



# Growing knowledge on SOUTH AFRICA'S WILD PLANTS

*Generations of South African families have reaped the benefits of traditional African vegetables. A ground-breaking multidisciplinary study initiated and funded by the Water Research Commission (WRC), in association with the Department of Agriculture, Forestry & Fisheries (DAFF), has provided scientific proof of their contribution to families' health and nutrition while growing critical knowledge on their production for enhanced household food security. Article compiled by Lani van Vuuren.*



**Left:** Traditional African vegetables can be found in modern urban markets, such as this one in Soshanguve, Pretoria.

Whether you refer to it as *morogo*, *imifino* or African leafy vegetables, traditional leafy food plants continue to play an important role in the contemporary food systems of people in South Africa, particularly in poor, rural areas. In South Africa, traditional African leafy vegetables are mostly gathered, with only selected species being cultivated, usually as part of a mixed cropping system in home gardens or smallholder plots.

Traditional African leafy vegetables have important advantages over exotic vegetable species, for example, they are generally easier to produce and usually require less resources (such as water) while being rich sources of micronutrients, such as iron and Vitamin A. Some of the most important traditional vegetable species, such as amaranth and spider flower, are pioneer plants, which emerge naturally when soils are disturbed following cultivation. Commercial farming systems may regard them as weeds, but in African smallholder cropping systems they are often left to grow for later harvesting.

The popularity of specific species depends on a variety of factors,

including availability, ease of preparation, taste, consistency and appearance. While still a niche market, traditional African leafy vegetables are not only gathered for home use but also sold in fresh or dried form at both informal and formal markets.

### TURNING INDIGENOUS KNOWLEDGE INTO DOCUMENTED KNOWLEDGE

The potential value for food security and rural development of gathering wild foods, growing locally adapted varieties and eating from the local ecosystem is recognised internationally. Despite significant advances, one in five South African families still experience difficulty in accessing food, with research indicating that local households are becoming increasingly dependent on social grants – a situation which is not sustainable in the long term (for more information on the latest food access statistics, read ‘Growing Currency rather than Carrots’ in *the Water Wheel* November/December, 2012).

Despite their significance in staving off hunger agronomic research on traditional African leafy vegetables has been neglected in the past. Generally, the utilisation, water use and agronomy of these crops are not well documented, contributing to the underutilisation of these food plants. A need has also been identified to document indigenous knowledge regarding these food plants.

To improve this state of affairs, the WRC has invested steadily in research into traditional African leafy vegetables since 1998. The latest multi-year study, which focused on the nutritional value and water use of indigenous crops, was the most intensive yet. The project placed particular emphasis on African leafy vegetables, such as amaranth, Jew’s mallow, Chinese cabbage, nightshade, spider flower, pumpkin, tamma melon and cowpea.

“Previous WRC-funded research confirmed that there is an expanding niche market for fresh traditional vegetables, particularly African leafy vegetables, yet we found little recorded knowledge on important production practices such as seed selection, fertilisation, pest control





**Left (top to bottom):** Jew's mallow, nightshade, amaranth and tamma melon were among the traditional vegetables studied in a recently concluded WRC project.

and water use in relation to environmental variables at localities where these crops are growing,” explains WRC Executive Manager: Water Utilisation in Agriculture, Dr Gerhard Backeberg. “Through this research we not only aimed to fill in these knowledge gaps, but to raise the status of traditional food plants in South Africa by pointing out the valuable contribution these plants could make to the food security and hence, nutrition security of South African households.”

Ultimately the project hoped to encourage and strengthen people’s abilities to generate food for themselves, as opposed to merely depending on government support systems, such as social grants. In this way communities are empowered to help themselves become food secure and maintain a healthy balanced diet.

**“Meat is a visitor but morogo is a daily food”  
– Pedi proverb**

One of the main products of the project is the publication, *Nutritional Value and Water Use of African Leafy Vegetables for Improved Livelihoods* – arguably the most comprehensive compendium of knowledge on these traditional food crops produced in South Africa to date. “The report gives thorough attention to a range of aspects, such as water requirements, drought and heat tolerance; agronomic characterisation and human nutritional,” Dr Backeberg tells the *Water Wheel*. “Together with the production guidelines produced as part of the project it will support the implementation of the National Strategy for Indigenous Food Crops by DAFF, which is currently under discussion.”

The project was undertaken by a multi-disciplinary team of scientists in the crop, food and nutrition disciplines from the University of Pretoria, Tshwane University of Technology (TUT), the Medical and Agricultural Research Councils.



*Traditional African leafy vegetables do not only stave off hunger, they can also provide valuable income, especially in rural areas.*

According to project team member, Prof Wim van Averbeke, of the Department of Crop Sciences at TUT, it was this multidisciplinary approach which makes the project unique and groundbreaking. “The collaboration with researchers active in the field of human nutrition was enriching for agricultural scientists and, I am certain, this also applied the other way around.”

## THE MAIN QUESTION

The central question the project hoped to answer was whether household production and consumption of African leafy vegetables should be promoted as part of the strategy to combat under-nutrition under conditions of resource

### WHAT ARE TRADITIONAL AFRICAN LEAFY VEGETABLES?

Traditional African leafy vegetables refer to the collective of plant species whose leaves and stalks are consumed as leafy vegetables. Collectively referred to as morogo or imifino, these vegetables include indigenous, indigenised and recently introduced leafy vegetable species.

**Source: Production Guidelines for African Leafy Vegetables**



**Above left:** For the first time production guidelines have been produced for African traditional vegetables to allow for sustainable production.

**Above right:** The spider flower, another one of the traditional African leafy vegetables.

limitation, particularly soil, water and plant nutrient availability – commonly encountered in rural areas of South Africa.

According to Prof Van Averbeke, the project collected sufficient data to answer this question with a fairly high degree of confidence. “The results clearly indicate that regular consumption of African leafy vegetables can assist in balancing diets by adding essential micro-nutrients, particularly Beta carotene and iron.”

Some plants provided more than 50% of the recommended daily allowance for vitamin A, and all eight vegetables studied provided at least 30% of the estimated average

requirement. What’s more, the vegetables provided varying amounts of other important nutrients, such as protein and various mineral elements, and also contained significant amounts of fibre.

### USE OF TRADITIONAL VEGETABLES ‘AS OLD AS MODERN MAN’

In South Africa, the use of green leafy vegetables as food is as old as the history of modern man. The !Kung people, who have lived in southern Africa for at least 120 000 years, relied heavily on the gathering of plants from the wild for their survival. In turn, Bantu-speaking tribes, who started to settle in South Africa about 2 000 years ago, also collected leafy vegetables from the wild. Hunting and the collection of edible plants were particularly important in their food acquisition systems during times of emergency, when crops had failed or livestock herds had been decimated.

**Source: Nutritional Value and Water Use of African Leafy Vegetables for Improved Livelihoods**



To order the reports, *Nutritional Value and Water Use of African Leafy Vegetables for Improved Livelihoods* (Report No. TT 535/12); *Production Guidelines for African Leafy Vegetables* (Report No. TT 536/12); and/or *Nutritional Status of South Africans: Links to Agriculture and Water* (Report No. TT 362/P/08) contact Publications at Email: [orders@wrc.org.za](mailto:orders@wrc.org.za); Tel: (012) 330-0340; Fax: (012) 331-2565; or Visit: [www.wrc.org.za](http://www.wrc.org.za) to download a free copy.

The study also confirmed that African leafy vegetables could be grown in home gardens using local resources. Importantly, the eight indigenous vegetables selected were shown to be more drought and heat tolerant than Swiss chard, a commonly grown exotic vegetable which was the reference crop in this study. This could prove significant in the context of climate change. Cowpea was found to be the most drought tolerable crop, followed by nightshade, pumpkin and tsamma melon. Amaranth was the most heat tolerant crop. For optimum growth, water requirements for the African leafy vegetables studied for a full growing season range between 240 mm and 463 mm.

Traditional vegetables are no more difficult to grow than exotic ones, and in some cases are easier. Prof Van Averbeke explains that since many African leafy vegetables grow the same way as weeds, they produce large amounts of seed, which can easily be stored. “The first batch of seed can be obtained from existing growers or researchers. Seeds can also be collected from plants growing in the wild. Once you have the seed, the system is easy to reproduce.”

Planting at the correct time is important. Preferably the plants should be grown directly from seed. “Producing seedlings followed by transplanting sometimes causes stress, and when stressed some of these crops quickly switch from vegetative to reproductive growth and start flowering to enhance their survival. That obviously does not suit the purpose of harvesting leaves,” explains Prof Van Averbeke.

Elsewhere in Africa traditional vegetables are mainstream and there is no reason why this could not be the case in South Africa, notes Prof Van Averbeke. “Every area in South Africa has its own particular suite of African leafy vegetables that form part of the local culinary tradition. It is important that we break the current view of especially younger South Africans who associate traditional



*Cowpeas are often grown in home gardens as part of a mixed cropping system.*

food plants with poverty and backwardness. The media can play an important role in turning this image around.”

This study demonstrated that traditional African vegetables offer exciting opportunities for enhanced exploitation. The WRC is continuing its investment in these traditional food plants. Research is continuing on water requirements, fertilisation and nutritional productivity of

African leafy vegetables and yellow fleshed sweet potatoes, including the modelling of water use of these crops. Furthermore, new research work will be undertaken on water use of indigenous legume and grain crops. By following this thematic and programmatic approach in water research, a comprehensive and detailed set of research reports on indigenous food crops will be available by 2017. □



*Knowledge of traditional African vegetables are usually passed on by women from one generation to the next.*