# Land Use Time Series

Data Corrections

## 1 SOLAR

### 1.1 FEEDBACK

It was identified that the solar land uses (i.e. Solar Infrastructure and Solar Pervious) were included throughout the time series (1985-2022) but should not be present back to the 1980s.

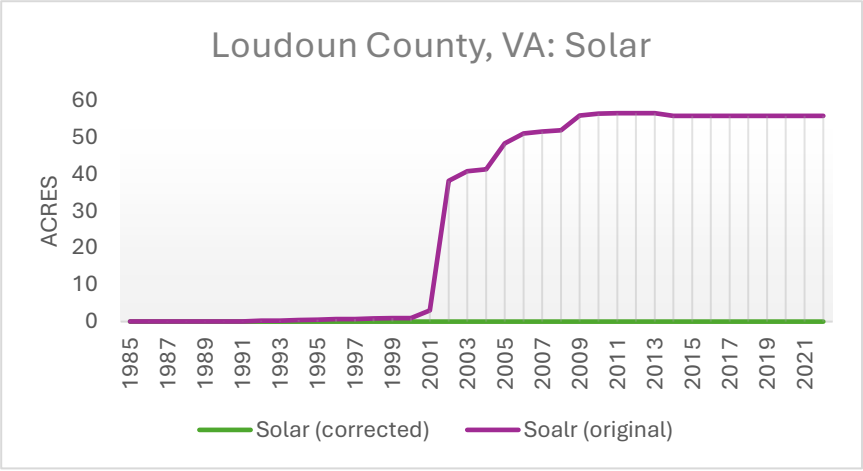
### 1.2 METHOD CORRECTION

This error was corrected in the model by incorporating Energy Information Agency (EIA) data to represent the earliest year that utility-scale solar fields were implemented in each county. The existing methods will persist, which utilize the annual National Land Cover Database (NLCD) to map when each solar field was built. For the solar fields that NLCD does not map, the reported EIA data will be used to "cut-off" solar, meaning no solar acres will exist in any county prior to the reported year of utility-scale solar. The NLCD will be used to estimate how much of the solar area will be allocated to the other sectors (i.e. agriculture, natural, water, open space).

### 1.3 CORRECTION RESULT

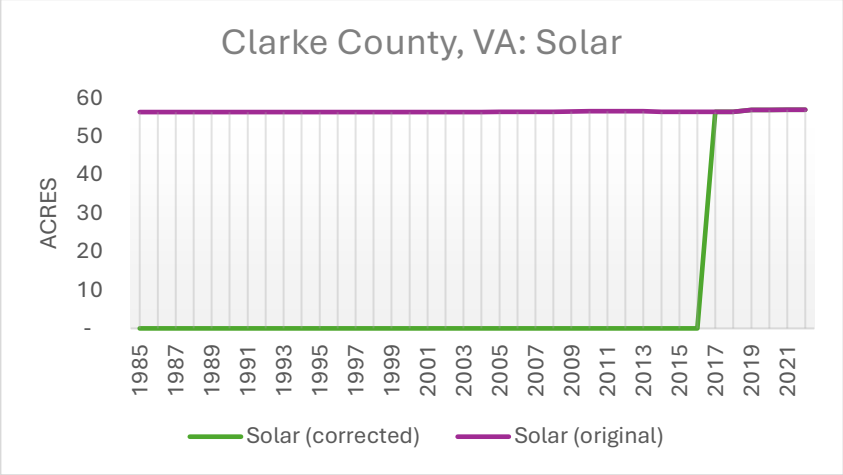
According to the EIA data, there is no utility-scale solar prior to 2022 in 104 of the 197 counties used in CAST. The earliest utility-scale solar reported is 2009. The average utility-scale solar year is 2016 and the median year is 2017. From 1985 to the year prior to the utility-scale reported year will show 0 acres of solar area. For example, if the reported year is 2018, then solar acres from 1985 to 2017 will be 0.

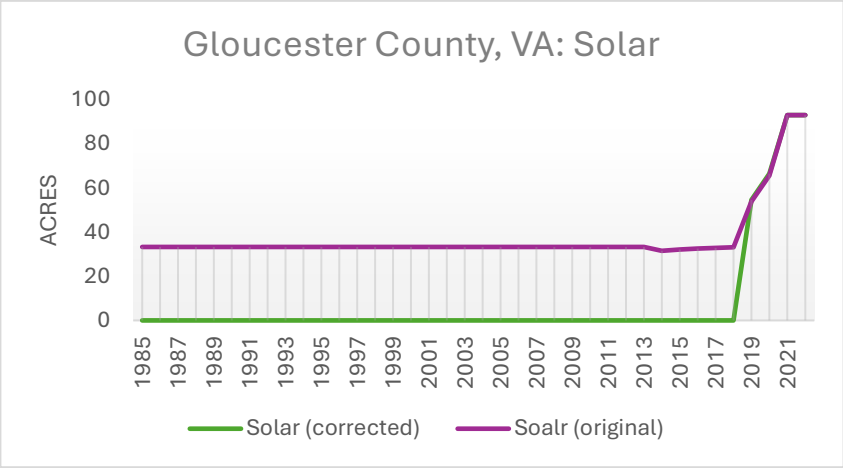
There are three ways this change may appear in the data. First, if a county has mapped solar area and is reported to have no utility scale solar during the observed period (1985-2022), then all solar area for all years is moved to other land uses. An example of this is Loudoun, VA, where the original data (purple) shows solar area over time and the corrected data (green) show 0 acres for all years.




Second, if a county has mapped solar area, EIA reports the first year of utility-scale solar is during the observed period (1985-2022), and the original methods did not

capture the construction of the solar field, then there will be a drop of solar area to 0 acres the year prior to the reported year. Clarke, VA is an example of this, where the reported utility-scale solar is 2017 and solar area drops to 0 acres in 2016. The original data (purple) show a constant solar area of ~56 acres between 1985 and 2016, where the corrected data (green) show 0 acres of solar prior to 2017.




Finally, if a county has mapped solar area, EIA reports the first year of utility-scale solar is during the observed period (1985-2022), and the original methods captured some of the construction of the solar field, then there will be a decrease in solar area as you move backwards through time until it drops to 0 acres the year prior to the reported year. Gloucester, VA is an example of this, where the reported utility-scale solar is in 2019 and solar area drops to 0 acres in 2018. In both the original (purple) and corrected (green) lines, the detected construction of solar between 2019 and 2022 is captured. The corrected line shows no solar area prior to the report year of 2019, where the original line shows a constant solar area of ~55 acres.

# 2 Cropland versus Pasture and Hay

## 2.1 Feedback

While total agriculture trends are smooth, there are drastic jumps in Cropland and Pasture/Hay due to differences in county % crop and % pasture reported in the Census of Agriculture.

## 2.2 Method Correction

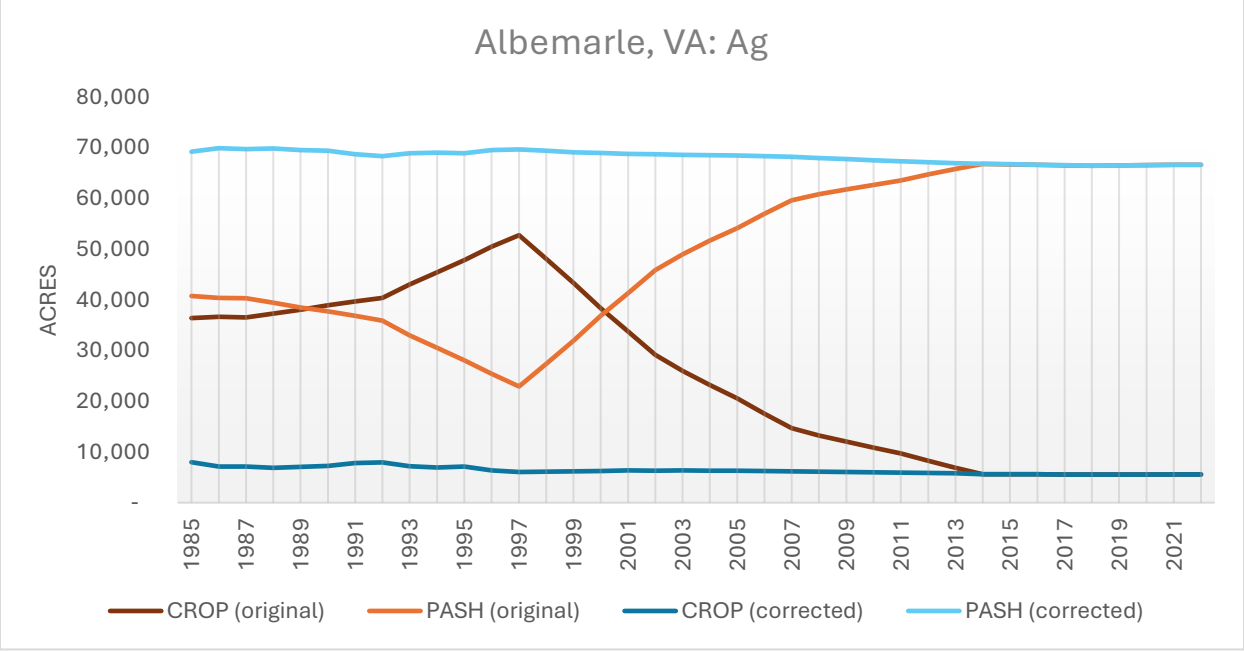
This issue was corrected by replacing the Census of Agriculture with a “smoothed” version of the census that is used in CAST and previous model versions/phases. The method itself is the same, which takes the reported % crop and % pasture per county and linearly interpolates between report years. These annual ratios are then multiplied by the mapped acres of agriculture to compute acres

of Cropland and Pasture/Hay over time. The update to this method is in the version of Census data to represent the % crop and % pasture in the report years.

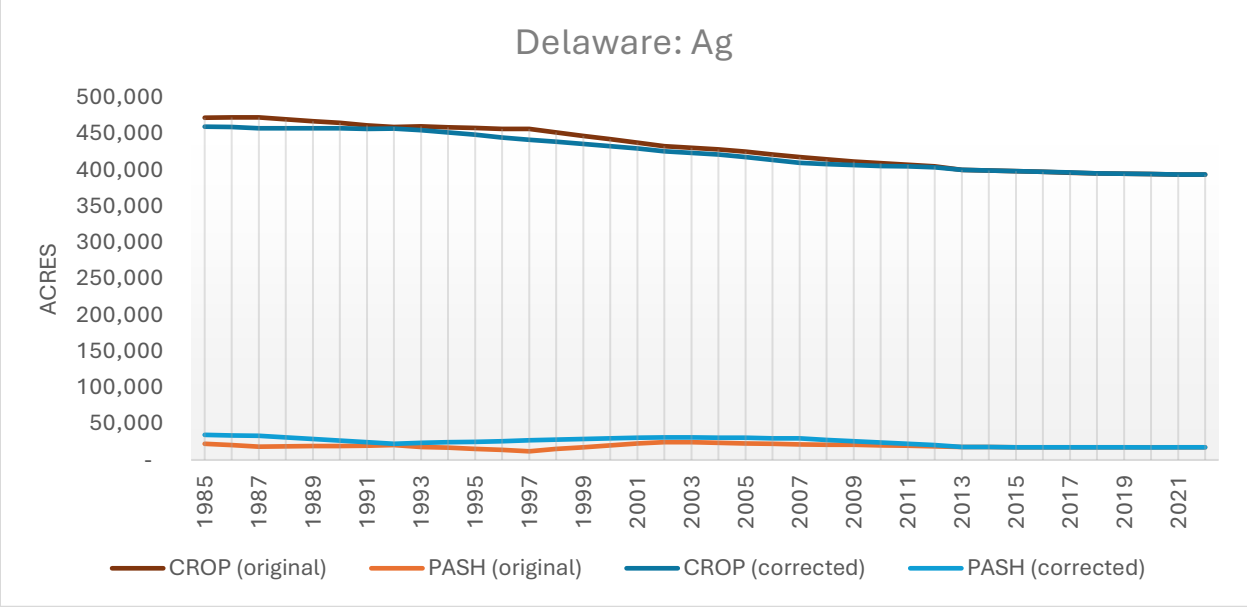
## 2.3 Correction Result

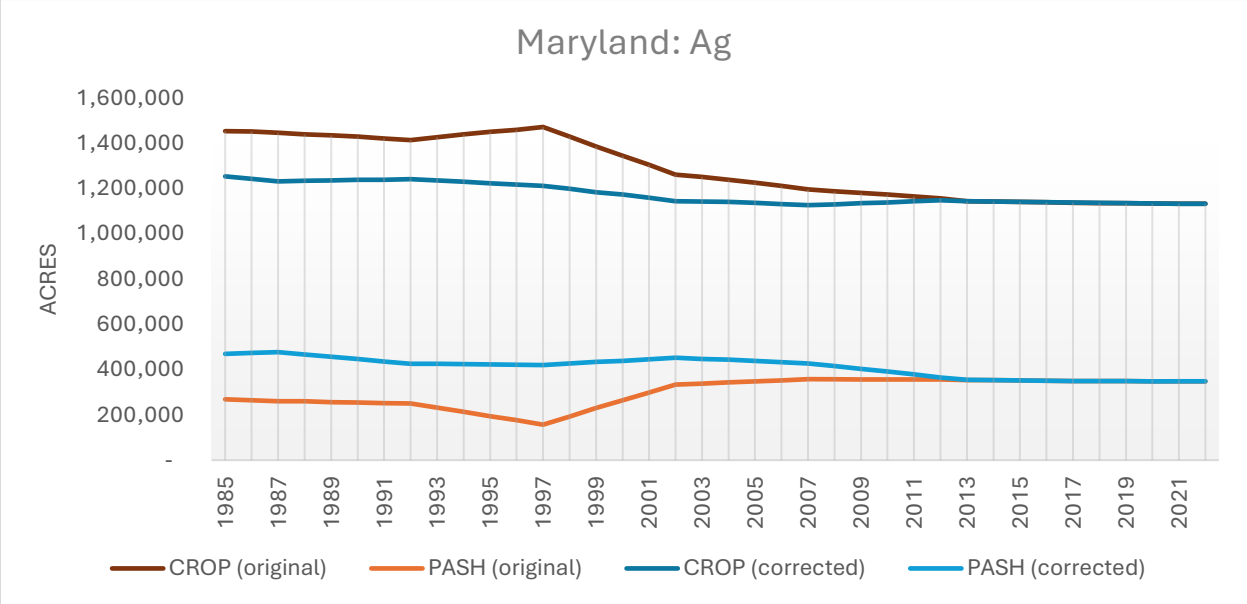
Overall, the Cropland and Pasture/Hay trends should be smoother than the original data provided for review. There are likely to still be "jumps" between cropland and pasture from the census, but it will be a much smaller jump than originally. The total amount of agriculture should be about the same, with small variations due to updated solar rules and finalized summary units/geographies. Below is an example of what a county may look like.

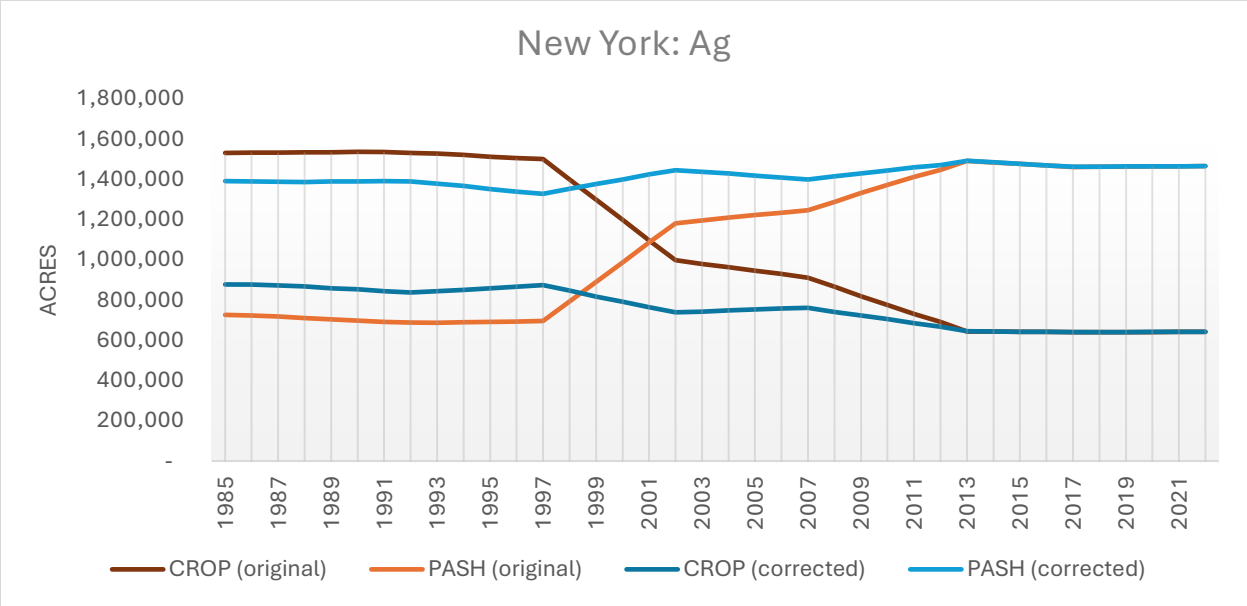
The orange lines represent the original Crop and Pasture/Hay acres and the blue lines represent the corrected acres of Crop and Pasture/Hay. In general, there are smoother trends in the blue lines compared to the orange lines.

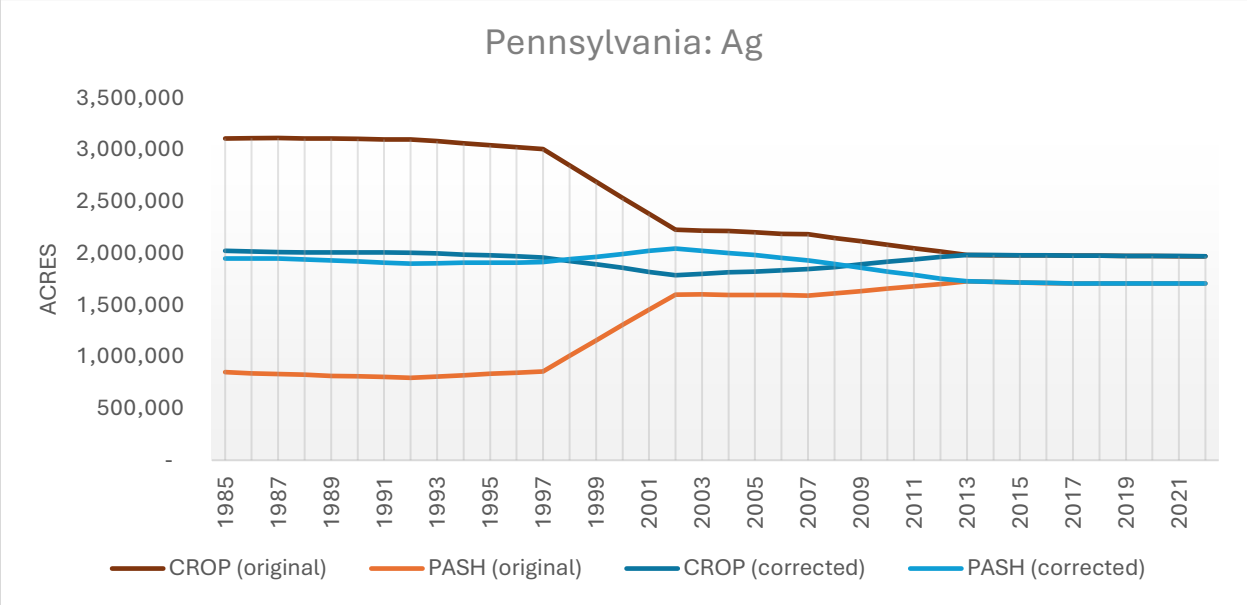


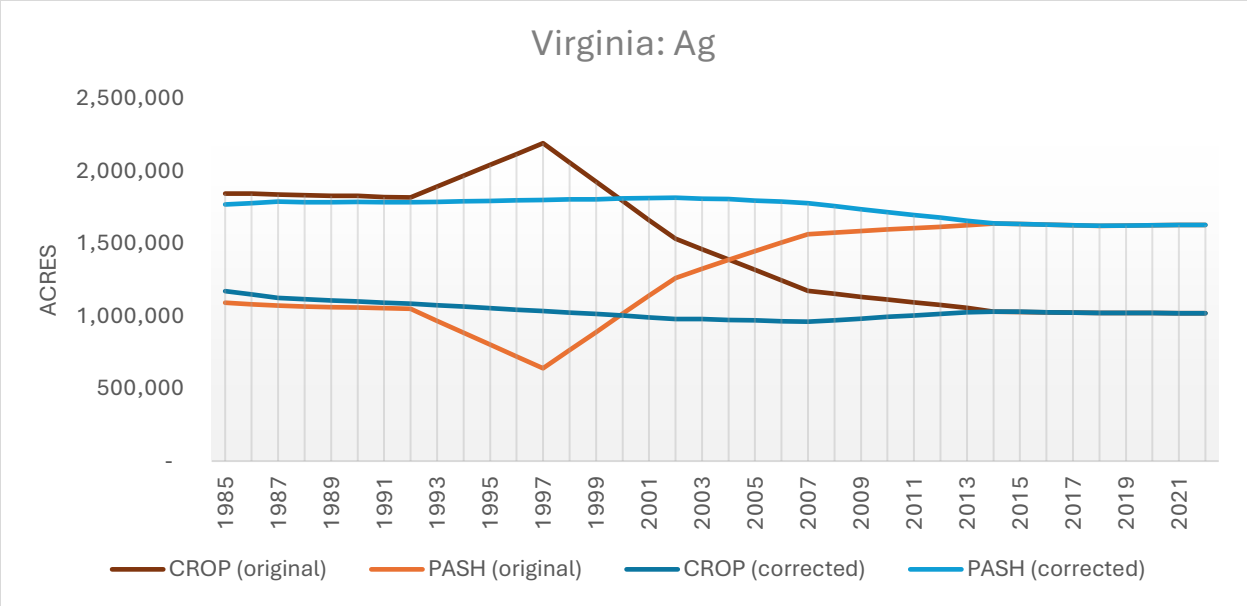
Below are plots comparing the original and corrected Cropland and Pasture/Hay acres for each state. The “state” numbers reflect the full extent of the counties that are included in CAST. The orange lines are the original Cropland (dark orange) and Pasture/Hay (light orange) acres. The blue lines are the corrected Cropland (dark blue) and Pasture/Hay (light blue) acres.

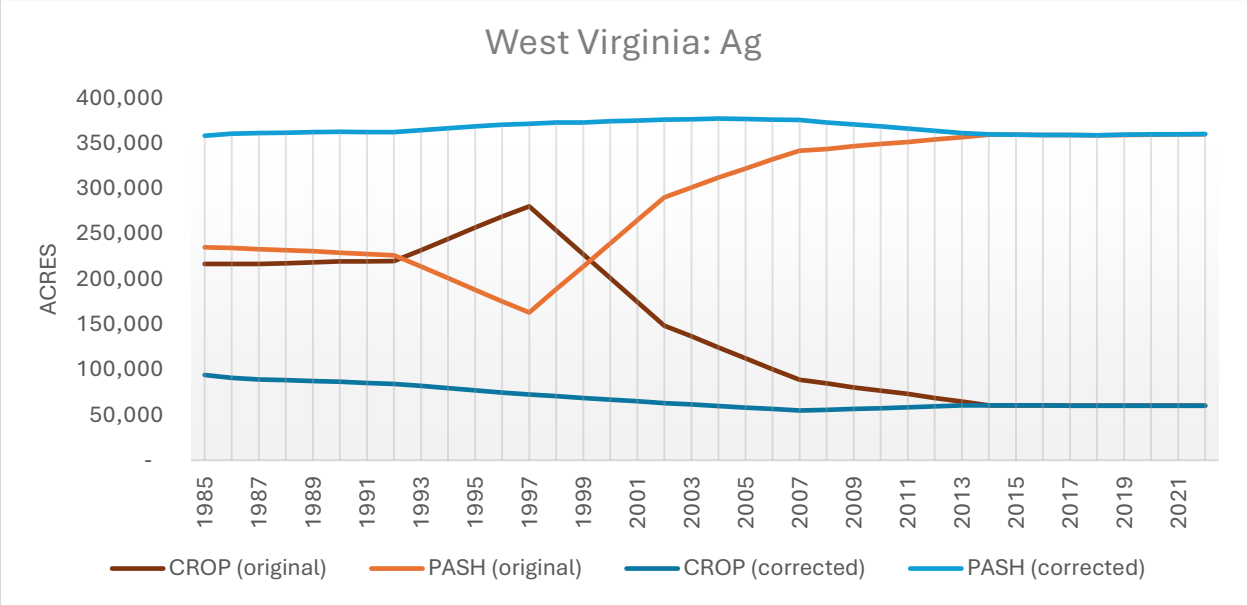



New York: Ag
ACRES
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
CROP (original)
PASH (original)
CROP (corrected)
PASH (corrected)


Pennsylvania: Ag
ACRES
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
CROP (original)
PASH (original)
CROP (corrected)
PASH (corrected)


Virginia: Ag
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
ACRES
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
CROP (original)
PASH (original)
CROP (corrected)
PASH (corrected)


West Virginia: Ag
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
-
ACRES
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
CROP (original)
PASH (original)
CROP (corrected)
PASH (corrected)