Factors for farmers to consider when you or your neighbor is growing an identity-preserved (IP) crop

Note: This document is intended as a framework of general factors for farmers to consider that can be adapted to local conditions, and as a source of useful reference materials. More information about some of these topics, particularly in regard to the Seeds and the Other Challenges and Considerations sections, can be found in the full report of USDA's Advisory Committee on Biotechnology and 21st Century Agriculture, entitled X, which is available online at http://www.usda.gov/wps/portal/usda/usdahome?navid=BIOTECH_AC21&navtype=RT&parentnav=BIOTECH .

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Opportunities

Secretary of Agriculture Tom Vilsack, in remarks to the United States Department of Agriculture's Advisory Committee on Biotechnology and 21st Century Agriculture (AC21), made these observations:

> …we have great diversity in American agriculture in terms of its size, in terms of its products, in terms of production methods and technology. And that's one cornerstone of the rural and agricultural economy in this country. Embracing diversity has helped, in my view, to make American agriculture resilient… We truly need diversity in agriculture. We need diversity in production methods, crops produced, and in the farming community itself. And failing to recognize and act on that fact, in my view, compromises agriculture's future, and I would argue the future of our country.

One key mechanism for increasing the diversity of agricultural production in the United States is through the production of identity-preserved crops. Identity preservation (IP) is a system that preserves the characteristics of a product throughout the supply chain, from seed to sale. The choice to grow IP crops is generally driven by marketplace needs. Farmers use IP to gain premiums when they market unique crops (such as seeds, certified organic crops, or a particular variety) in order to achieve an agreed-upon standard of quality and purity in their harvested product, as well as commit to specified production practices. Historically, in specialized production sectors, the growers and the rest of the value chain take responsibility for meeting any quality standards for the product's market demand, often through contractual arrangements.

IP crops can include, among other things:

- Crops intended for non-GMO/non-GE [1]markets
- Seed intended for planting
- Certified organic crops
- Certain GE/GMO crops (e.g., those with new functional traits)
- Crops produced using specific varieties and providing specified characteristics under contract (e.g., blue corn segregated specifically to produce blue corn chips).

IP production offers opportunities for farmers to derive premiums for their products in return for following more specific management practices. Those management practices may often include a greater awareness of what varieties your neighbors are growing and, sometimes, working with those neighbors so that everyone's production objectives can be met. IP production may in some cases also be subject to specific regulatory requirements or specifications from independent third parties.

Producing the increasingly diverse set of crop varieties for different markets depends on farmers working together to find solutions that jointly work for their production needs and enable all parties to

[1] This term has been used here because USDA has used the designation "non-GMO/non-GE" as an allowed designation under a process-verified program administered by the Agricultural Marketing Service.

access their intended markets. Though this document is primarily focused on issues for IP producers, the information in it should be relevant to all producers. Being a good neighbor means respecting what your neighbors are growing.

IP Production and Contracts

Much IP production is contracted beforehand by entities in the food, feed, and fiber supply chain, although certified organic products, which are identity-preserved, may enter the organic product stream without prior contracting. When contracts are used, they often indicate:

1. specifications for contract compliance as well as, sometimes, a discount schedule for imperfections and/or a bonus schedule for superior quality;
2. A description of the testing protocols and standards to be applied to determine whether contract specifications are met as well as the reasons deliveries would be rejected;
3. Buyers' rights to inspect the field or crop at any time;
4. Requirements for approval by a company or its 3rd party representatives; and/or
5. Delivery on buyers' call, under specified conditions and timing.

It is important to consider your ability to meet these requirements prior to entering into an IP production contract.

Also significant is the fact that some IP producers do not contract beforehand but strive to meet overall market standards for their products and sell directly into those markets (particularly the organic market). In general such producers, while striving to abide by market standards, face less certainty regarding market access and acceptability.

Meeting IP Requirements

Although the precise management practices that may work best for your IP production will vary by crop, region, and growing environment, a number of tools or considerations are generally relevant. These include:

- Understanding the biology of your crop and the particular characteristics of the variety you are growing, in particular its pollination behavior (e.g., whether it is self-pollinating or cross-pollinating);
- Knowing what your neighbors are planting and the potential implications of what they are planting on your management decisions (see section on coexistence below);
- Starting with seed appropriate for your IP needs (see seed section below) ;
- Having an intimate knowledge of local wild plants to identify possible cross-pollination with seed crops;
- Using crop rotation schemes to reduce pollen exposure from volunteer plants;

- Handling of crop to minimize, as much as practical, the potential for mixing during planting, harvesting or cleaning operations;
- Using staged planting times to temporally isolate your crop from unwanted pollen from sexually compatible crops growing nearby;
- Identifying and selecting fields/plots for crops potentially affected by crops on neighboring farms to minimize, as much as is practical, the potential for pollen flow to an IP crop;
- Using physical isolation to minimize, as much as practical, the potential for cross-pollination (distances are largely based on each crop's biology and reproductive system, i.e., whether self- or cross- pollinated). This could include, for example, using buffer rows or conservation land;
- Careful tracking and recordkeeping of your crops;
- Cleaning and inspection of planters, harvesters and other equipment pre- and post-harvest;
- Using module markers in harvest (modules being large compacted units of harvested material, especially cotton);
- Disposal of plant material (e.g., residue from planter clean-out) as appropriate;
- Using cleaned or dedicated transportation vehicles, storage bins, conditioners and ginning facilities as appropriate;
- Managing how people, machines, and equipment move from field to field (e.g., if planting both IP and conventional crop, work in IP field first, then in conventional one);
- Visually inspecting and roguing of all genetic stocks on a continuous basis to remove off-types and weeds;
- Inspecting fields multiple times and possibly enlisting third party inspection or verification;
- Applying post-harvest risk mitigation measures, such as not harvesting outside rows or selling outside rows on the commodity market, if cross-pollination is expected or known to have occurred .

Seed--A Critical Component

Farmers need to ensure that they start with seed with the appropriate characteristics to yield crops meeting the specifications required by their market. Farmers should deal with reputable seed companies and understand the information provided on the seed tag as required by the Federal Seed Act. Varietal purity provides assurance of low presence of any unintended genetics, but may not in itself guarantee that seed has the appropriate characteristics to meet specific IP production needs.

Some specialty seed companies may also be willing to meet a farmer's specific quality requirements especially in regard to unintended GE/GMO presence. If a farmer will have specific seed needs, it is prudent to have conversations at least a year in advance, or preferably earlier, with seed companies to ensure that appropriate seed will be available in the form, function, and quantity that is required. IP farmers might also consider testing seed delivered to their farm before planting or, if they are producing under contract, might work with their contractor to assure that their starting seed is suitable to meet their production requirements.

Coexistence—Working With Your Neighbors

It is helpful for today's farmer wishing to serve an IP market to have knowledge about his/her neighbors' crops, rotation plan and, sometimes, his/her input plan.[2] Good communication among farmers with neighboring fields as to the crops, rotation plans, farming protocols and the specific hybrids or varieties being produced has become a key to successful IP production in many instances, and can be an important tool for fostering coexistence among growers producing for diverse markets. Coexistence is a two-way street: it builds on the shared responsibility of farmers and requires collaboration and compromise on both sides of the fence line.

Farmers, and especially those producing IP crops, need to fully understand the requirements of their markets as well as the nature and dimensions of any buffers needed to achieve the specifications to satisfy that market.

Understanding how neighbors' crops might affect an IP farmer's ability to produce for his/her intended market will help the IP farmer plan appropriately to meet his/her production needs. All farmers can foster coexistence when they understand the potential geographic spread beyond their field borders of pollen, crop pests (e.g., insects, pathogens, nematodes, viruses, or weeds) and inputs being used on their own fields. Any farmer whose choices could potentially affect his/her neighbor's ability to market their crops should strive to minimize the potential for conflict. Often, but not always, coexistence problems can be eliminated or reduced by adjusting rotation plans, seed choices, planting times, or physical isolation, e.g., buffers.

When a farmer has information about what his/her neighbor is growing, it is possible to assess the likelihood for such potential problems. There are a few different situations to consider:

- Neighbors growing the same crop for buyers or markets having similar requirements: There is likely no coexistence issue and no need for either party to adjust behavior.
- Neighbors growing the same crop for buyers or markets with different requirements: There could be a potential coexistence issue that would justify significant horizontal, vertical or timing segregation.
- Neighbors growing different crops for buyers or markets with different requirements: There may be instances in which a potential coexistence issue might justify some segregation by both parties.

Here are a few practical things to think about:

- Can my neighbor and I work together on joint buffer areas or use other approaches for physical separation that could protect my crop and provide economic benefits for us both?

[2] In some areas of the country information about planting of crops that may be affected by neighboring crops may be provided via local pinning maps or web-based location services.

- Would it make sense for us to adjust our relative planting times to minimize potential impacts of our crops on each other?
- If my neighbor adjusts his/her plantings or practices to help me grow my IP crop, what can I do to help him/her more successfully produce their crop?

Other Challenges and Considerations

- Some new crop varieties intended for specific new uses may have the potential to affect the functional properties of neighboring crops. For example, some food crops may be engineered to produce novel pharmaceutical compounds and such crops could have the potential to affect the functionality or marketability of neighboring crops for food uses. Although the particulars are likely to depend on the specific circumstances, extra care and stewardship when growing these crops is likely to be required to minimize the potential for economic impacts on neighbors.
- New technologies are constantly evolving for the development of new crop varieties, and different countries may choose different approaches to regulate (or not to regulate) the products of particular technologies. Differential regulation of new products could lead to trade challenges and some new products may be difficult to identify or determine how they were produced.
- Testing is often required for IP products. Depending on what is being screened for and the tolerance levels specified, sophisticated and expensive tests may be necessary.
- Some production protocols can also require third party verification.

Finding Additional Information

Much additional information about IP production and about isolation and buffer distances appropriate for your crop and your environment can be found through your local extension service or Land Grant University. Some additional sources available at the time of issuance of this guidance are:

University of California at Davis guide to isolation distances: http://anrcatalog.ucanr.edu/pdf/8192.pdf

Existing U.S. Seed Industry Production Practices that Address Coexistence:
http://www.amseed.org/pdfs/issues/biotech/asta-coexistence-production-practices.pdf

Indiana Hybrid Corn Certification Standards (Commercial), including isolation distances:
http://www.indianacrop.org/ICIA/Media/ICIA/Certification-Standards/CORN-STANDARDS-2007.pdf

APHIS Minimum Separation Distances to be used for Confined Field Tests of Certain Genetically Engineered Plants. See link under:
https://www.aphis.usda.gov/aphis/ourfocus/biotechnology/sa_guidance_documents

Organic risk management information, including isolation information for corn:
http://organicriskmanagement.umn.edu/ .