Water and Household Food Production

The headline read "worst drought in 100 years", but the Strydkraal women said "we have buried the hunger".

Just before Christmas, Eva Masha, Emily Masha and Lucy Masha completed their water harvesting tanks in their residential stands in Strydkraal community, Sekhukhune District, Limpopo Province. They are now literally" reaping" the rewards!

Apart from the food they harvested they were finalists in the Women in Water 2004 award made by the Minister for Water Affairs and Forestry for their pioneering example.

No fewer than 12.5 million people in South Africa live in 2.4 million rural households. These are people with limited income and food costs are a major concern to many. However, gardening and farming currently play a limited role in village survival strategies. This is understandable considering present circumstances. For one, people want water for gardening. They regard the lack as a major constraint.

The programme of household food production propagated by the Water for Food Movement, spearheaded by Tshepo Khumbane and Marna de Lange, holds great promise. The secret lies in the integration of innovative new thinking and traditional wisdom.

FACTORS THAT MAKE THE DIFFERENCE

People believed that there was no water, but the rain is there for the harvesting by gathering, leading and distributing run-off in small earth channels.

Water can be stored for dry spells and winter in "do-it-yourself" below ground reservoirs.

Deep fertile soils can be created in the barrenness by trenching, if necessary, and mixing in household and organic wastes.

There are ways and means to sustain yields and quality with a minimum of chemical inputs.

Manually operated hand or treadle pumps provide a "hose for all" making watering a manageable chore.

So the women do literally "bury hunger". They dig underground reservoirs and trenched fertility beds as well as earth channels to collect and control run-off.

Digging an underground reservoir is hard work, but the rewards are sweet.

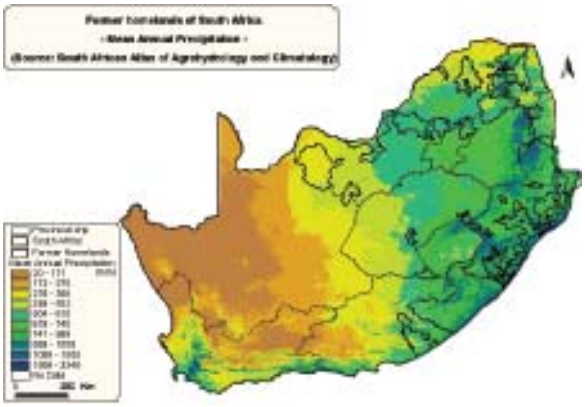
Full tank in the drought, all that is now needed is a bucket or a hand pump and hose.

The closed reservoir - all her own work - simple, safe and effective.

WHERE DOES ONE FIND THE WATER?

The areas where the villages are located are superimposed on this annual precipitation map (see p. 18).

Note that they are mostly located in areas of the country with reasonable rainfall and can count on receiving an average of at least 400 to 600 mm of rain annually. This applies even in areas now perceived as being too dry to grow anything!

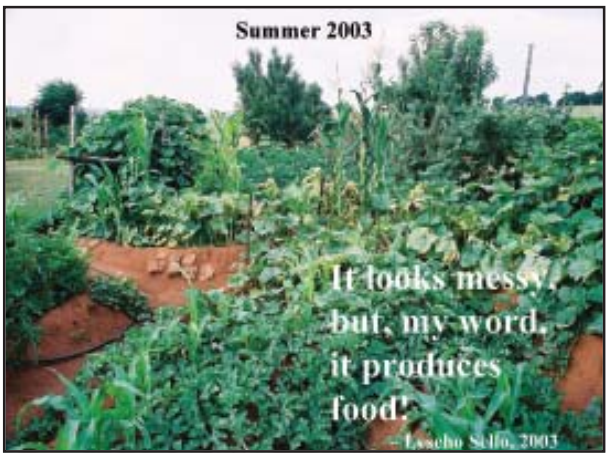


Five hundred mm of rain falling on a roof or other impermeable area represents half a cubic metre of water available for storage per square metre of roof. Thus an area of 50 square metres can provide 25 cubic metres of water that is sufficient to see a 100 square metre intensive garden through a full winter.

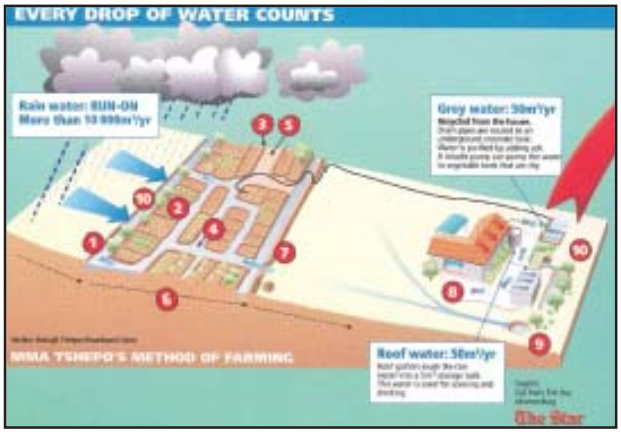
If the area is hardened such as a lapa or road where the run-off would be about 50% of that off an impermeable roof, it would only take about 100 square metres to provide the 25 cubic metres - still a very small area. Even if the water must be harvested from the veld, assuming run-off at 10%, the area required would only need to be 25 m long and 20 m wide!

SUMMER PRODUCTION

The intensive beds are laid out with paths between them that also serve as irrigation canals. Water is gathered from the surroundings by collection drains and discharged into the paths between the beds. This water infiltrates the deep beds and virtually doubles the impact of the rain shower. This run-on principle is of major importance. The rain may normally be sufficient to produce a crop without run-on, but certainly not the high yield that can now be attained and is equivalent to that achieved under intensive irrigation.



Note the deep path/irrigation channel that directs and stores run-on water that then seeps sideways into the deep "fertility beds".



Courtesy of *The Star* newspaper

A trench is dug across the slope of the land to catch run off.

Beyond the trench, the vegetable beds are dug a metre deep and filled with organic matter, grass, leaves, manure and ash and mixed with soil. The beds are fertile and absorb and retain moisture.

The beds are edged with paths that serve the purpose of channelling the water between the beds. The water then seeps into the beds over time. Excessive water is diverted into storage or safely disposed of down a slope.

During dry spells and in winter water is drawn by bucket or pumped back from storage and the beds watered conventionally by hosepipe or sprinkler.

WATER STORAGE

The villages are located in the summer rainfall regions with dry winters so that water harvested during the rainy season must be stored to provide for irrigation through winter. The quantity of water required depends on the area of the garden beds, climate, and crops grown and when they are grown. Storage is essential and a variety of reservoirs are being assessed.

An estimate has been made of the storage required per 100 m^2 of garden beds to cater for a typical winter crop mix. If reliance can be placed on recycling 2 m^3 of household water (grey water) per month then the storage volume required is significantly reduced.

Storage volume required: Cubic metres per 100 square metre vegetable garden				
	Limpopo	Bloem (FS)	Alice (EC)	Dundee (KZ-N)
Run-off only	27	20	19	27
+ grey water	17	11	10	19

WINTER PRODUCTION

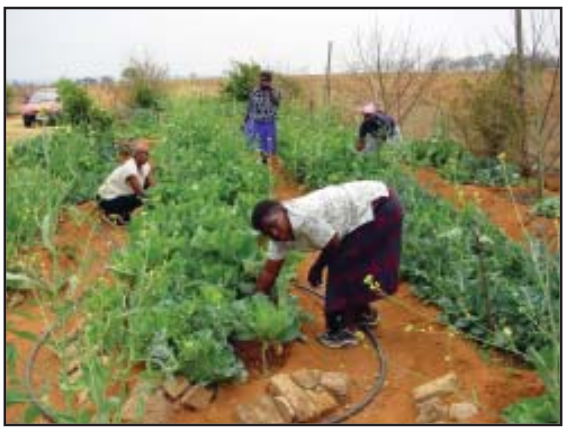
The planning and management of a household garden is an art in itself. Crops and their planting dates will depend on the climatic circumstances and the requirements of the family, the compatibility of companion crops and the rotations that are necessary to maintain fertility and control pests. Intensified small-scale farming of this nature can only be justified if the full irrigation requirements of the crops can be met.

Concentrating production in these intensive beds has many advantages. The initial digging of the trenches and their filling is a major undertaking but the follow up in subsequent seasons is not arduous. Production is intensive and yields are well up to the standards achieved on the very best commercial farms under irrigation.

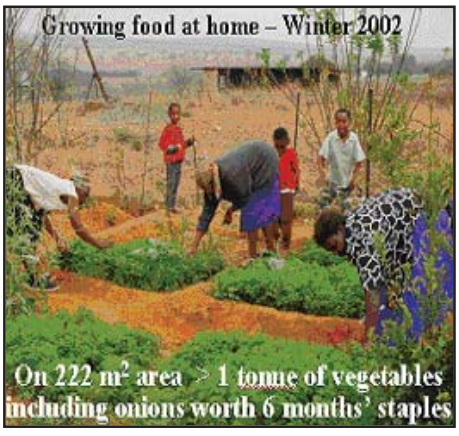
THE ROLE OF THE WATER RESEARCH COMMISSION FUNDED MODEL SAPWAT

SAPWAT played an important role by developing the "numbers" required for planning, policy development and implementation. Once the production plan has been drawn up for each individual bed in the garden, the irrigation requirements can be developed by applying the Sapwat routine. SAPWAT takes into account crop growth characteristics and both crop production and irrigation system management in arriving at estimates of crop irrigation or run-on requirements on a monthly basis. Monthly requirements in cubic metres for the garden as a whole can then be developed and finally generalised for application in the area.

The next step is to establish the catchment areas required to supply the monthly water requirements and the storage volumes that need to be provided for dry winter months and the inevitable dry periods during the rainy season. This is a relatively simple process of calculating water balances once estimates have been made for run off percentages from impermeable roofs, roads and paved areas and from grazing and cultivated areas. SAPWAT helped show that the seemingly impossible was quite feasible in most of the rural villages.



Watering in winter by hose, note the run-on channels for intensified summer production.



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Photographs provided by the Water for Food Movement – many thanks.