By Jonathan Dixon
Research Program Director

Production Research:

Where is the Commission Program after Three Years?

Over the past three years a great deal has changed in the way the California Avocado Commission approaches its investment in production research.

The Production Research Committee (PRC) has a different form, most notably it is smaller in size, and is analyzing research proposals and active projects from a perspective that is based on strategic needs and for increased returns to growers. It has taken some time to bring about a change in the philosophical approach used by the commission to determine how to get the best value from the production research budget. The last three PRC meetings have reflected this new approach where the committee members' discussions on research proposals have included both the merits of the project from a scientific point of view, and the wider implications of addressing industry issues and how the research would impact growers.

Investment in production research does not usually result in an immediate increase in grower profitability. Rather, production research is an investment in the future that will result in increased profitability down the road. A well-managed production research program can lead to substantial improvements in productivity and a reduction in the costs of growing as well as provide the necessary technical support for marketing messages and better quality through the supply chain. Investment in production research is needed to keep the California avocado industry's productivity increasing over time and avoid industry stagnation.

The other very important reason to invest in production research is to overcome crises that could result in the elimination of avocado growing in California. The most obvious example is when a pest becomes established in California avocado groves reducing yields or quality, and grower incomes.

By viewing production research as an investment in the future it becomes clear that determining which industry issues need to be addressed, accountability standards, and measures of success should be the same as those used when making other business decisions. Since the objective of CAC's production research program is to increase California avocado growers' profitability, the impediments challenging the industry define the strategic technical imperatives. The imperatives defined in 2011 by the CAC Board — a grower driven research management system, effective grower education, increased average per-acre production, achieving and sustaining critical industry mass, and maintaining a premium quality product — have been a consistent reference point for the PRC when evaluating research proposals.

The process for technical investment was described in the Summer 2011 issue of *From the Grove*. Since then, experience using the system has resulted in modification where concept proposals have been removed as an unnecessary extra step and the requests for proposals have become more specific in identifying the high priority topics set by the PRC.

The focus of the research program is on information needed to ultimately improve yields and recognizes that it is important for the commission to support grower profitability. In the current fiscal year there are 21 research projects, all of which are designed to increase average per-acre production. The imperatives on quality, critical mass and education are addressed by one project. The research to increase average per-acre production can be further broken down to 11 projects seeking better pest and disease control, five projects for better management, three plant breeding projects and two salinity projects.

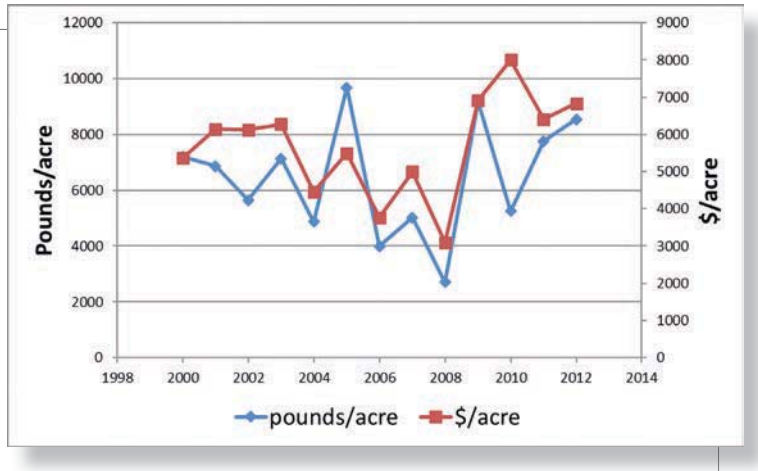
A challenge for any research program is to measure the impact of the research, specifically, whether the research is achieving the imperatives. Measuring the return on investment of research is not easy. Very often the changes to growing practices resulting in increased yields are not the result of the findings from recent research projects, but are the accumulation of findings from a number of research projects over time. This makes it very difficult to assign a return on investment against a single project. To measure the effect of production research on meeting the imperatives key performance indicators can be used to set the benchmarks for evaluating change. A key performance indicator for the imperative "increase average per-acre production" could be average industry yield over time. Another measure of success may be to evaluate changes in the costs of producing avocados. For example, costs for particular grove manage-

ment activities could go down or at least stay the same to indicate the research investment is meeting the imperative.

One approach to evaluate the research imperatives is to look at changes in industry statistics in the past few years and to look at how costs of producing avocados have changed over time through studies on the economics of growing avocados. While not ideal sources of information, they appear to be the best available.

Average per-acre production has increased in the period 2009-2012 to 7,682 pounds per-acre from 5,347 pounds per-acre in the preceding four years 2005-2008. It is possible that yields declined on average from 2005-2008 due to a drought in California. However, the 2009-2012 average yield is greater than the average yield for the four years 2001-2004 of 6,128 pounds per-acre. The average income per-acre also has increased in the four years 2009-2012 to $7,038 per-acre from $4,338 per-acre in 2005-2008 and $5,749 per-acre in 2001-2004. While there is still some way to go to reach an average production of 10,000 pounds per-acre, the trend is positive and appears to be somewhat sustained which may suggest the emphasis of production research on yield and increased outreach effort is having a positive effect.

In the Summer 2013 issue of *From the Grove*, Tim Spann and I reported that in the 2011 UC Davis avocado establishment and production cost study, the cost of pest control in 2011 averaged $169 per-acre less than in 2001 (the full reports are available on the CAC website under the yields/productivity tab of the research library section). For 55,000 acres this is a savings of $9.25 million in 2011 to California avocado growers compared to the spending on pest control research of about $4,000,000 from 2001 to 2011. The decrease in average pest control costs has come over a period of inflation and in the face continued introduction of new pests and therefore represents a good return on investment.



Average yields, pounds per-acre and income in dollars per-acre for California avocados.

There are a number of challenges facing California avocado growers, some of which require solutions in the short-term and others that are longer-term in nature. Over time the production research program will likely put increasing resources to the issues of salinity and root rot, new pest response and control, more efficient use of labor, and information to support branding and sustainability in the marketing program.

One way to do this is to implement systems that give up-to-date information on important markers like fruit size or maturity that will affect growers harvesting decisions and the perception of availability of fruit for the retail buyers of avocados. Utilizing "feedback systems" to provide information to help grower and handler decision making should be the next step in the continued development of a modern Californian avocado industry. These information systems are now feasible as new technology makes it possible to use the internet inexpensively and simply in the field.

The development of research findings into useful tools or systems is sometimes difficult to visualize. Bringing knowledge to the grower is where the most significant gains can be made in achieving real change in cultural management on the grove. Essentially, the principle the research program uses is, "Research is of no real value if growers don't have the opportunity to use the information."

This means that greater effort in education through outreach and the implementation of systems that increase production efficiency is needed. Integrating outreach into research projects has been a strongly desired goal of production research projects and is now an important part of proposal evaluation and assessment of project outcomes. For this reason research proposals now include a description of how the information generated from the research will be used and if the research will complement other research projects. An effective grower education system remains a work in progress at CAC but has improved through the quarterly publication of a grower magazine, news in The Greensheet, fact sheets, an updated website including online classes and support of the California Avocado Society seminars, field days and grower discussion groups. Yet to come are the decision support tools that will utilize specific grove information to monitor and predict grove profitability. A valuable way to get research projects to be more closely aligned with making a difference on avocado groves is to decide what tools growers need and then conduct the research to develop those tools. This places outreach needs first in the evaluation of research proposals and is where further development of the commission's investment in production research is needed.