



Southern Agricultural Production Risk Issues

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Agricultural producers are in the business to take certain inputs and transform them into outputs to meet demand in the market. Through this process producers profit when the revenue generated from production exceeds the costs of production. Uncertainty of revenue can be defined as risk. Risk can be defined as the possibility of adverse outcomes due to imperfect knowledge in decision making.

One category of agricultural risk is production risk (RMA, 1997). Producers often face greater risk of production than other sectors due to the fact they have little control over the environment in which they operate their enterprise. Production risks include weather, disease, pests and predators. These risks are especially prevalent for Southern producers because of potentially mild temperatures during winter months combined with relatively higher temperatures and intense humidity during summer months. Many crops that are grown in the South have high input costs including cotton, peanuts, rice, fruits, ornamentals and vegetables due to pests and diseases. Other management areas that can be categorized as production risks are use of and investments in new technology, machinery efficiency and availability, as well quality and efficacy of inputs.

Major risks:

- **Weather** – Row crop, fruit, vegetable and ornamental production face the risk of variable weather year-in and year-out. Livestock producers face weather risks that impact their animals or the inputs and facilities used in growing the animals. Examples of production losses caused by weather include drought, excessive heat, hail, excess moisture, wind, frost and freeze. Drought and heat are the most common risks, but many Southern crops are susceptible to

freeze and frost. Among weather-related perils covered by crop insurance since 1989, Drought and Heat has been the largest risk in terms of indemnities paid (39%). The next largest peril was Excess Moisture (27%), followed by Hail (9%) and Cold, Frost, Freeze (9%), Price (5%), Wind/Hurricane (3%), Disease (2%), Insect/Wildlife (1%) and Other (5%) (Crane, 2009). Strategies that producers can consider to manage weather risk include crop insurance, geographical dispersion, production differentiation, irrigation, farm programs, variety and breed selection, and transgenic and genetically engineered inputs.

- **Pests** – Pests generally refer to insects and parasites that cause injury and damage to crops, plants and livestock reducing yield, grades or quality and transmitting diseases. Pests are a big problem in the Southern region due to the favorable climatic conditions for pests and short winters. Wildlife is also a pest for many Southern producers due to increasing populations of deer, feral hogs, geese and expanding territories of fire ants, coyotes and other wildlife.
- **Disease** – The Southern region also has many of the diseases that growers must deal with due to hot and humid conditions. Producers often have to apply preventative and curative treatments to control diseases that reduce yield and quality. These control measures can involve large investments and require adequate scouting and management to be effective. Livestock producers must prevent disease or risk losing whole herds or houses due to quarantine. Producer understanding of adequate protocols/processes to manage and minimize disease incidents and outbreaks results in reduced expenses for curative measures and enhanced herd quality and/or performance.

Risk Management Strategies for Production Risk¹

- **New technology** – Improvements in technology for inputs increase the potential production and efficiency of production, but there are risks with integrating the technology into farm operations. Additionally, there exists innovation in new technologies – hoop houses or multiple-inlet irrigation to name a few examples – that serve to aid in reducing the uncertainty of weather risk adverse impacts. The new systems, new equipment and different management skills required in new technology implementation affect costs. Significant advancements in seed technology have been made that incorporate seed quality management. There is uncertainty regarding use over time of genetically engineered seed related to weed and insect resistance. Adoption of precision agriculture strategies works well in certain geographic regions and/or farming systems but not as well in others. Producer understanding of the costs and benefits of these new and/or modified technology systems is a prerequisite to using them to enhance risk management efforts.
- **Machinery efficiency** – Improvements in machinery efficiency generally entail larger-sized equipment or modifications that allow you to cover more acres or animals. These efficiency gains typically involve significant costs to implement. Therefore, the operations size must be considered to understand minimal scale of operation required to realize advantages of the investments in efficient machinery and/or equipment.
- **Availability, quality and efficacy of inputs** – Global competition of and domestic demand for inputs such as seed, fertilizer and chemicals create a risk of input availability that fluctuates from year to year. Variability among inputs creates risk of input reliability and/or quality. Producers may receive bad or mislabeled seed, poor formulations of chemicals and poor quality pharmaceuticals, medicines or fertilizers that drastically impact their production quantity and quality. Many inputs are marketed and sold with limited information, creating additional asymmetric information risk for the producer. In some cases, no information is available to the producer of input products marketed to them. There may be incidences where producers are misled by aggressive sales representatives. The mere increase in the types and variations of inputs creates a need for heightened grower awareness of potential costs and benefits of various inputs.

There are a number of strategies and tools available to help producers manage production risk. Below are a few examples of strategies that can be implemented, technologies that have been adopted or tools that can be used. Individual operations will have different risk environments and risk perceptions. Therefore, strategies to mitigate production risks should be considered as part of a comprehensive effort that links efforts directly into the overall goals and objectives of the operation. In general, a risk management strategy involves shifting some of the risk to another party or reducing the variability, i.e., risk. The tradeoff to a producer wanting to manage production risk may be a lower yield on average. However, agricultural production is risky because production cannot be controlled. Reducing variability in production can mean the difference in falling in a hole too big to climb out of, especially if one bad year can put one out of business. It should be noted that implementing a risk management strategy typically will involve some costs. However, the reduced likelihood of adverse impacts from the area typically outweigh the investment of time and money.

Enterprise diversification

A common strategy recommended to lower production risk is enterprise diversification. Producers will produce more than one enterprise to shift or reduce the risk of production losses and to avoid income being totally dependent upon one enterprise. Examples for reducing income variability include growing multiple crops to trade the gains of specialization for lower variability, choosing crops with different growing seasons or maturity dates, mixing livestock and crop enterprises, and raising different types of livestock.

Crop insurance

Crop insurance is purchased at some level on over 85% of the U.S. farmland crop acres (National Crop Insurance Services, 2013). Initially a pilot program, crop insurance has been around since the 1930s. In its history, however, crop insurance has only been available for major program crops, typically commodity row crops. Availability and affordability of these insurance products has improved in the last two decades, but other sectors of agriculture have traditionally been served with limited product offerings. There are traditionally two major types offered to producers: multiple peril crop insurance

(MPCI) and crop hail. The MPCI policies available to producers cover many of the perils mentioned above under weather, pests and diseases. Multiple peril crop insurance is backed by the federal government, and crop hail insurance is a single peril private product. Both products are sold through the private sector. Federal crop insurance is sold through 18 approved crop insurance companies (RMA, 2013). These companies also sell their own private crop hail policies. Producers can choose a minimum catastrophic protection (CAT), buy up to yield protection or cover price and yield with revenue protection. Other insurance products are sold in the private market as single perils products, such as weather or rainfall insurance. Insurance programs are also available in some areas for livestock, pasture and forage through the Federal Crop Insurance Program. The livestock policies are designed to insure against declining market prices of livestock, or shrinking margins between input costs and output prices. There are two types of plans available to livestock producers: Livestock Risk Protection (LRP) and Livestock Gross Margin (LGM). The LRP is based on price and the LGM is based on the difference between the commodity and feeding costs. Rainfall Index (RI) is available in select pilot counties where RI is designed to help pasture and forage producers in short water years.

Producers of non-program crops that do not have federal crop insurance policies can sign up under the Noninsured Assistance Program (NAP) available through the Farm Service Agency (FSA). The NAP program works similar to CAT coverage covering losses greater than 50% of expected production based on an approved yield and reported acreage.

Irrigation

Irrigation in the Southern states is an important tool for reducing production risk. Although many of the top irrigation states are in the Western region, states such as Arkansas and Florida are highly dependent on irrigation to reduce risk. Over 50% of cropland in Arkansas and Florida is irrigated, followed by Mississippi (25%), Georgia (23%), Louisiana (20%) and Texas (15%) (NASS, 2008). The remaining Southern states have less than 6% irrigated acres. The availability, quality and cost of water all must be considered in the irrigation decision. Increases in yield as well as reductions in yield variability often make irrigation a popular risk management tool where feasible. Additionally, advancements in new technology and production techniques have shown increased water use efficiency.

Excess capacity

Similar to hiring custom operators, having excess machinery or labor capacity is a strategy for managing planting and harvesting risk due to weather. Planting delays occur due to excess moisture, cold temperatures or inadequate moisture. Crop harvest can be delayed for the same reasons. Some producers will own or lease excess machinery capacity to help ensure timely planting or harvest when the harvest window is shortened by weather.

Custom operation

In order to be timely with planting, input applications and harvest, some producers will utilize custom operators. Using custom operators can allow a producer to farm more acres in a short amount of time and hit planting, spraying and harvest windows that may not be achieved without a custom hire operator. Timelier field operations can lead to better and/or less variable yields and less yield variability. Custom operators are also reducing their risk by performing the operations for a landowner for a fee, the yield and price risks being taken on by the landowner.

Government programs

Government programs have been used by farmers of traditional program crops to manage risk, particularly on the price side. Programs that address production risk are disaster programs for shortfalls in yields. The trend toward revenue programs combines yield benchmarks with price to support gross revenue. The 2013 Farm Bill will have a revenue program that is designed to work with crop insurance as the main safety net for major crop producers. Congress historically has passed disaster legislation that provides payments to producers who experience losses to crops and livestock. The most recent programs have included the Emergency Assistance for Livestock, Honey Bees and Farm-Raised Fish (ELAP), the Livestock Forage Program (LFP), the Livestock Indemnity Program (LIP), the Noninsured Crop Disaster Assistance Program (NAP) and the Supplemental Revenue Assistance Payments Program (SURE).

Contract production (vertical integration)

Contract production reduces price risk and can be a strategy to reduce production risk where the integrator provides the inputs such as feed and chicks to contract growers. The agribusiness firm controls the quantity and quality of these two inputs; technical services are provided to help

ensure the integrator's production specifications are met. Contract production is more common in poultry than in other livestock production and is also used in specialty crop production.

Precision agriculture

Precision agriculture tools include variable rate application of fertilizer and irrigation water, tractor auto steer, precision field leveling and soil moisture monitoring. These tools are generally adopted by upgrading machinery and equipment. The major reason for the investment in new technology is to reduce costs associated with inputs. Yields can also be improved or maximized using precision agriculture, and the variability between and within fields may be reduced. Thus, precision agriculture tools have the potential to reduce production risk due to more intensive management.

Transgenic seed and genetically modified organisms

New technology is increasingly delivered through seed by genetic engineering and breeding. Research by universities and major seed and technology firms has led to the development of transgenic seeds that have characteristics that not only increase yield but also reduce input use through resistance to insects and certain chemicals. Adoption of these technologies has been high but requires additional management to prevent resistance development in insects and weeds.

Lease arrangements

A majority of producers lease land as part of their operation. Lease arrangements have evolved over time as risk and returns have fluctuated. The main types of leases are cash lease, share lease and flexible cash or hybrid lease. Cash leases transfer more risk to the producer as the landowner receives a fixed payment negotiated between the landowner and producer. Share leases typically have the landowner and the producer sharing the risk of production; typical examples are one-third or one-quarter of the production going to the landowner as payment. A flex lease allows the payment to fluctuate based on

an arrangement agreed upon by the landowner and producer. The rental rate is tied to an index such as price, yield or some combination of the two.

Information sources to aid production risk decisions

Yield variability is predominantly a result of variations in weather, soil types, environmental conditions, pests and diseases. Since the creation of the land grant system in the United States, research and extension of the research has been disseminated to producers and industry professionals through the land grant universities system. Researchers and Extension professionals provide information and recommendations that producers can use to improve their production and reduce their production risks. Applied research gives producers data that is unbiased and applicable to their region. Extension makes objective recommendations based on data from applied research. As new technology emerges, the land grant system is able to test it in the field and provide objective results that producers can use to make decisions on production practices and enterprise mix.

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¹List of risk management strategies includes those found in Drollette, 2009; Kay, Edwards and Duffy, 2011; and RMA, 1997.

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*Ronald L. Rainey and H. L. Goodwin are Co-Directors of the Southern Risk Management Education Center and serve as editors of this publication series. To learn more about risk management education programs and resources, visit the Southern Center web site (<http://srmec.uark.edu>) or the Extension Risk Management Education Program link (www.extensionrme.org).

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