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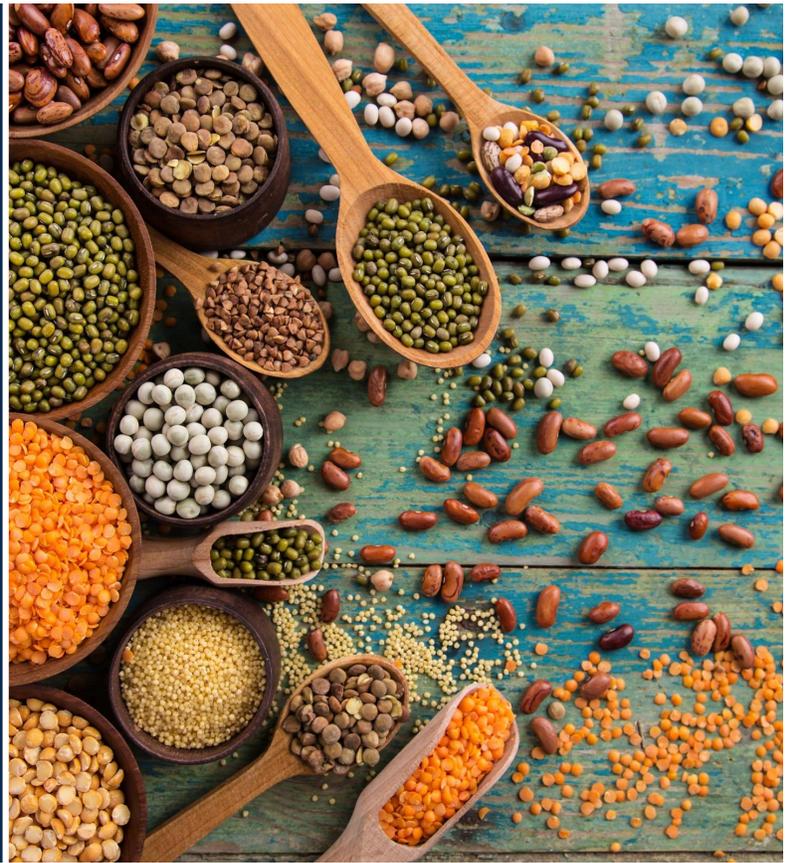
Pulse Processor Risk Analysis

Summary slide deck

January 29, 2026



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In partnership with USA Pulses



Purpose & scope

What this analysis covers and how to use it

Objective

- Quantify the financial exposure of a representative rural pulse processor to market and supply shocks.
- Translate plant-level shocks into regional economic activity and employment impacts.
- Document the current federal support landscape and the structural gap for processors (not policy prescriptions).

Coverage

- Representative processor calibrated from confidential processor survey data.
- Scenarios: 2018 trade disruption and 2021 drought shock.
- Regional footprint: Idaho, Minnesota, Montana, North Dakota, Washington + U.S. totals.

How this deck is structured

- 1) Baseline economics & model
- 2) Shock scenarios & sensitivity
- 3) Regional footprint & losses
- 4) Policy landscape & gaps
- 5) Appendix (tables, parameters)



Key findings

Headline results to anchor the discussion

Thin margins → low shock tolerance

Baseline operating margin is ~2.4%.

Breakeven occurs with small adverse moves:

- ~8% volume decline
- ~4–5% price decline
- ~3% variable-cost inflation

2018 trade shock stress test

- Revenue -48% and volume -44%
- Operating profit: +\$0.9M → -\$3.5M
- Short-term financing need rises to ~\$2.8M
- Employment falls ~38%

2021 drought stress test

- Revenue -48% and volume -52%
- Operating profit: +\$0.9M → -\$4.2M
- Financing need rises to ~\$3.5M
- Employment falls ~45%

Regional footprint + concentration

- Baseline activity supported: ~\$792M and ~2,346 jobs
- Losses under shocks: ~\$382M and ~900–1,060 jobs
- Largest exposure: North Dakota and Montana
- Policy gap: existing tools emphasize capital/infrastructure, not margin stabilization or supply-shock insurance.

Analytical approach

From processor survey to regional impacts

Processor survey
(confidential)

Representative pulse
processor model

Sensitivity +
shock scenarios

Regional scaling
(+ multipliers)

Plant-level outputs

- Revenue, costs, operating profit
- Employment adjustments
- Working capital drawdown + financing need
- Breakeven thresholds

Regional outputs

- Direct sales from pulse processing
- Indirect activity (supply chain)
- Induced activity (household spending)
- Employment supported/lost

Baseline performance

Low margin + working capital reliance under "normal" conditions

Baseline financial and operational profile

Metric	Baseline
Volume processed (tons)	45,053.5
Revenue (annual)	\$37,557,025
Total operating cost	\$36,658,376
Operating profit	\$898,649
Profit margin	2.39%
Employment (FTE)	55.06
Financing need	\$377,068
Working capital (est.)	\$4,118,000

Operating margin

2.4%

Operating profit

\$0.9M

Financing need (proxy)

\$0.38M

Interpretation

- Profitability depends on modest spreads between unit prices and unit costs.
- Small negative shocks can push operating profit below zero.
- Even in baseline, cash-flow proxy can be negative → reliance on working capital/credit lines.

Shock scenarios

Two historical stress tests applied to the representative processor

Scenario definitions

2018 Trade shock

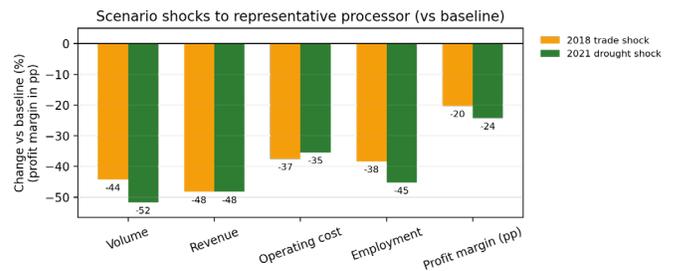
- Demand disruption and export price pressure
- Lower throughput, lower unit revenues
- Some cost reduction, but fixed-cost leverage dominates

2021 Drought shock

- Supply shortfall reduces volume processed
- Revenue declines similarly to the trade shock
- Employment adjusts more sharply due to volume collapse

All impacts are expressed relative to the baseline calibration.

Shocks applied to key drivers (vs baseline)



2018 trade shock impact

Representative processor outcomes

Key financial and operational outcomes (baseline vs 2018 trade shock)

Metric	Baseline	2018 trade shock	Change vs baseline
Volume processed (tons)	45,053.5	25,108.6	-44.3%
Revenue (annual)	\$37,557,025	\$19,450,500	-48.2%
Total operating cost	\$36,658,376	\$22,931,361	-37.4%
Operating profit	\$898,649	\$-3,480,860	\$-4,379,509
Profit margin	2.39%	-17.90%	-20.29 pp
Employment (FTE)	55.06	33.95	-38.3%
Financing need	\$377,068	\$2,771,183	\$2,394,115
Working capital (est.)	\$4,118,000	\$2,133,000	-48.2%

Operating profit

-\$3.5M

Profit margin

-17.9%

Financing need

\$2.8M

Takeaway: even with partial cost reductions, fixed costs and reduced throughput drive large operating losses and liquidity stress.

2021 drought shock impact

Representative processor outcomes

Key financial and operational outcomes (baseline vs 2021 drought shock)

Metric	Baseline	2021 drought shock	Change vs baseline
Volume processed (tons)	45,053.5	21,758.4	-51.7%
Revenue (annual)	\$37,557,025	\$19,434,661	-48.3%
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Employment (FTE)	55.06	30.15	-45.2%
Financing need	\$377,068	\$3,532,202	\$3,155,134
Working capital (est.)	\$4,118,000	\$2,130,000	-48.3%

Operating profit

-\$4.2M

Profit margin

-21.8%

Financing need

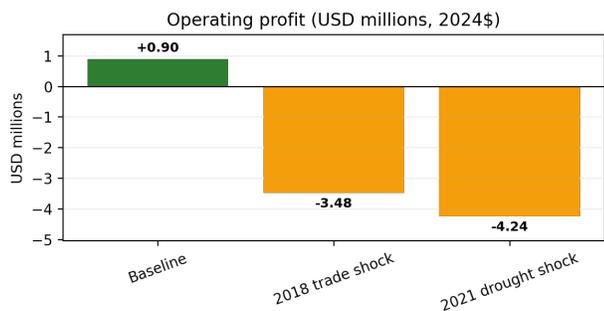
\$3.5M

Takeaway: supply collapses reduce throughput more than the trade scenario, producing deeper operating losses and larger financing needs.

Liquidity & continuity risk

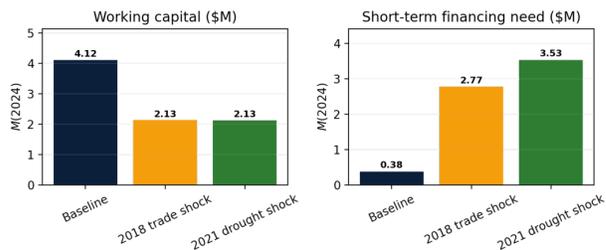
Working capital drawdown and financing needs under shocks

Operating profit shift



Operating profit turns negative quickly under both shocks.

Working capital & financing need

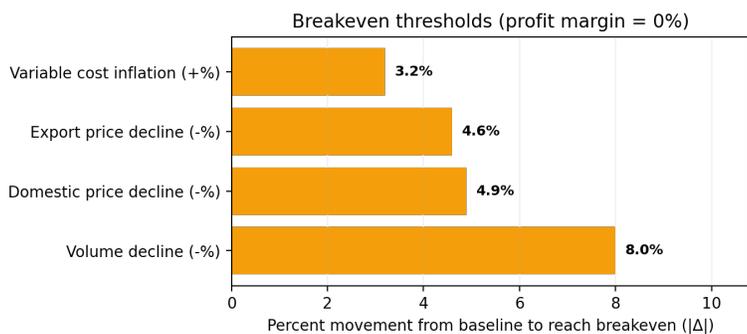


Shocks drive multi-million-dollar short-term financing needs while working capital falls.

Sensitivity: breakeven thresholds

How little it takes to eliminate operating profit

Breakeven thresholds (profit margin = 0%)



Interpretation (examples)

- A 10% volume decline can turn margins negative (operating leverage).
- A 10% export price decline can push margins toward ~-3%.
- A 10% domestic price decline can eliminate profitability.
- A 10% variable-cost increase can reduce margins by >5 percentage points.

Bottom line: the baseline margin provides a thin cushion against common shocks.

Why vulnerability is structural

Operating leverage, exposure, and limited hedging options

Fixed-cost leverage

A meaningful share of operating costs do not fall proportionally when volume declines.

Result: margins can swing from small positive to large negative quickly.

Export exposure

Export revenue share is material for many processors.

Trade disruptions transmit rapidly via prices, volumes, and contract frictions.

Input volatility

Supply shocks (e.g., drought) reduce throughput and can increase unit procurement costs.

Energy, labor, and logistics costs can rise during disruptions.

Liquidity constraints

Working capital is required to keep plants running during a downturn.

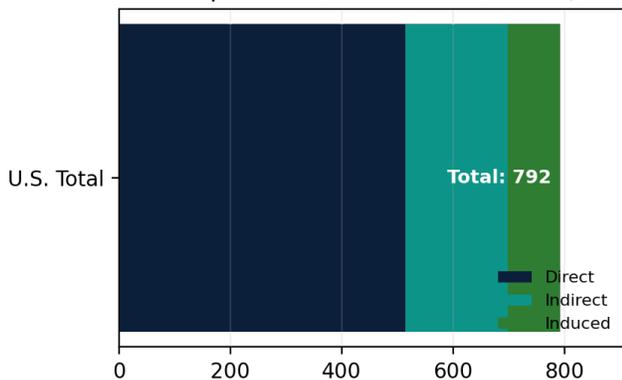
Credit availability can tighten precisely when financing need spikes.

Regional footprint: economic activity

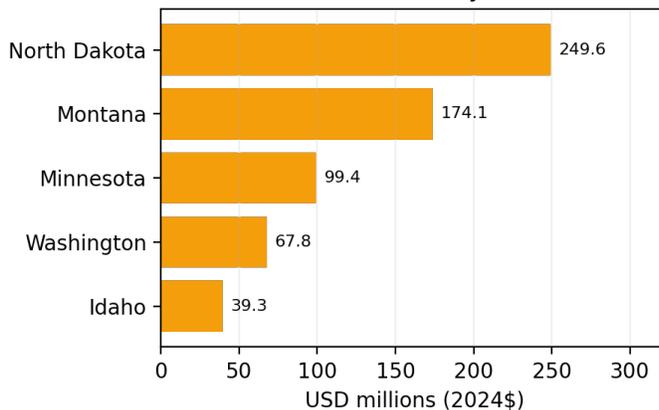
Baseline contribution of pulse processing

Baseline economic activity supported (USD millions, 2024\$)

Baseline economic activity composition (USD millions, 2024\$)



Baseline total by state



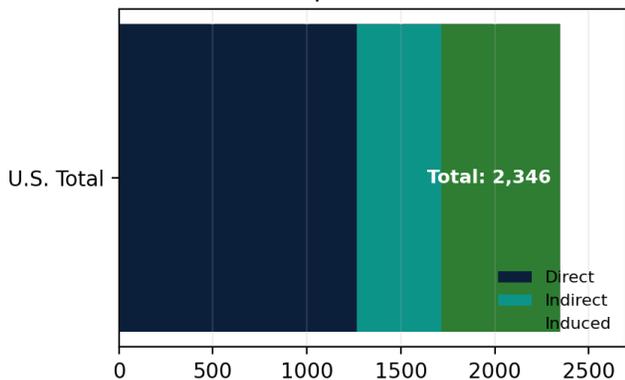
Total baseline activity: ~\$792M (direct + indirect + induced). Largest state contributions: ND and MT.

Regional footprint: employment

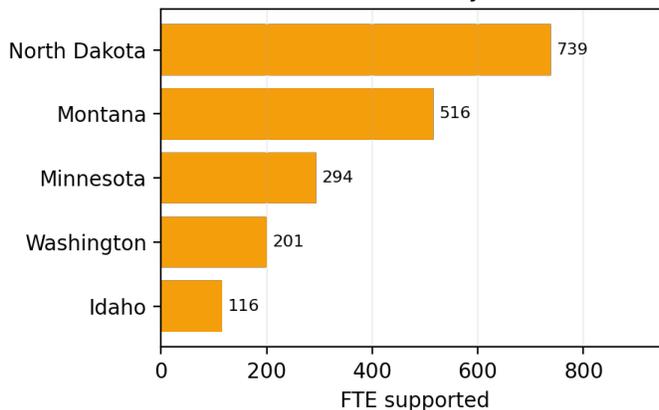
Baseline employment supported by pulse processing

Baseline employment supported (FTE)

Baseline employment supported composition (FTE)



Baseline total by state



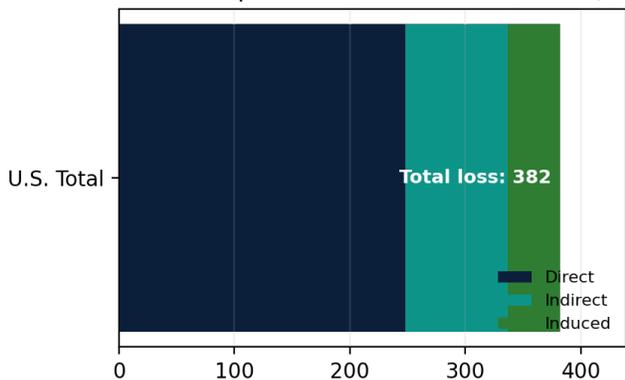
Total baseline employment supported: ~2,346 FTE (direct + indirect + induced).

Trade shock: regional losses

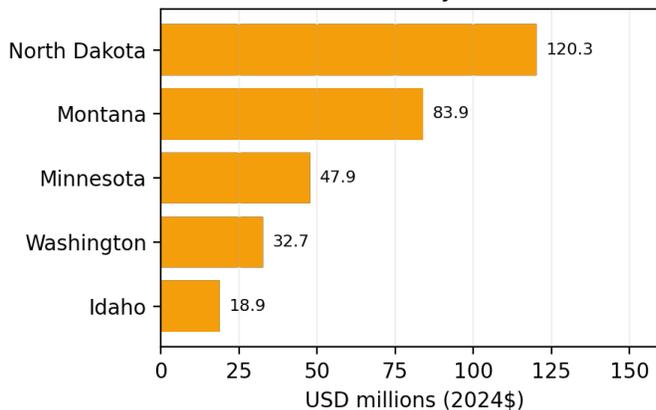
Economic activity reduction (USD millions, 2024\$)

2018 trade shock: economic activity losses

2018 trade shock loss composition (USD millions, 2024\$)



Total loss by state



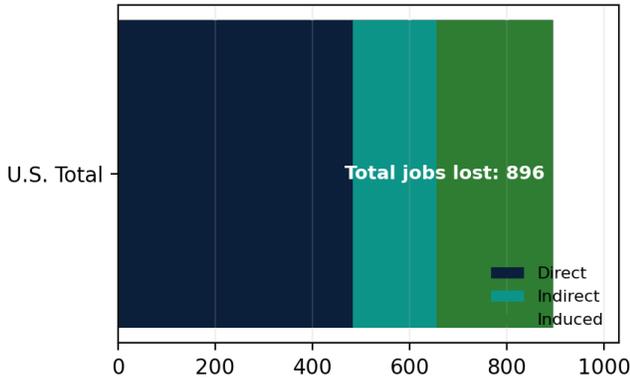
Total loss: ~\$382M, concentrated in ND and MT.

Trade shock: regional losses

Employment reduction (FTE)

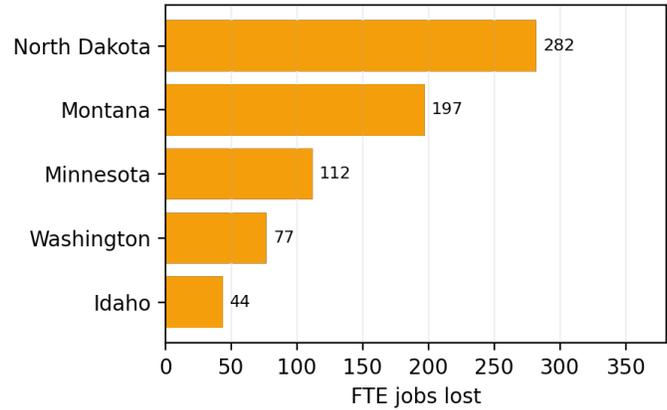
2018 trade shock: employment losses

2018 trade shock employment loss composition (FTE)



Total jobs lost: ~896 FTE across direct, indirect, and induced effects.

Total jobs lost by state

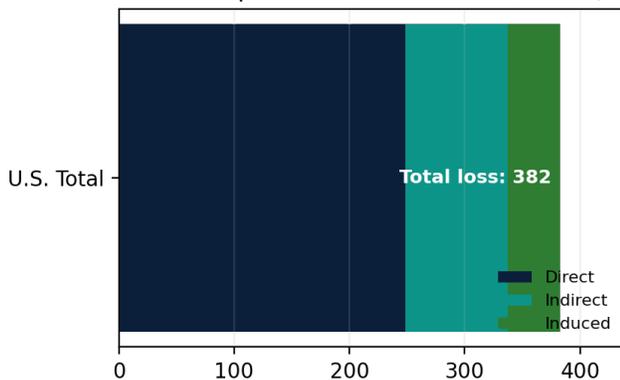


Drought shock: regional losses

Economic activity reduction (USD millions, 2024\$)

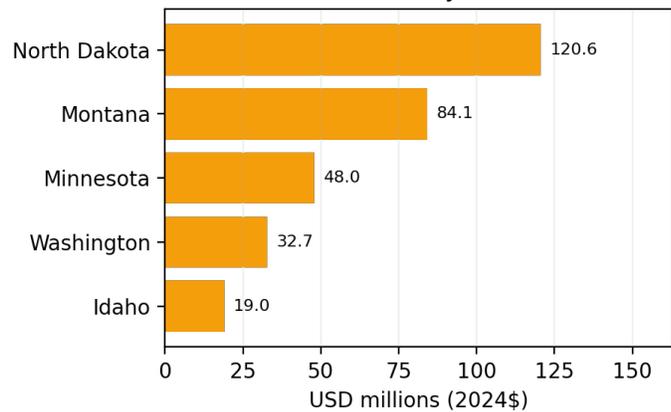
2021 drought shock: economic activity losses

2021 drought shock loss composition (USD millions, 2024\$)



Total loss: ~\$383M, concentrated in ND and MT.

Total loss by state

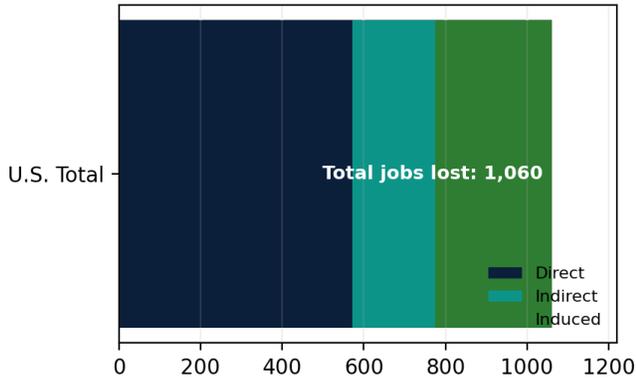


Drought shock: regional losses

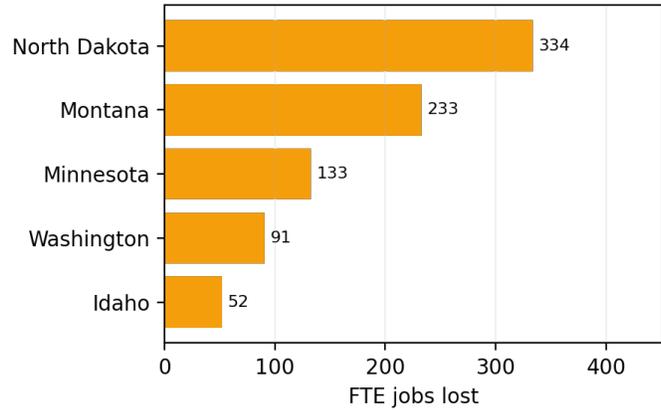
Employment reduction (FTE)

2021 drought shock: employment losses

2021 drought shock employment loss composition (FTE)



Total jobs lost by state



Total jobs lost: ~1,060 FTE (larger than trade shock due to deeper throughput loss).

Policy landscape

Current federal tools vs processor risk management gap

Federal support mechanisms for processors (summary)

Category	Program / Mechanism	Status	What It Does	What It Does Not Do
Currently Available	B&I Loan Guarantees	Permanent	Supports capital investment, facility expansion, equipment upgrades, refinancing, and some working capital.	Does not stabilize margins or protect against supply/price shocks.
	REAP Energy Efficiency Support	Permanent (loan guarantees available; grants periodically funded)	Reduces long-run operating costs through energy efficiency and renewable projects.	Does not provide short-term financial resilience during shocks.
	RFSI Grants	Temporary (ARPA-funded)	Supports processing, storage, and mid-supply chain infrastructure projects.	Obligation deadline: Sept 2026; project completion: Sept 2027; not permanent.
	State-Level Programs	Varies by state	May provide grants, loans, or tax incentives for rural development and food processing.	Fragmented, inconsistent, and generally small-scale; no national structure.
Currently Unavailable	Federal margin protection for processors	Does not exist	Would stabilize income during margin compression.	Core gap in federal agricultural risk policy.
	Insurance against drought-induced supply collapse	Does not exist	Would protect processors against throughput loss from crop failures.	No federal analog to crop insurance for processors.
	Income stabilization during trade disruptions	Does not exist	Would smooth revenues during tariff or export demand shocks.	Processors fully exposed to trade volatility.
	Dedicated technical assistance network (MPPTA-type)	Exists only for meat/poultry	Would support project design, grant writing, regulatory navigation, and financial planning.	Pulse processors lack organized federal TA support.
	Permanent processor grant programs	Does not exist	Would support expansion and modernization outside emergency appropriations.	Existing grant programs are crisis-triggered and temporary.

Core observation

Most existing tools emphasize capital investment and longer-run efficiency; there is no standing federal mechanism that stabilizes processor margins or insures against supply/throughput collapse.

Policy gap diagnosis

Where current tools sit vs what the shocks require



Meat & poultry precedent (context)

Dedicated processing programs exist in other sectors

What the precedent illustrates

- Federal programming has explicitly targeted processing capacity in meat & poultry.
- Programs combined capital support with technical assistance and capacity-building.
- The pulse sector lacks an analogous permanent structure and TA network.

Examples

- MPPEP: >\$325M invested (2021–2024) to expand/strengthen processing.
- MPPTA: technical assistance network for planning, grants, and regulatory navigation.

Illustrative timeline

2021 2023 2024

MPPEP investments expand capacity
+ MPPTA technical assistance

Why it matters for pulses (interpretation)

The quantified shocks create processor-level liquidity crises that can ripple into rural employment and economic activity.

A policy conversation can use the meat & poultry experience as a reference point for program structure (not direct equivalence).

Why insurance is hard for processors

Structural barriers to a crop-insurance analog

Why standard insurance products do not fit

- Crop insurance is tied to production; processors are outside the statutory/administrative structure.
- Business interruption typically requires physical damage (not market/supply shocks).
- Basis risk: plant losses are driven by a mix of prices, volumes, and costs.
- Moral hazard/adverse selection concerns without strong triggers and audits.

What this implies for policy design

- Any risk tool likely needs objective triggers (e.g., regional yield/production indicators, price indices).
- Requires clear definitions of covered losses and data reporting.
- Coordination with existing credit programs can reduce duplication.
- Design must balance speed (liquidity) and accountability.

Implications for program design (non-prescriptive)

How the quantified results can inform options

Define the problem to solve

- Primary stress is short-term margin compression and liquidity needs, not long-term profitability.
- Program metrics can focus on continuity of operations, avoided layoffs, and stabilized rural economic activity.

Targeting & triggers

Use objective triggers that correlate with processor outcomes:

- Throughput/regional production declines
- Export price indices/trade disruptions
- Verified operating margin compression

Instrument choices (some thoughts)

- Liquidity bridge (short-term loans/guarantees with rapid deployment)
- Temporary cost-share tied to maintaining employment
- Risk-sharing structures (public/private) where feasible

Data requirements

To implement triggers and evaluate outcomes:

- Standardized processor reporting (volume, revenue, costs, employment)
- Transparent verification pathways
- Alignment with confidentiality constraints

Appendix

Detailed tables, parameters, and supporting data



Appendix: model parameters

Cost and employment scaling parameters used for the representative processor model

Relationship	Model spec	Parameter	Value	Units
Total operating cost	Linear (Cost = a + b x Volume)	Variable total cost, slope b	437.23	\$ per ton
Total operating cost	Linear (Cost = a + b x Volume)	Fixed total cost, intercept a	8,647,931	\$ per year
Total operating cost	Linear, implied at representative baseline volume	Total cost elasticity with respect to volume	0.6949	unitless
Total operating cost	Log-log (ln(Cost) = alpha + beta x ln(Volume))	Cost elasticity with respect to volume, beta	0.9388	unitless
Employment	Linear (Employment = a + b x Volume)	Variable employment, slope b	0.000509	FTE per ton
Employment	Linear (Employment = a + b x Volume)	Fixed employment, intercept a	8.696	FTE
Employment	Log-log (ln(Employment) = alpha + beta x ln(Volume))	Employment elasticity with respect to volume, beta	0.8273	unitless

Appendix: CPI deflators

Indices used to convert nominal values to 2024 dollars

Year	CPI-U (2024=100)	Deflator to 2024\$
2016	240.01	1.3070
2017	245.12	1.2797
2018	251.11	1.2492
2019	255.66	1.2270
2020	258.81	1.2120
2021	270.97	1.1577
2022	292.65	1.0719
2023	304.70	1.0295
2024	313.69	1.0000

Appendix: representative processor

Operational scale and financial ratios (baseline)

Item	Baseline value	Units
Representative processor type	Composite, sample-base	N/A
Annual throughput	45,053.54	tons per year
Nameplate capacity	61,340.00	tons per year
Utilization	73.5%	share
Downtime	10.5%	share
Export revenue share	51.5%	share
Unit price	\$833.61	\$ per ton
Unit total cost	\$813.66	\$ per ton
Operating margin	\$19.95	\$ per ton
Working capital ratio	11.0%	share of revenue

Appendix: representative processor

Product mix and procurement notes

Item	Baseline value	Units
Product mix: lentils	26.2%	share of inbound volume
Product mix: dry peas	47.5%	share of inbound volume
Product mix: chickpeas	21.9%	share of inbound volume
Product mix: dry beans	4.4%	share of inbound volume
Procurement structure	Not modeled separately	N/A

Appendix: baseline results

Baseline financial and operational profile

Metric	Baseline
Volume processed (tons)	45,053.5
Revenue (annual)	\$37,557,025
Total operating cost	\$36,658,376
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Appendix: scenario results

2018 trade shock vs baseline (representative processor)

Metric	Baseline	2018 trade shock	Change vs baseline
Volume processed (tons)	45,053.5	25,108.6	-44.3%
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Appendix: scenario results

2021 drought shock vs baseline (representative processor)

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Volume processed (tons)	45,053.5	21,758.4	-51.7%
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Total operating cost	\$36,658,376	\$23,678,277	-35.4%
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Financing need	\$377,068	\$3,532,202	\$3,155,134
Working capital (est.)	\$4,118,000	\$2,130,000	-48.3%

Appendix: baseline regional impacts

Economic impacts by state (USD millions, 2024\$)

Geography	Direct Sales	Indirect Activity	Induced Activity	Total
Idaho	25.6	9.1	4.6	39.3
Minnesota	64.6	23.0	11.7	99.4
Montana	113.2	40.4	20.6	174.1
North Dakota	162.2	57.9	29.5	249.6
Washington	44.1	15.7	8.0	67.8
U.S. Total	514.8	183.7	93.6	792.0

Appendix: baseline regional impacts

Employment impacts by state (FTE)

Geography	From Direct Sales	From Indirect Activity	From Induced Activity	Total
Idaho	63	22	31	116
Minnesota	159	57	79	294
Montana	278	99	139	516
North Dakota	398	142	199	739
Washington	108	39	54	201
U.S. Total	1,264	451	632	2,346

Appendix: trade shock impacts

Economic activity losses by state (USD millions, 2024\$)

Geography	Direct Sales	Indirect Activity	Induced Activity	Total
Idaho	-12.3	-4.4	-2.2	-18.9
Minnesota	-31.1	-11.1	-5.6	-47.9
Montana	-54.6	-19.5	-9.9	-83.9
North Dakota	-78.2	-27.9	-14.2	-120.3
Washington	-21.3	-7.6	-3.9	-32.7
U.S. Total	-248.1	-88.5	-45.1	-381.7

Appendix: trade shock impacts

Employment losses by state (FTE)

Geography	From Direct Sales	From Indirect Activity	From Induced Activity	Total
Idaho	-24	-8	-12	-44
Minnesota	-61	-22	-30	-112
Montana	-106	-38	-53	-197
North Dakota	-152	-54	-76	-282
Washington	-41	-15	-21	-77
U.S. Total	-483	-172	-241	-896

Appendix: drought shock impacts

Economic activity losses by state (USD millions, 2024\$)

Geography	Direct Sales	Indirect Activity	Induced Activity	Total
Idaho	-12.4	-4.4	-2.2	-19.0
Minnesota	-31.2	-11.1	-5.7	-48.0
Montana	-54.7	-19.5	-9.9	-84.1
North Dakota	-78.3	-28.0	-14.2	-120.6
Washington	-21.3	-7.6	-3.9	-32.7
U.S. Total	-248.6	-88.7	-45.2	-382.5

Appendix: drought shock impacts

Employment losses by state (FTE)

Geography	From Direct Sales	From Indirect Activity	From Induced Activity	Total
Idaho	-28	-10	-14	-52
Minnesota	-72	-26	-36	-133
Montana	-126	-45	-63	-233
North Dakota	-180	-64	-90	-334
Washington	-49	-18	-24	-91
U.S. Total	-571	-204	-286	-1,060

Appendix: policy landscape

Available programs and identified gaps

Category	Program / Mechanism	Status	What It Does	What It Does Not Do
Currently Available	B&I Loan Guarantees	Permanent	Supports capital investment, facility expansion, equipment upgrades, refinancing, and some working capital.	Does not stabilize margins or protect against supply/price shocks.
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