Calculation Tools and Templates for Fundamental Design Principles Analysis

Tool 1: FDP Scoring Spreadsheet Templates

Master FDP Calculation Spreadsheet

System Information

Field	Input
System Name	[Enter system being analyzed]
System Type	Economic / Technological / Ecological / Social
Analysis Date	[Current date]
Analyst	[Your name]
Weighting Profile	[Select appropriate weights below]

FDP Individual Scores

FDP	Raw Score (0-10)	Weight Factor	Weighted Score	Evidence/Justification
SP - Symbiotic Purpose	[0-10]	[See weights]	[Auto-calc]	[Required documentation]
AR - Adaptive Resilience	[0-10]	[See weights]	[Auto-calc]	[Required documentation]
RE - Reciprocal Ethics	[0-10]	[See weights]	[Auto-calc]	[Required documentation]
CLM - Closed-Loop Materiality	[0-10]	[See weights]	[Auto-calc]	[Required documentation]
DA - Distributed Agency	[0-10]	[See weights]	[Auto-calc]	[Required documentation]
CH - Contextual Harmony	[0-10]	[See weights]	[Auto-calc]	[Required documentation]
ET - Emergent Transparency	[0-10]	[See weights]	[Auto-calc]	[Required documentation]
IH - Intellectual Honesty	[0-10]	[See weights]	[Auto-calc]	[Required documentation]

Dynamic Weighting System

Economic Systems:

FDP	Weight	Rationale
RE (Reciprocal Ethics)	3.0	Critical for distributive economics
SP (Symbiotic Purpose)	2.0	Essential for stakeholder value
CLM (Closed-Loop Materiality)	2.0	Environmental sustainability
All Others	1.0	Standard weighting

Technological Systems:

FDP	Weight	Rationale
ET (Emergent Transparency)	3.0	Data responsibility and algorithmic accountability
IH (Intellectual Honesty)	2.0	Limitation acknowledgment crucial
AR (Adaptive Resilience)	2.0	System robustness and learning
All Others	1.0	Standard weighting

Ecological Systems:

FDP	Weight	Rationale
CH (Contextual Harmony)	3.0	Environmental enhancement essential
CLM (Closed-Loop Materiality)	2.0	Circular material flows
AR (Adaptive Resilience)	2.0	Ecosystem resilience
All Others	1.0	Standard weighting

Calculation Formulas

Global FDP Score:

FDP_global = (Σ(FDP_i × Weight_i)) / (Σ(Weight_i))

Classification:

- **Natural (8.0-10.0):** Anti-fragile system
- **Hybrid (5.0-7.9):** Resilient system
- **Unnatural (0.0-4.9):** Collapse-prone system

Data Quality Assessment

Quality Factor	Score (1-5)	Notes
Data Completeness	[1-5]	5=Complete, 1=Major gaps
Source Reliability	[1-5]	5=Primary sources, 1=Unverified
Measurement Accuracy	[1-5]	5=Precise metrics, 1=Estimates
Time Relevance	[1-5]	5=Current data, 1=Outdated

Data Quality Penalty: If average quality < 3.0, reduce Global FDP by 0.5 points.

Tool 2: Stakeholder Mapping Tools

Comprehensive Stakeholder Analysis Template

Primary Stakeholder Categories

Internal Stakeholders:

Stakeholder Group	Influence Level (1-5)	Impact Level (1-5)	Benefits Received	Costs Borne	Net Effect
Owners/Shareholders	[1-5]	[1-5]	[List benefits]	[List costs]	[+/-/neutral]
Management	[1-5]	[1-5]	[List benefits]	[List costs]	[+/-/neutral]
Employees/Workers	[1-5]	[1-5]	[List benefits]	[List costs]	[+/-/neutral]
Board Members	[1-5]	[1-5]	[List benefits]	[List costs]	[+/-/neutral]

External Stakeholders:

Stakeholder Group	Influence Level (1-5)	Impact Level (1-5)	Benefits Received	Costs Borne	Net Effect
Customers/Users	[1-5]	[1-5]	[List benefits]	[List costs]	[+/-/neutral]
Suppliers	[1-5]	[1-5]	[List benefits]	[List costs]	[+/-/neutral]
Local Community	[1-5]	[1-5]	[List benefits]	[List costs]	[+/-/neutral]
Government/Regulators	[1-5]	[1-5]	[List benefits]	[List costs]	[+/-/neutral]
Environment/Ecosystem	[1-5]	[1-5]	[List benefits]	[List costs]	[+/-/neutral]
Future Generations	[1-5]	[1-5]	[List benefits]	[List costs]	[+/-/neutral]

Stakeholder Power-Interest Matrix

High Power, High Interest (Manage Closely):

- [List stakeholders who require active engagement]

High Power, Low Interest (Keep Satisfied):

- [List stakeholders who need monitoring]

Low Power, High Interest (Keep Informed):

- [List stakeholders who need communication]

Low Power, Low Interest (Monitor):

- [List stakeholders requiring minimal attention]

Symbiotic Purpose (SP) Calculation

SP = 10 × (Stakeholders with Net Positive Effect) / (Total Stakeholders Affected)

Stakeholder Benefit Analysis:

- Positive Net Effect: [Count]
- Negative Net Effect: [Count]
- Neutral Net Effect: [Count]
- **SP Score:** [Calculated result]

Voice and Representation Assessment

Stakeholder Group	Has Formal Voice?	Representation Quality	Decision Influence	Recommended Improvements
[Group 1]	Yes/No	[1-5 scale]	[1-5 scale]	[Specific recommendations]
[Group 2]	Yes/No	[1-5 scale]	[1-5 scale]	[Specific recommendations]

Tool 3: Material Flow Templates

Circular vs. Linear Flow Analysis

System Boundary Definition

Boundary Element	Included (Y/N)	Justification
Raw Material Extraction	Y/N	[Explain inclusion/exclusion]
Manufacturing/Processing	Y/N	[Explain inclusion/exclusion]
Distribution/Transport	Y/N	[Explain inclusion/exclusion]
Use Phase	Y/N	[Explain inclusion/exclusion]
End-of-Life	Y/N	[Explain inclusion/exclusion]
Waste Management	Y/N	[Explain inclusion/exclusion]

Material Input Analysis

Material Type	Quantity (units)	Source	Renewable?	Virgin/Recycled	Environmental Impact
[Material 1]	[Amount]	[Origin]	Y/N	V/R/Mixed	[Impact assessment]
[Material 2]	[Amount]	[Origin]	Y/N	V/R/Mixed	[Impact assessment]
[Material 3]	[Amount]	[Origin]	Y/N	V/R/Mixed	[Impact assessment]

Output and Waste Tracking

Output Type	Quantity (units)	Destination	Recyclable?	Biodegradable?	Becomes Input Where?
Desired Products	[Amount]	[Market]	Y/N	Y/N	[Next system]
By-products	[Amount]	[Destination]	Y/N	Y/N	[Next system or waste]
Waste Streams	[Amount]	[Disposal method]	Y/N	Y/N	[Recovery potential]

Circularity Metrics

Closed-Loop Materiality (CLM) Calculation:

CLM = 10 × (Recycled/Reused Outputs) / (Total Material Outputs)

Material Flow Analysis:

- **Total Material Input:** [Quantity] units
- **Recycled Material Input:** [Quantity] units
- **Total Material Output:** [Quantity] units
- **Recycled/Reused Output:** [Quantity] units
- **Waste to Landfill/Incineration:** [Quantity] units

CLM Score: [Calculated result]

Circular Design Opportunities

Waste Stream	Current Disposal	Circular Potential	Implementation Difficulty	Environmental Benefit
[Stream 1]	[Method]	[Opportunity]	[1-5 scale]	[Impact description]
[Stream 2]	[Method]	[Opportunity]	[1-5 scale]	[Impact description]

Natural System Benchmarks

Natural Analog	CLM Score	Key Circular Principles	Application to Your System
Forest Ecosystem	9.8	Nutrient cycling, decomposition	[How to apply]
Coral Reef	9.6	Symbiotic relationships, calcium cycling	[How to apply]
Mycelial Network	9.9	Complete decomposition and nutrient transfer	[How to apply]

Tool 4: Power Distribution Analysis

Decision-Making Centralization Assessment

Decision Category Matrix

Decision Type	Who Decides?	Process	Stakeholder Input	Transparency	Reversibility
Strategic Direction	[Role/Group]	[Process description]	[Y/N + details]	[1-5 scale]	[Y/N + effort]
Resource Allocation	[Role/Group]	[Process description]	[Y/N + details]	[1-5 scale]	[Y/N + effort]
Operational Policies	[Role/Group]	[Process description]	[Y/N + details]	[1-5 scale]	[Y/N + effort]
Personnel Decisions	[Role/Group]	[Process description]	[Y/N + details]	[1-5 scale]	[Y/N + effort]
Product/Service Design	[Role/Group]	[Process description]	[Y/N + details]	[1-5 scale]	[Y/N + effort]
Crisis Response	[Role/Group]	[Process description]	[Y/N + details]	[1-5 scale]	[Y/N + effort]

Power Concentration Analysis

Decision-Maker Hierarchy:

Level	Role/Position	Decision Count	Decision Impact (1-5)	Power Score
1 (Top)	[Role]	[Number]	[Impact level]	[Count × Impact]
2	[Role]	[Number]	[Impact level]	[Count × Impact]
3	[Role]	[Number]	[Impact level]	[Count × Impact]
4	[Role]	[Number]	[Impact level]	[Count × Impact]
5 (Bottom)	[Role]	[Number]	[Impact level]	[Count × Impact]

Gini Coefficient of Decision Power:

$$Gini = (\Sigma|Power_i - Power_j|) / (2n^2 \times Average\_Power)$$

Where n = number of decision-makers

Distributed Agency (DA) Calculation:

$$DA = 10 \times (1 - Gini\ Coefficient)$$

DA Score: [Calculated result]

Participatory Decision-Making Assessment

Stakeholder Group	Formal Participation Rights	Actual Influence (1-5)	Decision Categories Included	Barriers to Participation
[Group 1]	[Description]	[Scale]	[List categories]	[List barriers]
[Group 2]	[Description]	[Scale]	[List categories]	[List barriers]

Natural Distribution Benchmarks

Natural System	DA Score	Distribution Mechanism	Application Potential
Ant Colony	9.7	Pheromone-based collective intelligence	[How to adapt]
Starling Murmuration	9.8	Local interaction rules creating global coordination	[How to adapt]
Forest Network	9.4	Resource sharing through mycelial networks	[How to adapt]
Immune System	9.1	Distributed pattern recognition and response	[How to adapt]

Power Redistribution Recommendations

Current Centralization Issue	Recommended Change	Implementation Steps	Expected DA Improvement
[Issue 1]	[Change description]	[Step-by-step plan]	[Projected score change]
[Issue 2]	[Change description]	[Step-by-step plan]	[Projected score change]

Integration Guidelines

Using All Tools Together

Workflow for Complete FDP Analysis:

1. **Start with Stakeholder Mapping** - Identify all affected parties
2. **Conduct Material Flow Analysis** - Map resource use and waste
3. **Assess Power Distribution** - Analyze decision-making structures
4. **Calculate All FDPs** - Use data from above tools
5. **Apply Dynamic Weighting** - Based on system type
6. **Generate Integrated Score** - With quality adjustments

Cross-Tool Validation:

- **Stakeholder analysis should align with Power Distribution findings**
- **Material flows should reflect in Contextual Harmony assessments**
- **Power concentration should correlate with Symbiotic Purpose scores**

Documentation Standards:

- Save all completed templates with analysis date
- Include data sources and calculation methods
- Note limitations and assumptions
- Provide improvement recommendations
- Archive for future comparison

These tools provide the quantitative foundation needed to conduct rigorous FDP analysis that supports authentic transformation toward regenerative and distributive systems aligned with Regenerative Economics principles.