Supplemental Materials for: Spatiotemporal Analysis of Agricultural Insurance Loss and Causes of Damage across the Inland Pacific Northwest Region of the United States

The material contained herein is supplementary to the article named in the title and submitted to the journal, Agriculture, Ecosystems and Environment.

September 2023

This supplemental appendix provides exploratory data and factor analyses of agricultural insurance loss for the Pacific Northwest (PNW) and the inland Pacific Northwest (iPNW), to better understand the combined impacts by differing damage causes, commodities, counties, and years.

1. Supplemental Tables List

Table S1. Example of insurance loss records that were acquired from the USDA Risk Management Agency (RMA). Each record represents an individual insurance claim. Full datasets are available at https://github.com/erichseamon/AGinsurancepaper as well as via the following DOI:

2. Supplemental Figures List

Pacific Northwest (PNW) Summary Supplemental Figures

Figure S1. Pacific Northwest study area, which includes agricultural regions for the inland Pacific Northwest, the southern Idaho valley, and the Willamette valley.

Figure S2. PNW agricultural insurance loss by year, 1989 to 2022.

Figure S3. PNW agricultural insurance loss by year: 2001 to 2022.

Figure S4. PNW agricultural insurance loss by damage cause: 2001 to 2022.

Figure S5. PNW agricultural insurance loss by commodity: 2001 to 2022

Inland Pacific Northwest (iPNW) Summary Supplemental Figures

Figure S6. iPNW agricultural insurance loss by year, 2001 to 2022.

Figure S7. iPNW agricultural insurance loss by damage cause, 2001 to 2022.

Figure S8. iPNW agricultural insurance loss by commodity, 2001 to 2022.

Figure S9. iPNW agricultural insurance loss for wheat by damage cause: 2001 to 2022.

Figure S10. iPNW stacked barplot of annual wheat agricultural insurance loss, by top damage causes, 2001 to 2022.

Figure S11. iPNW map of wheat losses, 2001 to 2022..

Figure S12. iPNW agricultural insurance loss for apples by damage cause: 2001 to 2022.

Figure S13. iPNW stacked barplot of annual apples agricultural insurance loss, by top damage causes, 2001 to 2022.

Figure S14. iPNW map of apple losses, 2001 to 2022.

Pacific Northwest (iPNW) PCA Supplemental Figures

Figure S15. Top panel: biplot of principal components for PNW insurance loss, for wheat by county, with damage cause as the factor loadings. Bottom panel: Scree plot. Data from 2001 is 2022 is used.

Figure S16. Top panel: biplot of principal components for PNW insurance loss, for apples by county, with damage caus eas the factor loadings. Bottom panel: Scree plot. Data from 2001 is 2022 is used.

Figure S17. Top panel: biplot of principal components for PNW insurance loss, for barley by county, with damage cause as the factor loadings. Bottom panel: Scree plot. Data from 2001 is 2022 is used.

Inland Pacific Northwest (iPNW) PCA Supplemental Figures

Figure S18. Top panel: biplot of principal components for iPNW insurance loss, for all commodities by county, with damage cause as the factor loadings. Bottom panel: Scree plot. Data from 2001 is 2022 is used

Figure S19. Top panel: biplot of principal components for iPNW insurance loss, for all commodities by month, with damage cause as the factor loadings. Bottom panel: Scree plot. Data from 2001 is 2022 is used

Figure S20. Top panel: biplot of principal components for iPNW insurance loss, for wheat by year, with damage cause as the factor loadings. Bottom panel: Scree plot. Data from 2001 is 2022 is used

Figure S21. Top panel: biplot of principal components for iPNW insurance loss, for wheat by county, with damage cause as the factor loadings. Bottom panel: Scree plot. Data from 2001 is 2022 is used

Figure S22. Top panel: biplot of principal components for iPNW insurance loss, for barley by county, with damage cause as the factor loadings. Bottom panel: Scree plot. Data from 2001 is 2022 is used

Figure S23. Top panel: biplot of insurance loss for the iPNW, for wheat by year, with damage cause as the factor loadings. Uses a Kmeans technique for grouping. Bottom panel: Scree plot. Data from 2001 is 2022 is used.

Figure S24. Top panel: biplot of insurance loss for the iPNW, for wheat by county, with damage cause as the factor loadings. Uses a Kmeans technique for grouping. Bottom panel: Scree plot. Data from 2001 is 2022 is used.

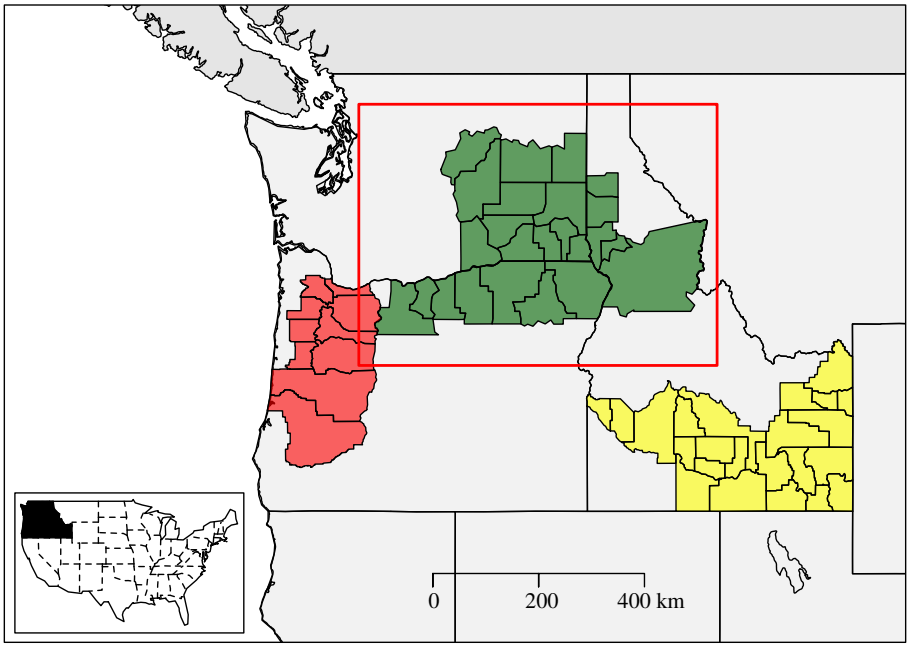


Figure S 1: Pacific Northwest study area, which includes agricultural regions for the inland Pacific Northwest, the southern Idaho valley, and the Willamette valley.

Table S 1: Example of insurance loss records that were acquired from the USDA Risk Management Agency (RMA). Each record represents an individual insurance claim. Full datasets are available at https://github.com/erichseamon/AGinsurancepaper as well as via the following DOI:

year	state	county	commodity	damagecause	month	acres	loss	lossperacre	cropyear
2001	ID	Ada	All Other Crops	Drought	SEP	17.000	153.00	9.000000	2001
2001	ID	Ada	All Other Crops	Heat	AUG	105.200	5249.00	49.895437	2001
2001	ID	Ada	All Other Crops	Freeze	APR	125.000	4500.00	36.000000	2001
2001	ID	Ada	All Other Crops	Wind/Excess Wind	MAY	50.000	1800.00	36.000000	2001
2001	ID	Ada	All Other Crops	Wind/Excess Wind	APR	92.500	3330.00	36.000000	2001
2001	ID	Bannock	WHEAT	Drought	AUG	133.000	1212.00	9.112782	2001
2001	ID	Bannock	WHEAT	Drought	SEP	777.520	24807.00	31.905289	2001
2001	ID	Bannock	WHEAT	Drought	JUL	3529.754	54726.46	15.504327	2001
2001	ID	Bannock	WHEAT	Heat	JUL	19.796	2371.60	119.801980	2001

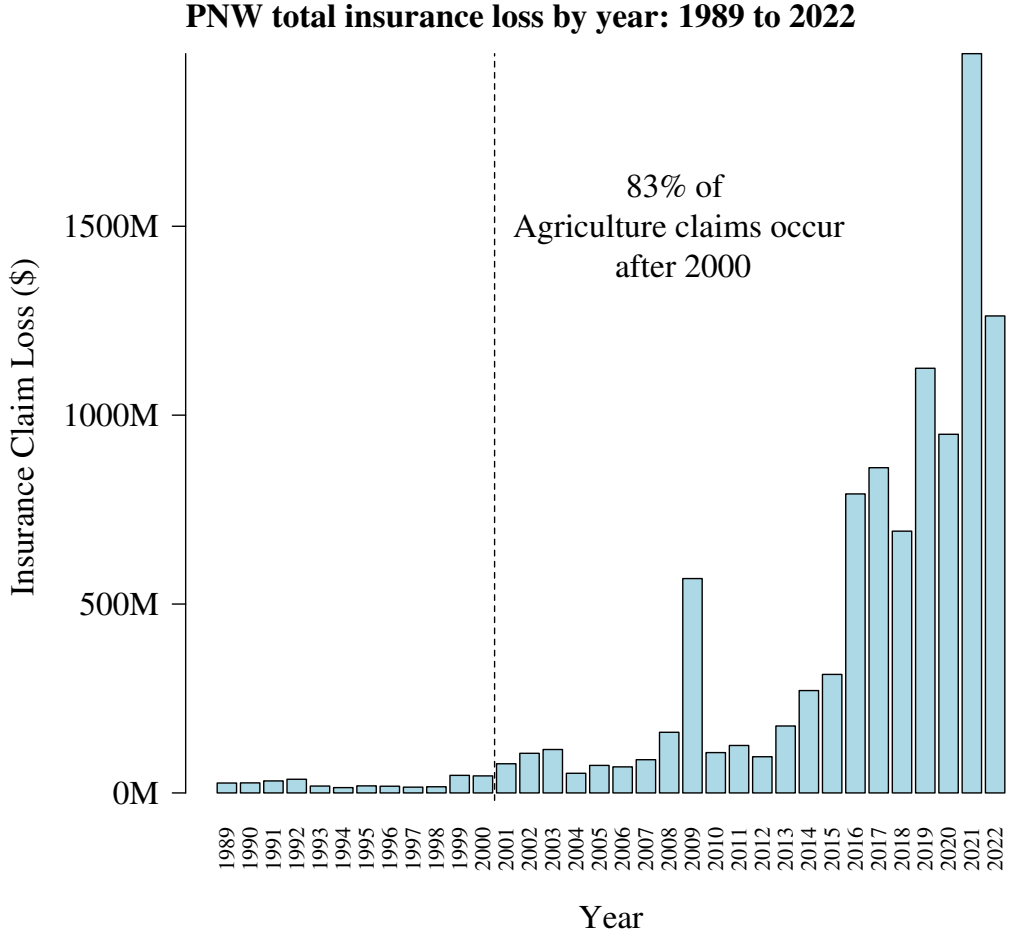


Figure S 2: Pacific Northwest agricultural insurance loss by year, 1989 to 2022

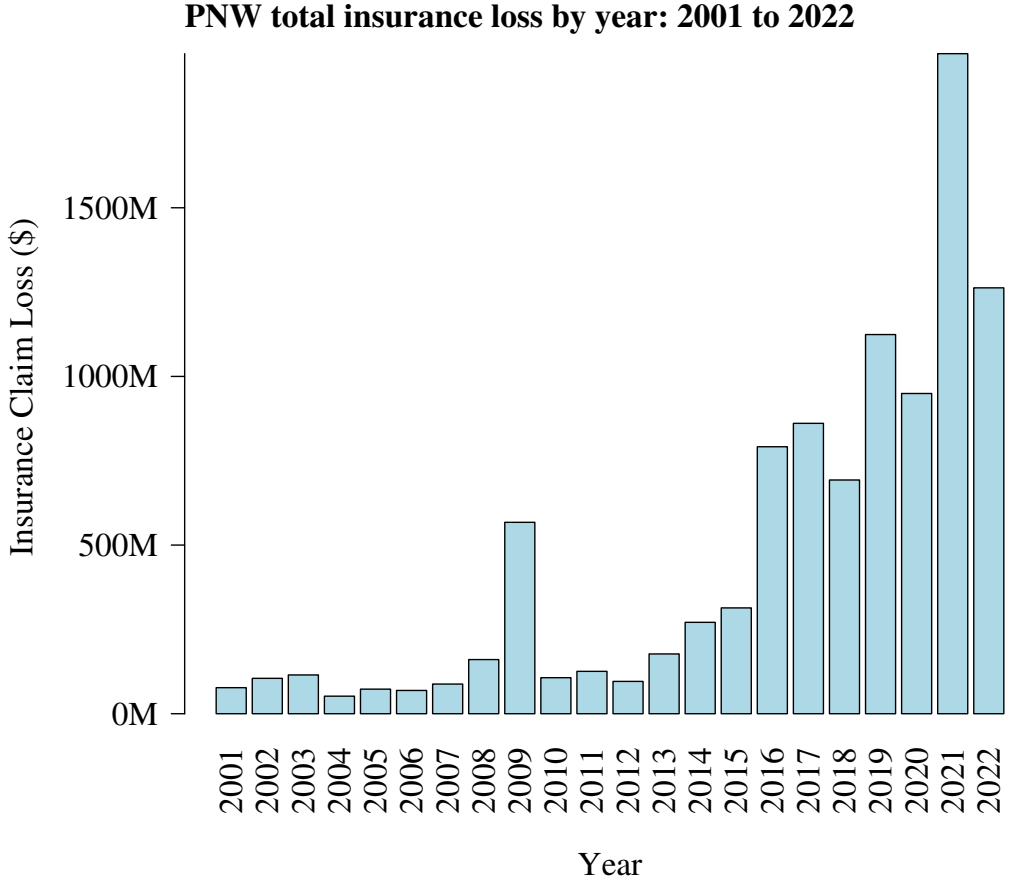


Figure S 3: Pacific Northwest agricultural insurance loss by year: 2001 to 2022

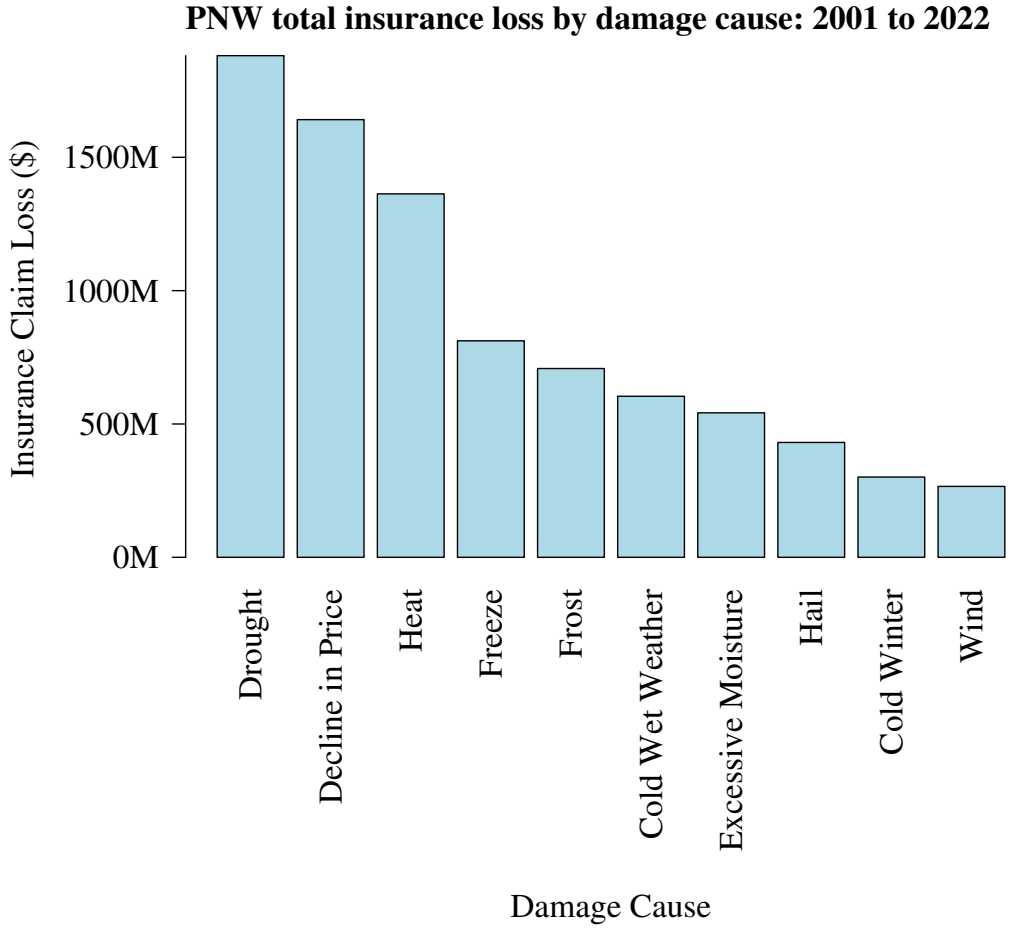


Figure S 4: Pacific Northwest agricultural insurance loss by damage cause: 2001 to 2022.

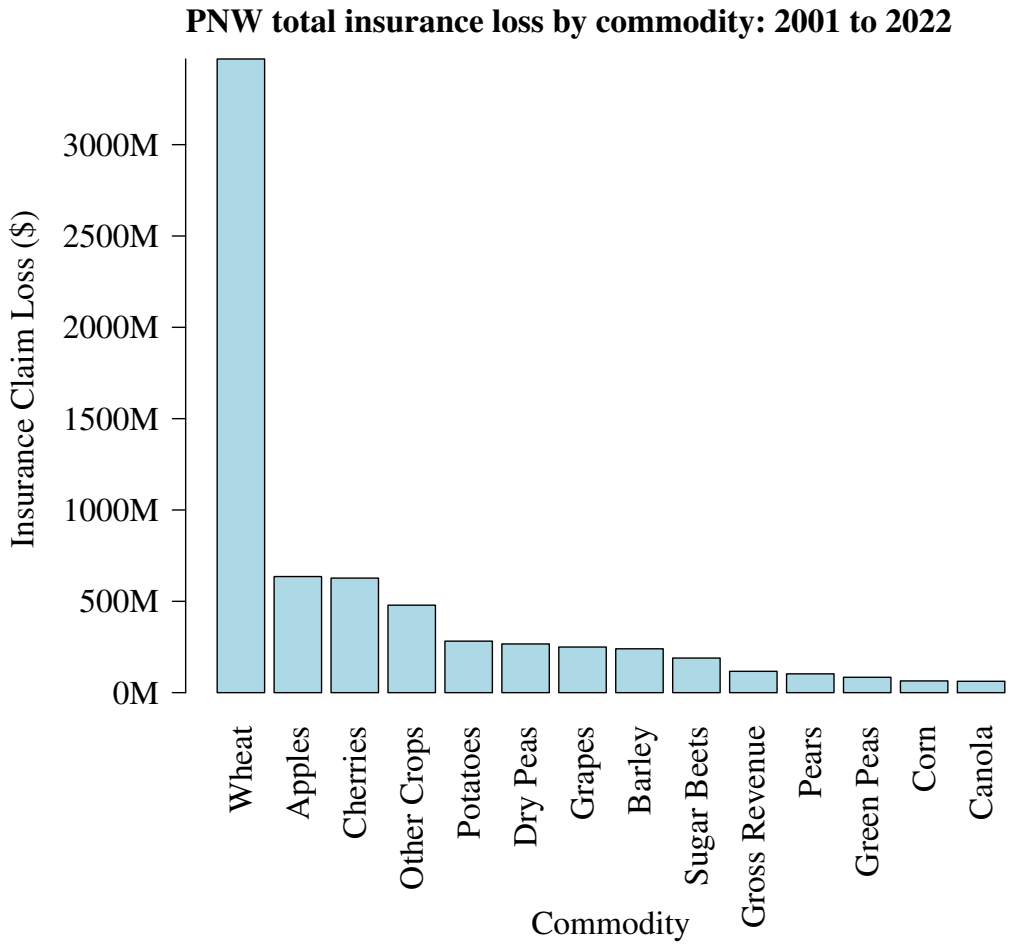


Figure S 5: Pacific Northwest agricultural insurance loss by commodity: 2001 to 2022.

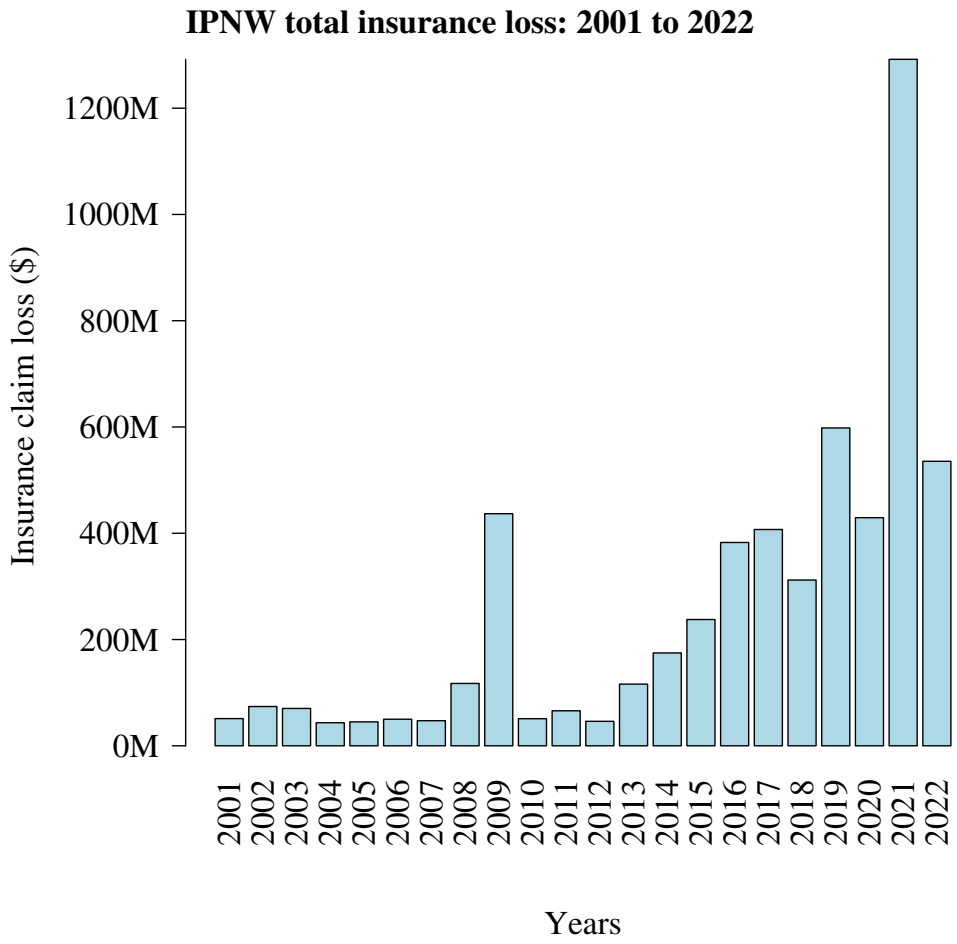


Figure S 6: Inland Pacific Northwest agricultural insurance loss by year, 2001 to 2022.

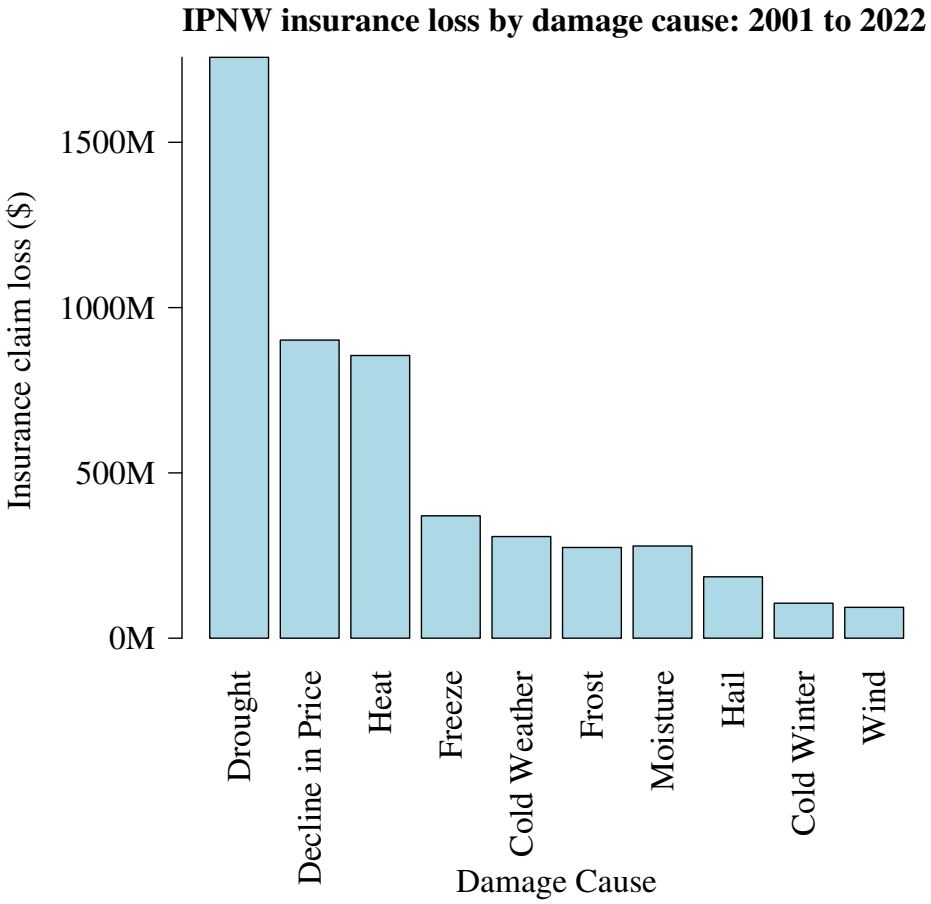


Figure S 7: Inland Pacific Northwest agricultural insurance loss by damage cause, 2001 to 2022.

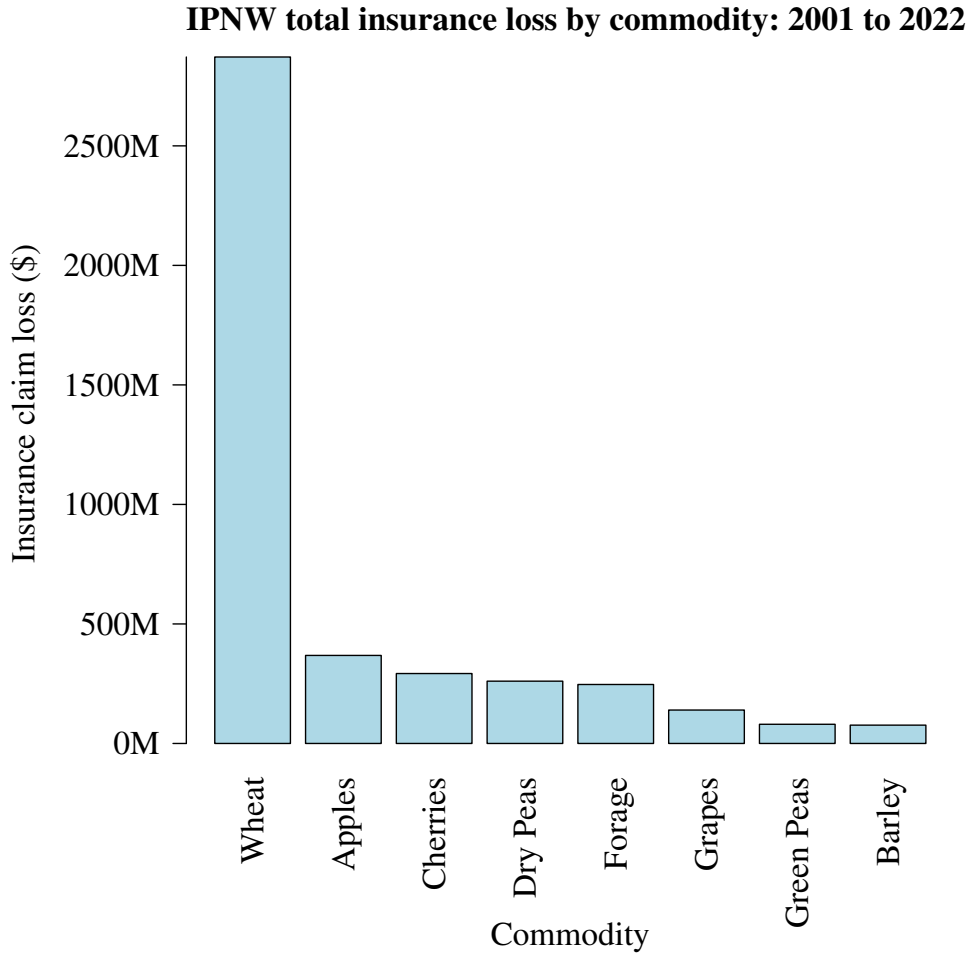


Figure S 8: Inland Pacific Northwest agricultural insurance loss by commodity, 2001 to 2022.

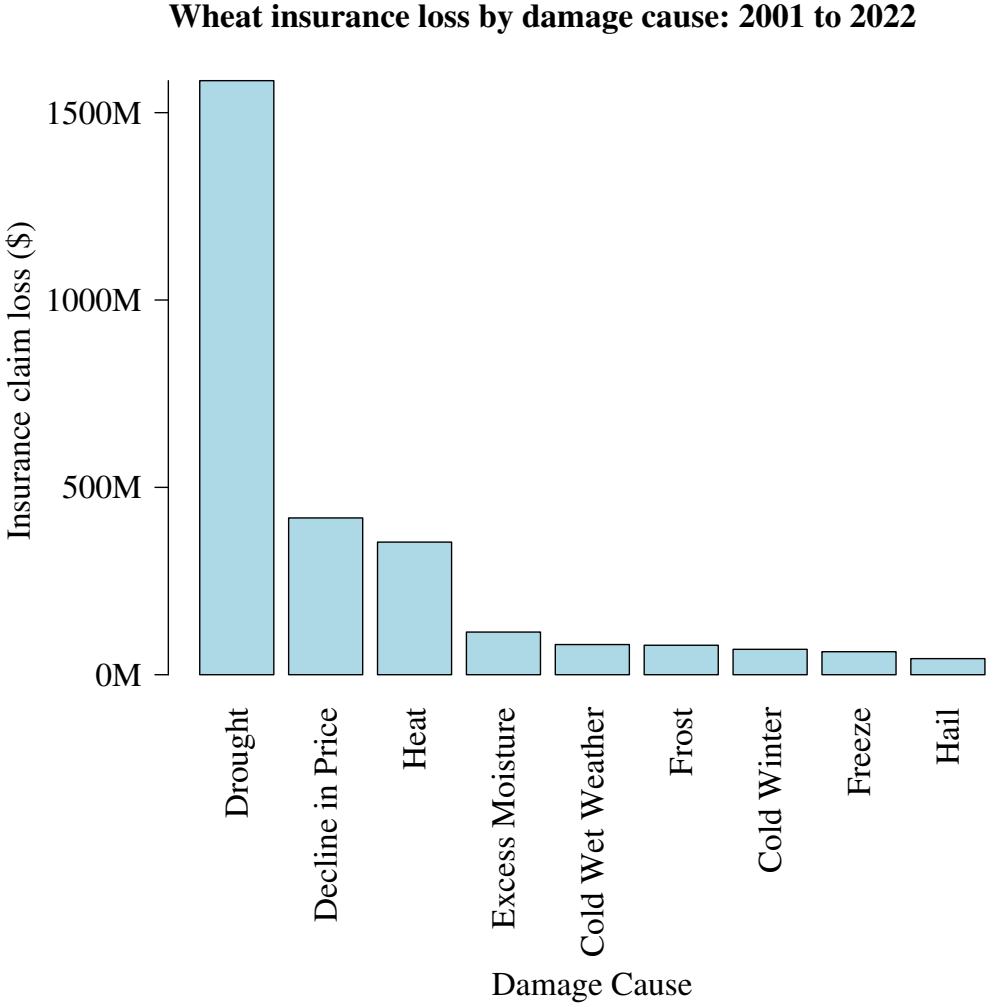


Figure S 9: Inland Pacific Northwest agricultural insurance loss for wheat, by damage cause, 2001 to 2022.

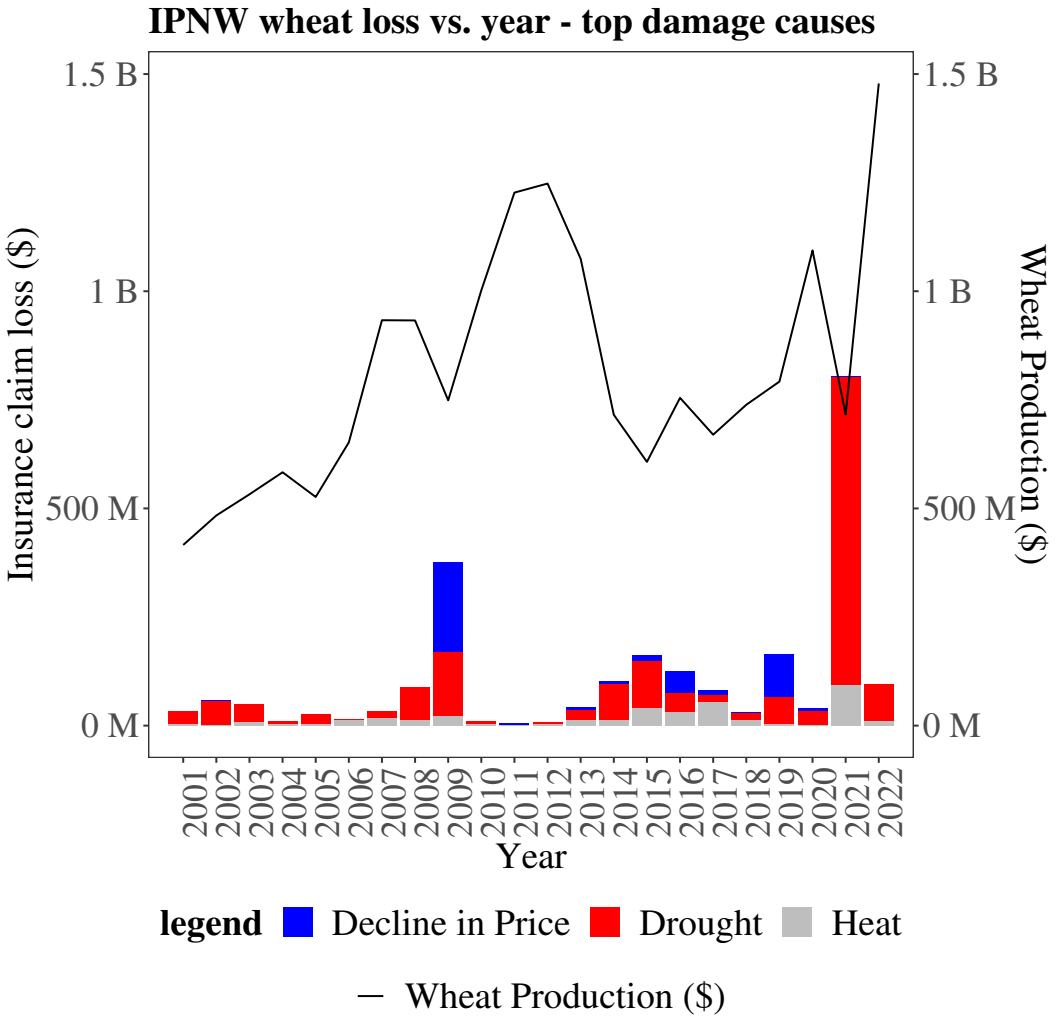
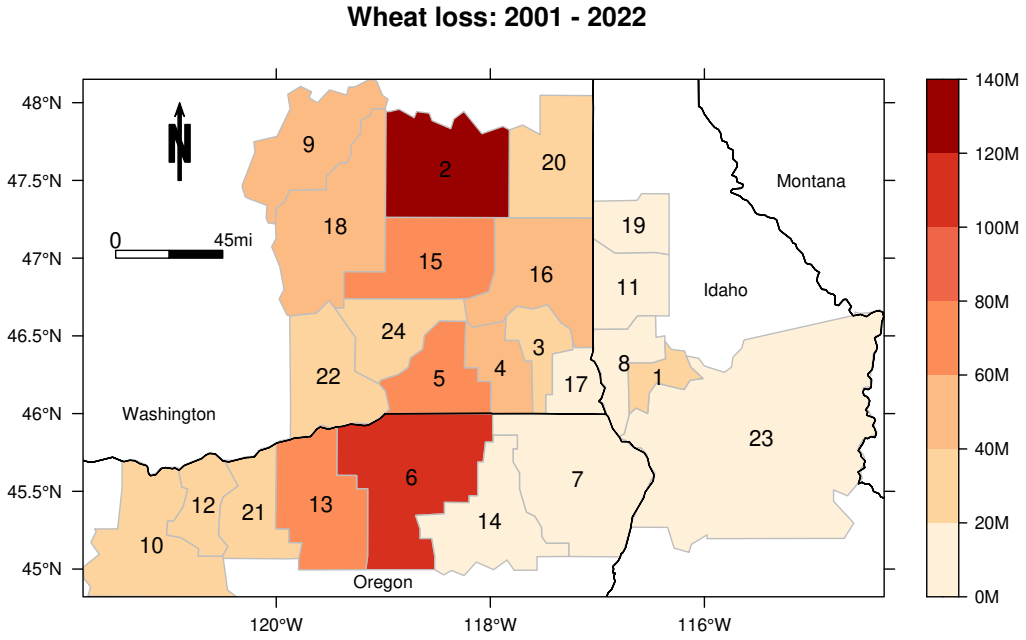


Figure S 10: Inland Pacific Northwest stacked barplot of annual wheat agricultural insurance loss, by top damage causes, 2001 to 2022.



Drought and Heat Damage Cause

1 Lewis: 2 Lincoln: 3 Garfield: 4 Columbia: 5 Walla Walla: 6 Umatilla: 7 Wallowa
8 Nez Perce: 9 Douglas: 10 Wasco: 11 Latah: 12 Sherman: 13 Morrow: 14 Union
15 Adams: 16 Whitman: 17 Asotin: 18 Grant: 19 Benewah: 20 Spokane
21 Gilliam: 22 Benton: 23 Idaho: 24 Franklin

Figure S 11: Inland Pacific Northwest map of wheat losses, 2001 to 2022.

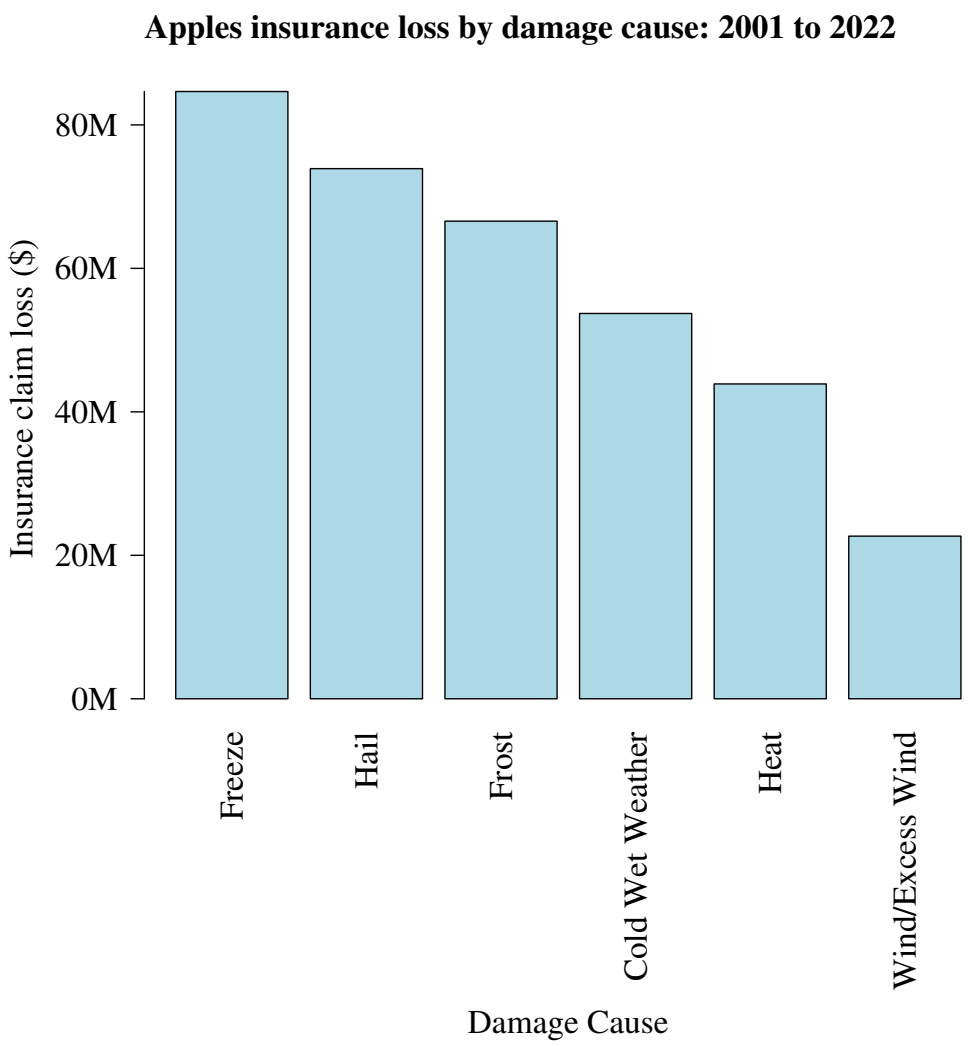


Figure S 12: Inland Pacific Northwest agricultural insurance loss for apples, by damage cause, 2001 to 2022.

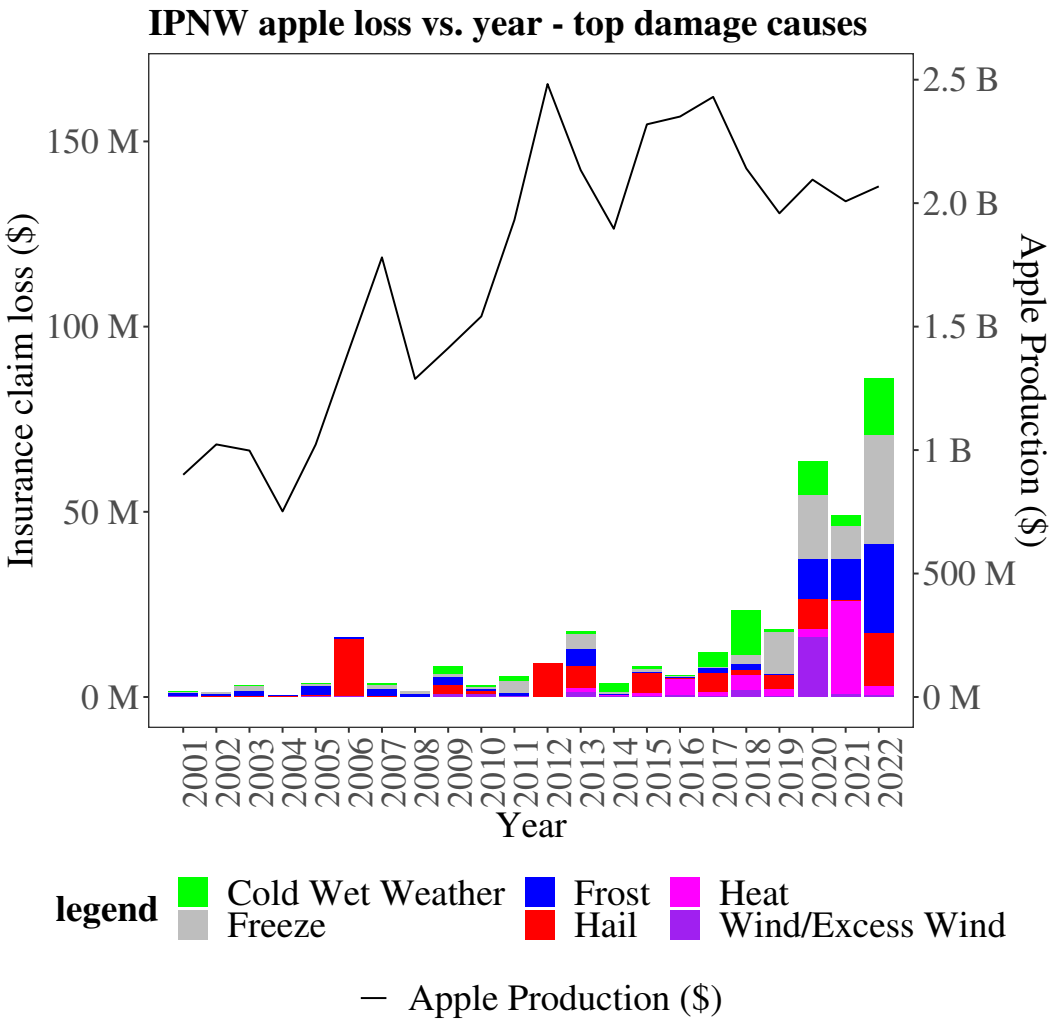
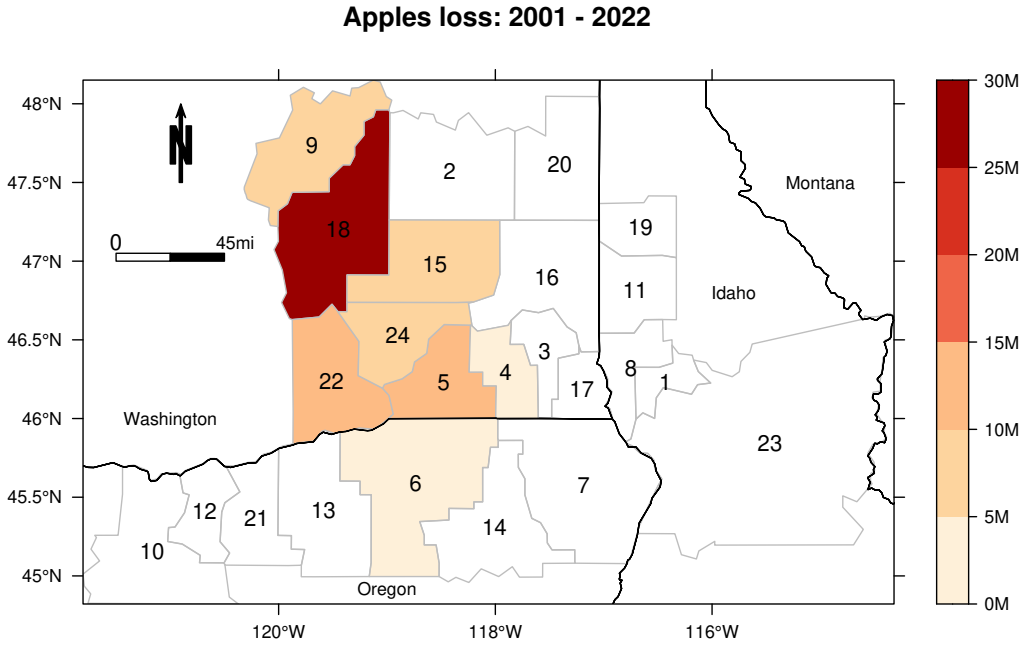


Figure S 13: Inland Pacific Northwest stacked barplot of annual apples agricultural insurance loss, by top damage causes, 2001 to 2022.



Freeze, Frost, Hail Damage Cause

1 Lewis: 2 Lincoln: 3 Garfield: 4 Columbia: 5 Walla Walla: 6 Umatilla: 7 Wallowa
8 Nez Perce: 9 Douglas: 10 Wasco: 11 Latah: 12 Sherman: 13 Morrow: 14 Union
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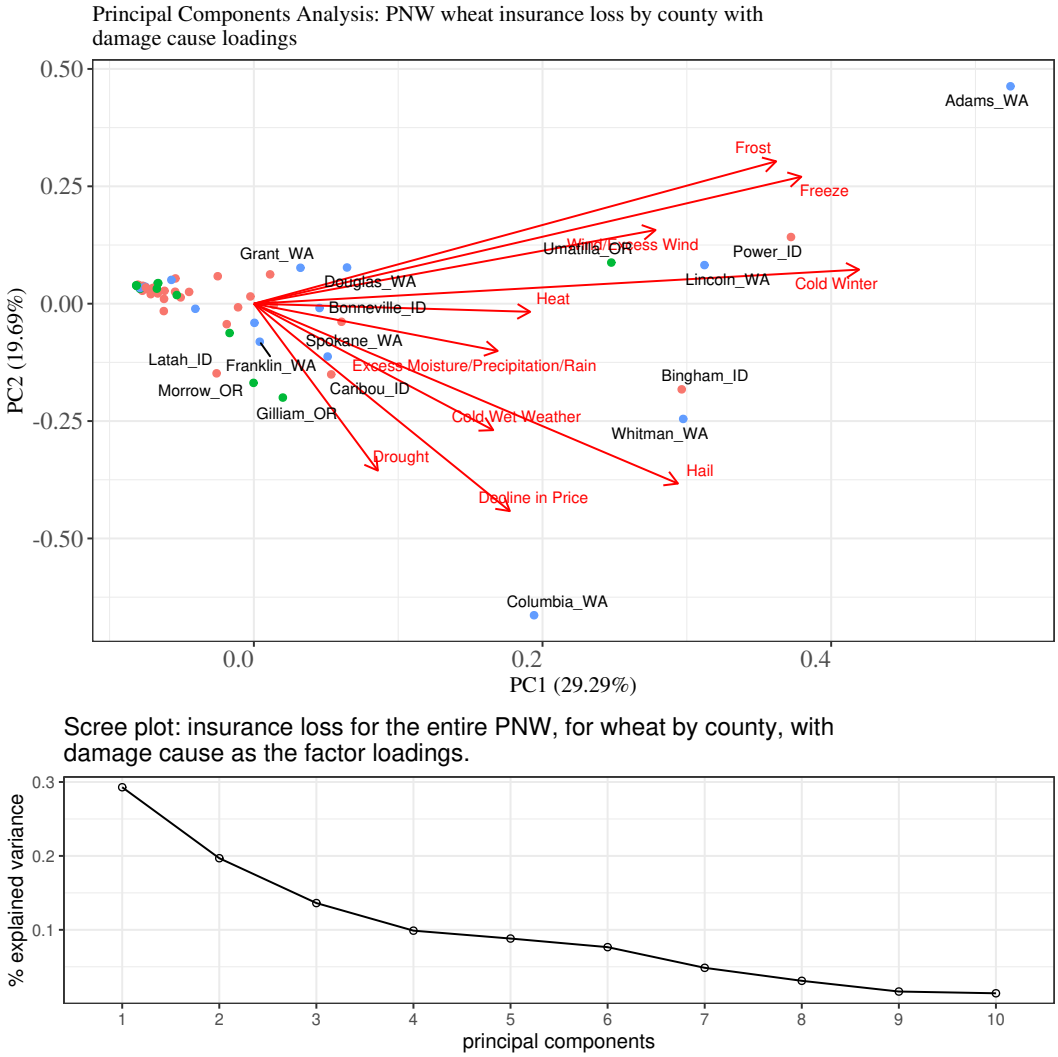
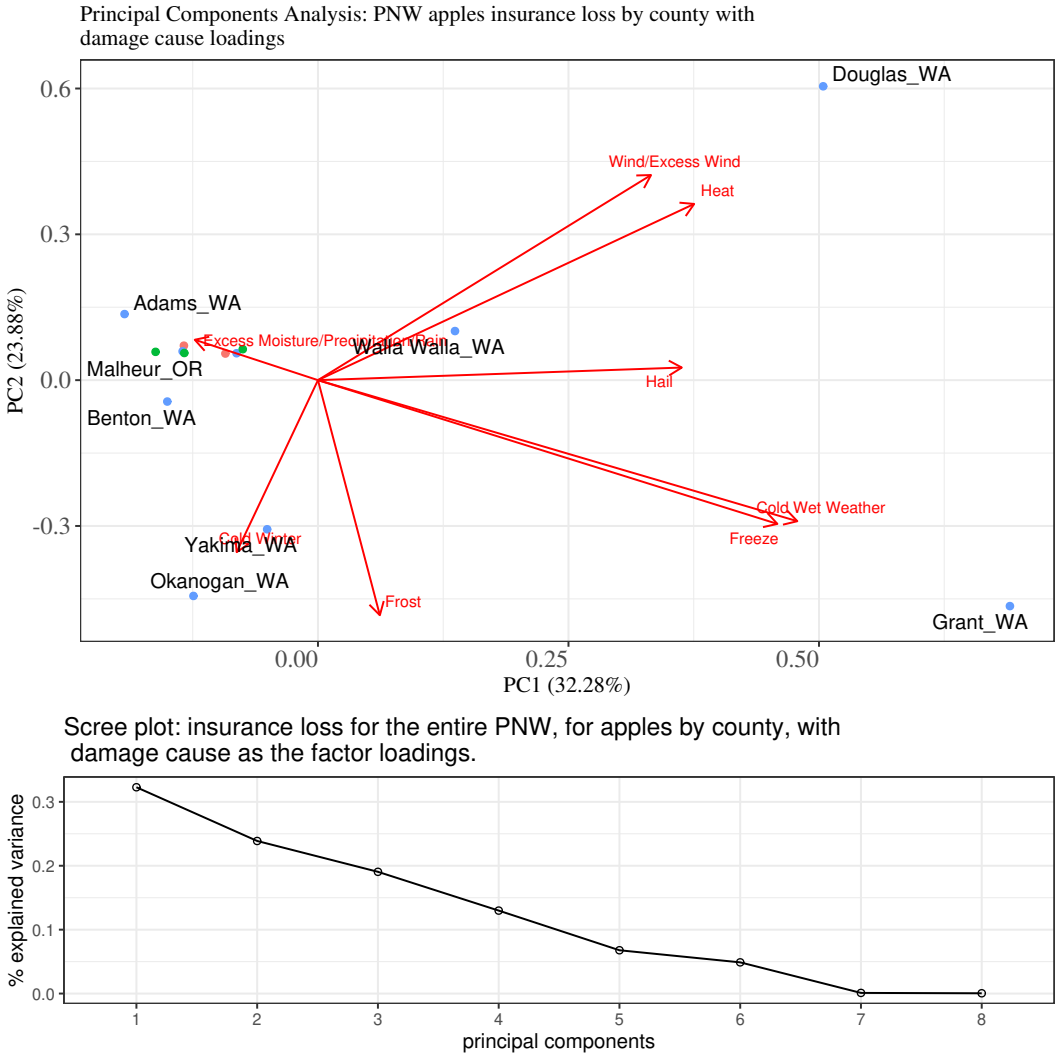


Figure S 15: Top panel: biplot of insurance loss for the entire PNW, for wheat by county, with damage cause as the factor loadings. Bottom panel: Scree plot. Data from 2001 is 2022 is used.



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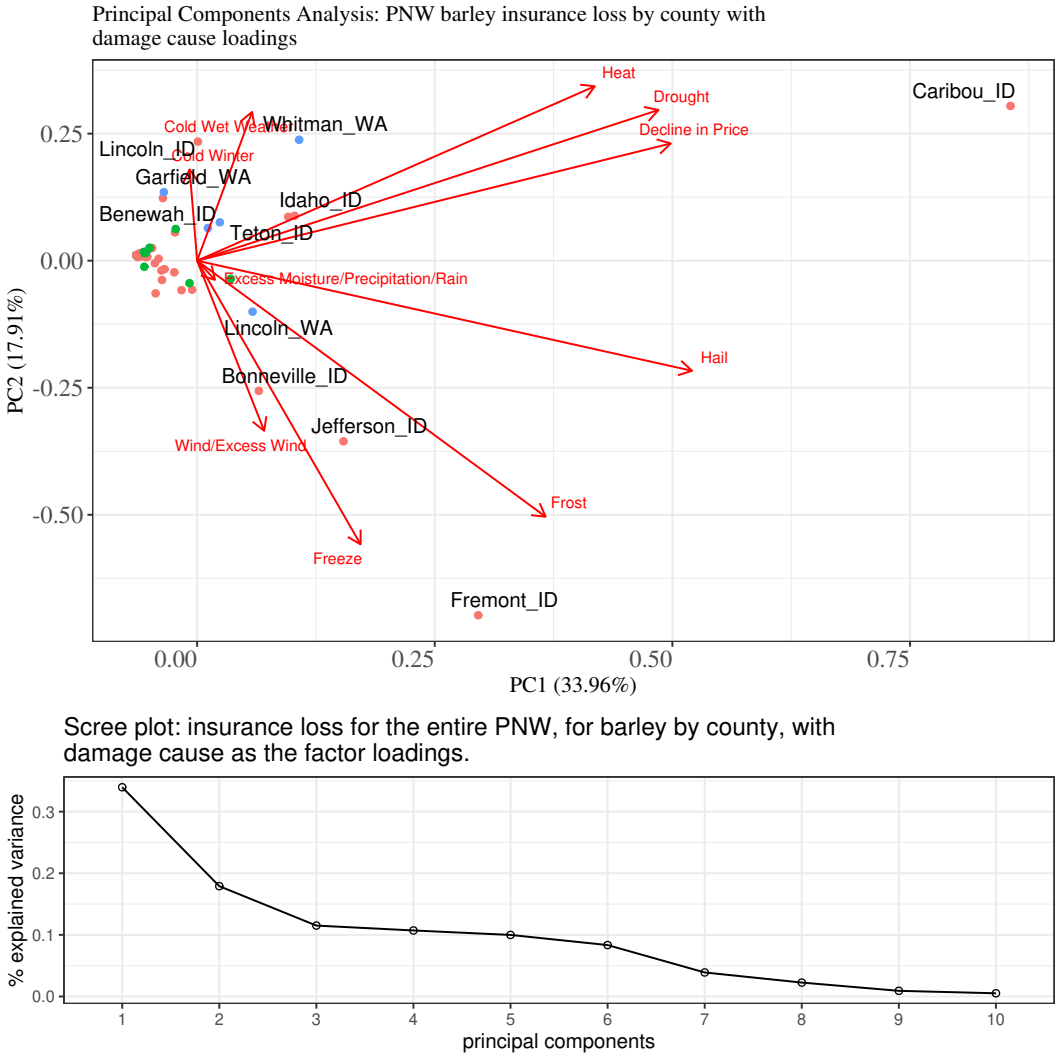


Figure S 17: Top panel: biplot of insurance loss for the entire PNW, for barley by county, with damage cause as the factor loadings. Bottom panel: Scree plot. Data from 2001 is 2022 is used.

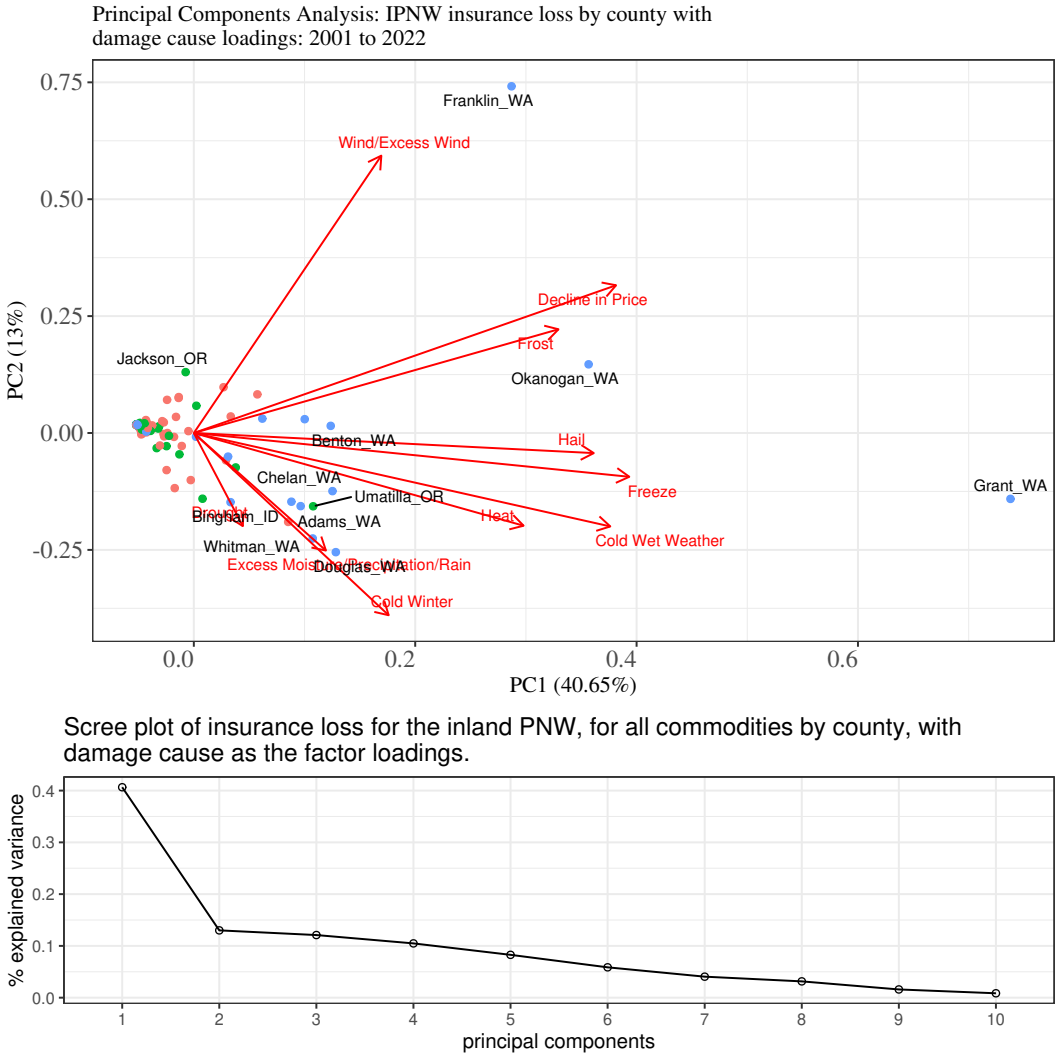


Figure S 18: Top panel: biplot of insurance loss for the inland PNW, for all commodities by county, with damage cause as the factor loadings. Bottom panel: Scree plot. Data from 2001 is 2022 is used.

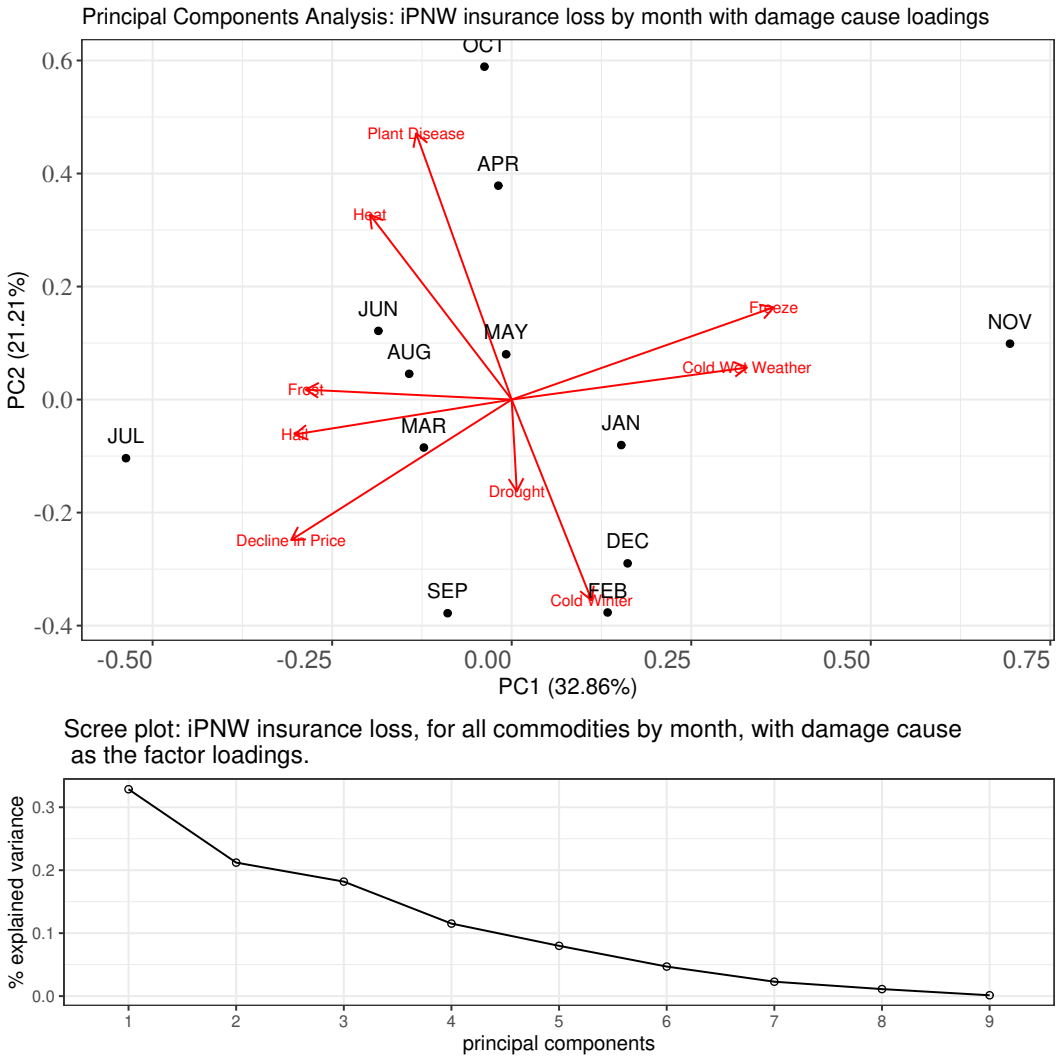
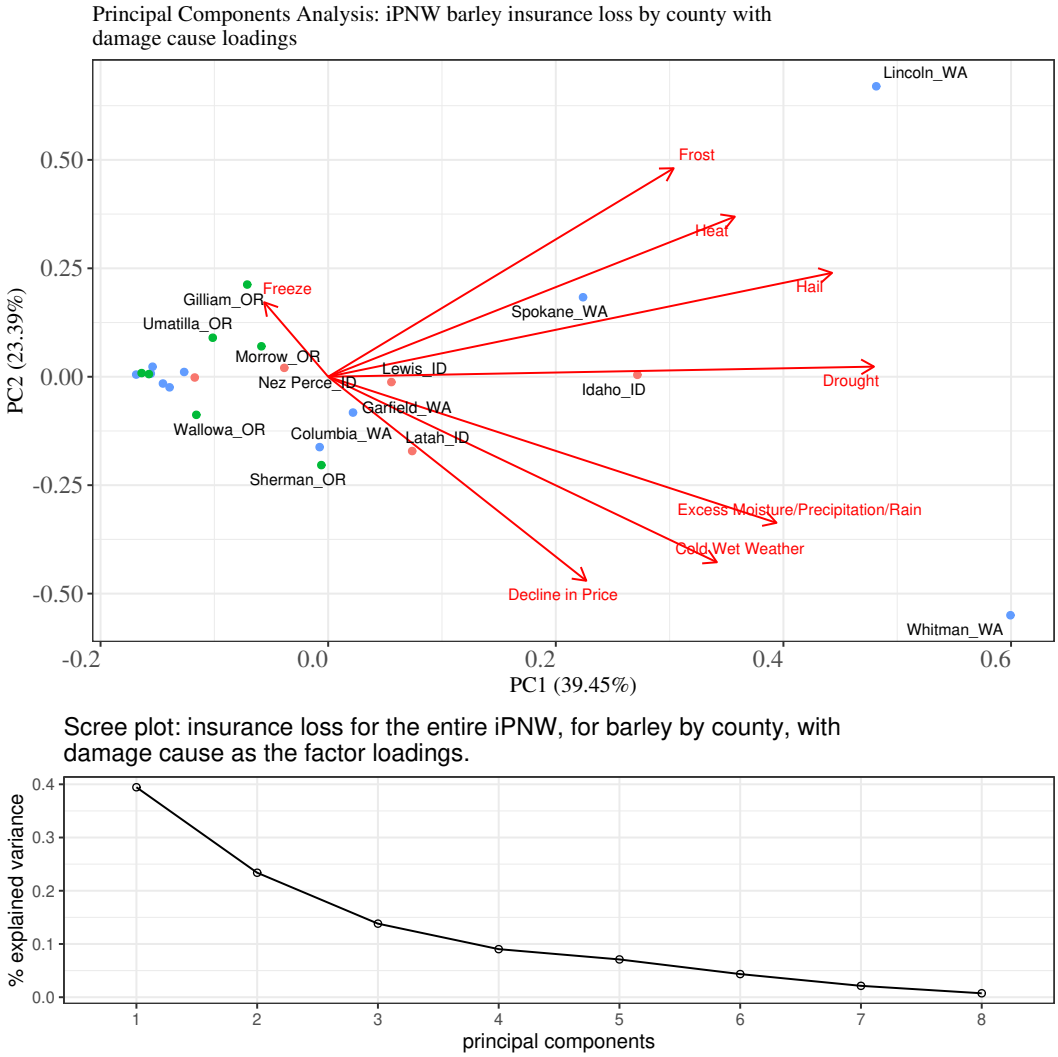


Figure S 19: Top panel: biplot of principal components for insurance loss for the entire iPNW, for all commodities by month, with damage cause as the factor loadings. Bottom panel: Scree plot Data from 2001 is 2022 is used.



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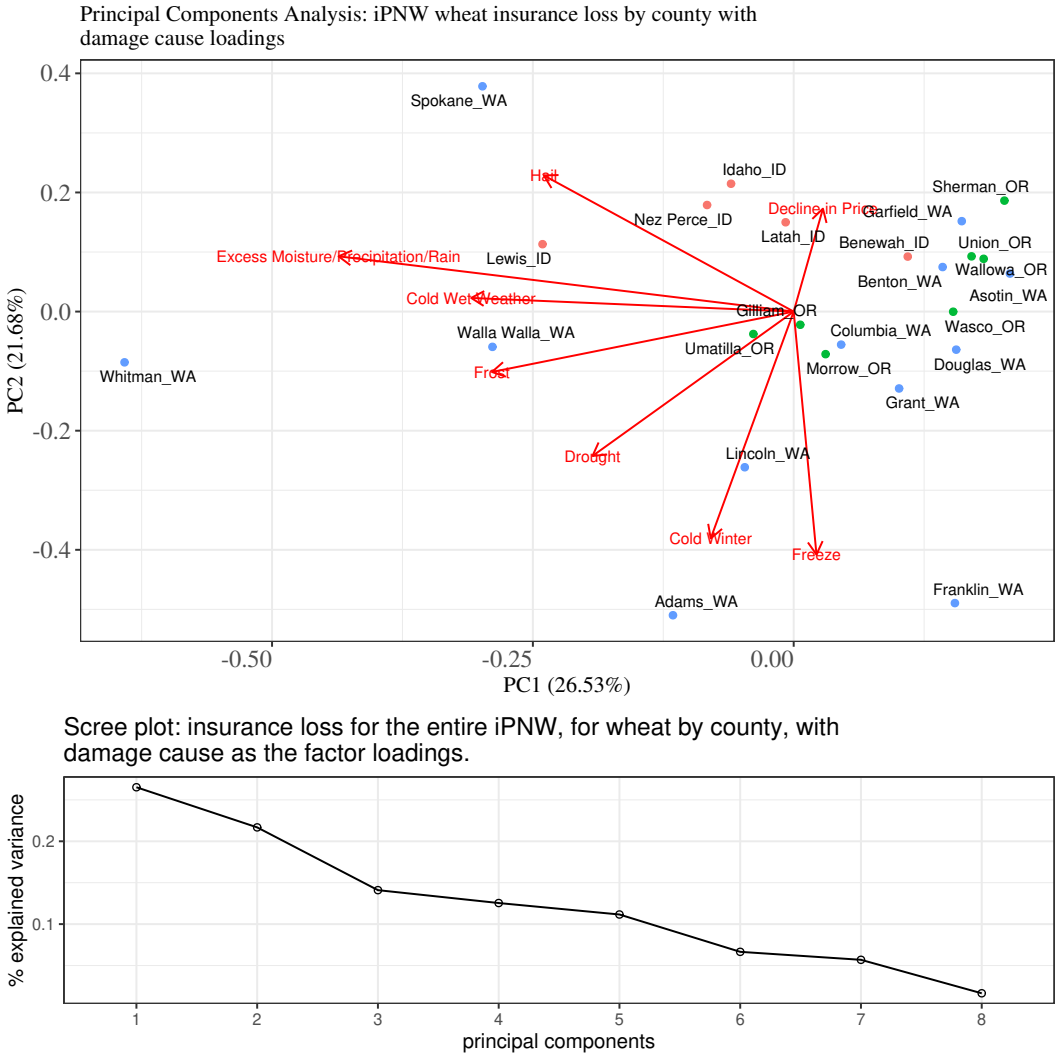


Figure S 21: Top panel: biplot of insurance loss for the entire PNW, for wheat by county, with damage cause as the factor loadings. Bottom panel: Scree plot. Data from 2001 is 2022 is used.

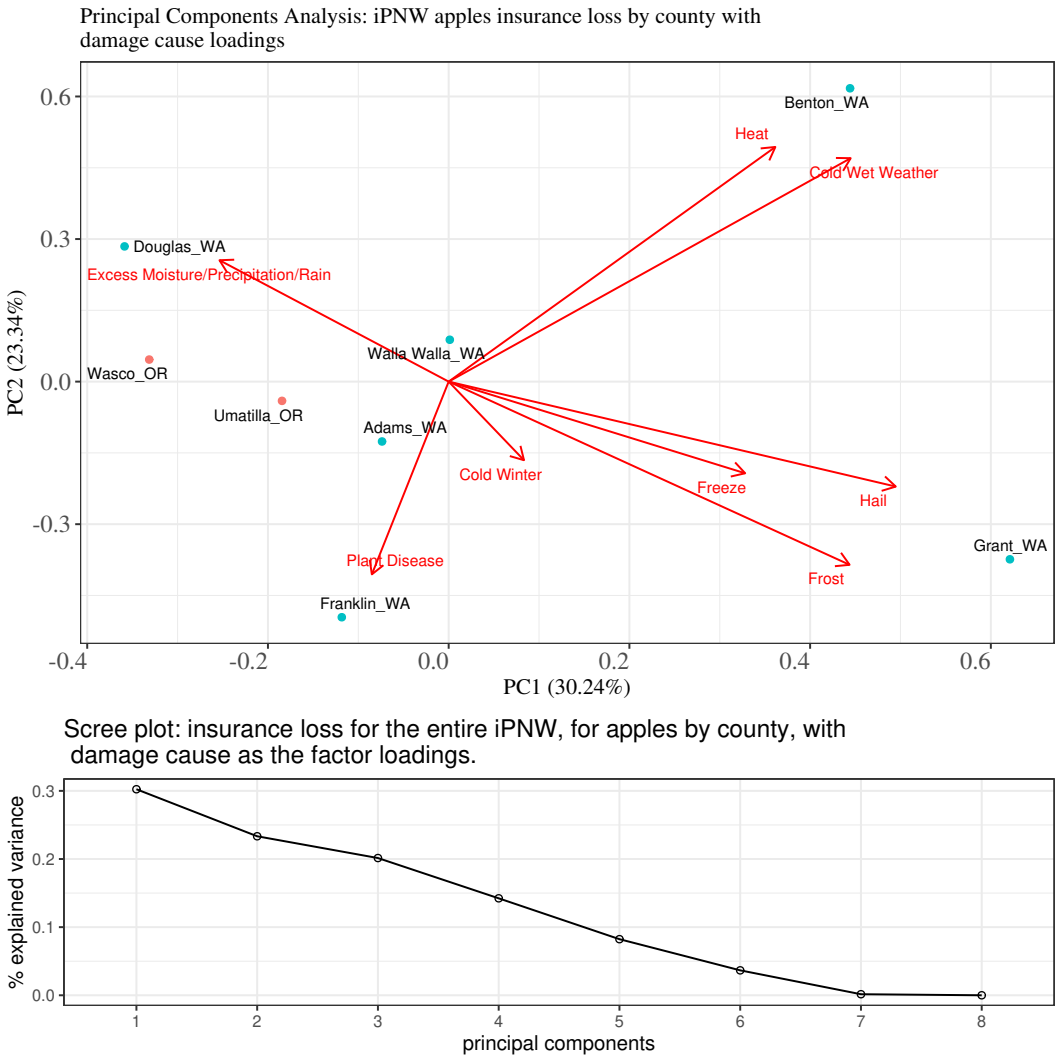
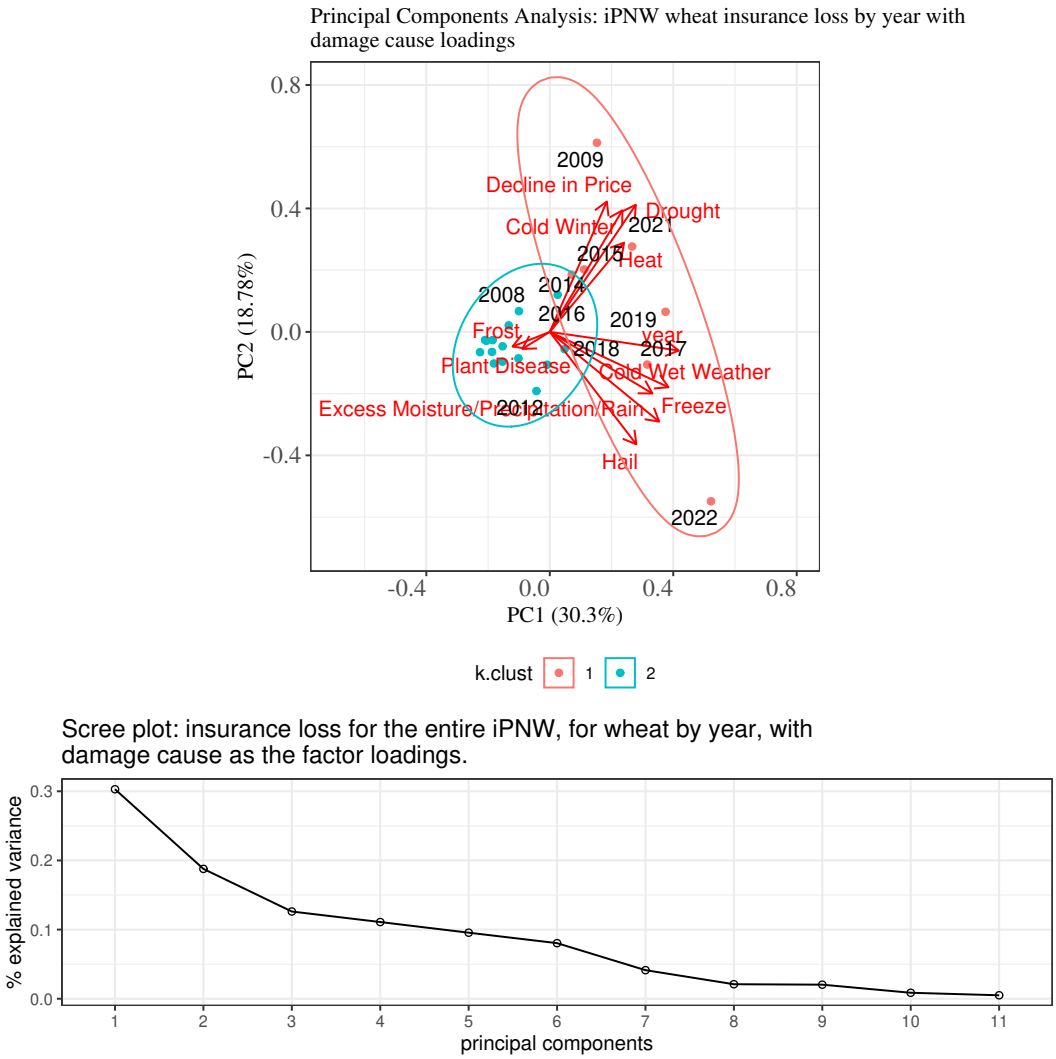


Figure S 22: Top panel: biplot of insurance loss for the entire iPNW, for apples by county, with damage cause as the factor loadings. Bottom panel: Scree plot. Data from 2001 is 2022 is used.



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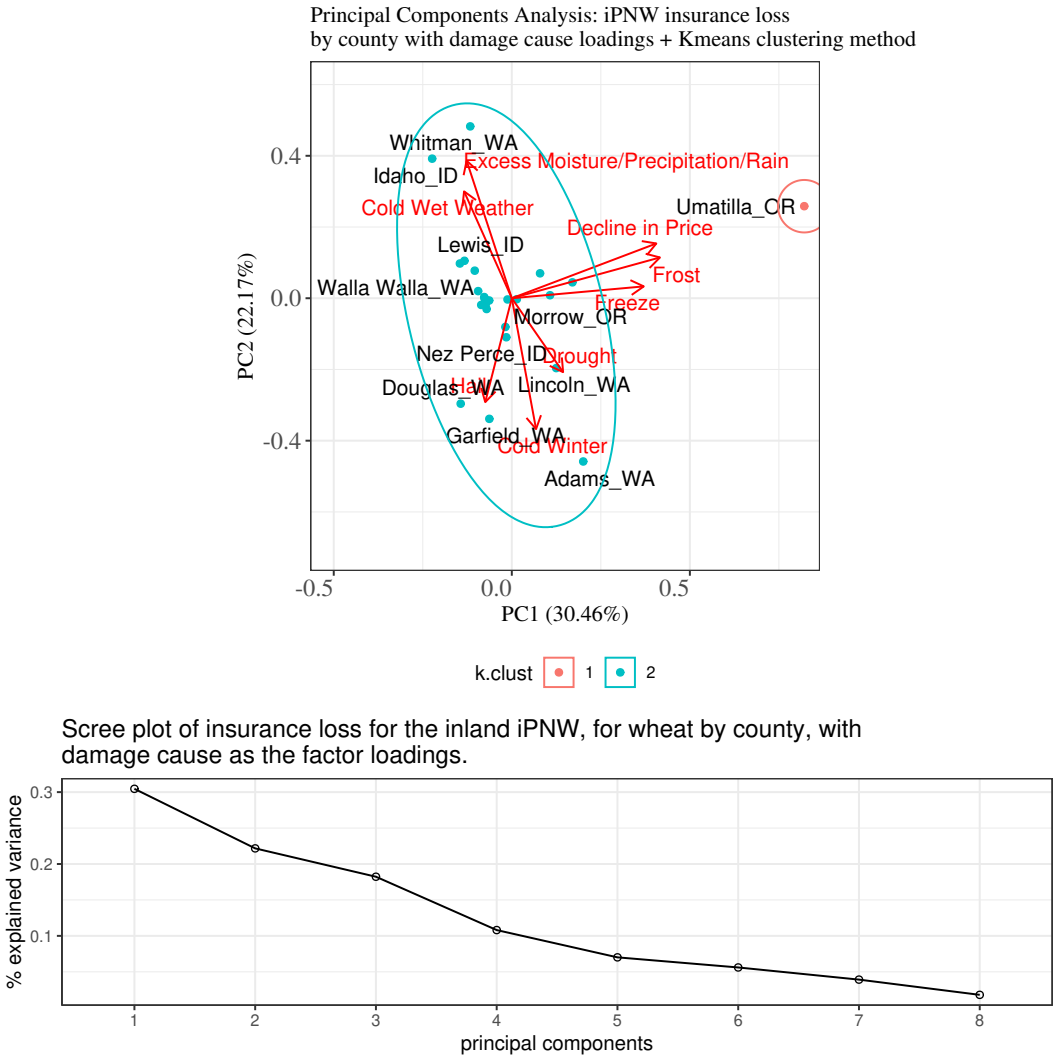

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