**AN EXAMPLE OF SUCCESS IN IMPROVED NUTRITION AND FOOD SECURITY**

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Malnutrition Matters (www.malnutrition.org) is a small meta-social business (registered non-profit), that has made a contribution to increased food security, using sustainable micro-enterprise to benefit not only BoP consumers / beneficiaries, but also rural women entrepreneurs and smallholder farmers. In 2005 Malnutrition matters (MM) had 13 small-scale soymilk systems in 8 countries, with the help of a US-based partner, Africare. MM now has over 300 small-scale systems deployed in 31 countries, 19 of them in sub-Saharan Africa, with the help of dozens of partners. The other 12 countries are: Belize, Brazil, Canada, Colombia, Guatemala, Honduras, India, Myanmar, North Korea, St. Lucia, Thailand, USA. There are now over 130,000 daily beneficiaries / customers getting additional protein and micro-nutrient-rich food, thanks to these 300 installations.

The problem we are addressing, chronic moderate malnutrition in developing countries, especially lack of protein and micro-nutrients, is a significant and fundamental problem for almost all developing countries. The approach of MM, to help incubate soy-food micro-enterprises in rural and urban settings, enables this problem to be tackled in a sustainable way, that creates self-funding employment for women and youth, in their own locale rather than far afield. The MM approach also creates economic benefit for local farmers who can grow and sell soybeans for higher profit than other crops. It ensures a virtuous economic cycle where there is no profit leakage to outside companies, allowing the revenues and profits to remain in the local community, for maximum local economic benefit. The MM approach of direct human consumption of soy foods, is also far superior to the animal protein cycle from an environmental perspective, which requires 10 - 20 times as much land, energy and water to provide animal protein for human consumption. The soy foods are also typically 1/4 to 1/3 the cost of the equivalent animal protein, which enables the BoP pool to benefit.

The small-scale soymilk systems, called VitaGoats and SoyCows, currently operating in the field are producing an estimated 130,000 servings of supplementary soy-food every day. So there are 130,000 daily beneficiaries, mostly children , and mostly in rural areas , benefiting substantially from this protein-rich food. The numbers of these small-scale systems could be scaled by 10x and 100x with the involvement of a major partner with national or multi-national presence. One example application which would enable significant scaling up is school-feeding. A VitaGoat or SoyCow could supply about 1,000 servings per day to schools in the surrounding area, using low-cost bicycle delivery, as has been demonstrated by the World Bank funded project in Orissa, India. Hybrid business models where a smaller number of servings are provided to schools and the remainder are sold into the public market are also viable. Of course, pure private enterprise models are also viable and in operation now in numerous countries including Ghana, Kenya, Liberia, Malawi, Mozambique, Myanmar, South Africa, Tanzania, Uganda, and Zambia.

MM has innovated substantially to improve the small-scale soymilk technology to enable more robust and simple systems for non-electric operation in very basic rural environments, as well as providing reliable and labor-efficient electric systems for operation in more urban environments. MM has also innovated in another area, namely small-scale and medium-scale solar food-drying technology, the SolarFlex systems. The primary problems we are addressing with this technology, related to the malnutrition problem of our soymilk technology, is that of food security and post-harvest losses. Much produce is wasted / lost due to the lack of preservation options and the lack of accessible processing plants. Small-scale solar food-drying technology enables much of this otherwise wasted produce to be simply preserved without the need for a cold chain or costly processing equipment. The highly efficient technology that MM has developed, after several generations of design improvement and assistance from a world-renowned expert in the field, enables one-day drying of most fruits and vegetables, a high-quality premium product with micro-nutrients preserved, with no additives or preservatives needed, and allows packaging in simple plastic bags, with shelf life of about one year at ambient temperature. Therefore, small landholders or cooperatives can use these systems to improve food security by preventing waste of produce and to increase their revenues by selling the dried product after the fresh produce season is past.

MM is also partnering with international organizations such as GAIN, ASA/WISHH and the African Development Bank / Government of Ghana in developing and implementing projects, in an effort to reach a larger scale. MM has recently signed an MOU with the Government of Ghana regarding supply of SoyCow and SolarFlex equipment and related training to their Rural Enterprises Programme Phase III project, funded by the African Development Bank, IFAD and the government of Ghana.

**MAJOR BENEFICIARY GROUPS**

There are two major groups benefiting from the VitaGoat/SoyCow and SolarFlex innovations: the consumers of the soy foods, who receive protein- and micronutrient-rich food, and the entrepreneurs who are making and selling the soyfoods. The consumers are primarily children in rural areas of developing countries; a group that needs and benefits greatly from the protein-rich food. The entrepreneurs are primarily women and youth in rural areas or small towns that create their own sustainable employment, and thereby improve the quality of life of their family and community. The community is a third beneficiary class: as the revenues and profits from the sale of the soy foods remains in the community, there is maximum indirect benefit to other vendors and service providers. Local farmers also benefit as there is increased demand for locally grown crops (in this case soybeans), for which they receive a higher income than for staple crops such as maize, rice or cassava.

Finally, the environment also benefits greatly from consumption of soyfoods rather than animal protein. The MM approach of direct human consumption of soyfoods, is far superior to the animal protein cycle from an environmental perspective, which requires 10 - 20 times as much land, energy and water to provide animal protein for human consumption.

CHILDREN:

Soyfoods are suitable for children 6 months and older. In a situation of moderate chronic malnutrition, the availability of additional protein and micro-nutrients in the diet can make a critical difference. Very often, children who are malnourished are primarily protein and micro-nutrient deficient (eg, Vitamin A, B12, C, iron, folic acid). There are often enough calories available for proper physical and neurological development (from low-cost staple foods), however, the missing protein and micro-nutrients disable certain metabolic functions and weaken the immune system, enabling opportunistic infections to weaken the body and interfere with development. The missing protein/micro-nutrients also impede proper neurological development, with a resulting future social and economic cost due to lower capability and productivity in adulthood. As the Copenhagen Consensus and now the SDGs have underlined, improved nutrition is the most cost-effective way to address many development issues, with a payback of $16 to every $1 invested. See this recent study which confirms that protein is the most critical element in addressing malnutrition and preventing stunting: http://www.npr.org/sections/goatsandsoda/2016/03/13/469943364/the-strange-and-surprising-debate-over-how-to-help-a-malnourished-kid?utm\_content=bufferc80ec&utm\_medium=social&utm\_source=linkedin.com&utm\_campaign=buffer

As most of the projects that MM has been involved with either are under-funded from an M&E point-of-view, or have a primary focus other than children's development, there are few documents that have properly measured the physical development impact of the soy food supplements. Metrics that have been used include height and weight of growing children, as well as incidence of disease. An excerpt of results from the Orissa school-feeding project is available: [ORISSA WORLD BANK CASE STUDIES](https://dl.dropboxusercontent.com/u/25210489/ORISSA%20SOYMILK%20WORLD%20BANK%20CASE%20STUDIES%2012-08.pdf) .

As the previous answer text has indicated, there are an estimated 130,000 daily beneficiaries of the soymilk being produced by the over 200 active VitaGoat and SoyCow systems. The largest single program is that in North Korea, led by First Steps Canada, which is providing a soymilk or tofu supplement to 100,000 children daily - see [FIRST STEPS SOYMILK PROGRAM](http://www.firststepscanada.org/programs) .

ENTREPRENEURS:

The organizations that operate the VitaGoat/SoyCow equipment are primarily women-led. As employment opportunities in rural areas are limited, a food-based micro-enterprise is valuable for local women and youth. A small-scale soymilk operation can provide about $5 of income per day for 2 to 4 women, depending on the volume of production. This can easily double a family income, so is a significant benefit to the women, their families and their communities.

Documentation of these opportunities and benefits is found below. Examples include MM's recent involvement in the USAID-funded Soybean Innovation Laboratory (SIL) projects in Ghana and Mozambique (2015). MM installed 5 SoyCow systems, 3 in Ghana and 2 in Mozambique. These 5 systems were provided to organizations who demonstrated a strong desire to operate the SoyCows as profitable micro-enterprises. This April 2015 Newsletter describes the installation and soymilk production in 3 centers:

<http://soybeaninnovationlab.illinois.edu/sites/soybeaninnovationlab.illinois.edu/files/Soybean%20Innovation%20Lab%20Newsletter%20-%20April%202015_0.pdf>

The second SIL Newsletter of Nov 2015 describes the operation of an MM-supplied SoyCow in Mocuba, Mozambique.

<http://soybeaninnovationlab.illinois.edu/sites/soybeaninnovationlab.illinois.edu/files/Soybean%20Innovation%20Lab%20Newsletter%20-%20November%202015.pdf>

A report from Gillian Perrera of the Mennonite Economic Development Association (MEDA), describes a SoyCow operation at Valley View University in Techiman, Ghana (from September 2013).

[“What if Soy Milk is just Regular Milk… introducing itself in Spanish?”](https://meda.org/stories-from-the-field-ghana/entry/what-if-soy-milk-is-just-regular-milk-introducing-itself-in-spanish) MEDA went on to sponsor two SoyCows that formed the basis of micro-enterprises.

Additional documents describe the quality-of-life impacts for women entrepreneurs in Liberia, involved in the USAID-funded HANDS program; OIC International (HQ in Washington DC) was the implementing agency. These VitaGoats were shared by between 3 and 12 women each, who produced soymilk to sell in the market. Income levels for dozens of women increased by over 100% and enabled substantial improvements in their families' quality of life.

Some of the installations and benefits to the local women entrepreneurs are described: [SUCCESS STORIES Liberia](https://dl.dropboxusercontent.com/u/25210489/success%20story%20-%20affordable%20nutrition%20in%20rural%20Liberia%2006-12.pdf)

Details of improvement in quality of life of women entrepreneurs, as part of a final report, is here: [Benefit to Women Entrepreneurs (Liberia)](https://dl.dropboxusercontent.com/u/25210489/HANDS%20Program%20Liberia%202010-2015.pdf) .

A less recent 2008 study by Africare documented the benefits of VitaGoat technology:

[WISHH 2008](http://www.wishh.org/soy-resources/soycows-vitagoats/)

[WISHH Bryson report 2008](https://www.google.ca/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&cad=rja&uact=8&ved=0ahUKEwiKv4DdgPrKAhUHW6YKHaR0AJUQFggmMAI&url=http%3A%2F%2Fwww.wishh.org%2Fwp-content%2Fuploads%2F2014%2F09%2F2008-Africare-VitaGoat.pdf&usg=AFQjCNFGjx_wWE1epQxpR2seHgg5NjM6WQ) powerpoint 'Case Study'

[WISHH full case study 2008](https://www.google.ca/url?sa=t&rct=j&q=&esrc=s&source=web&cd=9&cad=rja&uact=8&ved=0ahUKEwiKv4DdgPrKAhUHW6YKHaR0AJUQFghBMAg&url=https%3A%2F%2Fwww.africare.org%2Fwp-content%2Fuploads%2F2014%2F08%2FAFSR19.pdf&usg=AFQjCNEqCsiNvg33nwMkyXJlfgcNTCuphA&sig2=oy4Jhi)

FARMERS and COMMUNITIES:

As the profits from the sale of the soyfoods remain in the community, there is maximum indirect benefit to the surrounding community in general. There are no known empirical studies of the economic and nutritional benefits to the community.

Local farmers also benefit as there is increased demand for locally grown crops (in this case soybeans), for which they receive a higher income than for staple crops. No empirical studies regarding the economic benefit realized by farmers due to local soybean processing, are known. Metrics of labor expended and resultant income, vs staple crops, could be used to study this impact.

DAPP Malawi [project](http://www.uffnorge.org/files/231/Miljo_/295/Farmer_39_s_Club_Chikhwawa_2014.pdf) top of p 2 reference, p 10 picture.

And earlier information here [DAPP Malawi 2011](http://www.humana.org/522-farmers-clubs-are-making-a-difference-in-malawi)