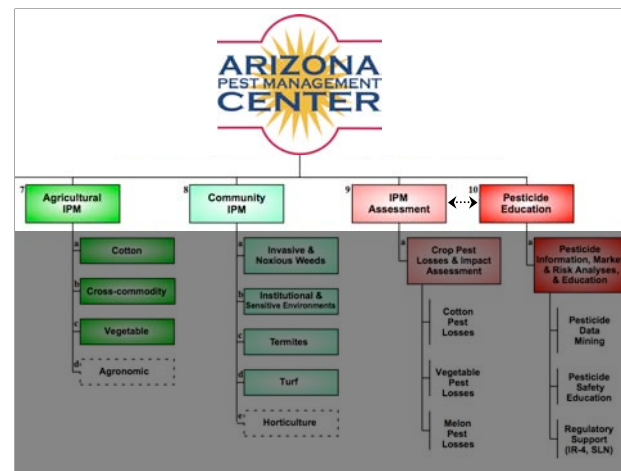
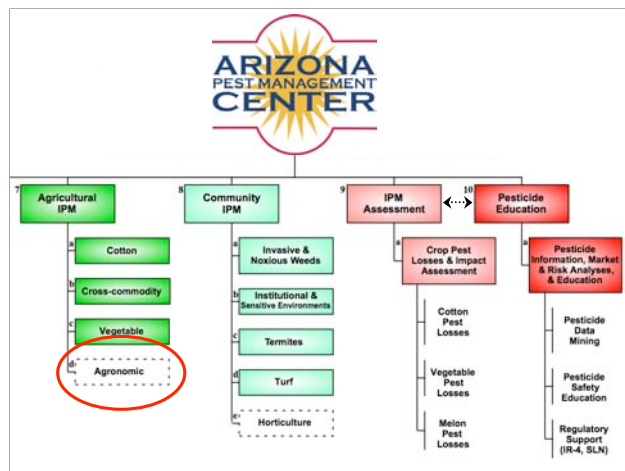


Hi everyone. For those that don't know me, I'm AI Fournier, my title is IPM Program Manager and I work out of the Maricopa Ag Center. I work with our specialists and agents statewide on a variety of projects related to pest management. Today I will talk about our efforts to develop a historical pesticide use (1080) database, provide an update on our progress and describe the potential benefits of this resource to the Arizona agriculture industry



Before I do, I thought it appropriate to review the structure of the Arizona Pest Management Center, the umbrella organization for all of our pest management programs in Cooperative Extension. The APMC is managed by the State IPM Coordinator (Peter Ellsworth) and IPM Program Manager (AI Fournier), as directed by a 20-member IPM Coordinating Committee. This organization manages the IPM program dollars we get from the feds through a competitive process. Our IPM programs are organized around strategic focal areas: Agricultural IPM, Community IPM, Pesticide Education, and a dedicated focus on IPM Assessment, measuring the impact of what we do. Today's talk will focus on some of the work we are doing in these 2 areas of Pesticide Education and IPM Assessment.



Each focal area houses several teams. These are the functional units of the APMC. These interdisciplinary teams work to address clientele needs in development of research and outreach programs around these themes. [Dotted boxes represent relatively newly organized efforts.]

Within Pesticide Education, we've been in the process of developing a complete historical 1080 database that will support data mining for research and evaluation purposes and to support pesticide registration processes, such as IR-4 and Special Local Needs registration process.

Within IPM Assessment, we have active Crop Pest Loss working groups that collect and analyze information about pest losses in cotton, leafy vegetables and melons. Some of you may have participated in the Lettuce Pest Losses or the Melon Pest Losses workshops that John Palumbo and Kurt organize, or the Cotton Pest Losses workshops that Peter Ellsworth conducts.

Pesticide Use Data (1080)

- Over 200 PCAs
- 700 applicators; 40 pilots
- 23,000 applications / year
- More than 320 products
- Over 120 different crops



In AZ, we have over 200 registered PCAs, more than 700 applicators and about 40 pilots. Overall, on average, 23,000 applications are reported of over 300 products applied to more than 120 different crops in Arizona.

Reported Uses (not 100%)

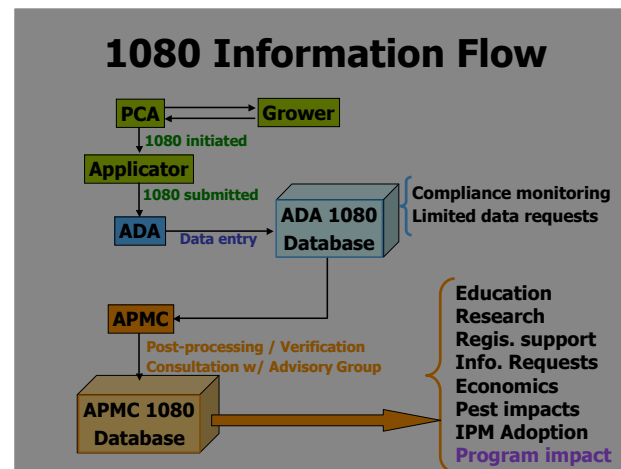
- Custom
- Aerial
- Section 18 & 24c
- RUPs
- Groundwater protection list
- Odiferous pesticides




- **Most states have little or no reporting!**
- **Question: Situations where 1080s are not completed or not submitted to ADA?**

This list shows the types of applications that require reporting to the state. In AZ, we do not have 100% use reporting as they do in CA, so it is important for us to understand what percentage of various kinds of applications are included in the data submitted to the state. Although our data is far from complete, I want to point out that most states nationwide have either no reporting requirements or only a few narrow situations where data are reported and recorded by the state. So Arizona is in a unique position to develop these data as a resource for research, education and to support needs of our agricultural community.

I have a question for the group. I'd honestly like your input on this question. Can anyone think of a common situation where you may complete a 1080 (or not) but where the data would not be submitted to ADA? One that I am aware of is grower-applied herbicides. Any others?



Let's look at the information flow for 1080 data. PCAs, in consultation with their growers, prescribe the use of pesticides by supplying them with a written 1080. This 1080 is also supplied to the applicator who, upon completing the spray, completes the 1080 and forwards it to Arizona Department of Agriculture. ADA enters the data with some initial checking and is responsible for compliance monitoring and enforcement. Maintaining a strict differentiation between regulatory and research/education activities, the data are passed to the APMC where they are post-processed by our database technician and shared with our stakeholder advisory group. This group is critical to guiding the usage of these data and for developing policy on its usage for assessment research and education. Our goal is to close this feedback loop so that rather than information always going in only one direction (i.e., to ADA), we carry back key information to our stakeholders that help us determine program impact and meet other stakeholder needs.

Clientele Benefits

- Defend against spurious claims - food safety, pesticides
- Support opening of new markets (e.g., organic)
- Document compliance, environmental stewardship and reduction of risk
- Justify emergency exemptions, special registrations, IR-4 program
- Justify continued use of valuable chemistries

These are some of the potential benefits to the industry of having these data readily available. With access to this information, we are uniquely positioned in Arizona to be proactive about our agricultural industry, its safety, environmental stewardship, etc.

Registration Support

- Section 18 Emergency Exemptions for:
 - Knack
 - Applaud (Courier)
- Defense of acephate, rates above 0.5 lbs ai
- Defense of endosulfan (2002 & 2006-7)
 - Rates above 0.75 lbs ai
 - Aerial application
 - Open boll restriction (24c)
- Emerging Issues at EPA:
 - Buffer zones & endangered species

These data have already provided great benefits with respect to supporting product registrations and re-registrations in Arizona. For example, when Knack was first introduced, 1080 data along with Crop Pest Losses data helped to support the need for Section 18 emergency exemptions to get make the product available for statewide whitefly control.

1080 data was used to defend the use of acephate at rates over one-half pound AI in Arizona. There has been an ongoing communication between the state and EPA regarding the use of endosulfan. Arizona is one of the last places where this AI is still available at rates above .75 lbs AI and for aerial applications.

In addition to these registration issues, the next big thing at EPA will buffer zones and endangered species act. EPA recently lost a law suit about it's failure to enforce ESA. With these data we are uniquely positioned in AZ to provide specifics that may help us retain safe uses of chemistries that would be otherwise be lost.

Cooperative Extension Benefits

- **Conduct novel research related to**
 - Pest occurrence
 - Pesticide use patterns
 - Economic benefits
- **Measure adoption of practices & technologies (e.g., cross-commodity guidelines)**
- **Documenting NEEDS and IMPACTS:**
- **Lead to funding for Extension programs**
- **Lead to funding for applied research projects**

We also have some "selfish" reasons for investing in the creation of this resource. For one thing, these data can be and have been used to conduct novel research on pest and pesticide use topics, including economic factors. It is a simple matter to integrate economic data on crop prices and pesticide costs to estimate economic benefits of various practices. Similarly, I will show you an example at the end of this talk, where we integrated GIS map information to conduct a geographic analysis of pesticide use. We can measure adoption of specific practices, including IPM strategies. We can document pest occurrence and identify pest problems for which we may have few effective options. It is important in CE to document both the NEEDS of our clientele and the IMPACT of resources and education programs that we develop to address these needed. This is pretty much a requirement now for us to be successful in competitive grants to fund both research and extension efforts.

APMC 1080 Update

- **2001 - 2005 database completed (2008)**
- **Database Specialist hired (Sept. 2008)**
- **1080 Advisory Group formed (Sept. 2008)**
- **First Advisory Group meeting (Oct 2008)**
- **Specialty Crops Block Grant funded (July 2009)**
- **1991 - 2006 data verification, processing ("back end" near completion)**
- **Next Advisory Group meeting: Sept 28, 2009**

The APMC developed a 5-year database of 1080 information for a specific grant project. This initial database was finalized early in 2008. In fall of 2008, we hired a computer programmer / database specialist, Richard Farmer. Richard has been working on expanding the 5-year database to include the complete historical data available from ADA electronically, back to 1991. In Sept 2008, we formed a small Advisory Board to help guide the project. The board includes PCAs, applicators, industry representatives as well as association reps. (I will show you the membership in a few moments.) That group met for the first time in Oct 2008 and provided some very good input about some of the issues involved in making data publicly available. In July of this year, I got word that a Specialty Crops Block Grant I put together will help support some of our database efforts specific to the SC industry. (I'll share some details on that.) Where are we now? We have invested a lot of time this year in post-processing and verifying the historical data. We have 1991 to 2006 currently in database form, without a user-friendly interface for retrieving information. That interface is the next step. I should also mention that we have set up the next meeting of the 1080 Advisory Group and this is scheduled for Sept 28.

1080 Advisory Group

- **Purpose:** Industry / grower / PCA / input
- **Issues:** data integrity, data access, aggregation
- **Current Membership:**

Art Anderson (Valent), Gary Christian (ADA), Hank Giclas (WGA), Greg Hogue (Wilbur Ellis) Jim Kirkpatrick (PCA), Greg Miller (Nichino), Jack Peterson (ADA), John Pew (custom applicator), Joe Sigg (AZ Farm Bureau), Phil Townsend (Sunland Chemical)

UA: Peter Ellsworth, Richard Farmer, Al Fournier, Bill McCloskey, John Palumbo, Russ Tronstad

Specialty Crops Block Grant


- **Expansion of Advisory Group (SC interests)**
- **Become current with 1080 data entry**
- **Routine updating of APMC database**
- **With input from Advisory Board, develop "front end" of database, process for requesting information**
- **Conduct analysis and develop report on safe and sustainable pesticide use by SC industry**


ADA 1080 Update

- ADA entering data, has improved the process with data checks
- Problem with "legals" on 1080 versus grower permits
- Pilot testing electronic 1080 submission (Contact Gary Christian 602-542-0903)
- Catching up on current data entry

I was asked by Jack Peterson to provide an update on the 1080 work at ADA. They have made some significant improvements. First, they have updated the user interface and it is now set up with many checks and balances to greatly reduce data entry errors. Jack asked me to mention to this group that has been an ongoing problem with the legals (township, range and section) listed on the 1080 not matching the legals listed on the grower permit. Since the legals do not match the options available for a specific grower, these 1080s have to be set aside and dealt with on a one-by-one basis. So please, growers, make sure your grower permits are up to date with the correction locations for your fields.


Another development is a pilot version of an electronic 1080 data entry form. This is currently available on the ADA website. ADA would like your input on this form and process. If you are interested in helping out with a pilot test of this technology, please contact Gary Christian. Finally, ADA has made great progress on a data entry backlog. They have been catching up on 2007 and 2008 data, and are getting close to entering data in real time.



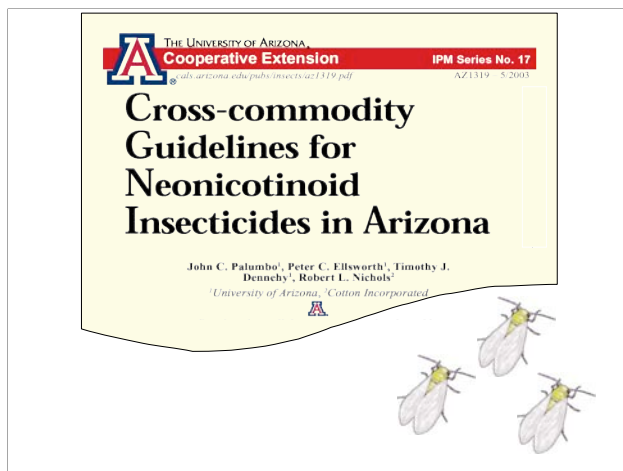


Measuring adoption of cross-commodity guidelines for whitefly control

Peter Ellsworth
John Palumbo
Yves Carriere
Al Fournier



Regional IPM
Competitive Grant



An example of 1080 data usage for spatially measuring IPM in multiple crops.

A few years ago, in a stakeholder process, we developed guidelines for the usage of neonicotinoids, a key class of insecticides used by growers of many different crops. In the old model, our educational effort would end there. Today, however, we are interested in whether these voluntary guidelines, were adopted or not and if not, why not?

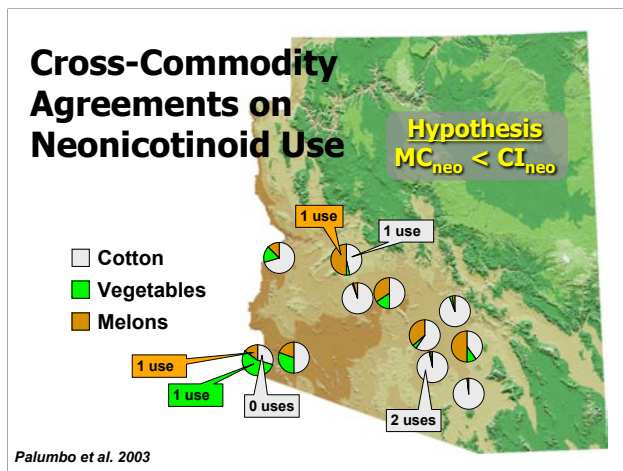
Sharing Neonicotinoids

Neonicotinoid Limitations:
Maximum usage by crop per season*

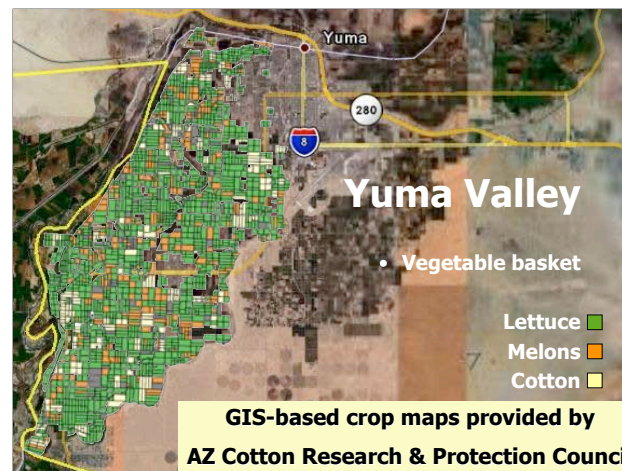
Community	Cotton	Melons	Vegetables
Multi-Crop	0	1	1
Cotton / Melon	1	1	—
Cotton-Intensive	2	—	—

**Seed, Soil, or Foliar*

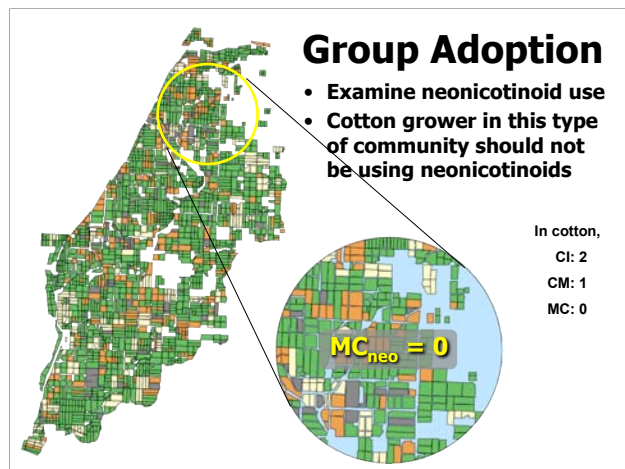
Under John Palumbo's leadership, we developed a stakeholder-driven set of guidelines that, in its simplest form, in essence, restricts neonicotinoids as a class to just two uses per cropping community. In a Cotton-Intensive community, growers of cotton there can use up to 2 non-consecutive neonicotinoids per season, while in Cotton/Melon communities, those two uses are shared between the cotton and melon grower. Perhaps most controversial, in the Multi-Crop community, the cotton growers there forego any usage of this chemical class, reserving the two uses to melon and vegetable growers there who are so dependent on this class for their whitefly control.



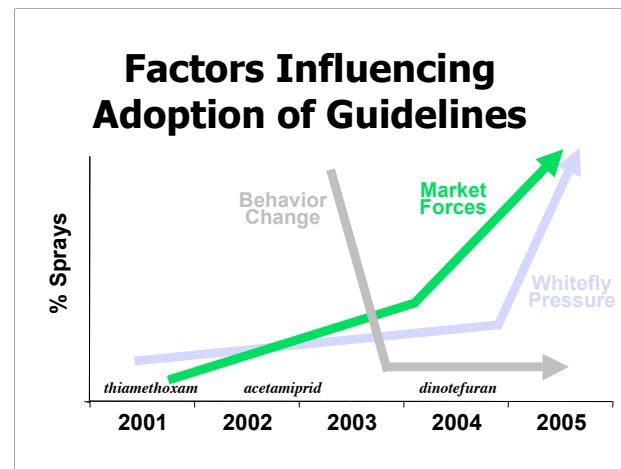
Without delving into the full set of guidelines, they in essence boil down to resistance management suggestions that restrict usage of the neonicotinoid class based on the cropping complexity of the area you are in. Growers of cotton, for example, in different communities have access to between 0 and 2 uses of this class of chemistry. So, cotton growers in Multi-Crop communities should be making less use (if any) of neonicotinoids relative to cotton growers in Cotton-Intensive communities within similar localities (to control for differences in pest pressures).



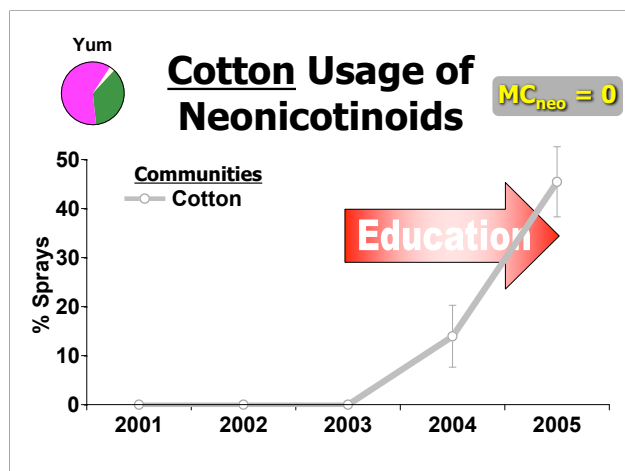
We also have access to detailed GIS-based crop maps statewide as maintained by a cotton-grower agency, the Arizona Cotton Research & Protection Council. Between these two datasets we are able to identify the cropping make-up of each "community". So here we have Yuma Valley, adjacent to CA and Mexico, and an area that represents the winter vegetable basket for our nation. It is a very intensively cropped area made up of cotton, leafy vegetable (mainly lettuces) and melons grown year round. In this sort of community, cotton growers have agreed to forego the usage of the neonicotinoid class because of the inherent risks of year-round usage of this class on all these high value crops.



In this example, neonicotinoid usage by cotton growers within Multi-Crop communities should equal zero. Thus, we have something we can test, as long as we have a comparable spatial system.

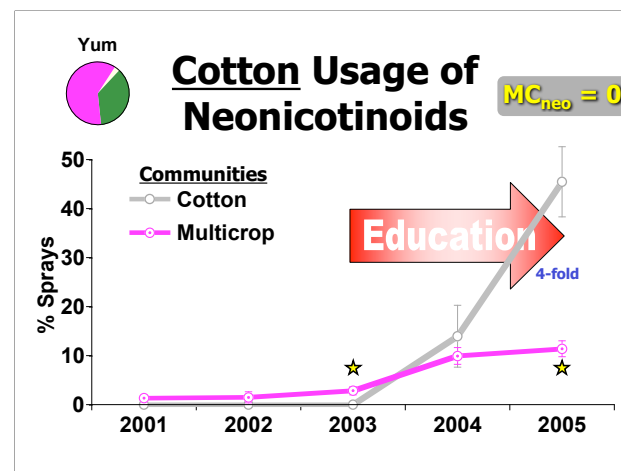


Documenting changes in behavior through time requires a clear understanding of competing forces & inherent change in the system. Market forces (new registrations) push users towards greater usage. In 2001, thiamethoxam was available, but by late 2002, acetamiprid became available as well. Still later (2004), dinotefuran was available to cotton growers. All the while, imidacloprid was available as a foliar spray either alone or in mixture with a pyrethroid. Whitefly pressures also change over time. In our case, pressures were low but increasing 2001-04 until 2005 when whitefly pressures were at a decade high. This pushes usage upward. Our impact on behavior should show some kind of decline in usage as a consequence of deployment of our educational programs for cotton growers in Multi-Crop communities.



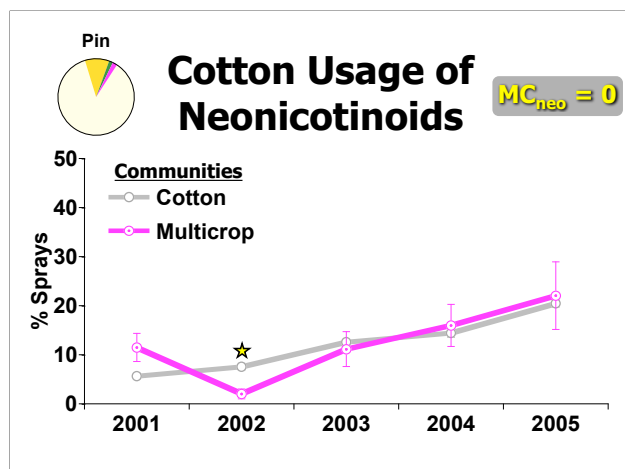
Over this same time period, we can examine the 1080 pesticide use database and measure the percentage of sprays made that contained a neonicotinoid for cotton fields in Cotton-Intensive communities of Yuma Co. These growers should be limited to no more than two non-consecutive neonicotinoid sprays (gray line). Cotton neonicotinoid usage started at 0% in 2001–2003 and increased as acetamiprid use increased, topping out at ca. 45%.

Our guidelines were published in 2003 and our educational efforts were intense to begin with and then re-intensified in 2005 (red arrow).



In contrast, cotton growers in Multi-Crop communities of Yuma Co. had very small usage of this class of chemistry in 2001–2002, and significantly higher usage in 2003. By 2005, the trend was reversed, presumably as a result of our education, showing a 4-fold reduction in neonicotinoid usage in comparison to cotton users in Cotton-Intensive communities.

Of course, the guidelines would have suggested no neonicotinoid usage in Multi-Crop communities. So ca. 10% of the applications made may have been at odds with the guidelines (though exceptions do exist in the guidelines themselves permitting use of neonicotinoids under limited conditions).



The conclusions are quite different as we move to the central part of the state and examine Pinal Co. usage data. Here it would seem that the clientele do not differentiate their usage of neonicotinoids by community type. The reasons for this are unknown at this time, but qualitative analyses of subject interviews should help us understand if this is a problem with the guidelines, perception of spatial dynamics, or perception of risk, among other potential factors. It could be as simple as growers not recognizing they are operating within a Multi-Crop community, for example.

% Sprays (Neonicotinoids), Pinal

Summary

- APMC 1080 database is independent from ADA (regulatory) database
- In AZ, we are positioned to be proactive:
 1. Support information needs of growers, PCAs and Ag industry
 2. Meet EPA requests for re-registration support
 3. Measure changes in pests and pesticide use patterns, IPM adoption
 4. Document benefits and impacts of extension programs to the industry

In summary, the APMC 1080 database is being built with stakeholder input from the agricultural community. We are interested in your comments and suggestions. Our database is distinct in form and function from the ADA database. It is not for regulatory use but for research, education and evaluation purposes, as well as to support the information needs and pesticide registration needs of the agricultural community.

I hope I have demonstrated by example how such a database can be used to help document the needs of the agricultural community and the adoption and impact of specific management practices, such as the cross-commodity guidelines. Ultimately, we can measure IPM adoption and potentially adoption of other pesticide use practices related to Pesticide Safety Education Programs. Documenting the impact of our work is an issue of accountability as well as stakeholder interaction, where more and more demands for transparency and two-way flow of information are expected.

Thank You!
More on the Web!

Arizona Pest Management Center:

- cals.arizona.edu/apmc

Arizona Crop Information Site:

- cals.arizona.edu/crops/



For more information, please visit these APMC resources.