Building Climate Resilience on the Eastern Shore: Key Issues and Coalition-Building Opportunities in Agriculture and Climate for Accomack and Northampton Counties

Prepared for:

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Introduction

The purpose of this report is to investigate the impact that sea level rise due to climate change has had on the agricultural sector in the Eastern Shore. This report refers to the Eastern Shore of Virginia as the counties of Northampton and Accomack. This work has been done in conjunction with work done by the University of Virginia Equity Center and the report completed by our classmates.

This report is split into two sections. The first is a content analysis of literature surrounding agricultural land and the impacts it will face due to climate change as well as planning documents from the two counties on the Eastern Shore. These documents were analyzed for mentions of climate change-related phenomena, such as water quality issues, ground water, saltwater intrusion, and more. There were also examinations of how the two counties referred to impacts and the specific language used to address issues related to climate change. The second section examines spatial data of flooding and ecological impacts in the region to define hazard areas. This was done by looking at the predicted sea level rise in the area as well as looking at parcel data for the counties. Some of the data used is exclusively from Accomack, as comparable data could not be obtained from Northampton. Hazard areas were examined to expose threatening economic and population changes. With the analysis provided by these two sections in concert, a fuller picture of opportunities to build climate resilience for agriculture in the Eastern Shore is revealed.

Exploring this issue of climate change impacts on the agriculture industry is essential for future policymaking along the Eastern Shore, as the proportion of workers in the agriculture sector is larger in both Accomack (1.8%) and Northampton (5.2%) than in Virginia as a whole (0.8%) (Bureau of Economic Analysis, 2021). For decades, Agriculture has been the economic backbone of the Eastern Shore, so an understanding of the impacts of climate change on this industry is invaluable. Agriculture as an economic activity has simultaneously transformed into a cultural practice on the Eastern Shore. With such strong ties of community and history around this practice, understanding how it will be affected by climate change is important to understanding how the Eastern Shore as a whole will be affected.

In this report, we find that residential development, rather than sea level rise, is perceived as the most pressing issue threatening agricultural land by residents of the Eastern Shore. This issue is presently the most visible cause of loss of agricultural land. We can see that there is concentrated development and growth in high-risk coastal areas that not only takes away agricultural land, but also hinders future costal resilience in the area. While sea level rise might not seem as imminent a threat to farmland on the Eastern Shore as development, it will be a problem in the future. Identifying that earlier on will make responding to issues, such as land loss and soil salinization, more manageable in the future.

Our hope is that this report can be used to create climate resilience on the Eastern Shore for agricultural workers and landowners. Below are definitions for important terms and concepts mentioned in the report:

Saltwater intrusion

Saltwater intrusion is the process by which salt water intrudes on the ground water of inland areas of land. This can happen in multiple ways. One way is the overconsumption of freshwater aquifers leading to saltwater moving in. Another way is sea level rise pushing more salt water into the ground and destabilizing the push and pull of saltwater and fresh water.

Ghost forest

Ghost forests are forests along the coast that have died due to saltwater intrusion. The ghost forest comes as a result of trees becoming bleached by the sun after dying, leaving stands of white trees.

Sea level rise

Sea level rise in the eastern shore is being measured in this report from 2050 predictions that show a 2-foot increase.

Quantitative Analysis - Conditions and Trends in Eastern Shore Agriculture

Based on intermediate predictions made by the National Oceanic and Atmospheric Organization, the Eastern Shore is likely to experience roughly 1.77 ft of sea level rise by 2060. For the purposes of this analysis, the census block groups in both Accomack and Northampton Counties were split into two categories based on how much of their land area was predicted to be lost to sea level rise in 2060—census block groups that were projected to lose greater than 10% of their land area were considered high risk, and those that were predicted to lose 9% or less of their land area were considered low risk. The map below exhibits these delineations.

Map 1. Low- and High-Risk Census Block Groups

To examine the impact of sea level rise more closely on the agricultural communities in Accomack and Northampton, three quantitative variables were examined: agricultural employment, length of occupancy, and assessed parcel values. The first two variables, agricultural employment and length of occupancy, were drawn from 2013 and 2021 American Community Survey Data to investigate whether or not the agriculture industry and residential tenure of coastal communities have changed over the past several years and also to identify potential trends that could assist with policymaking in the future. The third variable of interest, assessed parcel value, was obtained from the Accomack County Department of Assessment. Assessed parcel values were included in our analysis to provide some information about the current market for agricultural lands and to make some tentative predictions as to how climate change may differentially affect agricultural land uses versus other land uses. This parcel data was last updated at the start of the 2024 calendar year.

Table 1 provides an overview of the average agricultural employment in low- and high-risk census blocks from 2013 to 2021. In 2013, 15 individuals on average were

employed in low-risk census blocks, while 21 individuals were employed in high-risk census blocks across all counties. The overall average agricultural employment across all census blocks in 2013 was 20 individuals. By 2021, the average number of workers in low-risk census blocks had increased to 16, and the average number of workers in high-risk census blocks had risen to 23 across all counties, bringing the overall agricultural employment to 22 individuals. This comparison indicates a slight increase of 1 person in low-risk census blocks and 2 people in high-risk census blocks from 2013 to 2021, with an overall increase of 3 people on average across all census blocks.

Year	Low Risk	High Risk	All Census Blocks (Average)
2013	15	21	20
2021	16	23	22
Change	+ 1	+ 2	+ 3

Table 1. Average Agricultural Employment in Low- and High-Risk Census Blocks

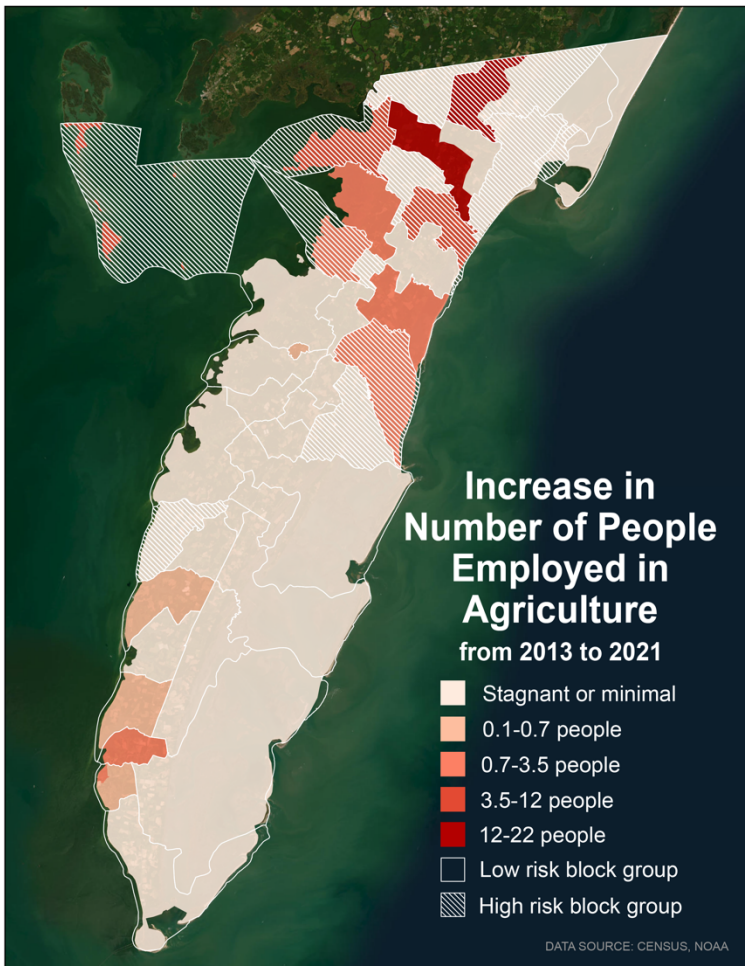
Map 2 illustrates changes in agricultural employment in Accomack and Northampton Counties from 2013 to 2021. Most block groups fall within the low-risk region, while around 12 block groups are classified as high risk. Notably, two block groups in the northern part of Eastern Shore experienced the largest increases in agricultural employment, ranging from 12 to 22 people during this period; one of these blocks is situated in a high-risk region. Several block groups in the northern end of the Eastern Shore, depicted in orange, showed moderate employment increases between 0.7 and 3.5 people. In addition, a few block groups shaded in light orange exhibited smaller employment gains of 0.1 to 0.7 people. Overall, the majority of block groups showed minimal or stable changes in agricultural employment over the study period.

The shifts in agricultural employment in Accomack and Northampton Counties between 2013 and 2021 represent a complex array of regional variables impacting agricultural labor patterns. The total rise in agricultural workers, particularly in high-risk census blocks, indicates a continued or expanding need for labor in agricultural industries, possibly due to the development of farming operations in high-risk areas and the rising demand for agricultural goods.

The significant rise in employment in the northern section of the Eastern Shore, especially in a high-risk block group, suggests localized patterns that may result from the availability of resources and land use adjustments due to sea level rise. Moderate job growth in other block groups indicates that, while development is inconsistent across all regions, there is a general trend of modest improvements in agricultural employment.

The general stability or minor changes in some block groups may be ascribed to reasons such as current agricultural methods that do not necessitate significant

changes in worker size. While general trends indicate a minor increase in agricultural employment, the underlying causes may differ between Accomack and Northampton Counties, subject to rising sea levels, shifting land use patterns, and policy-related issues.



Map 2. Increase in Persons Employed in Agriculture in Accomack and Northampton Counties (2013-2022)

Table 2 presents an analysis of the average median length of occupancy in low- and high-risk census blocks in Accomack and Northampton Counties from 2013 to 2021. In 2013, the average median length of occupancy in low-risk census blocks was 8.7 years, while it was 11.3 years in high-risk census blocks. The overall average median length of occupancy across all census blocks in 2013 was 10.8 years.

By 2021, the median length of occupancy in low-risk census blocks had increased to 9.6 years, and in high-risk census blocks, it had risen to 12.9 years. Across all census block groups, the average median length of occupancy in 2021 was approximately 12.4 years. The comparison from 2013 to 2021 indicates an increase of 1

year in the average length of occupancy in low-risk census blocks and an increase of 1.6 years in high-risk census blocks, resulting in an overall average increase of 1.7 years across all census blocks.

Year	Low Risk	High Risk	All Census Blocks (Average)
2013	8.7	11.3	10.8
2021	9.6	12.9	12.4
Change	+ 1.0	+ 1.6	+ 1.7

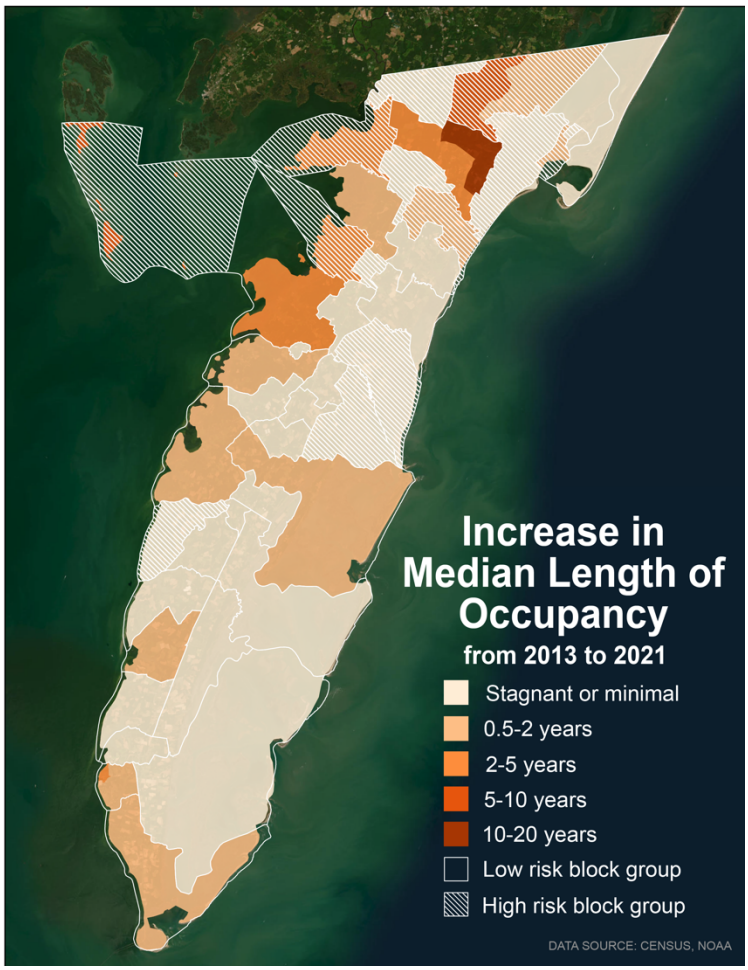
Table 2. Average Median Length of Occupancy in Years in Low- and High-Risk Census Blocks

Map 3 portrays changes in the median length of occupancy from 2013 to 2021. Length of occupancy refers to the amount of time residents have lived in their current homes. The northern part of the Eastern Shore experienced the most moderate to significant increases in median length of occupancy, ranging from 2 to 20 years. In particular, one block group in the northern region showed a substantial increase of 10 to 20 years in median length of occupancy between 2013 and 2021. A few block groups along the western border of the Eastern Shore showed moderate increases of 2 to 5 years in median length of occupancy over the same period. Approximately 10 block groups had smaller increases of 0.5 to 2 years, while the majority of block groups displayed minimal or stable changes in median length of occupancy throughout the study period.

Nevertheless, the change in the median length of occupancy from 2013 to 2021 in Accomack and Northampton Counties suggests a trend toward increased residential stability in both low- and high-risk census blocks. The overall increase in the average median length of occupancy, particularly in high-risk areas, could be attributed to a number of underlying factors, including residents choosing to stay in their current homes for an extended amount of time due to limited housing market mobility and the rise of sea level limited the potential land development. The considerable increases reported in the Eastern Shore's northern and western sections indicate that these locations may be experiencing distinct local patterns that contribute to higher occupancy stability, such as economic causes, alterations in housing availability, or changing demographics. Ultimately, the trend toward more extended median occupancy periods across most block groupings suggests that these counties' residential patterns are becoming more entrenched.

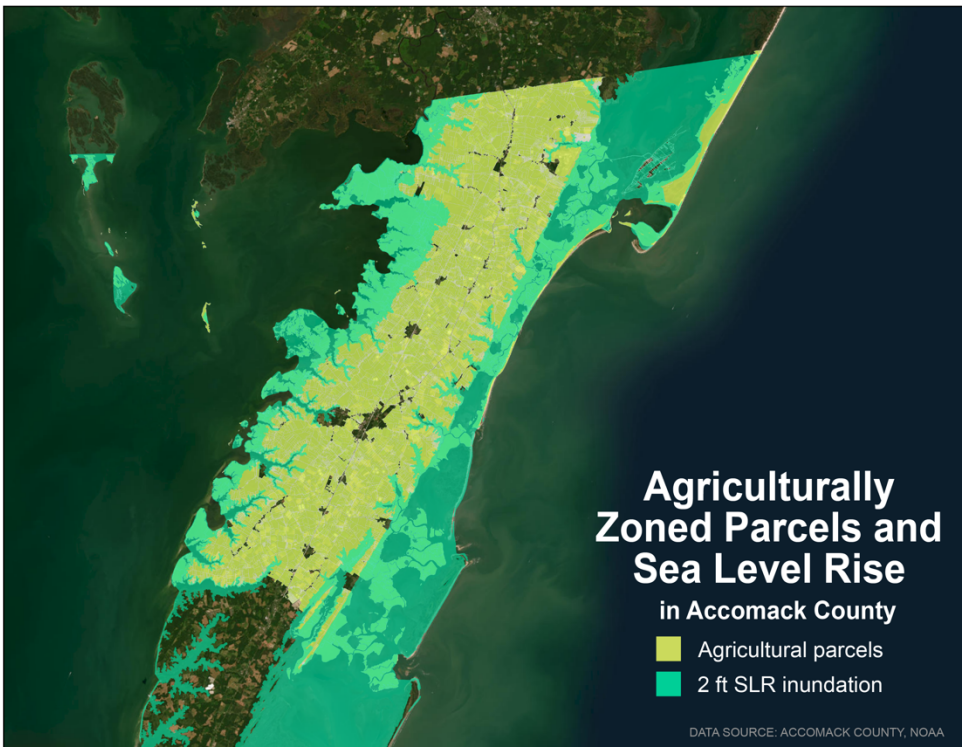
A high median occupancy length has some marginal benefits for a community in that it generally contributes to the stability of the residential community and increases the affordability of the area for incoming residents. However, declining in-migration to high-risk areas is likely causing a depression in the property market for existing homeowners relative to low-risk areas, which limits the ability of existing homeowners to

build property wealth. If the lack of in-migration becomes severe enough to cause the depopulation of the area, it could also negatively affect retail sales and other businesses that can only be maintained if there exists a proximate customer base of a certain size.



Map 3. Increase in Median Length of Occupancy Across Low- and High-Risk Census Blocks (2013-2022)

The second set of analyses looked at whether the value of agriculturally zoned parcels currently differed within low- and high-risk zones. This data was only available in Accomack County. Parcels valued at $10 million or more were excluded because they indicated an abnormal level of development or investment that could potentially skew the findings.



Map 4. Agriculturally Zoned Parcels and Sea Level Rise (2013-2022)

Map 4 highlights the parcels zoned for agricultural use in Accomack County that will be affected by two feet of sea level rise. While the majority of agriculturally zoned land is located towards the interior of the peninsula, if sea levels were to rise by roughly two feet over the next 40 years, more than 100 square miles of agriculturally zoned land in Accomack County may underwater, according to geographic projections by the NOAA. That means that approximately 30% of all agriculturally zoned land in the county could be made unusable by 2060.

Land Use	Value per Acre
Agriculture	$56,900
Other	$260,600

Table 3. Average Assessed Parcel Value per Acre by Zoning Designation in Accomack County (2024)

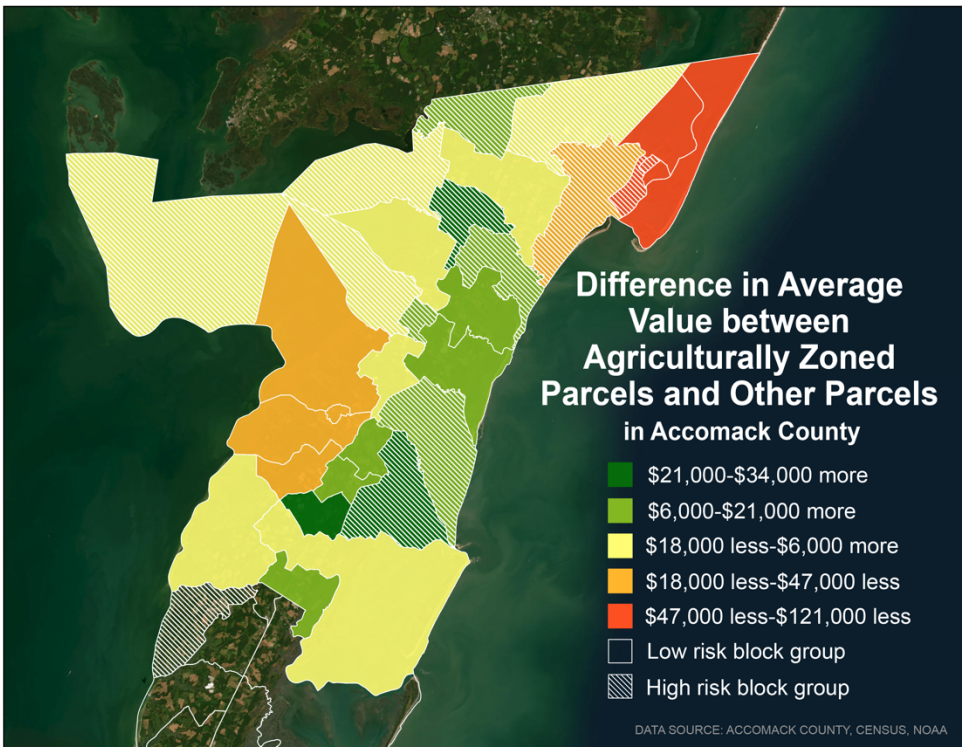
To obtain an initial understanding of the real estate market in Accomack County, we compared the property values in agriculturally zoned parcels to the collective property values in non-agriculturally zoned parcels. In Accomack County, a parcel could be zoned under any of the following zoning districts: Agricultural, Residential, Rural Residential, Barrier Island, General Business, Limited Business, Industrial, or Village

Development (County Government of Accomack, 2023). In the county at large, agriculturally zoned properties were found to be worth approximately $206,000 less per acre than properties under other non-agricultural zoning designations. T.is finding could be due to a number of factors, but the most likely explanation is that agricultural land is typically surrounded by rural or underdeveloped land, which can lead to a lower assessed value when compared to other more heavily developed land use types on the Eastern Shore. Additionally, agricultural parcels are typically sold at larger sizes in much less dense communities, which can push down the cost of land by the acre in the area.

Land Use	Risk Level		
	High Risk	Low Risk	Difference
Agricultural	$67,300	$56,100	- $11,200
Other	$23,500	$261,500	+ $238,000
Difference	- $43,800	+ $205,400	

Table 4. Average Assessed Value of Agriculturally Zoned Parcels per Acre by Risk Level and Land Use Type in Accomack County (2024)

Then, to try to predict the affect that sea level rise could have on the agriculture industry, assessed parcels were sorted into groups both by land use classification and by risk level. Ultimately, we examined four groups: high-risk agricultural properties, high-risk “other” (or non-agricultural) properties, low-risk agricultural properties, and low-risk other properties. As of 2024, high-risk properties in agricultural zoning districts are currently worth about $10,000 more per acre than in low-risk areas. However, the starkest difference in price is between non-agricultural uses in low- and high-risk areas ($238,000). In low-risk areas, non-agricultural properties are worth an average of $261,500 per acre, but in high-risk areas, non-agricultural properties are worth just $23,540 per acre, on average. These results indicate that in high-risk areas, the majority of the property wealth is held in land that is zoned for agricultural use. This could be a future policy challenge for urban planners in the area since the agricultural industry is particularly reliant on large amounts of land; it could be beneficial to rezone some of these areas to allow alternative uses that could withstand greater soil salination, flooding, and other impacts of sea level rise.



Map 5. Increase in Median Length of Occupancy Across Low- and High-Risk Census Blocks (2013-2022)

Map 5 further explores the differences in assessed property values between agricultural and non-agricultural uses in low- and high-risk census block groups. Agricultural land towards the eastern end of Accomack County appears to be valued higher per acre than land zoned for non-agricultural uses, which could indicate either a truly strong presence of the agricultural sector in that area or an external factor that has negatively affected development of properties devoted to other uses in the region. Regardless, the agricultural market seems to be comparably stronger than other uses towards the southern and eastern sides of Accomack County. In the majority of the low-risk zones, non-agricultural parcels are worth between $18,000 - $121,000 more per acre than agricultural parcels. This could indicate that low-risk areas have more development and a diversity of land uses, which could put them in a comparatively secure economic position over the next several decades. High-risk zones, on the other hand, appear to have a much weaker real estate market for property devoted to non-agricultural uses.

Qualitative Analysis - High-Priority Issue Areas for Public Policy

Climate policy and planning in Virginia has historically been carried out at the state level or in highly populated urban localities, including Norfolk, Fairfax, Charlottesville, and Roanoke; the state's rural, low-density counties are generally not engaged with climate-specific planning at the local or regional levels (Georgetown

Climate Center, 2022). That the Eastern Shore of Virginia is an exception to this trend is a testament to the salience of the issue on the peninsula, as a condition which has the potential to transform or disrupt key facets of contemporary socioeconomic life.

However, there is clear evidence that climate change, framed in these terms, is not a popular mobilizing issue in either county, and that using it as the basis for policy or land use decisions risks considerable controversy or unpopularity. As such, most existing adaptation, resiliency, or mitigation planning in the county tends to engage these issues through alternate language (the most comprehensive mitigation to date for the region is Accomack-Northampton PDC's 2021 *Hazard* Mitigation Plan, a tremendously detailed and useful report of nearly 600 pages which nevertheless makes reference to 'climate change' just once (Accomack-Northampton PDC, 2021) or by focusing instead on various component issues within the subject, such as sea level rise. Table [5] provides an overview of language choice in relation to priorities identified in a selection of public policy documents.

Selected Document	***Year***	**Climate Change, #**	**Sea Level Rise, #**	*Increased Hazard*	*Saltwater Intrusion*	*Changing Temperatures*
Accomack County Comprehensive Plan	2018	**5**	**45**	*YES*	*YES*	*NO*
Northampton County Comprehensive Plan	2020	**29**	**50**	*YES*	*YES*	*NO*
A-N PDC, Working Waterfronts Plan	2016	**0**	**19**	*NO*	*NO*	*NO*
A-N PDC Hazard Mitigation Plan	2021	**1**	**79**	*YES*	*YES*	*YES*
A-N PDC Regional Economic Development Plan	2019	**1**	**6**	*NO*	*NO*	*NO*
Chincoteague Comp Plan	2015	**5**	**10**	*YES*	*YES*	*NO*
Exmore Comp Plan	2015	**0**	**0**	*NO*	*YES*	*NO*
Wachapreague Comp Plan	2016	**0**	**19**	*YES*	*YES*	*YES*
Onley Comp Plan	2017	**0**	**0**	*NO*	*NO*	*NO*
Onancock Comp Plan	2021	**0**	**0**	*NO*	*YES*	*NO*
Cape Charles Comp Plan	2022	**0**	**11**	*YES*	*YES*	*NO*

Table 5. **Explicit mentions of climate, climate change, or global warming in a selection of the public planning documents used in this analysis.** Of note is the inclination to eschew language around 'climate change' in favor of component issues such as sea level rise, whether at the *county*, *regional*, or *local* level of government.

Where growing hazard and/or climate risk are mentioned, policy documents typically identify key economic sectors, infrastructural investments, and natural ecosystems which are put at risk by increased hazard. While [large majorities of both Accomack and Northampton] are zoned for agricultural uses and populated with agricultural infrastructure (including a significant proportion of land most susceptible to flooding in the future), the prominence of agriculture in the county is not reflected in these discussions. Inversely, dedicated agricultural planning policy engages with climate and hazard mitigation less than other issues prominent in the field. (See Figure 1)

Agriculture is generally not viewed as a coalition partner which will push for stronger climate action and planning, in Virginia and in the Eastern Shore specifically. We feel, however, that a true climate justice program for the Eastern Shore can be socially transformative and has the potential to address high-priority issues for the region's smallholding farmers. These include both the intensified risk to the industry as a result of climate change, as analyzed above, as well as non-environmental socioeconomic trends identified as high priority. By identifying the opportunities for synergy and co-benefit that climate planning has with these high-priority issues, we intend to point to potential avenues by which Eastern Shore agriculture can be brought into a popular coalition for climate equity.

As of 2022, the USDA Census of Agriculture found that a majority of farms in both counties were engaged in no-till or reduced-till farming, a method of reducing stored soil carbon and minimizing the emission cost of agriculture (USDA Census of Agriculture, 2024). No-till agriculture also stands to save significant costs and labor for small- to medium-farms, although the special equipment required can make initial adoption cost-prohibitive for many (USDA Climate Hubs, 2024). Public institutions have incentivized this shift in the interest of environmental health while campaigning on its productivity co-benefits; their relative success challenges the notion that farms are necessarily standoffish to environmental policy and provides an example for integrating agricultural priorities into climate progress.

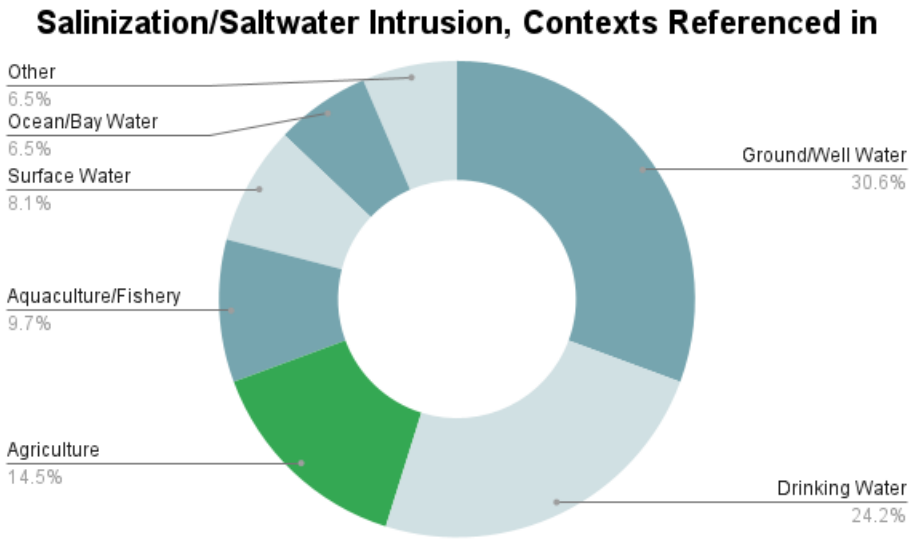


Figure 1. Contexts in which salinization or saltwater intrusion are mentioned within analysis. About 44% of agriculture-centered contexts are found in local news coverage, as opposed to public planning and policy.

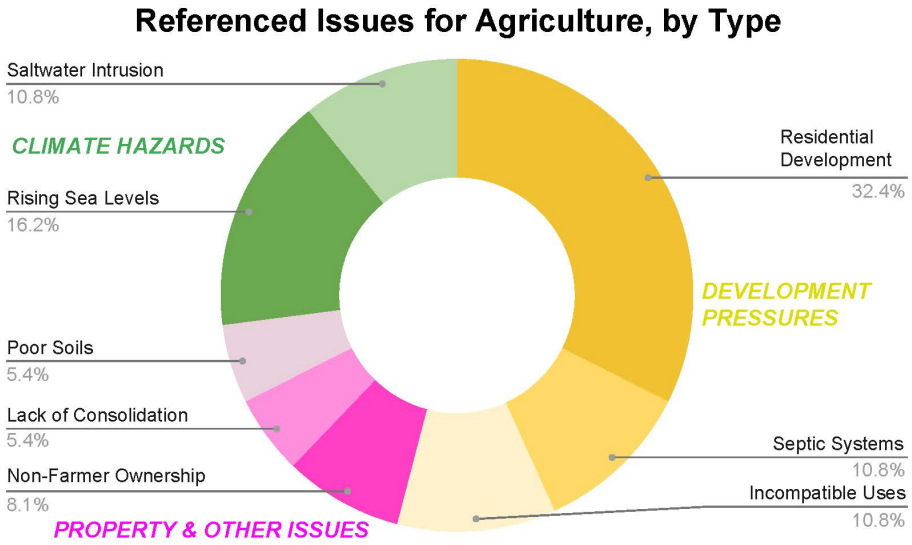


Figure 2. Action items and issues for agriculture referenced within analysis. Issues are aggregated into broad categories. Again, references to climate within agriculture typically come from news coverage instead of planning documents.

Themes	Codes	Count
Agricultural Land Management	Agricultural Zoning	4
	Commercial Farming	6
	Incompatible Uses	3
	Non-Farmer Ownership	3

Agricultural Land Value	Appreciation Source	3
	Compared to Non-Ag Land	1
	Depreciation Source	1
	Due to Sea Level Rise	7
Development	Clustered Land Use	9
	Dispersed Land Use	1
	Growth into Agricultural Land	9
Salinization	Agriculture	10
	Drinking Water	3
	Ground Water	15
	Surface Water	3
Soil Quality	Degradation	4
	Non-Prime Farmland	0
	Prime Farmland	4
	Steps to Protect	2

Table 6: Themes, Codes and their appearance in policy documents and news articles

In reviewing the regulatory frameworks and other articles, five key themes emerged, shedding light on critical aspects of agricultural land dynamics in the region including. Agricultural Land Management, Agricultural Land Value, Development, Salinization, Soil Quality. Each theme has several codes under it (see Table 6). "Salinization" emerged as a prominent concern, encapsulating the infiltration and dispersion of saline water into land, which poses significant threats to both groundwater and surface water quality. This phenomenon not only affects agricultural productivity by compromising soil quality but also disrupts ecosystems and agricultural activities reliant on irrigation.

Furthermore, "development" patterns were highlighted, showcasing ongoing growth trends and spatial characteristics within the region. These patterns, varying in density and settlement configurations, underscore the complex interplay between urban expansion, agricultural encroachment, and land use planning. As development encroaches upon agricultural land, issues such as dispersed land use patterns become pertinent in managing competing land uses.

"Agricultural Land Value" emerged as a central theme, reflecting the economic worth assigned to land primarily used for agricultural purposes. Factors such as competition with residential development, sea level rise impacts, and soil degradation contribute to the depreciation of agricultural land values, necessitating careful consideration in land use decision-making. Additionally, "soil quality" emerged as a critical determinant of agricultural viability, with distinctions between prime and non-prime agricultural soils guiding land management practices and conservation efforts. Lastly, "agricultural land management" highlighted the importance of optimizing land

use for productivity while mitigating environmental impacts and land use conflicts. Understanding these key themes provides valuable insights into the complex dynamics of land management, development pressures, and agricultural resilience in the study area, laying the groundwork for informed decision-making and sustainable development strategies.

Salinization, a significant concern in the context of land management and resilience on Virginia's Eastern Shore, is revealed as one of the major issues in the code count analysis. Its notable frequency of mentions across various aspects such as agriculture, groundwater, surface water, and drinking water underscores the pervasive impact of saline intrusion into the region's natural systems. The high code count associated with salinization highlights its widespread recognition as a pressing issue affecting both environmental and agricultural sustainability. The news articles highlight that farmers stopped planting their farms after their lands got salinized under the salinization theme (Turken, 2021). Over-pumping is identified as one of the reasons for the salinization in the policy documents, which is a result of residential development in and around agricultural lands (NCVA, 2011). However, despite these challenges, policies appreciate aquaculture as a prospective solution to utilize salinized lands in farming activities (Town of Chincoteague, 2020).

The ongoing challenges associated with urban and suburban expansion on the Eastern Shore are reflected in the significant development pressure, evident in discussions regarding clustered land use, growth into agricultural land, and incompatible land uses. This pressure is highlighted by the substantial code count attributed to development, indicating a heightened awareness of the impacts of land use dynamics. There is a recognized need for effective planning and management strategies to balance development with environmental conservation and agricultural preservation. The policy documents concerning development pressure on agricultural lands emphasize compact development around existing growth centers and preserving family farms (Northampton County, 2021). However, they also advocate for infill development and incompatible use in agricultural lands with special permission (Accomack County, 2018).

Effective management of agricultural land is essential for addressing both salinization and development pressure. Zoning regulations are crucial in mitigating incompatible land uses and safeguarding agricultural areas from encroaching urbanization. Additionally, commercial farming practices and non-farmer ownership of agricultural land can influence land use decisions, potentially exacerbating development pressure. Sustainable agricultural practices and responsible land stewardship are key in mitigating development pressure on agricultural land while addressing salinization concerns through improved soil management practices.

The competitive nature of farming, as highlighted in news articles, raises concerns about increased saltwater intrusion on farming lands (Turken, 2021). This underscores the importance of policies that protect agricultural lands as long as they

remain viable. The appreciation and depreciation of agricultural land values are closely tied to salinization and development pressure. Sea-level rise worsens salinization, leading to soil degradation and reduced agricultural productivity, potentially decreasing land values. Conversely, rising sea levels and population growth driving development pressure can increase land values, leading to competition for agricultural land and possible conversion to non-agricultural uses.

Balancing economic incentives with environmental considerations is crucial for maintaining agricultural land values and promoting sustainable land use practices amidst changing climate conditions. News articles also emphasize the increasing salinization of nutrition-rich lands and policies highlighting the population growth contributing to higher land values, thereby pressuring the viability of agricultural activities.

Soil quality degradation is a central concern that intersects with both salinization and development pressure. Salinization can compromise soil health by increasing soil salinity levels and reducing fertility, posing challenges for agricultural productivity and ecosystem resilience. Similarly, development pressure can lead to soil erosion, nutrient depletion, and loss of prime farmland, further exacerbating soil quality degradation. Implementing soil conservation measures, such as erosion control practices and nutrient management strategies, can help mitigate the impacts of salinization and development pressure on soil health, promoting sustainable land management practices and enhancing agricultural resilience.

By recognizing the interconnectedness of these themes and adopting integrated approaches to land management and resilience planning, stakeholders can address the complex challenges facing Virginia's Eastern Shore. Strategies that prioritize soil conservation, sustainable agriculture, and responsible land use planning can help mitigate the impacts of salinization and development pressure while promoting environmental sustainability and community resilience in the region.

This analysis identifies potential alignments in priority between climate resiliency and agriculture on the Eastern Shore. Direct risks to sustained agriculture and aquaculture due to climate-related hazard (including the threat sea level rise and saltwater intrusion poses to cropland, as well as the threat that rising sea temperatures and salinity poses to aquaculture) are clearly salient issues. Of higher salience, however, is the rapid conversion of agricultural land into residential/commercial development and the capture of the region’s limited prime farmland soils by septic systems. Development pressure in coastal areas also represents a threat to successful climate mitigation, expanding people and infrastructure in the climate frontline (Accomack-Northampton PDC, 2021), damaging long-term soil filtration capabilities (Accomack, 2018), and centering more of the region’s economy around industries vulnerable to serious hazard, such as tourism.

A growing number of farms rely on hired labor, much of amount of which is daily, seasonal, and informal; this sort of working arrangement is also sensitive to long-term disruptions in agricultural production brought on by natural hazard. A significant proportion of this labor, especially in aquaculture, is migrant labor (Accomack-Northampton PDC, 2021); another significant proportion of labor, especially in cropland, are permanent farm workers who lease their land rather than own it outright (Accomack, 2018). With these populations come a distinct set of concerns and pressures around availability and affordability of land, and a higher likelihood of being underrepresented in discussions of 'agriculture' generally. As such, it is essential that a climate equity program be willing to reimagine what fair working conditions, economic advancement opportunities, and agricultural contracting might look like if it is to be responsive to the priorities of the whole of Eastern Shore agriculture.

Engagement Strategies

In identifying the dominant and recurring priorities of Eastern Shore Agriculture and their compatibility with regional climate planning, we intend to better facilitate comprehensive, long-term, and grassroots coalition-building – not replace it. Our assertions of priority should not be taken as perfectly representative of any relevant individual/group. Rather, this analysis may help better tailor engagement strategies to be maximally productive in eliciting priorities and building mutual understanding.

One interesting strategy may be the utilization of participatory mapping in developing resilient visions for agricultural space; this would employ a mixed-methods approach that combines counter-mapping's use of grassroots, localized knowledge in the service of revealing new perspectives with cognitive mapping's spatialization of emotion, cognition, and perception (Kitchin, 1994). Coastal agricultural residents would receive a blank small area plan of a relevant coastline and would work together to map the changes in workable farming area that they have experienced, potentially the loss of viable cropland on their parcel due to saltwater intrusion, conversion of multiple parcels to development or infrastructure, etc. This technique would demonstrate the most prominent shifts in agriculture to an individual, utilizing what is often multi-generational expertise and familiarity with one's community. It would also allow for these experiences to accumulate into a mutually agreed upon set of systemic factors and threats that must be addressed, and eventually provide a basis for the most appropriate sites for land use intervention, ecosystem restoration, or managed retreat within a community.

This analysis and technique could also be extended beyond the bounds of climate action planning to act as sort of historic preservationist project. Minimizing the cultural and historical loss incurred by climate change is one of the most complex and underdiscussed challenges of climate 'mitigation' or 'resiliency'; on the Eastern Shore, where many high-risk coastal farms have a family history dating back centuries, the urgency of this challenge is magnified. Empowering residents with the ability to map the changing landscape of their environment would be an insightful grassroots way to capture some of the techniques, contours, and products of their work before climate

hazard forces significant adaptation or retreat. The extensive research work on Tangier Island's working landscape conducted by UVA's Lincoln Lewis and Andy Packwood serves as model and inspiration point for what a participatory preservationist exercise on the Eastern Shore mainland could offer (The A-School's, 2023).

Conclusion

This report identifies Eastern Shore agricultural land at high risk of facing increased climate hazard, frequently as a result of salinization, in the next few decades. This high-risk area represents a significant source of land value, employment, and cultural identity for the region. Current planning and policy around agricultural land management, however, identifies residential development pressure as a more immediate threat to the long-term viability of the industry. This threat at present is twofold, both replacing prime agricultural land and complicating efforts to mitigate sea level rise by placing more resources, infrastructure, and population within high-risk areas. This dynamic presents an opportunity for alignment between the interests of smallholding agriculture and the goals of a climate equity movement.

Our research intends to supply Eastern Shore decision-making with additional information which can potentially guide the formation of this dual strategy. The hazard zones identified demonstrate where exactly aid and resources can best be allocated to minimize damage from sea level rise, and generally to understand where issues of sea level rise are most pressing. Comparative analysis of average value by land type helps to create a better understanding of the impact of losing 30% of agricultural land by 2060. Considering the hazard zones identified, we see that agricultural land in low-lying coastal areas is comparatively among the most valuable agricultural land on the Eastern Shore, confirming development pressure dynamics and underscoring the sheer amount of economic and cultural resources threatened by climate change in the medium-term. Changes are necessary to mitigate the impacts of sea level rise and to ensure that the Eastern Shore's centuries-old agricultural tradition remains viable.

Assessing the relationship between agricultural planning and climate resiliency planning within Eastern Shore public policy suggests that climate language is often minimized, even within hazard mitigation plans. It is downplayed especially within agriculture/aquaculture policy, where residential development pressure is considered the more immediate threat to these industries' success. While this prioritization does speak to a very real and immediate shift that these industries face, it also may speak to an understanding of agricultural and climate political priorities as non-compatible. This report casts intensifying residential development pressure in high-risk climate hazard areas as a threat to climate equity and suggests the possibility for coalition-building between these stakeholder groups. Participatory mapping, a powerful tool for helping to cultivate grassroots problem-solving, is proposed as a potential engagement strategy which can help communities conceptualize their lived understanding of the area within

the context of climate resiliency and hazard mitigation. We hope that the methods and resources within this paper can also contribute to this effort as well.

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