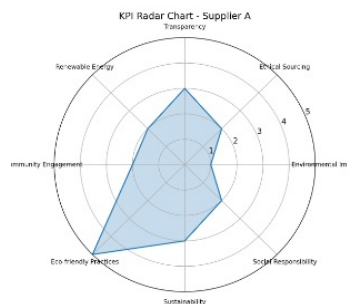
Framework Development: Continious Improvement & Monitoring tools

Kaizen
"change for the better

PDCA Cycle
Plan m do check and act

Lean and Six Sigma
Reduce defects & viability
Streamline workflow process

Process mapping
Mapping and flowchart visualization

Balanced Scorecard
Track KPIs, balance view of Org. performance

Root cause Analysis
5 whys, Fishbone (Ishikawa diagram)

KPIs & dashboard
Effective monitoring and real-time visualization.

Agile & scrum
Project management approach

Statistical Process Control
Statistical approach to monitor process improvement

BPM software
Automate process improvement

Total Qlty Management
Improving process through customer satisfaction.

Feedback loop
Gather input from various stakeholders

Gemba Walks
Value stream observation.

Benchmarking
Identify best practices

Framework Development: KPI Metric Environmental Impact

Process steps

Identify key indicators → Formulates strategies → Develop action plans → Add additional plans → Add additional variable → Define monitoring measurements → Develop KPI metrics → Monitor and refine KPI metrics
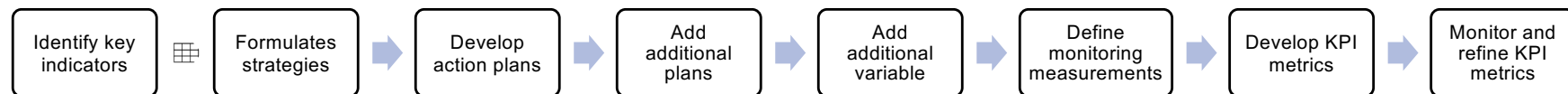
Results

Main KPI	Sub KPI	Measurement	Current Value	Target Value	Current Stage	Trend	Estimated Timeframe	Data Source
Carbon Emissions	CO2 emissions (metric tons per capita)	metric tons per capita	6.02	5.42	In Progress	Increasing	2026	Tracking Data
Carbon Emissions	CO2 emissions from solid fuel consumption (% of total)	% of total	0.01	0.01	In Progress	Decreasing	2026	Pivot Data
Carbon Emissions	CO2 emissions from liquid fuel consumption (% of total)	% of total	74.66	67.19	In Progress	Decreasing	2026	Pivot Data
Carbon Emissions	CO2 emissions from gaseous fuel consumption (% of total)	% of total	26.3	23.67	In Progress	Increasing	2026	Pivot Data
Renewable Energy	Renewable energy consumption (% of total final energy consumption)	% of total final energy consumption	16.52	18.17	In Progress	Increasing	2026	Tracking Data
Renewable Energy	Renewable electricity output (% of total electricity output)	% of total electricity output	N/A	N/A	In Progress	Data Not Available	2026	N/A
Renewable Energy	Alternative and nuclear energy (% of total energy use)	% of total energy use	N/A	N/A	In Progress	Data Not Available	2026	N/A
Energy Access	Access to electricity (% of population)	% of population	110	121	In Progress	Increasing	2026	Tracking Data
Energy Access	Access to clean fuels and technologies for cooking (% of population)	% of population	N/A	N/A	In Progress	Data Not Available	2026	N/A
Air Quality	PM2.5 air pollution, mean annual exposure (micrograms per cubic meter)	micrograms per cubic meter	17.13	18.84	In Progress	Increasing	2026	Tracking Data
Air Quality	PM2.5 air pollution, population exposed to levels exceeding WHO guideline value (% of total)	% of total	100	110	In Progress	Stable	2026	Pivot Data
Water Access	People using at least basic drinking water services (% of population)	% of population	109.74	120.72	In Progress	Increasing	2026	Tracking Data
Water Access	People using safely managed drinking water services (% of population)	% of population	80.33	88.36	In Progress	Increasing	2026	Pivot Data
Waste Management	Municipal solid waste collection coverage, (% of population)	% of population	N/A	N/A	In Progress	Data Not Available	2026	N/A
Waste Management	Recycling rate of municipal waste (%)	%	N/A	N/A	In Progress	Data Not Available	2026	N/A
Biodiversity	Protected areas (% of total territorial area)	% of total territorial area	N/A	N/A	In Progress	Data Not Available	2026	N/A
Biodiversity	Threatened species (% of total species)	% of total species	N/A	N/A	In Progress	Data Not Available	2026	N/A
Water Quality	Freshwater withdrawal (% of total renewable water resources)	% of total renewable water resources	N/A	N/A	In Progress	Data Not Available	2026	N/A
Water Quality	Water stress (% of total renewable water resources)	% of total renewable water resources	N/A	N/A	In Progress	Data Not Available	2026	N/A
Forest Management	Forest area (% of land area)	% of land area	N/A	N/A	In Progress	Data Not Available	2026	N/A
Forest Management	Deforestation rate (% of forest area)	% of forest area	N/A	N/A	In Progress	Data Not Available	2026	N/A

# Framework Development: KPI Metric Ethical Sourcing Assesment

Process steps

Identify key variables → Formulates strategies → Develop action plans → Add additional plans → Add additional variable → Define monitoring measurements → Develop KPI metrics → Monitor and refine KPI metrics
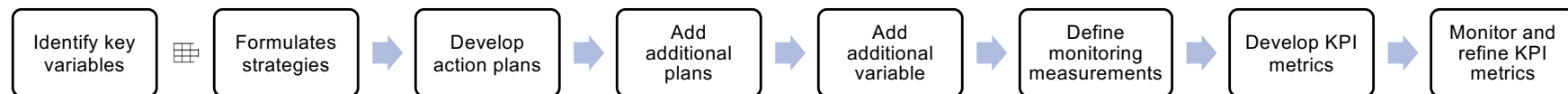
Results

Scenario	Level of Impact	Key Variable	KPI	Measurement	Target	Timeframe
Scenario 1	High	Transparency	Transparency Score	% of operations with full transparency	90%	1 year
		Eco-friendly Practices	Carbon Footprint Reduction	% reduction in carbon emissions	30%	2 years
		Social Responsibility	Social Impact Score	% increase in positive social impact	50%	18 months
General	High	Social Responsibility	Community Investment	Community investment as a percentage of profits	5%	1 year
Scenario 2	High	Innovation	Innovation Index	# of sustainable innovations implemented	10	2 years
Genaral	High	Innovation	Sustainable Products Developed	Number of new sustainable products developed	5	2 years
Scenario 2	High	Collaboration	Partner Collaboration Rate	% of partners meeting ethical standards	95%	1 year
General	High	Collaboration	Partnerships for Sustainability	Number of partnerships with NGOs or other companies	10	1 year
Scenario 2	High	Community Engagement	Community Engagement Score	# of community initiatives supported	20	18 months
Scenario 5	Moderate	Transparency	Transparency Compliance Rate	% compliance with transparency guidelines	100%	1 year
General	Moderate	Transparency	Operations Audited	% of operations audited for compliance annually	100%	1 year
Scenario 5	Moderate	Eco-friendly Practices	Eco-friendly Initiative Coverage	% of supply chain covered by eco-friendly practices	80%	2 years
		Education and Training	Training Completion Rate	% of employees completed sustainability training	95%	1 year
	Low	Social Responsibility	Social Responsibility Index	% improvement in social responsibility metrics	40%	2 years
		Visibility	Stakeholder Communication Frequency	# of stakeholder communications per quarter	12	6 months
General	Low	Visibility	Sustainability Reports Published	Frequency of sustainability reports published	4	1 year
Scenario 4	Low	Community Ties	Community Relationship Strength	% increase in community satisfaction	25%	1 year
General	Low	Community Ties	Community Projects Supported	Long-term community projects supported	5	2 years
		Community Engagement	Community Outreach Programs	Number of community outreach programs initiated	10	1 year
Scenario 3	Low	Inclusivity	Diversity and Inclusion Score	% representation of diverse groups in initiatives	85%	18 months
General	Low	Inclusivity	Diversity Index	Diversity index within the company and its suppliers	80%	1 year
		Education and Training	Training Sessions Held	Number of training sessions held on ethical practices	12	1 year
		System proposed				
		Resrecher observation				

Fraework Application in Case Study: Structure Approach

Structured approach of research framework application in case study
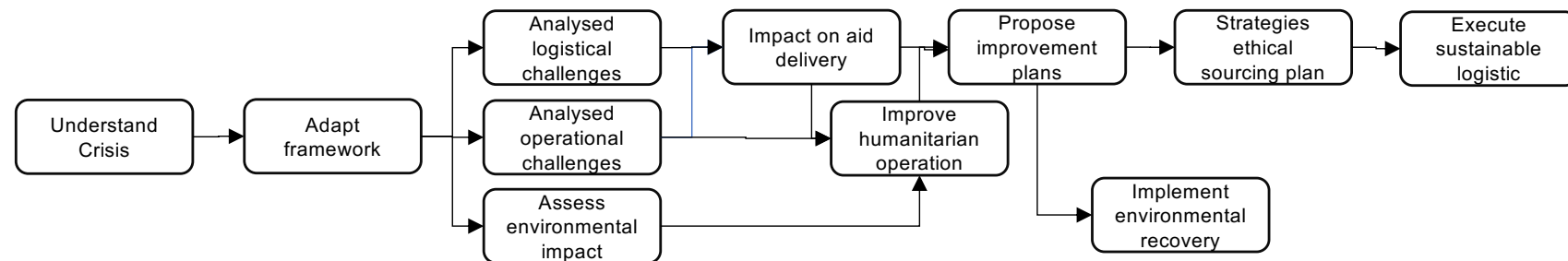
Overall insights of humanitarian aids in Gaza

Logistical/operational Challenges

Limited receiving & crossing points, infrastructure damage
Safety and security .

Limited WASH Access

Insufficient sanitation
Lack of clean water
Health impacts

Environmental Concerns

High carbon emission
Air pollution & waste
Water contamination
Biodiversity loses

Coordination gaps

Coordination delays
Restrictions on relief items
Lengthy custom clarences

Framework Application in Case Study: Enxtended KPI for Environmental

Key Findings
1. Carbon Emissions: Current targets exceeded, necessitating adjustments.
2. New KPIs: Developed for Biodiversity, Forest Management, Waste Management, and Water Quality.
3. Action Plan: Timeline spans of 2 years improvement.
4. Data Collection: Enhanced methods and real-time monitoring
5. Stakeholder Engagement: Identified as a crucial component of the action plan.

Next Steps:
1. Secure funding for enhanced monitoring systems
2. Implement new KPIs and adjust carbon emissions targets
3. Engage stakeholders and foster cross-sector collaboration
4. Regularly review and update the action plan based on progress and new data

Main KPI	Sub KPI	Related Environmental Impact	Measurement	Current Value	Target Value	Current Stage	Trend	Estimated Timeframe	Data Source	Progress
Carbon Emissions	CO2 emissions (metric tons per capita)	Carbon Emissions	metric tons per capita	6.02	5.42	In Progress	Increasing	2026	Tracking Data	111.0701107
Carbon Emissions	CO2 emissions from solid fuel consumption (% of total)	Carbon Emissions	% of total	0.01	0.01	In Progress	Decreasing	2026	Pivot Data	100
Carbon Emissions	CO2 emissions from liquid fuel consumption (% of total)	Carbon Emissions	% of total	74.66	67.19	In Progress	Decreasing	2026	Pivot Data	111.1177259
Carbon Emissions	CO2 emissions from gaseous fuel consumption (% of total)	Carbon Emissions	% of total	26.3	23.67	In Progress	Increasing	2026	Pivot Data	111.1111111
Renewable Energy	Renewable energy consumption (% of total final energy consumption)	Renewable Energy	% of total final energy consumption	16.52	18.17	In Progress	Increasing	2026	Tracking Data	90.91909741
Renewable Energy	Renewable electricity output (% of total electricity output)	Renewable Energy	% of total electricity output			In Progress	Data Not Available	2026		
Renewable Energy	Alternative and nuclear energy (% of total energy use)	Renewable Energy	% of total energy use			In Progress	Data Not Available	2026		
Energy Access	Access to electricity (% of population)	Energy Access	% of population	110.0	121.0	In Progress	Increasing	2026	Tracking Data	90.90909091
Energy Access	Access to clean fuels and technologies for cooking (% of population)	Energy Access	% of population			In Progress	Data Not Available	2026		
Air Quality	PM2.5 air pollution, mean annual exposure (micrograms per cubic meter)	Air Quality	micrograms per cubic meter	17.13	18.84	In Progress	Increasing	2026	Tracking Data	90.92356688
Air Quality	PM2.5 air pollution, population exposed to levels exceeding WHO guideline value (% of total)	Air Quality	% of total	100.0	110.0	In Progress	Stable	2026	Pivot Data	90.90909091
Water Access	People using at least basic drinking water services (% of population)	Water Access	% of population	109.74	120.72	In Progress	Increasing	2026	Tracking Data	90.90457256
Water Access	People using safely managed drinking water services (% of population)	Water Access	% of population	80.33	88.36	In Progress	Increasing	2026	Pivot Data	90.91217746
Waste Management	Municipal solid waste collection coverage, (% of population)	Waste Management	% of population			In Progress	Data Not Available	2026		
Waste Management	Recycling rate of municipal waste (%)	Waste Management	%			In Progress	Data Not Available	2026		
Biodiversity	Protected areas (% of total territorial area)	Biodiversity	% of total territorial area			In Progress	Data Not Available	2026		
Biodiversity	Threatened species (% of total species)	Biodiversity	% of total species			In Progress	Data Not Available	2026		
Water Quality	Freshwater withdrawal (% of total renewable water resources)	Water Quality	% of total renewable water resources			In Progress	Data Not Available	2026		
Water Quality	Water stress (% of total renewable water resources)	Water Quality	% of total renewable water resources			In Progress	Data Not Available	2026		
Forest Management	Forest area (% of land area)	Forest Management	% of land area			In Progress	Data Not Available	2026		
Forest Management	Deforestation rate (% of forest area)	Forest Management	% of forest area			In Progress	Data Not Available	2026		
Biodiversity	Species Diversity Index	Biodiversity	Shannon-Wiener Index	2.5	3.0	In Progress	To be determined	2026	To be established	83.33333333
Biodiversity	Protected Area Coverage	Biodiversity	% of total land area	10%	15%	In Progress	To be determined	2026	To be established	66.66666667
Forest Management	Reforestation Rate	Forest Management	Hectares per year	500	1000	In Progress	To be determined	2026	To be established	50
Forest Management	Sustainable Timber Harvest	Forest Management	% of total harvest	60%	80%	In Progress	To be determined	2026	To be established	75
Waste Management	Recycling Rate	Waste Management	% of total waste	20%	40%	In Progress	To be determined	2026	To be established	50
Waste Management	Landfill Diversion	Waste Management	% of waste diverted	30%	60%	In Progress	To be determined	2026	To be established	50
Water Quality	Water Quality Index	Water Quality	WQI Score	65	80	In Progress	To be determined	2026	To be established	81.25
Water Quality	Wastewater Treatment	Water Quality	% of wastewater treated	70%	90%	In Progress	To be determined	2026	To be established	77.77777778

Framework Application in Case Study: Ethical Sourcing Assesment

Strategies	Action Plan	Impact	Ease	Urgency	Priority score	Start date	End data	Duration	Dependcies	Metric	Target	Measurment Frequency	System	Tools	Responsible
Integrate sustainability metrics	Conduct a baseline assessment, define key metrics, and implement tracking systems.	High	Medium	High	2.7	10/1/2024	11/30/2024	60	[]	Sustainability Score	80% improvement	Quarterly	Sustainability Dashboard	Tableau, Power BI	Sustainability Manager
Embed renewable energy targets	Identify renewable energy sources, set targets, and develop an implementation roadmap.	High	Medium	High	2.7	12/1/2024	3/1/2025	90	["Integrate sustainability metrics"]	Percentage of Renewable Energy Use	50% increase	Bi-annually	Energy Management System	Energy Star Portfolio Manager	Energy Efficiency Specialist
Align with long-term sustainability objectives	Review current objectives, align with industry standards, and communicate changes.	High	Medium	High	2.7	12/1/2024	3/31/2025	120	["Integrate sustainability metrics"]	Alignment Score	90% alignment	Annually	Strategic Alignment Tracker	Balanced Scorecard	Chief Sustainability Officer
Enhance risk management	Conduct risk assessments, develop mitigation strategies, and integrate into decision-making processes.	High	Low	High	2.4	12/1/2024	3/1/2025	90	["Integrate sustainability metrics"]	Risk Mitigation Rate	70% reduction in identified risks	Quarterly	Risk Dashboard	RiskWatch, Risk Management Software	Risk Management Team Lead
Adopt KPI metrics methods	Identify relevant KPIs, train staff on data collection, and establish reporting protocols.	Medium	Medium	High	2.3	10/1/2024	11/15/2024	45	[]	KPI Coverage	100% implementation	Monthly	KPI Dashboard	Google Data Studio	Data Analytics Manager
Incorporate long-term planning	Develop long-term plans, align with strategic goals, and review annually.	Medium	Medium	Medium	2	4/1/2025	5/31/2025	60	["Align with long-term sustainability objectives"]	Long-term Plan Adherence	85% adherence	Bi-annually	Strategic Planning System	Microsoft Project	Strategic Planning Director
Expand social responsibility initiatives	Identify community needs, develop initiatives, and engage stakeholders.	Medium	Medium	Medium	2	4/1/2025	6/15/2025	75	["Align with long-term sustainability objectives"]	Social Impact Score	60% improvement	Annually	CSR Impact Tracker	CSRHub, Impact Reporting Software	Corporate Social Responsibility Manager
Incorporate scenario-based planning	Develop scenarios, train staff, and integrate into strategic planning.	Medium	Low	Medium	1.7	3/2/2025	5/31/2025	90	["Enhance risk management"]	Scenario Accuracy	75% accuracy	Quarterly	Scenario Planning Tool	WhatIf Analysis Tools	Business Strategy Analyst

Criterion	Metric	Weight	Score	Weighted Score	
Sustainability Integration	Percentage of sustainability metrics implemented (0-100%)	0.2	80	16	
Renewable Energy Adoption	Percentage of energy from renewable sources (0-100%)	0.15	65	9.75	
Long-term Sustainability Alignment	Degree of alignment with industry sustainability standards (1-5 scale)	0.15	80	0.6	
Risk Management	Effectiveness of risk mitigation strategies (1-5 scale)	0.1	60	0.3	
KPI Adherence	Percentage of relevant KPIs reported accurately (0-100%)	0.1	90	9	
Long-term Planning	Quality and depth of long-term sustainability plans (1-5 scale)	0.1	80	0.4	
Social Responsibility	Impact and scope of social responsibility initiatives (1-5 scale)	0.1	80	0.4	
Scenario Planning	Robustness of scenario-based planning approaches (1-5 scale)	0.1	60	0.3	
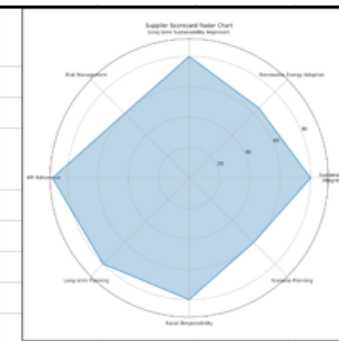
Fraework Application in Case Study: Challneges & Improvement Plan

Proposed improvement plan
(case study Humanitarian supply chain and operation in Gaza/Levantine countries)

Food security & agricultural recovery

Improve established concept of operations (CONOPS) by Logistic cluster

Increase access to clean water, sanitation and Hygiene

Medical & healthcare system restorations

Increase shelter & non-food items

Implement environmental recovery

Improve aid delivery and environmental sustainability in Gaza & Levantine countries

Enhance supply chain and logistics	• Improve infrastructure • Reduce bottleneck • Streamline process for aid delivery
Prioritize environmental compliance	• Implement sustainable sourcing practice • Address environmental challenges • Implement immediate, and long-term environmental recovery plan
Collaborate with local authorities	• Collaborate with authorities and all stake holders • Structured for smooth operations, compliance and regulations transparently • Engaged with affected population to priorities needs

Research Discussion: Key Findings & Data Interpretation

Basic commodities

Demand supply data: foods, non-foods, medical & fuel/gas

Environmental data

Infrastructure damage,
gas emission,
water and energy consumption,
biodiversity threats

IDP & IDA demographic data

Internal displace person, counter attacks to residence, healthcare and education facilities

.
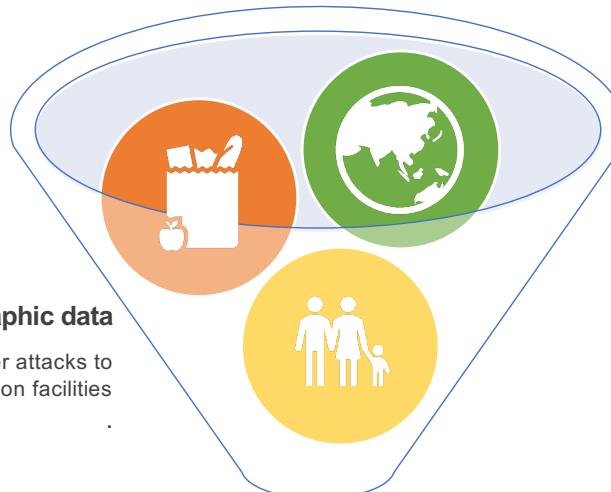
Analysis & Interpretation

Supply-demand mismatches
Resource allocation inefficiencies
Data metadata challenges
Improvement strategies
Insight trends and pattern
Highlight bottleneck

Research Discussion: Impact & Challenges of Analysis

Data visualization

Data Quality issues
– Misleading conclusion

Incomplete data coverage
– holistic assessment is hindered

Methodology transparency
– challenging to standardize metrics.

Spatial resolution coarseness
– Localized issues may be missed

Interconnectivity gaps
– in accurate result due to missing interactions

Temporal resolution limitations
– Overlooked on short-term changes

Environmental assessment

Complex Data Handling
– increases processing time and errors

Lack of standardization
– leads to inconsistent data formats

Manual data check
– introduce potential to human errors.

Inadequate visualization tools
– hinders effective data interpretation

Limited automation tools
– reduces efficiency in data analysis

Ethical sourcing analysis

Incomplete Data processing
– limits accurate scenario developments

Lack of clear metrics
– hinder effective decision making

Insufficient variable definition
– reduces analysis depth

Inconsistent key words extraction
– affected theme identification accuracy

Poor visualization tools
-   impacts on understanding of relationships between key variables

Datasets inconstancy and interconnectivity impact on research strategies and directions

Conclusion: Recommendation & Future reaserch Oppurtunity

Utilized data analytics tools
Keep the existing SOP
Establish Common Services (LOG excellent)
Improve Capacity Augmentation: cargo consolidation, storage, transportation, and tracking.
Utilize KPI metrics to address environmental issues
Invest simulation tools: Humanitarian Carbon Calculator (HCC) to mitigate emissions.
Practice ethical sourcing
Factors in social responsibility, environmental considerations, sustainable supply chain.

Future Research Oppurtunity

Recommendation for Practices

Enhancing sustainable and ethical sourcing in humanitarian situations with advance technologies.
Blockchain, AI, machine learning, and quantum computing Can improve sustainability in remote or difficult locations.
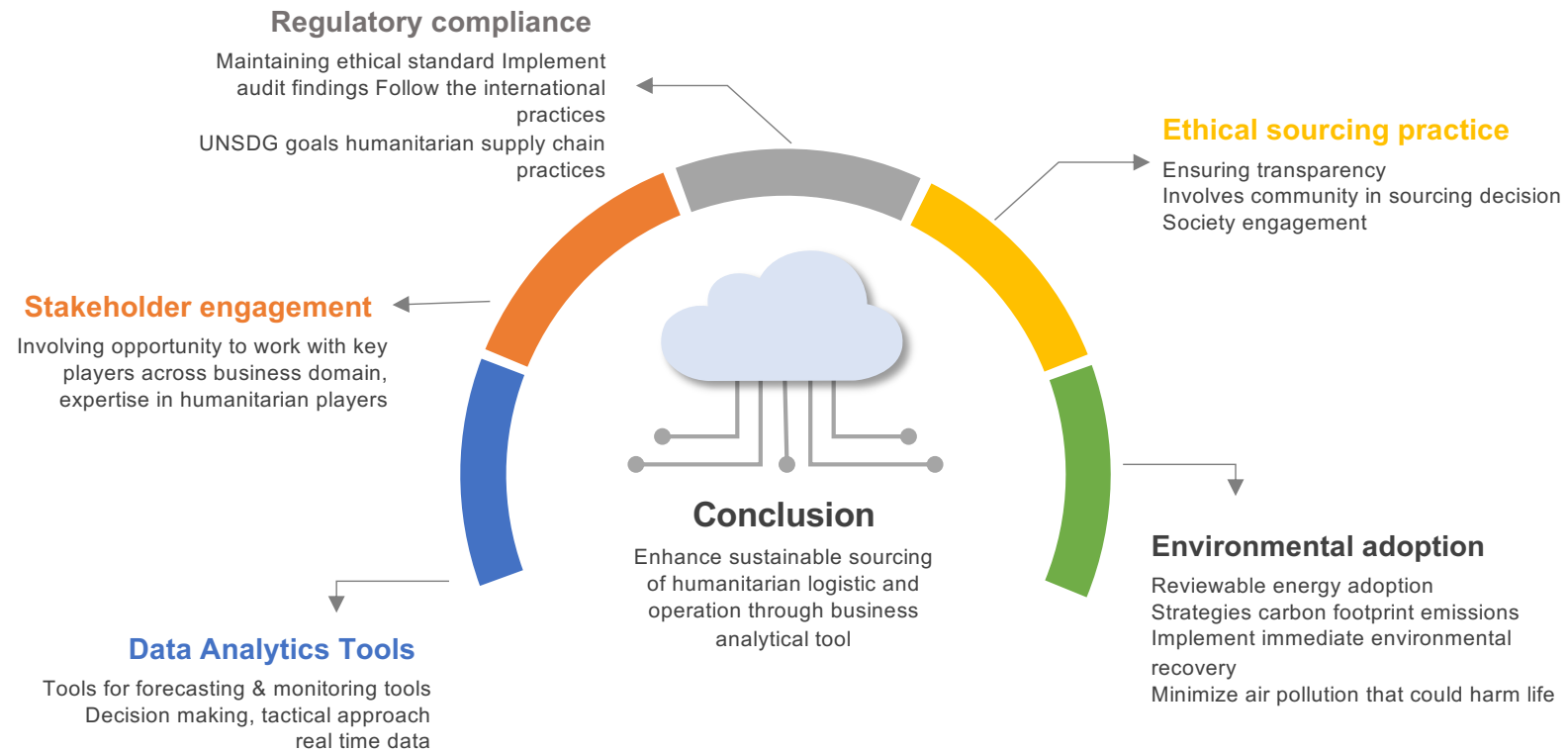Replace human with robots, UAVs, or drones for aid delivery can minimize emergency response time and mitigate risks.
Implement adaptive strategies, rapid response frameworks, and sustainability practices can enhance resilience.
Implement adaptive analysis, long-term impact assessment, and barriers to implementing sustainable sourcing practices.
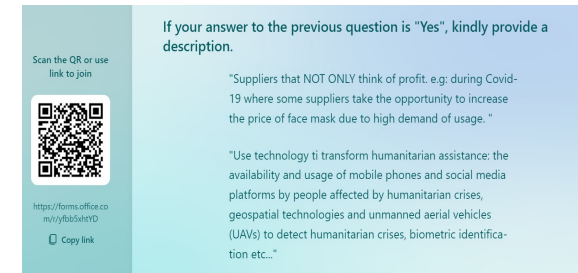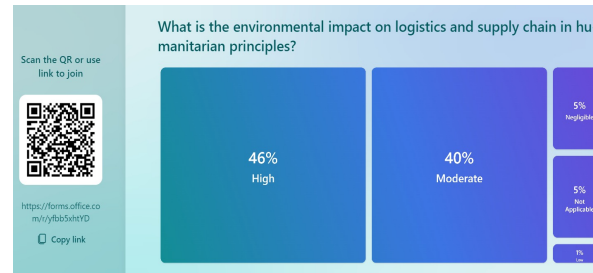
Research Conclusion

Regulatory compliance

Maintaining ethical standard Implement audit findings Follow the international practices
UNSDG goals humanitarian supply chain practices

Ethical sourcing practice

Ensuring transparency
Involves community in sourcing decision
Society engagement

Stakeholder engagement

Involving opportunity to work with key players across business domain, expertise in humanitarian players

Conclusion

Enhance sustainable sourcing of humanitarian logistic and operation through business analytical tool

Environmental adoption

Reviewable energy adoption
Strategies carbon footprint emissions
Implement immediate environmental recovery
Minimize air pollution that could harm life

Data Analytics Tools

Tools for forecasting & monitoring tools
Decision making, tactical approach real time data

THANK YOU!

BACKUP SLIDES

Meaning of humanitarian logistics.	No. Response
Emergency aid distribution	195
Crisis community support	161
Relief material distributio	131
Coordinate rescue recovery	75
Other	6
Impact of humanitarian logistics on crises.	**No. Response**
Provides essential aids supplies	180
Supplies shelter and necessities	177
Coordinates life-saving emergency response	116
Supports post-disaster community resilience	82
Other	8
Emergency activities in humanitarian logistics.	**No. Response**
Mobilising resources quickly	166
Facilitates sheltering and healthcare;	184
Coordination of aid distribution	155
Supply chain adaptation	114
Other	8
Daily challenges in delivering aid.	**No. Response**
Security and safety concern	157
Insufficient funding and resources	142
Inter-agency coordination gaps	158
Logistical and supply chains interruptions	134
Other	6
Tackling humanitarian aid challenges.	**No. Response**
Collaborative humanitarian coordination efforts	168
Enhanced through specialised training	161
Invest in innovative aid technologies	176
Promote funding and support	91
Other	9

SUSTAIBABILITY IN HUMANITARIAN LOGISTICS

Sustainability factors for relief materials.	No. Response
Environmental Impact	186
Ethical Sourcing	163
Quality and Safety	164
Cost-effectiveness.	98
Other	9
Environmental impact on humanitarian logistics.	**No. Response**
Not applicable	13
Negligigible	13
Low	3
Moderate	8
High	118
Reducing environmental footprint in logistics.	**No. Response**
Use of renewable energy sources	174
Adopt eco-friendly packaging materials	155
Implement transportation route optimisation	153
Promote sustainable resource procurement	144
Other	10
Importance of ethics in humanitarian logistics.	**No. Response**
Nort important	0
Slightly important	10
Moderately important	15
Very important	106
Exteremely important	104
Ethical practices in humanitarian supply chains.	**No. Response**
Transparency and accountability	206
Compliance	145
Due diligence	116
Stakeholder engagement	69
Other	17

ENVIRONEMTAL & ETHICAL COMPILANCE IN SUSTAINIBLE SOURCING

Assessing supplier sustainability in humanitarian logistics.	No. Response
Perform regular assessment	166
Evaluate supplier sustainability	139
Mesure with specific metrics	156
Collabarate with third-party auditors	92
Other	9
Responsible sourcing in humanitarian relief.	**No. Response**
Community-centred collaboration	153
Ethical sourcing and procurement	159
Environmental impact mitigation.	138
Feedback-driven process refinement	186
Other	15
Supplier prioritization of welfare in relief efforts.	**No. Response**
Collaborative partnership	164
Transparent supply chains	153
Environmental certifications	157
Social responsible initiatives	112
Ceartive approaches of sustainable relief procurement.	**No. Response**
Community engagement	158
Recycling initiatives	137
Innovative technologies	167
Education and empowerment	93
Other	10
Enhancing supplier sustainability evaluation.	**No. Response**
Continuous monitoring	161
Stakeholder feedback	112
Data analytics	188
Collaborative initiatives	99
Other	8

LEVEARGING BUSINESS ANALYITICAL TOOLS IN SUSTIANABLE SOURCING

Simple description of data analytics tools.	No. Response
Interpret patterns and trends	149
Simplified data for decisison-making	194
Analyses and reveals information	113
Enhances problem-solving through data	98
Other	8
Coomon tools used for data nalytics	**No. Response**
Microsoft Power BI/Excel	165
Tableau	70
Python/R	62
Google Analytics	132
Other	8
Data analytics' impact on sales and supply chain.	**No. Response**
Increased sales and marketing	153
Improved customer sastifaction	158
Optimized supply chains	153
Enhanced employee peformance	104
Other	10
Humanitarian use of data analytics for ethics.	**No. Response**
Monitoring supplier compliance	157
Analyzing supplier sourcing;	135
Monitoring environmental impact and labour practices	135
Identifying and addressing ethical violations	108
Other	10
Collecting and integrating supplier data accurately.	**No. Response**
Automate data collection continuously	163
Validate data for integrity	154
Ensure consistent data governance	127
Conduct regular audits for data accuracy	103
Other	7

What are the ethical practices in logistics and supply chain in humanitarian principles?

Scan the QR or use link to join

https://forms.office.com/r/yfbb5xhtYD
Copy link

- Transparency and accountability — 38%
- Compliance — 26%
- Due diligence — 22%
- Stakeholder engagement — 12%
- Other — 0%

What is the environmental impact on logistics and supply chain in humanitarian principles?

Scan the QR or use link to join

https://forms.office.com/r/yfbb5xhtYD
Copy link

- 46% High
- 40% Moderate
- 5% Negligble
- 5% Not Applicable
- 1% Low

If your answer to the previous question is "Yes", kindly provide a description.

Scan the QR or use link to join

https://forms.office.com/r/yfbb5xhtYD
Copy link

"Suppliers that NOT ONLY think of profit. e.g: during Covid-19 where some suppliers take the opportunity to increase the price of face mask due to high demand of usage. "

"Use technology ti transform humanitarian assistance: the availability and usage of mobile phones and social media platforms by people affected by humanitarian crises, geospatial technologies and unmanned aerial vehicles (UAVs) to detect humanitarian crises, biometric identification etc..."

Reserach result: Analysis of Questionnaires Feedback/Resonse
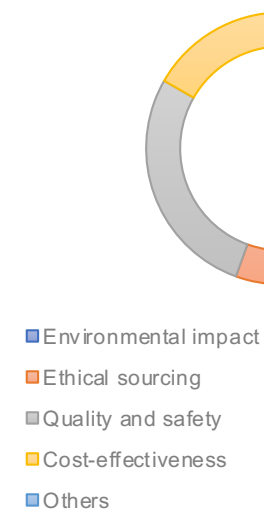
No. of respondents: 232
Age groups: 30-45 years old
No. of responses: 280-320 Online survey form (not inlcuding manual forms/face to face Interview)
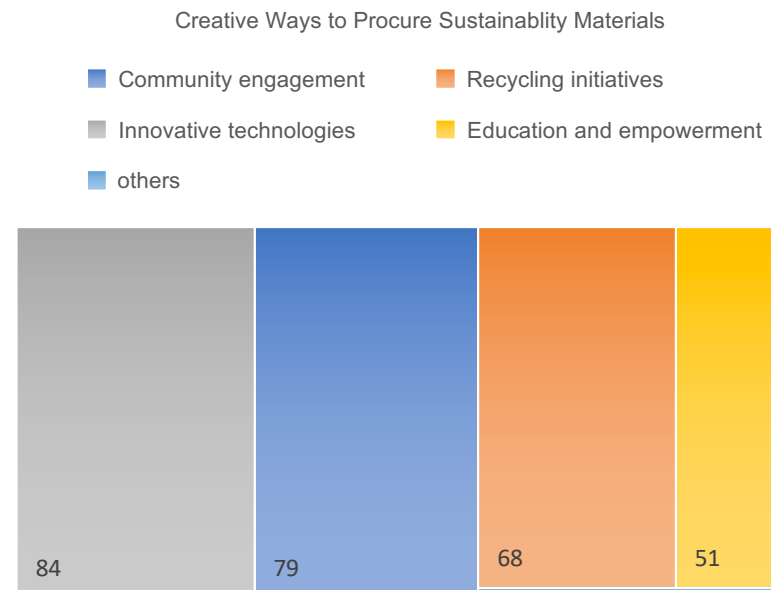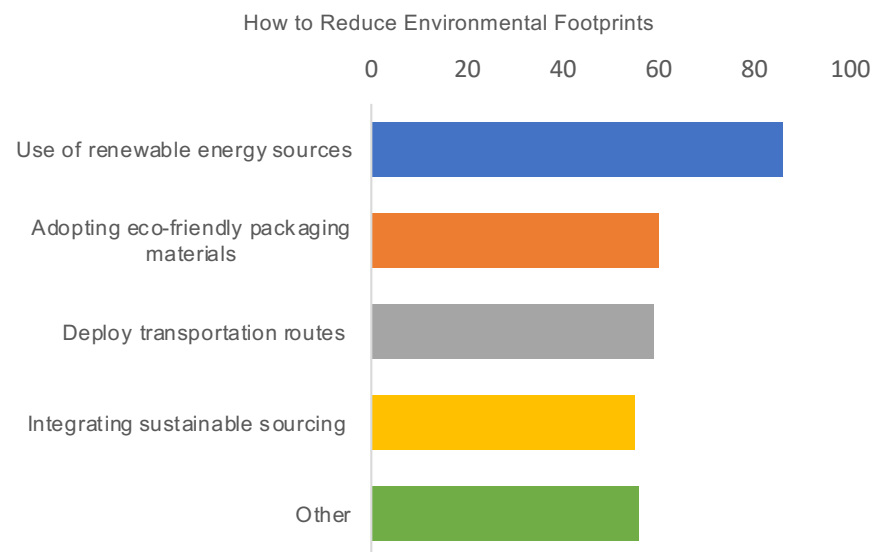

Challenges of Humanitarian Logistics

Key Factors of Sustainable Humanitarian Logistics

- Environmental impact
- Ethical sourcing
- Quality and safety
- Cost-effectiveness
- Others

Reserach result: Analysis of Questionnaires Feedback/Resonse

How to Reduce Environmental Footprints

Creative Ways to Procure Sustainablity Materials

- Community engagement
- Recycling initiatives
- Innovative technologies
- Education and empowerment
- others

84 79 68 51

Datasets Collections

Sources/contributors	Data Type	Data set	Key factors	clusters	Implantation strategies
UNRWA and partners For Gaza Suppliers and Dispatch tracking	Secondary - Meta data	List of the commodities received by Gaza from Humanitarian Org and partners	Generic data Humanitarian relief materials	Commodities received and dispatching' fuel data	Produce Dashboard
Gaza Heath service providers		list of health and medical needs for health service providers		Health and medical equipment	
UNOSAT		Agriculture damage analysis - 1 km stretch of land from the armistice demarcation line	Environmental assessment	Agriculture and biodiversity	**GIS/ modelling/observ ation**
Research questionnaires response	Primary – meta data	Analysis and research result developed based on data collection from research questionnaires and state of –the art from industry best practices.	Ethical assessment	Sustainability assessment metric	Building Performance metric index

Datasets Collections

Sources	Data Type	Clusters	Data Set	Focusing area	Data	Visualization
World Bank	Secondary-Metadata	Environment	Various gas emissions (6) , Air pollutions (3), water and Energy (3), biodiversity threatened (2), etc…	Levant Regions (CPR, JOR, LBN, SYR, ISR, PSE)	1960 - 2020	Data Visualization (Dashboard)
UNOSAT			Infrastructure damaged (12)	PSE (Gaza)	Oct 2023 – Jul 2024	
SHCC		Internal Displacement	Internal Displacement by number of shelters, victims (6)	ISR & PSE	Oct 2023 – Jul 2024	
WHO & Gaza Health Service Providers		Health	Demand and Supply Health & medical equipment by Category and sub-category (3)	PSE (Gaza)	Oct 2023 – Jul 2024	
UNRWA & WFC		Basic Commodities	General Basic commodities , Fuel (5)	PSE (Gaza)	Oct 2023 – Jul 2024	
Research Questionnaires	Primary – Metadata	-	*Develop framework based Environmental Impact and Ethical Sourcing practice using KPI Metrics (4) and Supplier Scorecard (2)*			Framework development

Notes: (numbers) number of visualization produced.

Fraework Application in Case Study: Ethical Sourcing Develepment Steps

Summary	Description of the process steps and finding
Mismatch and correlations variable	Correlate data sets from KPI ethical sourcing and CONOPS from logistic cluster
Integration strategy	integrate unique variables into comprehensive approach provides insights into each variable's impact on ethical practices, such as environmental focus, sustainability, and social responsibility.
Alignment strategy	Presents strategies, examining the effectiveness of unique variables.
Effectiveness variable	The table evaluates the effectiveness of variables in ethical sourcing practices in reducing environmental risks and carbon footprint.
Priority score	Prioritizes strategies for implementation based on impact, ease of implementation, and urgency, integrating metrics, embedding renewable energy targets, and aligning with long-term objectives.
Measurement frequency	strategies by priority score, which is calculated based on impact, ease of implementation, and urgency. The top priorities are integrating sustainability metrics, embedding renewable energy targets, and aligning with long-term sustainability objectives.
Timeline of strategies	This timeline outlines the start date, end date, duration, and dependencies for each strategy. It provides a clear roadmap for implementing the changes over time.
Mitigation strategies	These metrics cover various aspects of the integration, from sustainability scores to scenario planning effectiveness. Each metric has a specific target and measurement frequency, allowing for regular assessment of progress.
Mitigation contingency plan	This analysis identifies high and medium impact challenges in implementing strategies for SOP Procurement and KPI Ethical Sourcing, with proposed mitigation strategies for each. It provides a roadmap for enhancing ethical sourcing practices.

Fraework Application in Case Study: Ethical Sourcing Develepment Steps

Summary	Description of the process steps and finding
Action plan	Developing detailed action plans for each strategy. These action plans provide specific steps for implementing each strategy, ensuring a clear path forward for each initiative.
Responsible party	Identify reposbile parties for each mitigation and contigency plan . Each strategy has been assigned to a specific role or department, ensuring clear ownership and accountability throughout the implementation process.
Monitoring strategies tools	This monitoring system outlines the tools, systems, and responsible parties for tracking each performance metric, ensuring consistent and effective measurement of progress.
Risk management	This comprehensive risk management plan addresses each identified challenge with a specific mitigation strategy, contingency plan, and responsible party. It categorizes risks by level (High or Medium) and provides a clear framework for managing potential issues during implementation.
Comprehensive metrics	combining all the detailed action plans, responsibilities, monitoring systems, tools, risk levels, mitigation strategies, and contingency plans into a single table. This table provides a holistic view of the strategies and their implementation details.
Scorecard	supplier scorecard have been successfully developed, providing clear instructions for scoring and interpreting supplier evaluations. This ensures a structured approach to assessing suppliers based on ethical sourcing and procurement guidelines.

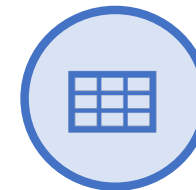# Gaps & Analysis: Data Inconsistency with Mitigation Plan

Data visualization

Metrics development

Lack of visualized environmental data

Implement machine learning and data visualization tool

Clear metrics for environmental data

**Data sets inconstancy and interconnectivity impact on research directions**

Data inconsistency and gaps in interconnectivity led to challenges, as applying the study to a specific case was not originally part of the research objectives. Accessibility and availability of data are often determined by case studies unique to each country or region, which shifted the research focus to accommodate these specifics.
The initial objective was to analyze the damaged infrastructure in Gaza, studying its environmental impact on relevant regions. However, due to disconnects between real-time and historical data from two different sources, integrating these data sets became unfeasible. Consequently, the research direction shifted, choosing to limit this effort and instead produce data using alternative methods and approaches.

Issues , Risk & Challenges: Resrech Development
Issues & Challenges

Issues/risk	Issues statement	Impact	Mitigations
Issues	The research scope is too broad, causing challenges in managing objectives	Potentially compromising the depth and quality of findings.	Focus only 1-2 key factors, streamline research efforts, eliminate peripheral topics, and enhance the research design by developing a more focused approach and using targeted data collection methods. Chosen key factors will be based on survey response, literature availability
Risk	Limited availability quantitative data	Research result may rely heavily on theoritical approaches and qualitataive data.	Ensure robust qualitatve data collecting on throughd etail interviews and focus groups. Use mixed method approaches to traingulate findisngs and strengthen validity. Develop compreshesive theoritical framework based on literatire and expert opinion.
Issue	Hypotheses based on trends and patterns from surveys	Hypotheses may be less grounded in empirical data and more reliant on theoretical assumptions.	Conduct a deep dive analysis of survey questionnaires to identify key trends and patterns. Validate hypotheses with additional qualitative data and expert reviews. Perform rigorous statistical analysis where possible to support qualitative findings.

Work Schedule
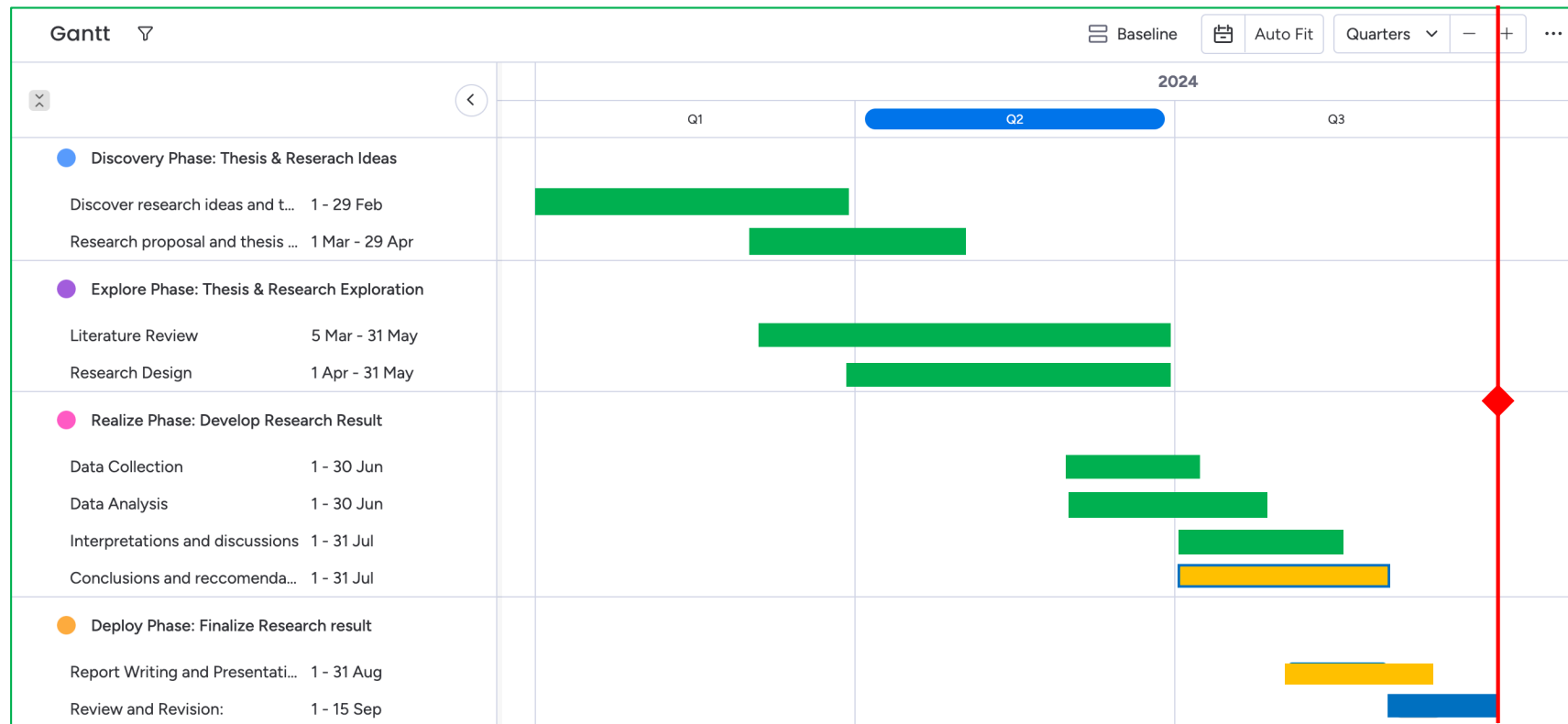
Work Plan: Details task with Key Milestones

Phase	Key Milestones	Target Date	Actual Date
Discovery	Thesis registration & approval	29.04.2024	07.05.2024
Explore	Feasibility study conduct literature review, theoretical approach	01.05.2024	15.05.2024
	Develop literiture review writing	15.05.2024	31.05.2025
	Develop theoretical approach writing	31.05.2024	15.07.2024
Development (Design & Analysis)	Data collection, data cleaning, data validation, data auditing	15.06.2024	15.07/2024
	Design & develop dashboard, metrics, hypothesis, practical approach (qualitative/quantitative approach)	30.07.2024	15.08.2024
	Data analysis; interpretation of key findings, patterns, trends, relationship, implications,	15.08.2024	31.08.2024
	Produce research result, recommendation and conclusion	31.08.2024	15.09.2024
Deploy	Produce thesis & report submission.	15.09.2024	05.10.2024

Notes:
- Key Milestones
- The baseline date does not include buffer time, and I am negotiating with my supervisor for an additional 2-3 weeks, reflecting the submission date of 05.10.2024.