
SYSTEMS THINKING
RESEARCH & LEADERSHIP
DEVELOPMENT INSTITUTE
THE NATIONAL STRATEGY FIRM
STRLDi

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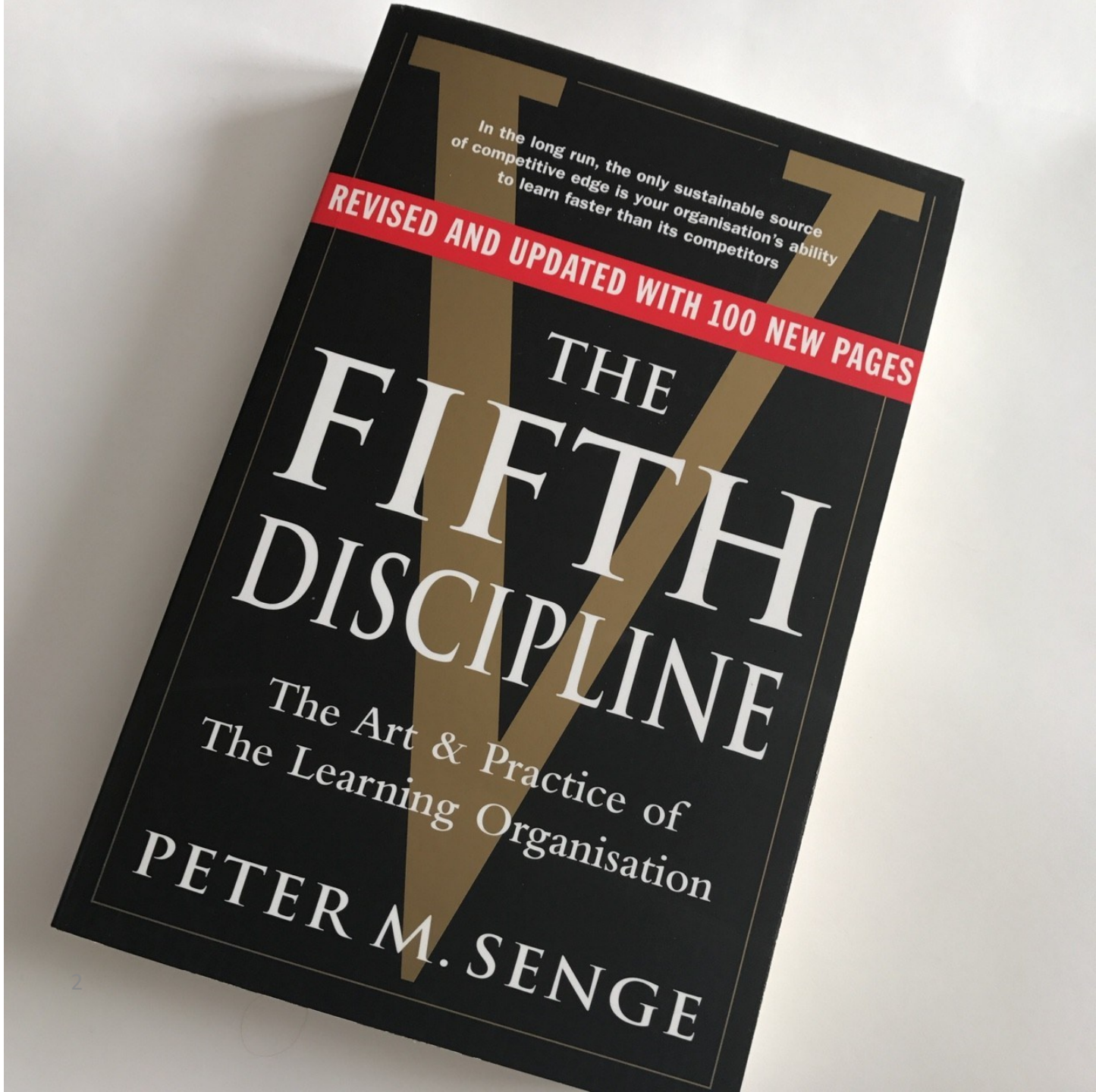
SYSTEMS **T**HINKING
RESEARCH & **L**EADERSHIP
DEVELOPMENT **I**NSTITUTE
(STRLDi), BOTSWANA



PROFILE

STRLDi

- Systems Thinking Research Institute
- Leadership Development Institute

PINNACLE FOODS:

- Food manufacturing & franchising (in development)
- Commercial horticulture seedlings production (2020 – 2023)
- Farmers' Learning Centre – short-term workshops for horticulture farmers (2022 – present)

Objective of Our Research Studies

- **Focus:** **persistent nature** of **national & global issues**, e.g. unemployment, extreme weather variability, see health & education levels grow and economic growth
- Research and present **reasons for persistence**
- Provide clients with a good understanding of the deeper **reasons that clients can address**
- We go beyond root causes to **identify reinforcing causal structures**
- Clients simultaneously undergo study of tools and process to advanced beginner levels
- Prepares them to co-develop strategies that cuts across sectors
- Share lessons learned with other nations and regions

THE INTENT OF THE FIVE DISCIPLINES

- The **five disciplines** are named so because they were not part of our upbringing, making the journey to mastering them challenging.
- Dr Peter Senge refers to them as disciplines because **they require continuous effort until they become ingrained in our way of being**. Once that happens, you may find you don't need anything else.
- The framework includes 60 tools (https://www.youtube.com/watch?v=vc2ruCErTok). **Regularly practicing these tools helps integrate the disciplines into our lives**. Volunteer to facilitate meetings, map system archetypes at every opportunity, engage in clarifying one's personal visions, or surfacing mental models.
- Without consistent effort, our attention spans risk becoming shorter with time.
- **We miss seeing the forests (dynamic complexity) for the trees (detailed complexity)** – we "fail to see the bigger picture," meaning someone is so focused on small details that they overlook the overall situation or important aspects.
- **True progress to understanding (learning) and resolving persistent systemic issues, begins** only **after the five disciplines have been integrated** into our daily practices.

Polling Question

- **READ THE PRE-AMBLE. HOW MUCH DOES THE STATEMENT RESONATE WITH YOU?**

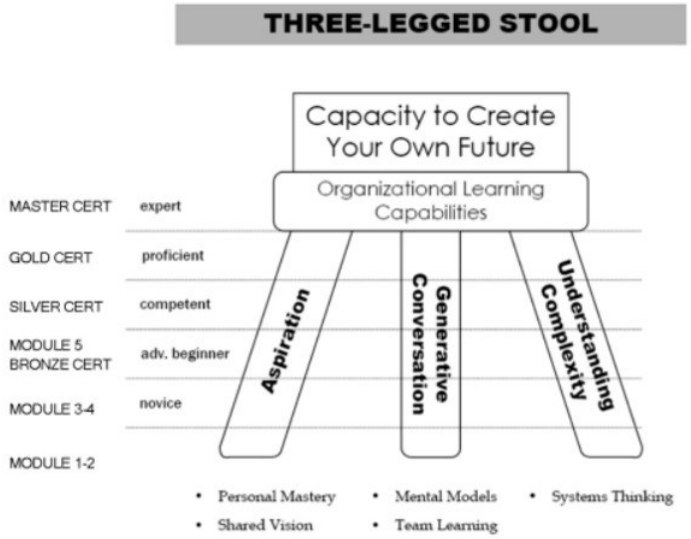
"True progress begins only after the five disciplines have been integrated into our daily practices. They require continuous effort and regular practice of the tools until they become ingrained in our way of being."

- **Option #1:** NOT AT ALL: "This is the first time I've encountered the statement phrased this way."
- **Option #2:** SOMEWHAT: "I have tried practicing the disciplines individually but never all of them together. I wasn't aware of the importance of their integration."
- **Option #3:** TRULY RESONATE: "I didn't realize what it truly takes to achieve the integration of these disciplines."

TOOLS OF THE FIFTH DISCIPLINE (50 min)

THE FIFTH DISCIPLINE OVERVIEW – INTENT: MANAGE CHANGE SEAMLESSLY

Incredible Tools for Unlocking The Secret To Understanding & Learning To Work With Our Realities



THE CAPABILITIES OF A LEARNING ORGANIZATION

TOOLS OF A LEARNING ORGANIZATION

TOOLS OF THE LEARNING ORGANISATION!

A ONE-PAGE SUMMARY OF THE FIFTH DISCIPLINE, THE ART AND PRACTICE OF THE LEARNING

Personal Mastery	*Shared Vision*	*Mental Models*	*Team Learning*	*Systems Thinking*
PRACTICES AND PRINCIPLES:				
• CLARIFYING PERSONAL VISION • HOLDING CREATIVE TENSION (FOCUSON RESULTS AND SEEK CURRENT REALITY) • MAKING CHOICES	• VISIONING PROCESS • ACKNOWLEDGING CURRENT REALITY	• DISTINGUISHING "DATA" FROM ABSTRACTION BASED ON DATA • TESTING ASSUMPTIONS • "LEFT-HAND COLUMN"	• SUSPENDING ASSUMPTIONS • ACTING AS COLLEAGUES • SURFACING OWN DEFENSIVENESS • "PRACTICING"	• SYSTEM ARCHETYPES • SIMULATION
PRACTICE TOOLS:				
□ Personal Mastery goes beyond proficiency □ Creative Tension Model □ Personal Vision □ Holding Creative Tension □ Structural Conflict □ Commitment to the Truth □ Using the subconscious □ Integrating Reason and Intuition □ Seeing our connectedness to the world □ Compassion □ Commitment to the Whole □ Centering long enough to focus on what we want □ Crafting the Purpose Statement – 1ºChoice	□ Encouraging Personal Vision □ From Personal to Shared Visions □ Spreading Visions □ Enrolment □ Commitment □ Compliance □ Guidelines for enrollment and commitment □ Anchoring Vision to Purpose and Values □ Positive versus Negative Vision □ Creative tension and commitment to the truth □ Why visions die prematurely	□ Planning as learning □ Managing mental models at personal and interpersonal levels □ Reflection Skills □ Leaps of Abstraction or Ladder of Inference □ Left Hand Column □ Inquiry Skills □ Balancing Inquiry and Advocacy □ Espoused Theory versus Theory-in-Use □ Double Loop Learning	□ Dialogue and Discussion □ Participants suspend their assumptions □ Seeing each other as colleagues □ There must be a facilitator who "holds" the context □ Dealing with Current Reality: Conflict and defensive □ The Missing Link: Practice □ Learning how "to practice"	□ 11 laws of complexity □ Seeing circles of causality □ Balancing Loop □ Reinforcing Loop □ Delays □ Archetypes □ Accidental Adversaries □ Balancing Loop with Delays □ Drifting Goals □ Escalation □ Fixes that Backfire □ Growth and Underinvestment □ Limits to Success □ Shifting the Burden □ Success to the Successful □ Tragedy of the Commons □ Behavior Time Graphs □ Leverages
THE ESSENCE OF THE DISCIPLINE:				
The essence of Personal Mastery is learning how to generate and sustain creative tension in our lives	Shared Vision is a force of "impressive power" that emerges when people share a desire to be connected in an important undertaking.	The essence of Mental Models is Learning to uncover deeply held internal images we have about how the world works, altering forever the way we think and create new ideas.	Team Learning is the process of aligning and developing the capacity of a team to create the results it truly desire.	The Art of seeing the forest and the trees! Seeing through complexity to the underlying structures generating change.

As presented by Peter Senge in his signature book (compiled by Sheila)

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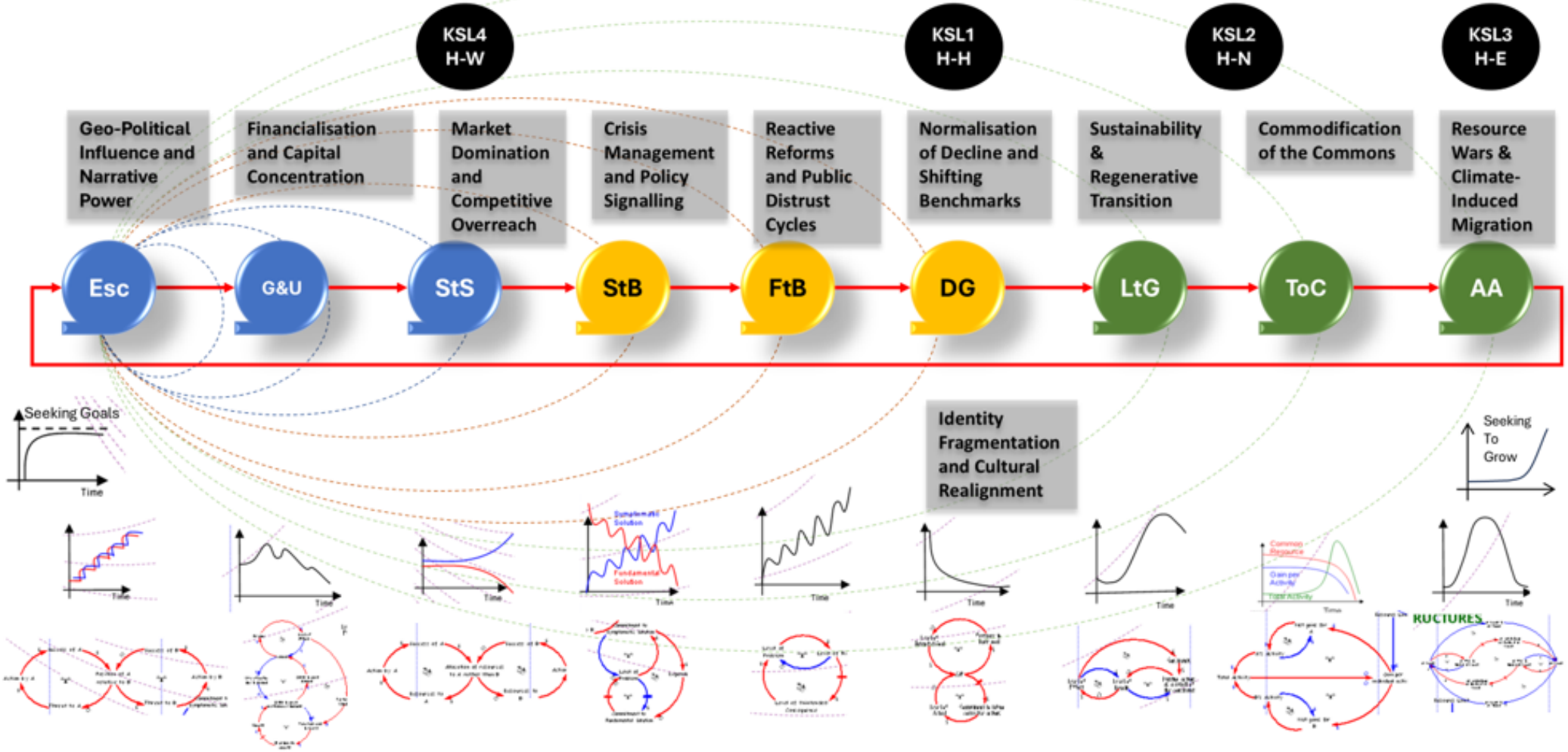
THE SYSTEMIC ONION FRAMEWORK

Understanding How Systemic Archetypes Drive Persistent Patterns of Growth, Decline, and Renewal

Developed by Ms Sheila Damodaran, STRLDi, integrating and extending the seminal systems archetype work of Peter Senge and his MIT team



Uncovered & Tested by Ms. Sheila Damodaran, 2002
First Global Presentation @ Pegasus Conference 2006
Updated 2018, 2019

The Persistent Structural Issues Atlas:

Mapping the Global Loop

Societal problems like unemployment and health crises are not isolated failures but "persistent structural pressures" generated by underlying systems. By mapping these into four interacting layers (KSLs), we can move from managing downstream symptoms to reshaping the structural generatore that produce them.

KSL 1: Human Formation

Societies must form disciplined, capable individuals whose technical competency—not just years of schooling—drives economic participation.

KSL 4: Institutional Allocation & Execution

Governance systems must prioritize long-term productive investment over short-term political distribution or "treating" symptoms.

KSL 4: Stb, StS

(Shifting the Burden, Success to the Successful)

The Central Reioforcing Loop: The four layers are connected by a central reinforcing cycle that elther drives national growth or deepens systemic failure.

The Propagation of Pressure: Weakness in one layer creates stress in ofhers; e.g., shallow production (KSL5) strains fixeal allocation (KSL4).

Primary vs. Secondary Issues: "Primary" issues are the structural generators (e.g., family breakdown), while "Secondary" issues are the visible symptoms (e.g., orime).

The Propagation of Pressure: Weakness in one layer creates stress in others, e.g., shallow production (KSL3) strains fixval allocation (KSL4).

KSL 1: DG, FtB

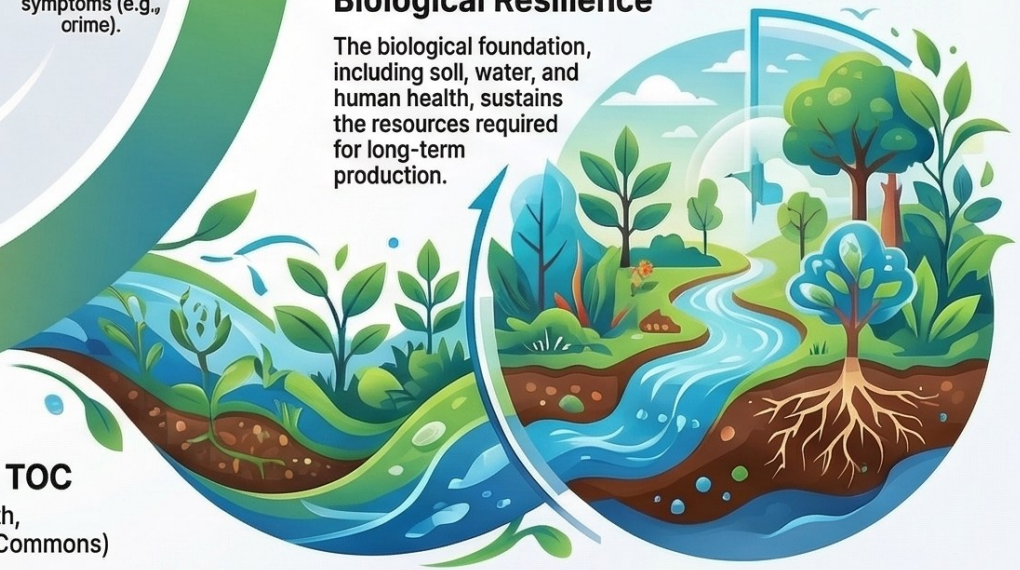
(Drifting Goais, Fixes that Backfire)

KSL 3: Productive Economic Capacity

The "real" economy transforms resources and labor into goods through manufacturing depth rather than just consumption.

KSL 2: Ecological & Biological Resilience

The biological foundation, including soll, water, and human health, sustains the resources required for long-term production.



KSL 3: G&U, Esc, AA

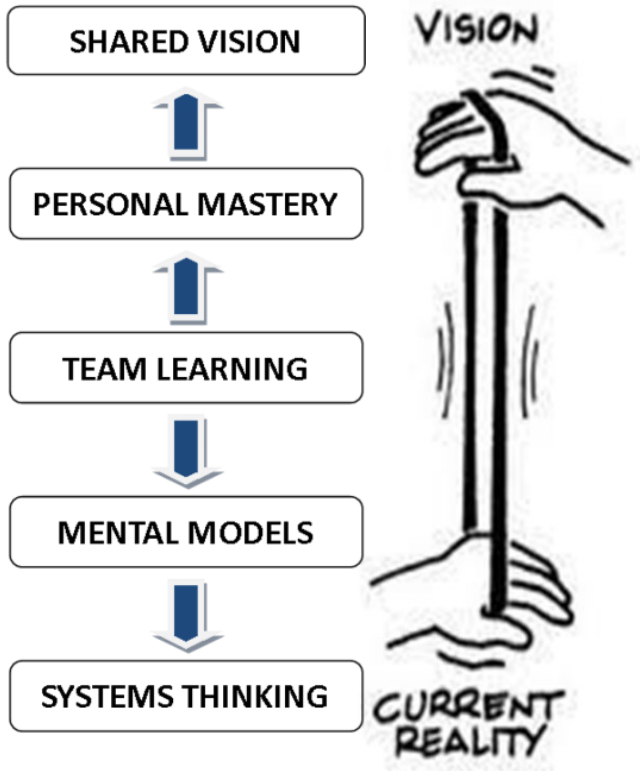
(Growth & Underinvestment, Escalation, Accidental Adversaries)

KSL 2: LtG, TOC

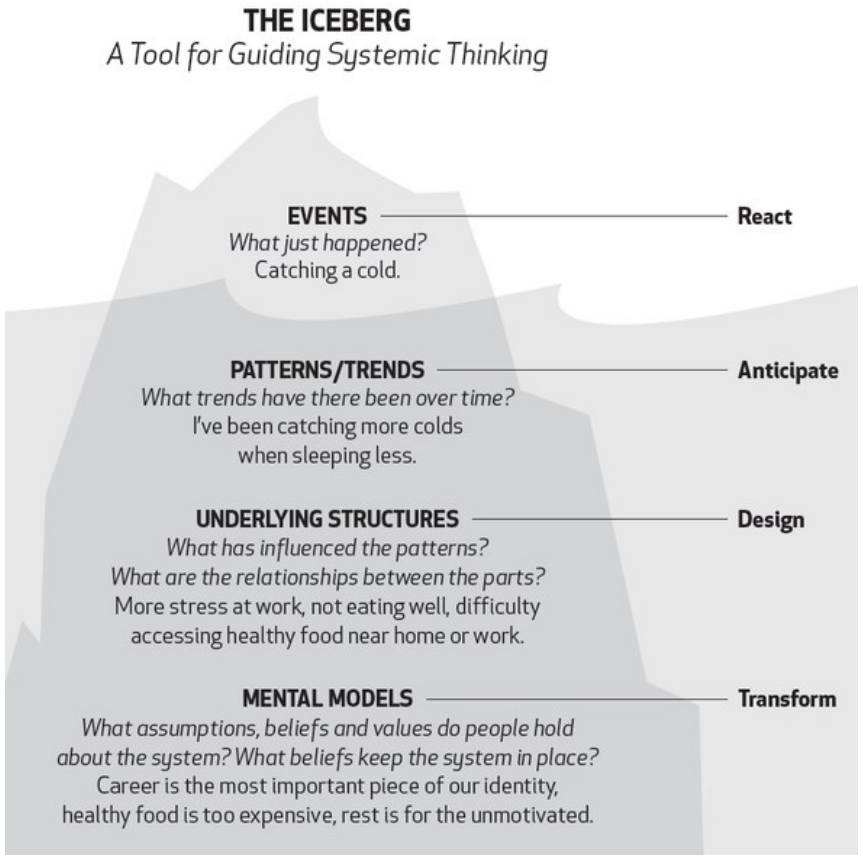
(Limits to Growth, Tragedy of the Commons)

KEY POINTS OF PRACTICE

CREATIVE TENSION MODEL



THE ICEBERG



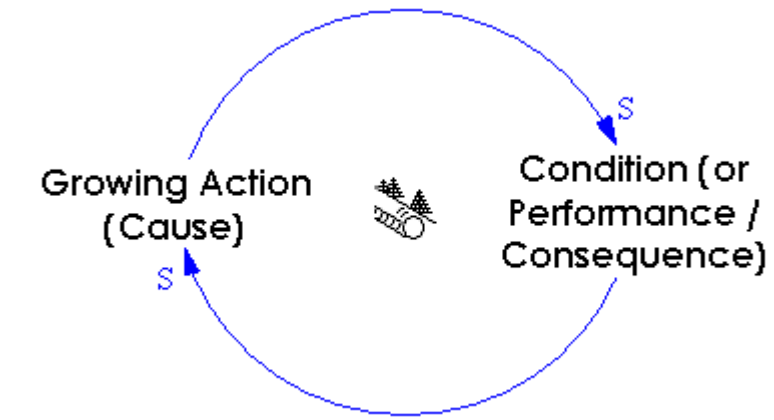
DEFINITION OF SYSTEMS THINKING

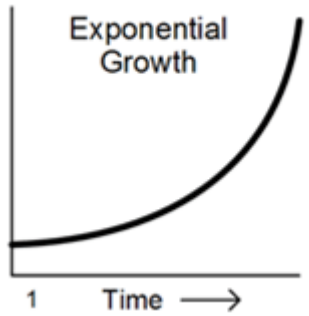
- Systems Thinking is **to discipline us in seeing and understanding patterns** – looking beyond events – to deeper "structures" that control events and, discovering the leverage that lies hidden in these structures.
- The **essence** of the discipline lies in a shift of mind (pg 68):
  - See **interrelationships** rather than linear cause-effect chains, and
  - See **processes of change** rather than snapshots

THERE ARE TWO DISTINCT PATTERNS IN SYSTEMS THINKING

REINFORCING LOOP

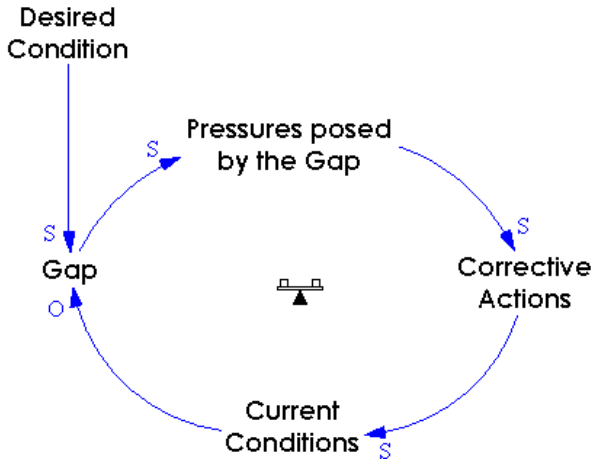
SEEKS TO GROW (NOT STABILISE)

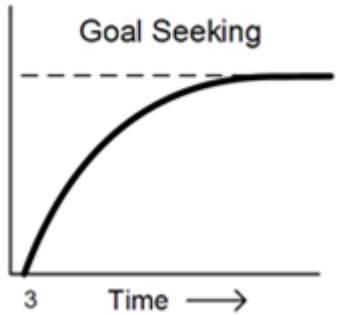




BALANCING LOOP

SEEKS TO STABILISE (NOT GROW)

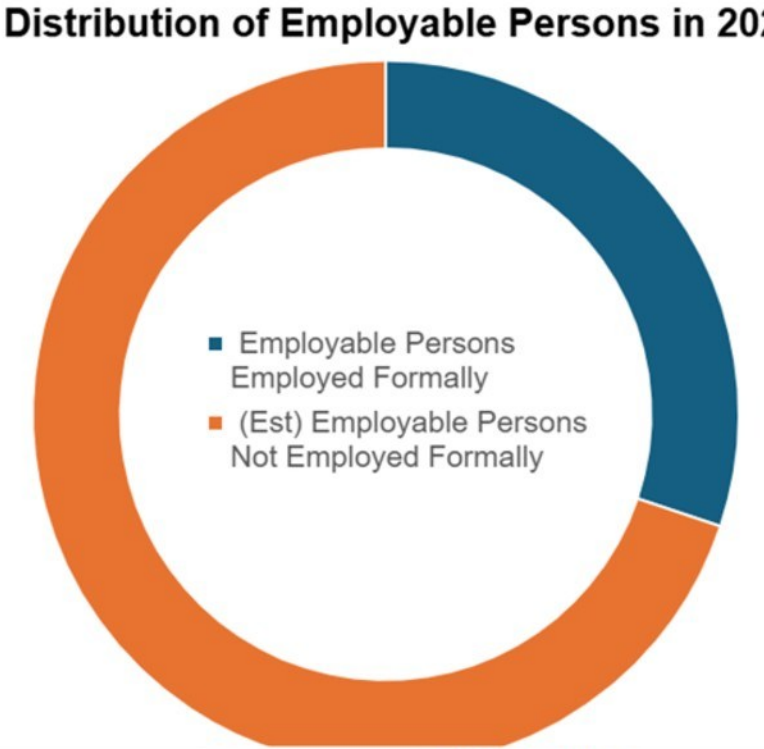




TIMELINE OF STUDY & RESULTS

• MAR 2012	STUDY FIRST MOOTED
• 2012-2018	ON HOLD PENDING DEVELOPMENT OF STATISTICS BOTSWANA
• AUG 2018	STUDY RE-INITIATED
• DEC 2018	DATA RECEIVED FROM STATISTICS BOTSWANA
• JAN 2019	STUDY COMPLETED
• MAY 2019	PRESENTATION AT PS's FORUM, OFFICE OF THE PRESIDENT
• OCT 2019	NATIONAL ELECTIONS
• APR 2020 – AUG 2021	COVID LOCKDOWNS
• DEC 2021	ANNOUNCEMENT OF IMPORT BAN OF HORTICULTURE PRODUCE
• JULY 2024	IMPORT BAN LIST IS EXPANDED AND PERIOD EXTENDED TO DEC 2025

THE CAPACITY OF THE ECONOMY TO EMPLOY WORKING AGE POPULATION, 2011 AND ONWARDS



Indicator	Population	Employable Population	(Est) Population Employed (Formal + Informal) @ 60%	Employable Persons Employed Formally	(Est) Population That is Working in the Informal Sector @70% Total Employed	(Est) Employable Persons Not Employed Formally	Unemployed	% Employed Formally	% YTY Change for Persons Not Employed Formally
Census 2011	2,024,904	1,349,936	809,962	378,900	566,973	971,036	404,063	28.1%	
Dec-21		1,544,648	926,789	494,457	648,752	1,050,191	401,439	32.0%	+ 8 %
Mar-22	2,346,179	1,564,119	938,472	486,432	656,930	1,077,687	420,757	31.1%	+ 2 %
Mar-24	2,763,338	1,842,225	1,105,335	555,212	773,735	1,287,013	513,279	30.1%	+ 19 %

The opportunity cost of unemployment

- **For every person who stays unemployed, the country loses GDP.**

- TODAY'S (2024) AVERAGE MONTHLY WAGE (GIVEN 40% FORMAL EMPLOYMENT or 25% OF THE POPULATION) **= P6,620.**
  This income feeds 4 persons including 3 persons who stay unemployed
  PER CAPITA INCOME **= P1,655**.

- Should every eligible working person be employed (100% employment), the AVERAGE MONTHLY WAGES RISES 2.5X UP TO **P16,550 per capita**
- This income feeds (assuming 2.5 million population and 1.5 million is the eligible working population – 1.6 persons that is 0.6 persons who stay unemployed (students, elderly, sick and the disabled persons)
  PER CAPITA INCOME = **P10, 343.75 That is 6.25x more today's rate.**

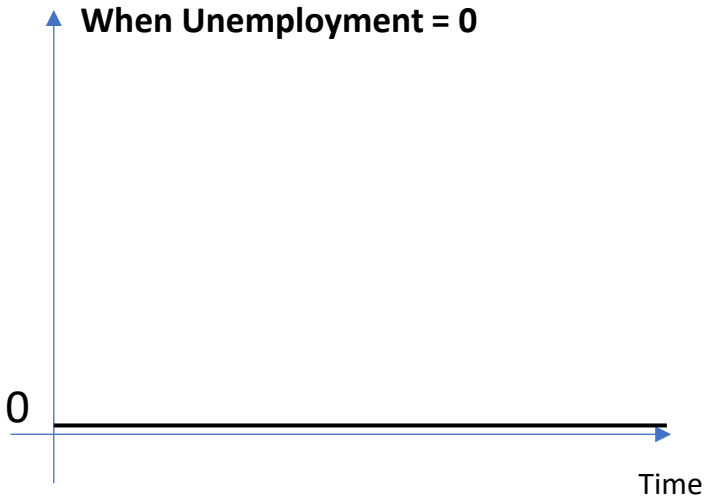
- Formal unemployment comes at a price for a nation.

WHAT CAUSES PERSISTENT UNEMPLOYMENT

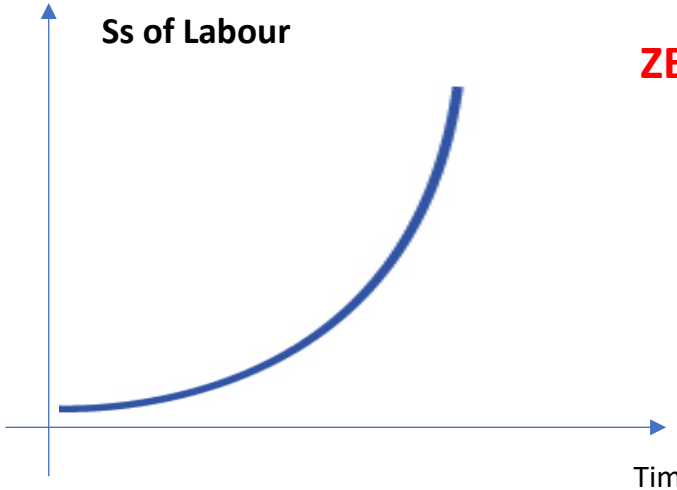
SELF WORK. TWO QUESTIONS:

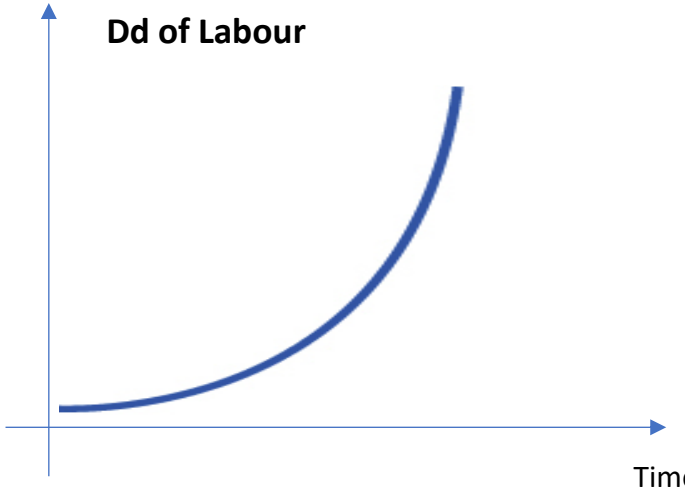
- IDENTIFY ORGANISATIONAL (GOVT, PTE, COMMUNITY, PROFESSIONALS) STAKEHOLDERS
- WHAT FILTERS TODAY MAY HAVE STOPPED THEM FROM LEARNING ABOUT THESE ALREADY?
- IDENTIFY IMPACT OF CAUSES THAT IMPACT YOUR ORGANISATION.

DRILLING DOWN PERSISTENT NATIONAL UNEMPLOYMENT

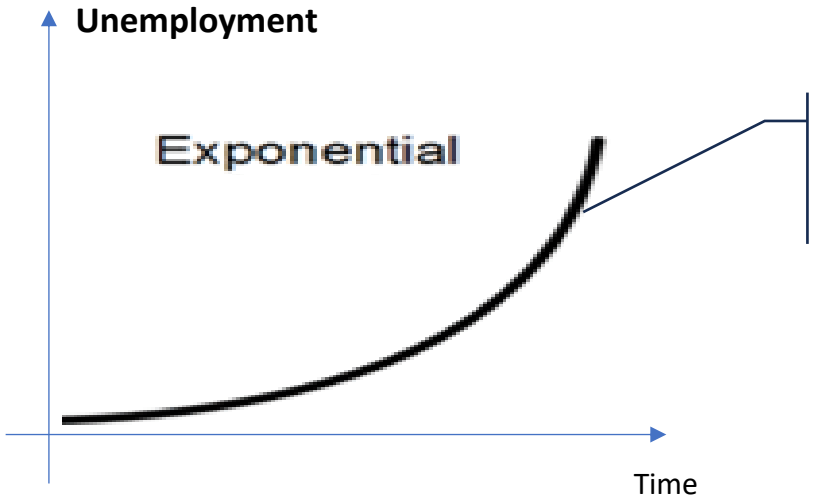


SS = DD MEANS
FULL EMPLOYMENT
ZERO UNEMPLOYMENT

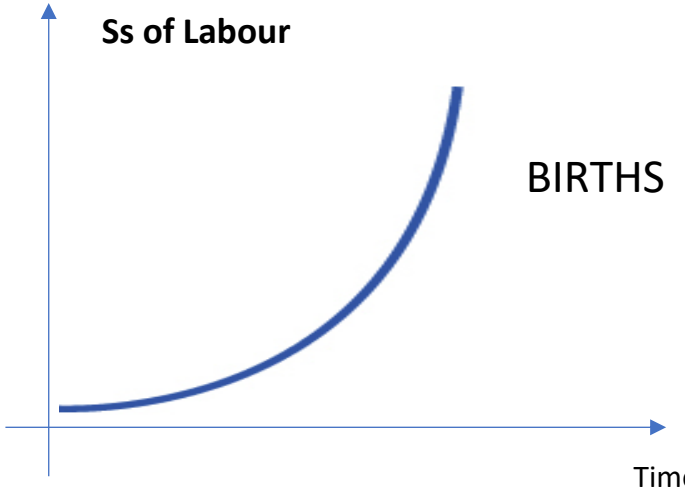


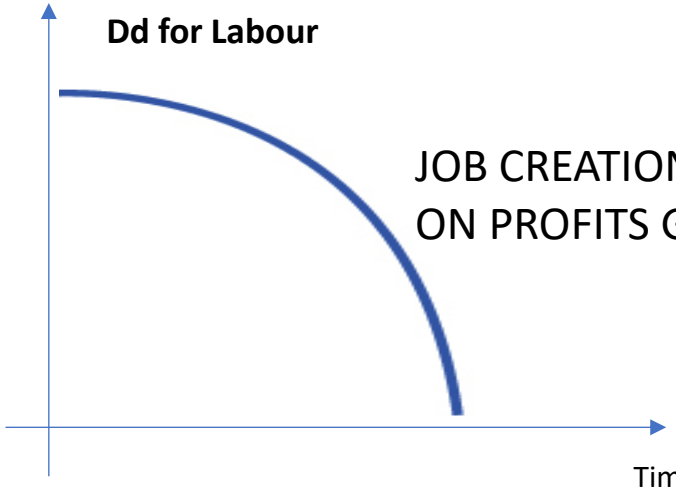


DRILLING DOWN PERSISTENT NATIONAL UNEMPLOYMENT

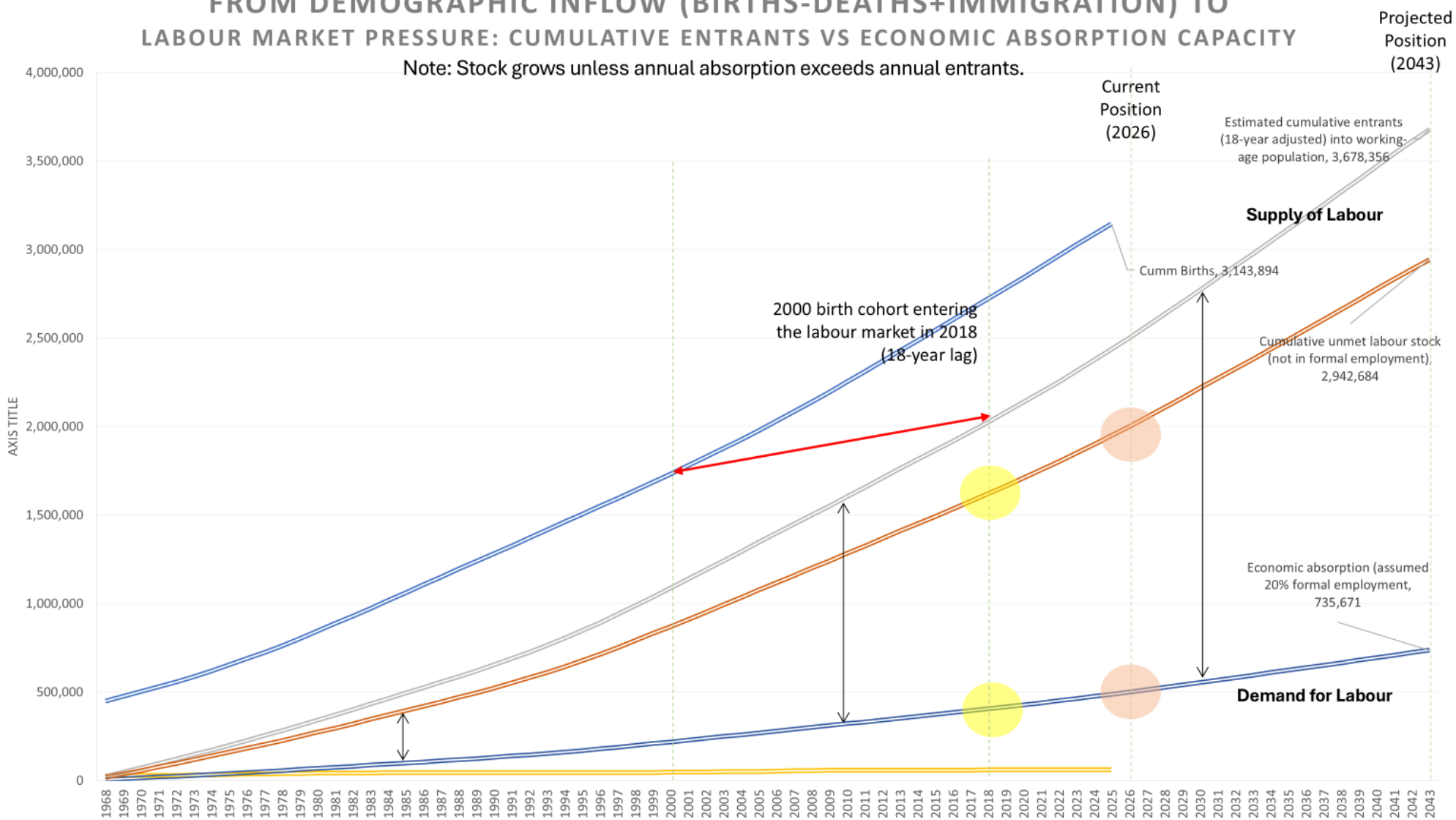


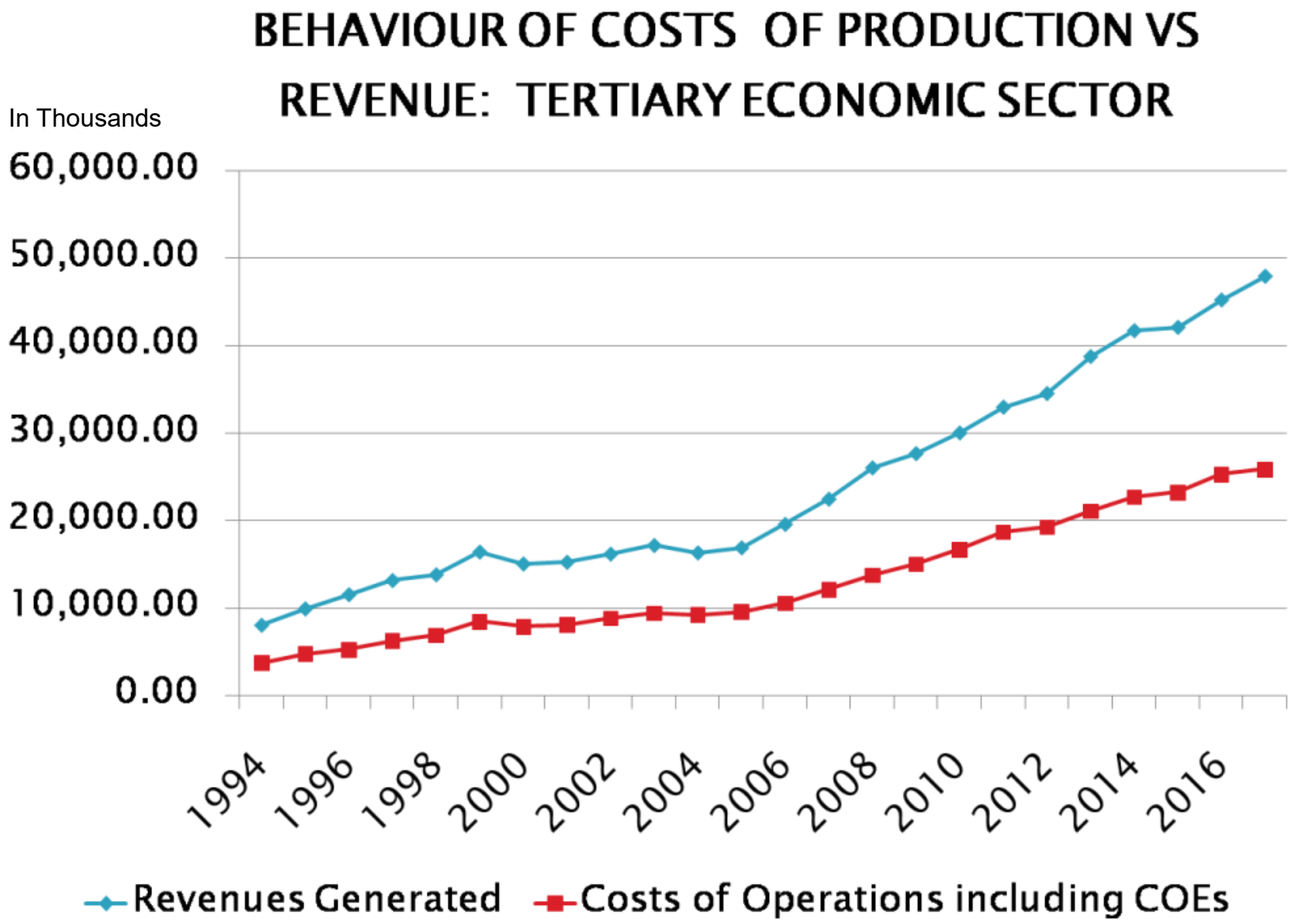
These graphs are indicating that a reinforcing causal loop structures are at play that are seeking to grow.

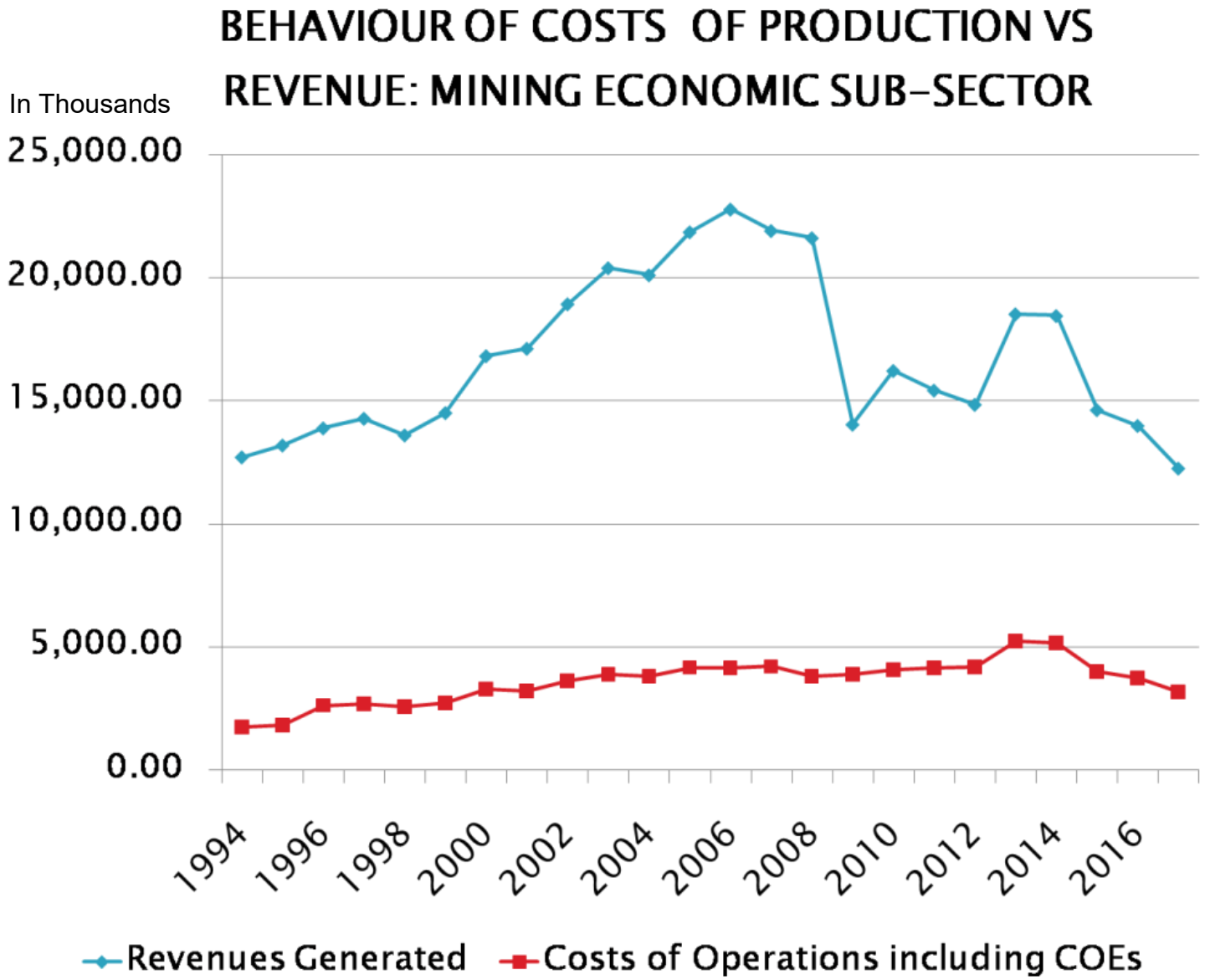


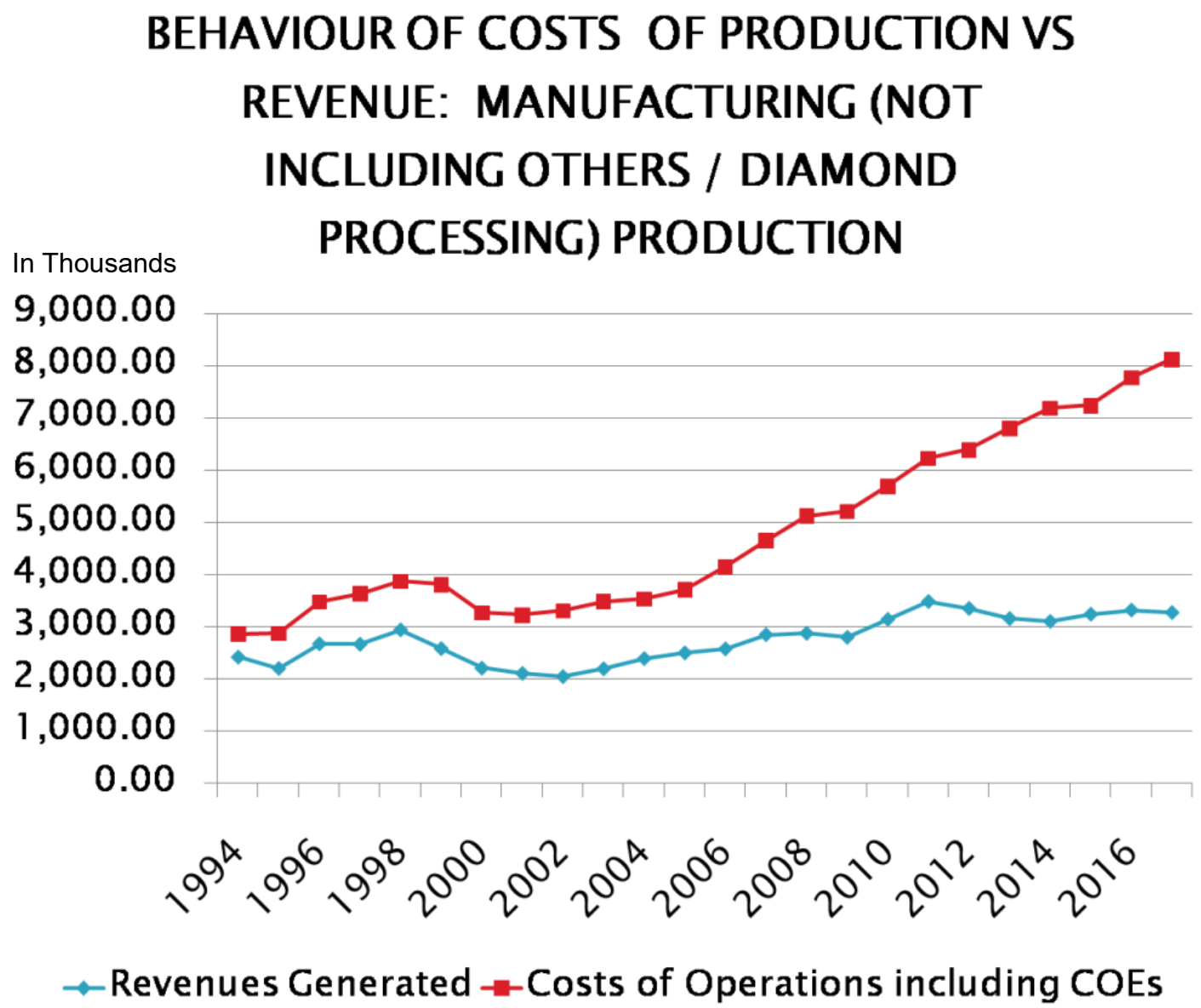


FROM DEMOGRAPHIC INFLOW (BIRTHS-DEATHS+IMMIGRATION) TO LABOUR MARKET PRESSURE: CUMULATIVE ENTRANTS VS ECONOMIC ABSORPTION CAPACITY

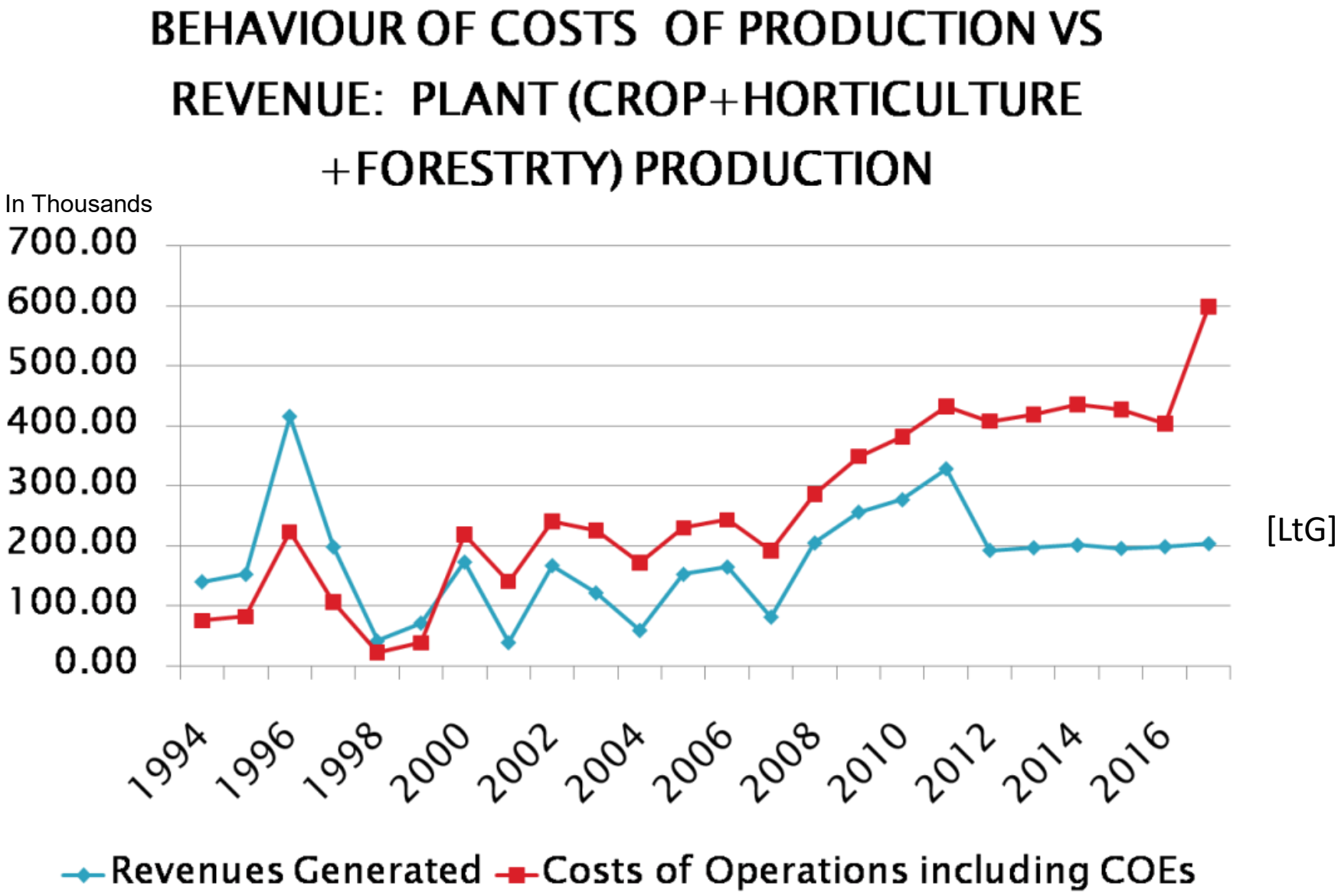



BEHAVIOUR OF COSTS OF PRODUCTION VS REVENUE: TERTIARY ECONOMIC SECTOR
In Thousands
60,000.00
50,000.00
40,000.00
30,000.00
20,000.00
10,000.00
0.00
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
Revenues Generated
Costs of Operations including COEs


BEHAVIOUR OF COSTS OF PRODUCTION VS REVENUE: MINING ECONOMIC SUB-SECTOR
In Thousands
25,000.00
20,000.00
15,000.00
10,000.00
5,000.00
0.00
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
Revenues Generated
Costs of Operations including COEs

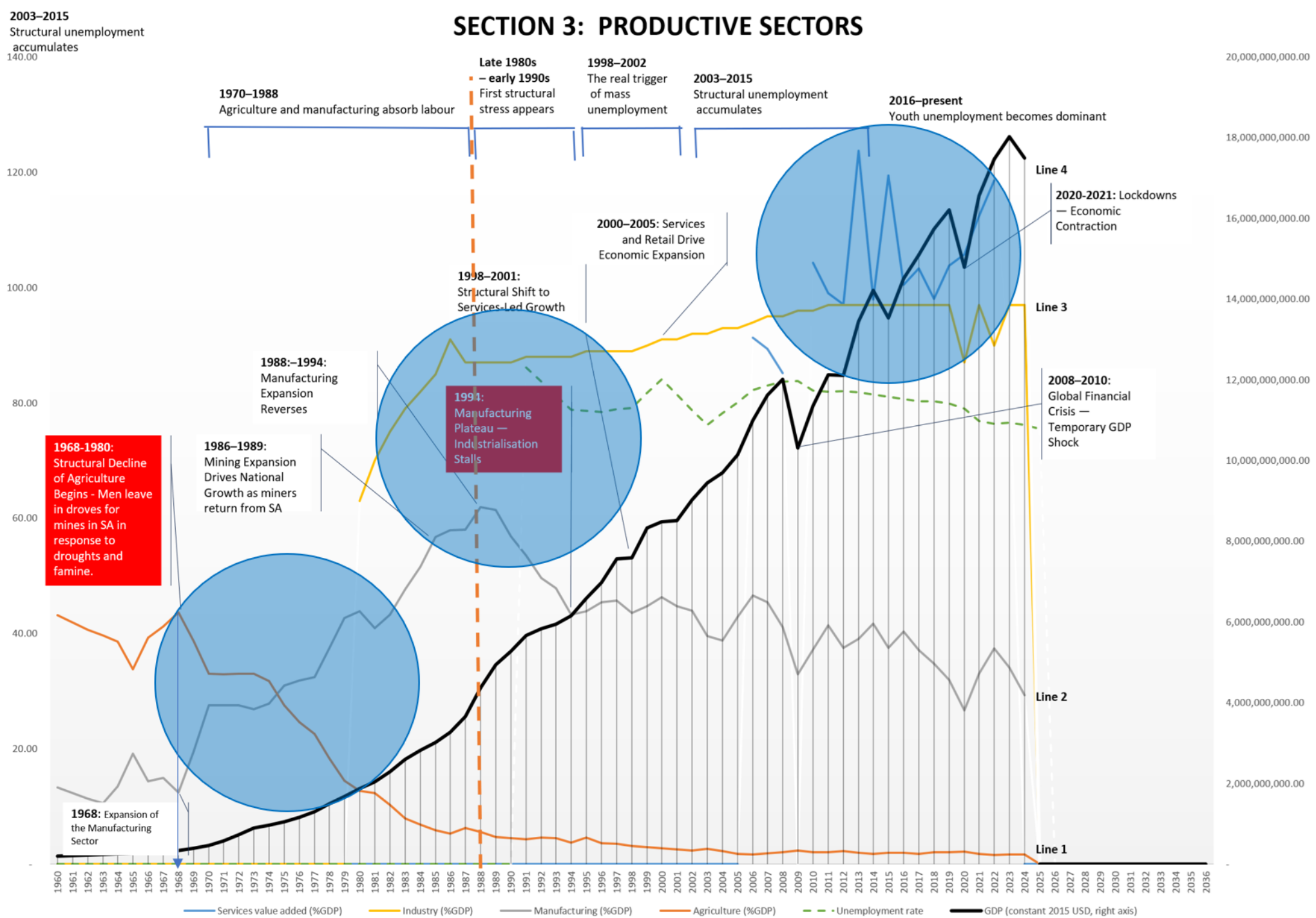

BEHAVIOUR OF COSTS OF PRODUCTION VS REVENUE: MANUFACTURING (NOT INCLUDING OTHERS / DIAMOND PROCESSING) PRODUCTION
In Thousands
9,000.00
8,000.00
7,000.00
6,000.00
5,000.00
4,000.00
3,000.00
2,000.00
1,000.00
0.00
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
Revenues Generated
Costs of Operations including COEs

[LtG]

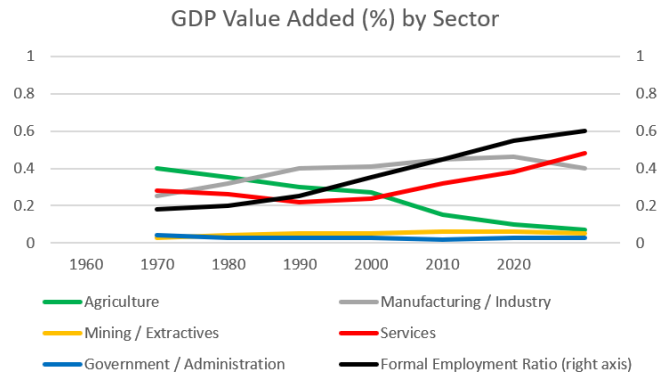

BEHAVIOUR OF COSTS OF PRODUCTION VS REVENUE: PLANT (CROP+HORTICULTURE +FORESTRTY) PRODUCTION
In Thousands
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
Revenues Generated
Costs of Operations including COEs

[LtG]

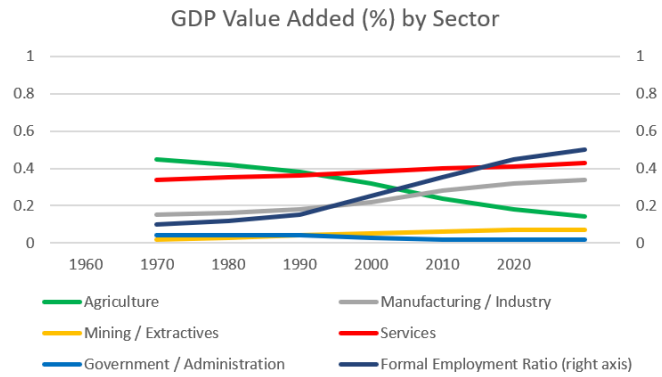
SECTION 3: PRODUCTIVE SECTORS



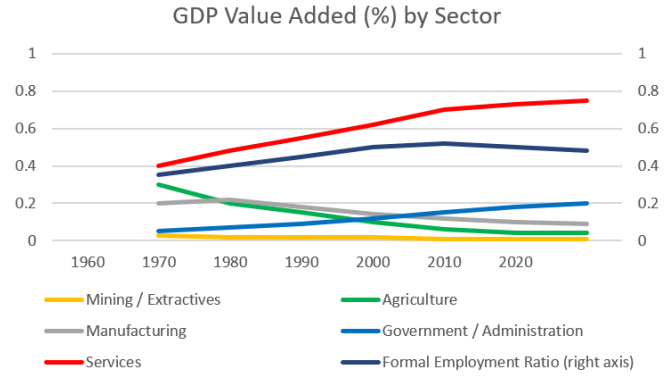
China – Pop: 1,41bil, GDP per capita: $10.5K



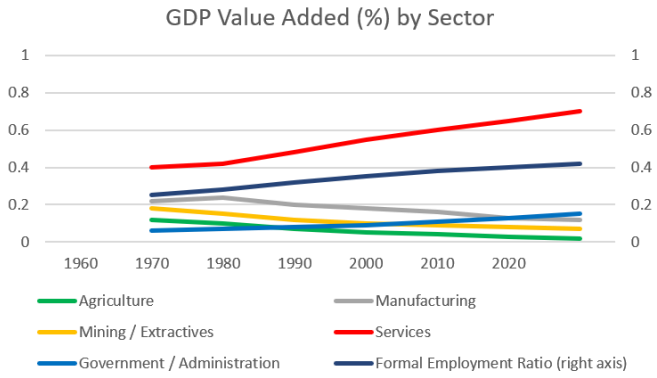
Vietnam – Pop: 97mil, GDP per capita: $2.8K



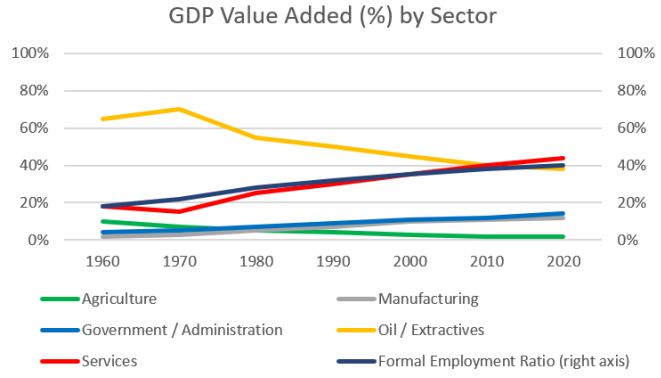
Greece – Pop: 10.7mil, GDP per capita: $19K



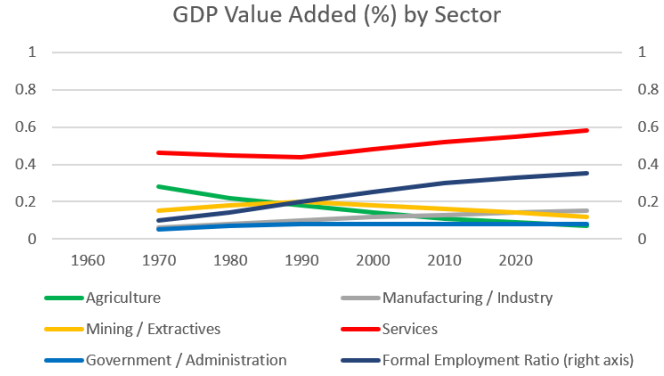
South Africa – Pop: 59mil, GDP per capita: $6K



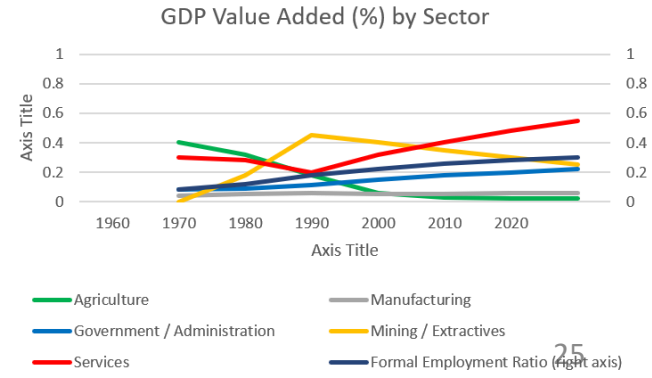
Saudi Arabia – Pop: 35mil, GDP per capita: $20K



Namibia – Pop: 2.5mil, GDP per capita: $4.7K

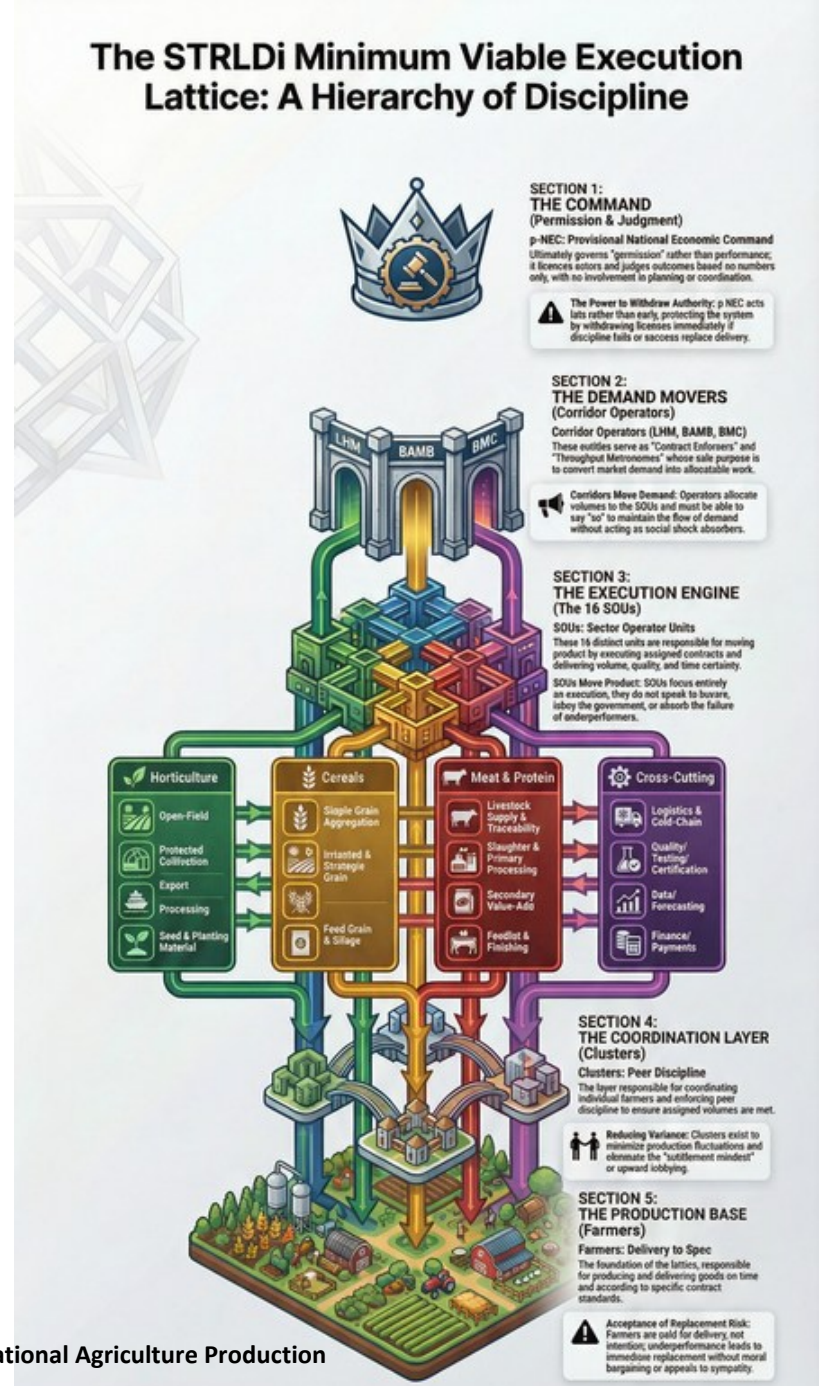


Botswana – Pop: 2.4mil, GDP per capita: $6.8K



Before We Model the System, Did We First Look at Its Behaviour?

https://www.linkedin.com/pulse/before-we-model-system-did-first-look-its-behaviour-sheila-damodaran-ycjsf/?trackingId=NBUVjQJ9QY6ItDBS9QZg9w%3D%3D



National Agriculture Production

https://strldi.weebly.com/blog/agriculture-corridor-execution-lattice

ROLE DOCTRINE — WHO DOES WHAT

1. p-NEC (Provisional National Economic Command)
Composition: OP delegate, Finance, Trade, Private Sector (BB-nominated), Financiers, MoA (regulatory), Systems role.

p-NEC exists to govern permission, not performance. It does not operate the corridor. It licenses it, protects it, and withdraws authority when discipline erodes. Its mandate is narrow by design:
License corridor actors
Protect execution from interference
Judge outcomes
Withdraw authority if discipline fails.

2. Corridor Operators (LHM, BAMB, BMC)
Their mandate is execution discipline in motion.
Convert demand into allocatable work
Allocate volumes into SOUs
Enforce quality, time, and exclusion
Report numbers, not stories

3. MoA (Post-Split Doctrine)
Two faces — permanently separated.

A. Sovereign Regulator (unchanged)▪ Law, standards, enforcement
International credibility
Sanctions authority

B. Corridor Service Units (CSUs)▪ Embedded execution support
SLA-driven
Time-bound
Contract-prioritised

4. SOUs (Sector Operator Units)
SOUs exist to execute contracts — not to expand mandates.
Execute assigned contracts
Allocate work to clusters
Replace underperformers
Maintain delivery disciplineit.

5. Clusters
Clusters exist to reduce variance, not amplify complaints.
Coordinate farmers
Enforce peer discipline
Deliver assigned volumes

6. Farmers
Farmers are paid for delivery — not intention.
Deliver to spec
Deliver on time
Accept replacement risk

7. BOHOCO & Farmer Associations
Representation remains necessary — but it is structurally separate.
Representation
Readiness preparation
Absorbing social pressure
Learning & advocacy

8. Financiers
Capital is disciplined, or it destabilises the spine.
Finance contracts
Price risk explicitly
Withdraw when discipline erodes

9. Donors
Donors support the ecosystem — not the engine.
Fund readiness
Fund learning
Fund exit pathways

10. Media, Political Parties, Public Forums
They are not part of the execution spine.
Not engaged during pilots
Not briefed on execution detail
Not answered reactively
Corridors die in public before they fail in reality.
Silence, at times, is policy.

THIS IMPLIES ….

VALUE-ADDED BY ECONOMIC ACTIVITIES AT CURRENT PRICES IN PULA: 2002-2023

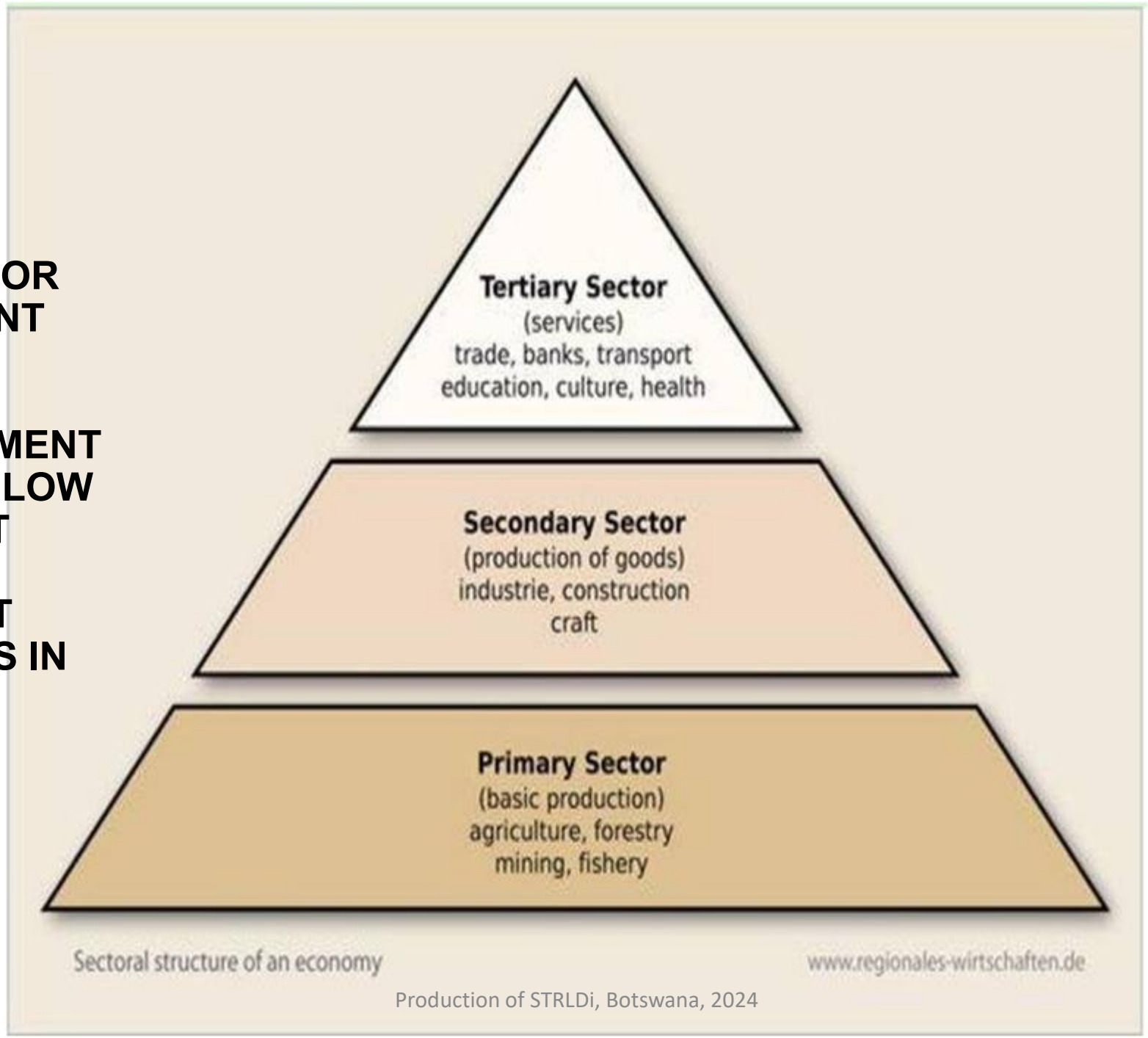
YEAR	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
TOTAL VALUE ADDED (in billion pula)	23.82	24.78	31.28	38.46	46.92	52.26	58.16	52.85	71.67	80.00	81.32	89.99	105.14	101.76	123.66	127.43	139.80	141.48	129.47	163.39	202.80	210.66		
PRIMARY ECONOMIC SECTOR	**10.9251**	**10.7380**	**11.7514**	**17.0330**	**20.2297**	**21.0724**	**21.6773**	**12.1342**	**25.5855**	**28.4769**	**25.0120**	**27.1203**	**35.4486**	**29.1772**	**38.4086**	**34.8456**	**31.4715**	**28.2325**	**19.3759**	**36.5301**	**55.1050**	**48.3091**		
Production of Raw Materials																								
Agriculture	0.8348	1.0122	0.9499	0.9279	1.2107	1.5047	1.8875	2.0710	2.7173	2.6360	2.9632	2.8769	3.0453	3.2150	3.4961	3.5838	3.6783	3.7481	3.7844	3.7183	3.9708	4.1700		
Percentage		21.3%	-6.2%	-2.3%	30.5%	24.3%	25.4%	9.7%	31.2%	-3.0%	12.4%	-2.9%	5.9%	5.6%	8.7%	2.5%	2.6%	1.9%	1.0%	-1.7%	6.8%	5.0%		
Extraction																								
Mining	10.0903	9.7258	10.8015	16.1051	19.0190	19.5677	19.7898	10.0632	22.8682	25.8409	22.0488	24.2434	32.4033	25.9622	34.9125	31.2618	27.7932	24.4844	15.5915	32.8118	51.1342	44.1391		
Secondary Economic Sector Essential Se	**2.9562**	**2.8828**	**3.1831**	**3.1327**	**3.6231**	**4.2956**	**4.3810**	**4.8122**	**5.4499**	**6.4346**	**6.9783**	**7.8747**	**8.1080**	**9.3874**	**10.9744**	**13.2577**	**21.9843**	**22.0087**	**20.4536**	**25.0069**	**29.4784**	**31.5338**		
SECONDARY ECONOMIC SECTOR	**5.0408**	**5.0042**	**5.5179**	**5.6447**	**6.7462**	**8.5022**	**8.6599**	**9.4745**	**10.9982**	**12.5088**	**13.5015**	**15.1598**	**15.8483**	**17.8291**	**19.8339**	**22.4722**	**32.6640**	**32.9690**	**30.1525**	**35.8746**	**43.0137**	**46.3777**		
Percentage		-0.7%	10.3%	2.3%	19.5%	26.0%	1.9%	9.4%	16.1%	13.7%	7.9%	12.3%	4.5%	12.5%	11.2%	13.3%	45.4%	0.9%	-8.5%	19.0%	19.9%	7.8%		
Manufacturing	2.0846	2.1214	2.3348	2.5120	3.1231	4.2066	4.2789	4.6623	5.5483	6.0742	6.5232	7.2851	7.7403	8.4417	8.8595	9.2145	10.6797	10.9603	9.6989	10.8677	13.5353	14.8439		
Percentage		1.8%	10.1%	7.6%	24.3%	34.7%	1.7%	9.0%	19.0%	9.5%	7.4%	11.7%	6.2%	9.1%	4.9%	4.0%	15.9%	2.6%	-11.5%	12.1%	24.5%	9.7%		
Water and Electricity	0.6800	0.7767	0.8068	0.7149	0.7851	0.7515	0.6541	0.3172	0.3938	0.1874	-0.4927	-0.1232	-0.5815	-0.2192	0.3950	1.7701	2.9125	1.6418	2.0838	2.2800	3.0480	2.4514		
Construction	2.2762	2.1061	2.3763	2.4178	2.8380	3.5441	3.7269	4.4950	5.0561	6.2472	7.4710	7.9979	8.6895	9.6066	10.5794	11.4876	19.0718	20.3669	18.3698	22.7269	26.4304	29.0824		
TERTIARY ECONOMIC SECTOR	**6.3443**	**7.2919**	**11.8963**	**13.2426**	**12.8074**	**14.4410**	**17.7010**	**18.8550**	**21.2092**	**24.2223**	**26.6454**	**30.8324**	**35.3554**	**36.0980**	**43.7326**	**46.1194**	**49.7070**	**52.5994**	**50.8714**	**59.3217**	**70.6307**	**78.7079**		
Percentage		14.9%	63.1%	11.3%	-3.3%	12.8%	22.6%	6.5%	12.5%	14.2%	10.0%	15.7%	14.7%	2.1%	21.1%	5.5%	7.8%	5.8%	-3.3%	16.6%	19.1%	11.4%		
Banks, Insurance & Business Services	4.2898	4.8063	5.3305	5.9186	2.1080	2.4065	3.1000	3.2627	3.6131	3.9092	4.3778	4.8822	5.1610	6.2009	7.7152	7.9010	9.1800	10.0753	10.0015	10.8603	12.8276	16.1807		
Diamond Traders					1.2314	1.2592	1.3900	0.8430	0.9592	1.3915	1.1307	1.8611	4.4242	2.7043	4.0145	3.2879	2.9627	2.1547	1.3370	3.5134	5.2590	3.7259		
Hotels & Restaurants	0.8986	1.2303	5.1163	5.4989	1.5530	1.7406	2.0098	2.2328	2.5596	2.7961	2.8438	3.0680	3.6022	3.8887	4.2383	4.5387	4.8691	5.1618	3.7546	3.5732	4.2043	4.3195		
Information & Comms Technology					0.9399	1.0983	1.4609	1.7597	2.1160	2.3827	2.6235	2.8984	3.3126	3.5953	3.9364	4.2360	4.5240	4.8436	5.0650	5.4989	6.1838	7.0004		
Real Estate Activities					2.5131	2.6541	3.2266	3.5346	3.9608	4.2579	4.8926	5.3871	5.9286	6.6025	7.7121	7.7907	8.3872	8.9699	8.7782	9.5497	10.2200	11.4781		
Transport & Storage	1.1559	1.2553	1.4495	1.8251	0.7962	0.9029	1.1078	1.3278	1.4064	1.6341	2.1222	2.3243	2.5182	2.7041	2.9117	3.0900	3.3198	3.4939	3.4109	4.0029	5.6026	5.9738		
Wholesale & Retail					3.6658	4.3794	5.4059	5.8944	6.5941	7.8508	8.6548	10.4113	10.4086	10.4022	13.2044	15.2751	16.4442	17.9002	18.5242	22.3233	26.3334	30.0295		
QUINTENARY ECONOMIC SECTOR	**1.5110**	**1.7455**	**2.1102**	**2.5444**	**7.1350**	**8.2492**	**10.1192**	**12.3836**	**13.8759**	**14.7886**	**16.1632**	**16.8766**	**18.4878**	**18.6530**	**21.6887**	**23.9903**	**25.9608**	**27.6840**	**29.0661**	**31.6639**	**34.0543**	**37.2641**		
Percentage		15.5%	20.9%	20.6%	180.4%	15.6%	22.7%	22.4%	12.1%	6.6%	9.3%	4.4%	9.5%	0.9%	16.3%	10.6%	8.2%	6.6%	5.0%	8.9%	7.5%	9.4%		
Education	1.5110	1.7455	2.1102	2.5444	2.5664	2.8431	3.3597	4.0111	4.5782	5.1358	5.8947	6.4133	7.1234	6.4752	7.7616	8.4618	8.6297	9.2111	9.9275	10.2110	10.5944	11.8720		
Human Health & Social Work					1.2593	1.3951	1.6486	1.9682	2.2464	2.5200	2.8924	3.1469	3.5560	3.8294	4.4729	4.8452	5.1581	5.6242	6.1151	6.6954	7.0106	7.3748		
Other Services					1.1164	1.2367	1.4615	1.7448	1.9915	2.2340	2.5641	2.7897	3.1309	3.3702	3.6107	3.8692	4.1016	4.3096	4.1382	4.5258	5.0511	5.6883		
Taxes Less Subsidies on Products					2.1929	2.7743	3.6494	4.6595	5.0598	4.8988	4.8120	4.5267	4.6775	4.9782	5.8435	6.8141	8.0714	8.5391	8.8853	10.2317	11.3982	12.3290		

Distribution of economic sector depending on the stage of economic development

Economic Stage	Primary Sector (%)	Secondary Sector (%)	Tertiary Sector (%)
Fully Developed Economy	3–5%	15–25%	70–80%
Resource-Dependent Emerging Economy	15–25%	30–40%	35–45%
Industrialized, Value-Added Economy	5–10%	30–40%	50–60%

- In fully developed economies, services dominate the economy while manufacturing and raw material extraction have a minimal share.
- In contrast, resource-dependent emerging economies maintain a higher share of the primary sector due to ongoing reliance on raw outputs, balanced by significant manufacturing activity.
- Meanwhile, in economies driven by industrialization and value-added processing, the secondary sector is robust, with a growing service sector complementing a modest primary sector.

CAPACITY FOR EMPLOYMENT BY SECTOR WHEN UNEMPLOYMENT RATES ARE LOW & A ROBUST RESOURCE DEPENDANT ECONOMY IS IN PLACE

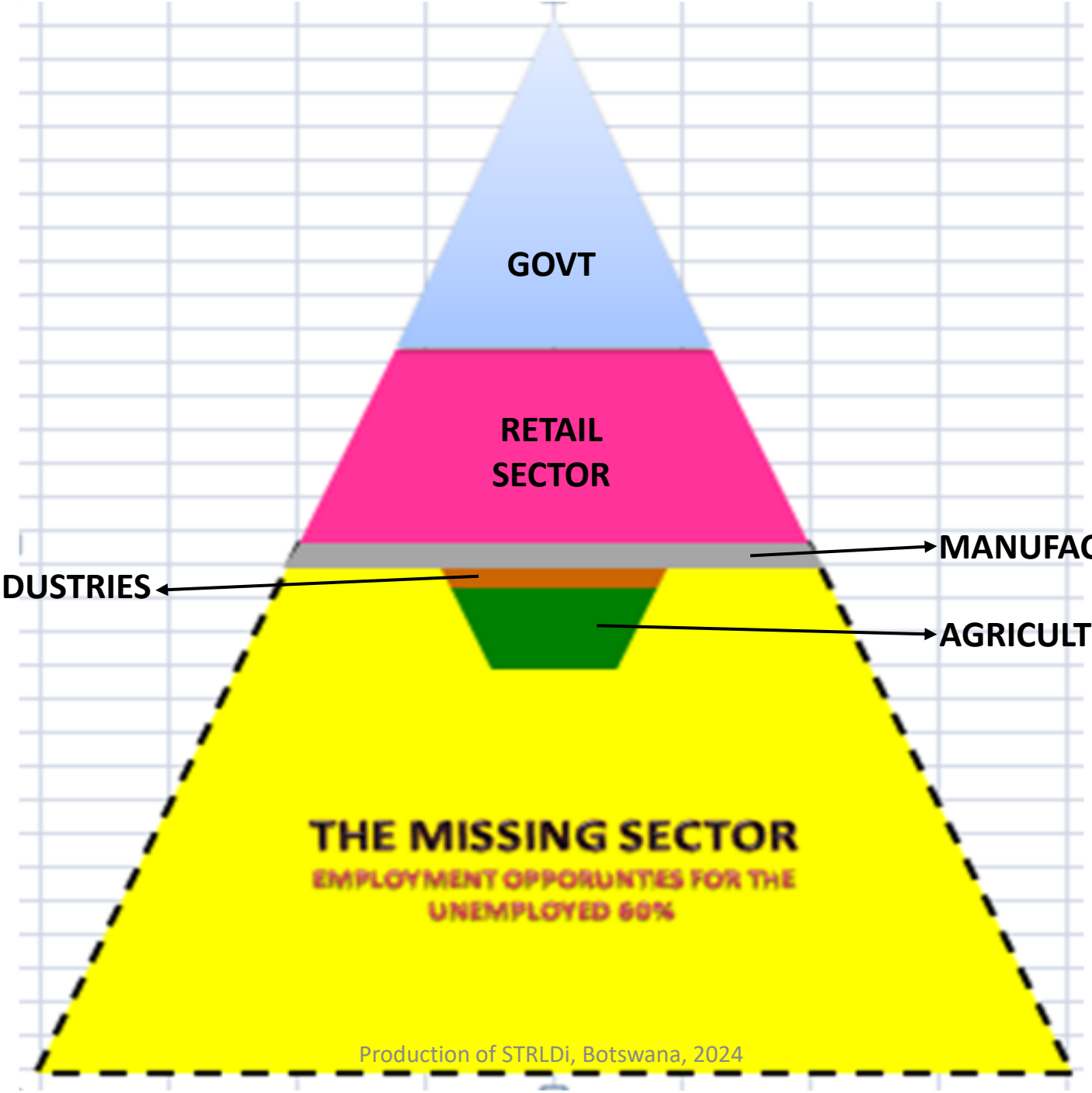


What is the change we want?

Economic Stage	Primary Sector (%)	Secondary Sector (%)	Tertiary Sector (%)	
Resource-Dependent Emerging Economy	25 %	40 %	35 %	100%
Botswana 2023 Comparison	23 % (2% Agric)	22 % (7% Mfg)	37 %	? %
Change That Is Needed:	? %	? %	? %	

- What policies in agriculture and manufacturing economic sectors will secure that change for the country?

EMPLOYMENT BY SECTOR TODAY

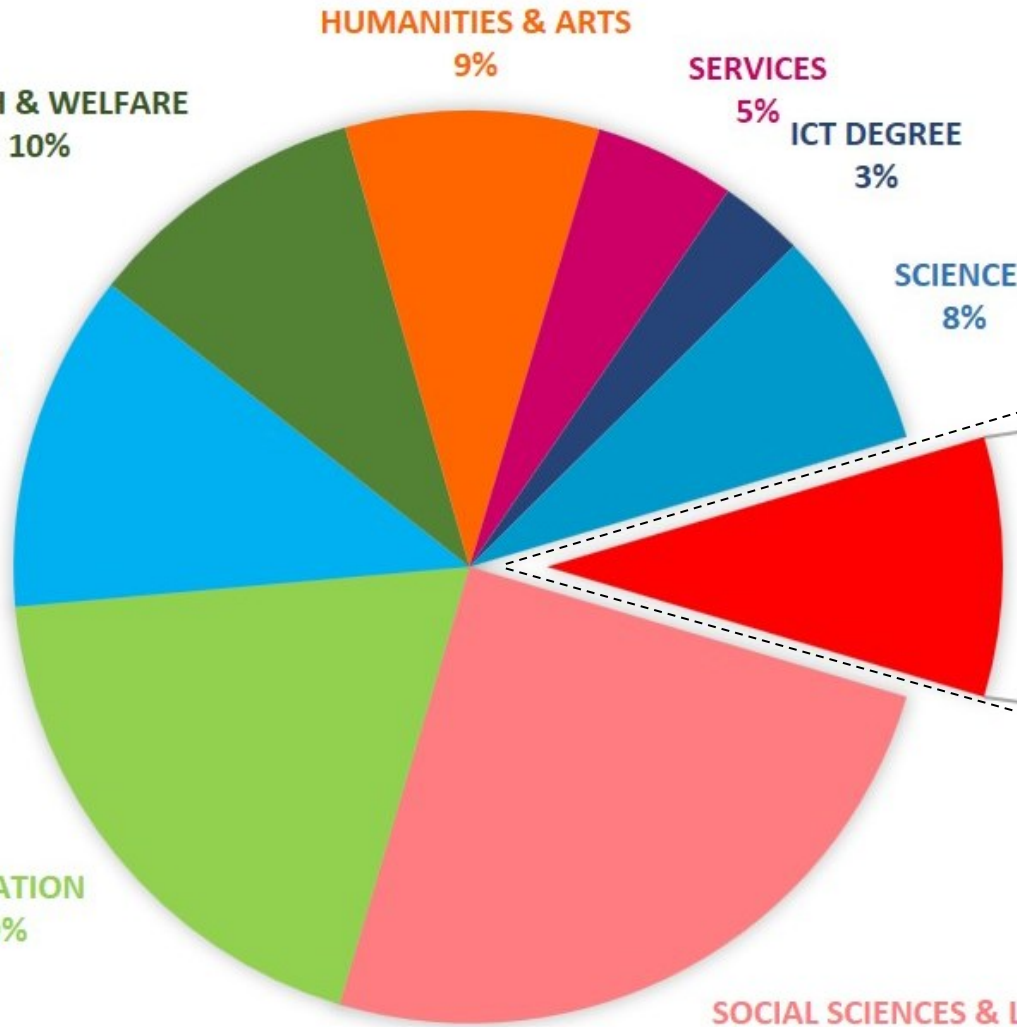


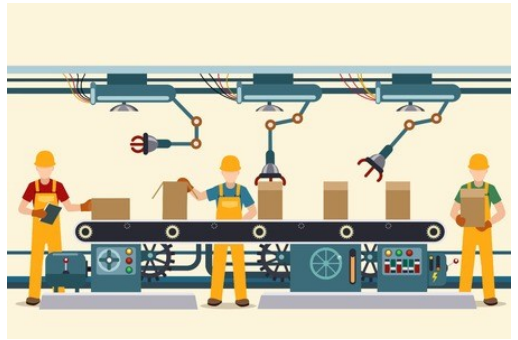
CONCLUSION:

THAT THE RETAIL SECTOR IS GROWING **AT THE EXPENSE OF** MANUFACTURING & AGRICULTURE ECONOMIC SECTORS BUT **NOT AS A RESULT OF THE GROWTH OF THE TWO SECTORS**.

WHY IS THIS HAPPENING?

DISTRIBUTION OF TERTIARY GRADUATES IN BOTSWANA BY COURSE TYPE 2009-2018



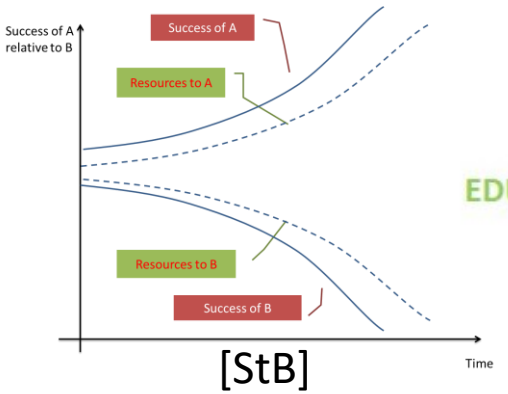


ENGINEERING & CONSTRUCTION
5%

AGRICULTURE DEGREE 3%

MANUFACTURING DEGREE 1%

INDIGENOUS SCIENCES 0%

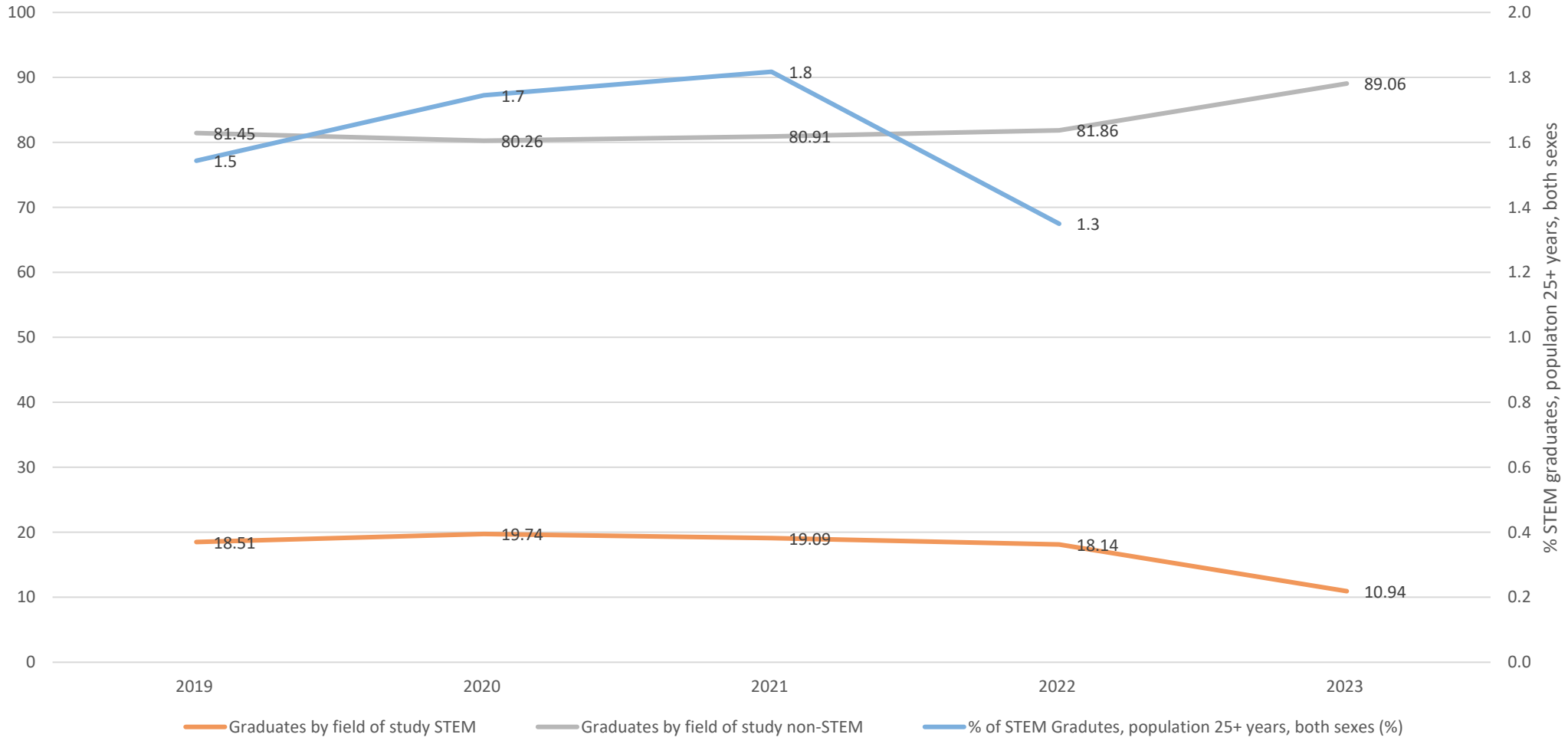


[StB]

DEMANDS STRONG ORATORICAL & WRITTEN SKILLS POSSIBLY IN SETSWANA

DEMANDS ENGLISH, MATHEMATICS, PHYSICS, CHEMISTRY & BIOLOGY

STEM Pipeline Composition Relative to Adult Population, Botswana 2019–2023 Source: UNESCO



COMPARISON

Unlocking Economic Growth Through STEM Education: A Strategic Imperative

A decisive shift in our education policy towards a strong STEM (Science, Technology, Engineering, and Mathematics) foundation is not just an investment in our youth—it is the key to unlocking sustainable economic growth, job creation, and regional competitiveness. In an era where innovation drives prosperity, our ability to equip learners with critical skills in technology, engineering, and scientific problem-solving will determine our success in building industries, expanding our manufacturing base, and reducing reliance on raw material exports.

By prioritizing STEM education, we can cultivate a highly skilled workforce capable of driving industrialization, supporting local enterprises, and positioning Botswana as a leader in cutting-edge solutions across sectors. This is not just about keeping pace with global advancements; it is about leading the charge in developing homegrown solutions that create jobs, strengthen our economy, and establish Botswana as a hub of knowledge and innovation for the region.

Country	Population (approx)	Employable Labour 65%	Labor Participation Rate (approx.)	True Participation 75%	Formally Employed	Population Employed
North Macedonia	2,100,000	1,365,000	62%	47%	393,530	18.74%
Israel	9,300,000	6,045,000	62%	47%	1,742,774	18.74%
Paraguay	7,000,000	4,550,000	63%	47%	1,354,421	19.35%
Maldives	515,000	334,750	63%	47%	99,647	19.35%
Lesotho	2,100,000	1,365,000	64%	48%	419,328	19.97%
Namibia	2,500,000	1,625,000	65%	49%	514,922	20.60%
Croatia	4,100,000	2,665,000	65%	49%	844,472	20.60%
Slovakia	5,500,000	3,575,000	66%	50%	1,167,953	21.24%
Austria	9,000,000	5,850,000	66%	50%	1,911,195	21.24%
Bhutan	750,000	487,500	67%	50%	164,129	21.88%
Malta	514,000	334,100	67%	50%	112,483	21.88%
Botswana	2,400,000	1,560,000	67%	50%	525,213	21.88%
Brunei	450,000	292,500	68%	51%	101,439	22.54%
Cyprus	1,200,000	780,000	68%	51%	270,504	22.54%
Uruguay	3,500,000	2,275,000	68%	51%	788,970	22.54%
Singapore	5,700,000	3,705,000	68%	51%	1,284,894	22.54%
Panama	4,300,000	2,795,000	69%	52%	998,025	23.21%
Hungary	9,600,000	6,240,000	69%	52%	2,228,148	23.21%
Luxembourg	626,000	406,900	70%	53%	149,536	23.89%
Mauritius	1,300,000	845,000	70%	53%	310,538	23.89%
Jamaica	2,900,000	1,885,000	70%	53%	692,738	23.89%
Costa Rica	5,000,000	3,250,000	70%	53%	1,194,375	23.89%
Slovenia	2,100,000	1,365,000	70%	53%	501,638	23.89%
New Zealand	5,100,000	3,315,000	71%	53%	1,253,319	24.57%
Seychelles	98,000	63,700	72%	54%	24,767	25.27%
Trinidad & Tobago	1,400,000	910,000	72%	54%	353,808	25.27%
Norway	5,400,000	3,510,000	73%	55%	1,402,859	25.98%
Ireland	5,000,000	3,250,000	74%	56%	1,334,775	26.70%
Estonia	1,300,000	845,000	75%	56%	356,484	27.42%
Denmark	5,800,000	3,770,000	75%	56%	1,590,469	27.42%
Iceland	343,000	222,950	79%	59%	104,357	30.42%
Switzerland	8,600,000	5,590,000	79%	59%	2,616,539	30.42%

WHY IS THIS HAPPENING?

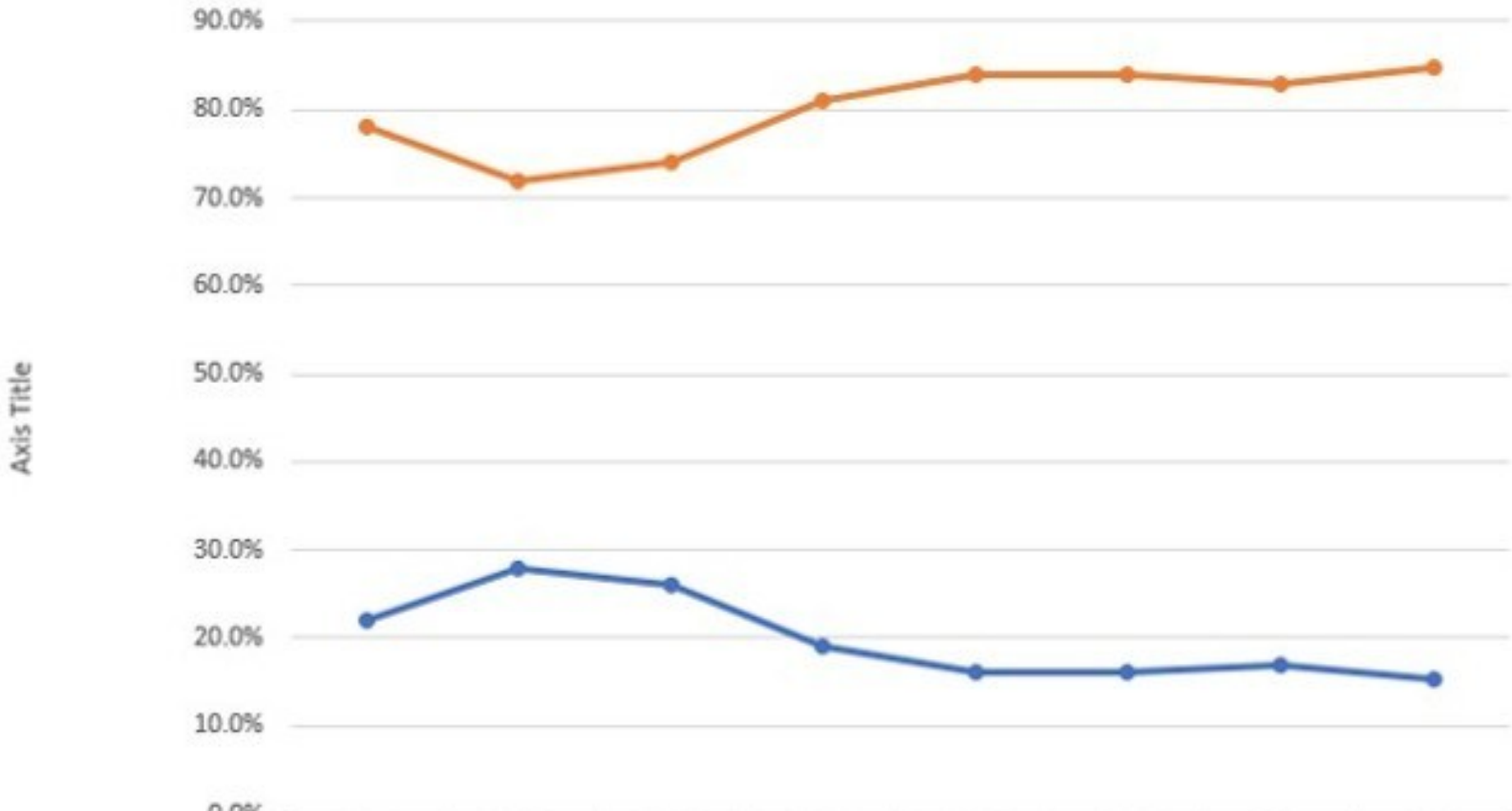
BIRTHS & FAMILY STRUCTURE [StS & Esc]

- There is an **80% chance** a child is *born to an unmarried parent or to parents who, although married, do not cohabitate in the same household*.

- With the country's marriage rate at only **20%**, it is more likely that unmarried women, sometimes with children from different fathers, will be more successful in having children.

- Further, **six out of ten** times, these women are unemployed and rely on a combination of state support and financial contributions from the fathers of their children to provide for their families. This financial dependency, while helping them fulfil family and community obligations, leads to tensions and conflicts at both familial and community levels.

Trend in Births by Mother's Marital Status: Married vs Unmarried



YOB	2015	2016	2017	2019	2020	2021	2022
Nuptial births	22.0%	28.0%	26.0%	19.0%	16.0%	16.0%	17.0%	15.2%
Ex-Nuptial births	78.0%	72.0%	74.0%	81.0%	84.0%	84.0%	83.0%	84.8%

CONSEQUENCE

- Children raised in households with diminished male leadership tend to excel in the softer sciences (e.g., arts and humanities) rather than in hard sciences. It is the easier option.
- However, the development and growth of the manufacturing and agriculture sectors demand citizens commit to developing strong skills in the hard sciences, such as those provided through STEM education. But it is not the easier option.
- The less a nation chooses to place a focus on these sectors, the less profitable they become over time. The more it reinforces the perception the sector will not be successful in the nation. But the more likely unemployment grows in the nation. This causes the households to divide even further.

IMPLICATION OF THE STUDY

- The solutions we have used to enhance employment (job creation by inviting foreign investments, reliance on extraction and soft-sciences industries) inadvertently exacerbate the challenges of building broader sets of the economy, ultimately negating the progress we make.
- Parents, usually mothers, who are not employed formally perpetuate children who are not employed formally.
- It is easy to become trapped in these cycles, repeatedly applying the same solutions to problems (focusing on the tree) without a comprehensive understanding of the systemic implications at play (the forest).
- Our intention is not to fall into these traps. Yet, we do.
- When we do not uncover and comprehend the inherent nature of systemic structures, we unwittingly navigate ourselves into these challenges.

THE "DOMINO" EFFECT OF NATIONAL UNEMPLOYMENT

Growing Action (Cause) — S — Condition (or Performance / Consequence) — S

[G&U]

Size of the manufacturing sector → Level of sales → Level of revenue vs expenses → Level of profitability by corporations consistently → Growth of export sector → Demand for Labour

[LtG]

Level of Employment → Growth of GDP → Level of per capita income / personal income → Attention on need for corrupt practices / crime → Level of personal sense of self-actualization → Attention on meeting the needs of the self

[AA]

Attention on meeting the needs of another → Quality of marital relations → Level of births

[BL]

Extent child grows up with both maternal and paternal influences with particulaly strong influence by the father in the field of sciences.

[StS]

Capacity to assimilitate mathematics and science subjects → Quality of academic achievements in mathematics and sciences → Attention on personal actions that impact nature → Level of rainfalls

[Esc]

Seeing results of personal actions → Level of innovation & creativity

[StB]

Level of academic excellence → Quality of Labour

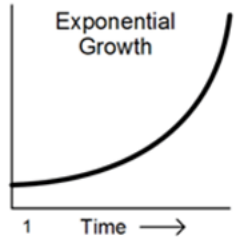
[FtB]

Level of skills → Quality of experience → Quality of production

[DG]

Capacity to grow abundance consistently → Size of the agriculture sector that promotes rainfall (e.g. horticulture)

Exponential Growth



THE ICEBERG

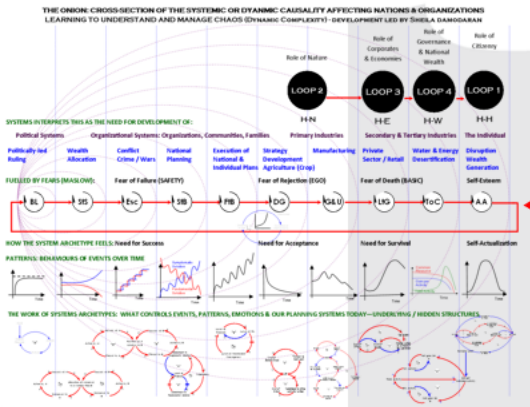
A Tool for Guiding Systemic Thinking

EVENTS — **React**
What just happened?
Catching a cold.

PATTERNS/TRENDS — **Anticipate**
What trends have there been over time?
I've been catching more colds when sleeping less.

UNDERLYING STRUCTURES — **Design**
What has influenced the patterns?
What are the relationships between the parts?
More stress at work, not eating well, difficulty accessing healthy food near home or work.

MENTAL MODELS — **Transform**
What assumptions, beliefs and values do people hold about the system? What beliefs keep the system in place?
Career is the most important piece of our identity, healthy food is too expensive, rest is for the unmotivated.

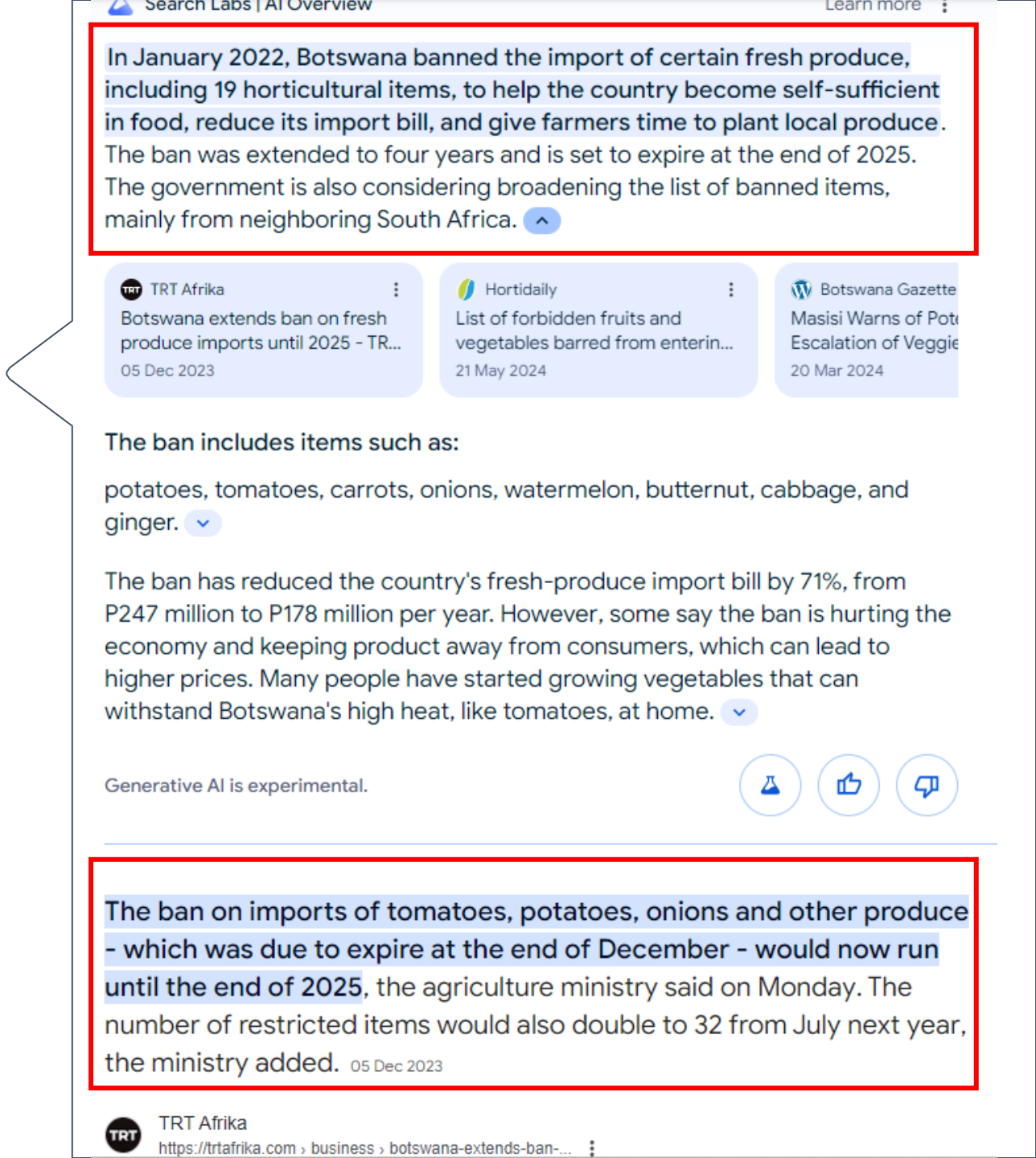


NOW THAT YOU HAVE DISCOVERED THESE, WHAT DO YOU WANT TO DO NEXT?

WHAT GOVT HAS DONE.
WHAT UKRAINE FARMERS WANT TO DO.

Ban of horticulture products from South Africa with effect from Jan 2022

This was a year after the lifting of COVID 19 lockdowns and two years after the completion of the story.



Government has revealed that due to the vegetable ban, local production of horticulture has increased from 36,244 tonnes to 45,221 tonnes, which is an increase of 25% while food imports, which vegetables are a part of, reduced significantly by at least 23.3%.

This comes after last month's revelation by government that it has not yet done a study to determine the degree to which the imposition of restriction on importation of vegetables has to date influenced the country's balances of trade. Earlier this year, it was reported that authorities at the Ministry of Agriculture were having a difficult time accepting the statistics about the progress farmers had made since the ban. Agriculture policymakers, farmers and other stakeholders were said to be scrambling to get accurate figures on how the horticulture has been performing. The vegetable ban came into effect on January 1, 2022 and targeted 16 vegetables such as onion, butternut, tomato, watermelon, carrot, potato, cabbage and ginger. The ban was intended to support local farmers, increase national food security by encouraging local vegetable production and improve horticulture competitiveness.

The ban was also meant to alleviate climate change effects, develop the agriculture value chain and foster citizen empowerment. Responding to a question in Parliament this week, the Minister of Trade and Industry Mmusi Kgafela said the importation of fruits and vegetables between the years 2020, 2021, and 2022 shows at least a 50% decline in the value of imported fruits and vegetables. He added that in this regard, the import ban has contributed in reducing imports and has also stimulated local production. "This was further facilitated by the government initiative of providing an Impact Accelerator Facility to the tune of P70 million, which allowed for a 50% grant and 50% own contribution to farmers. To this end, 461 farmers have benefited from the initiative across the country," he said. Kgafela also disclosed that on the other hand, for the years 2020, 2021 and 2022, exports increased by 28.95% compared to the last year before the restriction came into effect. "The imposition of the restriction on importation of fruits and vegetables clearly has had an impact on the structure of our imports. Before the ban, food, beverages and tobacco made up 36.1% of total imports

ANECDOTES BY THE HEAD OF STATE … IN 2021

The Phirinyane family of Kanye has been challenged to adopt the Reset Agenda by exploiting value chain opportunities in the agricultural sector as a way of keeping the late Mr John Phirinyane's legacy alive.

The advice was given by President Dr Mokgweetsi Masisi in Kanye Friday when he paid the family a condolence visit. Mr Phirinyane was laid to rest on September 17.

A master farmer, Mr Phirinyane was part of the Mosisedi farming block. His contribution to farming earned him a Presidential Certificate of Honour.

President Masisi suggested that the family exploit value chain opportunities such as branding, packaging, labelling and conservation of farm produce.

He said such initiatives could go a long way in creating employment thereby reducing the country's unemployment rate.
"Employment creation is not entirely the government's responsibility, but it starts from family set-ups," stressed Dr Masisi.

He described the deceased as a giant whose contribution to the agricultural sector was immense.

Bold decisions needed if the country is to attain food security.

April 3, 2023 Rocky Gofamodimo

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The imposition of a long-term ban on some agricultural products from other countries in December 2021 will probably go down as one of the most unpopular decisions of the Masisi administration.

Through the decision, one of the boldest Botswana has taken in the quest to become self-determining, as food security is at the heart of self-reliance, the nation will surely realise the truest meaning of the idiom; ***montsamaisa bosigo ke mo leboga bosele.***

> The ban was imposed to drive local production, reduce reliance on other countries for food and to claw away at the staggering P7 billion food import bill...
>
> SHARE ON X

It was also a deliberate move by the government to make remarkable strides in transforming the agricultural sector, whose mandate is to improve food security; champion agricultural development through local production; diversify the sector's value chains; create employment and promote consumption of local foodstuffs.

President Masisi's administration promised that the ban, which started with 16 vegetables, would be reviewed every year – not in any way to relax it, but to add more products to the list.

GROUP DISCUSSION (25 min)

- **GROUP DISCUSSION #1:**
  SYSTEMS THINKING IS A DISCIPLINE TO SEE AND UNDERSTAND PATTERNS OF BEHVAIOUR OF EVENTS OVER TIME.

  Why is this discipline essential for helping the mind shift from focusing on seeing the trees to seeing the forest?

- **GROUP DISCUSSION #2:**
  REFLECT ON THE STATEMENT - "THAT THE PURPOSE OF THE USE OF FIVE DISCIPLINES IN A LEARNING ORGANIZATION IS FOR MEMBERS IN THE TEAM LEARN / DISCOVER THE CREATIVE TENSION IT NEEDS TO UNDERSTAND SO AS TO CREATE RESULTS THAT MATTERS (FOR YOU, THE TEAM, THE ORGANIZATION, THE NATION).

  Draw example(s) from the case study that throw light on the statement.

- **GROUP DISCUSSION #3:**

  List examples of detail complexity and the name the dynamic complexity of which they are a part of.

DISTINCTIONS TO "SYSTEMS"

SYSTEM MANAGEMENT / ANALYSIS

DETAILED COMPLEXITY

- These exist because of a pre-defined objective / goal (balancing loop)
- The boundaries are pre-defined and even mandated
- Most conversations of "systems" fall in this category

Examples:

- Organisation and its divisions
- Industries and its organisations
- A car and its parts
- The human body and its parts
- Supervisor-supervisee relationship
- Employer-employee relationship

SYSTEMIC STRUCTURES

DYNAMIC COMPLEXITY

- The boundaries are not-predefined
- Does not exist because of a pre-defined objective
- The parts, more specifically the causes, are not obvious and needs discovering / learning
- Clues of its existence is picked up by persistent nature of issues – caused by a reinforcing loop
- The tools of systems thinking in particular system archetypes reveal the system, more properly referred to as systemic structure. These exist and are waiting to be revealed, treated and reversed.
- When not resolved, persistent issues come at costs to nations & the globe
- E.g. Global warming, unemployment, quality of the economy, quality of education levels, quality of health levels, wildlife-human conflicts, eroding corporate results, eroding corporate work productivity, urgent files, rising attrition.

FIRESIDE CHAT (25 min)

- **WAYS LEADERS HAVE WORKED THE FIFTH DISCIPLINE IN THEIR ORGANIZATIONS?**

PURPOSE OF REACHING OUT TO FAO

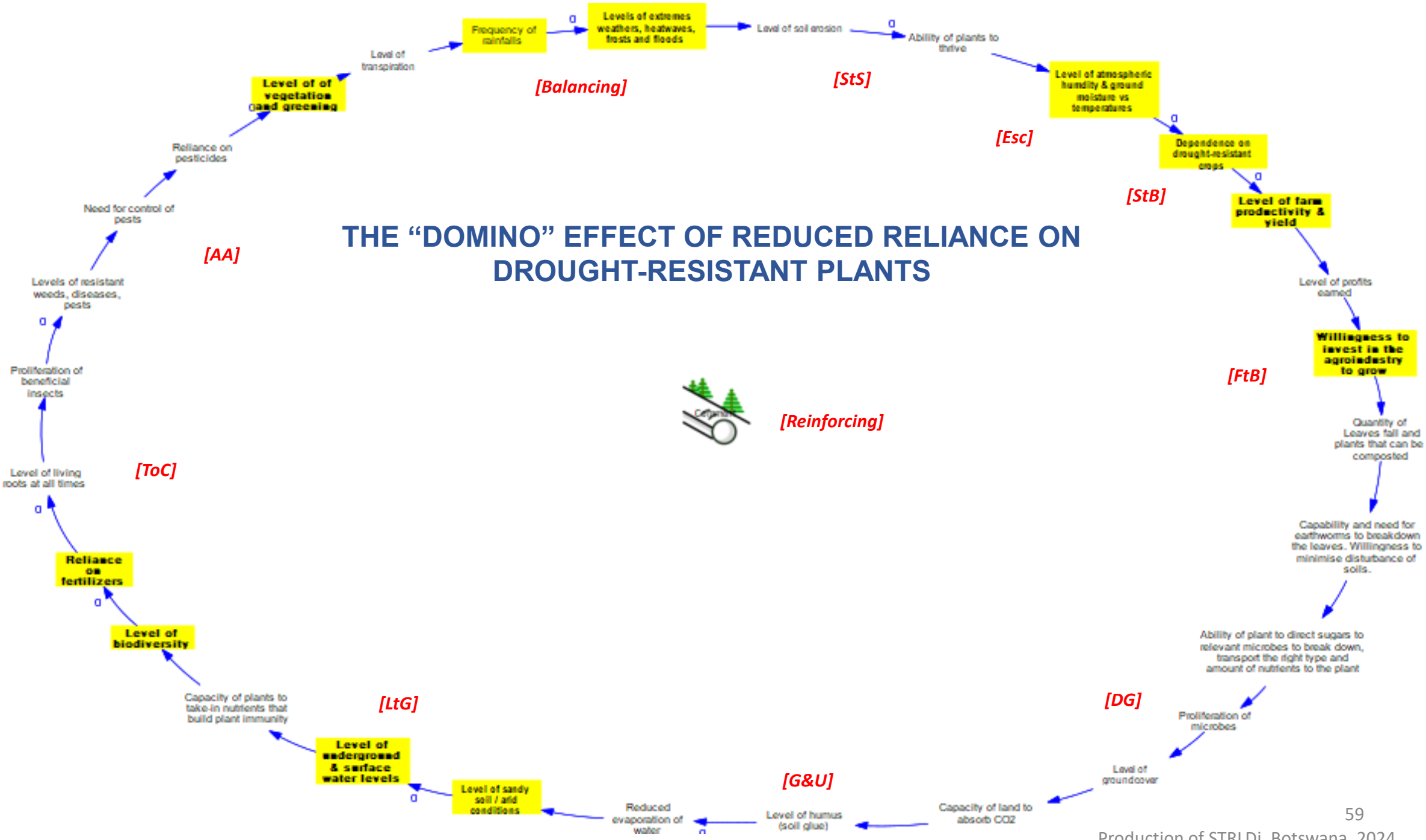
- The tools and the process used in the study of unemployment can be applied to understand the extreme weather variabilities we face as countries.
- The study tests the thinking that extremes in weather variability is in turn the result of the choices we make in terms of vegetation we grow on our lands.

WHY THE STUDY?

- In today's agricultural landscape, many solutions designed to enhance food production inadvertently exacerbate the challenges of climate stability, ultimately negating the progress we make.
- Consider this example: we often turn to drought-resistant crops in response to lower rainfall levels or a weakening water cycle. We believe plants that withhold or survive with less moisture, will result in better yields and thus improve food security for the masses. However, we overlook that when plants withhold water from transpiring, on such scales, the water cycle in the atmosphere remains weak or weakens further.
- What is happening here? The plants create a drought-prone environment. This leads us to continue planting drought-resistant crops in subsequent seasons. The plants perpetuate their existence. We fail to recognize that the system is leading us. This is **the** trap! Hence the statement. **Systemic issues often remain unaddressed because they are obscured, allowing them to perpetuate themselves.**

Discussion: What parts of the system had the solution ignored?

THE "DOMINO" EFFECT OF REDUCED RELIANCE ON DROUGHT-RESISTANT PLANTS



Analysis of rainfall and temperature time series to detect long-term climatic trends and variability over semi-arid Botswana

Published: 06 March 2018

Volume 127, article number 25, (2018) Cite this article

Jimmy Byakatonda, B P Parida, Piet K Kenabatho & D B Moalafhi

Abstract

Arid and semi-arid environments have been identified with locations prone to impacts of climate variability and change. Investigating long-term trends is one way of tracing climate change impacts. This study investigates variability through annual and seasonal meteorological time series. Possible inhomogeneities and years of intervention are analysed using four absolute homogeneity tests. Trends in the climatic variables were determined using Mann–Kendall and Sen's Slope estimator statistics. Association of El Niño Southern Oscillation (ENSO) with local climate is also investigated through multivariate analysis. Results from the study show that rainfall time series are fully homogeneous with 78.6 and 50% of the stations for maximum and minimum temperature, respectively, showing homogeneity. Trends also indicate a general decrease of 5.8, 7.4 and 18.1% in annual, summer and winter rainfall, respectively. Warming trends are observed in annual and winter temperature at 0.3 and 1.5% for maximum temperature and 1.7 and 6.5% for minimum temperature, respectively. Rainfall reported a positive correlation with Southern Oscillation Index (SOI) and at the same time negative association with Sea Surface Temperatures (SSTs). Strong relationships between SSTs and maximum temperature are observed during the El Niño and La Nina years. These study findings could facilitate planning and management of agricultural and water resources in Botswana.

https://link.springer.com/article/10.1007/s12040-018-0926-3

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