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Research Brief

Learning Pathways in Viticulture Management

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Issue

Managing a winegrape vineyard, like any agricultural enterprise, is a knowledge intensive activity. Winegrape growers learn about vineyard management by accessing a wide variety of information resources. The available information can directly influence vineyard management practices, which ultimately impacts environmental, economic, and social outcomes. This research brief focuses on two issues. First, grower perceptions of the usefulness of a number of different information resources growers. The information resources measured include personal experience, interpersonal relationships, outreach by local agricultural institutions, and published materials. Second, we also take a novel approach and analyze the knowledge sharing network of growers and outreach professionals to estimate which types of individuals are most central in this network. This analysis can help inform the outreach and education efforts of local agricultural organizations, like the Lodi Winegrape Commission (LWC), which plays a critical role in the local knowledge system. The research also provides insights into learning pathways within agricultural systems more generally. Our region of study was Lodi, CA, which is one of Californias oldest winegrape growing regions and is home to an estimated 500 growers managing 100,000 acres of winegrapes.

Key Findings

Personal vineyard management experience and personal relationships among growers and outreach professionals are the most frequently used and useful information resources among Lodi winegrape growers. Growers who are also outreach professionals (for example: vineyard managers or Pest Control Advisers (PCA)) are the most central individuals in the network, and thus are likely the most important information providers and are most familiar with the vineyard management challenges faced by the local grower population. At least in Lodi, the County Farm Advisor continues to be a highly used resource, and reflects the continuing importance of traditional outreach and education programs.

Management Implications

While agricultural outreach and education programs commonly focus on sharing technical content, our research highlights the social processes by which sharing this content is made possible. The central role of the county farm advisor suggests that traditional outreach and education programs provide a lasting basis for learning about viticulture management. However, the importance of growers who are also outreach professionals suggests that more decentralized approaches are also important. Cooperative extensions model of outreach and education is, at least in theory, top-down. Knowledge is created by university research and the County Farm Advisor delivers this knowledge to growers. Rather, we find that generation of viticultural knowledge is heavily reliant on personal experience and is shared through the grower community through knowledge sharing among growers and outreach professionals. We suggest that local outreach programs like the LWC and cooperative extension capitalize on the social nature of the knowledge system by actively cultivating knowledge sharing among growers and outreach professionals, rather than merely acting as broadcasters of information. It is particularly important to support and further strengthen the connections among growers and outreach professionals at the center of the network. These individuals are the core of the knowledge system. Also important is to ensure that the cores knowledge is shared with less connected individuals at the periphery of the social network. This can be achieved through outreach and education programs focusing on relationship building. We expect that effective cooperative extension farm advisors have already learned through experience the importance of leveraging the knowledge network. We suggest that the job descriptions of outreach professionals be adapted to explicitly include managing social networks with the ultimate aim of maximizing the benefits of social learning.

Methodology

The data comes from a mail survey and follow-up telephone calls of winegrape growers in Lodi, Cal-

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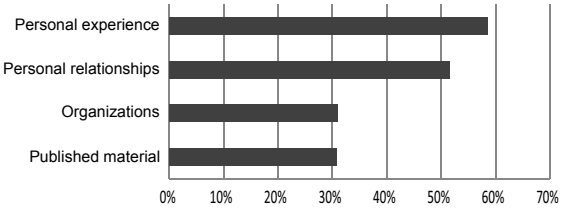

Figure 1 – Average percentage of growers ranking information resource categories as "very useful".

ifornia. The survey was sent to all growers listed by the 2009 Pesticide Use Report provided by the San Joaquin County Agricultural Commissioner Office. The survey collected a total of 210 responses with an overall response rate of 49.42%. We measured whether 29 different information resources were used, and for those that were used we measured their perceived degree of usefulness. The response options for each information resource were "never used", "not useful", "somewhat useful", and "very useful." Network information was collected by asking respondents to list the names of up to four other growers and four outreach professionals with whom they communicated and shared knowledge about viticultural management during the past year. Outreach professionals were categorized by job type based on information provided by survey respondents cross referenced with Internet searches.

Detailed Results

Usefulness of information resources. Figure 1 reports the average percentage of growers ranking information sources as "very useful" within four categories: Personal experience, personal relationships, organizations, and published materials. A majority of growers (58%)reported personal experience as their most useful information resource; second were personal relationships (51%). Learning about vineyard management is driven by grower engagement in the "hands on" practice of winegrape growing itself and by participating in a knowledge network with other growers and outreach professionals. To provide a more detailed breakdown within each category, Figure 2 reports the percent of growers who reported each individual information resource as being "very useful" and as being "never used." The top ten ranked "very useful" information resources include observations of growers own vineyards (82% of growers), PCAs (73%), trial and error experiences in ones own vineyard (59%), County Farm Adviser (58%), winery representatives (56%),

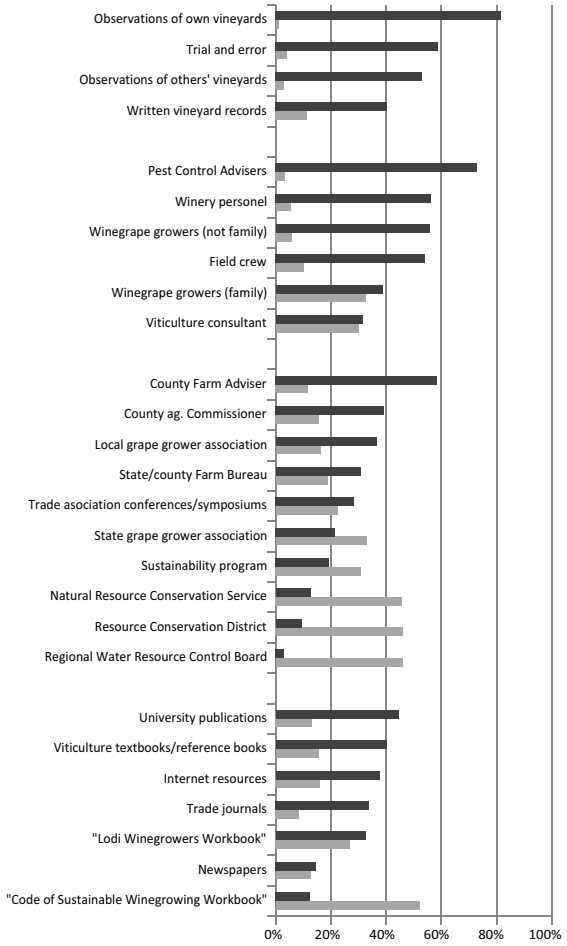

Figure 2 – Percent of growers rating information resources as "very useful" (dark grey) and as being "never used" (light grey).

other winegrape growers who arenot family members (56%), the growers field crew (54%), observations from other growers vineyards (53%), university publications (44%), and written vineyard management records (40%). From among this ten, only university publications fall outside the category of personal experience and personal relationships. There is also a clear negative relationship between "very useful" and "never used," which suggests growers tend to return to information sources they find initially useful and abandon those found not useful.

Position in the social network. A growers position in the social network can affect his or her ability to access and spread viticultural information. Individuals who are most "central" in the network have the greatest potential to be aware of others opinions and insights about viticultural management because they

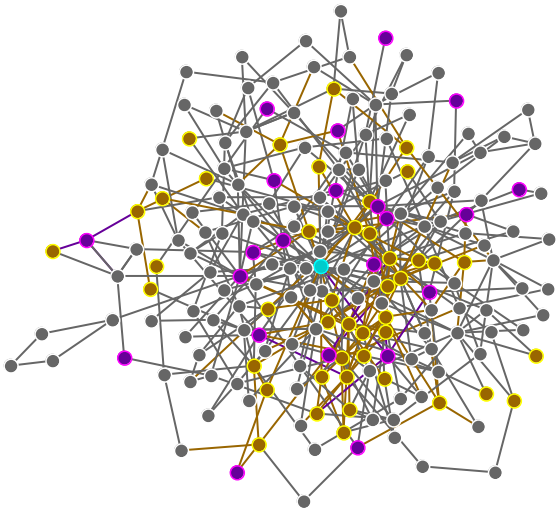

Figure 3 – Conceptualization of Lodi's social network of knowledge sharing. Aqua: CE farm adviser, Orange: grower + outreach, Purple: outreach, Grey: grower.

are in communication with many others. They may also be able to rapidly spread information through the entire network because they are connected to others who themselves are connected to many others. We calculated each individuals centrality in the network, thereby quantifying their potential to access and spread information. We summed two measures of centrality: one based on the number of connections an individual has and the second based on how many connections an individuals connections have.

Figure 3 visualizes Lodi's knowledge network, where points represent individuals and lines represent communication and knowledge sharing. Individuals who have higher centrality scores are physically located closer to the center of the network diagram. Visual inspection of the network diagram yields insight into which individuals and groups are most central or potentially best positioned to access and spread viticultural information. The County Farm Adviser (aqua) is very centrally positioned. Individuals who are both growers and outreach professionals (organge) strongly tend toward the center so we see a higher density of these individuals in the middle of the network. Those who are exclusively outreach professionals (purple) also tend inward but to a noticeably lesser degree. In contrast, individuals who are exclusively growers (grey) are concentrated just outside the networks center and also make up the majority of the peripheral individuals.

Figure 4 compares the average centrality scores of

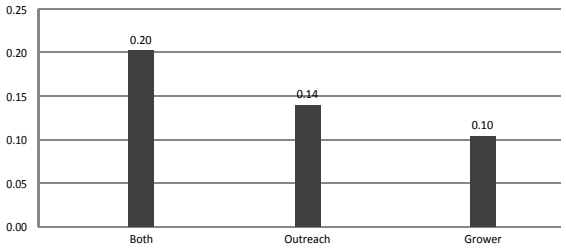

Figure 4 – Average centrality scores of the three categories of individuals.

the three categories of individuals, and shows that growers and outreach professionals score higher than those who are exclusively growers or exclusively outreach professionals. These individuals are unique in that they not only communicate across boundaries between outreach professionals and growers but also work in both. Their professional experience as viticultural "experts" and their practical experience as growers means that they might be the richest resources of viticultural knowledge. This characteristic, in combination with their high degree of connectedness to the rest of the network means that they are well positioned to spread their knowledge.

Figure 5 shows average centrality scores by outreach category. Among those who are both growers and outreach professionals we found that the County Farm Adviser is by far the most central individual. This suggests that the Farm Adviser is positioned to have a good awareness of growers information needs and has the ability to rapidly spread information through the entire social network. While this finding is not surprising considering that County Farm Advisers have traditionally served a very important role in agricultural outreach and education, it is a reminder that the land grant university and the cooperative extension system continues to be a powerful actor in the agricultural knowledge system.

Future Research Directions

The research reported here is only from Lodi, California. We will be conducting grower surveys in Napa County and the Central Coast in Winter 2011-12. The data from other regions will allow regional comparison of the structure of learning pathways. The research reported is also a snapshot in time of the social network and use of information resources. How grower participation in outreach and education programs influences the evolution of social networks over time and the consequences on adoption of vine-

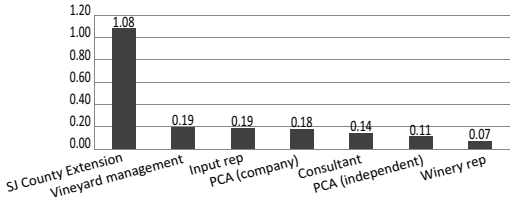

Figure 5 – Average centrality scores by outreach category.

yard practices is a question that has yet to be addressed. Future research should partner with agricultural institutions providing outreach and education programs in order to test the effects of outreach and education programs on improving the capacity of social networks to facilitate grower learning.