Rendering insights from USDA Farmer's market data

Visualizations to inform farm to school and state census data; and distribution of farmer's market to by Rural-Urban Continuum Codes

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Course:

Computation and Visualization

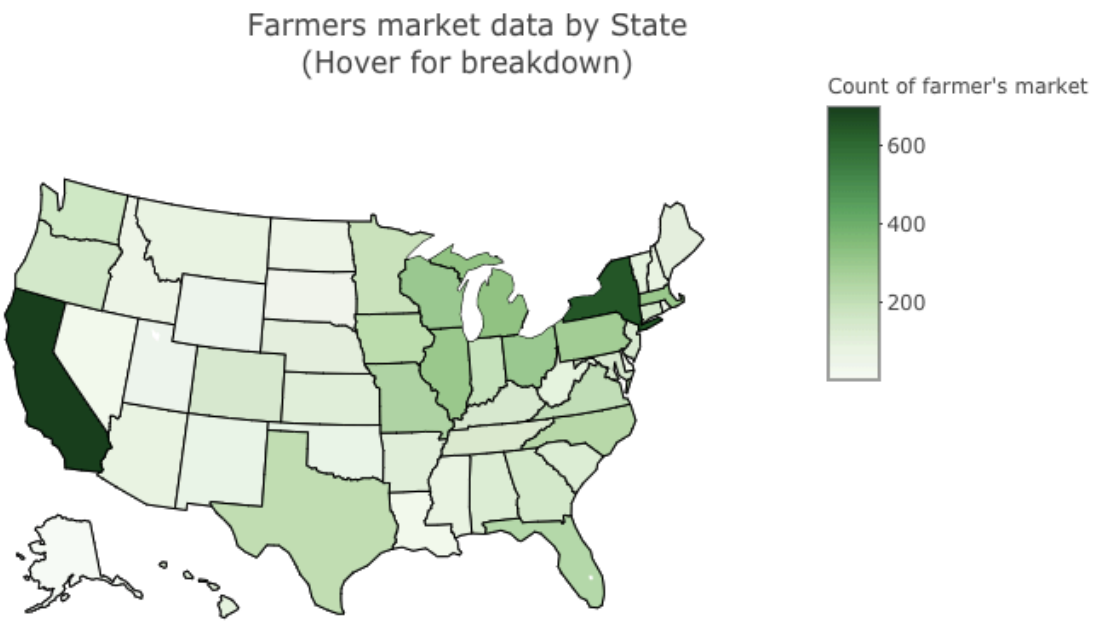
* Interactive visual

Abstract:

Farmers markets are community centrepieces and have become a critical ingredient to our nation's economy and food systems. are a priority strategy for improving community access to fresh fruits and vegetables. The U.S. Department of Agriculture (USDA) National Farmers Market Directory is a voluntary self-reported data source on farmers markets. The objective of this investigation of the USDA farmers markets data directory was to (1) identify the highest produce in each state, to determine (2) the individuals to market ratio by state and (3) student and school to market ration,(4) finding the social media platforms used by farmer's market and (5) payment accepted in markets by Rural-Urban continuum codes. Interactive Data visualisation was performed to understand access to markets by students and individuals. Over the last two years 977 new entries are recorded. The interactive data visualizations including geographic maps can help inform knowledge about the present farmer's market and provide insights to increase the efficiency in production, accessibility and availability.

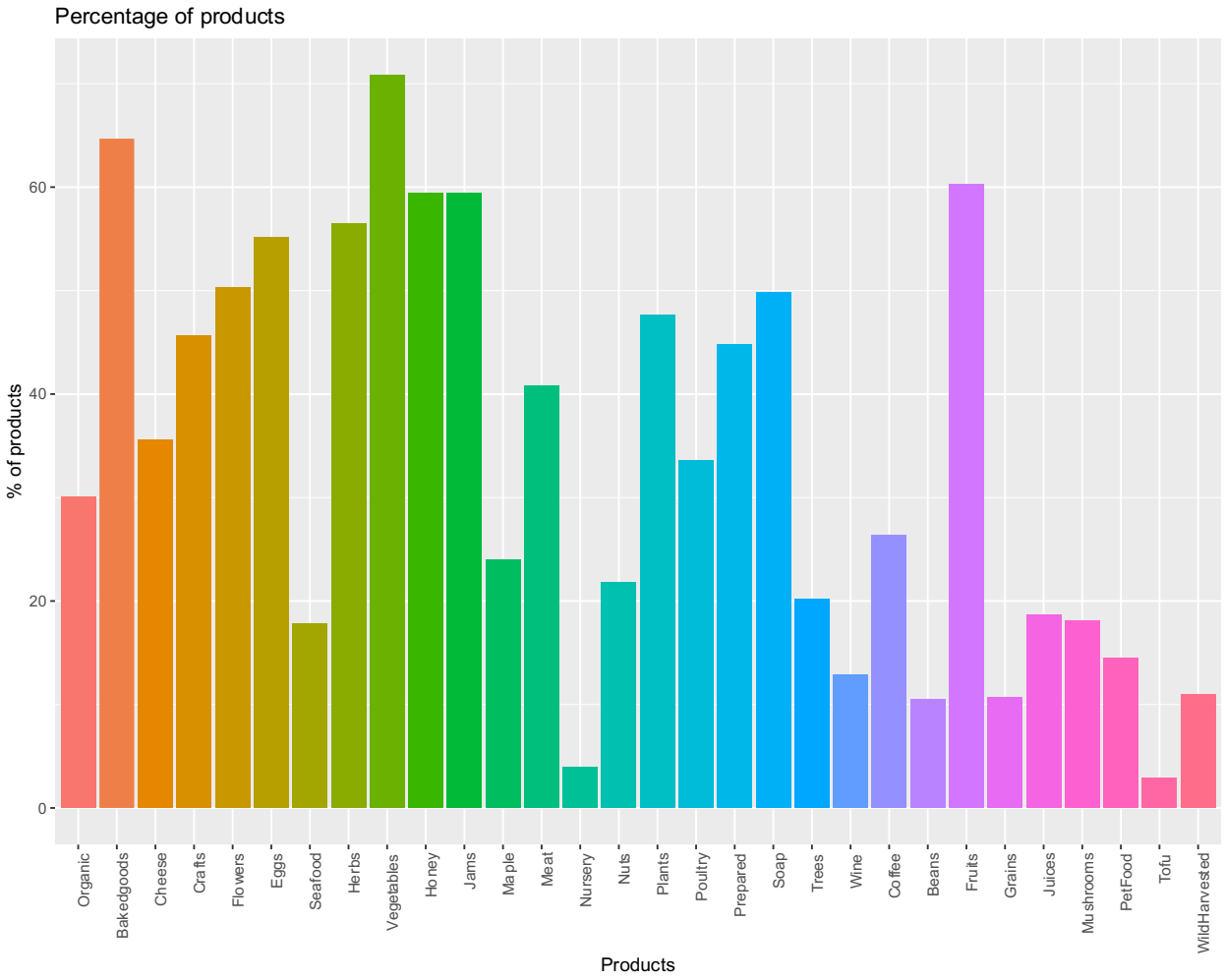
*Farmer's market by State

This interactive visualization helps understand the number of markets present in each state. The popularity of food markets has been uneven, however, with high densities of markets in certain areas. New York City and the Northeast have a vibrant food culture. So does the west coast, the metropolitan areas of Seattle and Portland. On the other hand Texas and much of the south have a lower intensity.



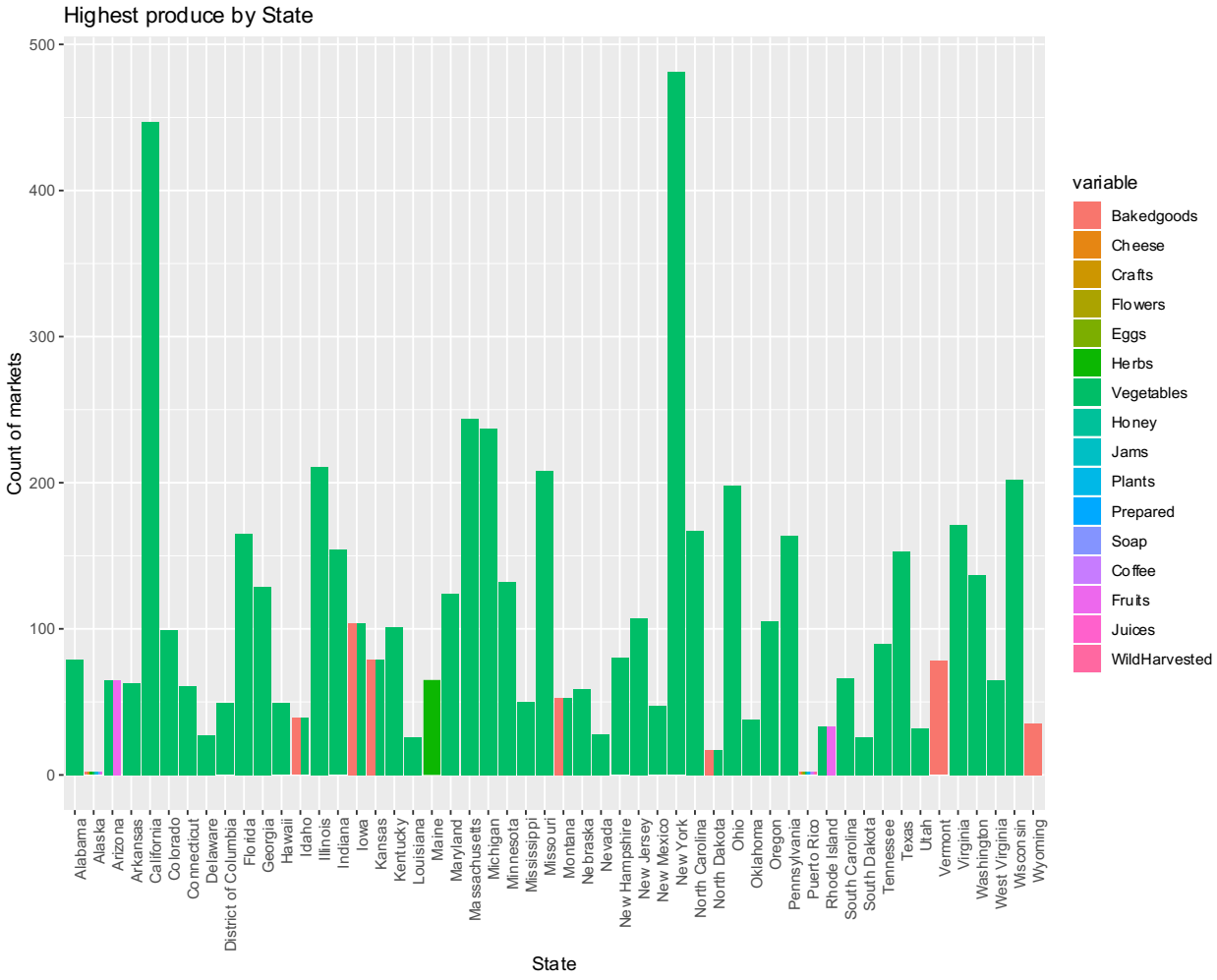
Percentage of Products

We are visualizing the percentage of products sold by all the farmer's markets throughout the country. As we can see vegetables, fruits and baked goods have a higher production rate by a large margin than the other products.


Percentage of products
% of products
0
20
40
60
Organic
Bakedgoods
Cheese
Crafts
Flowers
Eggs
Seafood
Herbs
Vegetables
Honey
Jams
Maple
Meat
Nursery
Nuts
Plants
Poultry
Prepared
Soap
Trees
Wine
Coffee
Beans
Fruits
Grains
Juices
Mushrooms
PetFood
Tofu
WildHarvested
Products

Highest product by state

Vegetables top the chart by being the highest produce from each state.

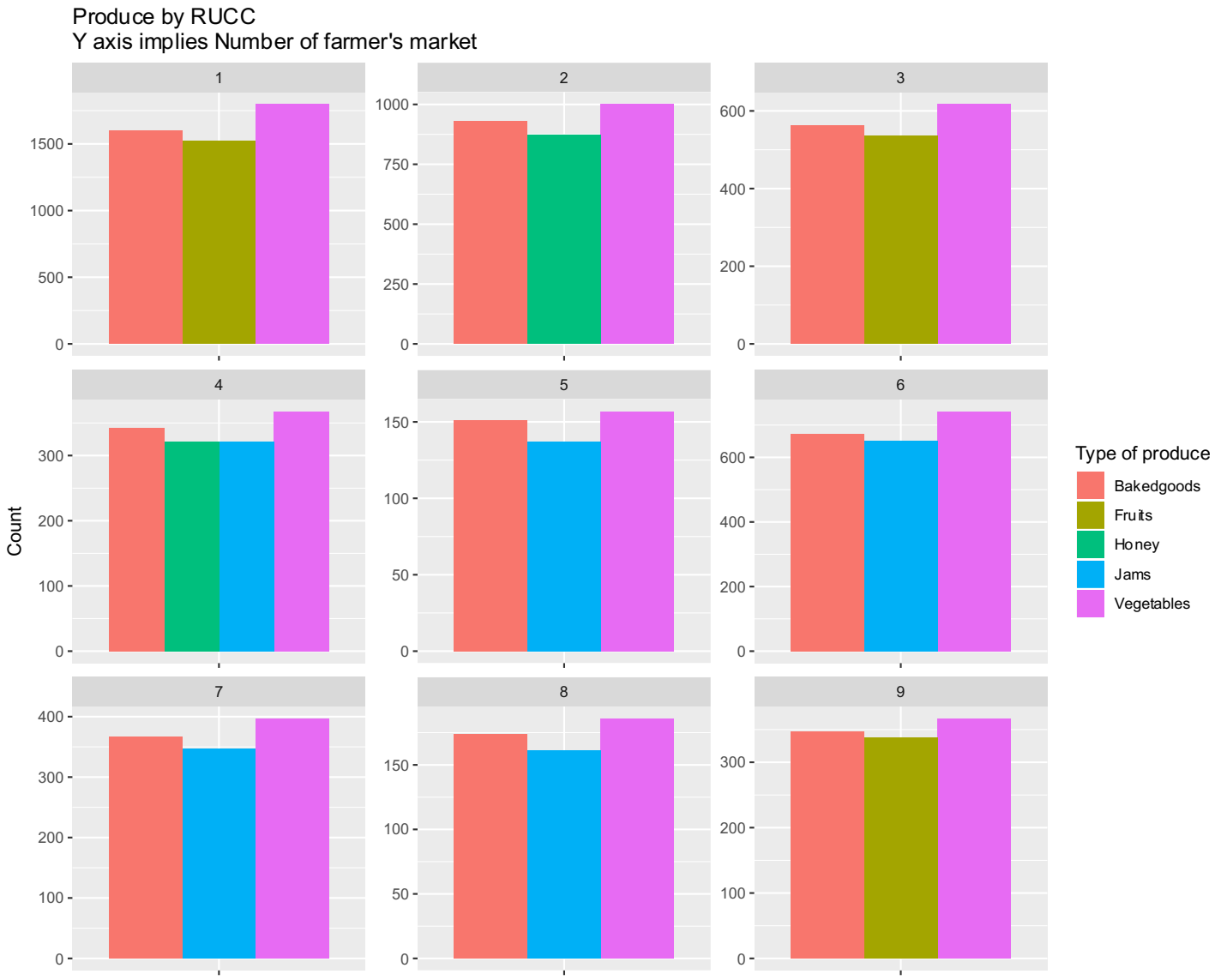


*Produce by RUCC - Interactive

The rural-urban commuting area (RUCA) codes classify U.S. census tracts using measures of population density, urbanization, and daily commuting. Having grouped locations by RUCC allows us to break county data into finer residential groups, beyond metro and nonmetro, particularly for the analysis of trends in nonmetro areas that are related to population density and metro influence.

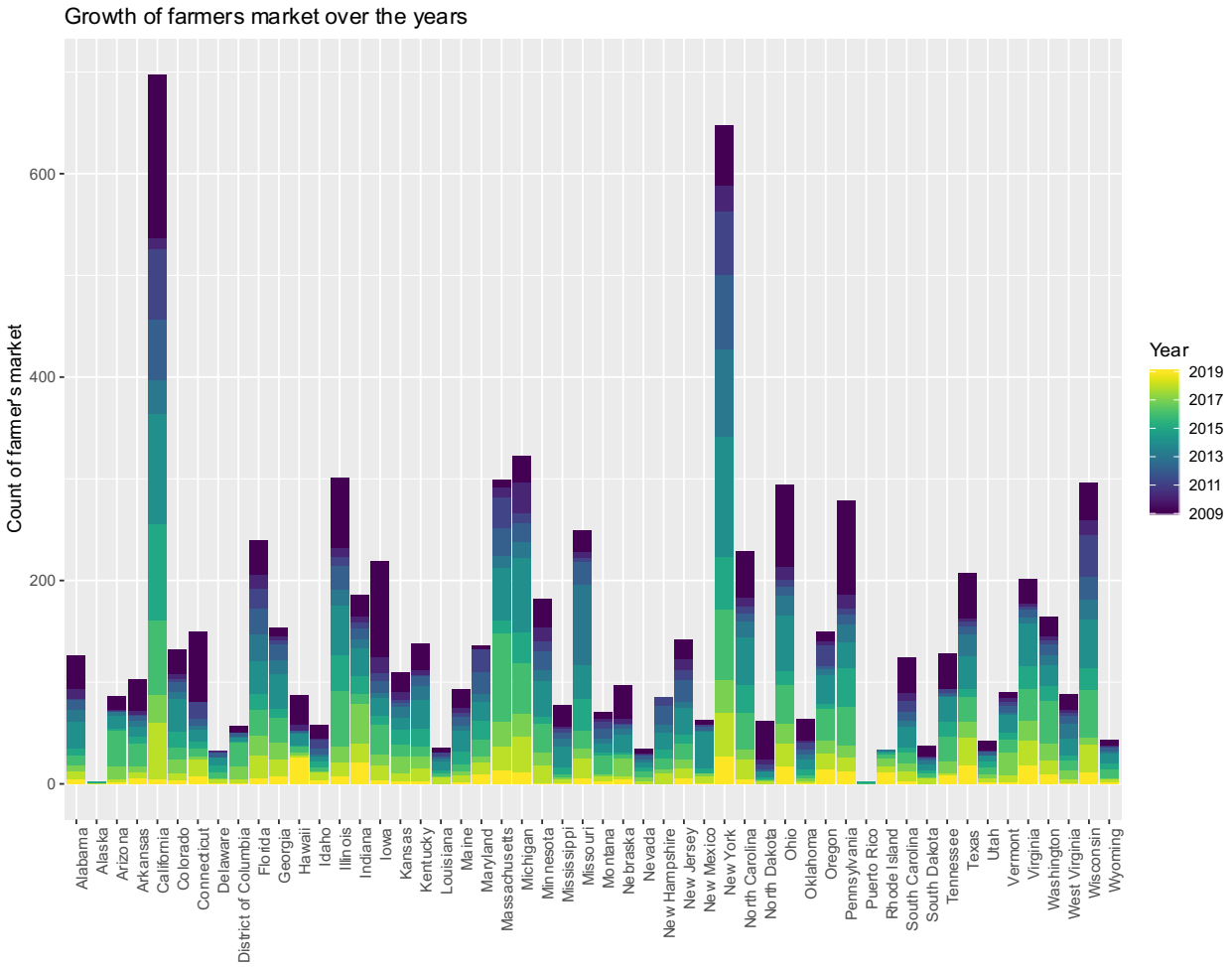
Code	Description
RUC1	Metro – population ≥ 1 million
RUC2	Metro – population 250,000 - 1 million
RUC3	Metro – population < 250,000
RUC4	Urban – population ≥ 20,000, adjacent to Metro
RUC5	Urban – population ≥ 20,000, not adjacent to Metro
RUC6	Urban – population 2,500 - 19,999, adjacent to Metro
RUC7	Urban – population 2,500 - 19,999, not adjacent to Metro
RUC8	Rural – adjacent to Metro
RUC9	Rural, not adjacent to Metro

This visualization allows us to visualize the produce broken down to something smaller than a county level and how the produce differs unlike the previous graph. In highest produce by State, the result suggests that vegetables are the highest and we can't really focus on the second highest because of the difference. We could have only assumed that baked goods might be the second and third being fruits. Whereas by looking at RUCC breakdown, interestingly we note that Jams take the third place in most of the non metro areas and Fruits in the metros.



*Growth of farmer's market over the years:

Farmers' markets continue to pop up throughout the United States. The number of markets listed in the USDA National Directory of Farmers' Markets has increased nearly five-fold since 2009, bringing the national total to 8,791 (USDA 2020).



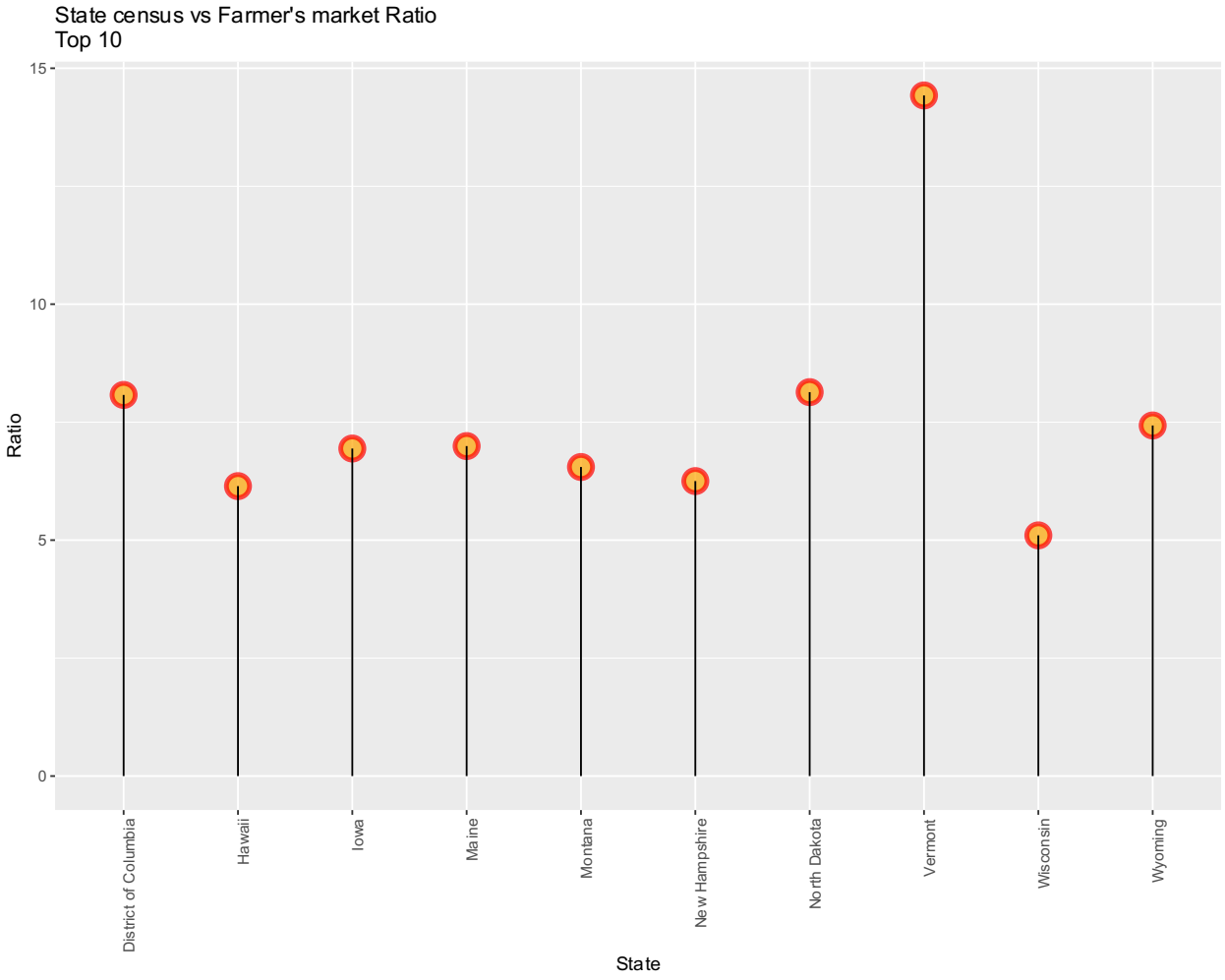
Farmer's market Accessibility:

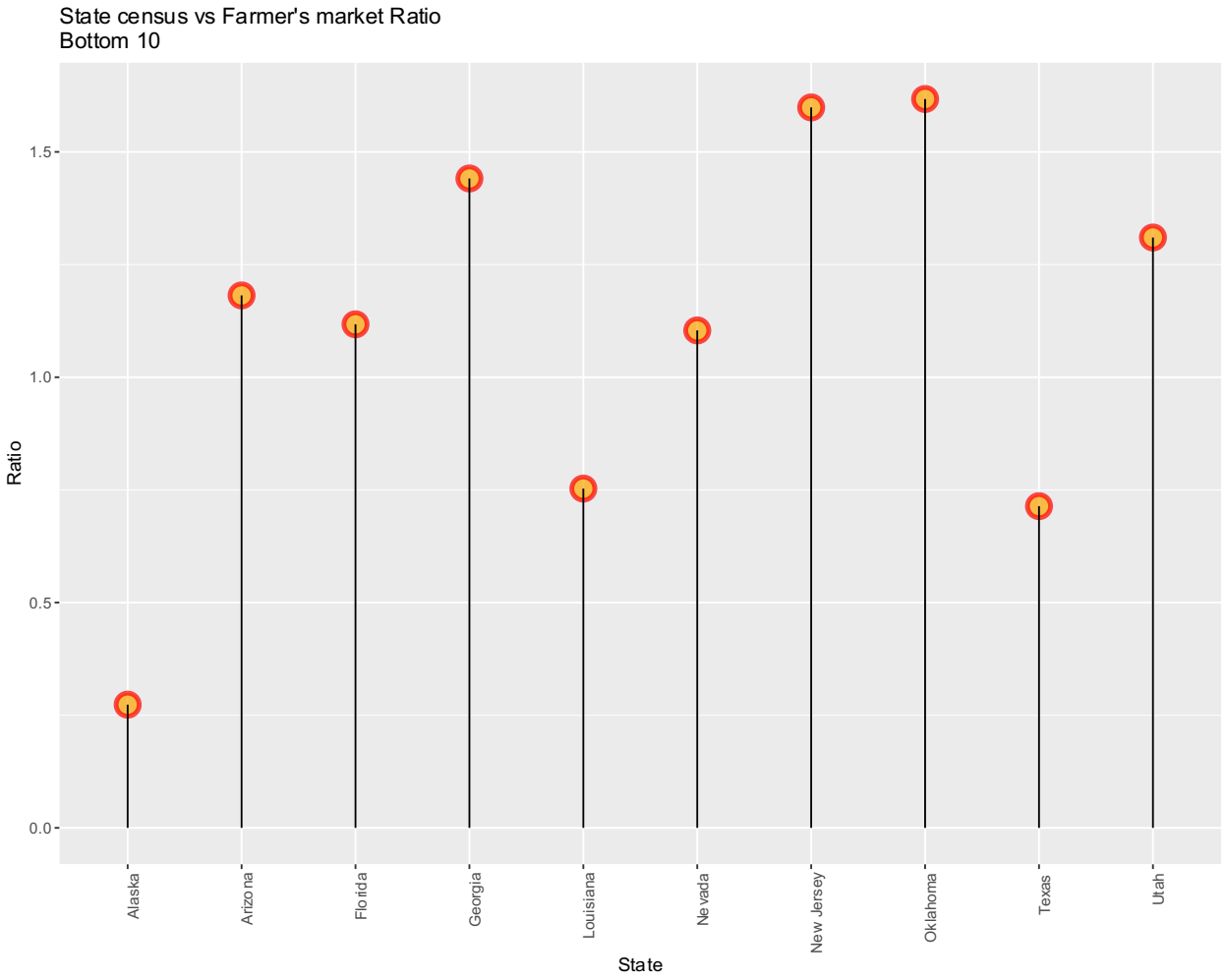
The knowledge of where food comes from and who grows it can also take on a moral, spiritual and educational dimension for local food consumers.
From USDA, information about state population, student population and number of schools by state was gathered and merged into the farmer's market dataset. With the numerous farmer's market program taking place, one significant program was the National school lunch program. To see how effective the location of farmer's market data helps the cause, multiple visuals are created to gain insights. Starting from how accessible to individuals, we progress from total population vs number of markets and then to no of schools.

State Population vs Farmer's market:

We take a ratio between the no of farmer's market available per 100,000 individuals. The Dallas-Fort Worth Metroplex (DFW) is the fourth largest metropolitan area in the United States, with a population of 6.4 million, and an annual growth rate of 2.0% (DFW's population is expected to double by 2050)

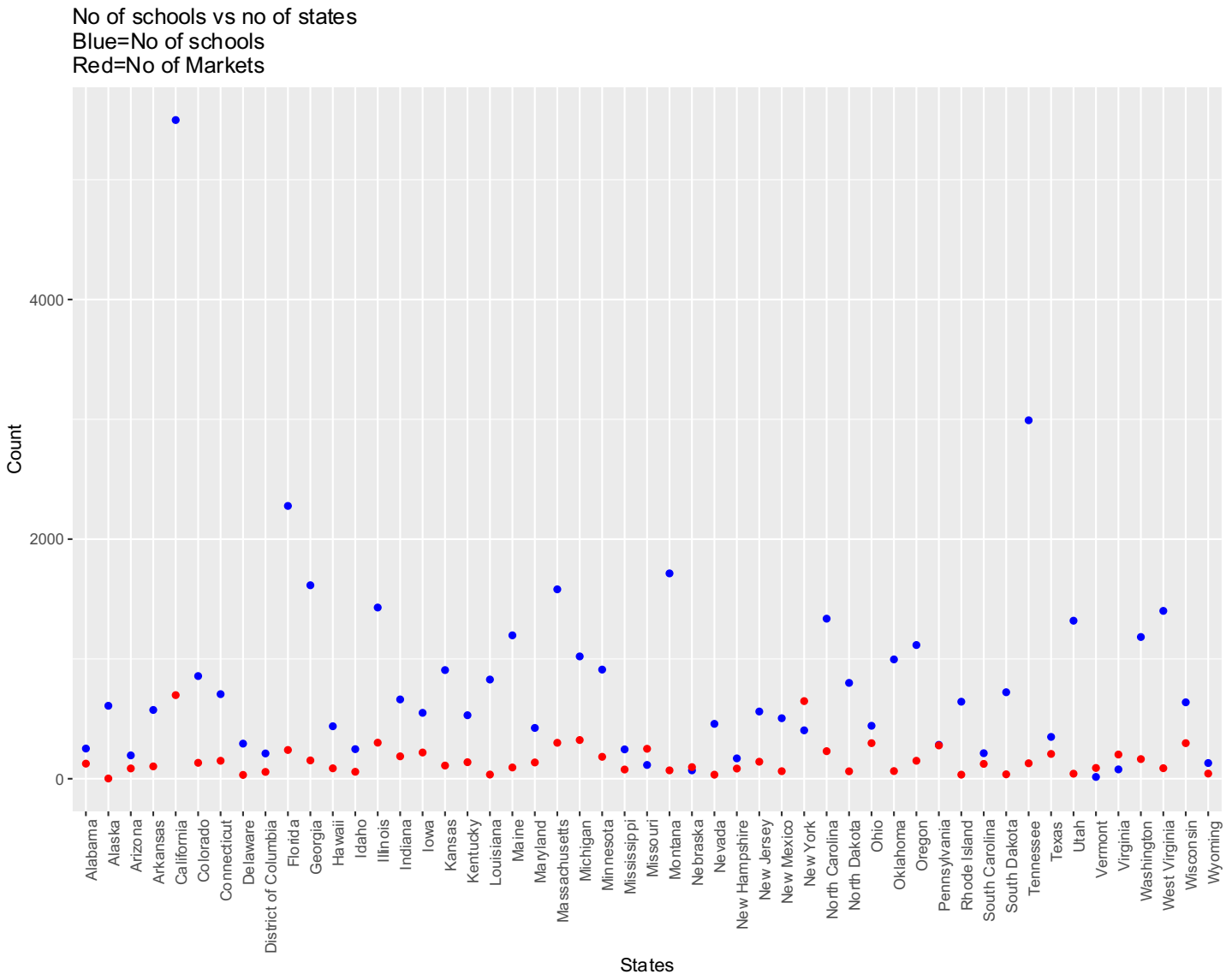
Now if we look at this visuals of 20 states with high and low ratio, Texas with a very high population has a very poor ratio. This suggests the need for farmer's markets in areas with a higher population and higher surface area.





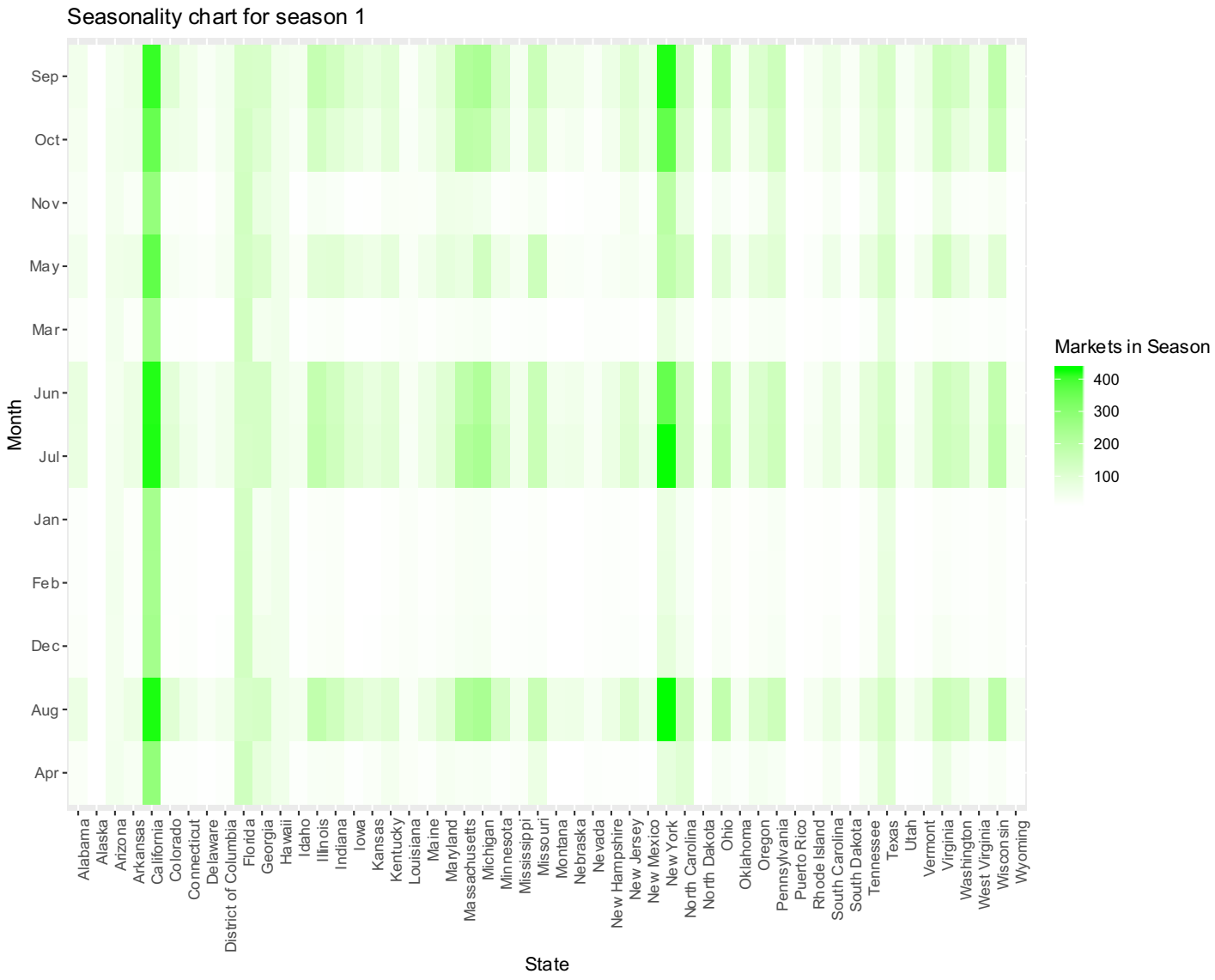
*Accessibility to students:

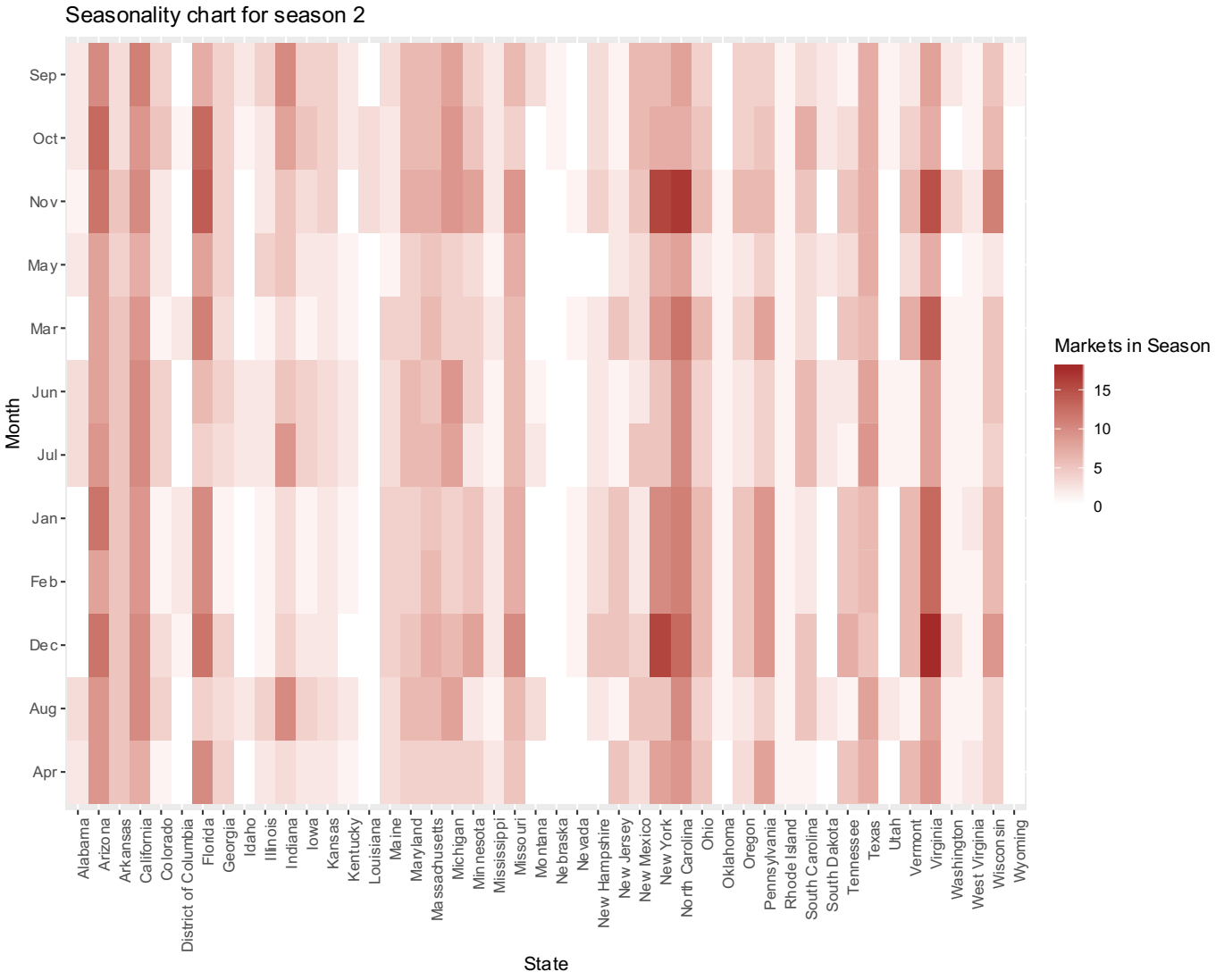
Now we analyze the accessibility to students. Contrary to the previous conclusion Texas has an almost equal number of markets as that of the number of schools. And the west coast with high farmer's market, has the highest difference. This creates a question of whether the no of schools in Texas are lower and should that be a concern or if the accessibility of nutritious fresh food to student's in California should be of concern.

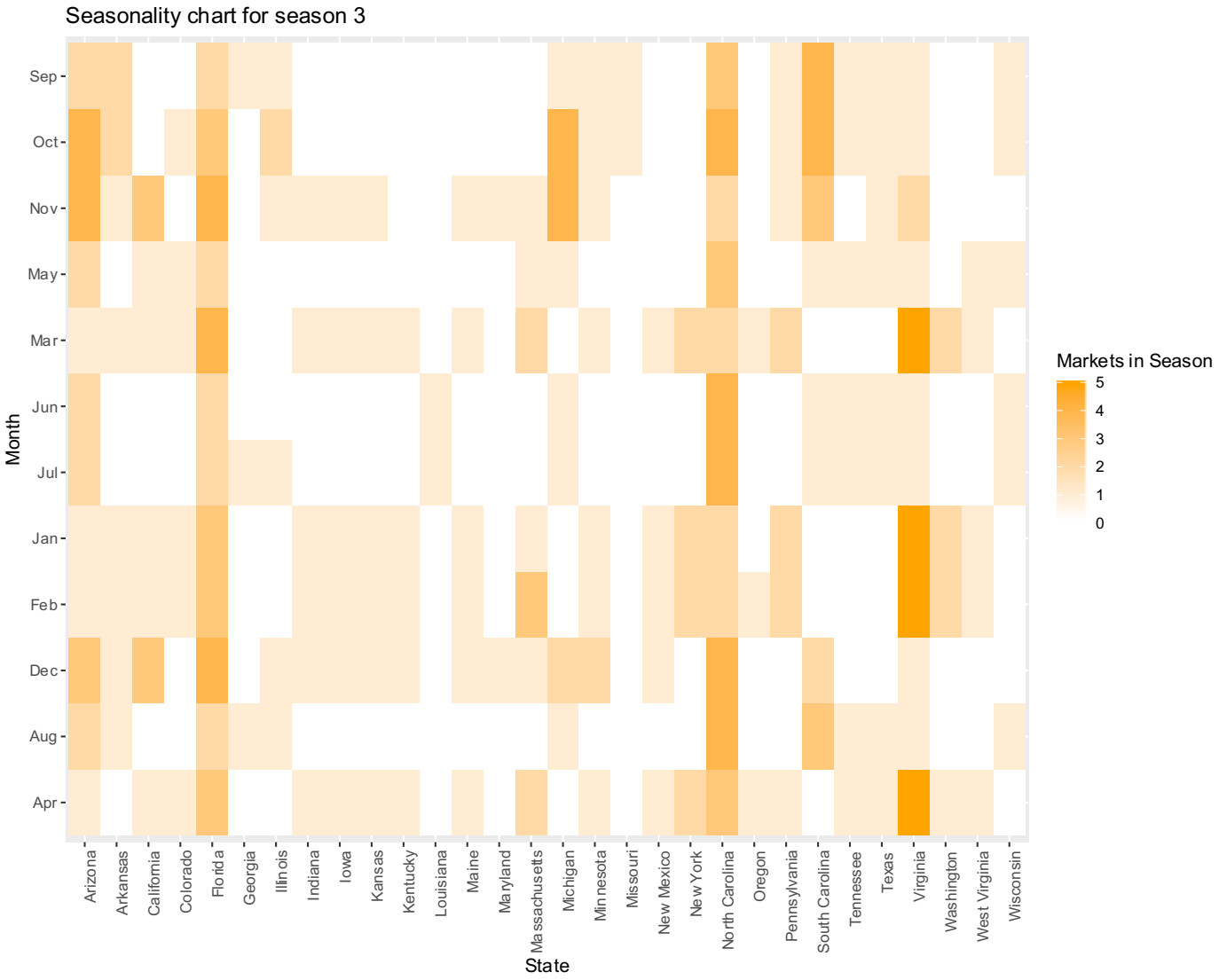


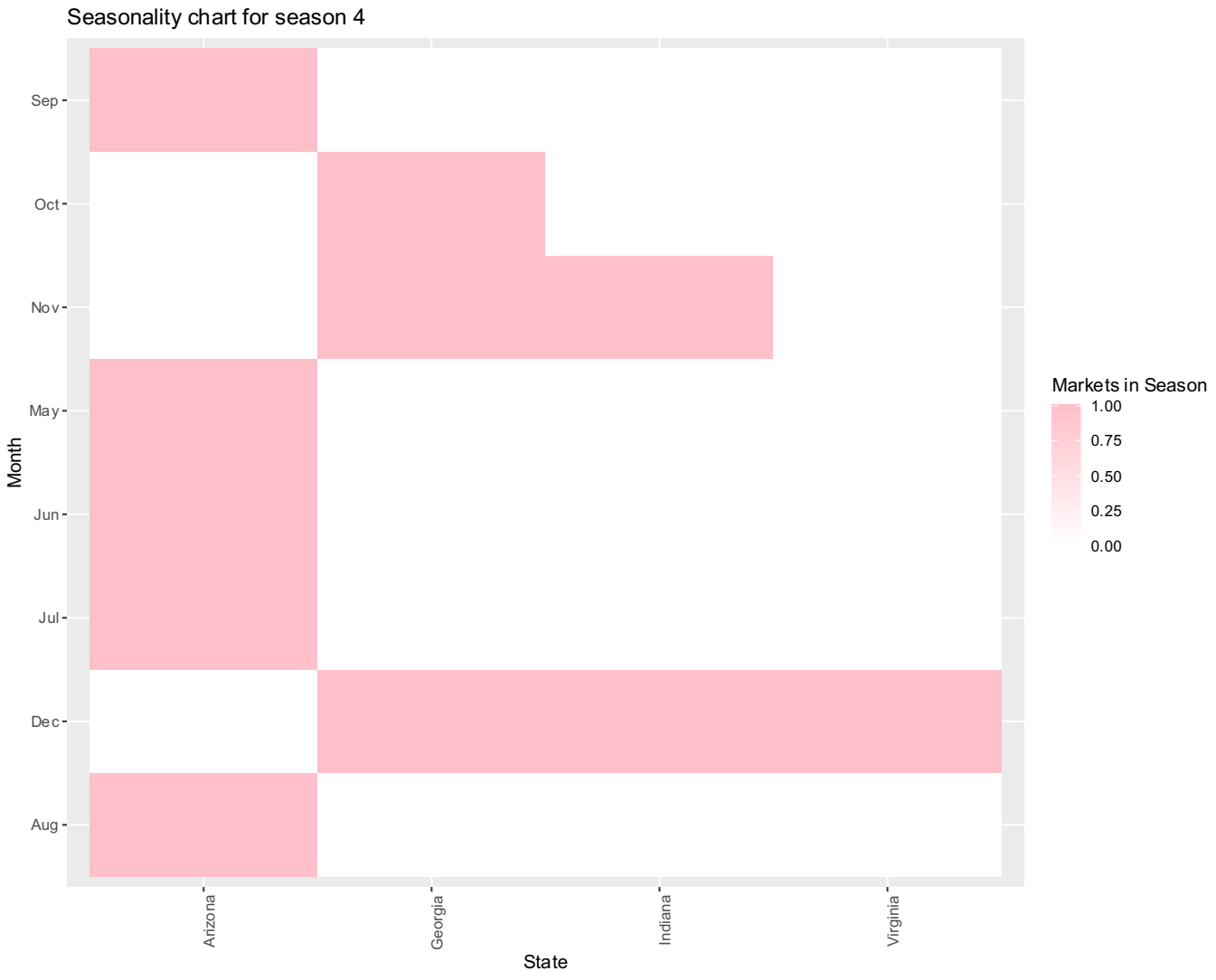
*Seasonality

Then we analyze the number of markets under production according to every season. We can see the number of markets in production decreases by season by the lessening complexity of the charts. To analyze this data, hover over the chart to see how many markets are in season,by,month, and by state.


Seasonality chart for season 1
Month
Sep
Oct
Nov
May
Mar
Jun
Jul
Jan
Feb
Dec
Aug
Apr
Alabama
Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
District of Columbia
Florida
Georgia
Hawaii
Idaho
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
Massachusetts
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
New Hampshire
New Jersey
New Mexico
New York
North Carolina
North Dakota
Ohio
Oklahoma
Oregon
Pennsylvania
Puerto Rico
Rhode Island
South Carolina
South Dakota
Tennessee
Texas
Utah
Vermont
Virginia
Washington
West Virginia
Wisconsin
Wyoming
State
Markets in Season
400
300
200
100

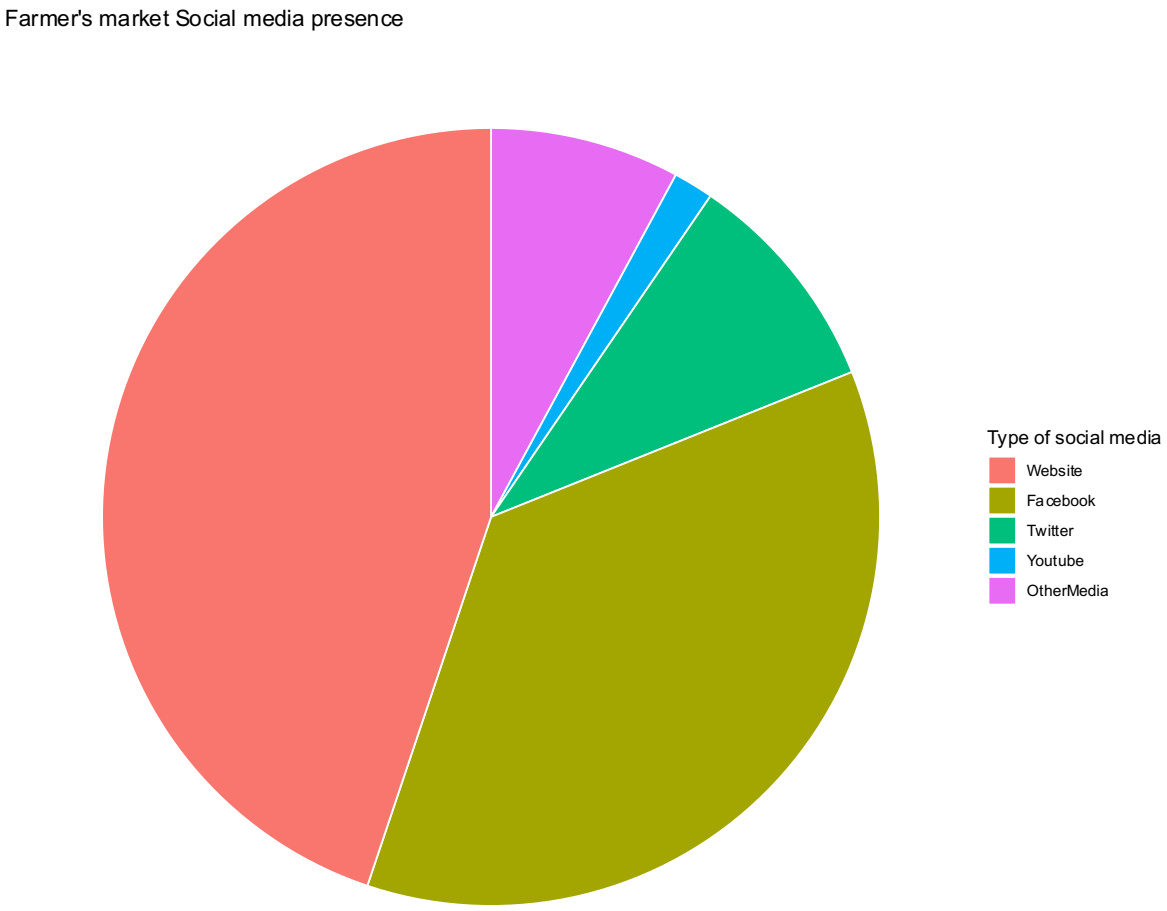

Seasonality chart for season 2
Month
Sep
Oct
Nov
May
Mar
Jun
Jul
Jan
Feb
Dec
Aug
Apr
Alabama
Arizona
Arkansas
California
Colorado
District of Columbia
Florida
Georgia
Idaho
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
Massachusetts
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
New Hampshire
New Jersey
New Mexico
New York
North Carolina
Ohio
Oklahoma
Oregon
Pennsylvania
Rhode Island
South Carolina
South Dakota
Tennessee
Texas
Utah
Vermont
Virginia
Washington
West Virginia
Wisconsin
Wyoming
State
Markets in Season
15
10
5
0

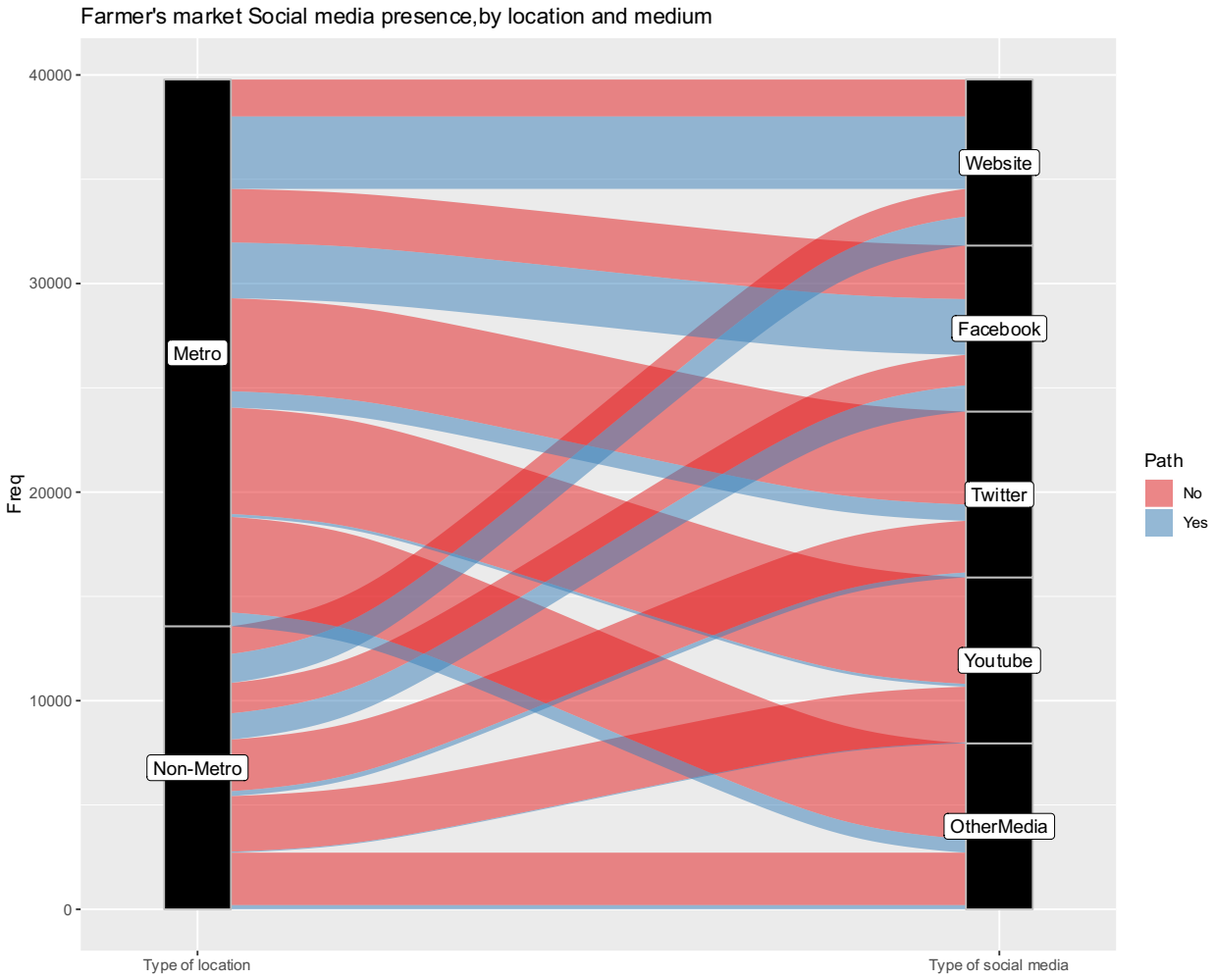

Seasonality chart for season 3
Month
Sep
Oct
Nov
May
Mar
Jun
Jul
Jan
Feb
Dec
Aug
Apr
Arizona
Arkansas
California
Colorado
Florida
Georgia
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
Massachusetts
Michigan
Minnesota
Missouri
New Mexico
New York
North Carolina
Oregon
Pennsylvania
South Carolina
Tennessee
Texas
Virginia
Washington
West Virginia
Wisconsin
State
Markets in Season
5
4
3
2
1
0


Seasonality chart for season 4
Sep
Oct
Nov
May
Jun
Jul
Dec
Aug
Month
Arizona
Georgia
Indiana
Virginia
State
Markets in Season
1.00
0.75
0.50
0.25
0.00

Social Media Presence

Among the 8 farmers markets with vendors for fruits and vegetables updated in 2018, 567 (%) have a Facebook page and 483 (55%) have a website.





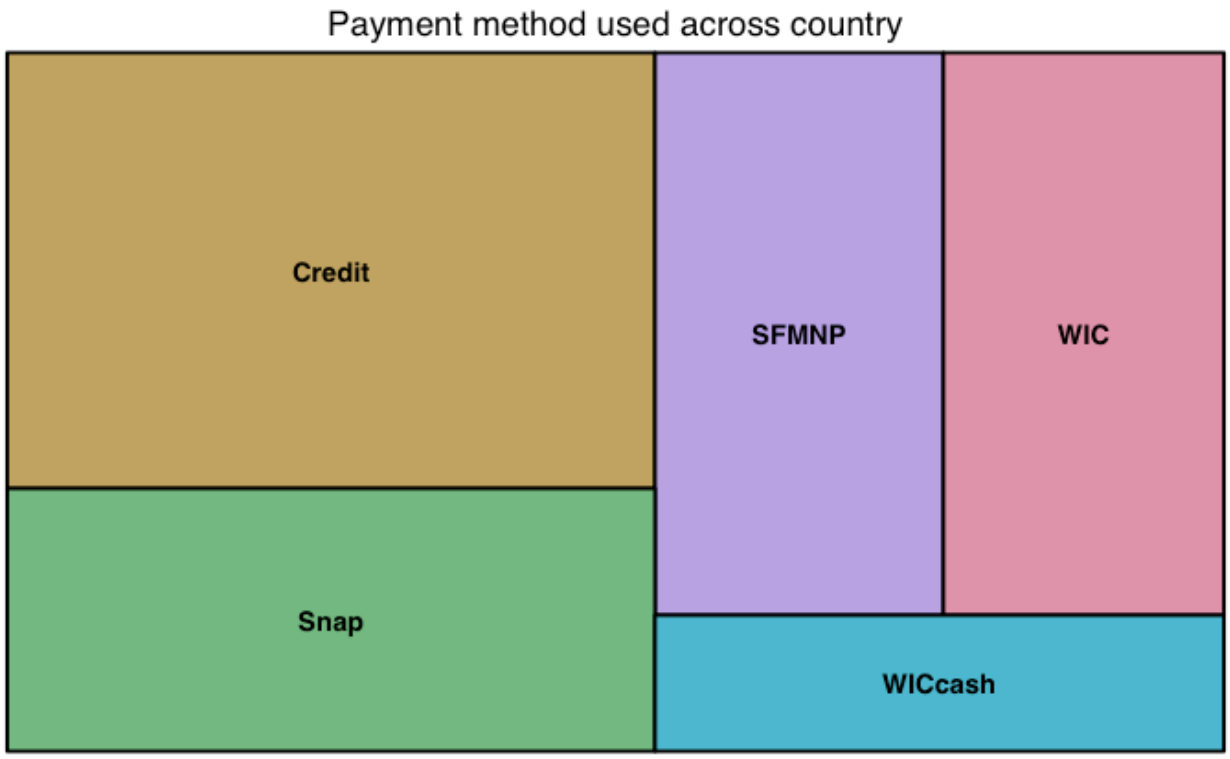
To facilitate harnessing knowledge on how farmers markets serve as nodes for products and community we provide visualization of geographic map(by RUCC) that blends information on location and social media (Facebook, Twitter, YouTube, and others).

It is very obvious from the chart that the number of social media user's are very high in Metropolitan areas.

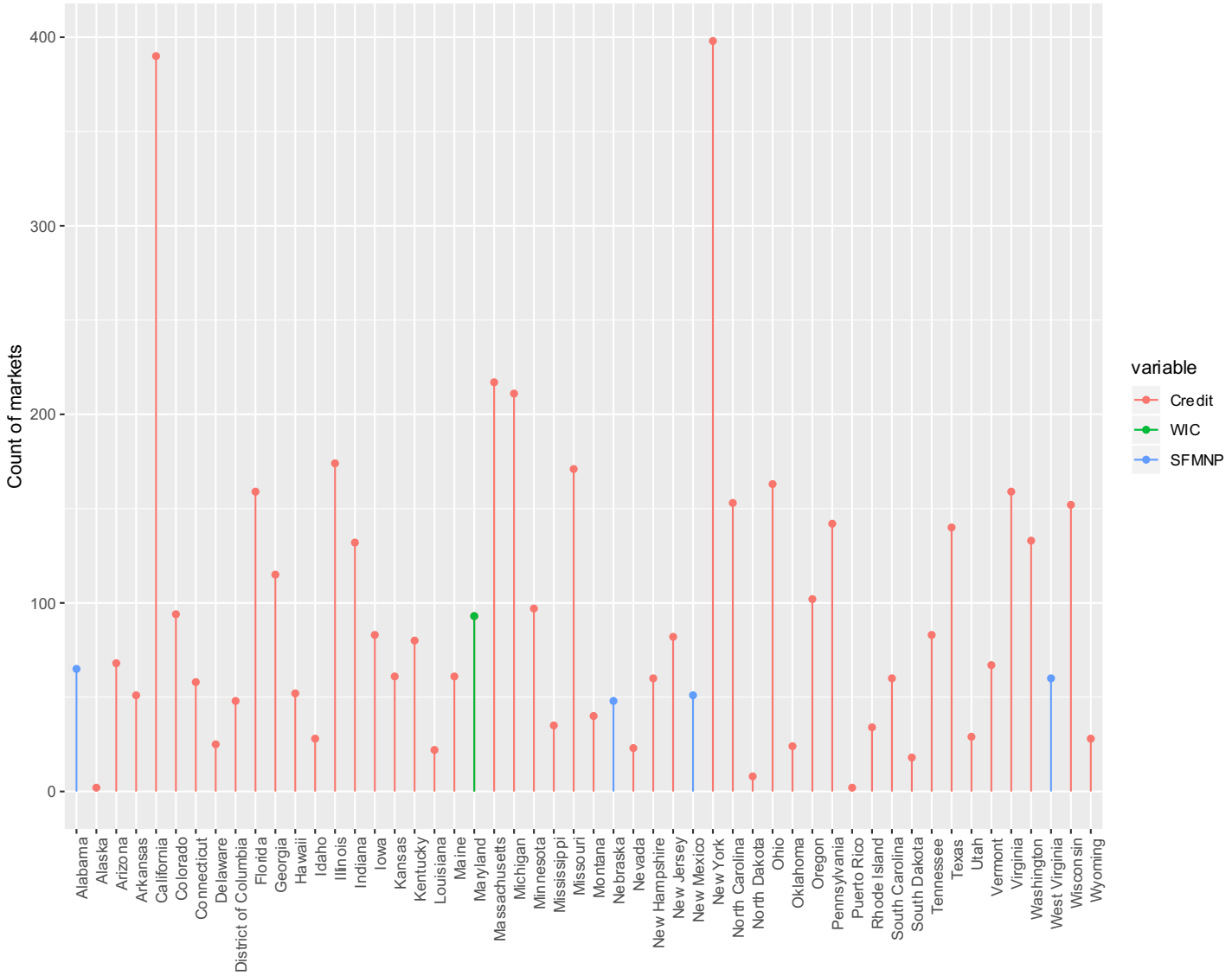
Payments

Treemap of payments accepted:

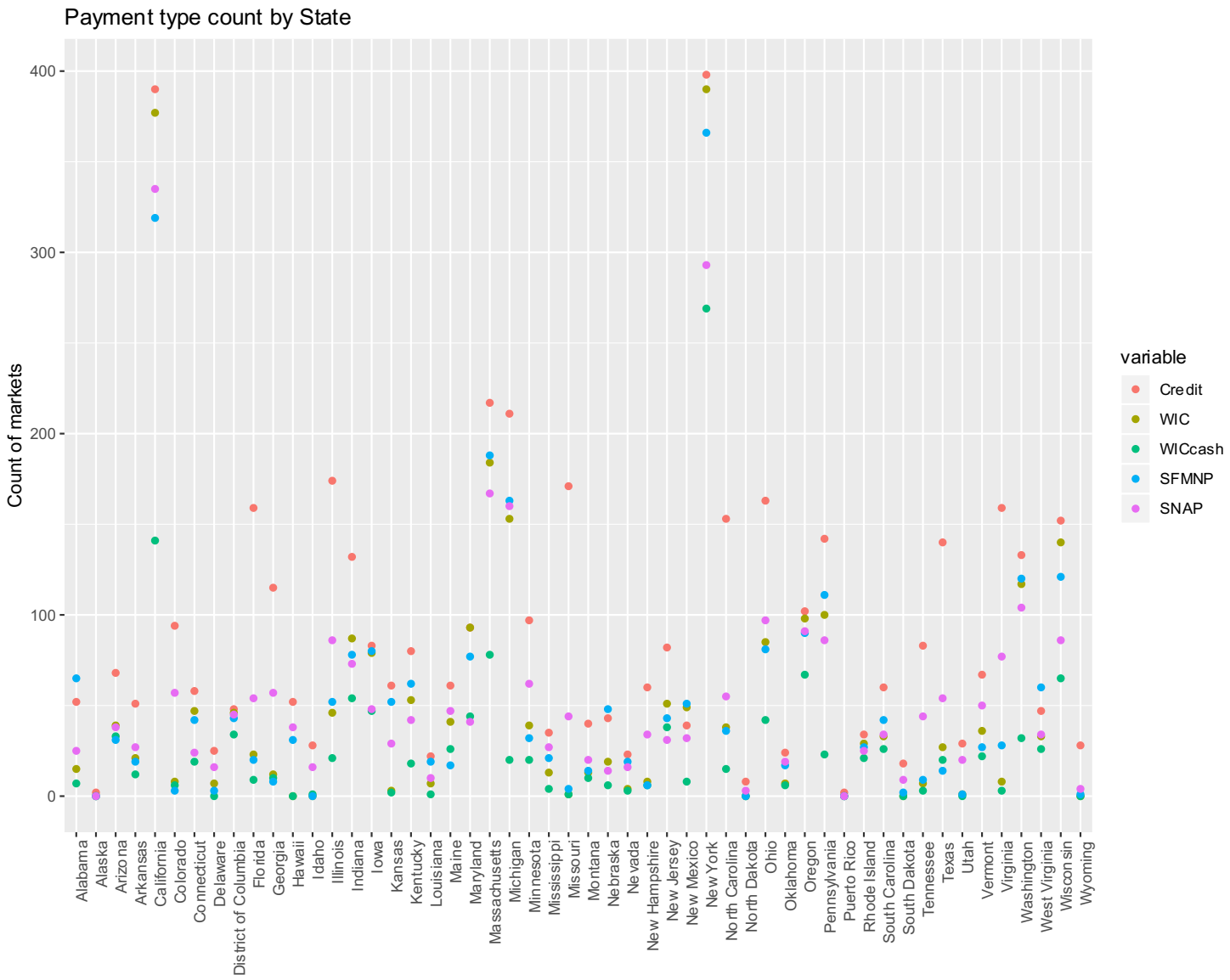
Clearly credit is the most used form of payment accepted throughout the country followed by SNAP.



We first try to understand which payment method is the highest by state.

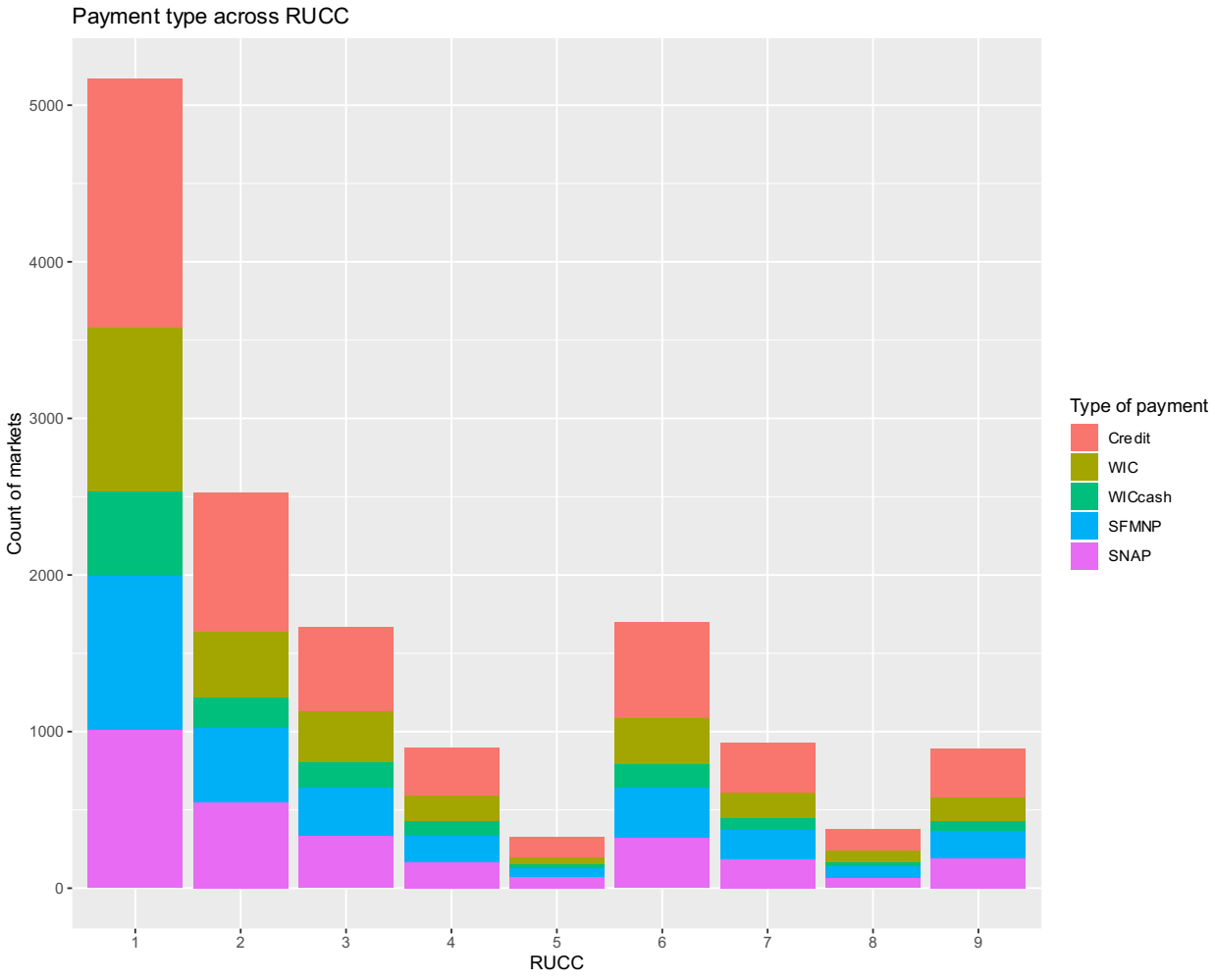


Then we do a relative comparison.This can help us to gauge which payments are most preferred where by people and with the help of this, we could establish a payment method of their interest in each county accordingly. And which payment method to exactly improve can also be harnessed.



*Payment type across RUCC

To look into it further we try to see the count of different payment methods used across RUCC. Now we can understand that the metropolitans have a higher access to different type of payments. We can further look into why the RUCC 9 has higher value than RUCC 5 and 8 and perform co-relation analysis.



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