

# Agriculture's Contribution to the Bioenergy Value Chain

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**Slide 1:** Significant public and private investments have already been made in the six "agricultural" links of the supply chain for bioenergy. The first, *germplasm*, has a number of strong commercial players (CERES, Syngenta, Monsanto, Pioneer/DuPont, and Canavialis). The last, *processing*, also has strong commercial players (Novozymes, Genencor, Broin, ICM, Iogen, and Verasun). However, the middle four links do not have strong economic drivers, and have not yet received the public and private investment that will be needed to make them viable links of the bioenergy supply chain.

**Slide 2:** In order to have viable, robust bioenergy industry beyond that derived from grain feedstocks, we must design and manufacture *harvest systems* that provide the following: high biomass quality, low cost, minimal disruption of grain harvest, and environmental benefit. We must also design low cost *transportation* from field to storage; and *analyze costs* of stover harvest (nutrient replacement, equipment, costs, transportation costs, labor, etc.), so that farmers know how to "price" biomass products. At Iowa State, faculty members Stuart Birrell and Rob Anex have designed first-generation prototypes of harvest and storage implements. Much is left to do, and significant additional public investment in these areas is warranted.

**Slide 3:** There is also much yet to be learned about *storage systems* for biomass. Faculty at ISU are currently evaluating the feasibility of wet storage (ensilage) as a biomass storage system. Other systems like hoop houses, large piles covered by teepees, bunkers silos, etc. also warrant evaluation.

**Slide 4:** It will be very important to design all links of the agricultural supply chain in concert so all phases of the system can be optimized. For this reason, ISU is developing a major new research program called "New Century Farm." The farm will focus on all the agricultural links for the bioenergy supply chain: cropping systems, harvesting, storage, transportation logistics, and recycling nutrients back to the land. In addition to being a place where research is carried out, the New Century Farm will be a place where students, extension personnel, and farmers can learn about biomass production systems.