

## FABRICATION OF WHEAT HARVESTING MACHINE

### ABSTRACT

This project is intended to help small-scale grain growers meet an increased demand for diverse, locally grown grains by designing a reaper-binder machine. To refine our prototype and final design, we worked closely with a three person review panel, made up of grain farmers and industrial designers. With this prototype, we hope to provide farmers nationwide with a way to harvest and bind grains on small plots of land in cities and along the periphery of urban areas.

### INTRODUCTION

Nationally, most of the food we eat is produced by large agricultural supply chains, which link farmers, seed suppliers, pesticide and fertilizer suppliers, transporters, distributors, wholesalers and retail outlets. Currently the United States harvests about 114.8 million acres of grain per year worth some \$15 billion (USDA Census of Agriculture, 2007). On a number of dimensions this scale of production is not sustainable. One of these issues is that \$28 billion is spent by all the farms in the U.S. on chemical fertilizer alone, which is made primarily from non-renewable resources including fossil fuels (USDA Census of Agriculture 2007). On an average farm in the United States, 107 gallons of fossil fuels per acre will be used, with one third of that going into the production of fertilizer (Pimental, 2006). These chemical fertilizers, pesticides, and herbicides end up either on our food or into our groundwater, posing health risks to farm workers, nearby residents, and consumers (Groundwater, 2003).

An alternative to these large and distant supply chains, and reliance on chemical fertilizers and other inputs, is to grow food, such as grains, organically and closer to where it is consumed. Such interest in encouraging local and regional agricultural production is evident in a number of cities, such as Portland, Seattle, New York, Detroit and Philadelphia where community gardens are burgeoning, farmers markets are expanding, urban farmers are growing food on rooftops, vacant lots, in retrofitted warehouses, in backyards, and new value chains that connect small and medium size growers to markets are proliferating (Lovell, 2010).

Even though there is a growing trend to produce local, fruits and vegetables in cities and on the periphery of urban areas, local grain production remains limited. It is rare, for example, for locally produced grains to be used even in small craft breweries since most breweries buy malted

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barley from large malt houses in the Midwest at commodity prices; nor is locally grown grain typically found in farmers markets since farmers typically get greater profits from selling fruit and vegetables. One barrier to expanding the market for locally produced grain is the lack of appropriate machinery to harvest grain grown on a small scale (C. Stanley, personal communication, 11/12/2011).

TECHNOFIST