

turning knowledge into practice

Analysis of Tobacco Farmer Income Diversification

Presented by

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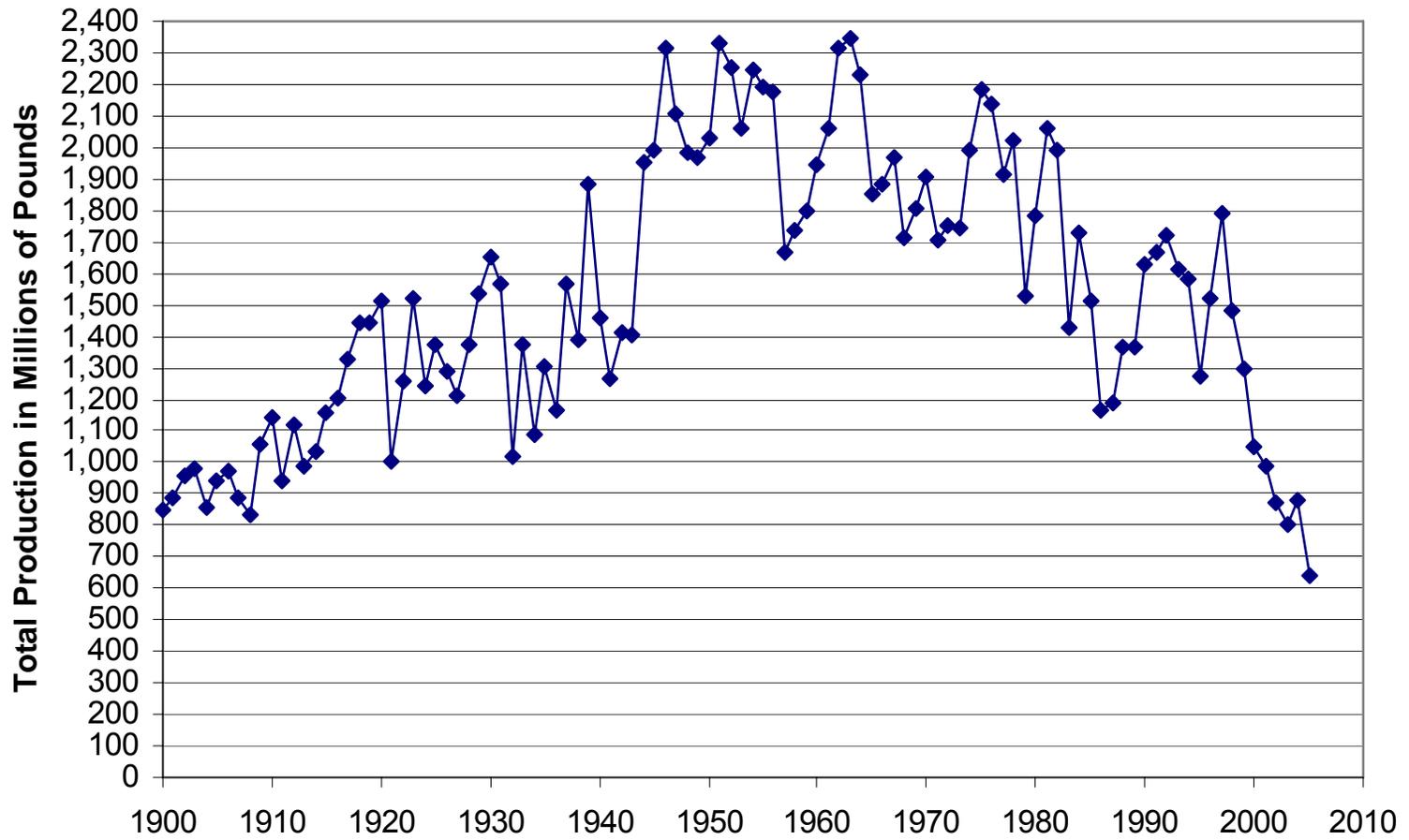
Study Overview

- Develop survey and collect data from NC tobacco farmers on farm and household characteristics, tobacco production and marketing, and attitudes regarding various programs, policies, and entities affecting tobacco markets
 - Largest tobacco-producing state, about 40% of national production
- Evaluate tobacco farmer attitudes towards and interest in diversification into alternatives to tobacco
- Examine ability of tobacco farmers and tobacco-dependent communities to adjust to changes taking place
- Track changes in attitudes towards tobacco control and tobacco manufacturers over time
- Evaluate effectiveness of providing information about diversification opportunities and funding sources to tobacco farmers

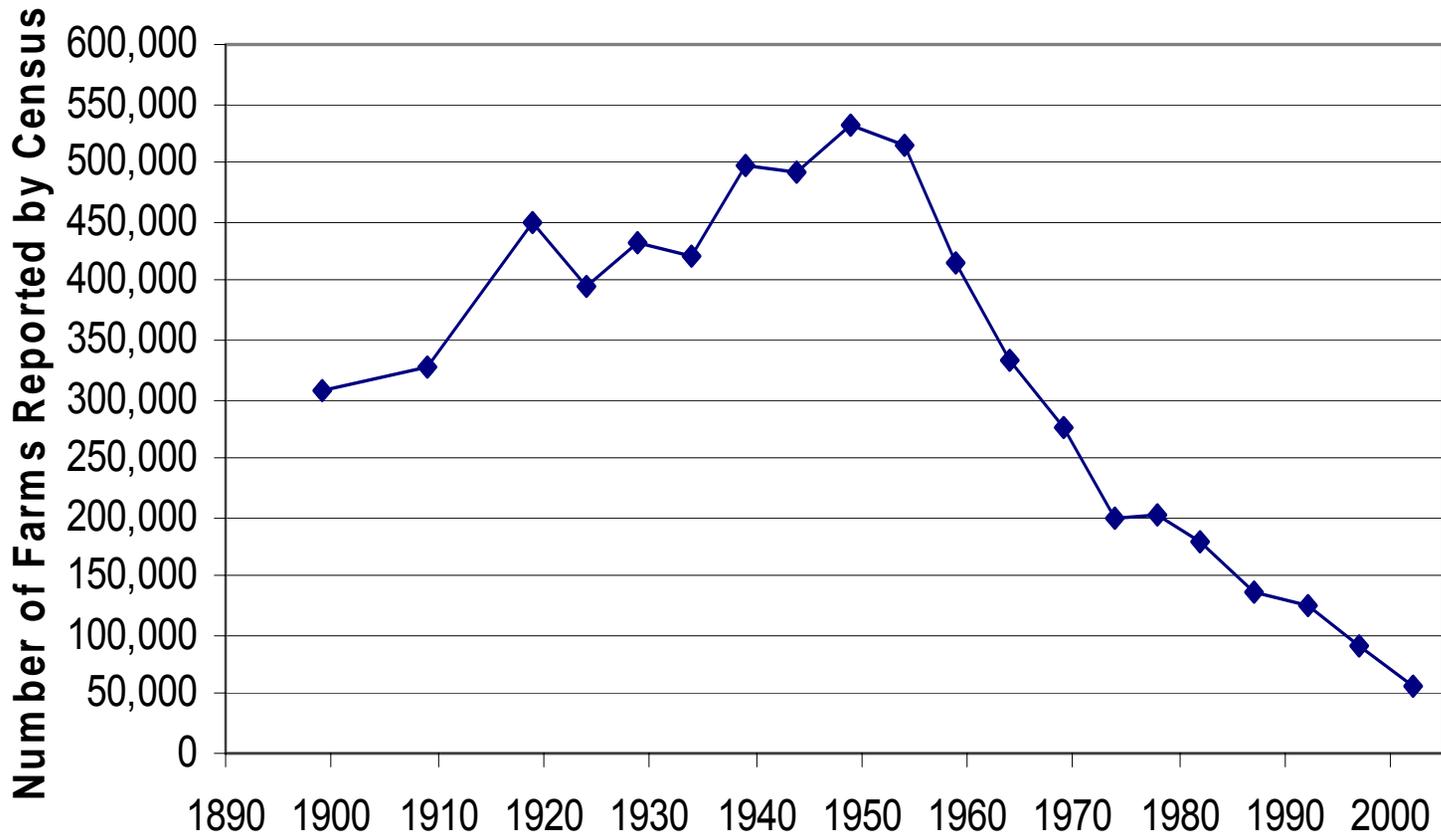
Rapidly Changing Tobacco Market Conditions

- Falling demand for domestic tobacco
- Increasing reliance on international trade
- Rising production costs
- Sharp reductions in quota levels, followed by October 2004 termination of the quota system and price supports
- Rapid development of direct contracting with manufacturers
 - From very little before 1999 to 80% of flue-cured by 2001
- Following long period as highly profitable crop, USDA ERS Costs & Returns data have shown negative residual returns in 4 out of the 5 most recent years with available data (1999-2003)

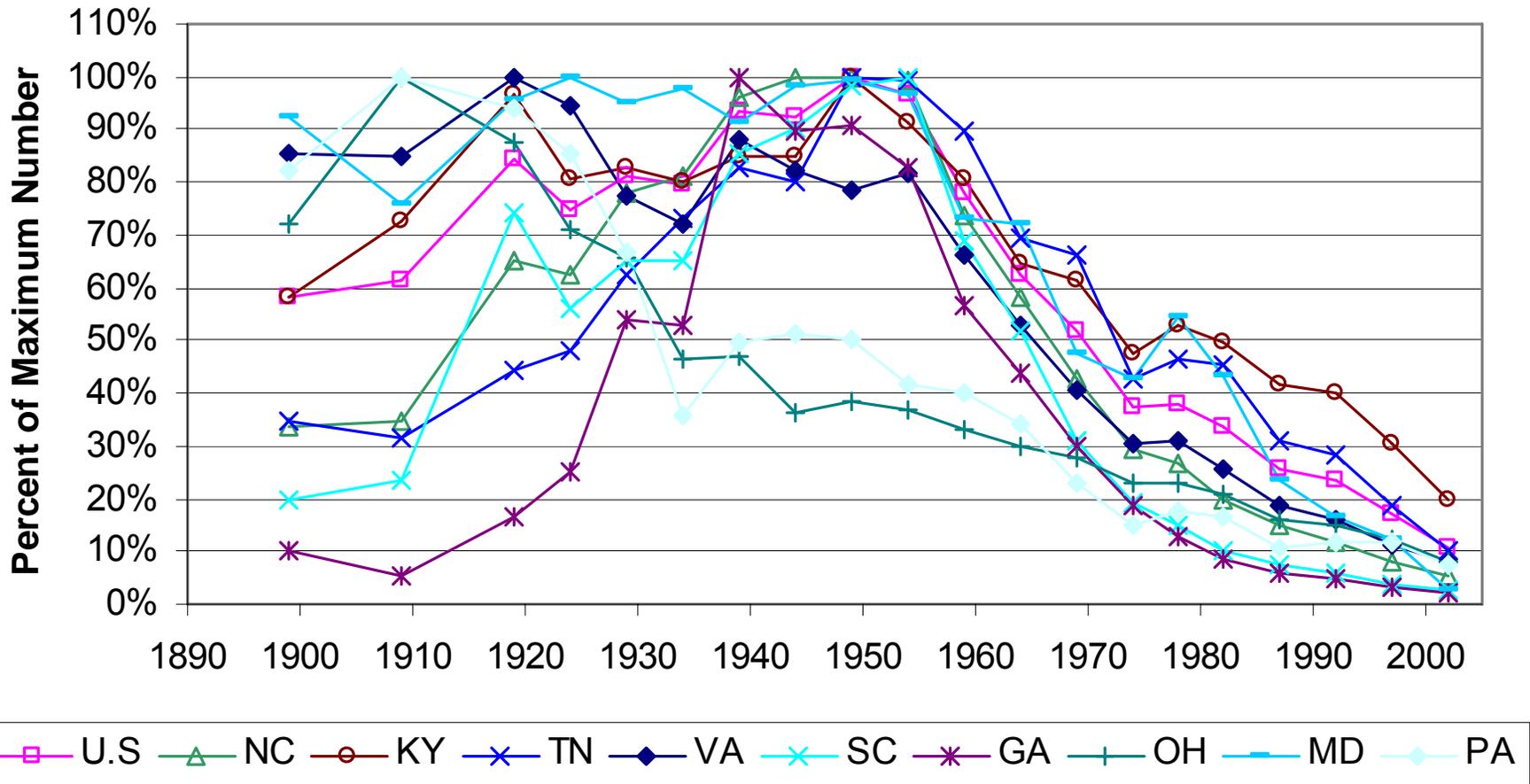
U.S. Tobacco Production



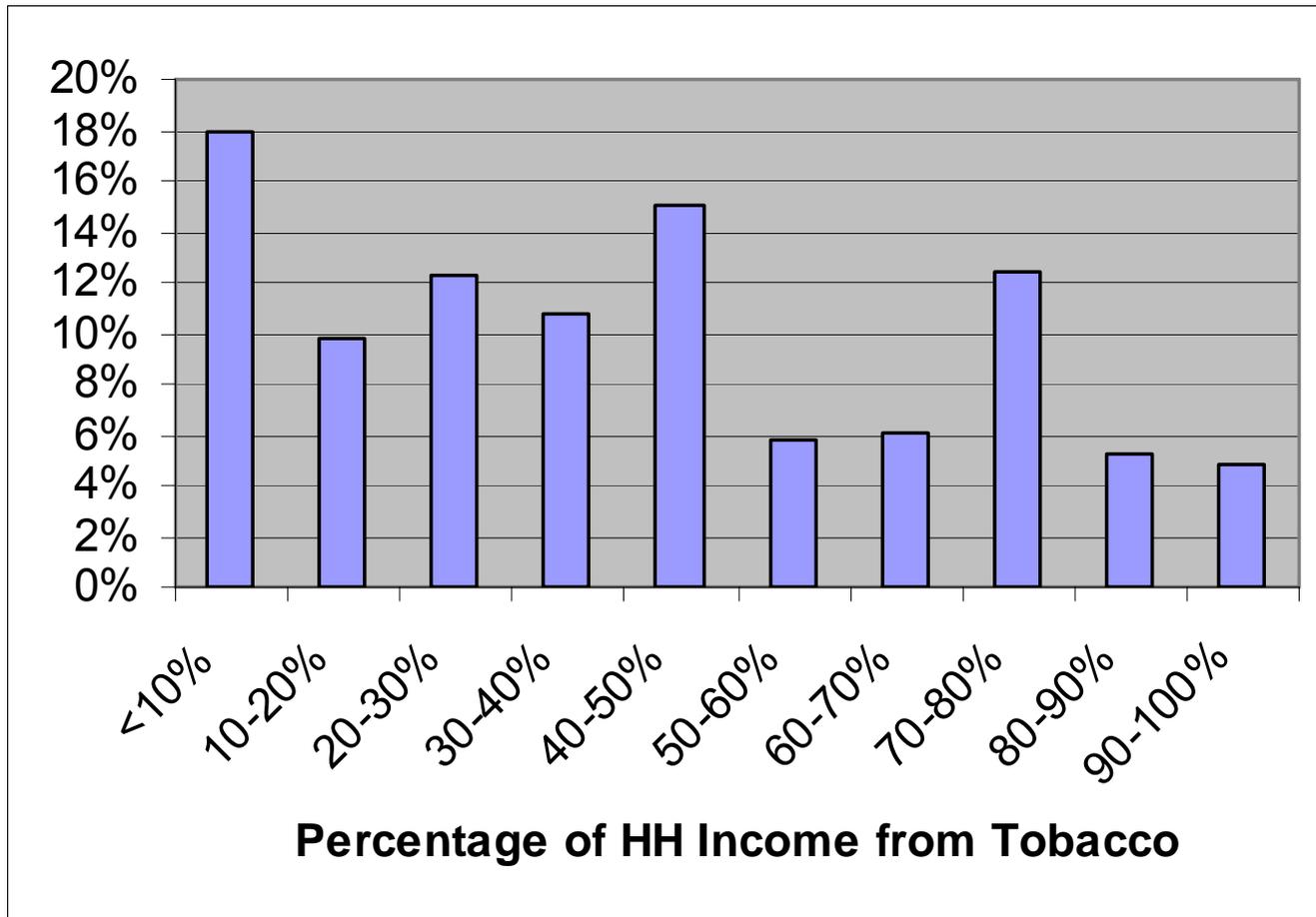
U.S. Farms Growing Tobacco



Change in Farms Growing Tobacco by State, 1899-2002



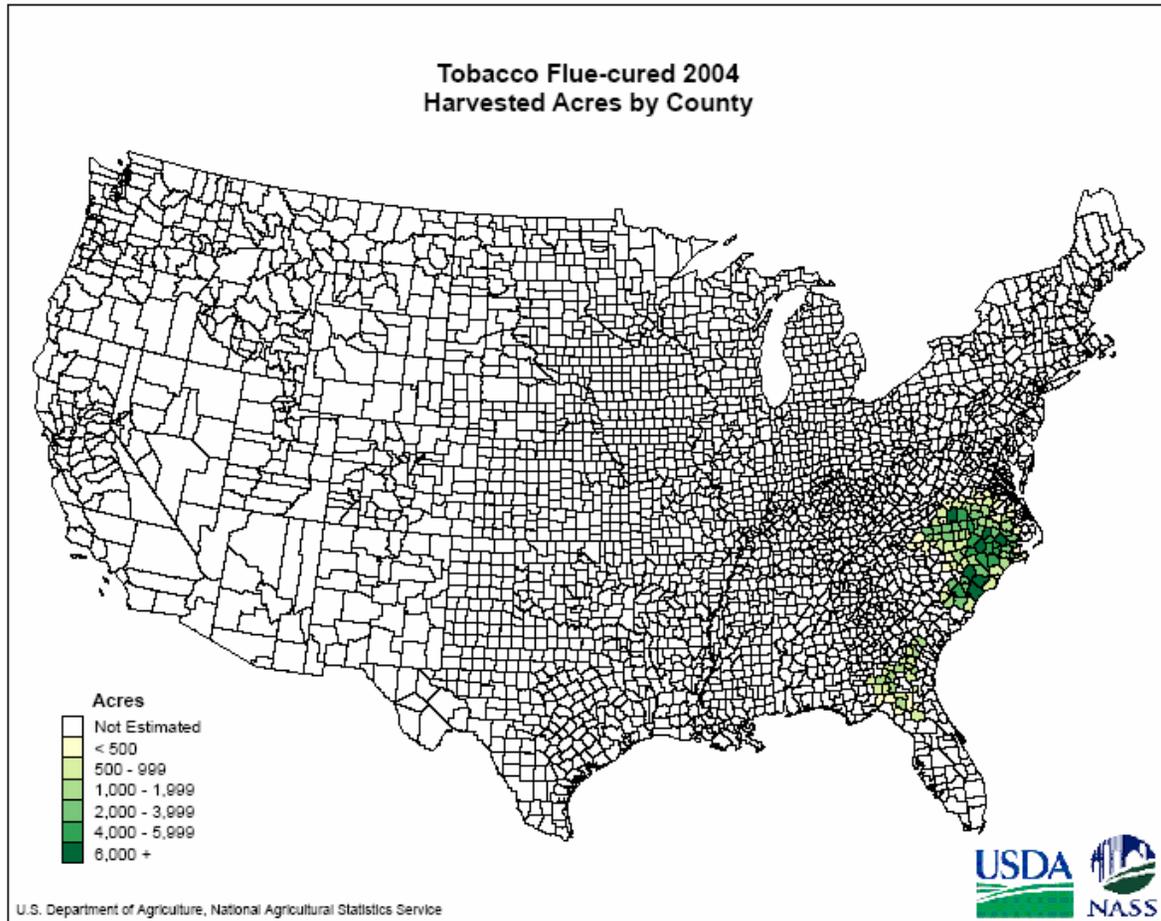
Share of HH Income from Tobacco



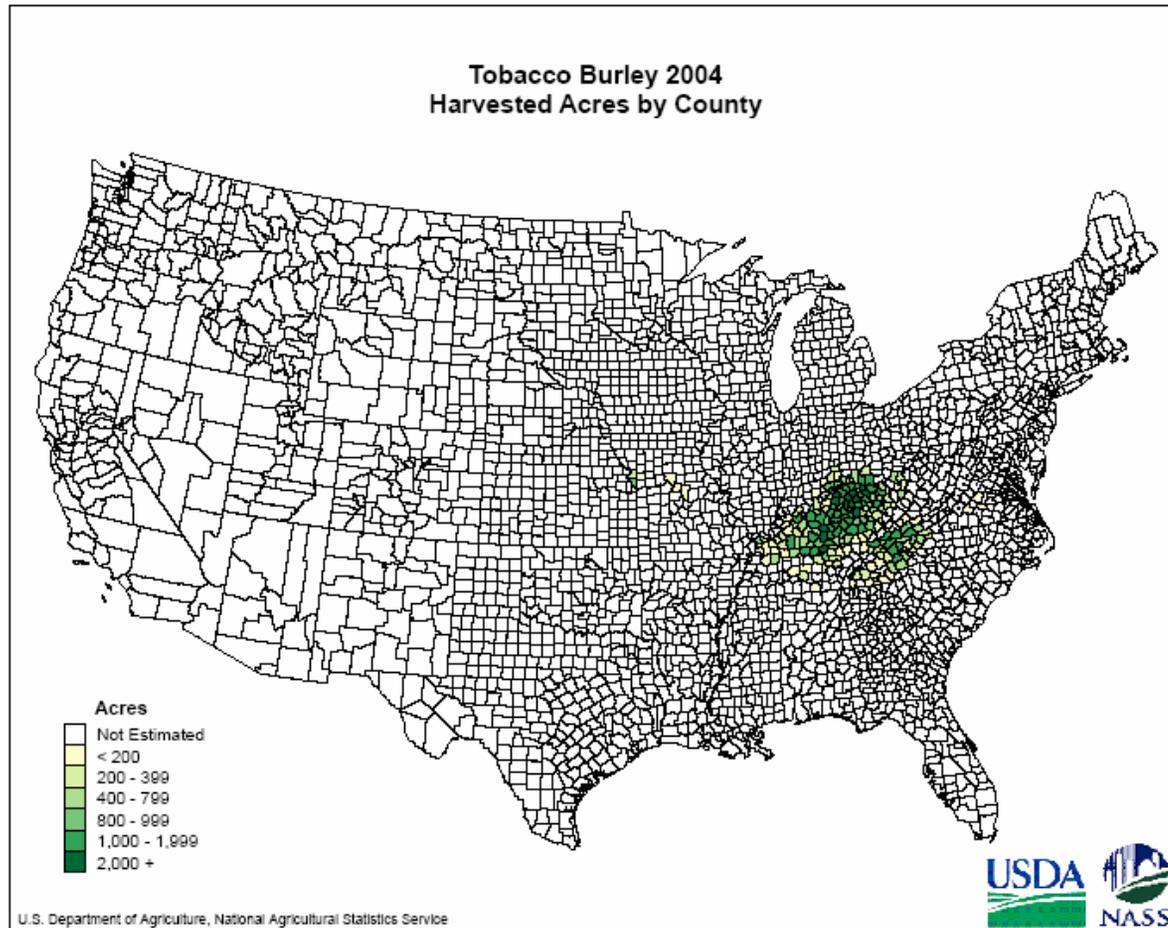
Diversification

- As the number of tobacco farms and income from tobacco has declined, there has been a great deal of interest in developing alternative sources of income, particularly in tobacco-dependent communities of the south
 - Tobacco is grown in over 500 U.S. counties in 23 states, but production is concentrated in selected regions of NC, KY, VA, TN, SC, and GA
- Influx of buyout funds could provide opportunities for investment in new enterprises, but it has proven difficult in the past to identify sufficiently profitable substitutes for tobacco

U.S. Flue-cured Tobacco Production



U.S. Burley Tobacco Production



How Have Growers Coped with Reduced Quotas?

| | 1999 | 2001 | 2004 |
|-----------------------------------|---------|---------|---------|
| Keep doing the same thing | 17.03% | 20.78% | 0.20% |
| Just do the best I can | 2.06% | 0.56% | 8.88% |
| Exit tobacco production | 6.04% | 2.79% | 0.99% |
| Increase tobacco production | 6.73% | 6.97% | 5.72% |
| Cut production expenses | 33.38% | 35.28% | 0% |
| Get an off-farm job | 6.87% | 9.21% | 6.90% |
| Retire | 2.34% | 1.81% | 0.79% |
| Adjust lifestyle by spending less | 4.95% | 11.99% | 31.56% |
| Diversify farm income | 4.67% | 2.51% | 14.19% |
| Rely on savings | 0.14% | 0.42% | 2.17% |
| Have not coped | 5.63% | 3.35% | 9.07% |
| Other | 10.16% | 4.33% | 19.53% |
| | 100.00% | 100.00% | 100.00% |

Model

- Assume that farm households maximize the net present value of the stream of expected utility subject to time, production, and budget constraints under price and production uncertainty
- Reduced-form equations for econometric estimation can be written in general form:
 - Land in use $i = f(\text{HH characteristics, resource endowments, market incentives, risk and uncertainty, and biophysical factors})$
 - Time allocated to use $i = f(\text{HH characteristics, resource endowments, market incentives, risk and uncertainty, and biophysical factors})$

Data

- Panel survey of NC tobacco farmers drawn from 14 of the 15 highest-producing counties for flue-cured tobacco in the state
 - Fielded 1997, 1999, 2001, 2004 (and another round late '05)
- Combined with secondary data on market variables
- HH Characteristics
 - Demographics (age, gender, race), education, tobacco use, self-indicated barriers to diversification, treatment county
- Resources
 - Total acreage owned, indicator variables for married, children

Data (2)

- Market Incentives
 - Expected tobacco revenue per acre, index of expected revenue for other crops, average county wage, quota lease price, indicator variable for proximity to urban county
- Risk and Uncertainty
 - County-level tobacco yield variance, index of yield variance for other crops
- Indicator variables for survey data years to capture changes in tobacco quotas and other policies impacting tobacco production

Regressions

- ACRESGROWN - acres of tobacco grown (some of those in sample have 0 because they lease out all of their quota)
 - Estimated as 2-part model with decision to grow tobacco (0/1), then decision on how much to grow
- ACTIVE – actively seeking opportunities for farm diversification
 - Estimated as probit using clustering by HH, same for 3 below
- INCPROFIT – identified ways to increase profitability of alternative products through processing or marketing activities
- OFFFARM – household has off-farm income
- OWNOFF – farm operator works off-farm

Results: Tobacco Acreage Grown, Decision to Grow Tobacco

- Farm operators with college degrees were significantly less likely to grow tobacco themselves rather than leasing to others
- Married operators more likely to grow tobacco
- Farmers that use tobacco products were less likely to continue growing tobacco, whereas we expected the opposite
 - Personal tobacco use does not appear to reduce diversification
- HH that indicated a lack of interest in diversification or the lack of other agricultural products as profitable as tobacco as barriers were significantly more likely to be growing tobacco

Results: Tobacco Acreage Grown, Acreage

- Data year indicator variables are very large and significant, reflecting changes in quota levels
- HH headed by white males have significantly more acreage
- Tobacco acreage increases with age, but at decreasing rate
- Tobacco acreage increases with resources (land)
- HH that indicated a need for additional skills before they could diversify had significantly more tobacco acreage
- Those that received information on diversification opportunities and funding sources actually had more tobacco acreage, which may reflect heightened awareness of buyout and other issues
- Expected revenue from alternative crops and location in an urban or adjacent county have the expected negative impacts on tobacco acreage

Results: Actively Seeking Diversification Opportunities

- Almost 68% actively seeking on-farm diversification opportunities
- Most strongly related to having educational attainment of high school graduate or above
 - High school graduates, those with some college, and college graduates were all between 15-17 percentage points more likely to be actively trying to identify ways to diversify than those without a high school diploma
- HH headed by whites (by 12.3 percentage points) and males (by 16.6 percentage points) are significantly less likely to show interest than households headed by women or minorities
- Being married had positive effect (10.8 percentage points), consistent with greater HH time resources making it easier to diversify
- Tobacco lease price had expected positive sign (1.2 percentage points/10 cents)
- Those who indicated no interest in tobacco diversification as a barrier to diversification were less likely to be seeking opportunities (6 percentage points)
- Effect of providing information on diversification during diversification program (1997-2001) (6.4 percentage points higher), but not afterwards

Results: Increase Profitability of Farm Products through Processing or Marketing

- About 45% have increased profitability on non-tobacco products through processing or marketing innovations
- Few significant variables
- Total acreage owned has positive effect
- Higher yield risk for tobacco and other crops both increase the probability of increasing profits, which may suggest that HH in higher-risk counties had greater potential for increasing profits

Results: Off-farm Income

- 51% have off-farm income, 19% of operators work off-farm
- Age and education are important determinants:
 - Positive effect of age, negative for age squared
 - Education levels of having attended at least some college increase probability of having off-farm income (11.9 percentage points high school graduate; >20 percentage points for at least some college)
 - As expected, being married has positive effect (28.7 percentage points)
- Self-identified barrier that more skills are needed to successfully diversify on-farm had positive effect (4.1 percentage points)
- Qualitative results for farm operators working off-farm are similar, except that that off-farm wage is highly significant, total acreage has a negative impact, and being male and being married both had negative effects on the probability of the farm operator working off-farm

Conclusions

- Changes taking place in tobacco markets have increased interest in identifying potential substitute income sources for tobacco farmers and their communities
- Findings suggest that farmers' decisions about tobacco acreage grown are shaped in expected ways by expected revenue and yield risk associated with alternative crops and proximity to an urban county
 - HH characteristics very important determinants
- Results generally show that farmers are interested in diversifying their income, but identify many barriers and less than half have identified any ways to increase profitability of alternative products
- Providing programs to encourage diversification may be necessary to aid in transition to other agricultural products
- Confounding influence of the impending buyout, which created incentives to grow tobacco and hold on to quota in order to qualify for buyout payments, could partially account for limited influence of economic incentives

Future Research

- Examine how diversification intentions and actions have changed following the buyout
 - Was federal tobacco program dampening incentives for diversification?
- How has household income changed after the buyout?
- How is tobacco buyout money being used by farm households?