

# Crop Insurance: Basic Producer Considerations

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## Introduction

Annual crop insurance decisions can assist producers in mitigating production, revenue, and financial risk. All crop insurance policies have similar elements however this article focuses on crop insurance as it relates to the coverage of traditional row crops (corn, cotton, soybeans, and wheat). Specifically, this article provides a brief background of crop insurance, discusses producer risks that can be partially mitigated by crop insurance, explains how coverage and indemnities are calculated, and discusses producer considerations when selecting a crop insurance policy. A second article, *Crop Insurance: Specific Considerations*, provides further considerations for producers with respect to lender and producer financial risk, prevented planting, and interactions with price cycles and commodity programs (Agriculture Risk Coverage - County Coverage (ARC-County) and Price Loss Coverage (PLC)).

## Background

In 2015, crop insurance policies covered over 100 commodities, 366 million acres, and \$102 billion in

liability. Crop insurance has been available since the 1930s, however producer adoption did not expand rapidly until the early 1990s. Over the past 25 years crop insurance has evolved from being a sparsely used novelty to an essential risk management tool. Since the early 1990s, there have been many crop insurance policies available to producers, Since 1997, producers have expanded the use of federal crop insurance and adopted revenue policies at the expense of yield policies (Figure 1). In 2015, revenue protection policies accounted for 91.7% - 183 million acres and yield protection 6% - 11.9 million acres of total insured acres of corn, cotton, soybeans, and wheat. By comparison in 1997, yield policies insured 75% - 74.8 million acres and revenue policies 24% - 23.4 million acres.

Many factors have contributed to the increased use of crop insurance, particularly revenue based products. First and foremost has been the increased financial outlays generated and required to produce a crop. For example, in 1997 an acre of corn was estimated to generate \$327.60 of gross revenue and cost \$363.73 to produce (\$162.25 variable cost plus \$201.48 in fixed cost). In 2015, that same acre of corn was estimated to generate \$612.62 in

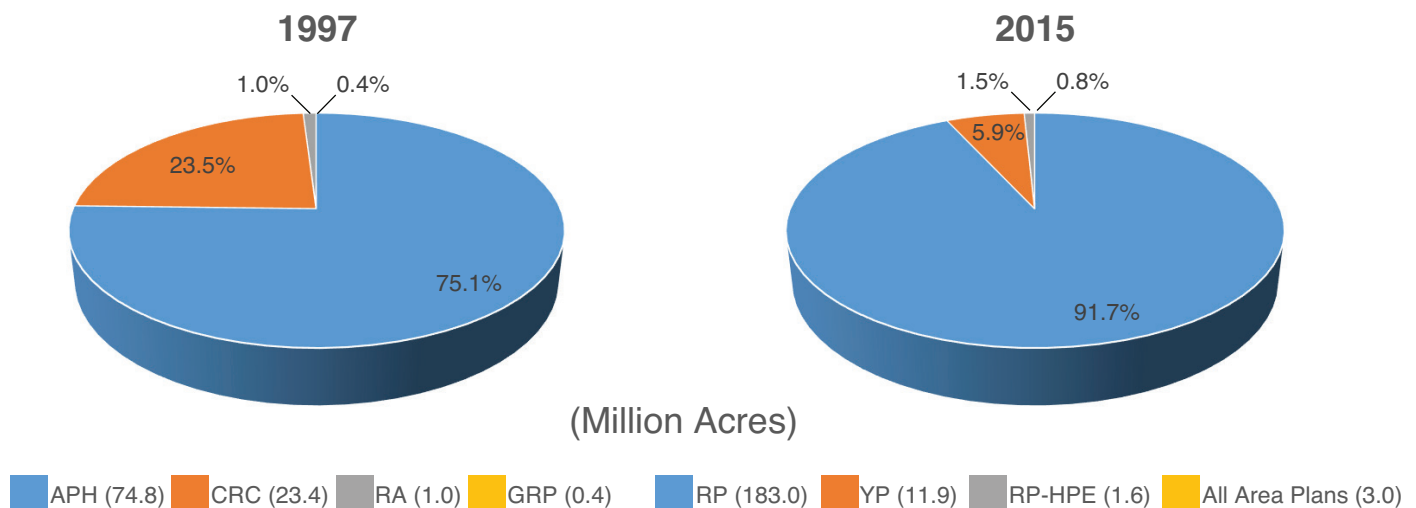


Figure 1. Crop insurance Policies by Type for Corn, Cotton, Soybeans, and Wheat, 1997 and 2015.

gross revenue and cost \$676.60 (\$334.69 in variable costs and \$341.91 in fixed costs) to produce, equating to an 85% increase in revenue and 86% increase in total cost (106% increase in variable cost and a 70% increase in fixed costs). Over the same time period estimated yield per acre increased from 130 bu/acre to 167 bu/acre, a 28% increase. As such, without considering other factors (yield variability, weather volatility etc.), the effectiveness of yield protection crop insurance policies as a risk management tool has been diminished relative to revenue protection.

### Producer Risks

Crop insurance is designed to assist producers in managing risk during the production year. As such, prior to evaluating crop insurance products and features producers should ask: What risk (s) can be mitigated with crop insurance? Risks that can be partially mitigated with crop insurance policies include: production, revenue, and financial.

- **Production risk** involves the uncertain natural growth process of crops (variability in yield and quality). Weather, disease, pests, and other factors can affect the quality and quantity of production. As such, producers should determine their production regions susceptibility to drought, flood, hail etc. when choosing a crop insurance policy.
- **Revenue risk** refers to the uncertainty in revenue (yield and price) producers receive for their commodities. In general, revenue risk, from the perspective of crop insurance can be identified as deciding to plant a crop with the expectation of one price or revenue level and harvesting at another. Volatility in prices and revenue during the production year can dramatically alter producer profitability. For primary row crops futures markets are used to determine crop insurance prices. As such, producers should fully consider the impact of local basis on the net revenue they are expected to receive for their commodity. In general, counties with a negative basis are able to mitigate more revenue risk with crop insurance than counties with a positive basis.
- **Financial risk** occurs when the producer borrows money and creates an obligation to repay debt in order to produce a crop. Financial risk associated with repayment of loans and other financial obligations is unique in that risk is also born by an additional entity – the agricultural lender.

Agricultural lenders provide capital to producers to plant, grow, and harvest a crop, thus, from the perspective of a lender crop insurance can be viewed as a source of repayment and collateral for debts.

### Calculating Guarantees and Indemnities

For yield and revenue crop insurance policies yield, price, and coverage level are required to determine the revenue or yield guarantee and indemnity payment. A producer's yield history is used to determine the Actual Production History (APH) yield. A producers APH is determined by 4-10 years of yield data for each insured unit (see unit structure below). To prove yields producers can use sales receipts, storage records, and feed consumption records. For corn, soybeans, and wheat, crop insurance price is determined from the Chicago Mercantile Exchange (CME), for cotton price is determined from the Intercontinental Exchange (ICE). The simple average closing price of the harvest futures contract over the price discovery period (one month) is used to set the crop insurance price for each commodity. Price discovery periods vary by commodity and region.

The revenue or yield guarantee sets the amount a producer is indemnified. The simple calculations are:

$$\text{Revenue guarantee} = \text{APH} \times \text{coverage level} \times \text{price};$$

and

$$\text{Yield guarantee} = \text{APH} \times \text{coverage level}.$$

For example, a soybean producer with an APH yield of 45 bu/acre, projected price of \$8.85/bu, and buy-up of 75% coverage would have a revenue guarantee of \$298.69/acre. If that same producer instead decided to purchase a yield protection policy, at the same buy-up level, coverage would be estimated at 34 bu/acre (45 bu/acre x 75% buy-up). For revenue policies, the spring revenue guarantee can be revised up if the fall price (price determined at harvest using the same method as the spring price) is higher than the spring price. If the fall price is higher than the spring price the revenue guarantee would be established at the higher coverage level. If the harvest price is lower than the spring price then the revenue grantee would remain at the established spring guarantee.

For an indemnity to be paid from revenue insurance actual revenue must fall below the revenue guarantee. For the example above, revenue would have to fall below \$298.69/acre for an indemnity to be paid. An indemnity

could occur from decreased yield, decreased price, or a change in both which results in revenue dropping below the guarantee (*i.e.* a price decrease could be offset with a yield increase causing revenue to remain above the guarantee). An indemnity trigger for yield protection occurs if actual yield falls below the yield guarantee. Price will not trigger an indemnity payment under a yield insurance policy. However, price will determine the amount of the indemnity the producer receives. In the above example, if yield is equal or above 34 bu/acre no indemnity is paid if it is below 34 bu/acre an indemnity is paid ([guaranteed yield-actual yield] x price).

### **Producer Considerations when Selecting a Crop Insurance Policy**

Given the risks associated with row-crop production it is imperative for producers to seek professional advice when making production and financial decisions. Using a qualified professional crop insurance agent is strongly encouraged as they will help producers select the appropriate coverage to mitigate their risks. For producers, it is important to identify the risks crop insurance policies can mitigate for each field and commodity being grown. Selecting the appropriate crop insurance policy depends on the commodity, region, production method, and financial resources available to the farming operation. After identifying the relevant risk, a producer must then evaluate the different crop insurance policy options. For all crop insurance policies it is important to determine: i) the type of insurance plan; ii) production practices; iii) yield exclusion opportunities; iv) unit structure; v) coverage level; and vi) premium cost.

#### **i) Type of Insurance Plan**

In general, crop insurance policies can be divided into two categories - yield and revenue. Yield policies provide protection during the production season against yield losses from forces outside the producer's control, such as drought or flood. Revenue policies provide coverage against decreases in revenue (price and yield combinations) during the growing season. Crop insurance policies can be further segmented into individual or group policies. Individual policies provide coverage for individual farms or farms managed by one producer - determined by the type of policy and the unit structures available to the farm operation. Group policies provide protection against area wide losses (*i.e.* a county or other specified geographic area) and are

not generally attached to production from one specific producer.

#### **Producer considerations:**

- **Is yield coverage sufficient to mitigate risk or should revenue protection be purchased?**

Individual financial circumstances and risk preferences will guide producers in determining if yield or revenue coverage will meet their needs. Additionally, talking with your lender about revenue versus yield coverage is encouraged. Consideration should be paid to differences in premium cost.

- **Does drought or frequent flooding occur on the farm?**

Fields within a county have different risk profiles. Low lying river bottoms will be at risk of flooding while sandy hill tops present a greater risk of drought. Location within the region, state, or county will influence the crop insurance coverage selected.

- **Does my marketing program provide adequate price/revenue risk protection?**

Crop insurance should be supportive to your farm's marketing program. Avoid doubling up costs by having marketing strategies covering the same risk as crop insurance. The goal should be to achieve a specified level of revenue coverage for a minimum cost.

- **Are individual yields correlated to county yields?**

If individual farm yields are strongly correlated with county yields producers may want to consider an area insurance plan that may have cheaper premiums. If individual yields are not correlated with county yields the effectiveness of an area plan will be diminished.

#### **ii) Production Practices**

Production practices can influence the crop insurance policy decision for producers. Irrigated vs non-irrigated and conventional vs organic are

two examples of production practices that can differentiate the insurance product that best suits your operation. For example, the risks a producer with irrigation face are very different than those without access to irrigation. Production practice will also determine buy-up level, unit structure, and premium cost.

***Producer considerations:***

- **What production practices are insurable in my county?**

Not all production practices are insurable in every county. Contact your crop insurance representative to determine which practices can be insured separately.

- **Is irrigation available to offset yield risk?**

Access to irrigation allows producers to reduce yield risk. Using marketing alternatives, such as options, may be more cost effective in some circumstances than purchasing revenue protection crop insurance.

- **Can private contracts or marketing orders offset price/revenue risk?**

Evaluate opportunities to mitigate risk outside of federal crop insurance, particularly for specialized production practices like organic and non-GMO. Laying off risk to other entities in the supply chain may be a cost effective solution.

**iii) Yield Exclusion Opportunities**

The APH yield exclusion allows producers to exclude the yield for a commodity if the simple average county yield falls below 50% of average yield for the previous ten production years. Producers in adjacent counties will also have the ability to drop the yield from their APH calculation. By excluding abnormally low yields producers can increase their APH and/or revenue guarantee.

***Producer considerations:***

- **Are my farms/commodities eligible for yield exclusion?**

Increasing APH raises the coverage (\$/acre or bu/acre) for each buy-up level of crop insurance. Producers should determine which years/commodities are eligible for yield exclusion in their county.

- **Can I get the same coverage through yield exclusion as buying-up additional coverage?**

In most circumstances using the yield exclusion will be in the producer's best interest. Yield exclusion can result in increased coverage buy-up for the same premium cost or reduce premium cost for the same coverage buy-up.

**iv) Unit Structure**

Each parcel of land that is insured independently of other parcels is defined as a unit. Separate production records must be maintained for each unit. The unit structure determines the coverage, premium paid, premium subsidy, and indemnity trigger for the crop insurance policy. The four unit structures are basic, optional, enterprise, and whole-farm. Basic units can be designated for all tracts of land and commodity that a producer owns, cash rents, or share rents with a different land owner in a county. Optional units may be designated when i) basic units occur in different township sections or ii) a crop is being grown under different production practices (irrigated vs non-irrigated). Enterprise units combine all acres of a single crop within a county in which the policyholder has a financial interest into a single unit, regardless of whether they are owned or rented, or how many landlords are involved. A whole farm unit combines all acres into one unit. Unit structure options available to producers will vary by region and commodity.

***Producer considerations:***

- **What is the difference in premium subsidization for different unit structures?**

Unit structures and buy-ups receive different premium subsidization from the federal government (Table 1). Tradeoffs between coverage and premium cost should be fully understood.

- **Are the yields and risks for individual land parcels correlated?**



**Table 1. Percent of Premium Covered by Government Subsidy for Coverage Levels, Crop Insurance Product, and Unit Structure.**

Coverage Level/ Buy-up (%)	Percent of Premium Paid by Federal Government				
	<i>Basic &amp; Optional</i> (%)	<i>Enterprise</i> (%)	<i>Whole Farm Unit</i> (%)	<i>SCO Subsidy</i> (%)	<i>STAX Subsidy</i> (%)
50	67	80	80	65	NA
55	64	80	80	65	NA
60	64	80	80	65	NA
65	59	80	80	65	NA
70	59	80	80	65	80
75	55	77	80	65	80
80	48	68	71	65	80
85	38	53	56	65	80
86	NA	NA	NA	65	80
90	NA	NA	NA	NA	80

Similar to group insurance policies, the effectiveness of the insurance coverage provided by unit structure is dependent on the correlation between yields and risks faced by each land parcel.

#### v) Coverage Level

Catastrophic risk protection endorsement (CAT) provides a minimum level of coverage. Where available, CAT coverage insures 50% of the approved yield and 55% of the price for a commodity. For CAT coverage, the premium is paid by the Federal Government; however producers are still required to pay an administrative fee of \$300 for each crop insured in each county. For RP, RP-HPE, and YP policies producers can choose to buy-up coverage from 55% to a maximum of 85% of yield (not available for all commodities or locations) and 100% of price. Since the early 1990s, producers have increased their average coverage level for corn, cotton, soybeans, and wheat (Figures 2-5).

#### *Producer considerations:*

- **What are my risk preferences?**

Producers are comfortable with different levels of risk exposure. Risk adverse producers will buy-up greater coverage while risk neutral producers may buy-up lower coverage.

- **Does the operation have sufficient cash reserves to withstand deep losses?**

An operations ability to absorb losses should be strongly considered when selecting a coverage level. Operations with lower working capital may want to secure greater buy-up coverage to avoid a deep loss that may force them to exit the industry. Operations with large cash reserves may be inclined to purchase lower coverage levels at lower premiums thus self-insuring over time.

- **How does this affect my ability to borrow?**

Maintaining a mutually beneficial relationship with your lender is imperative in agriculture. An open and honest dialogue will provide an indication of your lenders borrowing requirements and assist in obtaining the financing to plant, grow, and harvest your crops.

#### vi) Premium Cost

Type of insurance, production practice, unit structure, and coverage level will all contribute in determining the premium paid for crop insurance policies. Table 1 shows the premium subsidy (percent of total premium paid by the federal government) for different buy-up levels, unit structures, and crop insurance products. Producers can obtain premium estimates from approved insurance providers (AIP) in their county or the USDA-RMA's Crop Insurance Decision Tool available on line at: <http://prodwebnblb.rma.usda.gov/apps/CIDT/>. Premium costs will move in the same direction as the commodity's price (*i.e.* when

wheat prices are rising premium costs are increasing and vice versa).

#### ***Producer considerations:***

- **How much should I pay for crop insurance?**

Minimizing cost subject to a predetermined level of production should be the producer's goal. Stepping through the considerations above will often lead to a satisfactory premium. Lowest cost does not equal best value. Efficiency of coverage should be the goal.

- **What is the most effective way to lower premium costs while maintaining sufficient coverage?**

Yield exclusion is likely the most cost effective avenue but buy-up coverage and type of insurance plan should also be fully explored. A good crop insurance agent will be able to provide multiple scenarios for cost comparison.

#### **Conclusions**

Crop insurance has become a vital risk management tool for row crop producers across the United States. Recently row crop producers have favored revenue products with higher buy-up levels over yield products and lower buy-up levels. When producers are selecting

their crop insurance products they should determine the risks they are attempting to mitigate and consider the type of insurance plan, production practices utilized, yield exclusion options, unit structure that suits their operation, coverage level, and premium cost/subsidization.

Choosing a suitable crop insurance policy can be a complicated process with many variables to consider. Additionally, the best crop insurance policy is dependent on the purchaser's unique circumstances, as such producers are cautioned to avoid taking a one size fits all approach to crop insurance policy selection. Seeking advice from qualified crop insurance professionals will help simplify the process and help the purchaser avoid common pitfalls.

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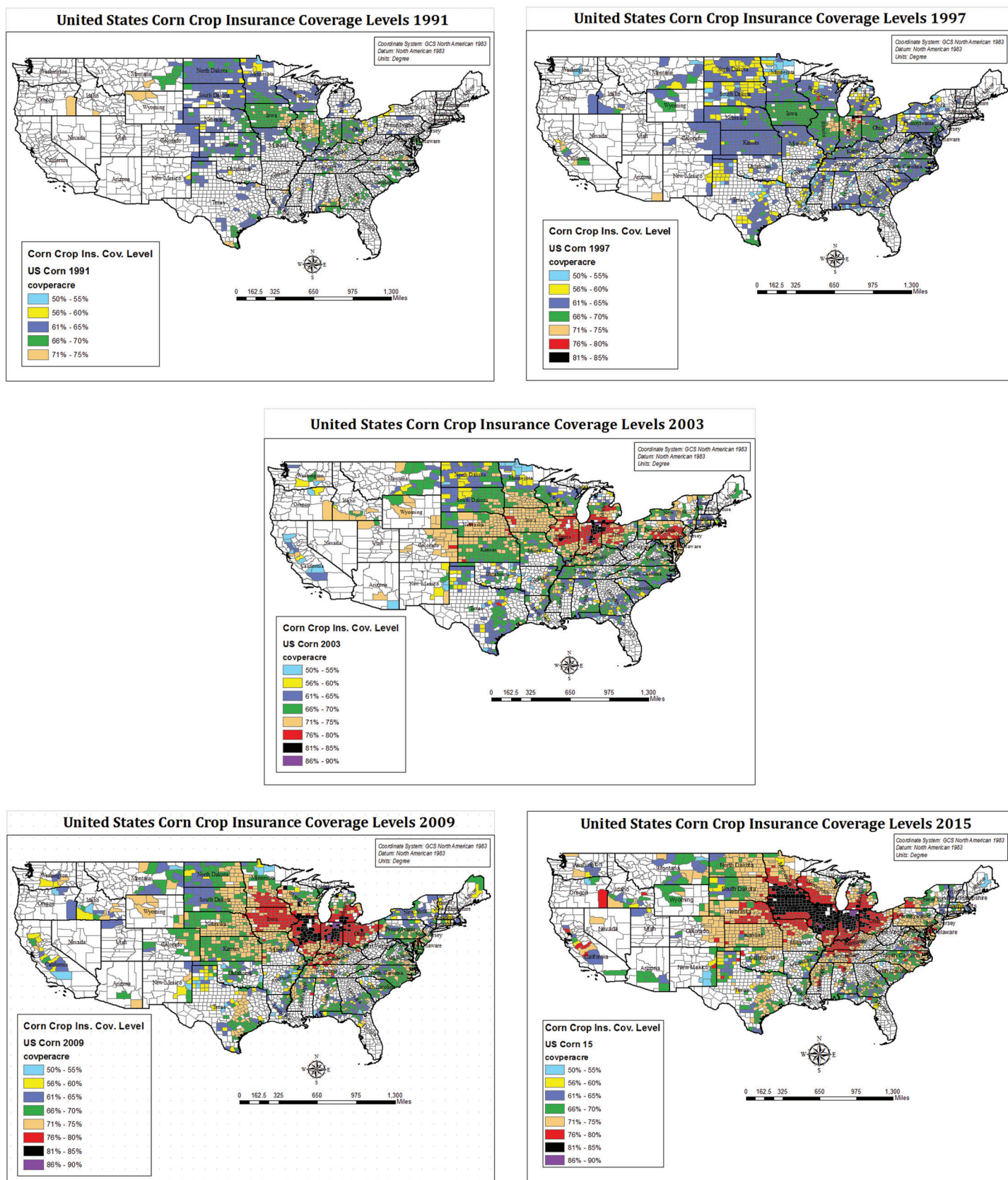


Figure 2. Corn Crop insurance Buy-up Levels the Year After a Farm Bill (1991, 1997, 2003, 2009, and 2015).



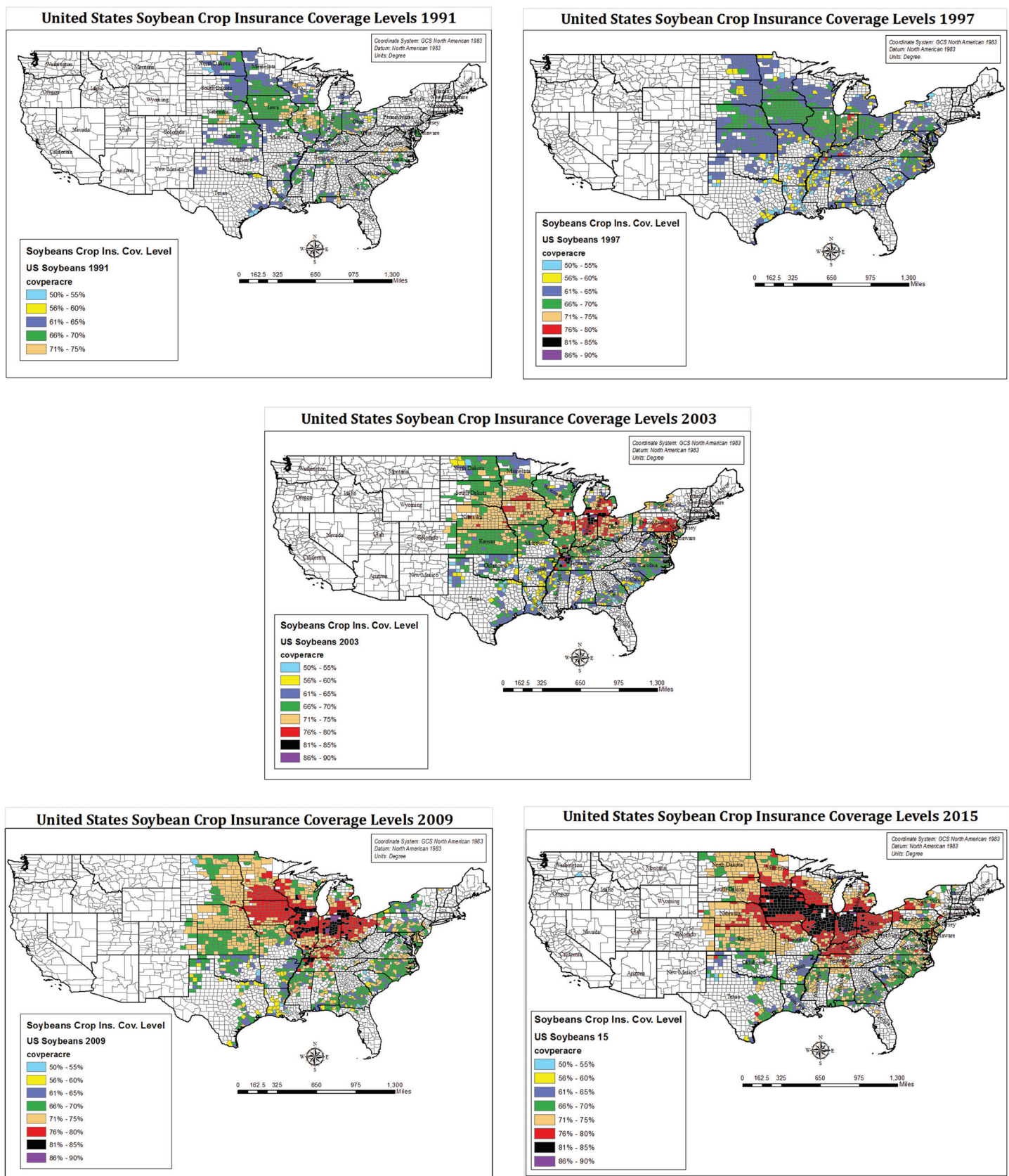


Figure 3. Soybean Crop insurance Buy-up Levels the Year After a Farm Bill (1991, 1997, 2003, 2009, and 2015).

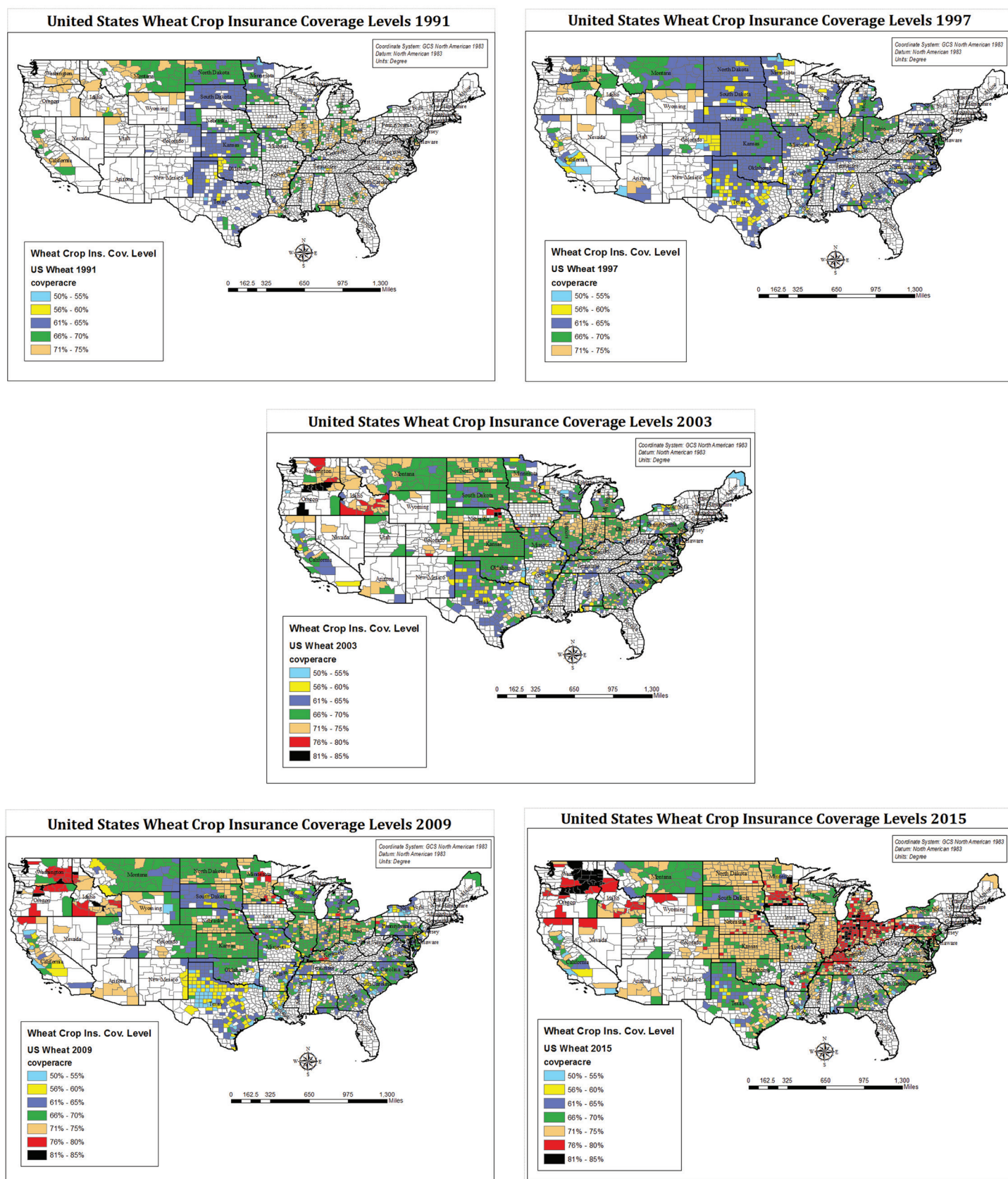


Figure 4. Wheat Crop insurance Buy-up Levels the Year After a Farm Bill (1991, 1997, 2003, 2009, and 2015).



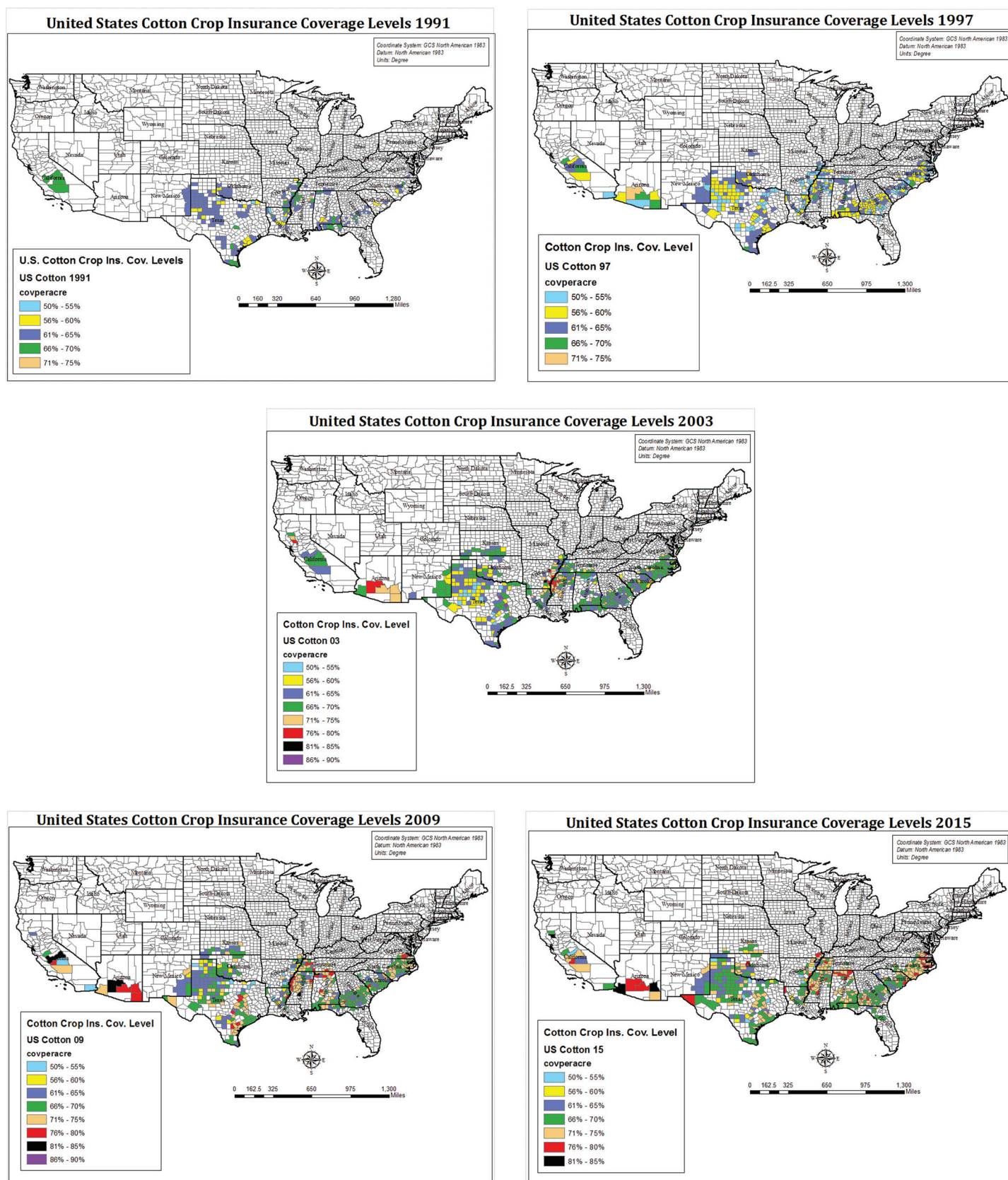


Figure 5. Cotton Crop insurance Buy-up Levels the Year After a Farm Bill (1991, 1997, 2003, 2009, and 2015).