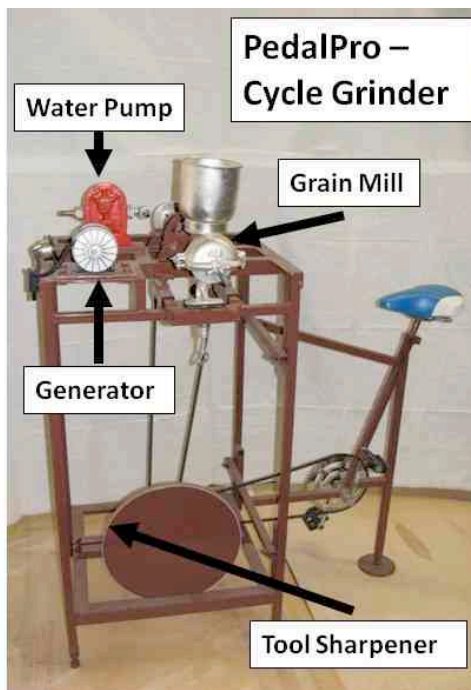
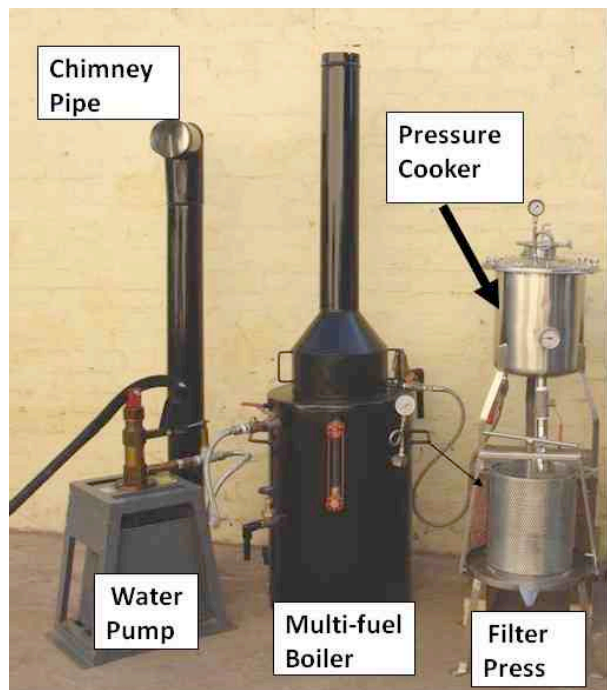


The **VitaGoat** and **SoyCow 'M'** are food processing systems which are optimized for soymilk and derivatives and can also be used to create value-added products from various cereals, grains, nuts, fruits and vegetables. This enables local groups to increase food security, improve health and create micro-businesses and employment. The main difference between the two systems: The **VitaGoat is fully non-electric** and uses the **PedalPro** for grinding, while the **SoyCow 'M'** uses an **electric grinder** which is optimized for soymilk and derivatives.



**VitaGoat System**

Foods	Production Capacity	Both Systems	PedalPro Only
<b>Soymilk</b> from soybeans and soymilk-derived foods such as soy <b>yogurt</b> & sour soymilk. The fibrous by-product " <b>okara</b> " also has many applications.	30-35 liters/hour (8-9 USG/hr)	✓	
<b>Tofu</b> - made by coagulating soymilk, draining the whey and pressing the curds. (Tofu box included)	7-8 kg / hr (15-18 lbs / hr)	✓	
<b>Fruit</b> or <b>vegetable</b> sauces, purees and juices	20-30 liters/hour (5-8 USG/hr)	✓	
<b>Flour</b> or <b>meal</b> from corn, sorghum, wheat, soy, rice, millet, etc	8 – 12 kg/hour (20-30 lbs/hr)		✓
<b>Peanut</b> or <b>other nut</b> butter or paste	8 – 12 kg/hour (20-30 lbs/hr)		✓
Ground roasted <b>coffee</b>	6 – 8 kg/hour (12-20 lbs/hr)		✓

## SoyCow “M” System



Primary foods can be processed into flours, pastes or wet slurries and used as they are or further cooked with steam, as for soymilk and its various derivatives. Cooked foods can also be preserved or pressed in a manual filter press to make juices and energy-dense beverages. Cooking is provided by an innovative and fuel-efficient “**multi-fuel**” **steam boiler**. This provides steam injection to a customized commercial pressure cooker and is the most energy-efficient cooking method.

### General Components

The VitaGoat has four main components although one of these, the PedalPro / cycle grinder, can be used on its own, in situations where only dry foods are processed without cooking. The SoyCow ‘M’ includes an electric grinder in place of the PedalPro but is otherwise the same as the VitaGoat.

**Multi-Fuel Steam Boiler:** Operating on either wood or other biomass such as coconut shells, coal or liquid gas, the boiler is about 10 times more fuel efficient than traditional open fire cooking or stove-top cooking. Water is heated in an inner stainless-steel chamber and the resulting steam is injected directly into the customized pressure cooker. The boiler is reliable, safe, and can be taken apart for cleaning. This latter feature is critical since most boilers accumulate scale on their inner shells and eventually fail if they cannot be cleaned.

*The boiler is shown with the hydraulic water pump and the chimney sections provided. Horses at rear are not included.*





**PedalPro (Cycle grinder+):** Included with VitaGoat or available separately. Energy is produced through a pedal-powered system that uses adjustable-speed pulleys, permitting fast and easy grinding of a variety of foods. An inexpensive modified hand mill using metal plates grinds foods 10-20 times faster than with traditional methods. **The PedalPro also provides for optional attachments such as a DC generator for charging batteries and a water pump. The flywheel can be adapted for tool and knife sharpening.** This allows a multi-function workstation which can operate independently of the VitaGoat as well as providing the food grinding capacity. Seating is adjustable depending on the operator's height and the pulleys can be matched to the individual's power.

*Working the PedalPro at Kwisero District, Kenya*



**Electric Grinder:** Supplied with SoyCow: This ½ HP "wet grinder" is optimized for soaked soybeans to produce a fine slurry suitable for soymilk processing. A pair of adjustable grinding stones (with spares included) provide an efficient output which is matched in capacity to the output of the SoyCow.

Water from the upper tank is passed through the grinder along with the soaked soybeans from the hopper. 12 liters of water processed along with 2 kg (dry weight) of soaked soybeans is the general ratio for soymilk. This will result in about 14-15 liters of protein-rich soymilk per batch in both the SoyCow and VitaGoat.



**Cooker:** Made from stainless steel, this vessel can cook up to 15 liters of food per batch, under pressure, thus greatly reducing cooking time and saving fuel. It is equipped with temperature and pressure gauges and a safety pressure relief valve. Product is fed through an easily-removable top opening and steam enters the vessel, from the boiler through a steam hose into the bottom of the vessel. Cooked product exits the cooker through a valve-controlled bottom outlet.

**Filter Press:** Also all stainless steel, pressing occurs by turning a threaded rod that pushes onto a disc, in turn squeezing out liquid from product held within a closed filter bag. The liquid simply pours out the bottom into a pail. The press is very simple to operate and clean.

*Soymilk production in Orissa, India, showing cooker (on table) and press below with boiler at rear.*



## Fabrication & Tech Support

Malnutrition Matters has completed technology transfers to India and Thailand. Training and support centers also exist in Zambia, Benin, Kenya and South Africa. The VitaGoat is available for approximately \$4,900 including spare parts and crating/fumigation, not including taxes, shipping and duties. Each system includes a set of spare parts such as gaskets, gauges, and valves. These are expected to be sufficient for more than one year of operation. Technical manuals are included and a training video is also available.

## VitaGoat Projects

Malnutrition Matters, as of June 2012, has installed over 200 VitaGoat and SoyCow systems in Africa, south and east Asia, and the Americas. The first pilot installations were done in partnership with Africare in 2004/5. Since then, scores of implementations have shown that with minimal training, these systems can be operated at the expected production capacity in typical field environments (no electricity or running water). The production of soymilk, fruit and vegetable purees, and ground nuts have proven very desirable from a consumer perspective and the VitaGoat or SoyCow can be viable as a business where it is used by a cooperative or as a micro-enterprise. In North Korea, in partnership with the NGO "First Steps", 79 VitaGoats and SoyCows have been installed in social feeding programs in schools, orphanages and collective farms benefitting over 80,000 children daily. Eight VitaGoats are operating in Orissa, India for a mid-day meal program operated by women's Self-Help Groups. Recent projects include HANDS, a USAID-funded project in SE Liberia where over 60 women have new jobs making and selling soymilk using 5 VitaGoat systems. We also have several recent successful installations in Myanmar, where soyfoods are more familiar than in most African countries.



*Women selling sour soymilk at the roadside, Grand Geddeh county, western Liberia*



*Children drinking fresh soymilk in Yangon, Myanmar*



*Making soymilk at DAPP Malawi project*

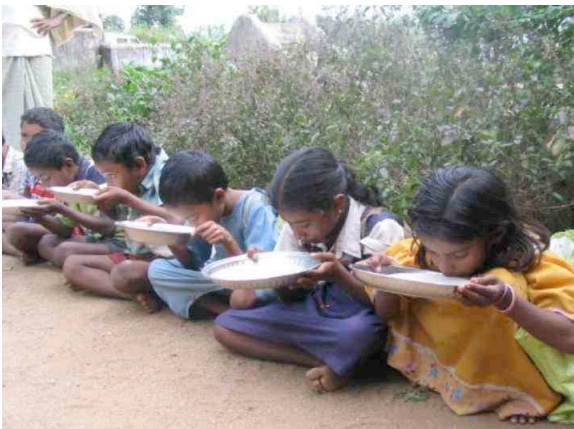


*Ladies with double system, and preparing bicycle delivery to orphanages, at First Steps center in Wonson N. Korea*

### **Economics**

The major investment cost of setting up a VitaGoat system is the cost of the equipment itself, along with a suitable production space. Cows in developing countries produce about 10 liters per day, so a VitaGoat can produce as much milk per day as 20 dairy cows. There are no costs associated with installing or consuming electricity or running water. The water source for the system can be as simple as a bucket. It has been shown that the investment can pay for itself within two years, assuming at least 4 hours of daily production are sold. The VitaGoat can be used in a number of settings, such as: direct feeding in humanitarian projects, social institutions (hospitals, schools, etc) and, perhaps most importantly, as the principal vehicle for a food production micro-enterprise which could employ 4 to 8 people. This could be like a “restaurant”, food processing “mini-plant”, retail outlet, or any combination of these.

### **Food Security**



*Kids drinking soymilk at BISWA in Orissa, India*

The VitaGoat can allow a group to help meet its nutritional needs and generate income at the same time. The foods can be processed much faster than with traditional methods, value-added foods can be prepared in greater volumes, freeing up time for women and girls for other activities, including education, care for others and income-generating activities. Also, much less energy is expended in preparing the foods, thus reducing the caloric needs of the women and freeing them from often exhausting work. The VitaGoat can also enable preserving of foods that are in seasonal over-supply by using the steam boiler for sterilization in an additional vessel.

### **Sponsors**

Malnutrition Matters would like to acknowledge the generous continuing support from its primary corporate sponsor Alpro N. V., the leading soy foods processor in Europe. MM would also like to thank its partners First Steps (North Korea projects), OICI International and Child Haven International, and the generous sponsorship from the Donner Canadian Foundation.