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# Federal Natural Disaster Assistance Programs for Livestock Producers, 2008-16

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and Seanicaa Edwards





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# **Federal Natural Disaster Assistance Programs for Livestock Producers, 2008-16**

Matthew MacLachlan, Sean Ramos,  
Ashley Hungerford, and Seanicaa Edwards

## **Abstract**

Natural disasters can cause income losses for livestock producers by diminishing grazing capacity of land, driving disease, or directly causing livestock losses. Under the Agricultural Act of 2014, three disaster assistance programs for livestock administered by the Farm Service Agency became permanent, and their eligibility requirements were generally relaxed. These disaster programs include the Livestock Forage Disaster Program, the Livestock Indemnity Program, and the Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish Program. Existing legislation—the Animal Health Protection Act—also authorized indemnity payment programs during the control of infectious disease outbreaks. This report examines how these programs work and which States and counties have farms that have received program payments. The report describes regional differences in payment delivery and shows how outlays vary greatly by year and program. Regional differences in production and natural disasters has led to differences in program payments across States and counties.

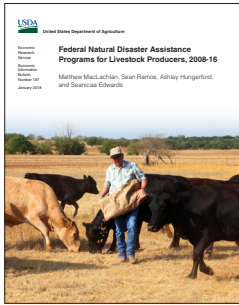
**Keywords:** livestock, honey bees, farm-raised fish, indemnity, natural disaster, emergency assistance, disaster assistance

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## Federal Natural Disaster Assistance Programs for Livestock Producers, 2008-16

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### What Is the Issue?

Harsh environmental conditions pose many risks to livestock producers. These risks can affect feed availability, animal health (including mortality rates), and production costs. For example, severe weather events such as drought, wildfire, blizzards, tornadoes, and hurricanes can destroy pasture (or “forage”). In addition, wild animal attacks and diseases such as pneumonia or cattle tick fever pose further mortality risks to livestock.

ERS researchers examine three USDA disaster assistance programs made permanent by the Agricultural Act of 2014 to better understand the timing, size, and geographic distribution of program payments to livestock producers. USDA’s indemnity programs are also considered; specifically, ERS researchers explore various economic incentives resulting from different payment structures to compensate producers for infectious disease damage or associated control efforts.

### What Did the Study Find?

A review of three USDA disaster assistance programs run by the Farm Service Agency (FSA)—the Livestock Forage Disaster Program (LFP), Livestock Indemnity Program (LIP), and Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish Program (ELAP)—found that payments delivered to livestock producers show significant differences between States and counties, and annual outlays vary greatly by year and by program. Many of these differences can be traced to regional differences in the frequency and severity of natural disasters.

- LFP, the largest of the three programs, provides payments to eligible producers when the grazing capacity of their land has been reduced by qualifying drought or wildfire. For losses experienced from January 2008 through December 2016, LFP distributed approximately \$6.77 billion nationwide—with the largest payment concentration in Oklahoma and Texas and substantial payments also going to Kansas and Nebraska. Between 2012 and 2014, widespread drought caused a nationwide surge in LFP payments.
- LIP provides payments for livestock deaths that exceed normal mortality as a direct result of an eligible loss condition, including extreme or abnormal damaging weather, disease promoted by such weather, and attacks by animals reintroduced into the wild by the Federal Government or protected by Federal law (e.g., wolves and avian predators). From 2008 to 2016, South Dakota received the most LIP payments, and Kentucky, North Dakota, and Texas also received substantial payments. Two severe blizzards—in

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2009 and 2013—were the two largest causes of livestock losses. LIP payments between 2008 and 2016 totaled approximately \$313 million.

- ELAP, with a \$20 million annual payment cap, is the smallest of the three programs. It provided total payments of approximately \$130 million from January 2008 through September 2016. This program covers some gaps in the assistance provided by LFP and LIP, as well as assistance to honey beekeepers (the main beneficiaries) and producers of farm-raised fish. Because of colony collapse disorder (CCD—sudden mass disappearances of the majority of worker bees in a colony), honey beekeepers have been the main beneficiaries of ELAP, with CCD affecting between 20 percent and 35 percent of colonies annually. Three-fourths of the managed honey bee colonies in the United States operate in California, with the next highest share operating in Florida. California and Florida received the largest share of ELAP payments—presumably because of their large number of operating beekeepers—while South Dakota also received significant payments.

Payments authorized by the Animal Health Protection Act of 2002 compensate producers for losses from disease outbreaks, support disease-control efforts, and contribute to production recovery. Payment-triggering events (primarily, outbreaks of economically significant infectious diseases) rarely occur, and USDA's Animal and Plant Health Inspection Service (APHIS) designs payment schemes to reduce underreporting by facilities with infected animals and underinvestment in disease prevention. Program design provisions encouraged producers to report suspected cases of infectious diseases through payments for animals and equipment seized during disease control. During some recent outbreaks, APHIS has explored the use of tiered payments based on the level of investment in equipment or practices that help control the spread of disease.

### **How Was the Study Conducted?**

Data from several sources were collected from January 2008 through December 2016 and examined through basic statistical measures and visual representations. Data sources included the USDA Farm Service Agency's county-level claims and payments from LFP, LIP, and ELAP; the U.S. Drought Monitor Service's county-level measurements of drought severity; and the USDA Agricultural Research Service's national rates of colony collapse disorder.

# Federal Natural Disaster Assistance Programs for Livestock Producers, 2008-16

## Introduction

Livestock producers face many sources of production risk from uncertain environmental conditions. These can affect feed availability, animal mortality rates, and production costs. For instance, pasture (commonly referred to as “forage”) is vulnerable to drought and wildfire. To replace lost pasture, producers typically purchase commercial feed, increasing their costs. Severe weather events, such as tornados and hurricanes, can also destroy forage. Besides affecting forage availability, the natural environment poses a mortality risk to livestock in the form of natural disasters, disease (e.g., when cattle contract pneumonia post-blizzard or contract cattle tick fever), and wild animal attacks.<sup>1</sup> These hazards can also interrupt normal production practices or weaken animal health, further reducing the profitability of livestock production.

From 1997 until 2008, the Federal Government partially compensated producers for lost feed and animals and increased production costs in the event of a qualifying natural disaster through ad hoc programs.<sup>2</sup> The Food, Conservation, and Energy Act of 2008 (also known as the 2008 Farm Act) and the Agricultural Act of 2014 (2014 Farm Act) formalized these existing programs or established new programs as permanent disaster programs with specific guidelines for issuing payments. The USDA’s Farm Service Agency (FSA) administers these programs.

The objectives of this report are to (1) provide background and economic statistics on the Livestock Forage Disaster Program (LFP), the Livestock Indemnity Program (LIP), and the Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish Program (ELAP);<sup>3</sup> (2) to discuss how they have changed over time; and (3) to illustrate the timing and geographic distribution of outlays for each program. We give specific attention to the relationship between recent natural disasters and total payment outlays.

With LFP, LIP, and ELAP, the 2008 Farm Act established new provisions or modified existing ones to protect livestock producers facing risks from natural disasters. These three programs were designed to reduce production risk, with triggers and payment schedules established for each context. Under the 2008 Farm Act, LFP, and LIP—which largely existed in more limited forms before 2008<sup>4</sup>—transitioned away from existing ad hoc programs with budgets and eligibility

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<sup>1</sup>Most events that trigger payments constitute what are commonly referred to as “natural disasters.” Other losses are a consequence of infectious diseases driven by natural disasters (e.g., pneumonia) or a result of predation by a protected species. For clarity and simplicity, we refer to all events as “natural disasters.”

<sup>2</sup>Losses from other forms of risk may be covered under products offered by the Risk Management Agency (RMA) or private insurance providers.

<sup>3</sup>FSA provides individual fact sheets that highlight program features and provide payment rates for qualifying producers for each of the programs (FSA, 2015a-2015e) derived from the official Farm Act legislation (CFR, ELAP, 2014; CFR, LFP, 2014b; CFR, LIP, 2014).

<sup>4</sup>Feed losses were previously covered under the Feed Indemnity Program (FIP), LFP’s predecessor. The FSA also provided the Livestock Assistance Grant Program—or State block grants—to help livestock producers partially recover forage production losses due to certain drought conditions during 2006 (FSA, 2006).

requirements designed to assist producers after particularly devastating natural disasters. Instead, these programs were funded through September 2011 to assist with needs from a variety of natural disasters. ELAP was simultaneously created to cover sources of risk not covered by LFP or LIP. Producers may also purchase private insurance to cover additional sources of risk. These policies are typically defined as individual animal, herd, or blanket and typically cover sources of risk not covered under LFP, LIP, or ELAP. However, individual policies may cover particularly high-value animals, especially horses, for the same losses.

Authorization to continue LFP, LIP, and ELAP ceased between October 2011 and the passage of the 2014 Farm Act, in February 2014. The 2014 Farm Act reinstated funding for these disaster programs, made them permanent, and modified their terms. These adjustments, combined with a historic drought in 2012-13, increased average and annual expenditures for LFP and ELAP, while expenditures for LIP remained relatively constant between Farm Acts. Retroactive payments issued for losses occurring between October 2011 and January 2013 constitute a sizeable portion of LFP outlays to date. These payments were disbursed in 2014 and continued at lower levels through 2015.

Whereas LFP and LIP authorize expenditure “...of such sums as necessary...” and hence have no budgetary limits, ELAP’s outlays are limited in the 2014 Farm Act to \$20 million (\$50 million under the 2008 Farm Act) (CFR, ELAP, 2008; CFR, ELAP, 2014) per fiscal year. ELAP payments are prorated when total qualified requests exceed \$20 million. ELAP payment distribution, therefore, begins after the end of the fiscal year when requests are made.

Livestock disaster assistance programs are key to U.S. agricultural policy and have provided assistance in counties that experience severe weather events. This report discusses administrative elements of these programs, including requirements, limitations, and the interactions among programs. (See box, “Producer Eligibility.”) The report ultimately serves to delineate the main features of U.S. livestock disaster assistance, which differ from conventional ad hoc disaster assistance and subsidized insurance programs. While ad hoc programs have been thoroughly researched (e.g., Young and Westcott, 2000; Glauber et al., 2002) as have several dimensions of Federal crop insurance—including moral hazard (Moschini and Hennessy, 2001; Mishra et al., 2005; Roberts et al., 2006), premium rating (Skees et al., 1997; Goodwin and Ker, 1998), and demand (Goodwin, 1993; Glauber, 2004; Babcock, 2015)—very little has been published on formal disaster assistance, particularly in the area of livestock.



## Producer Eligibility

Payment limitations and eligibility conditions are similar across the three programs. General eligibility conditions exclude high-income producers by imposing farm and nonfarm payment and income limits. Each program specifies the conditions that farmers must meet to receive payments, and determines the size of payments, typically based on the number of affected animals.

Total payments that livestock producers may receive depend on Government payment limits, producer income, and whether they meet other program requirements. The maximum annual payment that a producer can receive from the Livestock Forage Disaster Program (LFP), Livestock Indemnity Program (LIP), and Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish (ELAP) combined is \$125,000 (\$100,000 under the 2008 Farm Act).<sup>5</sup> Under the 2014 Farm Act, producers with adjusted gross income averaging \$900,000 or more over the preceding 3 years are ineligible for LIP, LFP, or ELAP payments. Similarly, under the 2008 Farm Act, producers with average gross nonfarm income greater than \$500,000 were ineligible.

The programs are funded through the USDA's Commodity Credit Corporation (CCC)<sup>6</sup> and are jointly designed to avoid redundancy in payments. For example, USDA's Farm Service Agency allocates ELAP payment only in response to a loss caused by a natural disaster not covered under LFP or LIP.

### *Previous Risk Management Purchase Requirement*

The 2014 Farm Bill removed requirements for producers to purchase private insurance, a policy from USDA's Risk Management Agency (RMA), or Noninsured Crop Disaster Assistance Program (NAP) coverage to receive either LFP or ELAP payments.<sup>7</sup> Elimination of this requirement allowed many additional livestock producers to become eligible for assistance under these programs and thus increased program outlays.

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<sup>5</sup>Any funds received from the Supplementary Revenue Assistance Payments Program (SURE) contributed to the producer's annual payment limit under the 2008 Farm Act (FSA, 2011).

<sup>6</sup>The USDA, Farm Service Agency operates the CCC. The CCC holds \$100 million in capital stocks from the U.S. Treasury and pays annual interest on this capital stock. The CCC also borrows up to \$30 billion from the U.S. Treasury in order to aid producers through direct farm program payments or loans.

<sup>7</sup>These requirements applied only to covered crops. No risk management product was available for livestock. LIP, therefore, did not have any such requirement.

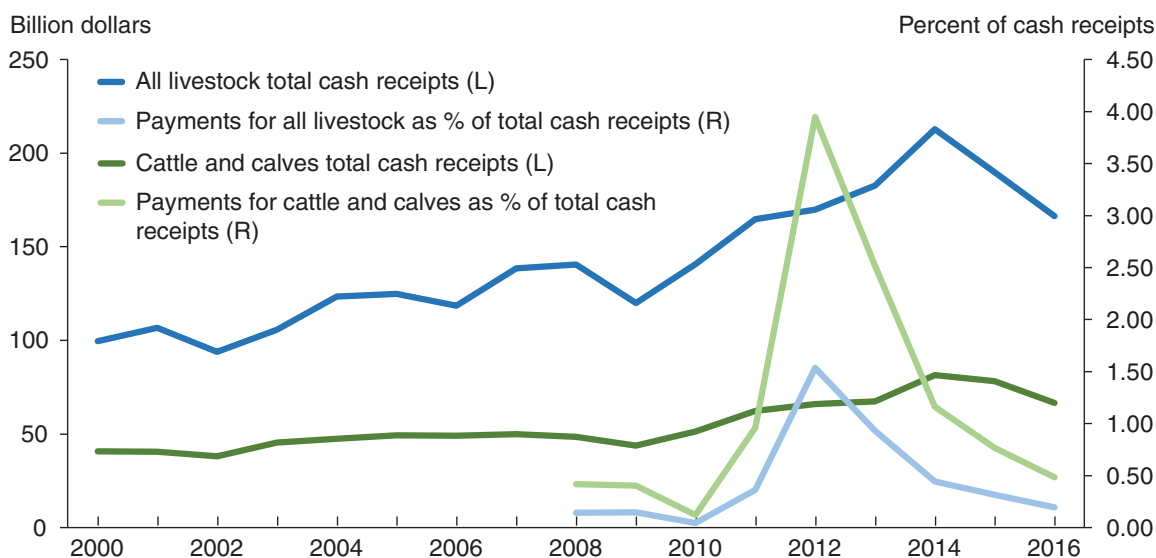
## National-Level Effect on Industry

The programs examined in this paper are small—in absolute and as a percentage of total cash receipts—compared to several other agricultural risk mitigation programs at the national level. Likewise, the total cash receipts received by producers of meat and animal products dwarf the combined outlays of LFP, LIP, and ELAP (fig. 1). In 2008-16, on average, these disaster program outlays represented 0.46 percent of total cash receipts for all livestock and 1.2 percent for cattle and calves (ERS, 2016). During the same period, per-year livestock disaster program outlays, as a percent of total livestock receipts, ranged between 0.04 and 1.54 and, as a percent of cattle and calves receipts, between 0.12 and 3.95. We compare the total cash receipts for all livestock and cattle (the commodity that receives the greatest fraction of payments) with total outlays (fig. 1).<sup>8</sup>

Crop and livestock production exhibit substantial differences. Similarly, the Government’s role in these production systems differs substantially. Livestock disaster assistance, however, shares several features with the risk management of crop production, which economists have examined more thoroughly. In the paragraphs that follow, we individually address concerns about perverse (or unintended) incentives raised by economists about crop insurance for livestock disaster programs.

Figure 1

### Payments for losses of calves, cattle, and all livestock rose sharply in 2012



L = left vertical axis; R = right vertical axis.

Notes: 2016 payments are estimates. Program payments are reported by the program year the claimant experienced the loss—i.e., calendar year for Livestock Forage Disaster Program (LFP) and Livestock Indemnity Program (LIP); fiscal year for Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish Program (ELAP)—and not when a payment was authorized or received.

Sources: USDA, Economic Research Service (ERS) calculations based on USDA, National Payment Services, 2017, Program Payments and Amounts and based on USDA, ERS, 2016, “Farm Income and Wealth Statistics” Farm Income Team.

<sup>8</sup>USDA’s National Payment Services (NPS) (2017) provides data on the amount and the number of payments by county and program year. NPS designates payments by the year that producers experienced losses rather than when payments were either authorized or received. For example, NPS categorizes outlays made in 2014 for pasture that was lost in 2012 as occurring in 2012.

LFP, LIP, and ELAP account for a smaller share of industry receipts than corn receives from crop insurance and Title I programs.<sup>9</sup> For example, during the drought-stricken 2012 crop year, net crop insurance payments<sup>10</sup> and Title I program payments for corn equaled 24.7 percent (\$12.2 billion) of U.S. corn production (\$49.3 billion).<sup>11</sup> In 2015, considerably fewer crop insurance policies for corn were indemnified compared to 2012, because of more favorable weather. Crop insurance and Title I program payments for corn totaled 5.4 percent (\$4 billion) of U.S. corn production (\$74.2 billion) in 2015 (NASS, 2016; RMA, 2017; CBO, 2014 and 2017).

While the national-level expenditures under LFP, LIP, and ELAP are relatively small, their effects are more pronounced at the regional level. By design, producers within areas experiencing declared natural disasters—particularly drought—receive support. The chapters that cover each program explore these relationships at the State level.

Concerns about market distortions arise whenever programs change the profitability of an industry. For programs or products that reduce risk, changes in production decisions can cause a deviation from allocative efficiency.<sup>12</sup> “Moral hazard” refers to situations where the costs of one person’s risks are borne by someone else (Miranda, 1991; Miranda and Glauber, 1997). For example, in crop production, a producer who applied less fertilizer or pesticide after purchasing a crop insurance policy would be motivated by moral hazard (Smith and Goodwin, 1996; Coble et al., 1997). Issues of moral hazard are unlikely for LFP because payments are triggered by the U.S. Drought Monitor’s drought designations, not by decreases in yield, which could be caused by poor management practices. On the other hand, for LIP and parts of ELAP, payments are triggered by excessive mortality rates on an individual farm (as opposed to use of a countywide index, as under LFP)—a situation that introduces moral hazard within these programs.<sup>13</sup> However, if moral hazard exists, its effects with LIP and ELAP will likely be small because only partial compensation is provided, many of the disasters for which these programs make payments are unanticipated, and the causes of death loss in bees are poorly understood.

When LFP and ELAP relaxed their participation requirements mandating that producers purchase Federal crop insurance or NAP, this reduced producers’ incentives to participate in Federal crop insurance or NAP. A lack of data combined with changes to NAP, LFP, and Federal crop insurance after the 2014 Farm Act took effect makes an empirical assessment of these interactions impossible.

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<sup>9</sup>Title I programs refer to the various programs including Agriculture Risk Coverage, Price Loss Coverage, and Loan Deficiency Payments in Title I of the Farm Act. For more information on these programs refer to O’Donoghue et al. (2016).

<sup>10</sup>Net payments are equal to the indemnity payments minus the farmer-paid premium.

<sup>11</sup>Under the 2014 Farm Act, Title I programs include Agriculture Risk Coverage (ARC), Price Loss Coverage (PLC), and Loan Deficiency Payments (LDP). The 2014 Farm Act created ARC and PLC while repealing the Direct and Counter-Cyclical Program (DCP), a program that existed for nearly 20 years. Counter-Cyclical Payments under DCP operated similarly to PLC, by compensating producers when the market price of a covered commodity fell below the target price specified in legislation. While Direct Payments under DCP had given producers fixed annual payments based on historical production, ARC only pays producers when revenue for the county or whole farm, depending on the variant of ARC falls below a threshold. Historical production (base) acres—not planted acres—for the current crop year determine payments for ARC, PLC, and the defunct DCP. For more information on these programs refer to O’Donoghue et al. (2016).

<sup>12</sup>Well-functioning markets free from distortions are typically considered to exhibit allocative efficiency: the unit-price paid is equal to the marginal cost of producing an additional unit.

<sup>13</sup>Compensation for death loss may dampen investments in mortality abatement.

## Livestock Forage Disaster Program

Disaster assistance under LFP provides eligible livestock producers with payments to partially cover additional monthly feed costs in the event of drought or wildfire, which could adversely affect pastures (FSA, 2015a). Feed costs typically represent the most significant cost of animal production (ERS, 2017).<sup>14</sup> LFP payments have tended to benefit producers west of the Mississippi and Missouri rivers, including the semi-arid Great Plains with its abundance of cattle.

During the 2008-16 period, a historic drought (October 2011-13) contributed significantly to increased outlays. The 2014 Farm Act's elimination of the crop insurance/NAP coverage requirement and an increase in the individual producer payment limit (discussed below), contributed to higher outlays than would otherwise have occurred. Also, elevated costs of substitute feeds—specifically corn—increased the value of lost forage and average producer payments, in turn.

The drought transformed the role of LFP from a small to a substantial risk management program. Retroactive LFP payments for drought conditions experienced from 2012 to 2013 equaled 19.4 percent of all Federal Government direct farm program payments during 2012-13 (NPS, 2017; ERS, 2016).<sup>15</sup> By comparison, from January 2008 through 2010—a period covered under the 2008 Farm Act that did not qualify for retroactive payments under the 2014 Farm Act—LFP payments composed less than 1 percent of Federal Government direct farm program payments to farms.

### Program Basics

LFP partially covers livestock feed costs on a per-animal basis for eligible expected losses due to drought or wildfire on native or improved pastureland. Expected losses from wildfire must have occurred on federally managed rangeland. Drought—the occurrence and severity of which is defined by the U.S. Drought Monitor—triggers the majority of payments (FSA, 2015a). The U.S. Drought Monitor designates five levels of increasing drought severity (from “abnormally dry: D0” to “exceptional drought: D4”), which LFP uses to determine compensation for producers (U.S. Drought Monitor, 2015). These designations index information from hydrologic and soil conditions as well as observations from 350 contributors<sup>16</sup> to estimate (rather than measure) drought conditions across the United States. These weekly estimates show the share of the total landmass in each drought severity category by week for the United States (fig. 2).

Several FSA terms describe the components used to determine LFP payments to producers (FSA, 2015b). The “payment rate” defines the amount paid per animal per month. (See Appendix A for payment rates per head for animals of different production types.) The monthly payment equals the number of animals of a particular production type times their corresponding payment rate.<sup>17</sup>

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<sup>14</sup>For example, in 2008-15, ERS data shows feed costs accounted for 57 percent of the gross value of U.S. cow-calf production.

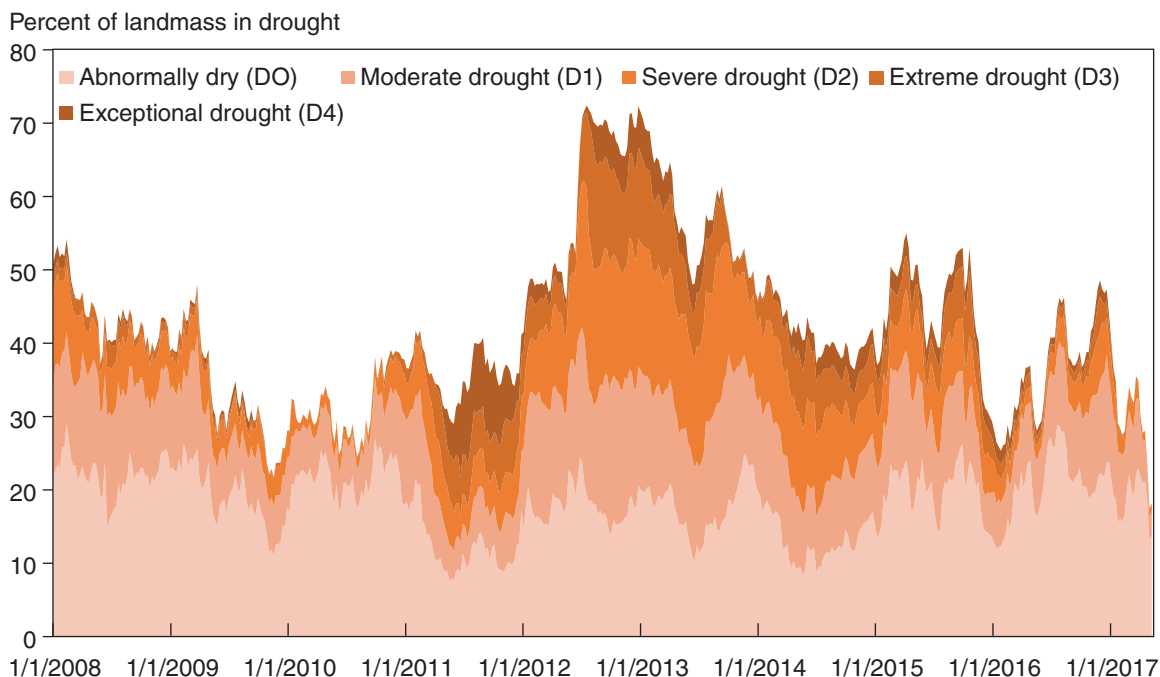
<sup>15</sup>This calculation is similar to one employed by Covey and Kuhns (2015). The 2012-13 direct farm program payments exclude LFP, LIP, and ELAP payments because they were issued retroactively in 2014.

<sup>16</sup>According to U.S. Drought Monitor (2016), the contributors include State climatologists, National Weather Service staff, Extension specialists, and hydrologists.

<sup>17</sup>Payment rates provided in Appendix A offset up to 60 percent of losses. Losses are determined using historic monthly corn prices.

Figure 2

**Between 2012 and 2013, large shares of the U.S. landmass experienced severe to extreme drought**



Notes: Intensity ratings in the legend are those of the U.S. Drought Monitor. Recorded levels are from weekly readings taken throughout each year and throughout the continental United States, Alaska, and Hawaii.  
 Source: U.S. Drought Monitor (2015).

The total payment to a producer is the product of the number of monthly payments and the monthly payment amount.

$$Total\ payment = Monthly\ payment \times \#\ of\ monthly\ payments \quad (1)$$

Table 1 shows the number of monthly payments<sup>18</sup> available based on the duration of a given drought condition under each farm act and highlights the increase in payment rates for D3 and D4 drought designations under the 2014 Farm Act. For example, under the 2014 Farm Act, 8 consecutive weeks of severe drought (D2) are required to qualify for a single LFP monthly payment. For areas experiencing extreme (D3) or exceptional drought (D4), a single week will activate monthly payments, and 4 weeks will increase the number of monthly payments by one. Also, (given a constant level of drought) each level of drought severity adds an additional payment. For example, a single week of extreme drought results in three monthly payments, while 4 weeks of extreme drought results in four monthly payments. Likewise, a single week of exceptional drought results in four monthly payments, while 4 weeks of exceptional drought results in five monthly payments.

<sup>18</sup>A multiplier represents the number of payments received by a producer. The value of each payment—called a payment factor—is determined by drought severity and production characteristics.

Table 1

**Payment multipliers by Farm Act and drought conditions for the Livestock Forage Disaster Program**

Drought level	Weeks of drought during grazing period	Consecutive week requirement	Number of monthly payments 2008 Farm Act	Number of monthly payments 2014 Farm Act
Severe drought (D2)	8	Yes	1	1
Extreme drought (D3)	1	No	2	3
Extreme drought (D3)	4	Yes	2	4
Exceptional drought (D4)	1	No	2	4
Exceptional drought (D4)	4	No	3	5

Source: USDA, Farm Service Agency, 2015, "Livestock Forage Disaster Program (LFP) 2014 Farm Act Fact Sheet."

For a producer to receive a payment, drought or wildfire must occur within the county during the normal grazing period, as defined by FSA (FSA, 2015a). Based on drought designations, producers currently qualify for between one and five monthly payments.<sup>19</sup> LFP determines the number of covered animals as the producer's lowest livestock headcount and the normal carrying capacity of the producer's acreage during the grazing period, based on FSA's schedule for the county and forage type. If drought conditions caused the producer to sell or dispose of livestock in 1 or 2 of the preceding production years, payments for the current year are reduced by 20 percent. (For more detail, see box "Examples of Livestock Forage Disaster Program Payments Under the 2014 Farm Act.")

### Examples of Livestock Forage Disaster Program Payments Under the 2014 Farm Act

#### *Example One*

Suppose the estimated monthly feed cost for Farmer A's cow-calf operation is \$500 based on herd size and age.<sup>20</sup> If the county where Farmer A's operation is located experiences 4 weeks of extreme drought (D3) during the grazing period for Farmer A's cattle, Farmer A can receive four monthly payments. Farmer A's LFP monthly payment is \$300—i.e., 60 percent of Farmer A's monthly feed cost, and the total LFP payment is .

#### *Example Two*

Suppose Farmer B also has a cow-calf operation with the same estimated monthly feed costs (\$500) and monthly LFP payment rate (60 percent) as Farmer A. If the county associated with Farmer B's operation experiences four weeks of exceptional drought during the grazing period, Farmer B can receive five monthly payments. Farmer B's total LFP payment is then

Producers leasing rangeland from the Federal Government may also receive LFP payments if wildfire diminishes the grazing capacity of the land. The Bureau of Land Management (BLM) and USDA's Forest Service (FS) manage Federal rangelands. BLM manages approximately 155 million acres of rangeland and leases the land to nearly 18,000 ranchers (BLM, 2016), while the FS manages

<sup>19</sup>As shown in table 1, the 2008 Farm Act allowed for a maximum of three payment multipliers.

<sup>20</sup>FSA estimates feed costs per animal based on input prices rather than eliciting actual costs from producers. See Appendix A for these estimates.

96 million acres of rangeland and leases the land to approximately 8,000 ranchers. In the event of a wildfire on federally managed rangeland that leads to a prohibition of grazing, eligible producers can qualify for a payment rate of 50 percent of monthly feed costs for the number of days during which the affected grazing land cannot be used for feed, for up to 180 days.

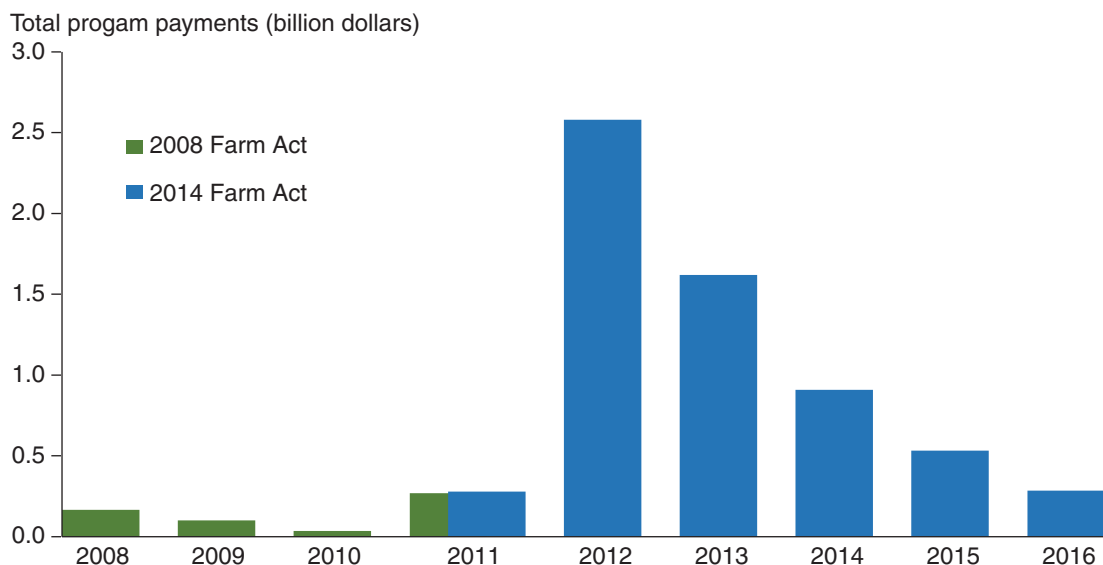
Before the 2014 Farm Act, LFP payments were contingent on producers' purchase of USDA, Risk Management Agency's (RMA) Pasture, Rangeland, and Forage (PRF) insurance or FSA's NAP. Under the 2014 Farm Act, receipt of LFP payments no longer require enrollment in either program.

## Drought and Heightened Payments

The upsurge in LFP outlays under the 2014 Farm Act, compared to those under the 2008 Farm Act, (fig. 3) coincided with a historic drought in 2012-13 that severely affected the Plains States (fig. 2).<sup>21</sup> Figure 4 shows the distribution of drought at its minimum and maximum levels. The drought directly contributed to lost forage and promoted wildfires that exacerbated low forage availability. Although LFP covers many livestock species, cattle ranchers were particularly affected by droughts immediately following the temporary expiration of LFP under the 2008 Farm Act. This untimely combination of events left affected producers exposed to substantial losses.

Figure 3

### Livestock Forage Disaster Program total outlays for program (calendar) years of loss, 2008-16

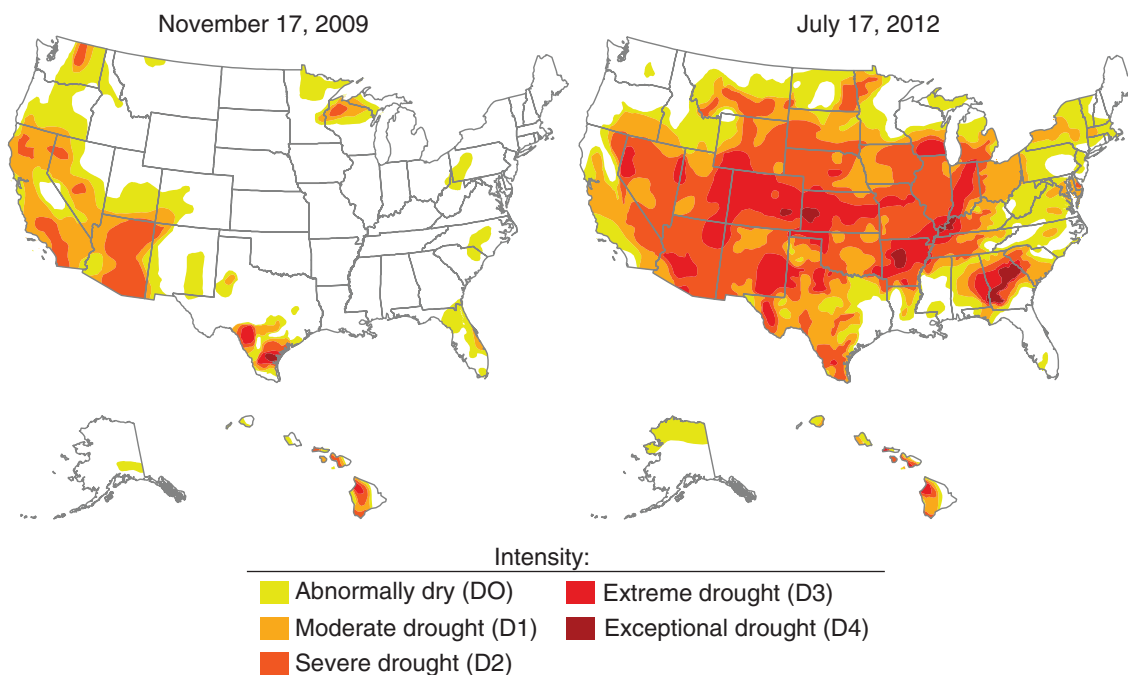


Notes: The 2008 Farm Act covered payments triggered by events occurring on January 1, 2011 to September 30, 2011, and the 2014 Farm Act covered payments triggered by events occurring on October 1, 2011 to December 1, 2011. Program payments are reported by the program year the claimant experienced the loss—i.e., calendar for Livestock Forage Disaster Program (LFP) and Livestock Indemnity Program (LIP); fiscal year for Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish Program (ELAP)—and not when a payment was authorized or received. Sources: USDA, Economic Research Service calculations based on USDA, National Payment Services, 2017, Program Payments and Amounts.

<sup>21</sup>Extreme and exceptional drought was concentrated in northern Texas, Oklahoma, and neighboring States to a lesser degree. Abnormally dry conditions and moderate and severe drought occurred elsewhere, and farmers faced increased challenges due to some degree of rain shortage throughout the United States.

Figure 4

### Levels of drought throughout the United States, 2009 and 2012



Notes: Each Drought Monitor map is accompanied by narrative text. (See Drought Monitor online.)

Sources: Created for U.S. Drought Monitor by Eric Luebhussen, USDA, Office of the Chief Economist, and Richard Helm National Oceanic and Atmospheric Administration, National Climatic Data Center.

The 2014 Farm Act made retroactive payments back to the fourth quarter of calendar 2011. As of December 2016, almost 70 percent of LFP outlays under the 2014 Farm Act were distributed in retroactive payments for the severe drought years of 2012-13 (NPS, 2017).

Shifting economic conditions (primarily in the form of increased feed prices) and the resulting revisions about when to slaughter compounded producers' direct losses from the drought. The permanent establishment of LFP reduces uncertainties or delays in payments, even between Farm Acts. The elimination of the condition of a Federal declaration of disaster expedites payments to a broader group of producers.

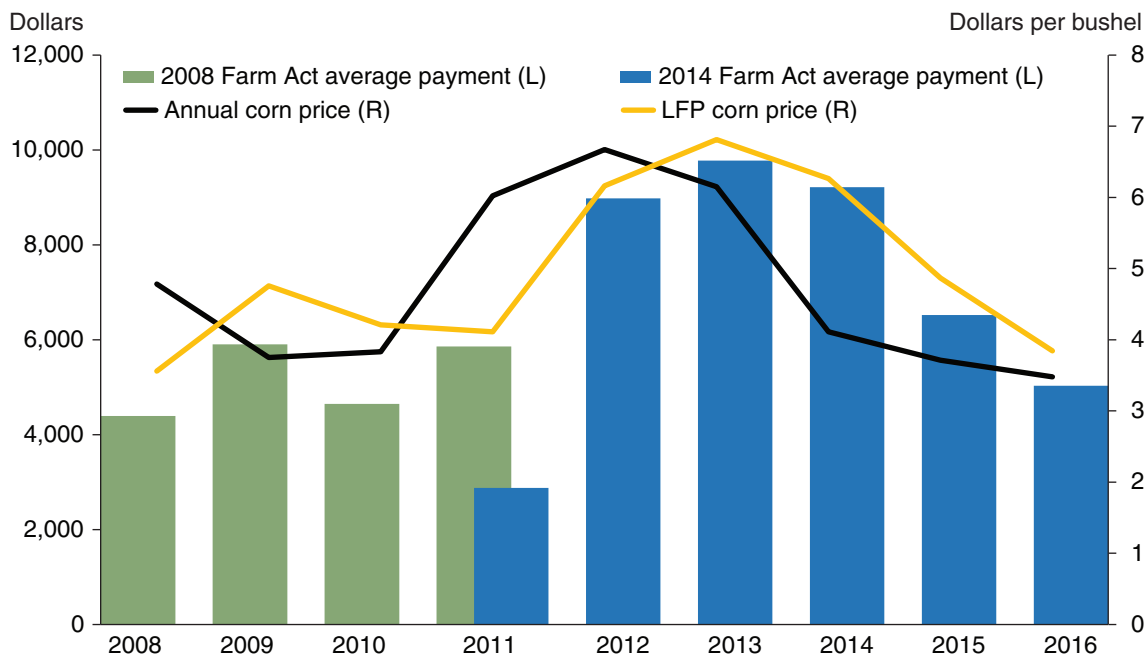
Higher average LFP payments under the 2014 Farm Act are also attributable to the higher corn prices during the severe drought years. Corn prices began declining in 2013, but high previous corn prices had a prolonged effect on LFP feed price calculations. For example, the corn price used for the 2011 program (calendar) year was \$4.11 (the average of the 12 months prior to March 1, 2011, because that was higher than the \$3.65 average of the prior 24 months). The persistent effect of corn prices on FSA payments can be seen in the comparison of annual corn prices, LFP-specified corn prices, and the size of average LFP payments to producers (fig. 5).

Figure 5 shows significantly higher corn prices for payment years covered by the 2014 Farm Act and also shows the lagged impact of annual corn prices on the referenced corn price for LFP. During 2012-16, the corn price used for feed calculations averaged 34 percent higher than the price during 2008-11, despite annual corn prices having declined the last 3 years of the more recent period, approaching the 2009-10 level.



Figure 5

**Annual corn prices, Livestock Forage Disaster Program (LFP)-specified corn prices, and average LFP payment size to producers by program (calendar) year of loss**



L = left vertical axis; R = right vertical axis.

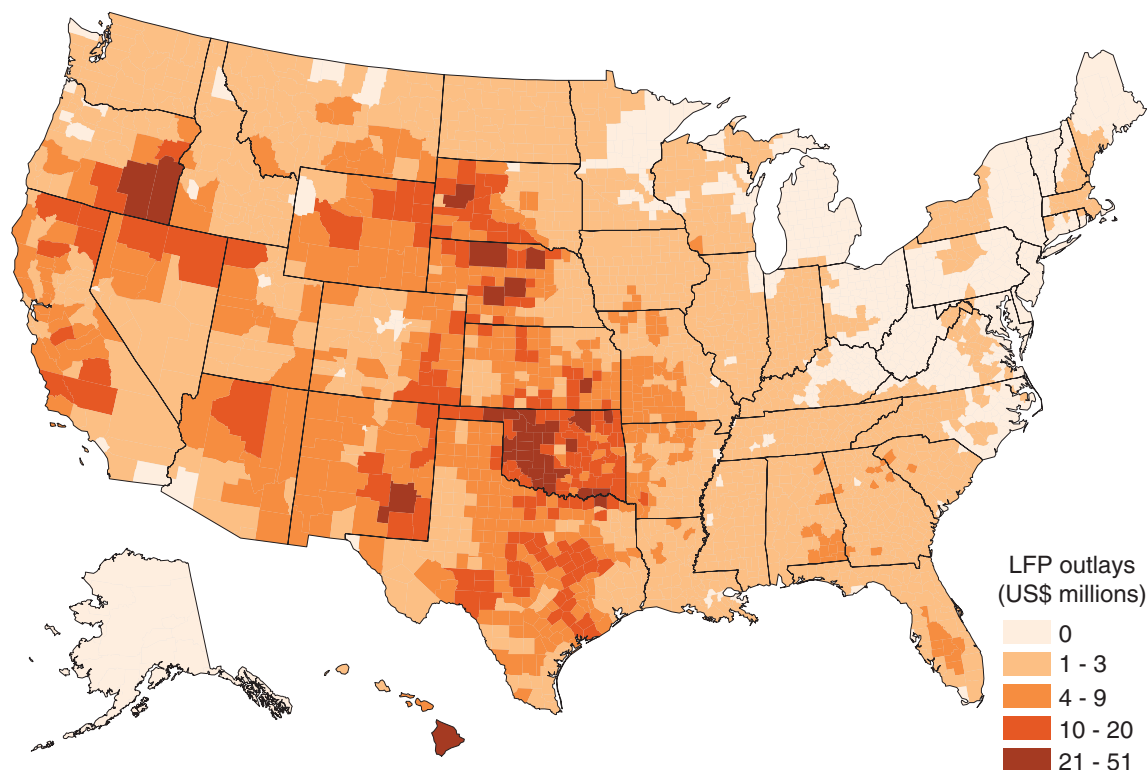
Notes: The corn price calculation specified for LFP in the 2008 and 2014 Farm Acts is defined as the greater of the average monthly national prices during the 12 or 24 months preceding March 1 of the program's current calendar year. By design, the variation in this calculation lags behind changes in the average annual corn price, which is based on a January-December average price in the program's current calendar year. Payments are averaged across producers. USDA, National Payment Services, 2017, Program Payments and Amounts reports program payments by the program (calendar) year the claimant experienced the loss, and not when a payment was authorized or received. Sources: USDA, Economic Research Service calculations based on USDA, National Agricultural Statistics Service (NASS), 2016, Quick Stats; USDA, Farm Service Agency (FSA), 2012, "Livestock Disaster Assistance Programs," FSA Handbook; and USDA, FSA, 2016, "Livestock Disaster Assistance Programs for 2014 and Subsequent Years."

### Largest Recipients: Oklahoma and Texas

During 2008-16, slightly over 41 percent of the \$6.77 billion in LFP outlays went to Oklahoma (21 percent) and Texas (20 percent). Given that these States together accounted for only approximately 18 percent of the cattle inventory as of January 1, 2017 (NASS, 2017), the disproportionate outlay shares indicate these States were hit harder by drought than other cattle-producing States. Kansas (8 percent) and Nebraska (8 percent) likewise received disproportionate shares of outlays. Figure 6 shows outlays by county.

Figure 6

**Livestock Forage Disaster Program (LFP) aggregate program (calendar) year outlays (millions of dollars) by county, 2008-16**



Source: USDA, Economic Research Service calculations based on USDA, National Payment Services, 2017, Program Payments and Amounts.

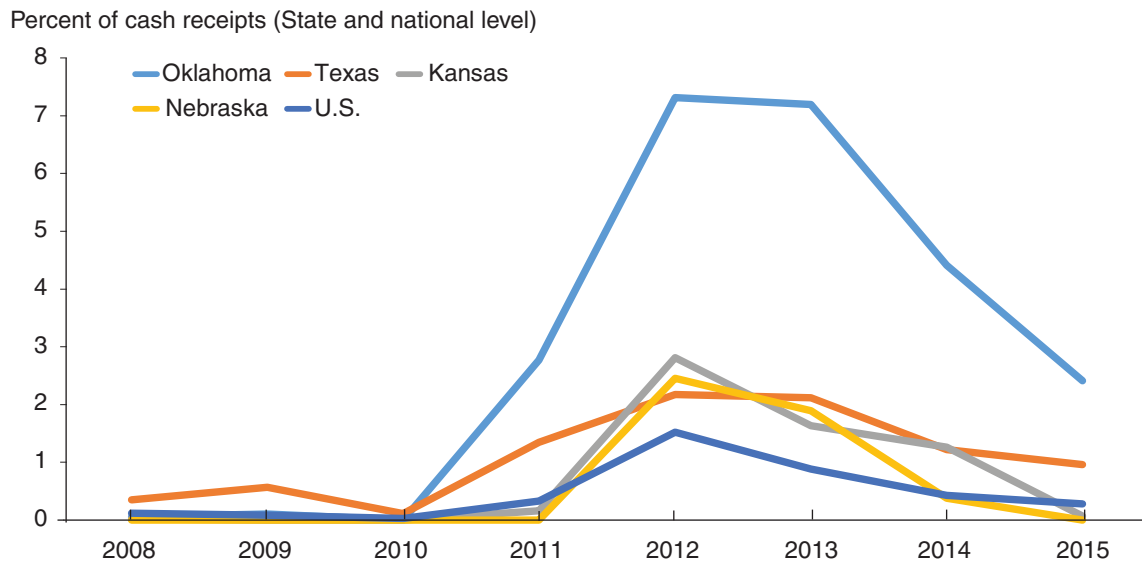
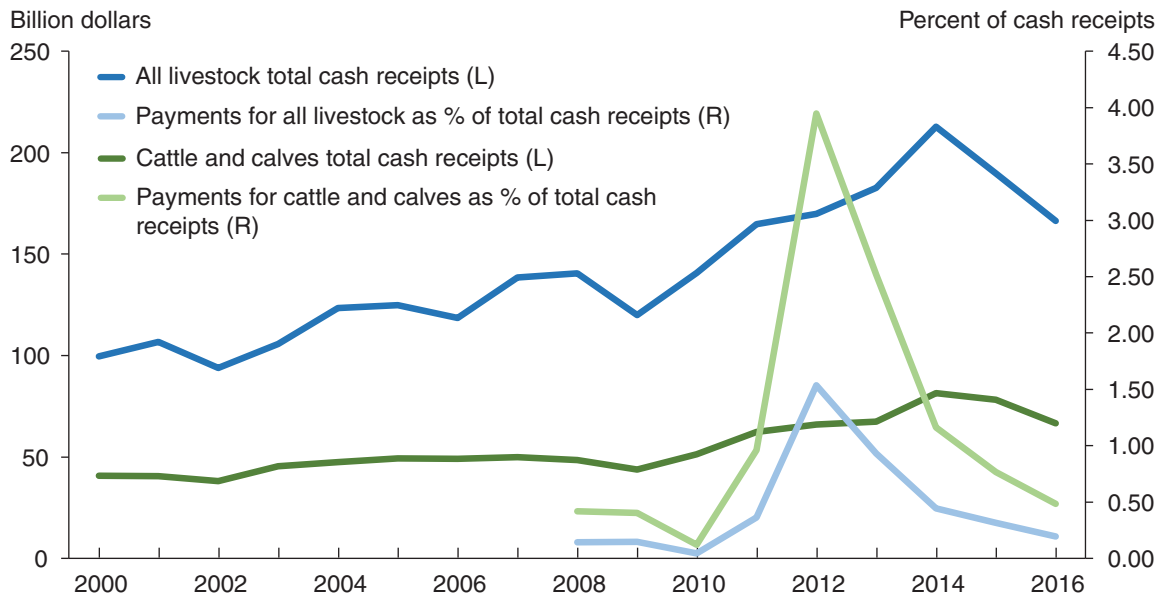
The shares of farm cash receipts for all livestock represented by LFP payments were particularly high in Oklahoma, with Texas, Kansas, and Nebraska, showing shares higher than the national average for most years (fig. 7). At the national level, LFP payments represented 0.46 percent of cash receipts for all livestock from 2008-16 and ranged between 0.02 percent and 1.52 percent (fig. 7).<sup>22</sup> From 2008 to 2015, LFP payments represented 3.03 percent of annual cash receipts in Oklahoma, 1.11 percent in Texas, 0.74 percent in Kansas, and 0.59 percent in Nebraska on average. In 2012, the percent of cash receipts represented an especially large fraction of farm cash receipts for these States: Oklahoma (7.31), Texas (2.17), Kansas (2.81), and Nebraska (1.52). The concentration of payments within these States indicates the intensity of losses attributable to 2012's historic drought.

The spatial distribution of expenditures reflects the complex interactions among climate, characteristics of production, and utilization of rangeland. Specifically, aggregate expenditures serve as proxies for the amount of drought-affected rangeland in active use. However, the detailed information on drought intensity provided by the U.S. Drought Monitor (2016) and regional production averages (ERS, 2017) falls short of allowing us to isolate the contribution of each of these factors to LFP expenditures.

<sup>22</sup>We omit 2016 in this discussion because State-level farm receipts are available only through 2015.

Figure 7

**Livestock Forage Disaster Program annual (calendar year of loss) program outlays as a percent of farm cash receipts for all livestock and cattle and calves at the national level (top), 2008-16, and for all livestock by selected State (bottom), 2008-15**



L = left vertical axis; R = right vertical axis.

Notes: USDA, National Payment Services, 2017, Program Payments and Amounts, reports program payments by the program (calendar) year the claimant experienced the loss, and not when a payment was authorized or received.

Sources: USDA, Economic Research Service (ERS) calculations based on USDA, National Payment Services, 2017, Program Payments and Amounts, and based on ERS, 2016, "Farm Income and Wealth Statistics," Farm Income Team.

## Livestock Indemnity Program

In addition to destroying pasture and increasing feed costs, natural disasters can increase mortality among livestock. FSA issues payments under LIP to livestock producers when mortality exceeds “normal loss”<sup>23</sup>—i.e., losses resulting from wildfires, animal attacks, and severe weather events such as blizzards and extreme cold—including losses due to weather-related consequences such as flooding and some diseases (FSA, 2015b). LIP does not compensate producers for elevated mortality levels in the absence of a disaster. To receive payment, an eligible owner<sup>24</sup> of eligible livestock must experience an eligible event *and* mortality above a normal loss (FSA, 2015b).<sup>25</sup>

Of the three disaster programs discussed, LIP is unique in that it has undergone only small changes since 2008. LIP has its origins in the 1997 Emergency Supplemental Appropriations Act (HOR, Committees on Budget and Appropriations, 1997).<sup>26</sup> Under the 1997 Act, retroactive LIP payments were issued in response to cold weather events accompanied by blizzards. Subsequent LIP programs addressed other extreme natural disasters such as floods and hurricanes. Because of the program’s ad hoc status, varying conditions and compensation amounts accompanied renewals under subsequent Appropriations Acts through 2007. The 2014 Farm Act formally transitioned LIP to a permanent program, likely eliminating the need for providing ad hoc disaster assistance.

### Program Basics

LIP provides payments to producers if their livestock succumbs to a natural disaster. An eligible event triggers indemnity payments when mortality increases as a direct result of dramatic changes in environmental conditions (e.g., blizzards, low temperatures, and flooding). Mortality rates also increase because of secondary factors. For example, extremely low temperatures and increased moisture compromise the immunological robustness of animals and create more favorable conditions for pathogens. Resulting infections increase the mortality rate beyond what is solely attributable to severe cold. Because of the cost and difficulty in identifying causes of mortality, any producer experiencing elevated livestock mortality in the 60 days following an eligible loss condition can apply for an LIP payment. LIP defines the eligibility of livestock based on the species and use of animals. With some exclusions, commercially grown animals are covered by LIP,<sup>27</sup> while all “wild free-roaming animals, pets, and animals used for recreational purposes, such as hunting, roping, or for show” are excluded (FSA, 2015b).

The 2014 Farm Act expanded LIP to include animals lost during attacks by reintroduced or protected wild predators. This provision was included primarily to assist producers affected by reintroduced Mexican wolves in Yellowstone National Park.<sup>28</sup> The program was also expanded to include livestock taken by federally protected—primarily avian—predators. Future changes could result from reintroductions of predators or newly designated endangered species.

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<sup>23</sup>“Normal” is an expectation determined by county, State, or regional averages in the absence of natural disasters.

<sup>24</sup>Swine and broiler growers are also eligible for compensation.

<sup>25</sup>When State averages are not available, regional or national averages are used instead.

<sup>26</sup>LFP’s predecessor, the Feed Indemnity Program (FIP), originated in 2005 as part of a hurricane disaster relief program.

<sup>27</sup>For example: dairy cattle, hogs, chickens, ducks, geese, turkeys, sheep, goats, alpacas, deer, elk, emus, and equine.

<sup>28</sup>Between 1998 and 2015, 315 livestock were confirmed to be fatally depredated by Mexican wolves. Difficulties in identifying the cause of death suggest that the actual mortality attributable to depredation may have been much higher.

## Livestock Indemnity Program Payments

Animal-specific payment rates and the proportion covered determine the LIP's liabilities in a given year. For the 2014 Farm Act, LIP payments have been for 75 percent of the market value of the animal type on the day before the animal's death (FSA, 2015b). These appraisal values are averaged across breeds, within a particular age/weight class for a given production purpose (e.g., dairy cows and beef cattle are appraised separately).<sup>29</sup> FSA does not appraise animal values individually. Payment rates by species vary from year to year and are published on the FSA website. LIP also covers losses to growers during contract production of poultry and swine. Any compensation provided by the integrator reduces LIP payments by the same amount (FSA, 2015b).<sup>30,31</sup> LIP does not cover contract growers of any animals that are not chickens, ducks, geese, swine, or turkeys.

## Payments Across Farm Acts

Total LIP payments made to producers vary between years (fig. 8), and the degree to which they vary largely depends on the frequency and severity of natural disasters—particularly, cold weather events. To a lesser extent, differences in annual outlays also reflect changes in program characteristics (e.g., animal appraisal values or eligibility requirements). The amount paid per animal increased or remained constant from year to year for almost all animal types, and caps on the maximum total payments increased between Farm Acts. All else equal, these conditions would suggest an increase in average and total payments similar to LFP and ELAP, yet none was observed. Instead, the absence of any clear trend indicates that the pattern of natural disasters and weather events plays a much more significant role than administrative changes.

## Largest Recipient: Northern Great Plains Region

County-level LIP outlays in 2008-16 (fig. 9) totaled \$313 million across the United States. South Dakota received the largest share of outlays (25.5 percent), followed by Kentucky (11.1 percent), North Dakota (9.9 percent), and Texas (7.6 percent). In 2 years when total payments were relatively high, 2009 and 2013, North and South Dakota combined received especially high shares of the payments (65 percent and 76 percent at \$41.8 million and \$44.7 million for 2009 and 2013, respectively). The myriad triggers for payments complicate the identification of an obvious relationship between LIP payments and weather patterns, and a precise statistical estimation of these relationships is beyond the scope of this research. However, the two largest annual outlays (aggregated across producers)—both experienced in the Northern Great Plains region—were attributable to severe blizzards (HOR, Committee on Agriculture, 2009 and 2015).

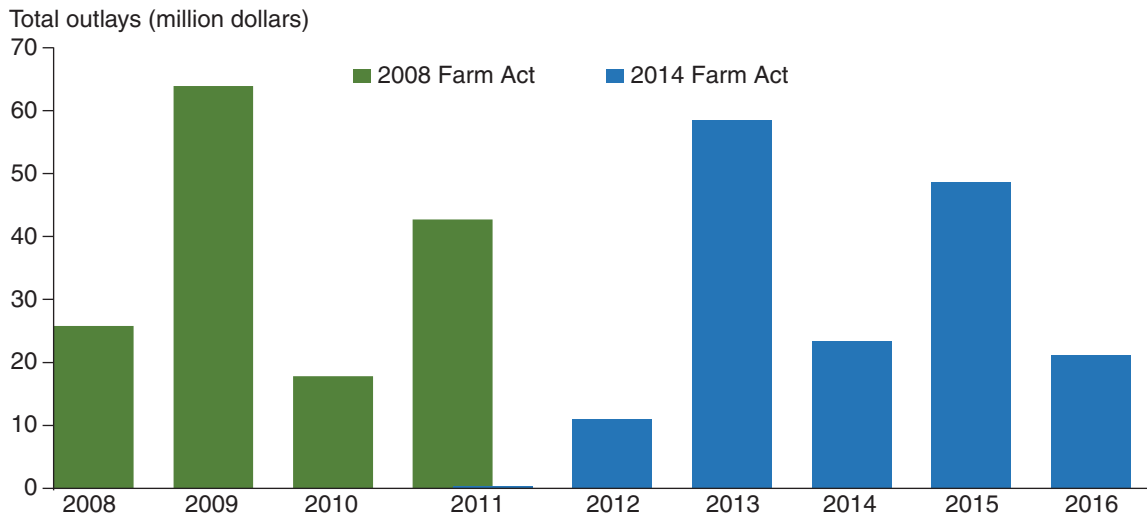
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<sup>29</sup>For detailed appraisal information, see Appendix B.

<sup>30</sup>In livestock production, the owner of the livestock is referred to as an “integrator.” The producers contracted to grow the commodity are referred to as “contract growers.”

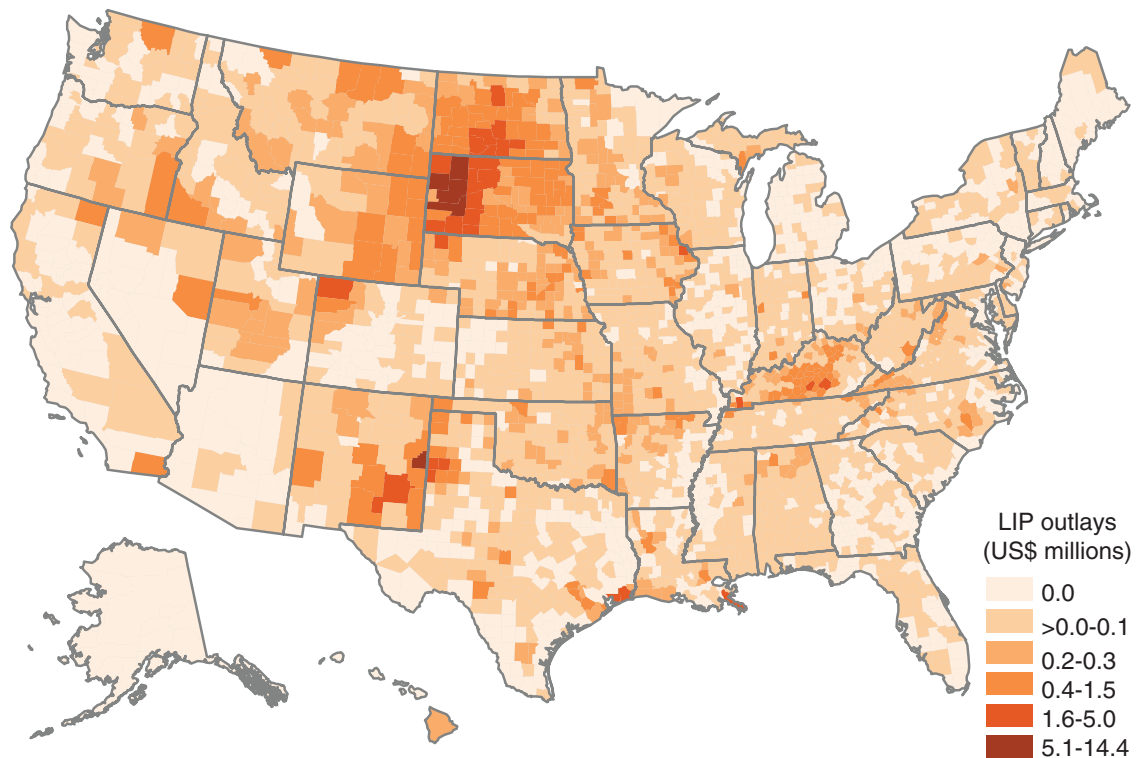
<sup>31</sup>Values used to appraise production income by contract growers are given in Appendix C.

Figure 8  
**Livestock Indemnity Program total payments for program (calendar) year of loss, 2008-16**



Notes: The 2008 Farm Bill covered payments triggered by events occurring on January 1, 2011, to September 30, 2011, and the 2014 Farm Bill covered payments triggered by events occurring on October 1, 2011, to December 1, 2011. USDA, National Payment Services, 2017, Program Payments and Amounts reports program payments by the program (calendar) year the claimant experienced the loss, and not when a payment was authorized or received. Sources: USDA, Economic Research Service calculations based on USDA, National Payment Services, 2017, Program Payments and Amounts.

Figure 9  
**Livestock Indemnity Program (LIP) aggregate program-year outlays (millions of dollars) by county, 2008-16**



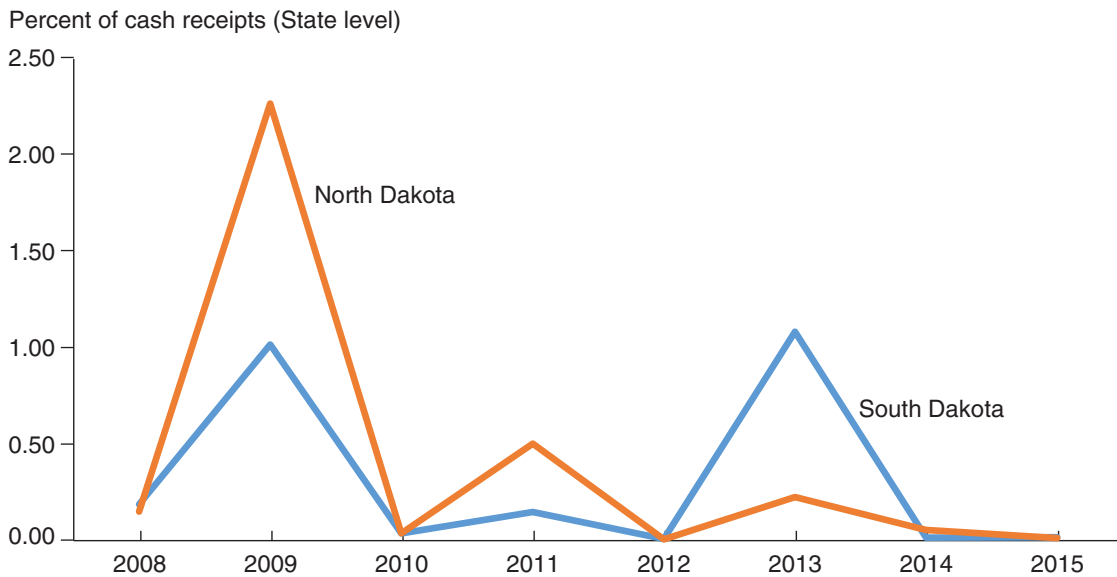
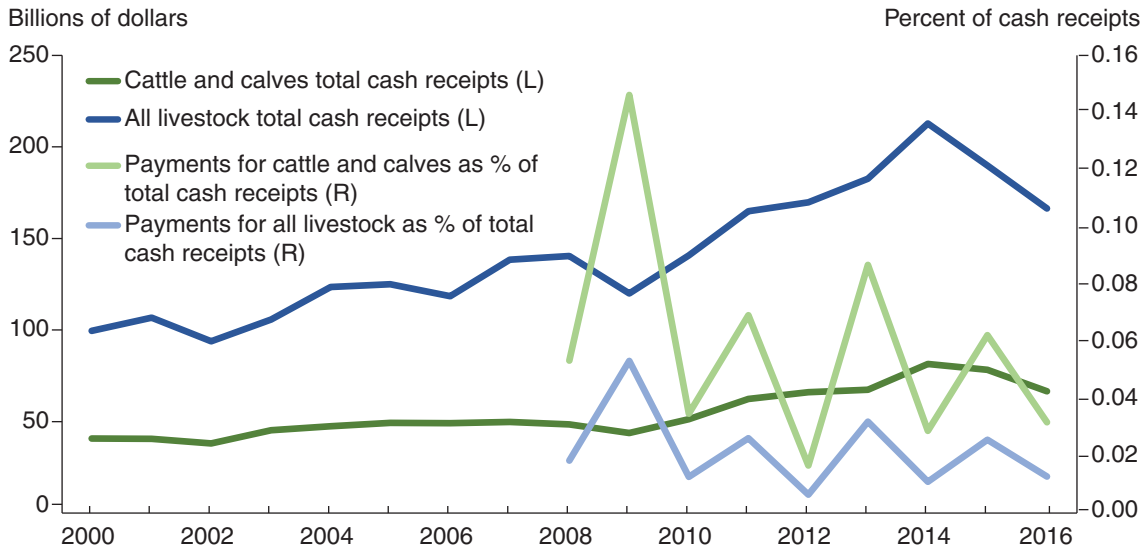
Sources: USDA, Economic Research Service calculations based on USDA, National Payment Services, 2017, Program Payments and Amounts.

Figures 7 and 10 indicate that, on average, total outlays for LIP were significantly lower than those for LFP. LIP outlays represented only 0.02 percent of the total cash receipts for livestock producers at the national level. For Kentucky and Texas (two major recipients), payments were less than 0.38 percent and less than 0.07 percent, respectively, of livestock cash receipts between 2008 and 2015. The intensity of severe weather events coupled with lower farm cash receipts in the Dakotas made LIP a relatively more significant program in these States. Figure 10 shows the share of annual cash receipts for all livestock represented by LIP payments at the national level and for South Dakota and North Dakota, which were particularly hard hit during two severe blizzards (2009 and 2013).

The spatial distribution of expenditures reflects the complex interactions among climate, characteristics of production, and utilization of rangeland (see fig. 9). Specifically, aggregate expenditures serve as proxies for the amount of drought affected rangeland in active use. The detailed information on drought intensity provided by the U.S Drought Monitor (2016) and regional production averages (ERS, 2017), however, fall short of allowing us to quantify the contribution of each of these factors to LFP expenditures.

Figure 10

**Livestock Indemnity Program annual program outlays (calendar year of loss), as a percent of farm cash receipts for all livestock and cattle and calves, at the national level (top), 2008-16, and for all livestock for South and North Dakota (bottom), 2008-15**



L = left vertical axis; R = right vertical axis.

Notes: USDA, National Payment Services, 2017, Program Payments and Amounts reports program payments by the program (calendar) year the claimant experienced the loss, and not when a payment was authorized or received.

Sources: USDA, Economic Research Service calculations based on USDA, National Payment Services, 2017, Program Payments and Amounts.



## Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish Program

ELAP covers losses from a range of production hardships as well as from natural disasters and weather events that LFP and LIP do not cover,<sup>32</sup> targeting additional environmental conditions, animals, and types of production risk. This program assists producers of livestock, honey bees, and farm-raised fish manage losses due to eligible weather events such as drought, wildfires, and blizzards, as well as other sources of production risk such as cattle tick fever. ELAP covers species excluded from LFP or LIP (e.g., honey bees), feed losses not associated with drought or wildfire, and several other production costs (e.g., the cost of water conveyance during a drought).

The triggers for payments are primarily designated by type of animal affected. For example, ELAP compensates livestock producers for lost forage due to disasters such as drought or wildfire that occur inside federally held lands. (The only weather-and-disaster-incurred losses covered by ELAP and LIP are those that occur *outside* federally held lands.) Similarly, ELAP covers certain livestock death losses not covered under LIP. ELAP also covers several sources of cost increases and productivity losses for livestock producers. Outside of livestock, producers of honey bees and farm-raised fish may receive payments for elevated mortality and feed losses. Because only ELAP provides natural disaster assistance for honey bees, which have experienced substantial losses attributable to colony collapse disorder (CCD), honey bee producers have received the largest share of ELAP payments.

The smallest of the three programs we discussed, ELAP has a budget of \$20 million per fiscal year under the 2014 Farm Act.<sup>33</sup> (Neither LFP nor LIP has legislated payment caps; rather, “such sums as necessary” are authorized.) The 2014 Farm Act also authorized retroactive payment to producers under ELAP for “qualified” losses incurred starting in the fourth quarter of 2011.

### Program Basics—Livestock

Qualifying death and feed losses not otherwise covered under LIP, LFP, or the Animal Health Protection Act (AHPA)<sup>34</sup> entitle producers to minimum ELAP payments of 75 and 60 percent of losses, respectively. ELAP additionally covers losses due to nonfatal diseases and a decrease in access to water. For all losses, producers must inform FSA within 30 days of the loss to be eligible for payments (FSA, 2015c).

ELAP also covers increased production costs attributable to water transportation costs associated with droughts and other disasters covered under the 2014 Farm Act that were not covered by the 2008 Farm Act.

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<sup>32</sup>Under the 2008 Farm Bill, ELAP could not be used for the same event as the Supplemental Revenue Assistance Program (SURE). SURE was not continued under the 2014 Farm Act.

<sup>33</sup>Originally, payments to producers who qualified for ELAP were available under the Agricultural Disaster Relief Trust Fund, providing up to \$50 million per year in payments; however, under the 2014 Farm Act, total annual appropriated funds were reduced to \$20 million per year funded by the CCC. Claimants did not exhaust available funds from 2008-14. The appropriated funds can be increased if exhausted.

<sup>34</sup>See Appendix B for a review of indemnity payments designated for the confiscation of animals as part of the control of reportable diseases.

ELAP covers losses from vector-borne diseases<sup>35</sup> not otherwise covered by LIP. FSA restricts eligible diseases to those transmitted by vectors for which vaccination or other acceptable management practices are unavailable or ineffective.

Producers receive ELAP payments for livestock death losses due to an eligible disease not covered under LIP (FSA, 2015c). FSA avoids duplicate payments by both programs for the same loss and determines coverage on a case-by-case basis. ELAP payments, in contrast to LIP payments, can be issued for costs associated with preventing fatal infectious diseases that occur independently of weather conditions—for example, cattle tick fever.

## Program Basics—Honey Bees

Qualifying honey bees—those kept in a managed hive or otherwise used in honey production—may be covered for losses due to mortality or feed shortages under qualifying conditions (FSA, 2015d). Qualifying conditions and compensation are similar to those established under the LFP and LIP programs (75 percent of the value of lost bees and 60 percent of lost feed). The notable and unique qualifying condition is CCD (See box, “Colony Collapse Disorder.”). The USDA’s Agricultural Research Service (ARS) defines CCD by the presence of few living or dead adult bees and a live queen with immature bees and honey. These specifications must be met to claim ELAP benefits. Over half of ELAP payments are distributed to adversely affected honey bee producers. Honey bee producers are covered for 75 percent of the replacement value of both bees and hive, for losses above 15 percent natural mortality.<sup>36</sup>

## Program Basics—Farm-Raised Fish

ELAP compensates producers of fish who raise fish in controlled environments for commercial purposes and experience losses due to mortality or feed shortage (FSA, 2015e). Only producers that experience losses as a direct result of a qualifying event are compensated. These events include only physical disasters and notably exclude losses from any diseases. Qualifying payments are identical to other disaster payments (75 percent for death loss and 60 percent for feed loss).

## Outlay Trends

Outlays for ELAP have exhibited limited between-year variation, with the most substantial jump between 2011 and 2012. This jump is attributable to administrative changes between the 2008 and 2014 Farm Acts, which include increased payments to commercial bee keepers resulting from greater recognition of CCD, coupled with severe droughts that required substantial water hauling (fig. 11).

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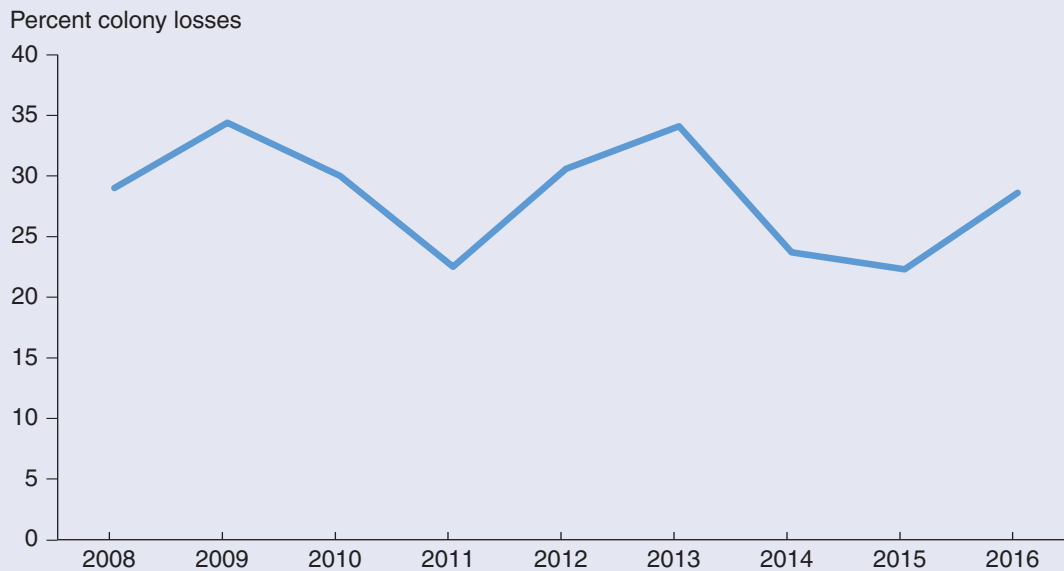
<sup>35</sup>Vectored diseases are spread by any agent—e.g., wild animals or insects—excluding livestock.

<sup>36</sup>See Appendix D for more information on CCD.

## Colony Collapse Disorder

While specific causes of CCD have not yet been identified, recent research collaborations with USDA, private industry, and academic institutions suggest there are several factors that could contribute to CCD such as common chemicals, overcrowding, pesticide poisoning, nutritional deficiencies of pollen, and stress associated with moving colonies (ARS, 2015). This research, however, does not definitively draw a link between these factors and CCD. Furthermore, limited information on the prevalence of CCD has been collected through voluntary surveys (ARS, 2015; Bee Informed, 2016). These surveys suggest that colony loss is typically above expected levels of winter losses—which are consistently around 15 percent—but do not indicate that CCD is increasing over time (vanEngelsdorp et al., 2010, 2011, 2012; Steinhauer et al., 2013; Spleen et al., 2013; Lee et al., 2014; Seitz et al., 2015; Steinhauer et al., 2016). We plot winter losses from 2008 to 2016 in the figure.

### Percent of honey bee colonies lost during winter among surveyed producers, 2008-16

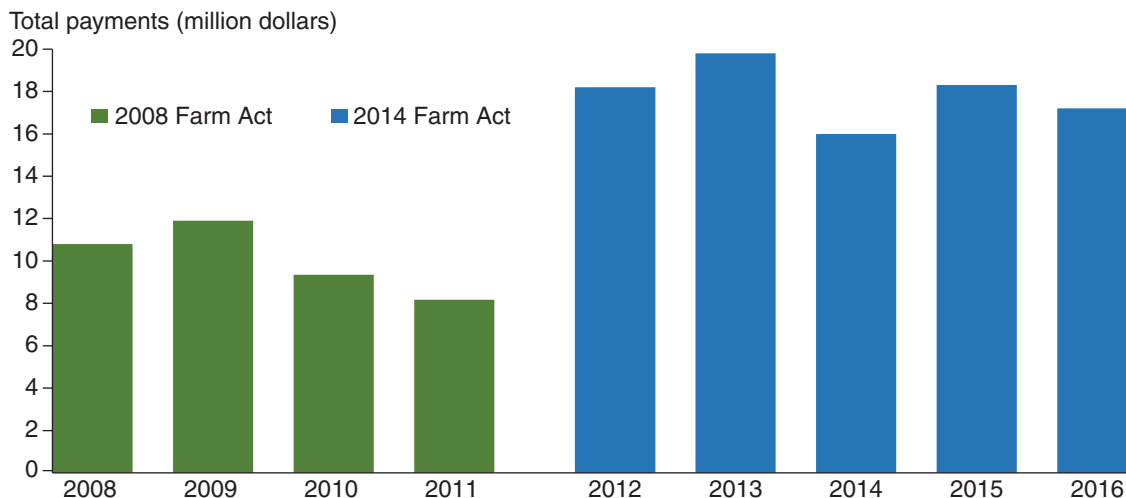


Sources: Bee Informed. "Winter Loss Reports." Online. Accessed June 2016.

The 2014 Farm Act made five crucial administrative changes that contributed to expenditure increases. Producers are now partially compensated for additional costs (which the Emergency Conservation Program previously covered) to transport water to eligible livestock because of an eligible drought (FSA, 2014b). The payment rates have increased from 60 percent to 75 percent for CCD losses and livestock death losses (FSA, 2014b). Socially disadvantaged producers are compensated for 90 percent of all losses covered under ELAP (CFR, ELAP, 2008 and 2014). More diseases such as Epizootic Hemorrhagic Disease and cattle tick fever are deemed eligible (FSA, 2014a; CFR, LFP, 2014b). Hail is now an eligible loss condition for livestock grazing losses (FSA, 2014b). Together, these factors help explain the persistent increase in expenditures after the end of the drought.

Figure 11

**Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish Program total payments by program year of loss, 2008-16**



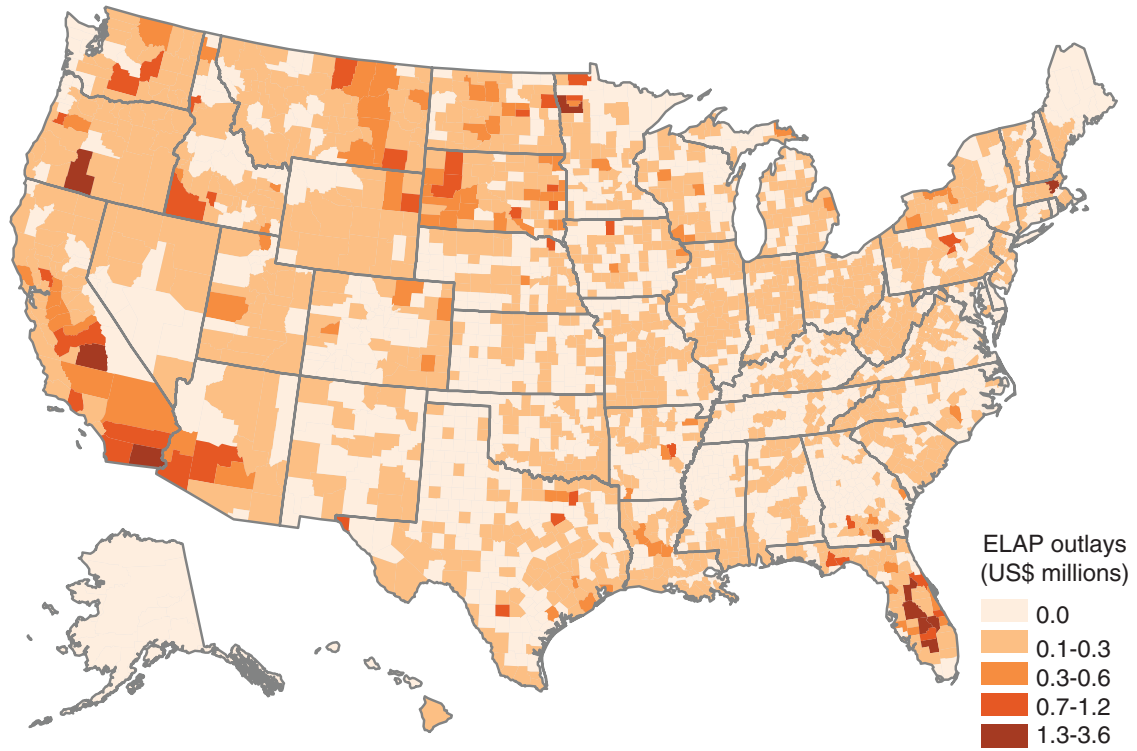
Notes: USDA, National Payment Services, 2017, Program Payments and Amounts reports program payments by the program (fiscal) year the claimant experienced the loss, and not when a payment was authorized or received.  
Source: USDA, Economic Research Service calculations based on USDA, National Payment Services, 2017, Program Payments and Amounts.

The spatial distribution of ELAP payments reflects the diverse production covered by the program (fig. 12). Although the lack of data pairing payments with production type negates a productive comparison of production and outlays, broad production patterns do provide suggestive evidence. As mentioned in the LIP chapter, Texas and Oklahoma are the largest contributors to cattle production. Note that the largest number of beekeepers is registered in California, followed by Texas, Florida, North Dakota, South Dakota, and Montana. Aquaculture production is concentrated in Mississippi, Idaho, Maine, Washington, Virginia, Louisiana, and Hawaii.<sup>37</sup>

<sup>37</sup>Data on total cash receipts for aquaculture and honey bees were unavailable. Between 2008 and 2015, ELAP payments typically represented less than 0.05 percent of cash receipts for all livestock for each State, with the exception of Florida. ELAP payments represented 0.1 percent of Florida's cash receipts and ranged between 0.02 and 0.21 percent.

Figure 12

**Aggregate program-year payments for Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish (ELAP) by county, 2008-15**



Source: USDA, Economic Research Service (ERS) calculations based on USDA, National Payment System, 2016, Program Payments and Amounts.

## Payments for Diseases Under the Animal Health Protection Act

Eradication or control of a particularly problematic infectious livestock disease requires public intervention beyond compensation for losses. USDA's Animal and Plant Health Inspection Service (APHIS) administers indemnity programs established under the Animal Health Protection Act of 2002 (AHPA) for diseases that (1) are very contagious, highly pathogenic, difficult to detect, or lead to substantial production or trade losses and (2) are controlled through depopulation of livestock and/or the destruction of other capital. These programs are distinct from LFP, LIP, and ELAP, but serve similar roles in maintaining producer welfare under adverse conditions.

APHA payment programs are designed to encourage producers' cooperation with Government-mandated actions and reduce losses during infectious disease control. Payments cover the full value of euthanized animals and destroyed equipment<sup>38</sup> for almost all facilities.<sup>39</sup> They do not cover costs associated with business disruptions.

Public indemnity programs, like private insurance policies, reduce the risks associated with select infectious diseases facing livestock producers. Several differentiating characteristics are worth noting. Insurance policies with market-determined premiums and deductibles are available to owners seeking to reduce risk from infectious diseases not covered by AHPA or ELAP. Privately held policies may stipulate disease-preventive actions that producers must take to be eligible for payments. In contrast, producers receive indemnity payments from AHPA or ELAP without an associated premium and regardless of their disease-prevention efforts.<sup>40</sup>

### Program Basics

APHIS is charged with responding to serious disease outbreaks among livestock populations. In the absence of more effective control strategies during an outbreak, AHPA grants APHIS the authority to depopulate infected herds and eliminate potential fomites (inanimate objects like clothing or trucks capable of spreading pathogens) to reduce the likelihood and severity of spread. Euthanized animals and destroyed equipment constitute a Government seizure, for which compensation is not required.<sup>41</sup> The payments—while not necessary for seizure—are instead designed to provide an incentive for compliance when desired behaviors are unobservable or optional. Payments equal to the fair market rate of each animal are provided for euthanized animals.<sup>42</sup> Producers receive no compensation for animals already killed by infection nor compensation for business interruptions—

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<sup>38</sup>Some pathogens such as foot and mouth disease and avian influenza are able to “hitchhike” on clothing or machines between facilities.

<sup>39</sup>Poultry producers not participating in the National Poultry Improvement Plan are compensated at only 25 percent of the value of euthanized animals and destroyed equipment.

<sup>40</sup>APHIS is currently considering implementing tiered payment systems in which compensation amounts would depend on biosecurity capital and practices. Difficulty in effectively monitoring the latter has hindered implementing incentive-compatible biosecurity stipulations in the existing indemnity policy.

<sup>41</sup>The U.S. Government has the authority to seize and destroy nuisances. This authority holds for all diseases that can be transmitted among livestock or from livestock to people.

<sup>42</sup>Animals are appraised across several dimensions (e.g., age and intended use) prior to depopulation. Payments are thus the total number of animals in each class multiplied by the market rate of that type of animal.

i.e., the waiting period between depopulation and repopulation. Instead, producers are advised to purchase insurance for business interruptions.

## Considering Private Incentives in Program Design

The incentives of regulatory agencies and of producers are often misaligned during infectious-disease control (Gramig et al., 2009). If payments are inadequate, Government-mandated depopulation and offers of indemnity payments may be met by producers with delayed reporting or nonreporting. On the other hand, excessively generous payments do not result in sufficient private biosecurity investment. In cases where private suppression of a disease is feasible, some farmers may be motivated to manage the disease privately and avoid reporting (motivated by “adverse selection”<sup>43</sup>). This motivation is especially likely for those farmers with a small number of infected animals or with more valuable animals.

Because greater indemnity payments reduce producers’ losses from public disease control, they are expected to increase reporting for these scenarios. For diseases with high mortality rates—such as highly pathogenic avian influenza (HPAI)—cost-effective private disease suppression is typically infeasible. APHIS’s goal in these cases is to motivate timely reporting to prevent disease spread (APHIS, 2015). The application of indemnities to only euthanized animals gives farmers an incentive to respond before their animals are lost to natural mortality. APHIS has expedited the indemnity process for HPAI to avoid unnecessary dampening of the incentive to report quickly.

There is an additional (moral hazard) concern that indemnity programs with high per-animal payments lead producers to underinvest in biosecurity—relative to the level that would most benefit society (Gramig et al., 2009). For example, an indemnity covering 100 percent of losses—including business interruptions—would eliminate any financial incentive to invest in safer animals or biosecurity for a particular pathogen. In more extreme scenarios, producers could purchase low-value animals during an epidemic.<sup>44</sup> These forms of moral hazard may be partially alleviated through the careful design of programs that provide payments based on biosecurity effort. For example, APHIS required producers to have had a biosecurity plan in place at the time HPAI was detected to receive indemnity payments during the 2016 outbreaks of HPAI (APHIS, 2015). APHIS provides a graduated payment scheme, such that producers that make higher levels of investment in biosecurity are rewarded with higher compensation in the event of losses.

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<sup>43</sup>“Adverse selection” refers to situations where the actual risk is significantly higher than what is known to the insurer.

<sup>44</sup>Indemnity payments are currently based on an animal’s age rather than actual market value. This simplification greatly streamlines the payment process at the cost of considering animal-level quality differences.

## Conclusion

We provide a detailed portrait of the ways the Farm Service Agency's livestock disaster assistance programs protect producers from production risks. We trace the distinct roles of the Livestock Forage Disaster Program (LFP), Livestock Indemnity Program (LIP), and Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish Program (ELAP); clarify interactions among programs; and explain the economics of indemnity payments. Tracking outlays over time and across States provides insights into when and where producers qualified for payments. Although the programs constitute a small share of farm cash receipts at the national level, they represent far larger shares in areas affected by natural disasters. Our findings may be useful in evaluating these and related programs.

The three FSA-administered livestock disaster assistance programs—LFP, LIP, and ELAP—differ in scale and scope and deliver payments that vary substantially by year and region. The largest of the three programs, LFP, provides payments to livestock producers when drought or wildfire diminish the grazing capacity of their land. LFP has delivered payments throughout the United States since 2008, with the highest concentration of payments in Oklahoma and Texas. LIP provides payments for livestock deaths indirectly or directly caused by certain natural disasters. After two major blizzards of the last decade, LIP has distributed a substantial portion of its payments to the Dakotas. Last, ELAP, which provides payments for a large variety of losses not covered by LFP and LIP, has, for example, provided assistance to beekeepers whose colonies have been affected by CCD. Together LFP, LIP, and ELAP represent a Federal layer supplementing private measures for providing a safety net for livestock producers when and where natural disasters occur.

Payments authorized by the Animal Health Protection Act of 2002 compensate producers for losses from disease outbreaks, support disease-control efforts, and contribute to production recovery. Payment-triggering events (primarily, outbreaks of economically significant infectious diseases) are rare, and APHIS designs payment schemes to give producers incentives to limit the incidence and spread of disease. Program design provisions encourage producers to report suspected cases of infectious diseases through payments for animals and equipment seized during disease control. During some recent outbreaks, APHIS has explored the use of tiered payments based on the level of investment in equipment or practices that help control disease spread.



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## Appendix A: Livestock Forage Disaster Program Feed Cost Payment Rate Schedule by Program (Calendar) Year

Kind	Type	Weight range/sex	Payment rate (\$ per head)									
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Beef	Adult	Bulls, cows	29.96	40.04	35.37	34.57	51.81	57.27	52.56	40.79	32.36	30.00
	Non-adult	500 pounds or more	22.47	30.03	26.53	25.93	38.86	42.96	39.42	30.59	24.27	22.50
Dairy	Adult	Bulls, cows	77.88	104.09	91.97	89.89	134.71	148.90	136.66	106.05	84.14	78.00
	Non-adult	500 pounds or more	22.47	30.03	26.53	25.93	38.86	42.96	39.42	30.59	24.27	22.50
Buffalo/Beefalo	Adult	Bulls, cows	29.96	40.04	35.37	34.57	51.81	57.27	52.56	40.79	32.36	30.00
	Non-adult	500 pounds or more	22.47	30.03	26.53	25.93	38.86	42.96	39.42	30.59	24.27	22.50
Sheep	All		7.49	10.01	8.84	8.64	12.96	14.32	13.14	10.20	8.09	7.50
Goats	All		7.49	10.01	8.84	8.64	12.96	14.32	13.14	10.20	8.09	7.50
Deer	All		7.49	10.01	8.84	8.64	12.96	14.32	13.14	10.20	8.09	7.50
Equine	All		22.17	29.63	26.18	25.58	38.34	42.38	38.90	30.18	23.95	22.20
Swine		Less than 45 pounds	0.89	1.19	1.05	1.03	1.55	1.72	1.56	1.21	7.12	6.60
		45 to 124 pounds	2.09	2.79	2.47	2.41	3.63	4.01	3.67	2.85	13.27	12.30
		125 to 234 pounds	3.60	4.81	4.25	4.15	6.22	6.87	6.31	4.90	17.47	16.20
	Sow	235 pounds or more	12.29	16.42	14.51	14.18	21.24	23.48	21.56	16.73	7.12	6.60
	Boar	235 pounds or more	7.20	9.62	8.50	8.31	12.43	13.74	12.63	9.80	26.65	24.71
Elk		Less than 400 pounds	6.60	8.82	7.79	7.61	11.40	12.60	11.58	8.98	16.56	15.36
		400 to 799 pounds	12.29	16.42	14.51	14.18	21.24	23.48	21.56	16.73	11.81	10.95
		800 pounds or more	16.18	21.62	19.10	18.67	27.98	30.93	28.39	22.03	32.36	30.00
Poultry		Less than 3 pounds	0.19	0.25	0.22	0.22	0.33	0.36	0.33	0.26	24.27	22.50
		3 to 7.9 pounds	0.38	0.50	0.45	0.44	0.65	0.72	0.66	0.51	84.14	78.00
		8 pounds or more	0.86	1.15	1.01	0.99	1.48	1.64	1.50	1.17	24.27	22.50
Rein-deer	All	6.60	8.82	7.79	7.61	11.40	12.60	11.58	8.98	32.36	30.00	
Alpacas	All	24.67	32.98	29.14	28.48	42.68	47.18	43.30	33.60	24.27	22.50	
Emus	All	15.33	20.49	18.10	17.69	26.52	29.31	26.90	20.87	8.09	7.50	
Llamas	All	10.93	14.61	12.91	12.62	18.91	20.90	19.18	14.89	8.09	7.50	

Source: USDA, Farm Service Agency, 2012, "Livestock Disaster Assistance Programs." FSA Handbook. USDA, Farm Service Agency, 2016, "Livestock Disaster Assistance Programs for 2014 and Subsequent Years."

## Appendix B: Livestock Indemnity Program Per-Head Payment Schedule by Program (Calendar) Year

Species	Type	Weight range	Payment rate (\$ per head)									
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Alpacas			262.5	262.5	240.29	280.53	262.5	267.87	270	270	270.00	270.00
Beef	Adult	Bull	886.11	903.48	820.84	971.03	1369.17	1381.63	1590.49	1965.78	1,987.89	1,350.34
		Cow	681.62	694.98	631.41	746.95	1053.21	1062.79	1223.45	1512.14	1,529.14	1,038.73
	Nonadult	<400 lbs.	343.83	319.44	302.58	336.04	460.96	454.46	553.77	716.48	757.59	471.22
		400 - 799 lbs.	487.04	463.41	432.59	490.68	669.14	641.18	748.34	1136.61	819.65	639.54
		≥800 lbs.	749.76	722.13	654.6	766.03	972.47	967.99	1149.39	1375.41	1,120.38	1,001.12
Buffalo/ Beefalo	Adult	Bull	1125	1147.05	1042.13	1232.82	1738.3	1754.12	2019.28	2495.75	2,523.82	1,714.39
		Cow	600	611.76	555.8	657.5	927.09	935.53	1076.95	1331.07	1,346.04	914.34
	Nonadult	<400 lbs.	326.64	303.47	287.45	319.24	437.91	431.73	526.08	680.66	719.71	447.66
		400 - 799 lbs.	462.68	440.24	410.96	466.15	635.68	609.12	710.92	1079.78	778.67	607.56
		≥800 lbs.	712.27	686.03	621.87	727.73	923.84	919.59	1091.92	1306.64	1,064.36	951.06
Chick- ens	Broilers/ pullets		1.81	1.92	1.87	2.39	2.42	2.6	2.6	2.57	2.60	2.35
	Chicks		0.19	0.2	0.18	0.23	0.21	0.22	0.22	0.22	0.23	0.24
	Layers/ roasters		10.45	13.66	9.23	11.42	13.63	14.49	15.14	19.61	3.27	3.15
	Pullets/ cornish hens					1.72	1.7	1.83	1.83	1.65	1.69	1.60
	Roasters					2.81	3.15	3.41	3.41	3.32	3.43	2.99
Dairy	Adult	Bull	1380	1464.38	1038.75	997.5	1087.5	1035	1080	1475	1,503.75	1,353.75
		Cow	1380	1464.38	1038.75	997.5	1087.5	1035	1080	1475	1,503.75	1,353.75
	Nonadult	<400 lbs.	345	366.09	259.69	249.38	271.88	258.75	270	368.75	375.94	338.44
		400 - 799 lbs.	690	732.19	519.38	498.75	543.75	517.5	540	737.5	751.88	676.88
		≥800 lbs.	749.76	722.13	654.6	766.03	878.37	835.96	872.31	1191.35	1,214.57	1,093.41
Deer		412.5	412.5	377.6	412.5	412.5	420.93	429.53	518.11	624.96	445.69	
Ducks	Ducklings		0.44	0.53	0.6	0.61	0.66	0.66	0.66	0.67	0.67	0.69
	Ducks		2.73	3.33	3.74	3.82	4.15	4.12	4.12	4.19	4.21	4.31
Elk		572.59	572.59	524.15	572.59	572.59	584.29	596.23	719.19	867.50	618.66	
Emus		150	150	137.31	150	150	153.07	171.34	206.67	249.29	177.78	
Equine		637.5	637.5	583.57	637.5	637.5	650.53	728.18	878.34	1,059.47	755.57	
Geese	Goose		11.88	21.05	20.66	19.35	12.88	21.31	21.31	15.78	21.84	24.33
	Gosling		2.5	4.42	4.34	4.06	2.7	4.47	4.47	3.31	4.59	5.11
Goats	Bucks		73.66	65.28	78.44	89.91	121.17	121.97	125.58	136.35	165.12	207.19
	Nannies		73.66	65.28	57.93	68.15	98.51	98.54	105.55	110.45	144.80	228.75
	Slaughter goats/ kids		47.36	48.56	48.74	58.89	66.72	46.72	80.25	78.58	71.05	65.27

Species	Type	Weight range	Payment rate (\$ per head)									
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Llamas			210	210	192.23	210	210	214.29	217.5	217.5	217.50	217.50
Rein-deer			412.5	412.5	377.6	412.5	412.5	420.93	429.53	518.11	624.96	445.69
Sheep	Ewes		82.49	82.49	81.14	117.39	175.98	104.86	119.83	136.34	120.62	121.87
	Lambs		102.02	104.58	104.98	126.84	143.7	100.63	172.85	169.24	153.04	140.57
	Rams		107.24	107.24	105.49	116.04	173.96	136.33	140.19	143.97	129.13	119.98
Swine	Feeder pigs	<50 lbs.	37.75	29.74	31	48.12	43.9	42.6	68.76	66.15	33.30	34.40
	Light-weight barrows/gilts	50 - 150 lbs.	56.18	52.59	48.7	67.73	67.73	73.93	88.7	93.93	59.91	57.01
	Sows/boars/barrows/gilts	151 - 450 lbs.	74.62	75.44	66.4	87.33	104.61	105.25	108.64	121.71	86.52	79.62
	Boars/sows	>450 lbs.	124.2	114.98	139.75	201.03	221.8	234.38	292.11	305.48	169.81	172.51
Turkeys	Poults		0.99	1.08	1	1.14	1.1	1.13	1.15	1.25	1.25	1.25
	Toms/fryers/roasters		10.24	12.3	11.23	12.2	14.45	13.49	13.68	14.58	15.88	15.88

Source: USDA, Farm Service Agency, 2012, "Livestock Disaster Assistance Programs." FSA Handbook. 2016. USDA, Farm Service Agency, 2016, "Livestock Disaster Assistance Programs for 2014 and Subsequent Years."



## Appendix C: Livestock Indemnity Program Per-Head Payment Schedule by Program (Calendar) Year—Contract Growers

Kind	Type	Weight range/sex	Payment rate (\$ per head)									
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Chickens	Broilers/pullets		0.2	0.21	0.21	0.26	0.27	0.29	0.29	0.28	0.29	0.26
	Layers/roasters		0.63	0.82	0.55	0.69	0.82	0.82	0.91	1.18	0.20	0.19
	Pullets/Cornish hens (small)					0.19	0.19	0.2	0.2	0.36	0.19	0.18
	Roasters					0.31	0.35	0.38	0.38	0.18	0.38	0.33
Ducks	Ducks		0.3	0.37	0.41	0.42	0.46	0.45	0.45	0.46	0.46	0.47
Geese	Goose		1.31	2.32	2.27	2.84	1.89	3.12	3.12	2.31	3.20	3.57
Swine	Feeder pigs	Under 50 pounds	4.29	3.38	3.52	5.47	4.99	4.84	7.81	7.51	3.78	3.91
	Lightweight Barrows/gilts	50 to 150 pounds	8.44	7.9	7.31	10.17	11.15	11.1	13.32	14.11	9.00	8.56
	Sows/boars/barrows/gilts	151 to 450 pounds	11.21	11.33	9.97	13.11	15.71	15.81	16.32	18.28	12.99	11.96
	Boars/sows	Over 450 pounds	51.04	47.25	57.43	82.61	91.15	96.32	120.04	125.54	69.78	70.89
Turkeys	Toms/fryers/roasters		1.13	1.35	1.24	1.34	1.59	1.48	1.5	1.6	1.75	1.75

Sources: USDA, Farm Service Agency, 2012, "Livestock Disaster Assistance Programs," FSA Handbook. USDA, Farm Service Agency, 2016, "Livestock Disaster Assistance Programs for 2014 and Subsequent Years."