Guar (Clusterbean, *Cyamopsis tetragonolob*) is a drought-tolerant legume that was introduced into the United States from India in 1903. Guar (Hindi for “cow food”) is an upright, coarse-growing summer annual legume known for its drought tolerance once established. Guar tolerates high temperatures and low moisture, and has an optimal performance range of 77 degrees to 95 degrees Fahrenheit within 10 to 40 inches of rainfall. Wet soils and humidity decrease plant performance and bean quality. Guar grows well under most soils, but prefers well-drained sandy-loams.

Traditionally, guar is used for human consumption and cattle feed in India, but it is also an excellent soil-improving crop that fits well into crop rotations. Throughout the world, guar has been in rotation with wheat, cotton and sorghum. Studies have demonstrated that guar has the potential to add over 100 pounds of nitrogen per acre in a single growing season. Texas cotton growers have measured a 15 percent increase in yield following guar rotation without the need for nitrogen application (Stafford and Lewis, 1975; Rogers and Stafford, 1976).

Guar seeds/beans have a very large endosperm that is processed into guar gum. Guar gum is white or yellowish and does not have a distinguishable odor. Guar gum contains up to 85 percent galactomannan. Galactomannan is a natural thickener that is water-soluble at low temperatures. The thickening properties (viscosity) of guar gum have led to its use in food, cosmetic, paper, pharmaceutical and petroleum industries. Today, the largest consumer of guar gum is the petroleum industry, which uses it to reduce fluid friction and as a substrate carrier in gas well development. Currently, greater than 90 percent of guar gum that is used by U.S. industry is imported.

India and Pakistan are the largest producers of guar, accounting for nearly 80 percent of the world’s production. The United States began commercial production of guar in the 1950s, concentrating production in the more arid regions of northern Texas and Oklahoma. Nearly 100,000 acres were planted in 1983, with a steady decrease to the 15,000 acres planted in 2011. This decline in planted acreage is attributed to
low petroleum and nitrogen fertilizer prices, and an increase in guar gum imports from India. Early in 2012, the supply of guar gum was stretched due to the expansion of natural gas exploration through the hydraulic fracturing process.

Prior to 2010, guar gum imports remained relatively stable at approximately 11,000 metric tons per month with an average price of $1,200 per ton (CyberColloids, 2011). However, guar gum is an integral part of the natural gas exploration process known as hydraulic fracture or fracking. The substantial increase in oil and natural gas exploration by U.S. firms has led to an increase in demand for guar gum. Imports increased from 11,000 tons per month in 2010 to an average of 24,000 tons per month in 2012 (Reuters, April 2012). Associated with this increase in demand has been an increase in the price of guar gum. Prices for guar gum have been extremely volatile and have ranged from $1,200 per ton to nearly $7,500 per ton in the past two years. While some price moderation is expected, experts predicted that prices will remain 30 to 40 percent above historical averages for the foreseeable future (Reuters, 2012). This price increase has significantly increased the cost of natural gas exploration, leading petroleum companies to explore regional production opportunities for guar and potentially creating new revenue sources for farmers.

Farmers and ranchers located in western Oklahoma and northern Texas possess suitable growing conditions to support guar production. In addition, the nitrogen-fixing properties of this crop make it an ideal rotation crop for wheat, sorghum and cotton farmers. A benefit/cost analysis on a monocropped guar production system was conducted at the Noble Foundation by Jon Biermacher, Ph.D. Using the current price of guar beans and yields observed in agronomic trials in western Texas, a favorable net return to land, labor, management and farm overhead could be achieved with the guar production system relative to winter wheat and dryland cotton crops. The results were mostly sensitive to the price of guar beans. However, for prices that remained 30 to 40 percent above the historical average, the economic results were still quite competitive with crops commonly produced in these regions.

As with many new opportunities, producers have limited production, harvest and marketing knowledge related to guar. The Noble Foundation has experience with guar production, and technical support is available from a regional guar gum manufacturer to assist interested producers. While there are risks and challenges associated with producing guar, the potential exists for farmers to realize production advantages associated with a crop rotation using a nitrogen-fixing plant that produces a product (guar gum) that will be in demand by the oil and gas industry in the foreseeable future.