TWO PROPOSED FRAMEWORKS FOR AN AC21 COEXISTENCE GUIDANCE DOCUMENT

PROVIDED BY AC21 GUIDANCE SUBGROUP MEMBERS

(Documents are for information only. Framework still under development.)

PROPOSED GUIDANCE FRAMEWORK SUBMITTED TO THE AC21 GUIDANCE DOCUMENT SUBGROUP
BY LYNN CLARKSON

Coexistence

How do we respect farmers' rights to choose their own markets while minimizing conflict between neighboring farmers in an age of growing agricultural diversity? What guidance can we offer to avoid conflicts caused by farmers' individual choices as to the markets they serve? The best management practices common to "identity preserved" programs for seed and food for decades still provide an important foundation for the coexistence plans being considered. However, they leave our agricultural community puzzled as to how to deal with distinctions required by markets segmented by:

- Traits that damage the functional value of neighboring crops (e.g., high amylase corn for the ethanol industry conflicting with the use of corn for processed foods that require specific starches)
- The technological source of seed
  - Traditional cross breeding - acceptable to almost everyone
  - Genetic Engineering (changes made at molecular level) - acceptable to many, not accepted in organics, outlawed or segregated by labeling in many countries and opposed by many
  - Different applications of CRSPR - yet to be determined
  - Other technologies yet to come - unknown
- Purity standards regarding traits that are either absolute or nearly absolute
  - GMO traits not legally approved in the market - zero tolerance (e.g., Vipterra corn in China)
  - GE traits that are approved but not welcome in a particular market - tolerance limited from 5% to 0.1% depending on the market (e.g., official Japanese standard for labeling at 5%, the unofficial commercial standard for many food companies in Japan at 1%, the common standard of Non-GMO food companies in the US at 0.9% and various British grocery chains at 0.1%)
  - Traits that can't be easily screened but must be detected through sophisticated testing
- Differing production protocols that require 3rd party verification and perhaps testing
  - Conventional – IP/Non-GMO
  - Organic
  - Bio-dynamic
  - Yet to emerge

Products from traditional, serious IP programs are sold in almost every grocery store in the US. They bear many similarities no matter the crop or region involved. Almost all include statements regarding:

1. The qualities needed for contract compliance, a discount schedule for imperfections, a bonus schedule for superior quality, a description of the testing protocols and standards to be applied as well as the reasons deliveries would be rejected
2. Isolation recommended to avoid: a) cross pollination by air or insects and b) the drift of chemicals applied to neighboring fields
3. Segregation suggestions to maintain purity in acquiring, handling and planting seed; harvesting, storing and transporting the crop
4. Avoiding harvest and post-harvest damage to the crop
5. Preparing the production field to avoid contamination
6. Cleaning of machinery working on the field to avoid cross contamination
7. Cleaning of equipment used to transport the crop from field to storage and from storage to market
8. Delivery or buyers' call conditions and timing
9. Buyers' rights to inspect the field or crop at any time
10. Requirements for approval by company or 3rd party representatives

An increasing number of IP programs require 3rd party verification/certification that farm production and environmental care meet the buyers' contract standards. Some require a specific isolation or specific behavior while others simply provide the end result sought by the contract and leave the details to the producer signing the contract.

With the advent of GMO traits, these traditional IP protocols run into limitations that challenge their effectiveness. First, these traits have become market distinguishing factors - factors that can't be measured without sophisticated testing. Second, market distinctions often hinge on adventitious presence at levels much lower than traditional for commercial production of almost anything other than seed, and sometimes lower than the levels accepted in seed production. Third, seed purity itself as well as cross pollination and mishandling have become disruptive factors.

Knowledge of Neighboring Crops

It is critical for today's farmer wishing to serve an IP market to know the neighbors' crop, rotation plan and sometimes input plan. The importance of communication between neighbors has become increasing important. Likely situations include:

- Neighbors growing the same crop for the same market, a common situation: There is likely no conflict and no need for either party to adjust behavior.
- Neighbors growing the same crop for different markets: There could be enough potential conflict to justify significant horizontal, vertical or timing segregation.
- Neighbors growing different crops for different markets: There could be enough potential conflict to justify some segregation by both parties.

Good communication among farmers with neighboring fields as to the crop, rotation plan, farming protocol and the specific hybrid or variety being produced has become a key to coexistence. The farmer potentially damaged needs to fully understand the requirements of his market as well as the nature and dimensions of buffers needed to satisfy that market. He also needs to know his neighbors' crops and how they might conflict with his market. The farmer whose choice could potentially damage his neighbors' crops should strive to minimize conflict and liability and help support the golden rule. Often, but not always, conflict can be eliminated or reduced by adjusting rotation plans, seed choices or buffer dimensions. Coexistence would be helped greatly if farmers understood the potential geographic spread beyond their field borders of DNA and inputs being used on their own fields.

Knowledge of the Seed

Seed companies would facilitate coexistence if they were to classify their seed as to trait purity and, whenever introducing a new functional trait, the distance over which that trait can alter the functionality of crops produced on neighboring fields. In the absence of seed purity guarantees as to potentially conflicting traits, farmers might be well served to test seed delivered to their farm before planting. When permitting the introduction of new traits, it would be beneficial for the USDA to require test kits exist for the new trait and that containment data be presented before commercialization.

Testing Technology

In a market world where traits must be tested to be detected, the efficiency of testing becomes increasingly important. Strip tests are reasonably inexpensive and quick enough to keep trade moving smoothly but not yet adequate to match the sensitivity of PCR testing. Improved testing technology that would deliver accurate results more quickly and economically would be helpful. Such improved technology is being developed.

Community Support

PROPOSED GUIDANCE FRAMEWORK SUBMITTED TO THE AC21 GUIDANCE DOCUMENT SUBGROUP BY LYNN CLARKSON, Page 3

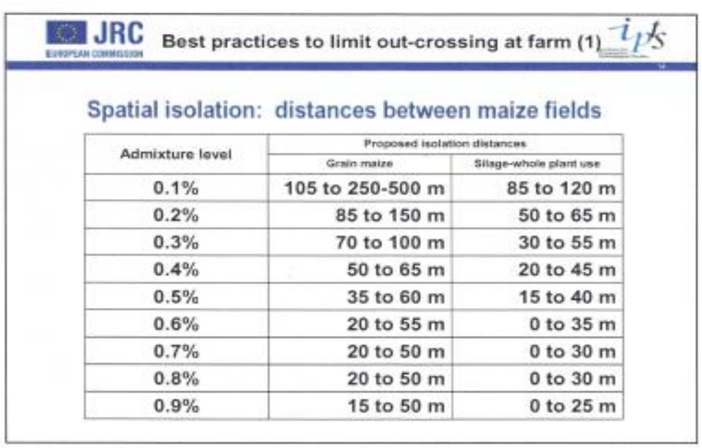
USDA, State Departments of Ag, trade associations and ag schools could facilitate coexistence by supporting messages that sensitize the farm community to the value of respecting differing market decisions with behaviors designed to minimize the impact of a farmer's decisions on land beyond the borders of his fields.

Reaching beyond my desk, I bring the following resources/notes to our committee deliberation:

"Best Practice Documents for coexistence of genetically modified crops with conventional and organic farming" published by the European Coexistence Bureau in 2010 and supplied to me by the director of that agency, Emilio Rodriguez-Cerezo. The document runs 72 pages. I have extracted page 10 below.

http://ecob.jrc.ec.europa.eu/documents.html

We now have three documents related to maize coexistence. The first one is the 2010 paper that you saw on best practices for farmers. Two more recent documents deal with best practices for monitoring the efficiency of maize coexistence strategies and the coexistence between maize and honeybee industry. We have finished a document on the coexistence between GM and non-GM soy, but it is not yet published. - Emilio



Spatial isolation: distances between maize fields

Admixture level	Proposed isolation distances	
	Grain maize	Silage-whole plant use
0.1%	105 to 250-500 m	85 to 120 m
0.2%	85 to 150 m	50 to 65 m
0.3%	70 to 100 m	30 to 55 m
0.4%	50 to 65 m	20 to 45 m
0.5%	35 to 60 m	15 to 40 m
0.6%	20 to 55 m	0 to 35 m
0.7%	20 to 50 m	0 to 30 m
0.8%	20 to 50 m	0 to 30 m
0.9%	15 to 50 m	0 to 25 m

Corn Nuts requires 660 ft. (1/8th mile) from any other corn or three-week planting time differential.

According to the American Seed trade Association (http://www.amseed.org/pdfs/issues/biotech/asta-coexistence-production-practices.pdf), it is the responsibility of the seed company to ensure it doesn't grow seed where it might be contaminated, and at least not use the TWO OUTSIDE ROWS for seed. They also say problems are quickly dissolved through farmer-to-farmer communication. 2011.

Then there is the plant isolation distance table by USDA, which also says 1/8th of a mile for corn.
http://howtosaveseeds.com/table.php#table

Seminis says the isolation required / susceptibility to cross-contamination depends upon the genetics of the IP crop in the field (in this case sweet corn that has different combining characteristics). http://www.seminis-us.com/sweet-corn-genetics-and-isolation/

There is the UC Davis Guide to isolation: http://anrcatalog.ucanr.edu/pdf/8192.pdf which quotes AOSCA standards.

Indiana also quotes the AOSCA standards: http://www.indianacrop.org/ICIA/Media/ICIA/Certification-Standards/CORN-STANDARDS-2007.pdf

Here is a report of (or inclusion of) a study of out-cross occurrence (adventitious presence) based on distance. Table 2. Keep in mind the distance is in meters, not feet. 125 meters = 410 feet, whereas 1/8th of a mile = 660 ft.

http://www.seedconsortium.org/PUC/pdf%20files/27-Managing%20pollen%20drift%20in%20maize%20seed%20production.pdf

Identity preservation is a system that preserves the value of a product throughout its production chain. Farmers use identity preservation to gain premiums when they market specialty crops (such as seed, organic or a particular variety) in order to achieve an agreed upon standard of quality and purity in their harvested product, as driven by the needs of the marketplace. 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. Market incentives balance the benefit and the burden at the farm level.

Identity preservation management practices will be dependent on a number of factors including the crop, the region and the growing environment and can include, if appropriate:

- Intimate knowledge of neighboring crops and the wild plant communities for possible cross-pollination with seed crops;
- Farmer to farmer communication;
- Rotation schemes of crops which reduce pollen exposure from volunteer plants;
- Handling so there is no mixing during planting, harvesting and cleaning operations;
- Temporal isolation for pollen release through staged planting times;
- Field/plot selection and identification;
- Isolation distances, largely based on each crop's reproductive system (self- or cross-pollinated);
- Buffer rows;
- Tracking and recordkeeping;
- Pre- and post-harvest cleaning and inspection of planters, harvesters and other equipment;
- Module markers used in harvest;
- Disposal of plant material as appropriate;
- Designated or cleaned transportation vehicles, storage bins, conditioners and ginning facilities as appropriate;
- Continuous visual inspection and rouging of all genetic stocks to remove off-types and weeds;
- Fields inspections multiple times, possibly by third parties; and
- Post-harvest risk mitigation, such as not harvesting outside rows, if cross-pollination has occurred after planting.