

## Health and nutrition

### Nutritional value and water use of African leafy vegetables for improved livelihoods

An inter-disciplinary research project, funded by the WRC, determined the drought- and heat tolerance, water use, agronomic requirements and potential contribution to human nutrition of a selection of eight African leafy vegetables.

#### Background

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 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 significance 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.

Despite their significance in staving off hunger, agronomic research on traditional African 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.



*Nightshade was one of the African leafy vegetables studied.*

To improve this state of affairs, the WRC has invested steadily in research into traditional African 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, specifically amaranth, Jew's mallow, Chinese cabbage, nightshade, spider flower, pumpkin, tsamma melon and cowpea.

The latest project aimed to fill previously identified knowledge gaps, as well as 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.

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. 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 the Department of Agriculture, Forestry & Fisheries.

## Study results

The study results clearly indicate that regular consumption of African leafy vegetables can assist in balancing diets by adding essential macronutrients, 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.

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. Since many African leafy vegetables grow the same way as weeds, they produce large amounts of seed, which can easily be stored.

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.

### Further reading:

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 Tel: (012) 330-0340, Email: [orders@wrc.org.za](mailto:orders@wrc.org.za), or Visit: [www.wrc.org.za](http://www.wrc.org.za) to download a free copy.