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United States Department of Agriculture

Rice Seed Choices, Adoption, and Practices

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*Selected Poster prepared for presentation at the 2015 Agricultural & Applied Economics Association and Western Agricultural Economics Association Joint Annual Meeting
San Francisco, CA, July 26-28.*

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Rice Seed Choices, Adoption and Practices

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The views expressed in this presentation are the authors and not necessarily those of ERS or USDA.



Background

Rice is produced worldwide and is the world's second or third largest staple crop, behind corn (maize).

- It is known to have been domesticated as early as the fifth millennium, B.C.E.

In recent years, U.S. rice use has been growing about 1% per annum – about even with U.S. population growth.



Background

Due to physical requirements for growing rice, production areas in the US are limited to four regions with each region specializing in a specific type of rice:

- Arkansas Grand Prairie,
- Mississippi Delta,
- Gulf Coast, and
- Sacramento Valley of California.



Approximately 50% production is sold in the domestic market with uses ranging from human consumption, to beer brewing, to pet food.



Objective

Given the steady growth of the rice market, producers need to stay abreast of the latest technologies.

The adoption of herbicide-tolerant and hybrid rice seed varieties is improving the productivity of U.S. rice production.

This research describes the adoption of these rice seed varieties between 2006 and 2013.



Data

Data for this research will be used from the United States Department of Agriculture (USDA) Agricultural Resource Management Survey (ARMS). ARMS is a nationally representative survey administered in three phases:

1. Phase I – screener survey
2. Phase II – field level data (crop production practices)
3. Phase III – farm level data (farm finances)

This research utilizes data from the 2 most recent ARMS of U.S. rice producers, conducted for 2006 and 2013.



Herbicide Tolerant v Hybrid

Herbicide Tolerant

Herbicide tolerant seeds have been developed conventionally, without genetic engineering techniques, to allow farmers to more effectively control certain weeds.

Hybrid

Hybrid rice is rice produced by crossbreeding different kinds of rice. There is an understanding that due to the increased vigor of hybrid varieties, the expected yield per acre of hybrid rice exceeds that of conventional rice.



Hybrid Rice Seeds

- In the U.S., a single hybrid rice variety was commercially introduced in 2000.
- Since 2000 there has been an increase in the hybrid rice varieties that have entered the U.S. market.
- In 2013, rice producers planted these hybrid seed on 23 percent of U.S. rice acres.



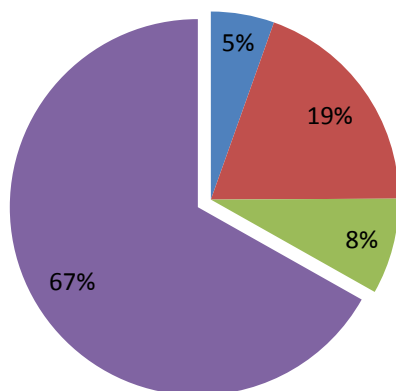
Hybrid Seed

- Hybrid seed varieties sometimes require more fertilizer than conventional varieties, which would boost fertilizer costs per acre.
- Hybrid seeds have higher yields that often offset their higher costs; however, some hybrid seed varieties have created challenges for the rice industry.
 - There have been quality problems, especially with milling due to their thin pericarps.
- Further adoption of the hybrid rice varieties may depend upon the resolution of the quality issues surrounding hybrid rice seed.



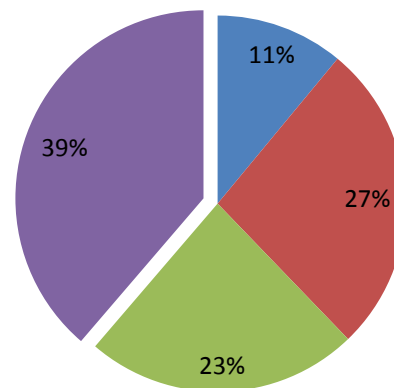
Producers' Seed Choice Migrate

Percentage of Producers by Seed Variety in 2006



Percentage of Producers by Seed Variety in 2013

- Hybrid
- HT
- Hybrid+HT
- Conventional



Long grain only, CA excluded.

Source: USDA ARMS Survey

From 2006 to 2013, producers have increased their use of HT seeds, hybrid seeds, or a combination of Hybrid+HT seeds while decreasing their usage of conventional seed. There are several reasons for these decisions, two of which are increased weed control and higher yields.



Management Practices of Rice Producers

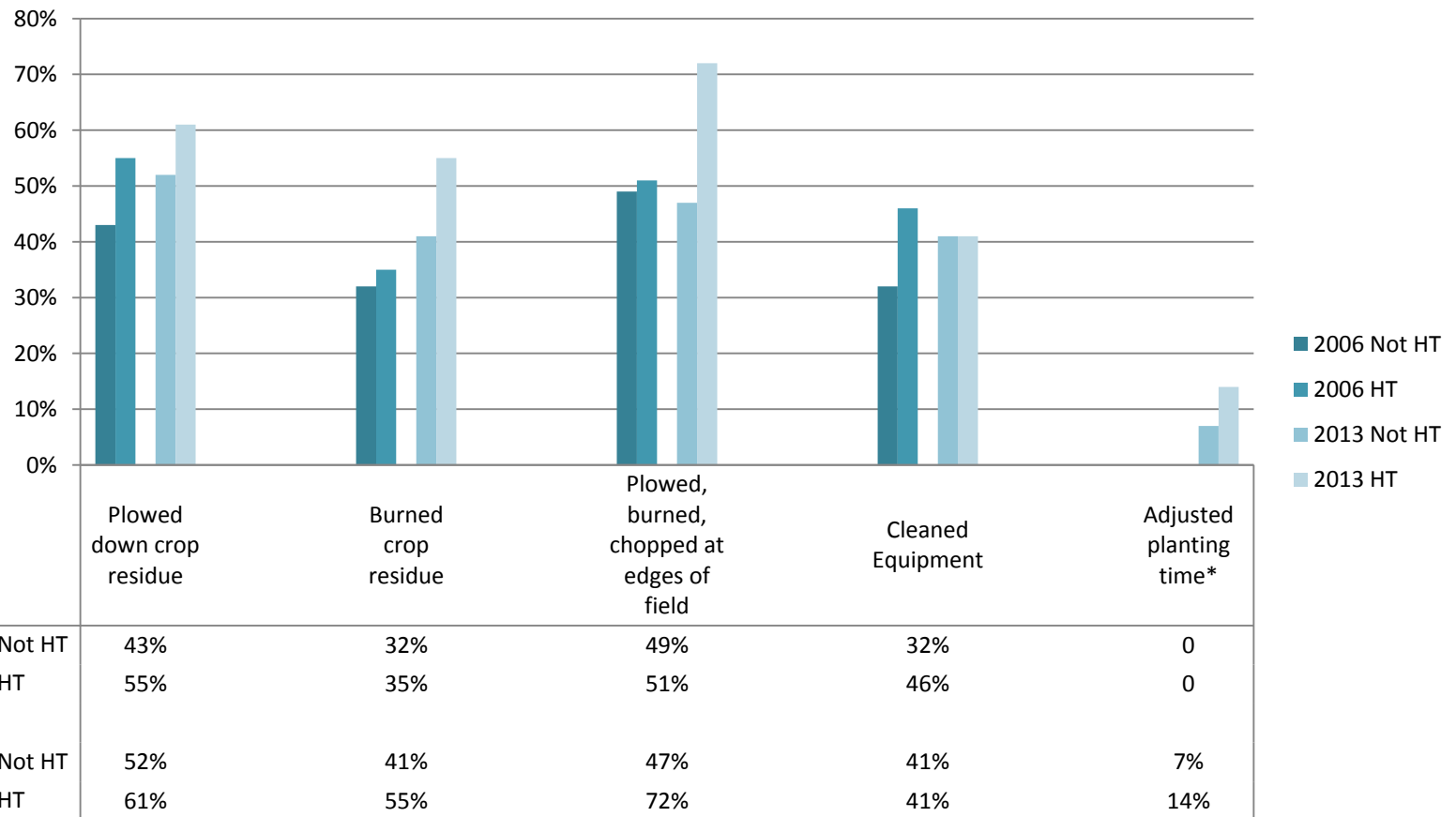
Weeds can develop resistance to herbicides, but certain field practices can slow the development of resistance.

- Crop rotations can slow resistance - in both 2006 and 2013, two-thirds of the acres planted to herbicide tolerant varieties were rotated into rice from other crops planted the previous year.
- Resistant weed varieties can also be managed by plowing crop residues, burning residues, and plowing, burning, or chopping at the edges of fields; use of each of those practices increased—among farmers planting herbicide tolerant rice—between 2006 and 2013.



Management Practices of Rice Producers

Management Practices on Rice Acreage with HT/Non-HT Seed Choice

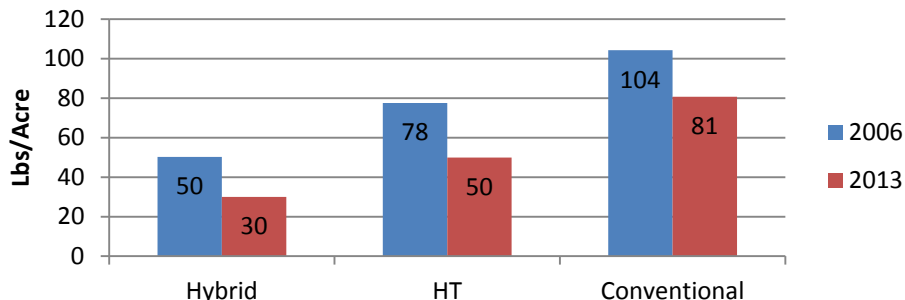


*Adjusted planting time not surveyed in 2006
 Long grain only, CA excluded.
 Source: USDA ARMS Survey



Seeding Rate and Costs Across Different Rice Seed Varieties

Seeding Rate by Seed Variety

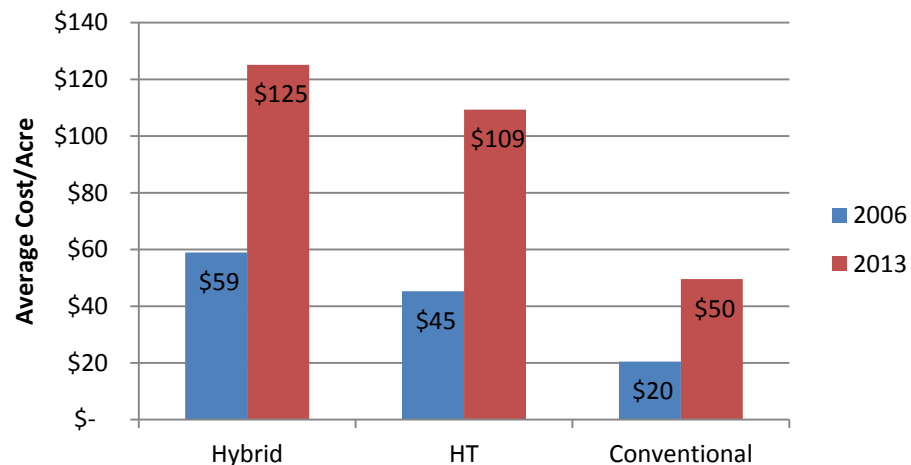


Long grain only, CA excluded.

Source: USDA ARMS Survey

Significant differences in the characteristics of hybrid and conventional seeds are leading to changes in some production practices, such as fewer pounds of seeds are recommended per acre for hybrid varieties.

Average Cost/Acre by Seed Variety



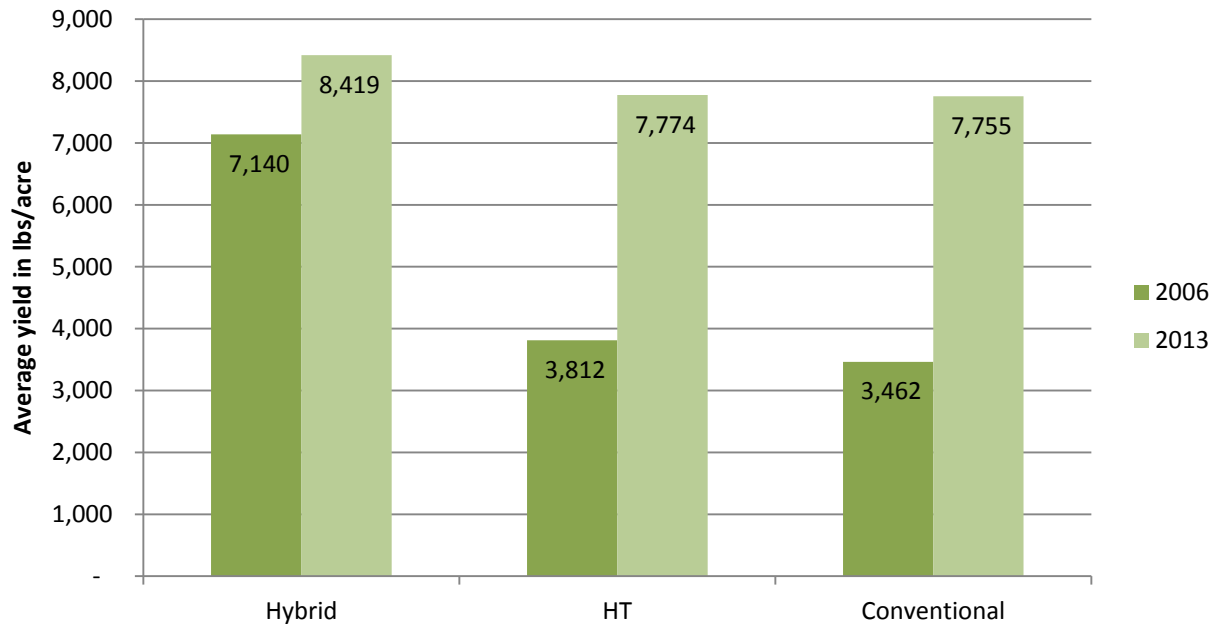
Long grain only, CA excluded.

Source: USDA ARMS Survey



Yields by Seed Variety

Rice Yields Increase for All Seed Types



Long grain only, CA excluded.

Source: USDA ARMS Survey



Take Away

- Producers are adopting HT and Hybrid rice seed varieties and decreasing their use of conventional seed.
- Producers that use HT varieties use other weed management practices at a higher rate than producers that use conventional seed.
- Producers may choose higher yielding hybrid or HT rice seed over conventional, even given the significant increase in seed cost.

