

# Growers using water efficiently

By NANCY BARR

If Pajaro Valley farmers used no more water than their crops needed, the water savings would be minimal, according to a study recently completed by the UC agricultural extension service.

The three-year study performed under the direction of Charles McNiesh at the ag extension office was funded by the Environmental Protection Agency at the request of the Association of Monterey Bay Area Governments (AMBAG).

"The project was designed to see if irrigation efficiency would save water," said Farm Adviser Norm Welch, who worked with McNiesh on the study. But Welch said he and the head of the Watsonville ag extension office, Ron Tyler, had doubts from the beginning that local growers could save much water by changing their irrigation practices.

"The growers know what they're doing," Welch said.

Welch, McNiesh and Tyler discussed the results of their study Thursday afternoon, explaining that their study is the first in more than 30 years to examine water usage in Pajaro Valley agriculture. The study shows that the amount of water used today per acre of crop is pretty much the same as it was in the late 1940s, McNiesh said.

McNiesh's study, called the Pajaro Valley Irrigation Project, involved approximately 100 growers. Tests were conducted in a variety of Pajaro Valley fields, orchards and greenhouses in an effort to determine how much water the crops need, how much water is being applied and how efficiently local crops are being irrigated.

Experiments showed that most growers are using more water than they need to, but not much more.

"For most crops in the valley, irrigations are very efficient," McNiesh said. "It would be hard to see any area where efficiencies are higher than here."

The study shows, for instance, that lettuce needs five acre-inches a year of water per planting. (An acre-inch is the amount of water it would take to cover an acre of land with water one inch deep.)

Average applied water and gross irrigation efficiency for major crops grown in the limited recharge zones.

Crop	Average Applied Water Per Crop (acre-in.)	Gross Irrigation Requirement (acre-in.)	Approximate Gross Irrigation Efficiency (%)
Lettuce	11	9	80
Cauliflower	17	14	80
Celery	24	19	80
Artichokes	12	11	90
Apples	8	14	--
Strawberries	20	17	85
Bushberries	18	17	95
Greenhouses	42	37	90

The five inches is the amount of water that must reach the crop for it to grow to optimum size and quality.

However, some of the water applied to a crop is lost through evaporation, leaching into the soil and through poor distribution of the water, particularly where a furrow irrigation system is used. Accounting for those losses, McNiesh figured nine acre-inches of water actually need to be applied to lettuce to assure the crop receives the five inches it needs.

McNiesh took measurements of the water usage at a number of farms in the valley and discovered the average lettuce grower is applying 11 acre-inches of water, in effect wasting two acre-inches of water per crop.

Considering that many lettuce growers plant two successive crops on the same field in one year, each grower could save approximately four acre-inches of water per acre per year, McNiesh said.

Multiplying the savings per acre by the number of acres planted in lettuce gives a total savings of 1,449 acre-feet of water per year.

Similar results were obtained from tests on other row vegetable crops and on strawberries, showing most growers are using more water than they have to.

However, tests in apple orchards showed the opposite. Most apple growers in the Pajaro Valley are not irrigating

their orchards enough. The average orchard needs 14 acre-inches of water per acre each year, McNiesh said, but the average grower is applying only eight acre-inches a year.

"Underirrigation can cause reduced fruit size at harvest," McNiesh said, "but we can't say it happens in every orchard."

Adding up the water savings possible if row crops were not overwatered and the subtracting the additional water that would be used if apples received as much water as they need would provide a total water savings of 1,577 acre-feet a year. However, McNiesh said, that doesn't mean the Pajaro groundwater basin overdraft — estimated at between 6,000 and 18,000 acre-feet a year — would be decreased by the same amount.

To figure the savings on groundwater, he said, whether fields and greenhouses are located in recharge areas must be taken into account. A recharge area is an area where water seeps into the ground and eventually reaches the groundwater basin, thereby replenishing the underground water supply. Different soil types in the valley determine whether the water will seep into the basin.

Excessive watering in in areas where the water does not recharge the groundwater basin is considered wasted, because it runs off into ditches along the

fields. Excess irrigation in areas where much water does seep into the basin is not considered lost, because the excess will be "recycled" by seeping right back where it came from.

Figuring how much of the water seeps back into the groundwater supply, McNiesh calculated that if local growers could attain 100 percent efficient irrigation, 1,982 acre-feet per year would be saved in the groundwater basin.

But, he said, it is not realistic to expect growers to ever reach 100 percent efficiency.

"Perfection is hard to achieve in anything," McNiesh said. "If you achieve 80 percent efficiency in irrigation, you feel satisfied.

"It's also to the growers' advantage to apply more water. It's only fair to expect them to err on the side of being too wet," he said, because the price they pay for underwatering would be a smaller or lower-quality crop.

McNiesh's study showed Pajaro Valley growers are achieving between 80 and 95 percent efficiency in irrigating their crops (see chart).

The main reason growers are efficient, McNiesh and Welch explained, is that their crops are more susceptible to disease if they are overwatered, and it is harder to prepare the soil for a second crop after the first one is harvested if too much water has been applied.

The quality of the crop is the biggest incentive to growers to apply the proper amount of water, McNiesh said, because the financial incentive in using less water is not that great. Since growers have their own wells, they are paying about \$20 to pump an acre-foot of water, but do not have to pay for the water itself.

The findings of the study will soon be published, Tyler said, and the information will be made available to growers who may be interested in improving the efficiency of their irrigation schedule.

The results of the three-year study lay to rest the contention that growers could save a great deal of water if they irrigated more efficiently, Welch said, and they show that a change in irrigation practices "are not a solution to the valley's water problem."