

## COMBATING MALNUTRITION WITH MORINGA

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Malnutrition is a major factor in the often high rates of infant mortality in the tropics and sub-tropics. In the poorest countries, as many as one child in five will die during infancy.<sup>1</sup> Worldwide it is estimated that seven million people die each year from hunger-related causes, and the vast majority of these deaths are caused by chronic undernutrition.<sup>2</sup>

Considerable investments have been made by governments and aid agencies in programs designed to prevent malnutrition. Approaches have included school lunch programs, nutrition education, introducing exotic vegetables, and even campaigns to periodically give children massive doses of vitamin A. A major drawback to these approaches is the dependence on imported solutions and outside personnel, and progress can quickly dissipate once the program funding dries up.

In 1996, the Church World Service office in Dakar began studying the potential of the *Moringa oleifera* tree to combat the problem of malnutrition. The tree is common throughout the West Africa region and its leaves are occasionally used to make a sauce. In Senegal this sauce, eaten with rice or millet, is called *Mboum*. Among some farmers in Niger, dried Moringa leaves are an important cash crop.<sup>3</sup>

The tree is called "Nebeday" in Senegal, most likely a derivative of the English words "never die" in reflection of the tree's ability to withstand drought, grow quickly from seed or cuttings, and regenerate itself even after the most severe pruning. It is often cultivated as a living fence around people's gardens. Although the tree is esteemed for its many medicinal uses, it was not commonly known that the leaves of this tree are extremely nutritious, or that the pods, flowers and growing tips of the tree are also edible. The traditional method of preparing the leaf sauce, however, causes much of the leaves' nutritional value to be lost. Fresh leaves are boiled two or even three times, with the water discarded each time, in order to remove the leaves' somewhat bitter taste.

During the second half of 1997, CWS began collaborating with the Senegalese organization AGADA (Alternative Action for African Development), based in the city of Ziguinchor, on a pilot project to test the theory that the products of the Moringa tree, added on a regular basis to an individual's diet, could prevent or cure malnutrition. The project's target group were infants and women of child-bearing age living in south-western Senegal. Malnutrition was a considerable problem in this region. The pediatrics unit in the town of Bignona (pop. 30,000) was treating over six hundred cases of malnourished infants every year. Country-wide, the infant mortality rate of 13% was largely caused by malnutrition.<sup>4</sup>

During the initial pilot project, AGADA personnel trained the doctors, nurses and mid-wives attached to eight health posts in methods of drying the leaves into a powder which could be used as a food additive in the treatment of malnourished children. The health workers were asked to keep records of their results. In addition, AGADA trainers conducted seminars in villages to teach women how to make

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<sup>1</sup> Population Reference Bureau, 1997. Population mondiale. Washington, D.C.

<sup>2</sup> Church World Service, 1999. Facts have faces (brochure). New York.

<sup>3</sup> Saint Sauveur, A., 1997. Le *Moringa oleifera* au Niger et en Inde, où quand les agriculteurs préfèrent planter les arbres, *Le Flamboyant*. Silva, France. 43:16-23.

<sup>4</sup> SNEPS-SNAN, 2000. Journées nationales de micronutrimet. République du Sénégal. Ministère de la santé (brochure).

Moringa leaf powder, how to cook Moringa pods and flowers, and ways of preparing the leaf sauce in order to retain more of the nutritional content. Training manuals, brochures, posters, radio spots and a film were put together by CWS and AGADA personnel for use as training supports.

Outside evaluations of this project were conducted in 1998 and in 1999. The positive findings led CWS and AGADA to expand the project. By the year 2000 virtually all government health workers, NGOs and many communities within the south-west region of Senegal had received training and the project began training activities in south-central Senegal.

### **Discussion and conclusions**

In terms of improving general health, the leaves of the *Moringa oleifera* tree have demonstrated a multitude of attributes. Interviews with people who have made Moringa a regular part of their diets point out that they have a keen awareness of improvements in their health and energy. Women who consume Moringa during pregnancy will have babies with higher birth weights. During lactation, mothers will produce more milk and have increased appetites. Through the project's collaboration with local health posts, successful treatment of malnourished children with Moringa has been well-documented. Because Moringa is accessible to mothers at little or no cost, malnourished children treated with it actually tend to recover more rapidly than those whose mothers are obliged to follow the "modern" approach which involves purchasing expensive milk powder, cooking oil and sugar. Today, several health posts offer packets of Moringa leaf powder for sale, and demand tends to outstrip supply. To date, absolutely no negative side effects to even daily consumption of Moringa have been recorded. Unexpected benefits of Moringa include an apparent cure for tapeworms and help in controlling diabetes and high blood pressure.

The question remains: To what degree can Moringa be a solution to the problem of malnutrition?

The World Health Organization has developed charts, currently used throughout West Africa, which enable health workers to compare a child's body length and weight and thereby determine to what degree the child deviates from the healthy median. According to where the child's length-weight ratio falls on the chart, he/she can be classified as normal, mildly or moderately malnourished (a Standard Deviation score of -1 to -2), or severely malnourished (-3 to -4 SD). Severe malnutrition in children is additionally defined as when there is "symmetrical oedema (fluid retention) involving at least the feet."<sup>5</sup>

When a child has reached this stage of severe malnutrition, there are very gross abnormalities physiologically including infections, impaired liver and intestinal function and problems related to imbalance of electrolytes. Intensive hospital care is required in these cases. The infections must be treated and new ones prevented, the electrolyte balance restored, and an intensive 24-hour feeding program instituted. Because of the physiological abnormalities, the severely mal-nourished child cannot tolerate iron or the usual amounts of dietary protein, fat and sodium. Until the child leaves this emergency phase and enters the rehabilitation phase (when the child's condition is stable and his or her appetite has returned, normally after 2-7 days) his or her diet needs to be high in carbohydrates and contain potassium, magnesium and other essential minerals, but low in protein, fat and sodium and completely lacking in iron supplements. Thus Moringa leaves, with their high iron and protein content, are not appropriate for use during initial treatment of the severely malnourished.

However, mild or moderate malnutrition before this terminal stage is reached is a completely different matter: the physiological abnormalities are much less severe and successful recovery can be had through a fully balanced diet containing all 40 essential nutrients in the correct proportions. Moringa, added on a daily basis to a child's food, has thoroughly demonstrated its ability to bring about rapid recoveries from moderate malnutrition.

But while successfully treating malnutrition is good, preventing it is much better. Malnutrition is brought on by a multitude of causes: lack of education, poverty, famine, parasites and impure drinking water are but some of them. A program which focuses on correcting micro-nutrient deficiencies alone will not fully eradicate malnutrition until these other causes are addressed. However, as the Moringa project in south-western Senegal has demonstrated, this approach can show very impressive results in reducing the incidence of malnutrition.

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<sup>5</sup>WHO, 1999. Management of severe malnutrition: a manual for physicians and other senior health workers. Geneva, p.4.

A major advantage to Moringa is the fact that it is a local resource. This contrasts with many of the ongoing programs designed to fight malnutrition which depend on imported products and outside donor support. Many programs which focus on vitamin A deficiency (VAD) use this donor-dependant approach. Vitamin A is a key modulator of the body's immune system, helping fight against infections and preventing diseases such as diarrhea, respiratory ailments, tuberculosis and malaria. Severe vitamin A deficiency results in nightblindness and manifestations of xerophthalmia (a dry, thickened, lusterless eye condition) which can damage the cornea and lead to blindness. Worldwide, the WHO estimates that 2.8 million children under the age of five exhibit severe clinical manifestations of xerophthalmia.

According to Senegal's National Center for Nutritional Alimentation, vitamin A supplementation can reduce the incidence of childhood illness and mortality due to measles by 50%, due to diarrhea by 40% and due to malaria by 30%.<sup>6</sup> On average, vitamin A supplementation programs have been effective in reducing overall childhood mortality by 34%.<sup>7</sup> To combat VAD, UNICEF is working in collaboration with national health authorities in many countries through a program to give every under-five child one massive dose of vitamin A, in tablet form, twice annually. At the same time iron supplements are being distributed to pregnant and lactating women against anemia.

Given the impressive impact on child mortality rates these vitamin A programs have had, they would appear to be a good idea. However, an opposing argument claims that this approach, focusing on specific micro-nutrient deficiencies and relying as it does on imported products and subsidies, is short-sighted and ultimately unsustainable.<sup>8</sup>

"This 'drug-based approach' to synthetic vitamin A distribution has received wide criticism, even from the very individuals who pioneered the work. Some of the limitations cited based on the 30-year experience of India are: ineffectiveness in correcting VAD (especially in populations where milder signs of deficiency are widespread), the limited shelf-life of vitamin A and logistical problems in ensuring supply. Supplementation programs are often expensive and unsystematic, and coverage may be poor. There have been many calls for an alternative approach, addressing the root causes of the problem rather than treating the symptoms. The World Declaration and the Plan of Action on Nutrition, adopted by 159 countries, at the International Conference on Nutrition organized by the UN's Food and Agriculture Organization (FAO) and WHO in 1992, states that strategies to combat micronutrient malnutrition should: *'Ensure that sustainable food-based strategies are given first priority particularly for populations deficient in vitamin A and iron, favouring locally available foods and taking into account local food habits.'*"

Ideally, good nutrition should be assured by a varied diet rich in meat, root, grain, fruit and vegetable foods. In reality, for a majority of the world's population such variety in food is unaffordable or seasonally unavailable. Within the arid countries of the African Sahel, for example, the dry seasons are marked by a heavy dependence on the staples of rice, millet and sorghum; during these months, fruits and greens can be found only in a few irrigated garden plots. And in virtually every year there is a lean period when grain stores have been exhausted one to three months prior to the new harvest. Elsewhere in the tropics, meals are generally built around one staple food rich in carbohydrates but very poor nutritionally, such as a *pap* or *fufu* made from yam, maize or manioc. Malnutrition is frequently characterized by this kind of restricted diet wherein a child consumes the same weaning pap every day.

In this context, Moringa is a very simple and readily available solution to the problem of malnutrition. The edible leaves of the *Moringa oleifera* tree are already an occasional food source throughout West Africa and other regions of the tropics and sub-tropics. As a source of vitamin A and iron they are among the best of tropical legumes. In addition, Moringa leaves offer very significant quantities of vitamin C, B-complex vitamins, calcium, protein, potassium, magnesium, selenium, zinc and a good balance of all the essential amino acids. A concerted effort to educate vulnerable populations in the value of Moringa as a source of nutrition, in training people in ways of preparing the leaf sauce so that the maximum of their vitamin and mineral content is retained, and encouraging families to use the leaf powder as a multi-vitamin and -mineral food supplement would go a long way towards eliminating micronutrient deficiencies.

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<sup>6</sup> SNEPS-SNAN

<sup>7</sup> Bellagio Brief, Conclusions of a meeting on February 3-7, 1999 in Bellagio, Italy.

<sup>8</sup> GRAIN, 2000. Engineering solutions to malnutrition. *Seedlings* magazine.

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For additional information, see the CWS website at: [www.moringatrees.org](http://www.moringatrees.org)