Garden Summary
(best of my garden experience and theories)

Water containment beneath

I have experienced a big reduction in the amount of water needed when a waterproof membrane was buried three feet or more below a garden surface. My best actual data is a photo of weeds at least five times taller over such a membrane, within a patch of ground left completely unattended for a season. Beyond this, I have found a suspiciously significant difference in poorly watered plants grown in similar membrane experiments.

For a photo-documented summary of experiments to date, see
http://technosmith.com/contents/03040-captive%20water%20table.pdf

In the largest of these experiments I suspect that there might be a leak, but I have no intentions of looking for it if such exists. Considering the tons of earth removed and replaced – along with the nagging possibility that it may not be a true measure of water savings – there are at least two things I will do differently in deploying future editions of this membrane.

First I will leak test the bottom under at least a foot of water.

Secondly, I will reconfigure the format to smaller modules so that the garden could be developed in increments, rather than committing to a single mammoth risk. Currently, I am considering a trench format six feet wide by three feet deep, that could be of any desired length. Rectangular or irregular areas could be covered by any combination of parallel trenches.

Water containment above

If you cover the garden plots with an impervious material to restrict evaporation, and combine that with water containment below, extreme water savings might be achieved. The goal would be to come as close as possible to limiting the water loss to that which is transpired by the plants. My theories on this one are described in http://technosmith.com/contents/03075-walk-in%20garden.pdf

Water storage

It is important to be able to monitor and adjust the water levels in membrane based gardens. I do this by laying 4”perforated drain pipes, covered in landscape fabric in the very bottom. These are connected to risers to give direct access to any water stored, so water can be removed or added if necessary. This access will also allow the testing of the nutrients in the water, so they can be amended if necessary. It is essential that the riser be at the lowest point of any gently sloping pipe.

An eight foot piece of 4” pipe can store just over five gallons. If five parallel 8’ segments were laid side by side in the bottom of a 2’ wide garden trench (make sure the one with the riser is slightly lower than the others), the assembly could store 26 gallons. This could prove very helpful during late-summer water shortages, or be distilled for household needs.

This captive water access opens the door to a whole different category of gardening: Hydroponics. Nutrients could be cycled into and out of a sequence of such gardens, to and from a storage tank, amended as necessary, or even linked to an acqua feature or (ugh) leach field.

While thinking along these lines it might be important in some cases to use a garden to cover a far greater cistern. Resources permitting, make it large enough to store an entire season’s worth of garden water and more, during rainy periods.

Configuration notes for water-saving gardens

If I were digging a garden trench module, I would expand the trench by two feet at the top. This extra width would (1) stabilize the sides of the membrane, (2) protect the sides of the membranes from spading forks applied to the actual garden strip, (3) enhance rainwater catchment, and (4) increase the

over-all moisture storage. The extra foot on each side would be covered by pavers, and become part of a pathway.

A depth of at least 3’ was chosen, because 90+ percent of common garden vegetables can live with that.

High density gardening tips

1. Plant things in two-dimensions instead of in rows. If the instructions call for rows 1' apart and spacing of 3" (common for carrots for instance), plant them in rows 3" apart, and that in itself will give you four times as many. Some efficiency of sunlight will be lost, but very little.
2. There are varieties of small melons and squash that can be grown vertically on frames, instead of spreading out horizontally over the ground. Cantaloupe, butter-nut squash, and acorn squash can be grown like this. Tomatoes can also be made to take up less space if they are properly trimmed and made to grow on flat vertical frames.
3. Transplantable plants are started and nurtured to about a third their mature size and then transplanted into the garden space. Consider the space required for the seedling project:

A 6" wide plant at maturity will allow four plants per square foot. At one third the size, you could prepare thirty-six seedlings in the same space.

It takes about half the plant's life to achieve one third its mature size. Simply replanting with 1/3-sized seedlings could double the productivity for a given period of time. This would also:

* Allow the rotation of different plant varieties as seasons change.
* Allow you to replant as individual plants are harvested, so you could have a continuous supply.