

Humanure Compost Toilet System

Condensed Instruction Manual

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WHAT IS "HUMANURE"?

Humanure (human manure) is human fecal material and urine recycled for agricultural purposes via thermophilic composting. Humanure contains valuable soil nutrients that enhance plant growth. For these reasons, humanure should be recycled whenever possible. Human excrement could be a major source of soil fertility if properly recycled. When discarded into the environment as a waste material ("human waste"), it creates pollution and threatens public health. When recycled by composting, the pollution and health threats can be eliminated.

HOW CAN HUMANURE BE RECYCLED?

Humanure can be recycled in two basic ways. First, it can be applied raw to agricultural land. In this case, humanure may be called "night soil." Unfortunately, raw applications of humanure to soil can create pollution and spread disease, so this method of recycling is strongly discouraged and is in fact illegal in the USA.

The second method of recycling humanure is through a process called "composting." This is the process used by the toilet system described in this manual.

WHAT IS COMPOSTING?

Composting is the managed, aerobic decomposition of organic material in such a manner that it develops internal biological heat. It is the feeding of humanure, food scraps and other organic materials to invisible organisms, including beneficial bacteria. Many compost organisms are too small to be seen, however, many of them can be seen. The larger ones include earthworms and many other tiny insects. Fungi also live in compost piles and they digest the tougher, woody plant materials.

WHAT ARE ORGANIC MATERIALS?

Organic materials are those materials that came from recently living things such as plants and animals. Common organic materials include human manure and other animal manures, sawdust, food scraps, weeds, leaves, grasses, wool, hay, straw, agricultural byproducts such as wheat chaff or residues from beer-making, vodka-making, cider presses, wine presses, distilleries and many other sources. A compostable organic material that is not from a recently living thing would be, for example, peat moss.

HOW DOES ONE FEED ORGANIC MATERIALS TO COMPOST ORGANISMS?

Organic materials are fed to compost organisms by creating a compost pile. A compost pile allows

us to combine various organic materials above ground, thereby providing oxygen to the aerobic microorganisms inside the pile. It also allows us to keep the organic materials quarantined inside an enclosed area away from people, dogs, goats, chickens and other creatures that should not be disturbing the compost.

Compost microorganisms will digest and convert humanure into a safe and pleasant soil-like material when the humanure is combined with carbon-rich organic materials such as grass, leaves, sawdust, hay, sugar cane bagasse, rice hulls, straw, and other animal manures. Aerobic compost organisms do not like raw humanure because it is too wet and too high in nitrogen. But when combined with drier materials that are higher in carbon, such as the materials listed above, the compost organisms love to consume and convert humanure back into soil.

HUMANURE TOILETS

A humanure toilet collects organic materials, primarily “toilet material,” which includes human excrements, fecal material, urine and toilet paper. It is not a waste disposal device used to dispose of “waste,” as is a flush toilet. The Loveable Loo may be the only type of toilet in the world that does not collect waste. The purpose of the toilet is to collect human fecal material and urine so that the collected toilet material can be recycled. When something is recycled, it is not wasted and should not be referred to as “waste” (which is why we call it “humanure” as opposed to “human waste”). Also collected in the toilet are toilet paper as well as paper tubes from the center of the toilet paper rolls. All urine is collected in the humanure toilet (no urine separation is required or recommended). Also collected in a humanure toilet are vomit (when sick), and baby diaper fecal material (scraped off the diaper into the humanure toilet).

Food scraps should be collected in a separate compost container and deposited directly into the same outdoor compost bin where the humanure is being recycled. It is important to understand that the humanure compost should not be segregated from your food compost. Everything should be composted in the same pile! The mix of materials enhances the health of the compost pile.

If you collect food scraps in the humanure toilet, you risk a fruit fly infestation. However, once the toilet receptacle has been removed from the toilet and set aside with a lid on it, you can put food scraps inside the toilet if you are going to empty it within a few days. There is still room for about 1 gallon of food scraps in a full humanure toilet receptacle. Keep in mind that a 5-gallon toilet receptacle filled to the brim with food scraps may be too heavy for many people to handle (weighing about 40 pounds or 18 kg).

The humanure toilet should be located in a private, comfortable setting, indoors year-round or outdoors in warmer climates, if desired. When properly used, the humanure toilet will create no unpleasant odors. Therefore many people choose to place their toilet indoors, in or near their bedrooms, offices, or in a basement, wherever it is most convenient, private and comfortable. Keep in mind that the toilets are best located where the receptacles can be easily removed to an outdoor compost bin.

HOW CAN A HUMANURE TOILET NOT CREATE BAD ODORS?

When any foul smelling material is deposited into a humanure toilet, it is covered with a clean carbon-based organic material to prevent odor, absorb moisture and prepare the material for composting. This is how humanure is mixed with the other organic materials — by covering. No manual mixing, stirring, chopping or digging of the humanure or the compost is required, only covering. Therefore, the materials used to cover the toilet contents are called “cover materials.” The cover materials used in the toilet should be somewhat moist (not wet or dry) and have a somewhat fine consistency. Sawdust from logs that are sawn into boards is ideal, but other materials can be used

depending on what is locally available. Some people utilize rice hulls, coco coir, sugar cane bagasse, peat moss, rotted leaves, even shredded junk mail. Proper cover materials are absolutely essential to the successful operation of a humanure toilet.

CAN WOOD ASHES BE USED AS A COVER MATERIAL?

No. Wood ashes or coal ashes should not be used as cover materials in humanure toilets, nor should they be used for making compost. Compost organisms do not thrive on such materials. Clean wood ashes (wood ashes without plastic or other garbage) are good for the soil. They should be applied directly to the soil or saved in an outdoor pile or in a fire-proof container for later garden use, but not added to a compost pile. Microorganisms don't eat ash. In fact ashes can raise the pH of the organic mass and thereby hinder the reproduction of the microorganisms. The object is to encourage microbial growth, not to discourage it.

HOW LONG DOES IT TAKE TO FILL A 5-GALLON (20 LITER) CONTAINER?

A 20 liter container will collect about one week's worth of human fecal material and urine, including cover material, produced by one average adult. The bigger you are and the more you eat, the faster the toilet receptacle will fill. If you're using an undesirable cover material in your toilet such as wood shavings, which are light and airy and will allow some odor to escape, your toilet will fill up faster because you have to use more cover material than is normally used. Human excrement is mostly liquid. The liquid will fill in the spaces between the cover material as the toilet container fills up. In fact, you can use the Loo as a urinal and only collect urine in it. When using a humanure toilet, a clean layer of cover material should be kept over the toilet contents at all times! The simple rule to follow is this: if the toilet contents have an odor, add more cover material until there is no odor.

HOW IS THE HUMANURE COMPOSTED?

The collected toilet material is taken to a compost bin and added to the bin's contents. If a single adult were using a humanure toilet with a proper cover material, he or she would have to empty approximately one 20-liter toilet receptacle once a week. For an average family of four, four toilet receptacles would have to be emptied per week, which can be done all at once and should take about 20 minutes. For every 20 liter container of toilet material taken to a compost pile, a roughly equal container of organic cover material will be necessary to bring back into the toilet room. The task of household humanure composting should be conducted by a willing and dedicated person who is experienced, reliable and responsible.

The rule is to add organic material INTO the compost pile, not ONTO the pile. You always pull the cover material layer aside from the top of your compost pile, open up the compost underneath (use a dedicated manure fork, shovel or similar tool), add the fresh organic material into the depression, pull the compost over the fresh material, pull the cover layer back over everything, then add more cover material as needed.

IS ONE TOILET RECEPTACLE ENOUGH?

No. For best results, a humanure toilet should be equipped with several receptacles, all of which have lids and all of which are exactly the same size and shape. When one receptacle is filled, it is removed from the toilet, covered with a lid, and set aside in a non-freezing location (it's impossible to empty frozen containers, plus they can split and leak if frozen). A clean, empty receptacle is then set

inside the toilet to replace the one that has been removed. Once the second receptacle is filled, it is also removed, covered and set aside, etc. You can do this with any number of receptacles. The full receptacles can be immediately taken to a compost area or just set aside somewhere for composting later. They do not take up much room. It is important that the toilet is ready and available for use at all times. You do not want all of your toilet receptacles to be full when someone has to use the toilet.

WON'T THE TOILET CONTAINERS SMELL BAD AFTER THEY ARE EMPTIED?

The toilet containers may smell bad. That is why they should be cleaned after emptying by using a long handled toilet brush, a little dish soap and water, or a hose or other form of water sprayer. It takes approximately 2 liters of water and a minute or two to clean one 20 liter toilet container. All water used to clean the compost receptacles should be deposited into the compost pile and never anywhere else. After emptying and cleaning toilet containers, the compost-maker should wash her or his hands.

Alternatively, you can put compostable plastic bag liners in your loo. When full, dump the liner and all into your compost pile. You do not have to break or puncture the bags. They will fall apart on their own when added to a pile. Bag liners are available at HumanureStore.com.

WHY PUT HUMANURE IN A COMPOST PILE?

Humanure can constitute a threat to public health because it can contain disease organisms. Therefore, it must be kept isolated until it completes the composting process. It is unsanitary and illegal in most places in the USA to defecate into holes in the ground. Same for applying human excrement raw to soil. There are three basic rules of human sanitation: 1) human excrement should not come into contact with drinking water or natural water sources; 2) human excrement should not come into contact with soil; and 3) you should always wash your hands after using a toilet or after adding toilet materials to a compost bin.

The purpose of the bin is to isolate and quarantine the humanure so that it does not come into contact with soil or water, nor can it be accessed by children or animals. Also, the bin elevates the humanure into an above-ground pile, which helps the compost organisms to have access to the oxygen they thrive on.

WHY WON'T THE HUMANURE CONTACT SOIL WHEN IN THE COMPOST BIN?

A humanure compost bin should be built on a soil base. This allows soil organisms to enter the compost from underneath. Such organisms can include earthworms and many other small creatures and insects, all of which are good for the compost pile. When building a new bin, shape the floor on the bottom of the bin like a shallow bowl. Dig dirt out of the center and throw it around the edges. Before a compost pile is started, the bottom of the bin is filled with organic material to create a thick layer between the humanure and the soil. This 18" (.5 meter) layer will absorb liquids draining from the initial humanure deposits. This is called a "biological sponge." It can be made of loose grass, leaves, weeds, hay, straw, animal manures, etc., or a blend of such ingredients. Once the humanure begins to compost (this is indicated by internal heating of the compost pile and may take a few hours, days or weeks, depending on a lot of variables), the compost pile will then begin to absorb moisture and may even require watering in dry climates. Graywater, and certainly urine, can be used to keep the compost pile damp. The compost should always have the moisture of a wrung-out sponge, and can even be wet, which is why all urine is added to a compost pile. If it is too dry, the microorganisms lack motility, cannot thrive, and the organic material will not compost.

If the compost seems too wet, work in more cover material when adding wet organic material to the pile. As long as the pile is above ground and not under water, you don't have to worry about whether there is oxygen in the pile. There will be. Theoretically, the motility of compost organisms require a liquid medium. You could say they swim rather than walk. Therefore, a damp pile is essential, as the microorganisms will proliferate in the "biofilms" that coat the organic materials.

WHY WOULD IT TAKE TIME BEFORE THE COMPOST BEGINS TO WORK?

The compost pile requires a certain amount of mass before it will start to compost and a certain amount of time for the compost organisms to multiply. That's why composting does not occur in the toilet receptacles, only in the compost bins. The amount of biological activity in the compost pile can be determined by monitoring the temperature of the compost using a compost thermometer. Some of the compost organisms generate heat during the composting process, especially in the initial stages. Some compost piles will be so hot you cannot put your hand inside the pile. The heat, however, is internal. Compost piles do not radiate heat and cannot effectively be used as a radiant heat source.

WILL THE COMPOST BIN SMELL BAD?

When any toilet material is deposited into a compost bin, it must be covered to prevent odor. The same rule for cover material usage at the toilet is used at the compost bin: if it smells bad, cover it until there is no odor. The cover materials can include weeds, leaves, grasses, hay, straw, even scrap woolen or cotton materials, but should never include tree branches or thick, woody materials, including wood chips (compost organisms are not termites). Keep a cushion of cover material around the insides of the bin to prevent toilet materials from leaking out. The organic materials should be deposited into the center of the bin in a depression in the compost, then covered over with the cover material. A tool such as a shovel, rake, or hay fork should be kept at the compost bin for making the compost and it should not be used for any other purpose anywhere else.

When adding material to a compost bin, first rake open the cover material. Pull it to the sides to expose the compost underneath. Then, dig a hole into the center of the exposed compost by pulling the existing compost in all directions toward the edges of the bin using a rake, fork, shovel or compost tool. Dump your new organic materials into the hole. Rake the existing compost back over the new material, then rake the cover material back over the compost. Add enough new cover material to keep a clean layer on top of the compost at all times. By following these directions, no food materials will be exposed to attract vermin such as dogs or racoons; nothing will smell; nothing will attract flies, and the humanure will be deposited directly into the active part of the pile where it belongs.

What about rain water? If humanure should not contact water, should we keep out the rain? Rain water is good for compost because it helps keep the compost moist. Once the compost starts working (heats up), it can absorb a lot of moisture. In areas where rain is excessive such as monsoon areas, it may be advisable to cover the compost during heavy rains. If the compost is subjected to excessive rain, it can leach liquids from the bottom of the pile. This is unlikely to occur under normal circumstances. However, in severe rain conditions a simple water-proof cover over the compost, such as a tarp, will prevent leaching. In dry climates the compost may need to be watered. Graywater can be used for this purpose. A heavy cover material layer (such as hay or straw) on top of the compost pile will absorb rain and prevent leaching. It will also prevent the compost from drying out in arid climates.

WHAT ABOUT FREEZING?

If the compost pile gets too cold, it can stop working and go dormant. In very cold climates, it may freeze solid. How hot a compost pile gets and how long it stays hot is often a matter of how big it is and how much cover material is being used. The bigger piles get hotter and stay hotter longer. More cover material provides more insulation. Backyard compost piles tend to be approximately one cubic meter in size. They can freeze at this size during very cold weather, especially when not covered adequately and/or not fed regularly with fresh organic material. When the compost pile is frozen, it can still be added to. The material added to a frozen pile should be spread out to keep the pile somewhat flat in order to prevent a frozen mountain from developing in the center of the pile. It is best to keep cover materials dry in the winter months so they don't freeze. A bale or two of straw or hay, per family of four, per month, should provide sufficient cover material for use on the compost pile during the winter. A frozen compost pile will revive after it thaws out. Freezing does not hurt the compost pile.

In addition, the cover materials used in the toilet itself should be kept from freezing. If sawdust is used as a cover material in the toilet, for example, a container of sawdust should be kept indoors and unfrozen at all times during the winter in cold climates. A "wheelie bin" plastic garbage can is perfect for storing sawdust inside during the winter months, so long as it is stored where it won't freeze. A family of four can expect to use two wheelie bins per winter in northwestern Pennsylvania where it snows from November until April.

WHAT ELSE SHOULD BE PUT INTO THE COMPOST PILE BESIDES TOILET MATERIAL?

All food scraps should also go into the compost bin. These can include meats, bones, fats, oils, vegetable peels, liquids such as spoiled milk or stale beer, tea bags, egg shells, hair, and anything else that is organic and produced by the household during food production and consumption. So can cotton sanitary napkins (although you will have to pick out pieces of plastic from the compost when it is finished). Small animal mortalities such as dead chickens, cats, racoons, possums, ducks or other creatures can be buried in a compost pile as well. Other animal manures, such as chicken manure, sheep manure, horse manure, goat manure, etc., can also be added to a compost pile. If you have large amounts of animal manures, such as from a herd of animals, much of the animal manure can be composted separately so your household humanure compost bin does not fill too quickly. It may be necessary to keep a wire cover on top of the compost pile to prevent dogs and other animals from climbing on top of the pile and disturbing the compost, although a thick cover material layer on top will deter most vermin.

WHEN SHOULD A COMPOST PILE BE STARTED?

The best time to start a compost pile is in the mid-summer when the days are the longest and there is ample vegetation for creating a biological sponge and for cover material. The compost will start working more quickly during this time of year. Compost likes fresh, green vegetable matter, so fresh leaves, weeds, grasses and sawdust are ideal for a compost pile. Later in the year, if the pile goes dormant and even freezes, there will be an adequate population of compost organisms already in the pile that will enable the pile to start working again in the spring. On the other hand, anytime a compost bin fills up and has no more capacity for additional organic material, a new bin can be started, even in the winter months.

HOW LONG DOES IT TAKE TO FILL A BIN?

A standard humanure compost bin used by a family of four is about a cubic meter up to 1.5 meters square by 1.5 meters high. A bin of this size can hold the entire amount of organic material collected by the family over a year, including humanure, cover materials, food scraps, garden and yard materials. The reason a small bin of this size can hold so much material is because the organic material shrinks while it is composting. The compost organisms are converting the organic materials into a dense humus — a process that involves constant shrinking of the organic materials that are added to the pile. When composting for larger groups, larger bins will be needed, or a number of bins may be used. In cold weather if the compost is dormant or frozen, it will undergo no shrinkage and will fill more quickly. However, once it starts working again in the spring, it will again shrink. One misconception that many people have is that the bin looks full and they think they need a new bin when they don't. If the pile is active, it will be shrinking between additions of organic material. So it may look full, but you can still add a lot to it because it keeps shrinking.

IS THIS TRUE THAT A COMPOST PILE SHOULD BE TURNED PERIODICALLY?

No, you do not need to disturb the compost pile other than to move the cover material from the top center of the pile and dig a small depression there when adding new material. Let the compost organisms do the rest of the work for you. Sufficient oxygen will be entrapped in the pile as you add compost materials. Digging, chopping and turning the pile is totally unnecessary and will disturb the compost organisms that have established their own layered populations. Just build the pile, patiently allow it to age, and then use the compost. It is a mistake to try to hurry the composting process. Composting requires patience. Composting is like an art. The practice of composting can be improved through experience and observation. There is much misinformation being circulated about backyard composting, often, ironically, by compost educators. To learn more about “compost myths,” read the Humanure Handbook.

The humanure composting methods outlined in this instruction manual involve “contained” composting. The compost is never left in an exposed pile. The compost is always collected only in bins and always covered. When someone piles organic material in an open pile, as was often done back when composting practices were first being developed (and is still done today in many places), the pile will stink, it will attract flies and it will need to be repeatedly stirred or turned. Open piles are usually not covered because the surface area is too large and it would take too much cover material. Also, open piles have large surface to volume ratios (there is too much surface relative to volume). This means the internal heat of the pile is unavailable to a large amount of the organic material on the outer surfaces. These piles must be repeatedly “turned” so that the outside is turned inward, allowing all parts of the pile to be subjected to the internal temperatures. Turning is a very labor intensive process and totally unnecessary when containing the organic material in a covered bin. The notion that compost piles must be turned refers only to open piles, which is not what we're doing or recommending.

WHEN IS THE COMPOST READY TO BE USED?

After the compost bin has been completely filled, it must be covered with a generous layer of clean cover material and left to rest, undisturbed, for approximately one year. This is the aging or curing stage of the compost and it is a very important stage. The amount of time the compost is allowed to age, undisturbed, is called the “retention time.” During this time, nothing whatsoever should be added to the compost bin. During the retention time, the final decomposition of the organic material is

taking place. This is often dominated by fungal organisms as well as larger organisms such as earthworms. The compost environment is an alien environment for human disease organisms and such “pathogens” are killed during the composting process. The retention time allows for an additional safety period. The compost will continue to shrink while curing.

Immature compost is “phytotoxic” or toxic to plants. It will kill plants. You do not want your compost to be immature. You may hear people saying how fast they can make compost — some say only a few weeks. Stay away from these people as they don’t know what they’re talking about. Let your compost fully mature. Allowing it to cure for approximately one year after the bin is filled is a good practice. Plants will start growing on your compost pile when it’s fully mature. You can pull a sample of your compost out, put it in a jar and sprout a seed in it to test the maturity. Pumpkin or cucumber seeds work well for this purpose. Otherwise, after a year or so of aging, the compost will be ready. In tropical climates, the curing or retention time may be reduced to nine months. Use your compost thermometer and make sure the compost temperature has dropped to ambient (outside) air temperature before using it for agricultural purposes.

HOW SHOULD THE FINISHED COMPOST BE USED?

The finished compost, after the retention time is complete, should look and smell like rich, dark, moist garden soil. It can be used to grow garden plants, trees, vines, shrubs and flowers. It can be used on top of the soil as a mulch, or dug into the soil for better root access for the plants. It can also be buried in holes where trees and shrubs are to be planted. Once the first batch of compost has been completed (which will require approximately a two year period — a year of collecting and a year of aging), a gardening household of four people can produce approximately one cubic meter of compost annually. In the interests of public health, all compost produced on a family plot should be used only on that plot. When compost is made and then transported off the property, or sold, the compost operation can be considered commercial, can be regulated, and can be subject to a host of statutory restrictions. This can be avoided by making and using your own compost.

HOW DO WE KNOW THE COMPOST IS SAFE TO USE?

Finished compost should never be “sterile,” but it should be sanitary. That means the compost should be teeming with beneficial microorganisms that do not pose a threat to human health. Any human disease organisms that may have been in the original organic material should have been eliminated, weakened, or greatly diminished by the time the compost has become mature. Finished compost can be tested for both the existence of pathogens as well as for agricultural quality (testing labs are listed in the Humanure Handbook). If a composter doubts the safety of the finished compost, the compost can be used for ornamental plants and flowers, for trees and bushes, or for food crops where the compost will not come into contact with the food and where the handling of the compost will be minimized.

An alternative is to simply allow an additional year of retention time for the compost. Allowing additional retention time requires no energy and only a small amount of space. The additional retention time may contribute to the safety of the finished compost when the compost quality is in question (such as when the humanure has been collected from a population that suffers from confirmed diseases). Therefore, if the compost does not seem “finished” after a year of collection and a year of retention, allow it to age another year.

On the other hand, rather than let the mature compost sit another year, shovel it into holes in the ground and plant something on it. Wear gloves and wash your hands afterward. A healthy household that composts its own humanure does not need to be overly concerned about the safety of the fin-

ished compost if the instructions in this manual are followed. On the contrary, by composting humanure rather than disposing of it into the environment, long-term public health and safety can be improved, the environment can be protected, and the finished compost can provide soil fertility.

ACQUIRING THE COVER MATERIALS

Without proper cover materials in adequate quantities, the humanure compost toilet will not work. An individual family can usually find cover materials by locating local sawmills or sawdust sources, purchasing peat moss in compressed bags, buying hay or straw from a farm or farm supply store, scavenging materials from the local environment such as leaves, grasses and weeds, or getting leaves from the local municipality after they've been raked up in the fall. Some municipalities sweep up leaves then dump them into piles where they're left to rot. Rotted leaves are ideal for humanure toilets. Contact your municipality to see if such a source of organic material is available to you. Avoid wood chips or wood shavings as the larger particles do not compost well.

Cover materials should not be wet. They should have a basic carbon content from stems and leaves and other plant cellulose byproducts. Again, the simple rule when using cover material is if the compost that is covered smells unpleasant, it needs more cover material. Cover until there is no bad odor.

HOW TO BUILD A COMPOST BIN

A simple compost bin is four pallets set on edge and tied together in a square. More permanent bins involve posts and boards. If the top of the compost is accessible to chickens, dogs, etc., it can be covered with wire mesh to prevent the compost from being disturbed. A square piece of loose wire fence works well and is easily removed when adding compost to the pile. The compost bin itself can be built from pallets, scrap wood, wire mesh, stacked bales of hay or straw, other recycled materials, or even masonry materials such as block, brick or stone. Do not use lumber that is treated with chemicals.

A humanure toilet system can be used in the same location for generations. The most serious composters will construct a permanent bin. A minimum three bin system is recommended. One bin is filled for a year and then left to age. Another bin is filled for the second year while the first bin ages. The first bin is gradually emptied as the second bin fills. By the time the second bin is full, the first bin is empty and the cycle starts again. The central bin is used to store cover material, which must be kept dry so it won't freeze in the winter. A roof over the third bin can be used for rain water collection, with the water being conveniently used for cleaning compost toilet receptacles. A water collection system must be drained during freezing weather.

COMPOST TOILET COLLECTION FOR CENTRALIZED COMPOSTING

An alternative to individual "backyard" humanure composting is centralized composting at a compost facility operated by a government agency, a private enterprise, an agricultural collective, a farm, or even by a friend or neighbor. In such a scenario, the humanure toilet receptacles, full and covered with snug lids, are collected from homes, toilet stalls and even apartments, perhaps daily or weekly, and are taken to a composting site.

Such systems have been employed throughout the USA at music festivals and other gatherings where humanure is collected on a daily basis and composted on-site along with food scraps and other organic materials. The toilet users are not the composters. The collection and composting is done by a trained crew. Video footage of such systems can be seen at HumanureHandbook.com.

COMPOST MONITORING BY GOVERNMENT AGENCIES

When humanure compost toilet systems are employed on a large scale in villages, it may be advisable for the local health department, the local agricultural department and even local universities to provide assistance. This can be done by monitoring the compost-making process to determine best practices (which cover materials work best, how much gray water is required to water the compost, if any, etc.), to analyze finished compost samples for the existence of pathogens, and to conduct analyses of the finished compost to determine its agricultural value.

COMPOST TOILET TRAINING PROGRAMS

When humanure toilet compost systems are being employed by individuals on a large scale in a village setting, it is important that the individuals undertake a training program prior to starting their composting systems. This training program should include being required to read and understand a manual such as this one, being required to watch an instructional video showing a successful existing humanure compost system in operation, and attending a toilet building workshop, a compost bin building workshop, or a compost usage workshop. These training programs could be conducted by local NGOs, local government agencies, or by local private enterprise.

OPPORTUNITY FOR COTTAGE INDUSTRIES

When valuable materials are discarded as waste, they create a drain on the revenues of society. When valuable materials are recycled, they allow us to reclaim wealth. The recycling of humanure on a large scale can create small businesses. These could include toilet making businesses, compost bin construction and erection businesses, and compost-making businesses. The finished compost can enhance local agricultural production. The finished compost can also be a valuable salable commodity. Therefore, humanure compost toilet systems can provide an opportunity for the creation of new businesses.

For more information: The Humanure Handbook, by Joseph Jenkins or humanurehandbook.com.

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**EXAMPLES
OF COMPOST
BINS**

EXAMPLES OF HUMANURE TOILETS

