VILLAGE CENTER

IN THE DEVELOPMENT OF ICT MODEL VILLAGES

X INFOPOVERTY WORLD CONFERENCE

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INTRODUCTION

Through the last ten years, the Infopoverty World Conference has explored the issues of poverty in the world. Following the "quantitative benchmarks" established as the Millennium Development Goals (MDGs) and the Millennium Declaration to "halve extreme poverty" by 2015, The Observatory for Cultural and Audiovisual Communication in the Mediterranean and the World (OCCAM) has set the priority for the development of ICT Model Villages in impoverished and disadvantaged communities. The current ICT Village model provides for satellite connectivity and e-services to be made available to remote communities.

INTRODUCTION

ICT Village Model

Sustainable development in the ICT Village Model is the next key element to the creation of long-standing sustainable solutions for these disadvantaged communities. This includes issues such as basic community infrastructure, including access to safe water, basic sanitation, and solutions for renewable energy. The ICT for Sustainable Development workshops in Washington D.C. and Bangalore also developed thematic topics for ICT and sustainable development, including infrastructure development (water, energy, transportation), basic human needs and development (food, healthcare, drinking water, primary education), economic growth and poverty reduction, and alienation, empowerment and governance.

Following is an excerpt from the foreword of the United Nations Development Programme book, "The Sustainable Difference – Energy and Environment to Achieve the MDG's"

'Today, the scientific community increasingly recognizes that environmental degradation is having a significant impact on human development. Notably, it is the poor who are disproportionately affected by the degradation of their land, air, water and biological resources, with many lacking access to clean and affordable water and energy services. Ensuring environmental sustainability and access to energy services is key to achieving all of the Millennium Development Goals (MDGs) – the eight goals that represent a global commitment to make rapid progress on key development issues.'

The following goal is the focus of this analysis of sustainable development principles related to the ICT Village model. All of the MDGs will fully benefit from the implementation of sustainable development strategies with the ICT Village model.

Goal 7: Ensure Environmental Sustainability - This MDG goal sets a number of environmental targets, including reducing by half "the proportion of people without sustainable access to safe drinking water and basic sanitation."

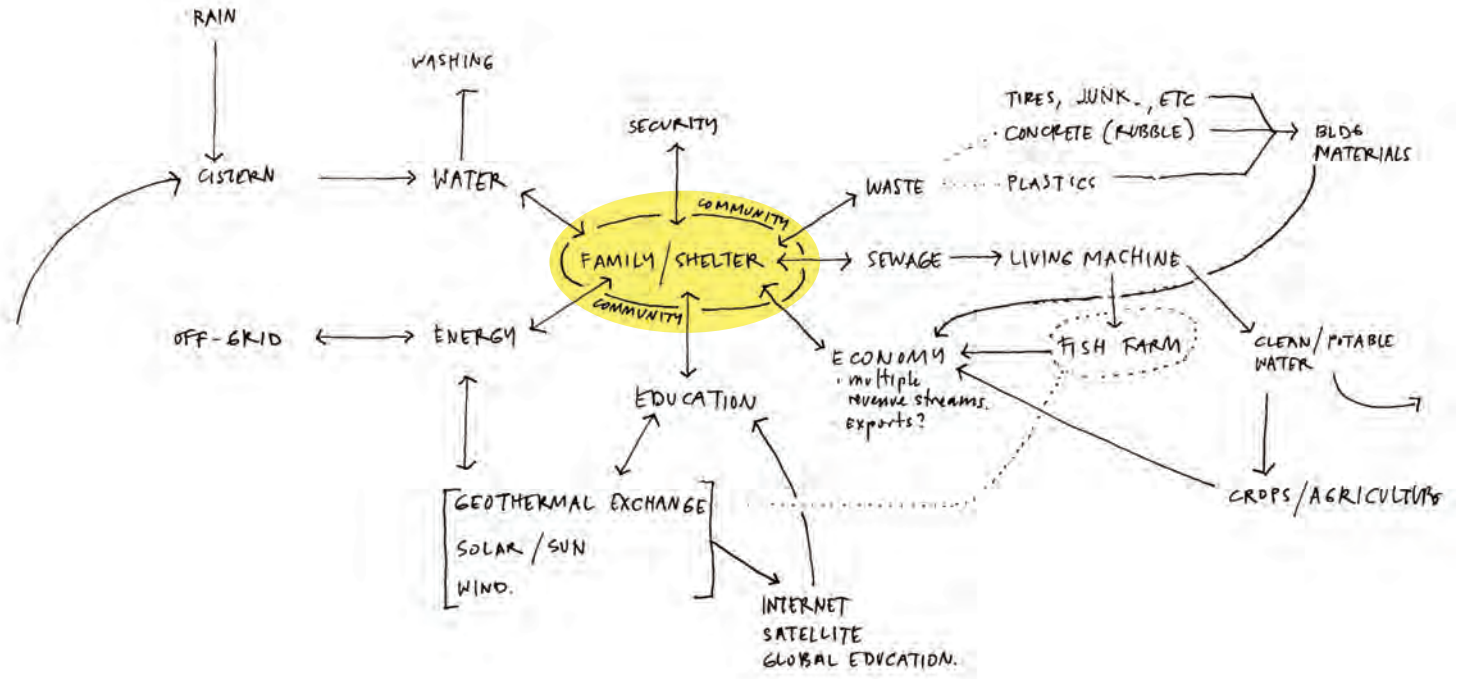
The ICT Village Center concept is a straight-forward approach to realizing a significant social impact in disadvantaged communities while maintaining the cultural identity of the community.

Sustainable housing solutions will easily follow the creation of a site-specific ICT Village Center. It is a driving principle that the correct sustainable housing solutions should be developed with the collaboration of local inhabitants, with the use of local building materials and an understanding of the local climate. The primary purpose of the ICT Village Center concept is to provide the best resources available to empower the local inhabitants to serve the community and to secure their own future.

The following concept considers the integration of the ICT Village model with ideal sustainable development practices in the creation of a self-contained ICT Village Center.

CONCEPT

ICT Village Center



This concept is for the fabrication of self-contained community centers that can be shipped to disadvantaged communities. ICT Village models have been developed in Honduras, and others are planned in India, Zimbabwe, and recently promoted as disaster relief for the refugees in Haiti. In an existing community, especially in a community destroyed by natural disasters, it is often a significant challenge to locate appropriate structures or confirm physical locations for setting up ICT technologies. A shipping container that is adapted and then delivered to these communities can reduce or even eliminate many of these challenges.

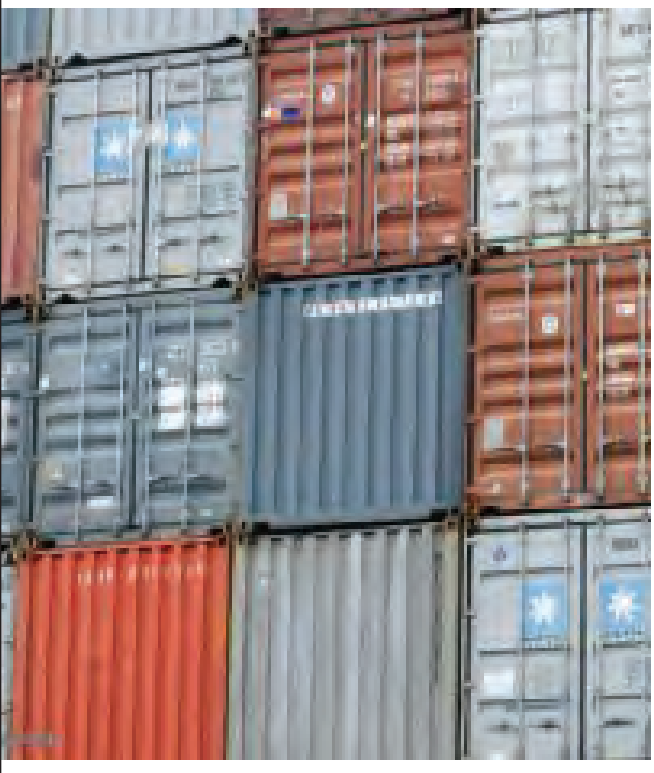
Steel shipping containers provide an abundant resource available to be converted into this self-contained unit. Many countries import more containers than they export, which leads to the surplus of containers in those nations. Steel shipping containers outlive their usefulness as cargo carriers within 5 years, and they sit abandoned in shipyards long after. This availability makes steel shipping containers an affordable resource and a great option for this concept.

Because of the shipping container's "unibody" construction, it is also appropriate as a structure/shelter in high seismic zones. Although many global communities do not have building code restrictions, the shipping container will exceed all structural code requirements that may be required in any country in the world. These units can also provide shelter from other weather-related events, such as protection for communities in hurricane-prone corridors. The typical steel shipping container is 8 feet (2.44 meters) x 8 feet (2.44 meters) x 20 feet (6.10 meters). Containers are also available in 40 feet (12.19 meters) lengths.

The use of a shipping container for emergency housing is not a new concept. In response to the disaster in Haiti, Clemson University researchers are designing ways to convert shipping containers into emergency housing in the hurricane-prone Caribbean. Sealaska Constructors, LLC/TransAmerican Solutions is currently developing concepts for a pre-fabricated building core with emergency fold-out tents for rapid deployment in disaster relief areas, including Haiti.

Pre-fabricated cores collapse to fit into shipping containers along with medical supplies and equipment. Each core contains a rainwater collection system, septic system, kitchen, bathroom, solar ovens, tools, survival necessities, hammocks, solar power with LED lighting, and more. The ICT Village Center concept will supplement emergency housing ideas and opportunities similar to the examples shown.

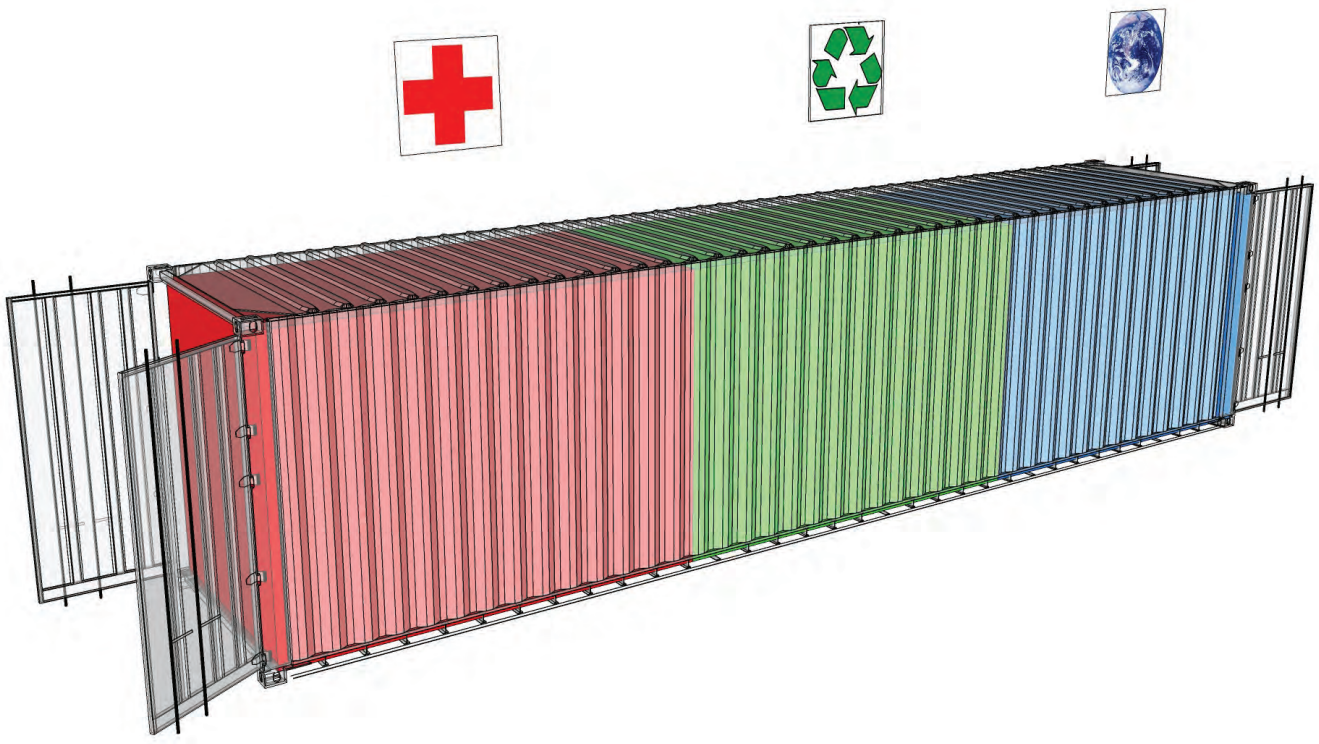
The ICT Village Center unit could be placed in the center of an existing community or even as a start-up container for the development of a new community or a community rebuilding following a natural disaster. A standard steel shipping container can be retrofitted to house all of the available resources for the community to address the most basic of human needs for energy, water, sanitation, and education. All of these resources would be integrated within the steel container. Additional modifications to the steel container shell can also be explored to expand the size of the container through fold-out elements or pop-out sections.

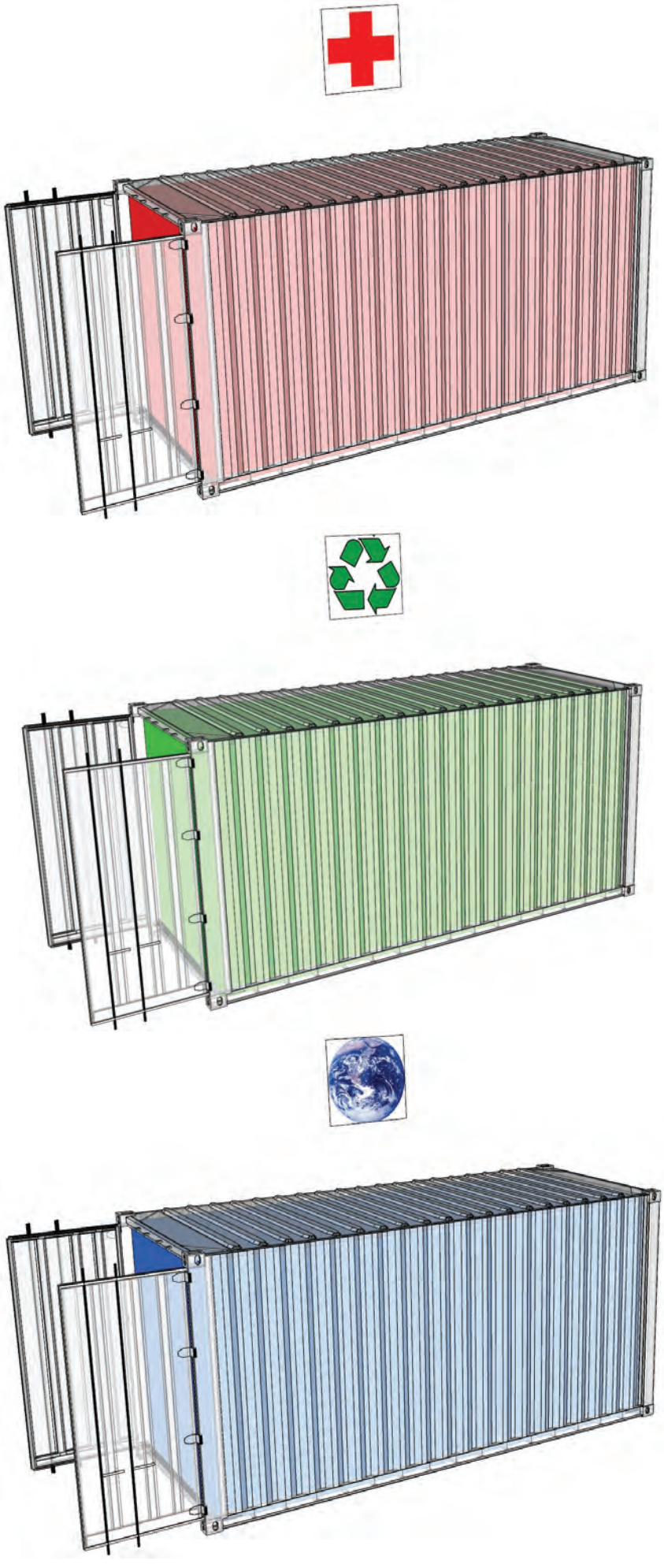


CONCEPT

ICT Village Center

A single modified shipping container could be compartmentalized into primary spaces to meet the functional requirements of the village center. The ICT Village Center concept proposes a single container unit with up to three separate primary functional areas. A second option would be to create separate container units for each function. There could be an individual container dedicated to medical needs for the community; a health clinic with medical equipment, a second container dedicated to education needs for the community; a kiosk with broadband satellite connectivity required for e-learning, and a third container dedicated to sustainable development needs for the community; operating renewable energy systems and equipment. Depending on the needs within the community the number of containers and types of functional areas may be different. The following describes these three primary functional areas in greater detail.

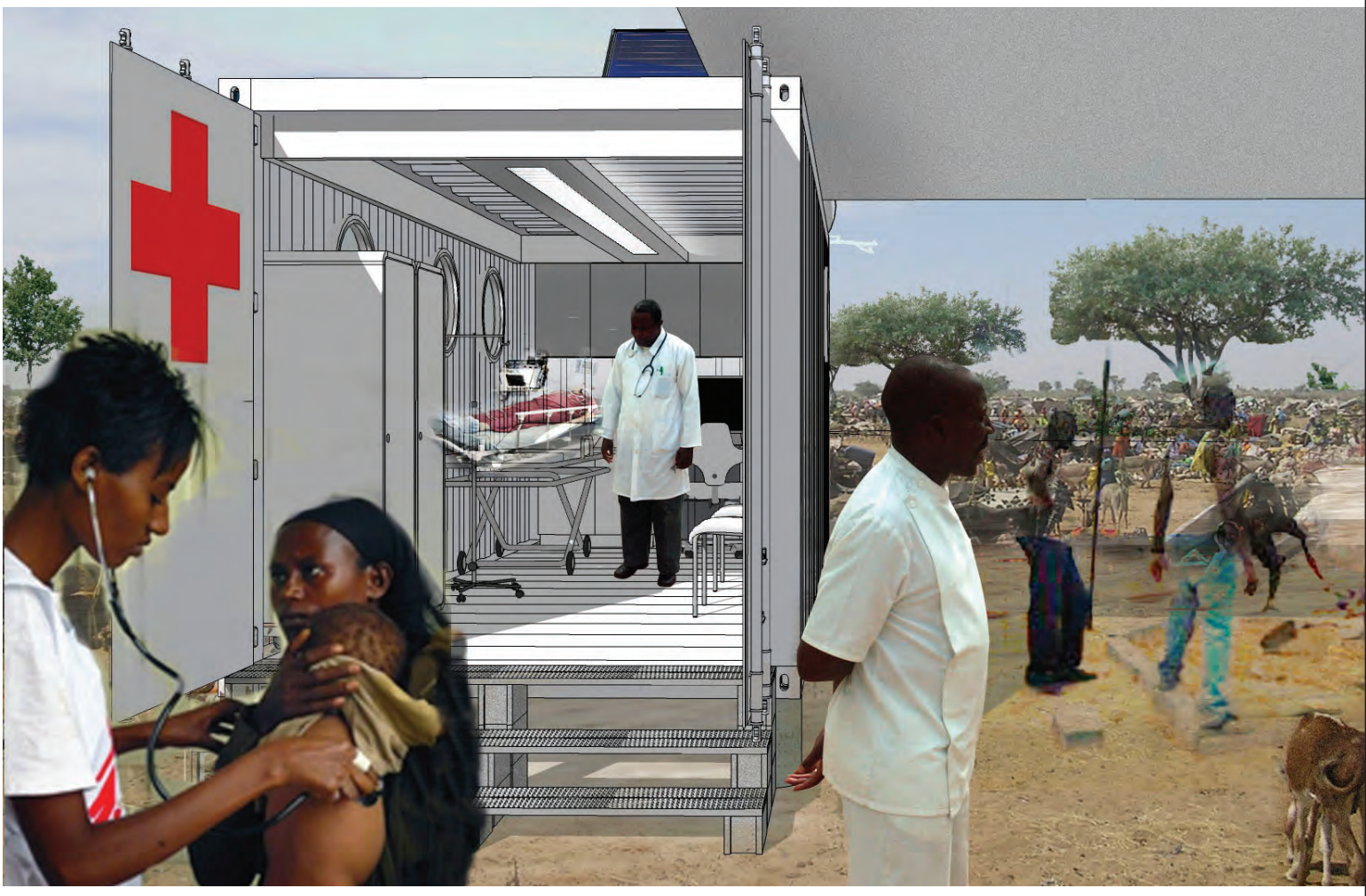




DESIGN

Medical Unit

Medical Unit: Reducing infant mortality, improving maternal care, and combating HIV/AIDS, malaria and other diseases are major priorities established in the MDGs. The creation of a health unit within the ICT Village Center would provide much-needed medical supplies and equipment available to serve the community. There are a number of groups that are currently developing concepts and constructing prototypes for the transformation of shipping containers into medical units. These organizations may be potential partners in the implementation of a Village Center concept. Containers To Clinics is one organization that is currently constructing shipping container units that are to be fully fitted with medical equipment for shipping to communities in need. The planning for the health unit would need to be unique to the community it will serve, and the final retrofit would depend on the actual community and specific human needs. The medical area should be developed in full collaboration with other expert groups, including doctors and nurses serving in these disadvantaged communities.



Educational Unit

Educational Unit: Primary education is a major priority established in the MDGs. “Continuous training and support aimed at the empowerment of the members of the community and the full exploitation of the natural and human potentials” is a stated aim of OCCAM. The education kiosk will be equipped with broadband satellite connectivity and offer e-services to promote sustainable development in the community, as certified by the UN Commission on Science and Technology for Development and including e-learning such as e-phytopathology, e-parasitology, e-veterinary, digital land tenure, telemedicine, and e-governance. The creation of an educational kiosk within the ICT Village Center would provide primary education to the inhabitants of the community and, through education, equip them to become more self-sustaining.

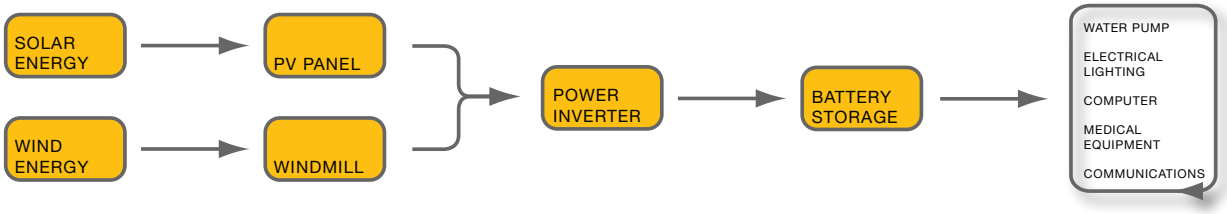
A component of the educational area would be additional outdoor space surrounding the ICT Village Center that could be used for classrooms and training sessions. These spaces can become a hub of activity and generate excitement in the community.

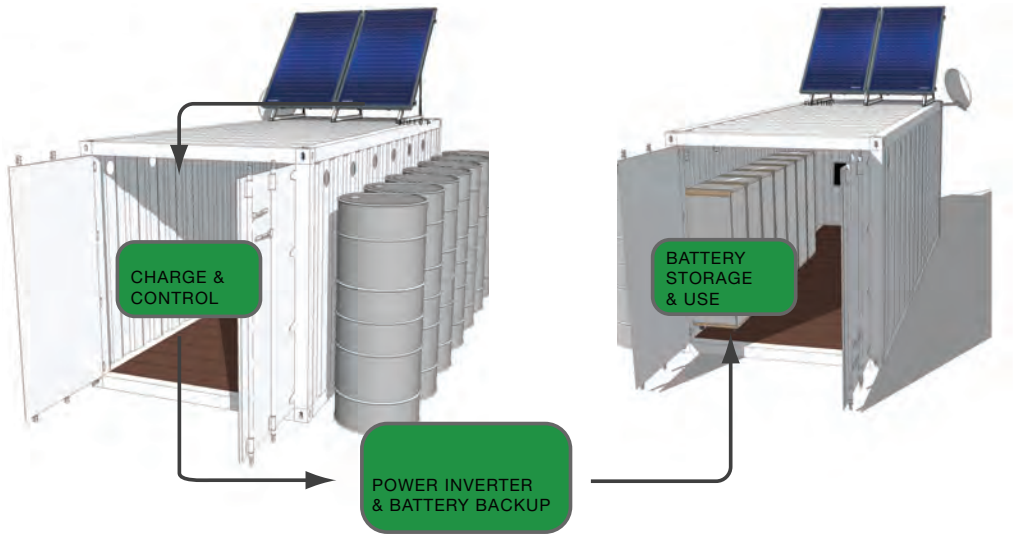
DESIGN

Sustainability Unit

Sustainable Development Unit: Ensuring sustainable development is a major priority established in the MDGs. The following diagrams define the basic principles for water conservation, basic sanitation, and renewable energy.

The ICT Village Center would be equipped with various renewable energy technologies. These technologies include solar and wind collectors for producing power generation for the self-contained unit and support of the medical equipment and educational kiosk. The turbines and solar panels would be fold-out components, stored in the confines of the container for shipping, then unfolded and arrayed for optimum performance at the initial set-up of the ICT Village Center. Additional energy generation may be provided to the community



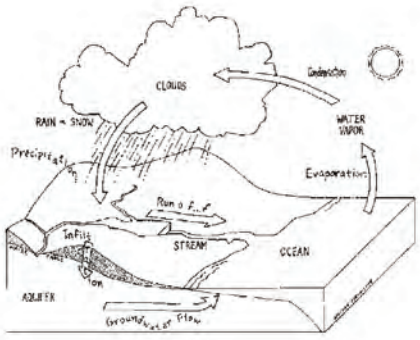


Water Conservation

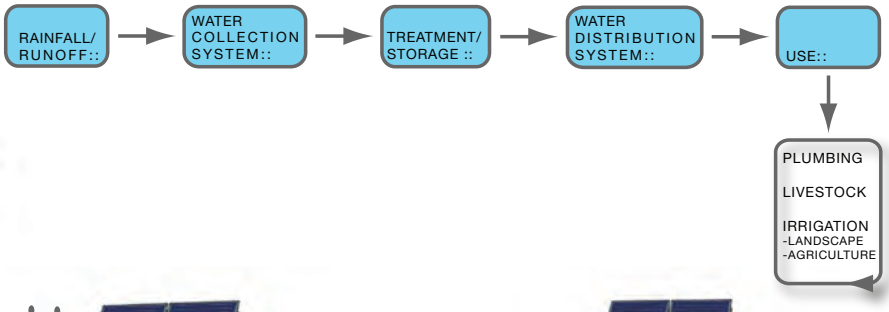
As defined in the Millennium Development Goals Report for 2009, about 70% of the water withdrawn worldwide is for agriculture and irrigation. This withdrawal is greater in arid and semi-arid countries and less in tropical countries. The potential for collection of rainwater will be unique to the community it will serve, and the final retrofit will depend on the actual community and specific human needs. Rural communities have less access to improved drinking water sources (piped water), and approximately 24% of rural populations rely on surface water for drinking, including lakes, rivers, unprotected dug wells or springs (only a small portion rely on rainwater). Rain water collection could be a valuable sustainable development component in countries like India and in Haiti or other tropical environments. Education for efficient water use is critical. In response to depleted water resources and a pending water crisis, the Millennium Development Goals Report for 2009 states the following:

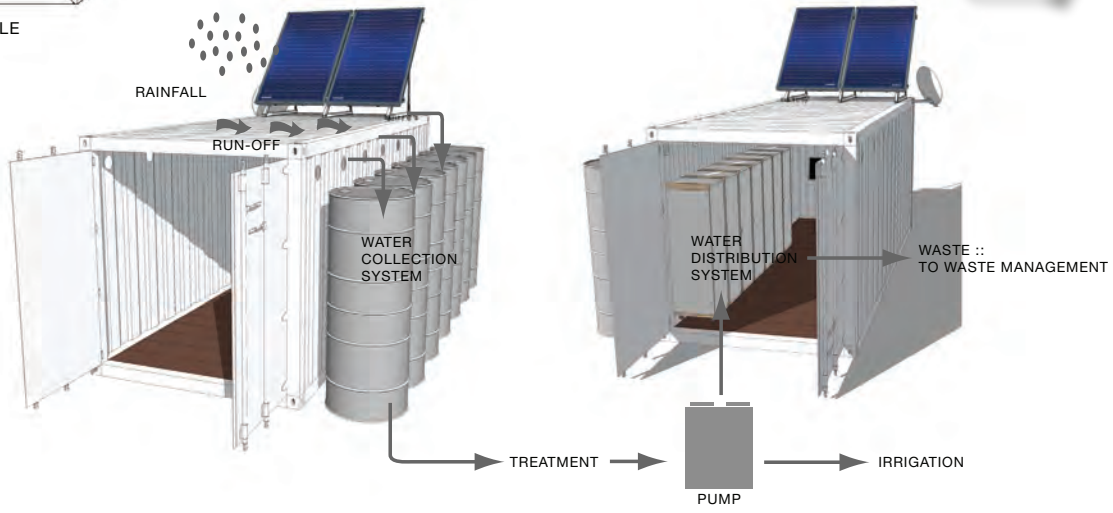
'Reversing this trend (increases in water withdrawal) will require more efficient water use, primarily through improved crop varieties and better agronomic practices that lead to higher economic returns and yield more crops with the same volume of water.'

Rainfall may be collected by a gravity catchment system from either the roof surface of the shipping container or a constructed shading canopy between container units. The water can be easily directed to a roof wash with a screen to filter any large debris or insects. The water would flow through conduits (pipe) into storage containers which previously held components packed/ shipped within the container. Here, the water is not exposed to light. The water will not become stagnant over time because bacteria cannot grow and expand without light. The storage containers would be coated with a UV inhibitor to assist in this filtration. These storage tank collection systems also keep the water from coming in contact with the ground, therefore no contact with pollution, pesticides, or heavy metal substances. The water passes from the storage tanks through filters and is either directed to be used for household water needs like plumbing, laundry, cleaning, or it is directed to be used for irrigation or livestock needs.



WATER LIFE CYCLE





DESIGN

Waste Management

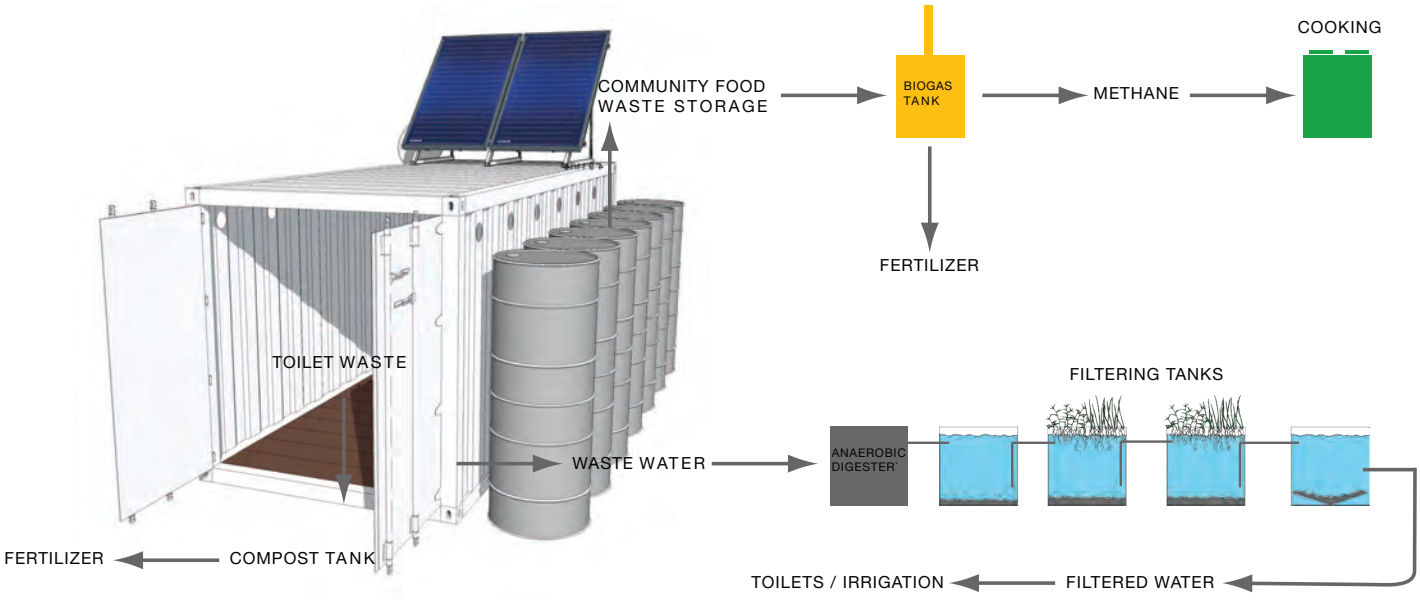
Sanitation is a significant concern in global communities. The Village Center unit would contain an improved sanitation facility for use by the community. This type of sanitation facility would be designed specifically for the community that it serves. Rural communities are highly susceptible to health issues related to open defecation and poor sanitary conditions. According to the Millennium Development Goals Report for 2009, approximately 1.4 billion people will need to gain access to improved sanitation facilities to meet the 2015 target. Septage waste from the sanitation facility would be directed to a "living machine," or could be used in other waste management systems, such as a compact digester for producing biogas from food waste. Small, compact biogas plants, developed by ARTI, are currently in use by a large number of urban and rural households in Maharashtra, India.

As defined by John and Nancy Jack Todd, United Nations University, a living machine is the following:

'A living machine is a contained ecosystem made up of thousands of species of selected living organisms. Such an ecosystem is usually housed in a casing or structure, frequently a series of cylinders, made up of light-weight and sometimes light-transmitting materials. It is similar to a conventional machine in that it is comprised of a number of interrelated parts that function together to perform an assigned task. The design is based on principles evolved over millennia by the natural world in regulating the great ecologies of forests, lakes, prairies, and estuaries, and the ecosystems within ecosystems that are their component parts. Their primary energy source is sunlight. Mirroring the metabolism of the planet, living machines are driven by hydrological, mineral, and climate cycles.

Living machines, by adopting and mimicking the strategies of natural systems, have proved extraordinarily effective in detoxifying and restoring the most severely contaminated waters. Based on the premise that waste is a resource out of place and that nature handles every form of waste by turning it into a resource, living machines imitate the purifying and recycling abilities of natural aquatic ecosystems. Powered by sunlight, they contain populations of bacteria, algae, microscopic animals, snails, fish, flowers, higher plants, and trees.

Living machines are capable of reintegrating wastes into larger systems and of breaking down toxic materials or, in the case of metals, recycling them or locking them up in centuries-long cycles. Living machines make it possible to produce large amounts of food in urban or remote areas and, as a result, could be part of a strategy for addressing issues of inequity between peoples and regions. Some less fertile parts of the world, like the semi-arid subtropics, would benefit enormously as the tropics are the greatest reservoirs for the necessary spare parts. By miniaturizing the production of essential human services living technologies have the further potential of releasing natural systems from human abuse. This would free nature to continue to evolve in a wild state, free from excessive human interference, greatly reducing the human footprint on the ecology of the planet.'



The ICT Village Center concept would include the development of this concept of a natural ecosystem. Materials to construct the components of the ecosystem would be shipped within the container and put in place with the initial set-up. The set-up for the ICT Village Center may include the creation of a fish farm (depending on the community it will serve) that would be a vital component of the natural ecosystem.

Clean, potable water produced from the natural ecosystem could be used for agriculture and provide supplemental water for the rainwater collection system. Pumps and equipment would be powered by the renewable energy generated at the community center. The education kiosk would provide training for local inhabitants about the proper maintenance and management of the systems.

The collection and reuse of physical waste materials (trash) is also a consideration with the ICT Village Center concept. Specifically in communities that are recovering from a natural disaster, like Haiti, there is a significant amount of building rubble and debris that may be recycled to become new building materials or soil amendments. Concrete may be crushed for sub-base below roadways, drainage fill, or aggregate for new building materials. Other waste products, such as rubber tires or plastics can be ground or shredded and recycled or repurposed for new uses. The educational kiosk would provide training for local inhabitants in the handling, recycling, and disposal of their waste products.

Phillip Bogdonoff describes a living machine as follows:

'A Living Machine is a miniature ecosystem. A number of aquatic tanks provide habitats for many species of organisms, including bacteria, algae, plants, and fish. Through a series of steps, septage introduced at one end of the system is gradually broken down, beginning with anaerobic and aerobic bacteria, into simpler chemical elements that become nutrients and food for higher life forms such as algae, snails, and aquatic plants and invertebrates (snails and bugs). Eventually the water becomes clean enough that fish can live and reproduce. The basic idea is that Nature knows how to take waste and turn it into food.'

CONCLUSION

Knowledge

The ICT Village Center is a simple concept that will help to integrate sustainable development practices into impoverished communities. The use of readily available shipping containers to fully contain and deliver valuable resources to urban or remote villages is a proven concept. The ICT Village Center concept offers an economical way for others to assist a community to meet the most basic of human needs, including energy, water, sanitation, and education.

First and foremost the specific needs of the community must be determined. This can only be done through interaction with the local inhabitants in the community. A number of existing initiatives are already in place to offer methods, or "toolkits" to assist NGO's and volunteer groups to better understand their community needs and execute appropriate sustainability solutions to meet the MDGs. These ideas include the Human-Centered Design Toolkit by IDEO, and similar methodologies by other groups. The development of the ICT Village Center would follow these existing initiatives and work in partnership with these ideas. The ICT Village Center concept will be most effective as partnerships are nurtured and resources are shared by all.

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