

The Meko Family Making Casa del Agua A

by Mike Shannon

A year ago, the day-to-day household tasks of bathing and dish-washing held little significance for Linda Dobbyn and her family.

Now, when she or her husband, pulls the stopper to drain the bath of their 2-year-old son, another step begins in a research experiment designed to conserve a precious natural resource—water.

Dobbyn, her husband, David Meko and their son, Matthew, are residents of Casa del Agua, a Tucson house designed to demonstrate and test water and energy conservation methods.

Each time a member of Dobbyn's family bathes, washes dishes or clothes, the water they use is monitored, filtered and stored for appropriate re-use.

- Matthew's bath water will irrigate the landscaping.
- A load of laundry will provide water to flush the toilets.
- Showers will supply water to the evaporative cooler.

A graduate student and teaching assistant at the University of Arizona, Dobbyn, 31, is working on her master's degree in planning. She will use the family's experience at the house as the basis for her thesis.

"I'm not really in a scientific field," Dobbyn says. "But I decided to go for it and just apply (to live at Casa del Agua) anyway."

The project's director selected them, she says, "because we are a family with a child and represent a normal household."

Family life at the 3-bedroom house at 4366 N. Stanley Place is unconventional.

"It's quite a bit different (from living in a traditional family setting)," Dobbyn says. "The research part of it requires the most work.

"We have to monitor everything; read all the meters, take measurements and get temperature readings. I mean it (meter reading) really gets on your nerves. You have to come home



every day and go out there and do these things.

"Dave actually does all the meter reading. He kind of competes with himself, day-in, day-out. He times himself. Actually, he's devised all these neat systems so it's faster. He's got it down to a swift 10 minutes, and there's a lot to do."

Meko, 36, a research associate with the Tree Ring laboratory at the UA, says he enjoys his role at Casa del Agua.

"I like the idea of the experiments going on," he says. "They add a little bit

of spice and interest to what's happening. ...How many fish (that live in the water filtration tanks) are going to die today and what's going to work and what's not."

Kenneth Foster, director of the project and the UA Office of Arid Lands Studies, says Casa del Agua is unique.

"I am really not aware of any other strictly water-related house anywhere," Foster says.

The concept of Casa del Agua grew out of a research project between Foster's office and the City of Tucson.

Home



MIKE SHANNON

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“It began with demonstrating water-harvesting techniques in Avra Valley,” he says. “Tucson Water (the city’s water department) then expressed an interest in demonstrating how water conservation and re-use techniques could be applied at an urban level.

“From that suggestion by Tucson Water, we have gone forward to bring this project into reality.”

Foster estimates the total cost of Casa del Agua at between \$75,000 and \$100,000.

Its primary goal is to educate the public about water and energy issues and to demonstrate water and energy conservation techniques. Another goal, he says, is to evaluate the system’s cost, practical application and effectiveness.

Casa del Agua, a single-story, adobe-brick house was built in the 1950s. The task of redesigning the house began in 1983, and was completed in September 1985. Dobbyn and her family moved in last November.

The house has been retrofitted with a series of experimental water

conserving systems. The modifications include:

- Architectural changes, such as the addition of a greenhouse that provides passive solar heat to the home, area for a vegetable garden and storage for water-metering and filtration systems. The roof area has been increased by extending the eaves to provide shade and increase the surface to collect rainwater for re-use. Water-saving devices include low-flow shower heads, faucet aerators, and low-water-use toilets.

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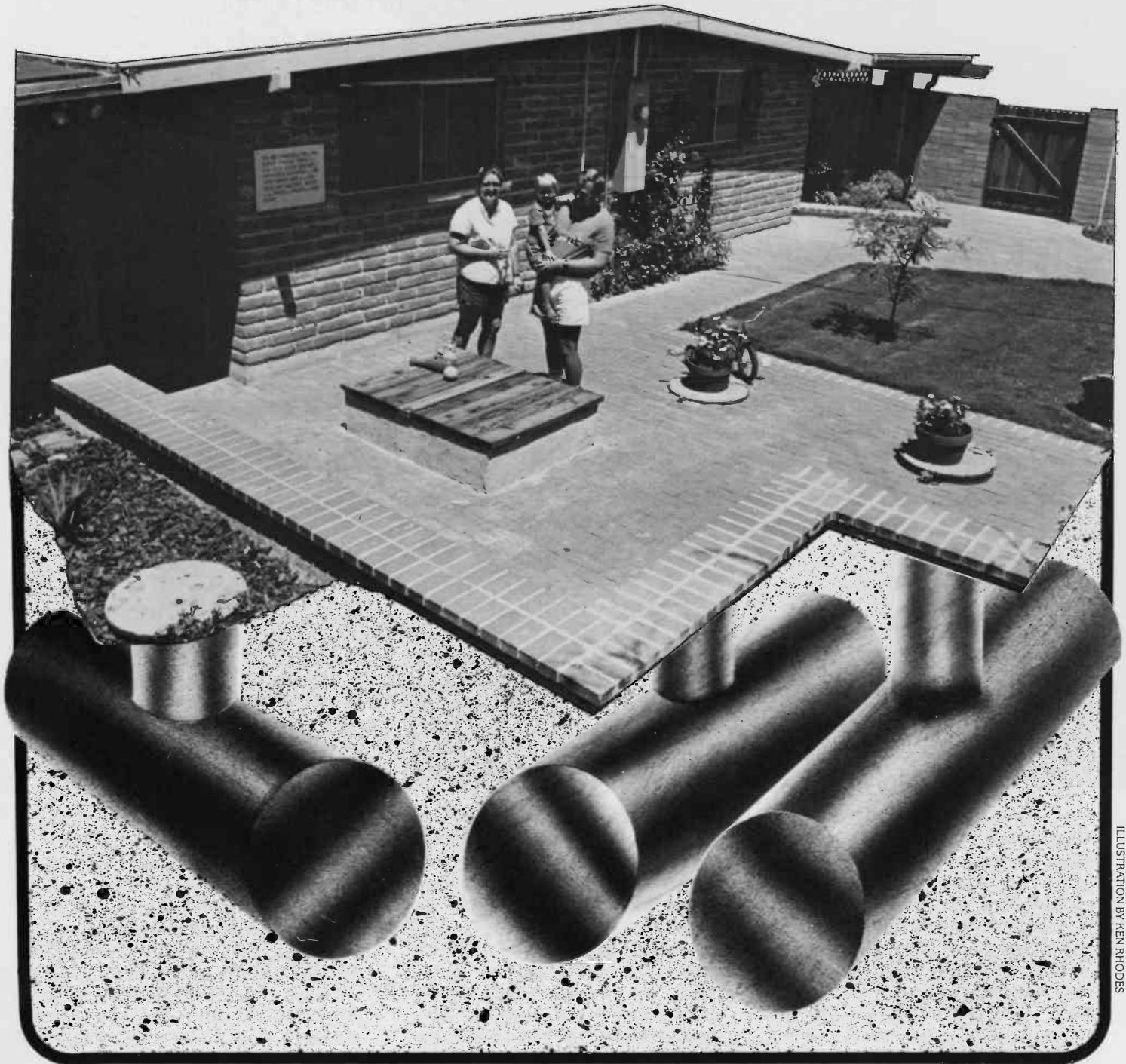


ILLUSTRATION BY KEN RHODES

A brick patio and planters cover the three buried water storage tanks. One 800 gallon tank(left) stores gray water while the other two provide storage for up to 14,000 gallons of collected rainwater.

- The landscaping incorporates drought-resistant plants in areas of prolonged sunlight. Sloped, brick paving and contouring of the yard direct rainfall to vegetated areas. Vines and trellis have been planted for additional shading.

- Three huge tanks have been buried underground to provide storage for rainwater and gray water (water from showers, hand washing, laundry, etc. that is free from heavy organic waste). The gray water provides two-thirds of the water needed for irrigation, evaporative cooling and toilet flushing.

In addition, the house's drain, waste and vent systems were modified. The toilets' waste lines and the kitchen's garbage disposal have been rerouted to carry organic waste directly to the city sewer line.

Gray water is generated by the washing machine, tub and shower and one side of the kitchen sink. The home's existing drain system directs the gray water into treatment tanks to be filtered by two systems.

One is a commercially available mechanical system that uses a cartridge filter and settling tank to upgrade the quality of the gray water. The other is a biological filter or aquaculture tank filled with water hyacinths to help break down contaminants.

Although the aquaculture tanks provide an attractive method of water purification, the simple system of using fish and flowers is not without its problems—like mosquito breeding grounds.

"They (mosquitos) were laying eggs in the tanks," Dobbyn says. "As a means of controlling this we introduced Tilapia (fish) into the them. However, the fish are sensitive to cold temperatures. If the water gets too cold they just die.

"Odor from the tanks is another problem. In warm weather they smell pretty bad." Some of the conservation systems are experimental, Dobbyn stresses.

Foster says annual water use by Dobbyn and her family will be less than half that of a family of similar size, in a standard house.

Figures supplied by the UA Office of Arid Lands Studies predict the annual water-use savings at Casa del Agua will be about \$164 after the first year.



Water hyacinths in a tank along the south patio help to break down contaminants in the stored gray water.

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- Faucet aerators cut water use by almost 50 percent, saving \$26.52.

- Water-conserving showerheads reduce water flow by about 40 percent, saving \$85.67.

- Low-flush toilets use from about 30 to 80 percent less water (depending on the type) than conventional toilets, saving from \$22.10 to \$51.88.

These estimates are based on water, sewer, and energy-bill (gas and electric) savings.

Besides gathering data from the home's metered water systems, the

family hosts an endless stream of workmen and researchers. Dobbyn conducts public tours of Casa del Agua each Sunday.

"It's not just the tours that make the house a real public fish bowl type place," Dobbyn says. "It's the people who come by all the time who have to work on the project."

Meko said, "there are always people coming by and experimenting with something. Putting something in or taking something out. It's more like an apartment complex because of this than a house. There are people on the grounds all the time."

Although the Sunday tours restrict the family's ability to travel or make other weekend plans, Dobbyn says sometimes they can be amusing.

"I've felt funny sometimes," she says. "When I have a half-dozen people in the information room (a reception area attached to the house with a door leading into the kitchen) watching the demonstration video...I sneak back in the house. Maybe I'm eating a peanut butter and jelly sandwich and they peek in. It's just kind of an odd feeling.

"Or I'm trying to discipline Matthew for throwing his orange juice on the floor and he's in here screaming and they're out there trying to watch the videotape. That's always humorous.

"Then there was the Boy Scout troop that came through and found all the mosquito larva (in the water filtration tanks) and said 'boy have you got mosquitos in there.' That's when we realized we had better get some fish in there (to feed on the larvae)."

Soon Dobbyn will begin to sort through the family's experiences at Casa del Agua for her master's thesis.

The family has a one-year contract with the UA. They have the option to remain at Casa del Agua for a second year.

"As far as staying here another year," Dobbyn says, "we'll just have to wait and see."

Dobbyn and Meko say their experience at Casa Del Agua has made them more aware of the need to conserve water.

"When we move into a normal house," Dobbyn says, "whether we decide to do anything with it (installing water conservation systems) or not, this water awareness will definitely carry over." **Lp**