GROWING FOOD IN A HOTTER, DRIER CLIMATE

In his timely, richly detailed “Growing Food in a Hotter, Drier Climate: Lessons from Desert Farmers on Adapting to Climate Uncertainty”: (2013) Gary Paul Nabhan stresses principles and specifics for feeding ourselves sustainably in a dry future.

But he clarifies his motive for doing that by showing how fragile our food security is now, given current agricultural practices.

It takes 7.3 calories, only 1.6 of them on the farm, to produce a single food calorie – the rest are expended in processing, transporting, storing, etc. And we waste nearly half of all the food we grow.

Worldwide, humans and agriculture use such vast amounts of water that by 2025 we’ll need the equivalent of 110 more Colorado rivers just to meet human needs – and irrigated agriculture is already in trouble.

Erosion has already affected 40 percent of cropland globally. Yields of corn, soy and cotton may fall by 40 percent to 70 percent by this century’s end.

Degraded soil quality, shrinking chill hours for fruit trees, disrupted pollinator-crop interactions – the list goes on.

Expect higher temperatures, Nabhan writes, and thus longer growing seasons requiring more water, increased water

scarcity, more soil salinization, more expensive inputs, more diseases, pests and weeds.

But don't wait passively. Nabhan would have us act vigorously now -- depend less on groundwater and dams and more on local water sources, on growing water-stingy crops, keeping more water in the soil, diversifying croplands, reducing soil salinization, etc.

Nabhan's over-riding message is, adapt food systems to local conditions and imitate nature, its organisms, its systems, and farmers who have worked closest with them.

Fit crops and agricultural practices to locales, and note that none of the following techniques suits large scale monoculture.

If there are intermittent floods, as in the Sonoran desert, build "fredges" along watercourses to catch nutrients and water which then seep down to crops' roots. Fredges consist of small living trees linked by woven branch fences.

Or, in the high reaches of the Gobi, dig horizontal wells to store snowmelt. At one site, which receives only an inch of rain a year, water from these wells grows food for 250,000 folks.

In the U.S. Southwest, construct succulent-edged terraces on slopes to hold soil and water, along with waffle gardens – slowing water in basins, with berms, swales, check dams and weirs. Dig deep trenches above and below fruit trees, filled with

compost and biochar and kept moist, so enriched water seeps to their roots. Copy the ancients by burying clay pots filled with water which slowly seeps out to plants' roots. One such system grows 11 tons of melons per acre with less than one acre-inch of water.

Choose plants suitable to your locale. Century plants, adapted to the dry Southwest, can generate twice the biomass of hybrid poplars, three times that of sugar cane, given equal water, and can use that water ten times better than cereals.

Arrange plants in guilds so tougher, drought and wind resistant plants shelter and "nurse" more vulnerable varieties, providing frost control, retaining moisture, enriching soil and often armed with spines to discourage browsers.

Increase your soil's organic content. At one percent soil can hold 33 pounds of water; at 5 percent it can hold 195 pounds.

Whenever possible, grow perennials rather than annuals. Vineyards can sequester 7 times as much CO2 as annuals, and fruit trees 9 times as much.

Seek local seeds to develop drought tolerant varieties. Grow several genetic lines, thus providing the best food security.

Plant nectar rich flowers to attract pollinators until your crops need them.

By focusing on growing food in the hottest and driest climates, Nabhan prepares us to deal with the most extreme challenges nature may offer in an uncertain future.